Addendum No. 1
to the Bidding Documents

WPCF Upgrade – IFAS Treatment System Equipment Pre-Selection
Town of Vernon, Connecticut
Vernon Water Pollution Control Facility

Issued January 4, 2018

Under the provisions of Article 7 of Section 00200, Instructions to Bidders, Bidders are informed that the Bidding Documents for the above mentioned Project are modified, corrected, and/or supplemented as follows. Addendum No. 1 becomes part of the Bidding Documents and Contract Documents.

Acknowledge receipt of this addendum by inserting its number on Page 00410-3, Article 5.2 of the Bid form. Failure to acknowledge receipt of the Addendum may subject the Bidder to disqualification.

Project Manual Changes

Item 1-1 Section 00100 – Advertisement For Bids

Change the bid opening date and time to **January 16, 2018 at 2:00 p.m.**

Item 1-2 Section 00200 – Instruction to Bidders

Add the following paragraph directly following Paragraph 14.2 of Section 00200:

14.3 A submitted Bid shall include two (2) hard copies of the entire Bid package, with one copy labeled as "Original", as well as one copy of the entire Bid package in electronic form provided on a data CD.

Item 1-3 Section 00200 – Instruction to Bidders

Delete Paragraph 18.1 in its entirety and **replace** it with the following:

18.1 Owner reserves the right to reject or accept any and all Bids, to waive or accept any and all informalities, and the right to disregard or accept any nonconforming, nonresponsive or conditional Bids if it deems it to be in its best interest to do so.

Item 1-4 Section 00410 – Bid Form

Delete Section 00410 in its entirety and **replace** it with the attached Section 00410.

Clarification: *Modifications to the bid form include clarifying the conditions for the Design MLSS Concentration in Paragraph 5.4.C, Items 2 and 3, specifying the units for headloss in Paragraph 5.4.C, Item 11 and 12 addition of media surface area design criteria in Paragraph 5.4.A, and Items 8 and 9, clarifying the terminology of Paragraph 5.4.A, Item 10.*

Item 1-5 Section 00410 – Bid Form Schedules

Delete Schedule 11391B-1 – Blower System Schedule in its entirety and **replace** it with the attached Schedule 11391B-1.

Clarification: *Modifications to the bid form schedule include clarifying references to the footnotes within the current and future percentile air flow rows. See Question 4 below for further details. It also includes modifications to the Schedule 11391A-2 "IFAS Treatment System Aeration System General Design Conditions Schedule" to be consistent with modifications in Item 1-24 below.*

Item 1-6 Section 11391 – IFAS Treatment System

Delete Paragraph 1.1.A.7 in its entirety and **replace** it with the following:

7. The Aeration system controls shall include air flow control valves, air flow meters, dissolved oxygen (DO) sensors for each Aeration Zone. The aeration system controls may also include an optional ammonia based DO setpoint controller and ammonia sensors that uses an advanced process controller to determine optimal DO setpoints to be used by the ITSMCP in its control algorithms. Providing the specified instrumentation is required and not optional.

Item 1-7 Section 11391 – IFAS Treatment System

Delete Paragraph 1.3.C in its entirety and **replace** it with the following:

C. Design the IFAS Treatment System to allow for maintenance of plant operations during construction and performance testing after the operation of the Zimpro PACT-WAR system is phased out and before the IFAS Media is installed and completely acclimated. This means that during construction, the Seller is responsible for demonstrating with design calculations that the tanks online can achieve BOD removal and seasonal nitrification for ammonia removal in accordance with the WPCF's following effluent quality (effluent BOD <15 mg/L and effluent ammonia <1.7 mg/L as N from April 1st through October 31st), at the current maximum month design flows and loads (specified below), when the existing aeration tanks are taken out of service one at a time, when the aeration blowers are replaced one at a time, and when either aeration tank #5 or #6 is taken out of service to install IFAS Media Retention Screens and IFAS Media in the Tanks. The design shall be robust enough and the sequencing and scheduling of equipment deliveries shall accommodate the following requirements and limitations necessary to maintain plant operations during construction and performance testing.

Item 1-8 Section 11391 – IFAS Treatment System

Delete Paragraph 1.3.D.2 in its entirety and **replace** it with the following:

2. Primary Effluent Loads:

Parameter	**Design Current (2020)**	**Design Future (2040)**
BOD (lb/d):		
Average Annual	5,600	8,880

Parameter	Design Current (2020)	Design Future (2040)
Maximum Month	7,730	12,290
Minimum Month [4]	4,430	7,030
Maximum Day	9,060	14,370
Minimum Day	3,420	5,420
Max Day Diurnal Peak	N/A	21,550
Min Day Diurnal Min	1,710	N/A
TSS (lb/d):		
Average Annual	3,950	6,140
Maximum Month	5,530	8,620
Maximum Day	7,070	11,000
TKN (lb/d):		
Average Annual	870	1,500
Maximum Month	1,100	1,880
Minimum Month [4]	720	1,230
Maximum Day	1,230	2,110
Minimum Day	630	1,090
Max Day Diurnal Peak	N/A	3,170
Min Day Diurnal Min	320	N/A
TP (lb/d) [1]:		
Average Annual	180	320
Maximum Month	270	450
Maximum Day	290	500
Other Average Annual:		
Alkalinity	165 mg/L as $CaCO_3$	See Notes 2 & 3
pH	7.2 SU	See Notes 2 & 3

Notes:

1- Total Phosphorus loads and alkalinity levels shown assume that no multipoint chemical addition for phosphorus removal will be provided upstream of the IFAS Treatment System. Actual loads and alkalinity levels will be less if multipoint chemical addition is implemented. Alkalinity addition will be provided prior to the IFAS Treatment System using magnesium hydroxide to maintain minimum alkalinity

Parameter	Design Current (2020)	Design Future (2040)
levels leaving the IFAS treatment system at greater than 50 mg/L as $CaCO_3$ and a minimum effluent pH of 6.5 s.u. 2- Alkalinity and pH data are based on existing WPCF operating data collected from 2013-2016 at the influent to the secondary process. 3. Flow & Loads during Performance Testing – During performance testing it is anticipated that the WPCF will be operated with only one train on-line, consisting of only one oxic zone containing IFAS Media operating at current flows and loads so that the equivalent influent loading of the IFAS Treatment System is as close to as possible the design future maximum month flows and loads. See Paragraph 3.6 for details of the process performance testing protocol. 4. For the purposes of estimating power consumption of the Blower System, as required on the Bid Form, Section 00410, Bid Item 8 a and b, define Minimum Day as the 5th percentile, Minimum Month as the 20th percentile, Annual Average as the 50th percentile, Maximum Month as the 80th percentile, and Maximum Day as the 95th percentile.		

Clarification: *Modifications to the flows and loads include the addition of minimum month current and future design loads for BOD and TKN. These loads shall be used to determine the power consumption of the Blower System as specified on the Bid Form, Section 00410.*

Item 1-9 Section 11391 – IFAS Treatment System

Delete Paragraph 1.3.F.1 in its entirety and **replace** it with the following:

Design Parameter	Value
Influent Wastewater Temperature[1]	
Minimum Month	10 °C
Annual Average	16 °C
Maximum Month	22 °C
Maximum Allowable MLSS Concentration: [2]	(mg/L)
Design Future Conditions[2a]	3,100
During Construction when Zimpro PACT-WAR system is offline, without IFAS media and based on the following conditions[2b]:	
4 Clarifiers Online, SVI <200 mL/g	3,500
4 Clarifiers Online, SVI <150 mL/g	4,200
	4,200

