Allen Park
Belleville
Brownstown Twp.
Dearborn Heights
Ecorse
Lincoln Park

Downriver Utility Wastewater Authority

25605 Northline Road ● Taylor, Michigan 48180

River Rouge
Riverview
Romulus
Southgate
Taylor
Van Buren Twp.
Wyandotte

REQUEST FOR PROPOSALS

for

BIOSOLIDS DRYERS MANUFACTURER SERVICES

via

PROGRESSIVE DESIGN-BUILD PROJECT DELIVERY

Issued: October 14, 2019

Due By: November 25, 2019

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1.0 NOTICE TO OFFERORS

OHM Advisors Inc. (OHM), on behalf of Downriver Utility Wastewater Authority (DUWA), is requesting Proposals (RFP) from drying technology suppliers ("Offerors") for a Biosolids Thermal Drying System (the "Project") to be implemented by a Design-Build (DB) entity via Progressive Design-Build (pDB) services delivery at the Downriver Wastewater Treatment Facility (DWTF) located at 797 Central Street, Wyandotte, MI 48192 (the "Project").

This RFP invites the submittal of a proposal ("Proposal") from vendors interested in providing biosolids dryers manufacturer services for the Project. Following the receipt of Proposals, a selection committee will evaluate the submissions and may conduct interviews as its basis for making a recommendation to DUWA for an award to a single Offeror. DUWA will select an Offeror that DUWA determines to provide the **best value**, based on qualifications and other factors that have been set forth in this RFP and any other factor(s) deemed in the best interest of DUWA. The Offeror will be awarded a Biosolids Dryers Technology Supply Contract ("Contract") by the selected DB entity for its delivery of the Project. See **Attachment D** for the minimum terms and conditions between the DB entity and the Offeror. The final contract between the DB entity and the Offeror shall be provided to DUWA for review. DUWA is in the process of soliciting proposals for the DB entity.

1.1 Required Materials

Offeror will submit a sealed package containing (5) five bound copies of the completed Proposal plus one complete electronic copy in PDF format on a flash drive by the deadline and to the address shown in the next section.

1.2 Submittal Location and Deadline

The Proposal must be received by DUWA's System Manager, OHM Advisors, at:

OHM Advisors

c/o Lambrina Tercala, P.E.

34000 Plymouth Road

Livonia, Michigan 48150

Proposal packages must arrive to the mailing address on or before:

3:00 p.m. EST, on Monday, November 25, 2019

It is the responsibility of the Offeror to see that the package sent through the mail or any other delivery method shall have sufficient time to arrive and be stamped in by this specified date and time. The receiving time at OHM Advisors' office will be the governing time for acceptability of submittals. Telegraphic, telephonic, faxed or emailed submittals will not be accepted. Late submittals will not be accepted.

1.3 Notice of Determination

DUWA will notify the Offeror by email whether it was selected for the Project.

2.0 DESCRIPTION OF DUWA

DUWA is a public body corporate organized pursuant to the provisions of Act 233. DUWA was incorporated by the Cities of Allen Park, Belleville, Dearborn Heights, Ecorse, Lincoln Parks, River Rouge, Riverview, Romulus, Southgate, Taylor, and Wyandotte; and the Charter Townships of Brownstown and Van Buren Township (the "Communities") to own and operate the Downriver Sewage Disposal System (the "System"). The System is located in the Charter County of Wayne, Michigan and is the second largest wastewater system in Michigan, serving the Communities with a service area population of 350,000.

2.1 Downriver Wastewater Treatment Facility

The Downriver Wastewater Treatment Facility ("DWTF") utilizes preliminary, primary, secondary, and disinfection treatment processes to treat sewage prior to discharging treated effluent to the Trenton Channel of the Detroit River. The DWTF is an oxygen activated sludge (OAS) plant as a secondary wastewater treatment plant. The DWTF's typical dry weather flows range from 30 to 60 Million Gallons per Day (MGD). However, the DWTF has the capacity to fully treat 125 MGD, and the capability to process up to 225 MGD during extreme wet weather events.

Preliminary treatment consists of influent pumping, screening and grit removal. After grit removal, wastewater enters the primary treatment facilities. In the primary treatment facilities, there are seven (7) primary settling tanks with ferric chloride and anionic polymer feed capabilities. During wet weather conditions, all preliminary treatment flow in excess of 150 MGD up to 225 MGD is pumped by the Tunnel Pump Station. The Tunnel Pump Station by-passes excess preliminary treatment flow from primary treatment and re-introduces the flow into primary treatment effluent flow before the low lift pump station. The low lift pump station has a pumping capacity of 200MGD and pumps flow into the secondary treatment process. Secondary treatment consists of pure oxygen fed to the OAS plant and final settling.

Preliminary treated wastewater (screening and grit removal) undergoes primary sedimentation with the ability to enhance treatment with ferric chloride/polymer addition. Primary sludge is pumped to gravity thickeners for co-processing with wasted secondary biosolids from the OAS process. Secondary wasted activated sludge (WAS) is pumped to the gravity thickeners. Thickened biosolids (typical range of 2 to 3 %TS) are pumped to the Solids Handling Building for dewatering and cake conveyance to enclosed truck loading bay. Raw (undigested) cake biosolids (typical range of 23 to 31 %TS as a blend of belt filter presses and centrifuges dewatering) are hauled away in double-hitch gravel train trailers (55 tons loads each) to landfill(s) for disposal.

As is further detailed in Attachment E, the composition (mass ratio of primary sludge to WAS, wet mass quantity and dry solids quality) of the dewatered cake biosolids will vary as a result of seasonal treatment (during the months of March through May) of de-icing fluid waste (glycol) from the Detroit Metro Airport. The mass ratio of primary sludge is constantly more than thickened secondary biosolids and balances (1:1) in late winter/early spring when higher rates of activated sludge are generated from the processing of glycol from the Airport. During the non-glycol treatment periods, the typical feedstock composition of primary sludge to thickened WAS is in a range of two-to-one (2:1) and to as high as three-to-one (3:1). As a result, centrifuged cake biosolids can be dewatered to more than 30% TS.