4 Clarifiers Online, SVI <200 mL/g, step feed	5,000
4 Clarifiers Online, SVI <150 mL/g, step feed	3,700
5 Clarifiers Online, SVI <200 mL/g	4,600
5 Clarifiers Online, SVI <150 mL/g	4,700
5 Clarifiers Online, SVI <200 mL/g, step feed	5,000
5 Clarifiers Online, SVI <150 mL/g, step feed	
Maximum Allowable RAS Flow Rate	8 MGD
Minimum Allowable Gross Yield:	(lb TSS / lb BOD removed)
Phosphorus Removal Season with coagulant addition for phosphorus removal[3]	0.9
Phosphorus Removal Season with EBPR[3]	0.8
Non-Phosphorus Season[3]	0.8
During Construction when Zimpro PACT-WAR system is offline	0.8
Minimum Allowable Suspended Growth Aerobic Solid's Retention Time (SRT) [4]	(days)
Future Design Conditions with IFAS Media	2.2
During Construction when Zimpro PACT-WAR system is offline without IFAS Media (winter)	10
Effluent Phosphorus	<1 mg/l orthophosphorus[3]

Notes:

1) Based on existing WPCF operating data collected from 2013-2016

2) Estimated from State Point Analysis maximum RAS rate, and a peak hour flow reflective of stated conditions.

   a. For Design Future 2040 conditions (peak hour flow = 22 MGD) with all five clarifiers online, a Sludge Volume Index (SVI) of 150 g/mL was used in the State Point Analysis, which assumes sludge conditioning in anaerobic selector zones and minimum aerobic SRTs required for good settling sludge. If Seller's proposed design alters these criteria then documentation should be provided for the adjusted maximum allowable MLSS concentration. The potential use of a step feed operating mode may increase the allowable MLSS concentration, but this shall not be allowed in determining the IFAS Treatment System design for future conditions.

   b. During Construction at Design Current 2020 conditions (peak hour flow = 12.4 MGD). Depending on the construction sequencing, four clarifiers may be online due to replacement of one clarifier at a time. A Sludge Volume Index (SVI) of 200 g/mL was used in the State Point Analysis. This SVI does not allow credit for any anaerobic selector zones to condition sludge. If Anaerobic

Selectors are provided as part of the construction treatment layout and sized in accordance with Paragraph 1.3.B.1, then SVIs of 150 mL/g are allowable. MLSS concentrations listed for step feed alternatives are allowable at plant flows less than 8 MGD. At flows higher than 8 MGD, the process must be capable of entering into step feed mode, which will lower the MLSS concentration to acceptable levels. Note: These MLSS concentrations may be exceeded for short periods of time during dry weather when an Aeration Tank is temporarily taken out of service to install the IFAS media and IFAS media retention screens.

3) Phosphorous removal shall be achieved through the use of either chemical addition (aluminum sulfate, polyaluminum chloride, or ferric chloride) at the effluent of the IFAS Treatment System reaeration zone, through EBPR, or a combination of these processes. The design shall accommodate the additional nonvolatile solids generated as a result of chemical addition (assuming no EBPR or limited) and its impact on the gross yield and volatile solids content of the MLSS.

4) SRT = Vo * MLSS * 8.34/ (Y * BODin) where Vo is the total volume of all operating oxic zones in million gallons, MLSS is the mixed liquor suspended solids concentration in mg/l,Y is the gross yield in lbs TSS/lb BOD, and BOD is the total BOD loading to the process in lbs/day.
This SRT does not included attached growth on the IFAS Media within the oxic zone containing IFAS Media.

Item 1-10 Section 11391 – IFAS Treatment System

Delete Paragraph 1.3.F.4.d in its entirety and **replace** it with the following:

d. Provide a minimum number of Aeration Zones for the respective process zone as shown in the table below. Each Aeration Zone shall have its own D.O. Sensor, Air Control Valve, and Air Flow Meter.

Process Zone (Located Entirely in Tank 1, 2, 3, 4, 5, or 6)	Minimum # of Aeration Zones
Oxic Zone not containing IFAS Media /Swing Zone	2 or 3
Oxic Zone Containing IFAS Media [1]	3
Post-Anoxic Zone	1
Reaeration Zone	1

Notes:

1. For the purposes of this table, an "Oxic Zone Containing IFAS Media" may contain one or two IFAS Media Retention Walls (each with Media Retention Screens).

Item 1-11 Section 11391 – IFAS Treatment System

Delete Paragraph 2.1.A in its entirety and **replace** it with the following:

A. The IFAS Treatment System specified in this Section shall be designed, furnished, and serviced by:

1. Veolia Water Technologies, Inc (dba Kruger);
2. Suez Treatment Solutions, Inc. with METEOR™;
3. World Water Works with Ideal IFAS;
4. Or equal.

Item 1-12 Section 11391 – IFAS Treatment System

Delete Paragraph 1.3.G.1.c in its entirety and **replace** it with the following:

c. Automatic DO Control Mode - the operator (or the optional Ammonia Based DO Setpoint Controller) will determine a DO setpoint for that zone and the control loop shall modulate the air flow control valve to achieve the desired DO setpoint for that zone (subject to user adjustable minimum and maximum air flow setpoints that are necessary to provide minimum flows to the diffusers for even mixing and to prevent in damage to the diffusers).

Item 1-13 Section 11391 – IFAS Treatment System

Delete the entire *row* in Scope of Supply in Paragraph 2.2.A that has a description "Ammonia Based D.O. Setpoint Controller with Instrumentation" in its entirety and **replace** it with the following:

Optional Ammonia Based DO Setpoint Controller with Instrumentation (Instrumentation is not Optional)	Seller

Item 1-14 Section 11391 – IFAS Treatment System

Delete Paragraph 2.6.G.4.b in its entirety and **replace** it with the following:

b. The Blower Package is designed for outdoor installation and provided with a VFD by the same manufacturer as the VFDs provided in Section 11391B to be installed remote from the package blower and located indoors.

Item 1-15 Section 11391 – IFAS Treatment System

Delete Paragraph 2.8.D in its entirety and **replace** it with the following:

D. Design the ITSMCP to interface with the WPCF's SCADA System, the optional Ammonia Based Dissolved Oxygen Setpoint Controller (if provided), the Blower System Master Control Panel (See Section 11391B), the Mixer VFDs and Mixer Monitoring (See Section 11391C), and all related field instrumentation specified

herein. A summary of the anticipated control strategy for all equipment for the complete IFAS Treatment System is provided as follows:

Item 1-16 Section 11391 – IFAS Treatment System

Delete Paragraph 2.8.D.4 in its entirety and **replace** it with the following:

4. As a minimum, the following data from the ITSMCP shall be communicated to and from the Ammonia Based Dissolved Oxygen Setpoint Controller (if provided):

    1. All DO Sensor Readings and Default DO Setpoints
    2. All Air Flows
    3. All Ammonia & Nitrate Sensor Readings
    4. Plant Flows
    5. RAS Flows
    6. IMLR Flows
    7. Swing Zone Status
    8. On-Line Tank Status
    9. Step Feed Mode Status
    10. Optimized DO Sensor Setpoints – Output

Item 1-17 Section 11391 – IFAS Treatment System

Delete Paragraph 2.8.I.10.d in its entirety and **replace** it with the following:

d. The panel shall be suitable for top or bottom conduit entry as approved by the Engineer. For top mounted conduit entry, the panel top shall be provided with nominal one foot square conduit entry area which may be drilled to accommodate conduit and cable penetrations.

Item 1-18 Section 11391 – IFAS Treatment System

Delete Paragraph 2.9 in its entirety and **replace** it with the following:

A. If provided as an option, the ammonia based dissolved oxygen (DO) setpoint controller shall be designed to model the system performance and send revised system dissolved oxygen set points to the Blower System Master Control Panel. Note that the Seller shall assume all costs of patent fees or licenses for all equipment or processes it supplies and shall safeguard and save harmless the Buyer (Construction Contractor), Owner and Engineer and their agents from damages, judgments, claims and expenses arising from license fees or claimed infringements or any letters of patent or patent right, or because of royalty or fee for the use of any equipment or process; and the price stipulated for all such patent fees, licenses, or other costs pertaining thereto.