Currently, there are four (4) aged belt filter presses (BFPs) and two (2) high-solids centrifuges (Alfa Laval – ALDEC G2-120 machines) in the dewatering area of DWTF's Solids Handling Building. Veolia North America – Central, LLC (Veolia) is the contract Operator for DUWA of the DWTF under a long-term (20-year) agreement to provide full-service operations, maintenance and management (OM&M) services through the end of 2039. Veolia is responsible for the processing, management and disposition of all biosolids produced at the DWTF.

2.2 Cake Biosolids

Currently, the thickened biosolids blend of primary sludge and secondary WAS have been co-dewatered via a combination of BFPs and centrifuges. The fiber (cellulostic) content in the primary sludge results in a consistently high level of dewaterability of the thickened biosolids. During the non-glycol processing periods (e.g. June thru Jan.) the cake solids from the centrifuges will be slightly higher than during the glycol treatment periods (e.g. Feb. thru May). A structured emulsion polymer is used for biosolids dewatering.

The BFPs will be removed as part of the DB entity's Scope of Work (SoW) for the Project and therefore, the cake for the Project will completely and exclusively be raw and undigested biosolids from dewatering centrifuges (the "feedstock") for thermal drying into Class A product (e.g. granules with minimal dust at 90 to 92 %DS).

Information associated with the historical data and the current baseline of biosolids generation at DWTF, as well as seasonal variations and peaking factors associated with this Project are included in Attachment E.

3.0 OVERVIEW OF PROJECT

3.1 Project Background

As a result of restricted landfill capacity, the volume of dewatered biosolids accepted at regional landfills have been substantially decreased and disposal fees have dramatically increased (to almost double previously budgeted rates). As such, DUWA has investigated improved means for dewatered biosolids processing. DUWA assessed their options and has elected to reduce their dewatered biosolids volume and wet mass by installing a biosolids dryers system. The dried biosolids can be disposed of at a landfill, used as landfill daily cover, or used for beneficial reuse by a third party.

The Project includes the supply of parallel trains of in-direct, medium temperature heat dryers to continuously and reliably produce Class A biosolids (e.g. 90 to 93 %DS) in accordance with U.S. EPA's 40 CFR Part 503 Biosolids Rule. Upon successful commissioning, Veolia will operate the Project on a planned 7 days per week basis, 52 weeks per year to adequately and consistently process centrifuged cake biosolids into Class A dried product for hauling and final disposition.

The Project will include construction of indirect heating biosolids dryers, removal of the 4 BFPs that are beyond their useful life, and addition of 1 new cake feed hopper and 1 new centrifuge (to complement existing) to provide space for the new dryers. Ancillary equipment would also be installed to support the thermal drying process equipment, including a heat source for the dryers, air emissions capture and odor treatment system(s).

The Project is to be located inside the enclosed dewatering area of DWTF's Solids Handling Building. The Project will process only centrifuged dewatered biosolids (the "feedstock") for thermal drying into Class A product (e.g. granules with minimal dust at 90 to 92 %DS). The cake solids from the centrifuges has averaged 28.5 %TS (a range of 26 to 32 %TS). The BFPs will be removed as part of the DB entity's SoW for the Project. The 12% historical average variation in wet cake mass production (Section 2.2) is the basis for maximum month and capacity design criteria for the Project, relative to daily average cake biosolids production and processing generation levels (365-day basis).

The Offeror is to furnish the Project in accordance with the design criteria and scope of supply, as defined in the Offeror's Contract. The Contract will be assigned to the DB entity for its execution and field implementation of the Project.

A more detailed description of the Offeror's SoW and the interface obligations and field services required of the Offeror with the DB entity, DUWA and Veolia is provided in **Attachment A**: Technical Specifications (attached). **Attachment A** includes detailed information on deliverables, acceptance testing and systems performance, as well as process warranty requirements for the drying technology and related equipment systems furnished by the Offeror. Attachment A also provides general instructions with respect to erection and installation, as well as inspection and field-testing services to be provided by the Offeror.

3.2 Project Delivery

The procurement of the Project is occurring with two concurrent and overlapping RFPs. The first RFP is the procurement of the biosolids drying technology system (Project) equipment through the issuance and evaluation of the Proposals received in response to this RFP. The second RFP is the procurement of the progressive Design-Build (pDB) team that will be in charge of designing and constructing the Project. DUWA will select the Project from compliance and responsive Proposals received from Offerors that the pDB entity will have no authority to change.

The DB entity will be leading the progressive implementation of the Project in collaboration with the selected Offeror, DUWA and Veolia. The core work of the DB entity will be to demolish and remove the existing four (4) BFPs and supply/install a new third (3rd) high-solids centrifuge to complement the existing two (2) centrifuges. The heat dryers are to be installed in the location of the removed BFPs. The DB entity will design and provide conveyance systems for each process step including but not limited to feeding the centrifuges, the dryer and truck loadout. A cake biosolids hopper (e.g. live-bottom bin) is to be included by the Offeror, as well as a thermal oil* heater system (as fired by natural gas) as the primary heat source for adequate evaporation of moisture from the dewatered cake biosolids. Field erection and installation of the Project will be performed by the DB entity. The DB entity will also provide a bypass conveyance/piping system of cake biosolids around the dryer trains and to the enclosed truck loading bay to enable Veolia to provide continuous dewatering operations should one or both of the drying trains be off-line.