B. The controller shall be suited for the specified conditions as previously listed and include an industrial personal computer (PC) with powerful processing software that will allow for the

modelling of the IFAS/activated sludge system kinetics and provide modified dissolved oxygen setpoints to the aeration tank Oxic Zones in a manner that will optimize energy use, minimize dissolved oxygen entering anoxic and Anaerobic Zones, better utilize the influent carbon for denitrification and biological phosphorus removal, while still achieving the desired level of nitrification.

C. If the specified ammonia based dissolved oxygen (DO) setpoint controller is not provided as an option, Seller shall provide ammonia and nitrate instrumentation for monitoring purposes only.

Item 1-19 Section 11391 – IFAS Treatment System

Delete Paragraph 3.3.B.3 in its entirety and **replace** it with the following:

3. At least two training sessions on the IFAS Treatment System shall occur prior to the conversion of the aeration tanks from the parallel train, nitrification removal mode into the IFAS Treatment System, BNR mode configuration. One training session shall occur after the BNR mode conversion is complete and shall focus on step feed mode operations, seasonal variations in the process configuration, and the optional Ammonia Based DO Setpoint Controller if provided.

Item 1-20 Section 11391 – IFAS Treatment System

Delete Paragraph 3.6.G.5 in its entirety and **replace** it with the following:

5. In addition to the above data, Seller to provide supporting evidence that demonstrates that they are in compliance with the O&M Guarantees except power consumption as indicated on the Bid Form despite variations in primary effluent flow and loads.

Item 1-21 Section 11391A – IFAS Treatment System Aeration System

Delete Paragraph 1.4.D.1.a in its entirety and **replace** it with the following:

a. Certified oxygen transfer performance curves to demonstrate capability of the fine bubble aeration equipment proposed in the design and performance specified in the IFAS Treatment System Aeration System Schedules. Factory oxygen transfer testing results are acceptable.

Item 1-22 Section 11391A – IFAS Treatment System Aeration System

Delete Paragraph 2.1.C in its entirety and **replace** it with the following:

C. Or Equal (Note: coarse bubble aeration system suppliers who routinely provide equipment designed by IFAS Treatment System Seller, and for which the Seller is responsible would be considered as Equal.)

Item 1-23 Section 11391A – IFAS Treatment System Aeration System

Add the following Paragraph directly before Paragraph 2.5.A.1:

1. The term "coarse bubble" may be interchangeable with "medium bubble" throughout this Section as long as the requirements for coarse bubble aeration systems as specified herein are met.

Item 1-24 Section 11391A – IFAS Treatment System Aeration System

Delete "11391A—2 – IFAS Treatment System Aeration System General Design Conditions Schedule" (page 11391A-22) in its entirety and **replace** it with the attached Schedule 11391A—2.

Item 1-25 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 1.4.C.9 in its entirety and **replace** it with the following:

9. Certification indicating that the mixing equipment has been designed to provide adequate mixing within tanks that include aeration diffusor systems and that the mixer manufacturer has coordinated the with the diffuser manufacturer regarding the basis of design, expected mixer performance, and placement of the mixers. Certification shall also include mixer design criteria including mixer horsepower, tip speed, flow velocities and other applicable design criteria necessary to coordinate with the IFAS Treatment System Aeration System Manufacturer providing diffusers located within the aerated zones.

Item 1-26 Section 11391C – IFAS Treatment System Mixers

Renumber Paragraph "1.8 Performance Requirements" to "1.9 Performance Requirements".

Delete the text "Maintenance and Spare Parts" directly following Paragraph 1.7.A and **replace** it with the text "1.8 Maintenance and Spare Parts".

Renumber Paragraphs 1.7.B through 1.7.F and **replace** with Paragraph numbers 1.8.A through 1.8.E.

Item 1-27 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 2.3.D.1 in its entirety and **replace** it with the following:

1. The propeller shaft shall be made of stainless steel ASTM/AISI 431, ASTM/AISI 329, or better.

Item 1-28 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 2.3.E.5 in its entirety.

Item 1-29 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 2.3.F.1 in its entirety and **replace** it with the following:

1. The mixer shall have a high efficiency synchronous speed, inverter duty motor.

Clarification: Note the level of efficiency provided by the vendors will influence the 20-year life cycle cost evaluation for the overall IFAS Treatment System.

Item 1-30 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 2.3.G.5.a in its entirety and **replace** it with the following:

a. The cable entry seal shall consist of cylindrical elastomer bushings or heavy duty galvanized cast iron assembly with Buna-N strain relief grommets. Secondary sealing systems including epoxies or silicones shall not be allowed except as part of a design recommended by the Factory Mutual (FM) Research Corporation specifications for Explosion Proof Certification with a FM-approved sealant.

Item 1-31 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 2.5.G in its entirety and **replace** it with the following:

G. Wire rope construction shall be 7×19 type 304 stainless steel or 316 stainless steel, cable with adequate lift rating and of sufficient length to meet the required lift below the mounting level for raising and lowering the mixers. Wire rope lifting cable assemblies shall be equipped with a swaged ball fitting on one end to work with the quick disconnect anchor on the davit crane winch and on the other end a heat treated drop forged type 304 stainless steel oval hook for connection to the mixer and provided with sufficient length for lifting of the mixer. Wire rope keepers shall be stainless steel and designed to hold free ball fitting end of the wire rope lifting cable assembly when it is detached from crane. Base cover shall be a plastic cover that fits in the mast hole in the pedestal base to help keep water from collecting inside the base when the davit crane is removed.

Item 1-32 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 2.9.B in its entirety and **replace** it with the following:

B. All cast iron surfaces coming in contact with the mixed liquid shall be protected by a factory applied spray top coat of oxiranesther (Duasolid) paint finish or a solvent-free ceramic coating on the exterior of the mixer.

Item 1-33 Section 11391C – IFAS Treatment System Mixers

Delete Paragraph 3.6.B.5 in its entirety and **replace** it with the following:

5. Samples shall be taken at locations as determined by the Engineer with sampling equipment provided with the mixers. In general, samples shall be equally spaced horizontally and vertically within each zone and be taken from existing platforms greater than 1 feet of either a tank wall, baffle wall, tank bottom, aeration grid diffusors (if applicable in given mixing zone), or water surface elevation.

Clarifications

Item 1-34 Section 00200 – Instructions to Bidders

Paragraph 4.3 references experience requirements located within Division 11. The experience requirements in Div. 11 are less restrictive than those listed within Section 00200, Paragraph 13.5.A as the Non-monetary criteria. This allows bidders with the experience to still bid, even though they may not receive the available points during the evaluation for the non-monetary criteria.

Item 1-35 Section 11000 – Equipment - General

Paragraph 2.1.A specifies "anchor bolts, nuts, washers, bolt sleeves, and assembly hardware shall be Type 316 stainless steel.

Item 1-36 Section 11391 – IFAS Treatment System

The Bidder shall be responsible for designing a system that during construction can meet the requirements, as specified in Section 1.3.C. Paragraph 1.3.C.4.b details the constraints required to be met prior to the installation of the IFAS media and IFAS media retention screens. It is intended that one tank be taken offline at a time to install the screens and media during dry weather over a short period of time. If the Bidder's plan for maintaining plant operations during construction deviates from that which is specified in Section 1.3.C, documentation must be provided to support the modification(s) and this will be considered as part of the monetary and non-monetary evaluation.

Item 1-37 Section 11391 – IFAS Treatment System

Items 1-6, 1-12, 1-13, 1-15, 1-16, 1-18, and 1-19 modify the requirements of the Seller to provide an Ammonia Based Aeration Control System. The Ammonia Based Aeration Control System is now optional. Please see these items for further details. Note that the energy efficiency of the aeration system (which should be improved to some extent if the Ammonia Based Aeration Control System is provided) will still be considered as part of the operational and maintenance life cycle costs during the bid evaluation based on the Bidder's O&M guarantees for energy as required on the Bid Form, Item 8, IFAS Treatment System Blower System Annual Energy Consumption.