The DB entity will also be responsible for interim dewatering operations while the Project is being installed and commissioned. The DB entity will be responsible for its sequencing and interfacing/coordination operations plan with DUWA and Veolia, and the DB entity will provide temporary dewatering equipment during installation of the Project.

The DB entity's work shall generally be performed into three phases, consisting of:

- Phase I – Permitting, 30% and 60% design packages; reviews and workshops
- Phase II – 90% and 100% design packages; demolition and construction; start-up, commissioning and acceptance testing; and Project close-out activities
- Phase III – Warranty period and additional acceptance test

Note regarding heat source:

For the purposes of this RFP, the heat source is assumed to be hot oil. However, alternative heat sources may be considered for selection. The alternative heat source shall not require any certified boiler technicians be contracted by DUWA or added on-site staff by Veolia

3.3 Project Objectives and Expected Results

The Project includes the supply of in-direct heat dryers to provide consistent and reliable thermal drying of the wet cake biosolids into Class A dry product. The wet cake from the centrifuges will be conveyed to a single cake hopper (live-bottom bin) to be discharged into feed pumps via variable speed controls to supply feedstock to the dryers' system. The cake biosolids will be processed in a once pass-through (plug-flow) manner and without any solids recycle to produce dried granules with minimal dust for conveyance to trucks with gravel train size trailers within existing (two) loading bays for haul away by a third-party to landfill disposal and/or beneficial use.

The overall Project objectives and expected performance results include the following:

a. A minimum and target average biosolids moisture content removal and wet mass reduction of 68.5% and 70.0%, respectively.
b. Production of Class A solids in granular form with minimal dust content

c. Annualized operating uptime of 91.5% and target maximum month at 100%
d. Reliable feedstock processing through both dryer trains without fires or sparks
e. Automated process control and continuous monitoring of operations and safety
f. Ease of accessibility for process sampling, trouble-shooting and maintenance
g. A significant net reduction in operating expenses (i.e. dryers operating costs will not materially offset savings from cake biosolids processing and landfill disposal costs)

3.4 Design Criteria

The Project Design Criteria is summarized in Table 1 (following). The Design Criteria reflects the target ("sweet spot") for centrifuge cake solids content of 28.5 %TS (and target controlled range of 26-29 %TS) so as optimize feedstock conveyance, bin storage and pumping, and moisture evaporation of the dryers' system.

Table 1: Project Design Criteria

Design Criteria	Daily Avg.	Max. Month	Capacity
Wet Mass Processed, WTPD	140.0	156.0	175.0
Dewatered Cake Solids, %TS	28.5	26.0	26.0
Cake Bin Storage Fill, % of Level	85.0	85.0	85.0
Cake Bin Solids Retention Time, hrs.	8.1	7.3	6.4
Feedstock Loading Rate, lb TS/hr	3,630	3,380	3,790
Dryer Operation Uptime, % hrs/dy	91.5%	100%	100.0%
Inlet Drying Temperature, deg F	See Note *	<525	550
Outlet Dry Solids Temperature, deg F	95 - 115	< 120	<100
Dried Solids Content, %DS	90.0 – 92.0	> 92.0	92.0
Drying Evap. Demand, lb H2O/hr	8,830	9,370	11,000

** Inlet temperature safely operating in range of 330 to 500 deg F for thermal oil and up to 280 deg F for hot water.*

The overall quantity of dryers is dependent on the equipment selected, however, in no case, shall a single dryer unit be accepted. Relative to the Project Design Criteria provided above in Table 1 (above), if two dryer units are provided, the individual dryer units shall nominally be able to process half (50%) of the feedstock flow and loadings on an equivalent processing schedule and reliability duration over each operating year.

The integrated Biosolids Thermal Drying System shall include a single (one) 60 to 65 cubic yards (CY) storage bin for feedstock interconnect between centrifuges dewatering and dual thermal drying trains. The single (one) thermal oil heater system shall have a net output capacity of 18.0 MMBtu/hr to continuously and safely supply heat to the dual thermal drying trains via dual loops for flow/temp. controls. The quantity of hot water heater system, if applicable, may be more than one.

Each dryer train will have its own condenser for control and management of recirculating process air with net foul air exhaust flow and condenser water blowdown as return streams from the Solids Handling Building to the DWTF for further treatment/disposition. Alternative approaches will be considered if sufficient information is provided to understand the complete financial and environmental implications.

Fugitive emissions of odor and/or dust within the Solids Handling Building (SHB) from the Dryer Project are to be controlled and mitigated via the following Basis of Design expectations:

- Dryers Supplier to provide process air emissions control for any odor and particulate matter (dust) from Dryers enclosures and enclosed discharge conveyance systems.
- DB Entity to provide enclosed dried solids conveyance from the discharge conveyance of dryers to the existing SHB truck bay for trailers loading.
- Dryers Supplier and DB Entity to consider any additional odor control and/or dust suppression system(s) for the dried solids at the SHB bay during trailers loading

3.5 Scope of Supply

The conceptual scope of supply for the Project by the Offeror is summarized below. The major processing equipment for the Project, as to be provided by the Offeror, includes critical spare parts of various components. DUWA recognizes major process equipment and critical spare parts listing will differ based on manufacturer, and some elements noted in this RFP may not be included in the Offeror's proposed scope of supply. The listing identified herein and dryers' system equipment noted in **Attachment A** are meant only to present a standard of understanding.

The DB entity will supply the third centrifuge and dried solids conveyance, along with ancillary support systems.