Item 1-38 Section 11391 – IFAS Treatment System

Per Paragraph 1.5.G.1, "a structural design certification with structural calculations both signed by a Professional Engineering licensed in Connecticut" are required for the specified equipment and in accordance with Section 11000.

Item 1-39 Section 11391 – IFAS Treatment System

Per paragraph 3.6.A, Seller is responsible for developing the Process Performance Test Procedures, which includes a sampling plan to verify the effluent performance criteria. At a minimum, Owner will provide sampling data on the parameters and frequency specified in Paragraph 3.6.F.4.c. Otherwise, Paragraph 3.6.F.4.e governs.

Bidding Period Questions & Responses

The following responses/clarifications are based on questions raised during bidding period.

1. Can you clarify the requirements for diffuser performance testing especially related to factory test and field based tests?
   The intent of the specification was not to require factory or field performance testing on the provided diffusors; however, vendors shall provide certified oxygen transfer performance curves for standard testing parameters based on available data per Section 11391A, Paragraph 1.4.D.1.

2. Please clarify whether the design mixed liquor suspended solids (MLSS) concentration required in Section 00410, Paragraph 5.4.C, Item #2, is to be at annual average flow or maximum month flow?
   See revisions to the Bid Form, as indicated in Item 1-4 above.

3. The maximum allowable MLSS concentration indicated on 00410 Schedule 11391 – A2 of 5,000 mg/L seems contradictory to values noted in other locations throughout the document. At what conditions is this concentration allowable?
   This design condition is intended to be a maximum concentration by which the mixing and oxygen transfer capacity of the aeration system shall be designed to handle under all operating conditions. This criterion does not in any way supersede the process performance guarantees for effluent treatment performance. It simply provides operational flexibility during construction and for various future process operations under conditions separate from the process performance guarantee.

4. Are percentile airflows located within Section 00410 Schedule 11391 – B-1 to be calculated for percentile loading values from an influent loading distribution? If so, please stipulate the actual loading values for each percentile.
   The percentile air flow rates are based on the operating range of airflow rates based on AORs provided by the IFAS Treatment System Seller based on their design of the System. The AORs shall be based on the Aeration System Design and the Flows and Loads specified in Section 11391, Paragraph 1.3.D, as revised in this addendum in Item 1-8. Bidder shall use these percentiles to estimate the "IFAS Treatment System Blower System Annual Energy Consumption" as required on the Bid Form, Section 00410, Item 8 a and b, following the instructions in the associated footnote, Paragraph 5.3.B.2.

5. It is assumed that the maximum and minimum capacities do not include the standby blower capacity but please clarify.
   Correct, the Standby blower is intended to provide redundancy only.

6. The Blower Package Power Requirements, namely Operating Points #2, #3, and #4 on Section 00410 Schedule 11391B-2 appear intended to demonstrate compliance with Section 11391 1.7.C but it's not clear how these operating points are to be calculated. Please clarify.
   The Operating Points for the Blowers on Section 00410 Schedule 11391B-2 are intended to characterize both the energy performance and turndown of the Blowers and demonstrate that the Operating Points/efficiencies on Section 00410 Schedule 11391B-1 are achievable and demonstrate compliance with Section 11391B Paragraph 1.7. Operating Points #2, #3, #,4 in 00410 Schedule 11391B-2 are intended to be air flow capacities that are evenly distributed between the Min (#1) and Max (#5) air flow capacities. Therefore #3 air flow capacity is halfway between #1 and #5 (Hence (#1 + #5)/2). Similarly, #2 air flow capacity is halfway between #1 and #3 (Hence (#1 + #3)/2), etc. The power requirements should be based on the blower performance at these air flow capacities. Note that since the Blower System includes three duty blowers per 00410 Schedule 11391B-1, the Blower System air

flows are not expected to align with the Blower Package Requirements air flows except perhaps at the min system air flow (one duty blower) and max system air flow (three duty blowers operating).

7. During construction, the system must be able to completely nitrify; however, is this based on annual average or maximum month "current" design loading rates?
   Vendors shall meet the effluent performance given current design maximum month loading rates. See modifications to Section 11391, Paragraph 1.3.C as detailed in Item 1-7 and Section 11391, Paragraph 1.3.F as detailed in Item 1-9 above.

8. During construction, assuming a worst-case scenario during commissioning in which the MLSS temperature = 10C, the loading is at current maximum month design conditions, the largest aeration tank (either 5 or 6) is out of service, and the PACT-WAR system is offline, nitrification to below 1 mg/L to meet the performance requirements is likely achievable if the following operating configuration is allowable. Is this possible?
   1. Tanks 3, 4 and 5 (or 6) all operating in series.
   2. Step feed into tanks 4 and 5 (or 6).
   3. Operating MLSS of 3500 - 3700 mg/L

   Please note the modifications to the performance requirements during construction in Section 11391, Paragraph 1.3.C as detailed in Item 1-7 and Section 11391, Paragraph 1.3.F as detailed in Item 1-9 above, which should alleviate these concerns. It is expected that the Zimpro PACT-WAR system will be shut down as the tanks are ready to be converted from four tanks in parallel operation (existing) into two trains as specified for future design. Channel modifications to convert to the new operating mode with two parallel trains and/or using step feed may or may not be available depending on the construction schedule; however, bypass pumping may be provided to facilitate any operational mode recommended by vendors. Operating MLSS shall be consistent with the operating modes detailed in Section 11391, Paragraph 1.3.F.1, "Biological Process Design Criteria."

9. Is the intention to have the PACT-WAR system online during rehabilitation of each of the aeration tanks?
   Correct, the Zimpro PACT-WAR system cannot be taken offline until the conditions listed in Section 11391, Paragraph 1.3.C.4.a are met. To avoid construction delays, it is recommended the Zimpro PACT-WAR operating mode be maintained during modifications to each aeration tank (#3 through #6). Per Paragraph 1.3.C, Bidders are not responsible for the system Maintenance of Plant Operations during construction design or effluent performance "until after the Zimpro PACT-WAR system is phased out."

10. Consider removing requirement to submit stamped structural design certifications and calculations as specified in Section 11391, Paragraph 1.5.G.1. The equipment required to be certified is considered non-structural.
    The specified requirements must be met. The specified equipment requiring stamped structural certifications and calculations are critical for the overall performance of the IFAS Treatment System, and could lead to catastrophic failure of the overall IFAS Treatment System if they were damaged in a seismic event.

11. Please consider a wet chemistry ammonium analyze such as the Chemscan UV 4100 series.
    This comment appears to be related to Section 11391, Paragraphs 2.9 and 2.10., and is related to energy efficiency optimization. Wet chemistry units will not be allowed for this process control purpose.

12. Are feedback Ammonia Based D.O. Setpoint control schemes allowable?
    No, the Ammonia Based D.O. Setpoint Controller shall be provided as specified in Section 11391, Paragraph 2.9.

13. Where is the intended location of the ITSMCP?
    The ITSMCP will be located within the Blower Control Room, which is an indoor, ventilated space that will be maintain within a temperature range of 45ºF and 95ºF.

14. How does one prevent the rope or the bomb for the sampler specified to be used for the Mixer Performance testing in Section 11391C, Paragraph 3.6.B from becoming entangled with the diffusor grids?
    Please see revision to Section 11391C, Paragraph 3.6.B.5 in Item 1-33 above.