Conceptual Project Equipment Components:

- Wet Cake Live Bottom Bin
- Storage Bin Cake Feed Pumps
- Cake Solids Polymer Dosing Rings
- Cake Solids Feed Conveyance
- Cake Solids Bypass Conveyance
- Dryer Access Platforms and Stairs
- In-Direct Heat Thermal Dryers
- Dryer Water Sprinkling Systems
- Dried Solids Extraction/Cooling Screws
- Thermal Oil Heater Skid System
- Natural Gas Supply Train at TO Heater
- Thermal Oil Supply/Recirc. Pumps
- Thermal Oil Primary & Secondary Loops
- Thermal Oil System Expansion Tank
- Thermal Oil System Dump Tank
- Dryers Hot Oil Heat Exchanger(s)
- Dryer Air Exhaust/Recirc. Fan(s)
- Vertical Packed-Bed Condensers
- Condenser Service Water Pumps
- Air Compressor (Instruments/Vales)
- Dryers Control Panels and I&C Package

The Offeror shall provide, in their Submittal, the total units provided per dryer train, dryer system, and spare parts for the Project equipment components referenced above.

3.6 Key Performance Indicators (KPI)

The following operational KPI and core process performance metrics for the Project are listed below:

- Average daily runtime = 22.0 hours per day
- Average operating schedule = 52 weeks per year
- Average cake biosolids = 28.5 %TS (range of 26-29 %TS), however, dryer cake variation can and should be expected without operational impact to the dryer system
- Target dry biosolids = 92 %DS (range of 90-93 %DS with minimal dust)
- Dryers thermal energy efficiency < 1,500 Btu/lb H2O evaporated

3.7 Schedules

The following tables provide the anticipated Procurement and Project Schedules. DUWA reserves the right to modify the Schedules via Addenda issued prior to the date set forth below.

Procurement Activity	Date
Issue Project Equipment Vendor RFP	October 14, 2019
Pre-Submittal, Confidential Meetings & Site Visits	October 28 thru November 8, 2019
Due Date for RFP Questions	November 8, 2019
(Off-Site) Pilot Testing	October 14 thru November 25, 2019
Off-Site Tours of Existing Installs	November 11 thru December 6, 2019
Proposal Due	November 25, 2019
Recommendation of Project Equipment by DUWA Technical Committee	December 2019
Recommendation of Project Equipment and pDB Team Selection to Board; Board Approval	January 2020
Contract Negotiations	January 2020
NTP to pDB Team	February 13, 2020

Project Schedule (inclusive of DB Entity Activity)	Date
Negotiations, Contract Development and Issue NTP	February 13, 2020
DB Entity - Prepare and Submit Applicable Permits; Permit Approvals (Anticipated)	Apr 2020
Submit 30% Design	Apr 2020
DUWA Review Comments with Approval/Release Critical Equipment (30 days after receipt of 30% design)	May 2020
Submit 60% Design	June 2020
EGLE Part 41 – Comments (8 weeks)	Aug 2020
Open Book GMP Proposal	July 2020
DUWA Board Approves Final Negotiated GMP Scope and Fee ***Following receipt of EGLE 60% comments*	Aug 2020
100% Design Submission	Sept 2020
EGLE Part 41 Permit	Nov 2020
Construction NTP	Nov 2020
Construction Substantially Complete	July 1, 2021
Start-Up and Commissioning	Sept 2021
Preliminary 30-day Acceptance Test	Oct 2021
Final Completion - Deliver warranties, O&Ms, record drawings	Nov 30, 2021
Two Year Warranty Period w/ 30-day Stress Test	Nov 2023

DB Entity shall coordinate with EGLE for submission and approval of the project as outlined herein and within the Design-Build RFP. It is anticipated that each of the progressive design milestone submittals will be provided to EGLE with 8-week review periods for the 60% design and 100% design.

DUWA Design reviews shall be completed in 30 days; other submittals shall be per General Conditions section 3.8, provided in the Sample Contract Appendix of the Design-Build RFP.

Any exceptions and/or known variances shall be identified by the Offeror in the Submittal with explanation of challenges, suggested changes and propose any offered solution(s) that DUWA may consider, while maintaining the fast-track objective.

Offeror shall detail the historical performance of technology supply and equipment delivery information relative to each of its three (3) key reference projects, as well as the overall schedule and any challenges in the execution of those schedules (i.e. planned versus actual).

DUWA is interested in a fast-tracked project as to reduce operating cost. The Offeror's ability to meet or beat the Schedules suggested above is very favorable to DUWA.

3.8 Project Funding

The Project is to be funded by DUWA utilizing a combination of funding sources, including reserves and loan-interest loans or bonds. DUWA has recently prepared and submitted a Letter of Interest (LOI) to US EPA to seek funding via the Water Infrastructure Finance and Innovation Act (WIFIA)

loan program. If a WIFIA loan is not awarded to DUWA by US EPA, then DUWA will proceed with traditional municipal bonding to secure the funds. Schedule implications may be realized if there is a shift in funding source.

The WIFIA loan requirements including NEPA, Davis-Bacon, American Iron and Steel, and all other federal cross-cutter provisions apply. The Offeror shall be reasonably expected to furnish additional information and/or drawings to DUWA that supports its needed cost data and/or documentation to enable disbursement of WIFIA loan funds. For further details, Offerors should familiarize themselves with U.S. EPA's WIFIA Loan program and review their website at: https://www.epa.gov/wifia.

4.0 PROCUREMENT PROCESS

4.1 General Information

DUWA is soliciting submissions via a single-step RFP procurement process, which will include an interview by all Offerors as the basis of selection for awarding a Contract to a single Offeror. The response provisions, submission requirements and selection criteria, as set forth in this RFP are intended to provide DUWA with the requested information from Offerors to make a "best value" decision.

Procurement and selection shall be made without any lobbying and/or direct contact with DUWA (and its 13 municipal members) by Offerors.

4.1.1 Compliance with Legal Requirements & DUWA Policies

This Procurement will be in accordance with Michigan's Antitrust Reform Act, Public Act 274 of 1984 and all applicable federal, state, and local laws, and DUWA policies and procedures.

The Project SoW must comply with the requirements of all applicable local law and ordinances, as well as State and Federal agencies. Each portion of the Project SoW shall be performed by a person licensed, equipped and experienced to do work in the particular field. Offerors are encouraged to review public Contract Code and Public Law, which include requirements for performance of the work by Contractors and Subcontractors.

The Offeror and any of its subcontractors shall comply with DUWA's procurement and workplace policies, included as **Attachment B** to this RFP. The applicable DUWA policies for this Project include purchasing and procurement; ethics, harassment, conflict of interest and affirmative action; safety and a drug-free workplace.

4.1.2 Expenses of Dryer Technology Supplier

DUWA accepts no liability for the costs and expenses incurred by Offeror in responding to this RFP. Each Offeror that enters into the Procurement process shall prepare the required materials, the Proposal, at its own expense and with the express understanding that the Offeror cannot make any claims whatsoever for reimbursement from DUWA for the costs and expenses associated with the process, even in the event DUWA cancels this Project or rejects all Proposals.

4.2 DUWA Rights and Procurement Conditions

DUWA reserves without limitation, and may exercise at its sole discretion, the following rights and conditions with regard to this Procurement process:

a. To cancel the Procurement process and reject any and all Proposals;

b. To waive any informality or irregularity;

c. To revise the RFP, any other Procurement documents, and Schedule via an Addendum;

d. To reject any Offeror that submits an incomplete or inadequate response or is not responsive to the requirements of this RFP;

e. To require confirmation of information furnished by an Offeror, require additional information from an Offeror concerning its Proposal and require additional evidence of qualifications to perform the work described in this RFP or a subsequent RFP;

f. To provide clarifications or conduct discussions, at any time, with one or more Offeror;

g. To contact references who are not listed in the Offeror's qualifications and investigate statements on qualifications and/or qualification of the Offeror identified in the Proposal;

h. To consider Alternative Technical Concepts and/or approaches identified by Offeror;

i. To take any action affecting the RFP process, or the Project that is determined to be in DUWA's best interests; and

j. Approve or disapprove of the use of particular Subconsultants, Subcontractors, or Key Team Members and/or substitutions and/or changes to Subconsultants, Subcontractors, or Key Team Members from those identified in the Proposal. Such approval or disapproval shall not be unreasonably exercised.

k. DUWA reserves the right to make the sole and final decision of Offeror on the basis its procurement process and other factor(s) it deems appropriate.

l. DUWA reserves the right, but shall not have the obligation, as part of this RFP process to hold discussions and/or negotiations with the Offerors. If such discussions and/or negotiations are conducted, they will done in an honest, fair and confidential manner, and in good faith with respect to the rights of the direct parties.

m. All Submissions received by DUWA are understood to be confidential documents and as such, DUWA shall make reasonable efforts, consistent with applicable laws, to refrain from disclosing to competing Offerors prior to selection and award, the content of any commercially confidential information that is contained in another Offeror's Submission package.

4.3 Outline of the Procurement Process

a. This RFP invites an Offeror to submit a Proposal discussing their technical qualifications to provide manufacturing services and the conceptual design of their proposed biosolids dryers technology system (Project).

b. Prior to the submission date for Proposals, written questions will be accepted as defined in this RFP. Procurement inquiries shall be made, via email, to Lambrina Tercala, P.E. (Lambrina.Tercala@ohm-advisors.com). All questions and relevant information inquiries received by this time and date will be responded to, in writing, by issuance of addenda, to all of the registered Offerors. Anonymity of the source of specific questions and information inquiries will be maintained in the written responses. Reponses to all questions and information inquiries will be emailed to all of the registered Offerors.

c. DUWA will conduct one (1) mandatory, Confidential Individual Pre-Submittal Meeting with each Offeror for approximately three (3) hours. The format of the Confidential Individual Meetings will be designed to allow the Offeror to ask DUWA questions regarding the Project and DUWA's goals and concerns. All information provided in the Proprietary Individual Meetings will remain confidential during the procurement process.

d. A site visit/ tour of the DWTF Solids Handling Building will be provided as part of the meeting to enable all Offerors to inspect the Project area and receive first-hand

orientation to the existing biosolids dewatering facilities that will incorporate the new thermal drying system and ancillary facilities. Accordingly, Offerors shall bring their own Personal Protective Equipment (PPE) to participate in the site tour, which should minimally include a hard hat, steel toed shoes/boots, and safety glasses.

e. Complete voluntary off-site pilot test to assess the dryer's ability to successfully process DWTF's biosolids. DUWA will provide up to two drums and shipping costs (in USA) for the pilot test. All other expenses will be by vendor.

f. Coordinate a field trip by select members of DUWA's RFP Selection Committee to an existing install. DUWA will pay for travel expenses of the Selection Committee members only. Offeror will identify the site for travel and coordinate with the site's operators for the visit. The visit is expected to include discussions with operators in the challenges and successes of the Dryer's operation and permit the Selection Committee to see and touch the Dryer while in operation. Sites identified for travel are expected to include those located in the Midwest or East coast of the USA only.

g. Offeror will submit their Proposal and other deliverables required pursuant to this Procurement at the time and in the manner set forth in this RFP and any Addenda. DUWA will not consider Proposals or other deliverables that are submitted after the time set forth in the RFP. Offeror are solely responsible for making sure that DUWA receives the Proposal in a timely fashion.

h. DUWA will conduct one (1) Interview with each Offeror. The Interview shall be approximately ninety (90) minutes and will occur after the submission of the Proposal. DUWA reserves the right to ask questions of the Offeror, including but not limited to questions regarding the Offeror's Proposal. Offeror should include in the presentation an explanation of how their drying system equipment meets or exceeds the Project requirements, including technical, schedule, and pricing considerations.

i. DUWA will evaluate the information submitted by each Offeror utilizing an Evaluation Committee. The Committee will review and evaluate the Proposals based on the evaluation criteria set forth in this RFP to select one (1) Offeror for the Project.

j. At its sole discretion, DUWA may ask written questions of Offeror, seek written clarifications, and conduct discussions with Offeror on Proposals.

k. DUWA will provide email notification to all Offerors of the selection decision and make a selection summary available to all Offerors at the conclusion of the Procurement.

l. By submitting a Proposal pursuant to the RFP, the Offeror represents and warrants that it will enter into the contract provided by DUWA subject to the terms set forth in its Proposal.

m. All Offerors may request a de-briefing from DUWA with respect to the Procurement; however, DUWA shall conduct no such de-briefings until it has either reached an agreement on the Project or canceled the Procurement.