15. The Blower System Schedule (Section 11391B, Schedule 1-1) requires a total of four (4) blowers, but Figure 7 in Appendix A only shows a total of three blowers. Please clarify.
    Figure 7 in Appendix A depicts the existing conditions of the Blower Building, not proposed conditions. The number of blowers to be provided shall be in accordance with the Blower System Schedule (Section 11391B, Schedule 1-1). *Per Section 00410, Paragraph 5.5.F, general arrangement drawings of the proposed equipment layouts shall be provided with the Bid.*

16. The Scope of Supply (Section 11391, Paragraph 2.2) did not reference channel aeration. However, Section 11391, Paragraph 2.11.A calls for "one air flow meter per aeration zone and one for existing grid for west distribution channel for channel mixing" Are we required to provide aeration air, grid, and blowers for this, or any other channel mixing?
    The West Distribution Channel contains existing aeration distribution piping, aeration grids, and diffusers, which will remain and reused as part of the proposed IFAS Treatment System upgrade. The Seller is not responsible for providing any addition aeration distribution piping, grids, or diffusors for this location. Air flow provided to the existing West Distribution Channel for channel mixing shall be provided by the aeration blowers that are included in the Seller's scope. Moreover, Seller is responsible for coordinating the air flow rates to the existing channel mixing aeration system in accordance with Footnote 1.a of the Blower System Schedule (11391B-1) within Section 11391B. One air flow meter shall be provided by the Seller on the west distribution channel's aeration discharge header to facilitate the coordination between the required air flow rates and the Blower System. No other channel mixing system shall be required for the IFAS Treatment System beyond the West Distribution Channel.

17. On Page 11391-43 and 44, Section 2.8.D.1a, calls for pH, DO, ammonium, and nitrate analyzers and Pages 54 through 59 give the details on the Field Instruments including analyzers, level sensors and the respective transmitters. However, except for DO analyzers, transmitters and set point controllers no other instrument hardware are listed in the Scope of Supply list on Page 11391-35. Please clarify the scope.
    The Scope of Supply on Section 11391, Paragraph 2.2 includes the item, "Ammonia Based D.O. Setpoint Controller with Instrumentation". The associated instrumentation shall include ammonium and nitrate analyzers in accordance with the minimum requirements as specified in Section 11391, Paragraph 2.10.A.1 All other instrumentation, such as level sensors and pH analyzers shall be provided as part of the Seller's scope of supply to meet the minimum requirements as specified in Section 11391, Paragraphs 2.10 and 2.11.

18. For the PLC, do you have any preference about any vendor, i.e. Allen Bradley, Modicon, etc., or it is flexible to the bidder's choice?
    For interchangeability of parts, all PLC and OIT equipment supplied by the IFAS Treatment System Seller shall be by Allen Bradley CompactLogix and PanelView Plus, respectively, to be consistent with those being provided with the UV Disinfection System and the Cloth Media Filters.

19. In reviewing the aeration specifications, we believe the recommended alpha value of 0.9 for coarse bubble diffusers is on the high side. Can you please confirm?
    After review, we have revised the recommended coarse bubble diffuser alpha value listed in Schedule 11391A—2 – IFAS Treatment System Aeration System General Design Conditions Schedule. Please see modifications detailed in Item 1-24.

20. Could you please clarify the differences (or similarities) between aeration zones vs. treatment trains?
    Per Section 11391, Paragraph 1.3.A, there shall be "at least two identical parallel treatment trains". Each treatment train shall consist of the appropriate treatment stages/zones as specified in Section 11391, Paragraph 1.3.B. Some of these treatment stages/zones may be oxic zones (or anoxic zones that during construction or when as operated as swing zones will be oxic) which contain multiple Aeration Zones as required in Section 11391, Paragraph 1.3.F.4.d.

21. In Section 11391, Para. 2.10 A(1), please confirm the number of sensors that are required. As an example, for DO probes, the language describes "...for each Aeration Zone...", while the Nitrate analyzer mentions "one per treatment train".
    Instrumentation quantities are to be determined by the IFAS Treatment System Seller. Section 11391, Paragraph 2.10.A.1 provides minimum requirements for instrumentation quantities only, dependent on the final IFAS Treatment System layout to be determined by the Seller. Please see above question for clarification of terminology.

22. Additionally, we did not see probe placement on the figures. Do you have an idea of where exactly each probe needs to be located? Cabling can also make difference in how we approach our proposal.
    Instrumentation locations are to be determined by the IFAS Treatment System Seller.

23. Please provide lb COD/lb of glycerin product that will be used in the bid evaluation.
    As indicated on the Bid Form, Section 00410, Bid Item 5, the intended glycerin product to be considered during the bid evaluation will be MicroC 2000. MicroC 2000 is listed as containing 1,100,000 milligrams of COD per liter of product. Please see Footnote 1 and 2 of Table 5.3.B.1 in the attached Bid Form for additional details for determining glycerin costs and dosages that will be applied as part of the Bid evaluation.

END OF ADDENDUM NO. 1

J:\V\V0037 Vernon WWTP\005 WPCF Design\Bidding\IFAS Pre-Selection\Addenda\Addendum 1\Addendum 1.doc

SECTION 00410

FORM FOR BID

PROJECT IDENTIFICATION:

Vernon CT Water Pollution Control Facility Upgrade
IFAS Treatment System Equipment Preselection

TABLE OF ARTICLES

ARTICLE 1 - BID RECIPIENT

1.1 This Bid is submitted to:

Town of Vernon Office of the Town Administrator
14 Park Place
Vernon, CT 06066

1.2 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents. This agreement will stipulate that the Bidder's Goods and Special Services as specified or indicated in the Bidding Documents will be furnished at the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents and the upcoming upgrade project.

ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

2.1 Bidder accepts all of the terms and conditions of the Advertisement for Bids and Instructions to Bidders, including without limitation, those dealing with the disposition of Bid deposit. The Bid will remain subject to acceptance until October 1, 2019, or for such longer period of time that Bidder may agree to in writing upon request of Buyer.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.1 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents and hereby acknowledges the receipt of all Addenda. Bidder acknowledges that Vernon's Water Pollution Control Facility (WPCF) currently uses the Zimpro PACT-WAR treatment process in which powdered activated carbon is added to the aeration tanks and spent carbon is regenerated on-site. Following upgrading of the WPCF, the PACT-WAR process will be discontinued.

B. Bidder has visited the Point of Destination and site where the Goods are to be installed or Special Services will be provided and become familiar with and satisfied as to the observable local conditions that may affect cost, progress, and furnishing of Goods and Special Services, if required to do so by the Bidding Documents, or if, in Bidder's judgement, any local condition may affect cost, progress, or the furnishing of Goods and Special Services.

C. Bidder is familiar with and has satisfied itself as to all federal, state and local Laws and Regulations that may affect cost, progress and furnishing of Goods and Special Services.

D. Bidder has carefully studied, considered, and correlated the information known to Bidder; information commonly known to sellers of similar goods doing business in the locality of the Point of Destination and the site where the Goods will be installed or where Special Services will be provided; information and observations obtained from Bidder's visits, if any, to the Point of Destination and the site where the Goods will be installed or Special Services will be provided; and any reports and drawings identified in the Bidding Documents regarding the Point of Destination and the site where the Goods will be installed or where Special Services will be provided, with respect to the effect of such information, observations, and documents on the cost, progress, and performance of Seller's obligations under the Bidding Documents.

E. Bidder is aware of the general nature of work to be performed by Buyer and others at the Site that relates to the Goods and Special Services that are to be furnished as indicated in the Bidding Documents.

F. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

G. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing the Goods and Special Services for which this Bid is submitted.

H. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon furnishing the Goods and Special Services required by the Bidding Documents, and that the IFAS media will perform satisfactorily when installed at the Vernon CT WPCF.

ARTICLE 4 - BIDDER'S CERTIFICATION

4.1 Bidder certifies that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.

4.2 Bidder certifies that Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

4.3 Bidder certifies that Bidder has not solicited or induced any individual or entity to refrain from bidding.

4.4 Bidder certifies that Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph:

A. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

B. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of the Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

C. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

D. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process.

ARTICLE 5 - BASIS OF BID

5.1 Bidder proposes to furnish all Goods and Special Services required for construction of the IFAS Treatment System Equipment for the Vernon CT WPCF Phosphorus Upgrade Project in accordance with the accompanying Bidding Documents prepared by Tighe & Bond, Inc., for the Contract Prices specified in Article 5 Paragraph 5.3A at the guaranteed operation and maintenance values and costs specified in Article 5 Paragraph 5.3B, with additional supporting equipment information, documentation and bidder qualifications as described in Article 5 Paragraphs 5.4, 5.5, and 5.6, all according to the terms of the Bidding Documents.