5.0 DOCUMENTATION REQUIREMENTS

5.1 Submittal Process

There is no page limitation for the Proposals.

The overall content and format of the Proposal shall adhere to the outline (following) and as more described in the following section:

- Cover Letter
- Executive Summary
- Statement of Qualifications
- Project Description
- Project Approach and Scheduling
- Financial Capabilities
- Indicative Price and Basis

5.2 Contents of Proposal

5.2.1 Cover Letter

Offeror must include a cover letter that includes the following: one (1) name, mailing address, telephone number, and e-mail address of the Offeror and the principal contact person(s). It must be signed by a representative of the Offeror who is authorized to sign such material, must expressly certify under penalty of perjury that all information provided in the Submission package is true and correct to the best of the representative's knowledge, and must commit the Offeror to the obligations contained in the Submission.

5.2.2 Statement of Qualifications

DUWA is seeking information and an understanding of the Offeror's capabilities and competencies to supply the Project SoW (see **Attachment A**: Technical Specifications for details on Technical Specifications).

General information should be provided about the type and size of the company, as well as key design engineers and field services individuals that would be utilized for this Project. Key personnel of the Offeror should be identified (and their credentials generally described) for those individuals who would attend pDB workshops during Phase I and II services of the DB entity and collaborate with DUWA and Veolia during Project implementation, as well those individuals who would be providing the dryers system(s) check-outs and field testing, training and commissioning support (inclusive of the acceptance testing and demonstrated performance in accordance with design criteria and operational KPI).

Relevant experience and qualifications include thermal drying using hot thermal oil as fired by natural gas or hot water, with successful operating systems at medium to large size WWTPs (e.g. 15 to 150 MGD).

5.2.2.1 Minimum Qualifications and Experience

The minimum qualifications and experience for the Project include the following:

- Material or construction and/or location of manufacturing for the drying technology and ancillary equipment must meet funding requirements by US EPA WIFIA loan program, as applicable.
- proven compliance at three (3) installations to produce Class A biosolids
- evaporation design capacity installation of greater than 4,000 lb H2O/hr

- in-direct heating via utilization of hot thermal oil or hot water supply / recirculation with inlet temperature safely operating in range of 330 to 500 deg F for thermal oil and up to 280 deg F for hot water
- no issue of an experienced dryer dust explosion and/or fire at a U.S. plant within last 3 years.
- scope of supply and services in contract value exceeding $3.0 million USD

5.2.2.2 Preferred Qualifications and Experience

The preferred qualifications and experience for the Project include the following:

- multiple operating installations in the U.S. at WWTPs
- dewatered biosolids from centrifuges and cake solids at least 25.0%TS
- reference projects with multiple drying trains at WWTPs (U.S. and global)
- operating installation of a single drying train at design capacity > 20 DTPD (if using multiple driers)
- operating installations on a seven (7) days per week processing schedule
- materials of construction that mitigate corrosion or melting

Offerors shall provide three (3) key project references of operating installations within the past ten (10) years and include relevant client contact information as well as current data with respect to design criteria, scope of supply, sale price, performance requirements, operating history and after-market support services.

Any installations by an Offeror of its proposed dryer system technology that are no longer in service and/or performing at reduced operating conditions should be disclosed and described as to the situations, root causes of problems and remedies.

Supplemental information for Offeror's credentials of experience and relevant qualifications may be provided as attachments to its Submission, with DUWA's request for consideration of reasonableness with respect to voluminous content / quality.

DUWA reserves the right to waive minor irregularities and non-material variances to the information provided in Submissions for the 'Minimum Qualifications and Experience' section. DUWA also reserves the right without prejudice, to disqualify an Offeror's Submission if it is deemed upon review, to be non-responsive and/or non-compliant with the 'Minimum Qualifications and Experience' section.

5.2.2.3 Key Personnel and Credentials

The key personnel to be utilized by the Offeror for the process design work, technology supply coordination with the DB entity and performance of field services shall be identified with summary descriptions of their credentials and an overall organizational chart as to management structure and staffing for the Project. Key personnel may include, but not be limited to the following core activities and/or positions for development and delivery of the Contract:

- Project Manager as the single point-of-contact with DB entity
- Process design and equipment systems engineering
- Value engineering and constructability workshops representative(s)
- Equipment scope and technology manufacturing/delivery coordinator

- Field services supervisor and representatives for check-outs / training
- Commissioning supervisor to field interface during the acceptance tests
- Submittals (e.g. shop drawings, instructions, OEMs) production manager
- Service engineer as single point-of-contact for Operator during warranty

The key personnel shall provide the number of years of professional services (process design and technology systems supply) in the biosolids management industry, as well as relevant years of experience with biosolids thermal dryers and design-build projects.

5.2.3 Project Description

The Offeror shall provide a narrative description of its proposed in-direct heat / thermal drying technology and integrated/supporting equipment systems for the Project.