5.2 This Bid includes Addenda numbered _____

5.3 The proposed Contract Prices and Guaranteed Operation and Maintenance Costs are provided in Paragraphs 5.3.A and 5.3.B below:

A. CAPITAL COST

Item No.	Unit of Measure	Description	Total Price Dollar Figure Total Price Written Words
1	L.S.	Supply the IFAS Treatment System as specified herein including all ancillary equipment, spare parts, tools, and Special Services.	$
2	L.S.	Spare Mixer – The additional cost to supply one shelf spare mixer as specified in Section 11391C.	$
3	L.S.	Two-year extended warrantee for equipment– The added cost to extend the warrantee requirements specified in Section 11391, Paragraph 1.7 by two years.	$
4	L.S.	Seller's service agreement – Two-year service agreement as specified in Section 11391, Paragraph 1.11.	$
TOTAL IFAS TREATMENT SYSTEM BID PRICE CAPITAL COST Sum of Items 1, 2, 3, and 4 Above			$

B. OPERATION AND MAINTENANCE GUARANTEE

1. Chemical Consumption

Item No.	Item Description	Units	Guaranteed Value/ Cost[3]	
			Design Current Average Annual Flow 3.1 MGD[4]	**Design Future Average Annual Flow 5.0 MGD[4]**
5	Cost of **Supplemental Carbon (Glycerin) based on MicroC 2000**	$ / lb COD [1]	TBD by Engineer	
6 (a,b)	Average **Supplemental Carbon** dosage required under specified Conditions to meet TN goal of 4.5 mg/L as TN (if needed)	lb as COD / MGD [2]		

Notes:
(1) Costs of the compound specified for each item listed above based on bulk quotes from suppliers for bulk deliveries to the Vernon WPCF.
(2) lb / MGD = pounds of the compound specified for each item above per million gallons of wastewater treated on an annual average basis.
(3) Performance tests specified in the technical specifications will be used to verify the guaranteed values. If performance tests indicate that (or refinements to the operational strategy require that) the overall annual average chemical consumption is greater than the amount guaranteed, then Bidder acknowledges that a penalty may be assessed based on the cost impact as discussed in Section 11391.
(4) Flow indicated is the Primary Effluent which includes WPCF Influent Flow plus plant recycle flows

2. Energy Consumption

Item No.	Item Description	Units	Guaranteed Value/ Cost[5]	
			Design Current Average Annual Flow 3.1 MGD	**Design Future Average Annual Flow 5.0 MGD**
7	Cost of Energy	$ / KWH	$0.14 as determined by Engineer	
8 (a,b)	IFAS Treatment System Blower System Annual Energy Consumption[1]	KWH		

Item No.	Item Description	Units	Guaranteed Value/ Cost[5]	
			Design Current Average Annual Flow 3.1 MGD	Design Future Average Annual Flow 5.0 MGD
9 (a,b)	IFAS Treatment System Mixer Annual Energy Consumption[2,4]	KWH		
10 (a,b)	Maximum Required Internal Mixed Liquor Recycle Pumping Rate under specified Conditions [3,4]	%		

Notes:

(1) Blower energy consumption: Calculate energy based on the Blower System Power Requirements listed in the IFAS Treatment System Blower System Schedule 11391B-1. attached to this Bid Form. Total Energy = 10% * (5^{th} + 95^{th} percentile) + 20% *(20^{th} + 80^{th} percentile) + 50%*(50% percentile) * 24 hours/day * 365 days/year.

(2) Mixing energy consumption: Calculate energy based on the specific proposed power requirements for each mixer (based on the recommended speed setting for the mixer in that location) totaled up over all mixers to be provided (excluding spares if any) as indicated in the IFAS Treatment System Mixer Schedule 11391C-2 attached to this Bid Form and operating 24 hours a day and 365 days per year.

(3) Recycle Pumping energy consumption will be calculated by Engineer based on the pump flow (Design Average Annual Flow rate specified multiplied by the % return rate entered above (say 200% to 300%)), the pump head (to be determined by the Engineer) and the estimated pump efficiency (to be determined by the Engineer) and operating 24 hours a day and 365 days per year.

(4) Include in the calculation the manufacturer's stated efficiency for all equipment provided including motors, VFDs, and harmonic filter equipment. Provide supporting documentation. If efficiency curves are not available from a manufacturer for a component, use full load efficiency.

(5) Performance tests specified in the technical specifications will be used to verify the guaranteed values. If performance tests indicate that (or refinements to the operational strategy require that) the overall annual average energy consumption is greater than the amount guaranteed, then Bidder acknowledges that a penalty may be assessed based on the cost impact as discussed in Section 11391.

C. The Bidder acknowledges that this bid will be evaluated using the Guaranteed Operational and Maintenance Values and Costs included in Paragraph 5.3B in the following manner:

1. The annual operating costs will be based on calculations that will utilize the following weights assigned to the guaranteed costs/values:

a. Current average daily flow of 3.1 mgd - 75%

b. Design average daily flow of 5.0 mgd - 25%

2. The Bidder acknowledges the Guaranteed Operational and Maintenance Values and Costs included in Paragraph 5.3B must be guaranteed for the time periods described in Article 18 of the Instructions for Bidders (Section 00200).

5.4 A summary of the proposed equipment (and equipment required to be provided by the Buyer), a detailed breakdown of the operational and maintenance values used to back up the values in Paragraph 5.3.B, and delivery schedule to be provided is as follows:

A. General IFAS Treatment System Equipment Requirements

		Proposed Value
1.	Total Number of Treatment Trains Proposed (#)	2
2.	Number of Treatment Trains On-Line at or above the Design Peak Hourly Flow Rate (#)	2
3.	System Maximum Bulk Fluid Flow(1) (MGD)	
4.	Recommended Minimum Flow Capacity for the Internal Mixed Liquor Recycle (IMLR) in each Train (MGD)(2)	
5.	Recommended Maximum Flow Capacity for the Internal Mixed Liquor Recycle (IMLR) pumps per Train (MGD)(2)	
6.	Media Percent Fill in IFAS Zone (%)	
7.	Maximum Allowable Media Percent Fill for IFAS Zone (%)	
8.	Protected Surface Area of Supplied Media (ft^2/ft^3)	
9.	Total Effective Media Surface Area per Train (ft^2)	
10.	Number of Media Retention Screens per IFAS Media Retention Wall (#)	
11.	Total Area of Media Retention Screens excluding drains Screen and Scum Screen. (square feet - total)	
12.	Total Area of Media Retention Screens excluding drains Screen and Scum Screen. (square feet- open area)	

Notes:

(1) Maximum Bulk Fluid Flow is the sum of the primary effluent flow, RAS rate, and IMLR rate(s).

(2) This will be used to select the number and size of IMLR pumps in each train.

B. IFAS Treatment System Zone Configuration & Dimensions[1]

Zone Description[2]	IFAS Treatment System Zones Configuration				
	Length (ft)	*Width (ft)*	*Side Water Depth (ft)*	*Volume (MG)*	*Number of "Aeration Control Zones" in this Zone Volume (MG)*
Anaerobic Selector #1[3]					0
Anaerobic Selector #2[3]					0
Anaerobic Selector #3[3]					0
Pre-Anoxic[4]					
Oxic *without* IFAS Media					
Oxic *with* IFAS Media					
Oxygen Depletion Zone[5]					
Post Anoxic[5]					1
Re-aeration[5]					1
Total					

Notes:

(1) Dimensions and Locations shall be for only one treatment train, with the understanding that the second treatment train will have nearly identical dimensions and volumes. Each zone listed may contain more than one Aeration Control Zone.

(2) The listed zones are the minimum required zones as specified in Section 11391, Paragraph 1.3. Additional zones required per the IFAS Treatment System Seller's specific design, shall be included in the spare rows. Information on this table shall reflect the zone configuration and dimensions as shown on Seller's layout drawing provided with this Bid.

(3) These zones to be located within Tanks #1 and #2 and will also serve as Anoxic

Selectors and a contact tank for RAS flow if plant is operated in step feed mode

(4) These zones to be located within Tanks #3 and #4 and will also serve as Oxic Swing Zones after construction is completed and as oxic zones during construction.

(5) These zones to be located within Tanks #5 and #6 and will also serve as Oxic Swing Zones after construction is completed and as oxic zones during construction.

C. Process Design Criteria

		Proposed Value
1.	Design Sludge Volume Index (mL/g) [(1)]	
2.	Design MLSS Concentration (design future 2040 maximum month flows and loads conditions) (mg/L)	
3.	Design MLSS Concentration (during construction when Zimpro PACT-WAR system offline, without IFAS Media, and design current 2020 maximum month flows and loads conditions) (mg/L)	
4.	Gross Yield – during phosphorus removal season with coagulant addition for phosphorus removal (lb TSS / lb BOD)	
5.	Gross Yield – during phosphorus removal season with EBPR (lb TSS / lb BOD)	
6.	Gross Yield – during non-phosphorus removal season (lb TSS / lb BOD)	
7.	Gross Yield – during construction when PACT-WAR system is offline (lb TSS / lb BOD)	
8.	Aerobic Suspended Growth Solids Retention Time (SRT) – future design conditions (days)	
9.	Aerobic Suspended Growth Solids Retention Time (SRT) – during construction when Zimpro PACT-WAR system is offline (winter) (days)	
10.	Average Annual RAS flow rate (MGD)	
11.	Total Head Loss across IFAS Media Zone and IFAS Retention Screens at Current Design Average Day Flow of 3.1 MGD (in) [(2)]	
12.	Total Head Loss across IFAS Media Zone and IFAS Retention Screens at Maximum Bulk Fluid Flow (in) [(2)]	

Notes:

(1) Sludge Volume Index can be based on previous experience. Provide as part

of the bid, data from at minimum two existing IFAS treatment systems with anaerobic selector zones operating at the provided SVI as evidence to the design SVI.

(2) Calculate Headloss based on Maximum Bulk Fluid Flow which is the sum of the specified (primary effluent) flow, recommended RAS rate (50% to the specified flow), and IMLR rate(s).

D. IFAS Treatment System Aeration System Equipment

1. Provide a completed Aeration System Equipment Schedule, which is attached to this Bid Form as Attachments 11391A-1,11391A-2, 11391A-3, and 11391A-4.

E. IFAS Treatment System Blower System Equipment

1. Provide a completed Blower System Equipment Schedule, which is attached to this Bid Form as Attachments 11391B-1 and 11391B-2.

F. IFAS Treatment System Mixer Equipment

1. Provide a completed Mixer Equipment Schedule, which is attached to this Bid Form as Attachment 11391C-1 and 11391C-2.

G. Delivery Schedule

		Duration
1.	IFAS Treatment System (as specified in Section 11391)	
1A.	Preliminary Shop Drawings (weeks from Owner's request, maximum of 4)	_____
1B.	Shop Drawings (weeks from execution of purchase order with the Buyer, maximum of 10)	_____
1C.	Delivery of Goods (weeks from Shop Drawing Approval, maximum of 22)	_____
2.	IFAS Treatment System Aeration System (as specified in Section 11391A)	
2A.	Preliminary Shop Drawings (weeks from Owner's request, maximum of 4)	_____
2B.	Shop Drawings (weeks from execution of purchase order with the Buyer, maximum of 10)	_____
2C.	Delivery of Goods (weeks from Shop Drawing Approval, maximum of 22)	_____
3.	IFAS Treatment System Blowers (as specified in Section 11391B)	
3A.	Preliminary Shop Drawings (weeks from Owner's request, maximum of 4)	_____

3B.	Shop Drawings (weeks from execution of purchase order with the Buyer, maximum of 10)	
3C.	Delivery of Goods (weeks from Shop Drawing Approval, maximum of 22)	
4.	IFAS Treatment System Mixers (as specified in Section 11391C)	
4A.	Preliminary Shop Drawings (weeks from Owner's request, maximum of 4)	
4B.	Shop Drawings (weeks from execution of purchase order with the Buyer, maximum of 10)	
4C.	Delivery of Goods (weeks from Shop Drawing Approval, maximum of 22)	

5.5 The following supplementary information is to be provided with the Bid:

A. A schedule of values providing a detailed breakdown of the lump sum items provided on the Bid Form into the various types of Goods and Special Services to be provided. The breakdown shall be by specification section and content and include materials, installation, and start-up for equipment and controls where applicable.

B. A written description of the changes to the design required for the IFAS Treatment system to achieve an Annual Average Effluent Total Nitrogen (TN) less than 3.0 mg/L as N.

C. Written description and Seller's literature of the proposed system.

D. Dimensioned plans and sections of the proposed system process equipment including field instruments, control panels, and all other major system components. Provide sample control panel schematics and dimensions designed from projects of similar size and scope.

E. Dimensioned plans and sections of the proposed system layout including required number of trains, dimensions (lengths, depths, relative water surface elevations) of the minimum required process zones and any additional required process zones per Seller's design within each treatment train, IFAS media retention screen locations, aeration zone piping and grid locations, required maintenance clearances from provided equipment, and minimum relative elevations of all equipment to be supplied.

F. General arrangement drawings show the proposed equipment within the Owner's existing structures as they are illustrated on Figures 5, 6 and 7 included in Appendix A. These layouts shall show placement of blowers, mixers, IMLR pumps, aeration system droplegs, aeration system control instrumentation, and all other equipment specified herein and demonstrate compliance with all dimensional limitations and shall **be based on the AutoCAD .dwg files that were made available by the Engineer as described in Section 00200, Article 3.**

G. Design Data

1. Complete process calculations, including but not limited to:

    a. Sizing of process oxic and anoxic volumes.

    b. Selection of design MLSS concentration under future and current conditions subject to maximum loads specified herein.

    c. Selection of design solids retention time under future and current conditions subject to maximum loads specified herein.

    d. Selection of gross yield at various design conditions.

    e. Selection of IMLR rate.

    f. Selection of media type, quantity and percent fill.

    g. Design of aeration system, determination of process air required and determination of air required for mixing.

    h. Reports of process simulation model output, including a summary of kinetic rates used for both the fixed-film and suspended growth.

    i. Basis for equipment recommendations to be provided by others, including IMLR pumps and Tank isolation gates (or other inlets as required to prevent media migration).

    j. Energy Calculations supporting the operation and maintenance guarantee values

2. Hydraulic calculations developed to demonstrate compliance with the allowable head loss through the IFAS basin, media retention screens and other devices designed to prevent media migration downstream or upstream of the IFAS zone.

H. Description of the level of factory assembly prior to factory system testing and a description of the factory system testing conducted at this level for each of the provided pieces of equipment.

I. Written description of any specific equipment requirements such as the need for equipment to be protected from weather and the elements. Provide an explanation.

J. Details of any special tools or equipment required for operation and maintenance of the proposed system.

K. Details of the IFAS Treatment System Controls Strategy including, system preliminary process & instrumentation diagram, control panel layouts, wiring schematics, written description of the Ammonia Based D.O. Setpoint Controller modelling algorithms, and written description of the overall system automatic control systems.

L. Details demonstrating the ability of the proposed system to hydraulically pass the range of flows as required to meet the design average day and peak hour flow rate.

M. Proposed operational strategy for maintaining operations of the secondary system during construction, including phasing of tank modifications, calculations

demonstrating effluent performance once the Zimpro PACT-WAR system is turned off in accordance with Section 11391, Paragraph 1.3.