Provide a process description as to how the proposed in-direct heat, medium temperature drying system fits into the DWTF Solids Handling Building, properly interfaces with the existing and expanded centrifuges dewatering systems, and integrates into Veolia's operations (plan for 22 hours per day, 7 days a week, 365 days per year basis) for thickened biosolids processing, dewatered cake handling and dried product loading of trailers for haul away to final disposition (plan for normal 6 days per week and peak 7 days per week schedule).

Key components of the Project description shall include an overview of the drying technology and processing approach, adherence with the Project Design Criteria and Scope of Supply and its ability to reliably achieve the Operating KPI.

Additional key elements to the Project description should include a Project Process Flow Diagram (PFD); Mass and Energy Balances (MEB); Equipment Dimensions (floor area footprint); and General Arrangement Drawings (illustrating layout of dryer systems). MEB's shall include information for each of the process streams (solids, water and air).

5.2.4 Project Approach and Scheduling

The Offeror shall provide a narrative description of its management approach and other technical aspects in the supply and implementation of the Project.

The technical offering and proposed solution should include the Offeror's understanding of the Project and related key issues, and include a narrative description of the management and field services approach in a progressive DB delivery environment which includes collaboration with the DB entity, as well as coordination with DUWA (as Owner) and Veolia (as Operator). Specific field services should be detailed, relative to support to be offered and provided by the Offeror during the pDB delivery phases of the Project, and inclusive of start-up, commissioning and acceptance testing periods, as well as "after-market" services (e.g. system optimization, additional training, upgraded PLC programming and operator interfacing systems, etc.) that may be requested by DUWA and/or Veolia (after pDB services close-out of Project).

The Offeror should describe any equipment redundancy features of its dryer technology system and integrated/supporting processing equipment for the Project which demonstrates factor(s) that contribute to the expectation of high reliability and processing performance over a long-term operating period. Describe features that promote ease of maintenance and provide operational continuity during maintenance.

DUWA is seeking an Offeror who possesses the process design resources and technology delivery services to execute a fast-tracked pDB delivery and implementation schedule as a

direct sub-contractor to the DB entity and also collaboration with other parties (DUWA and Veolia).

The Dryer delivery should meet or beat the Owner's estimated date as to promote Project efficiency and have the least amount of impact on Owner operations and the Project stakeholders, as possible.

- Describe the overall approach to accommodate the suggested Project Schedule. Include a description as to how the Offeror will address regulatory and stakeholder approvals for the permitting process, as applicable.
- Identify the challenges in scheduling the fabrication of the Dryer and how the Offeror will address those challenges.

DUWA reserves the right, at any time, to make additions, modifications or deletions to any of the events or dates that comprise the Project delivery schedule and pDB timeline. Any such changes to the Project schedule shall be made and notified by the DB entity to the Offeror during the phased pDB activities, following DUWA's review and their follow-on issuing of any approvals to changes in the Project schedule.

Offeror shall affirm its ability to adhere to the delivery schedule and activities timeline shown in **Section 3.7** of this RFP. Any exceptions and/or known variances shall be identified with explanation of challenges, suggested changes and propose any offered solution(s) that DUWA may consider, while maintaining the fast-track objective.

Offeror shall detail the historical performance of technology supply and equipment delivery information relative to each of its three (3) key reference projects. Explain the overall schedule and any challenges in the execution of those schedules for each of its three (3) key reference projects. Moreover, explain the reason(s) for differences in the planned versus actual (or projected) dates of technology supply and delivery; erection and installation; start-up / commissioning / acceptance testing; and final completion, while including any approved time extensions.

For completed projects, provide the number of days from the original contract date for completion, any granted time extension date, and actual (recorded) date of completion.

5.2.5 Financial Capabilities

The Offeror shall provide a narrative description of its corporate financial strength and resources to execute the Project, state its bonding capacity and its ability to provide the technology warranty and process performance guarantee(s).

Generally, describe the number of years that the Offeror has been in business and supply a Dun & Bradsheet report. Provide proof of licensing to do business in Michigan for the supply of the good and services required for the DUWA Project. Identify and detail any change in corporate ownership at any time in the past three (3) years from the date upon which this RFP was issued.

Specifically, detail the annual revenues for each of the past three (3) fiscal years and the affirmation that it can performance bond and provide financial security for its Contract scope (and can at a minimum, demonstrate its ability to performance bond and warranty an Offeror Contract value of at least $6.0 million USD). Denote to the extent possible, the percentage of Contract value that it would be prepared to offer DUWA with respect to the technology system performance bonding and process warranty, as well as contemplated duration of term (e.g. months or years).

Provide a letter from a bonding company stating the Offeror's ability to acquire a performance bond for the Indicative Price (as provided in **Attachment C**). The letter should be in the form of a Consent of Surety as evidence of financial security.

Provide any other financial information and other security resources that the Offeror proposes as relevant and value to DUWA that may be considered for inclusion in the Contract (as will be assigned to the DB entity). Describe the company's overall current state of financial capabilities, strengths, and outlook, as well as any impact issues in the past five (5) years that may impact its forward-going ability to supply the dryer technology and successfully execute a contract.

Offeror shall state whether it has the ability (or has) the Project insurance requirements and the coverage limits as stipulated in **Attachment C** of this RFP. Provide a declaration or notarized statement from the Offeror insurance company or from a broker/agent as to the ability to obtain (or has) insurance in coverage limits as stated in **Attachment C**.

5.2.5.1 Contract Default History

If the Offeror has been (or currently is) involved in a legal claim, contract dispute, or lawsuit in excess of $50,000 that has been filed in court or arbitration concerning its technology or equipment and/or process design work in the last five (5) immediate years from the date of issuance of this RFP, it shall identify the claim(s) by providing the name of the project owner and claimant, location and scope of the project, claim date and a brief description of the nature of the claim, the court in which the claim was filed, and a current status of the claim (e.g. pending or if resolved, a brief description of the resolution).