N. Written explanation of how Seller's proposed IFAS Treatment System design addresses the following common operational concerns that have been attributed to IFAS Treatment Systems installed in the past:

1. Controlling DO at suitable levels to optimize treatment and keeping a mixed tank

2. IFAS media migration backflowing through IFAS media zone inlet structures into distribution channels and upstream zones in a manner that minimizes headloss.

3. IFAS media floating and rafting above retention screens

4. IFAS media being captured and caught in IMLR pumps

5. Screens blinded with impinged media

6. Removing media from tanks for purposes of in-tank inspections and maintenance

7. Excessive foaming within the IFAS media zone

8. In-situ field instrumentation becoming damaged by repeated collisions from IFAS media and biofilm growth on the sensor

5.6 The Seller represents to the Owner the following as evidence of Seller's qualifications to supply the equipment and provide services specified herein:

A. Number of years Seller has been in business under the name in which these Goods and Special Services will be furnished.

B. Number of installations in the United States and worldwide with equipment functionally similar to that proposed. Include installation dates for each.

C. A list and description of projects in the United States where the Seller's design team has designed and installed as IFAS system. The projects listed shall provide suitable detail for evaluating the Bidder's qualifications and experience, which are non-monetary criteria discussed in Article 13 of the Instruction to Bidders (Section 00200).

D. A list and description of projects in the United States where the Seller's proposed equipment has been installed. The projects listed shall provide suitable detail for evaluating the Bidder's qualifications and experience, which are non-monetary criteria discussed in Article 13 of the Instruction to Bidders (Section 00200).

E. Provide the following information for each installation cited in items C and D above:

1. Name of wastewater treatment facility

2. Name, Address, and telephone number of system owner's or operator's contact person who can address the performance and maintenance of the Seller's equipment

3. Design flow rates including average annual, maximum month, maximum day, and peak hour

4. Date system was placed into operation

5. System design objectives (i.e. BOD removal, nitrification, denitrification EBPR) and target effluent limits for ammonia, total nitrogen, and total phosphorus, if applicable

6. Supplemental Carbon Type used, if any

7. Media type

ARTICLE 6 - TIME OF COMPLETION

6.1 Bidder agrees that the furnishing of Goods and Special Services will conform to the schedule set forth in Article 5 of the Agreement.

6.2 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.1 The following documents are attached to and made a condition of this Bid:

A. Bid Schedules for IFAS Treatment System Aeration System, IFAS Treatment System Blower System, and IFAS Treatment System Mixer Equipment.

B. Bid deposit in the amount of _____ dollars ($_____ _____), consisting of a bid bond in the amount of five percent of the total amount of Bid provided in paragraph 5.3.A of this section.

C. A letter from surety indicating that the Bidder currently qualifies for the performance bond required as detailed in these documents

D. Evidence of Bidder's qualifications in accordance with Article 5 of this Bid as well as Supplementary Information Specified in Article 5.

E. Evidence of authority to sign.

ARTICLE 8 - BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

END OF SECTION

J:\V\V0037 Vernon WWTP\05 - WPCF Design\Design\Specifications\Preselection\Discfilters\00410-P.doc

11391B-1 - Blower System Schedule	
Description	IFAS System Blowers
Number of Units	3 Duty + 1 Spare Standby
Blower System – Turn Down Minimum Air Flow (Current) Maximum Air Flow (Future) Discharge Pressure – Low Discharge Pressure – High	 _____scfm Total _____scfm Total _____psi _____psi (Specified air flows shall be achieved over specified range of discharge pressures and temperatures specified in the Blower Package Schedule)
Current Design Conditions 5th percentile Air Flow 20th percentile Air Flow 50th percentile Air Flow 80th percentile Air Flow 95th percentile Air Flow Nominal Discharge Pressure=	**System Delivered Air Flow / Blower System Power Requirements** _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____psi
Future Design Conditions 5th percentile Air Flow 20th percentile Air Flow 50th percentile Air Flow 80th percentile Air Flow 95th percentile Air Flow Nominal Discharge Pressure=	**System Delivered Air Flow / Blower System Power Requirements** _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____SCFM[1] / _____KW[2] _____psi
Starting Conditions	Design the Blower System to slowly increase air flow and pressure to flush water out of the air diffuser system piping upon startup. Startup one Blower Package at a time after a power outage.
Other Service Conditions	As noted on the Blower Package Schedule
Control Strategy	The Blower System Master Controller will 1) select the number of Blower Packages and each Blower Package speed to achieve the desired air flow rates at the system pressure required for maximum energy efficiency

11391B-1 - Blower System Schedule

Notes:

(1) As determined by (and indicated on the Bid Form of) the IFAS Treatment System Bidder based on the following design constraints:

a. Air Flow Capacities shall be based on the Actual Oxygen Requirements specified for the IFAS Treatment System, the IFAS Treatment System Bidder's design of the aeration tanks and fine and coarse bubble air diffuser systems. Note: During normal operation, the air supplied by the blower will also supply air for mixing to the existing west distribution channel - Allow for 80 scfm min (5^{th} and 20^{th} percentile), 200 scfm average (50^{th} percentile), and 320 SCFM maximum (80^{th} and 95^{th} percentile) for supply to existing coarse bubble diffusers in the existing west distribution channel. Blower size shall not be increased by these air flow rates, and during times of peak air demand this air will be manually shut off based on an alarm from the IFAS Treatment System Main Control Panel.

b. Design pressures shall include a 0.5 psi pressure drop allowance at maximum air flow capacities for piping and fittings provided by others, plus all pressure drops for equipment included in the IFAS Treatment System Bidder's scope of supply.

c. Low pressure shall be based on low aeration tanks levels (at low flows) and low air demand and High pressure shall be based on high aeration tank levels (at design maximum month flows) and high air demands.

(2) As determined by the Blower Manufacturer and IFAS Treatment System Bidder based on conditions provided by the IFAS Treatment System Bidder and as indicated on the Bidder's Bid Form. The "Blower System Power Requirement" for each condition given shall be determined by the Blower Manufacturer by estimating the project specific "wire to air" power requirement as follows:

a. Determine the most efficient number of blowers to be operated to satisfy the specified conditions and the required flow(s) and pressure(s) to be delivered by each Blower Package.

b. Utilize manufacturer's power performance curves for the Blower Packages that are required for the specified conditions to determine the power requirements. The power requirements shall be derived from and be consistent with and directly traceable to the blower specific energy performance guaranteed in the process performance guarantee specified above per ISO 1217 Annex C.

c. Apply efficiency factors for the proposed motor based on the manufacturers data for the NEMA MG-1 routine test results.

d. Apply efficiency factors for the proposed VFD based on the VFD manufacturer's specific published data on efficiency at full load.

e. Add in the power requirement for the blower cooling fan(s) and other motors included for the operating Blower Packages.

f. Air flow rates and energy demands for Channel Mixing within the West Distribution Channel shall be excluded from the Operations and Maintenance Life Cycle Analysis.

11391A – 2 – IFAS Treatment System Aeration System General Design Conditions Schedule	
Parameter	*Value*
Influent Wastewater Temperature	
Minimum Month	10 °C
Annual Average	16 °C
Maximum Month	22 °C
Maximum Allowable MLSS Concentration (under normal conditions)	3,100 mg/L
Maximum Allowable MLSS Concentration	5,000 mg/L
Site Elevation	230 feet
Atmospheric Pressure	14.57 psia
Relative Humidity	
Typical	60%
Maximum	100%
Implied Oxygen percentage in Air	21%
Standard Oxygen Correction Factors	
Alpha (coarse bubble diffusers)	0.8
Alpha (fine bubble diffusers)	0.5
Beta	0.95
Theta	1.024
Atm Pressure	14.7 psia
Water Temp	20 °C
C^*_{sat20}	10.52 mg/l
C_{surfT}	9.07 g/l
Purge Systems required	
Coarse Bubble Diffuerss	As Noted
Fine Bubble Diffusers	Manual