If the Offeror has filed a claim, contract dispute or lawsuit in excess of $50,000 against a project owner and/or principal design/build entity (either the designer, builder or both firms) concerning its technology or equipment, process design or payments for contract work in the last five (5) immediate years from the date of issuance of this RFP, provide information as prior paragraph.

If in the last five (5) immediate years from the date of issuance of this RFP, the Offeror's insurance carrier, or any form of insurance, has refused to renew the insurance policy for the coverage types and limits as required under the contract with an Owner or design-build entity, based upon losses or non-payment, provide the name of insurance carrier and year of refusal.

5.2.6 Indicative Price and Basis

The Offeror shall provide its indicative capital pricing for its contract scope and value (e.g. the cost for equipment supply and shipping), the operating cost basis, as well as a net present worth analysis (20-yr) as requested in the Cost Proposal Form as **Attachment C**.

The indicative pricing is to include process and design engineering, equipment supply and shipping to the DWTF, and the necessary field services (and including the pDB workshops during the Phase I and II services of the DB entity). In addition to technology supply, the indicative pricing shall include all other components in the Scope of Work (SoW) by the Offeror , such as process design, engineering support services, materials, Documents, assembly instructions / erection monitoring, installation requirements, field services, O&M personnel training, start-up/commissioning, process warranty and performance bonding, as well as the two (2) thirty-day (30-day) acceptance testing.

Pricing shall be FOB shipping point, with freight allowed to the job site (DWTF Solids Handling Building). The indicative pricing shall not include sales or use taxes. The indicative pricing shall be valid for ninety (90) days from the Proposal Submission date.

For the purposes of developing the Net Present Worth Analysis, assume the following price considerations. Include replacement and/or repair cost for system components for each year from Year 1 through Year 20. Include note if replacement part is a provided spare part or not.

- EPA Discount Rate: 4.000%
- Life Expectancy: 20 yrs., min
- Cost Recovery Period: 20 yrs.
- Electric (energy only): $0.07053 per kWH
- Natural Gas (supply + delivery): $3.85 per dekatherm from Years 1-2; increase 3% thereafter
- Potable Water: $4.409 per 1000 gals; incorporate assumptions where SFE may be used in lieu of potable water
- Biosolids Disposal Fees (per wet ton): $53 (Year 1), increase 6% thereafter
- Hauling Fee (per wet ton): $14 (Year 1), increase 3% thereafter

6.0 EVALUATION CRITERIA

The criteria below will be used to evaluate the Proposals. All material will be reviewed to verify that the Offeror has the qualifications necessary to successfully complete the Project. Proposals that have not complied with requirements, do not meet minimum content and quality standards, or take unacceptable exceptions to the General Terms and Conditions of the Contract, will be eliminated from further consideration. Proposals will be reviewed and evaluated by an evaluation committee.

6.1 Statement of Qualifications — 40%

This category will evaluate the Offeror's ability to provide the dryer manufacturer services for the Project and produce the required outcome in a timely manner. Consideration will be given based upon the Offeror's experience, years in business, past and current client references; technical expertise and professional competence in areas directly related to this RFP; number of years of experience in performing similar work. It is the intention of DUWA to award a contract to the Offeror who furnishes satisfactory evidence that the Offeror has the requisite experience and ability to enable the Offeror to execute the work successfully and properly, and to complete services in a timely manner. To determine the degree of responsibility to be credited to the Offeror, DUWA will weigh the evidence that the Offeror has performed satisfactorily other contracts of like nature, magnitude and comparable difficulty and comparable rates of progress.

6.2 Project Approach and Scheduling — 30%

This component evaluates the Offeror's responsiveness in their Proposal, including completeness and thoroughness of proposal. This category will also evaluate:

a. Ability to provide services as outlined in the Request for Proposals
b. Approach and proposed process design to project scope
c. Demonstrated knowledge of the work provided
d. Explanation of the Project or services provided
e. Innovative approaches and internal measures for timely completion of the Program

6.3 Financial Capabilities — 10%

The Offeror should set forth their financial strength capabilities and ability to meet performance bond and warranty requirements.

6.4 Indicative Price and Basis— 20%

The Offeror should set forth a maximum cost for each of the Project elements. Proposals will be evaluated for the transparency, thoroughness, and reasonableness of their proposed costs.

LIST OF ATTACHMENTS

Attachment A: Technical Specifications

Attachment B: DUWA Procurement and Workplace Policies

Attachment C: Cost Proposal Form

Attachment D: Minimum Required General Conditions Between Dryer Manufacturer and Design-Build Entity

Attachment E: Veolia's Technical Memorandum re Biosolids Generation @ DWTF

ATTACHMENT A: TECHNICAL SPECIFICATION

SECTION 1 – GENERAL

This technical Specification details the necessary work to furnish and coordinate the installation of the equipment for the Biosolids Thermal Drying System (the "Technology") at the Downriver Wastewater Treatment Facility ("DWTF"). All components of the Technology included herein shall be designed and furnished by one "Technology Supplier" in order to centralize responsibility for the biosolids thermal drying equipment supply and meet the performance guarantees as defined herein.

The Technology shall be installed at the DWTF's existing biosolids dewatering building (as a weather protected building) and shall include the key unit processing components of wet cake biosolids storage and pumping, dryer unit(s), cake biosolids bypass conveyance (piping), dried biosolids cooling and conveyance, thermal oil heating system, foul air exhaust and condenser, and control panel with programmable logic controller (PLC) (and including human-machine interface [HMI] into DWTF's supervisory control and data acquisition [SCADA] system). The Downriver Wastewater Utility Authority ("DUWA") is the owner of the DWTF and will become the owner of the Technology through acquisition from the design-build entity ("DB Entity"). The DB Entity will purchase and install the Technology on behalf of DUWA. The Technology will be operated and maintained by Veolia Water North America–Central, LLC ("Operator").

1.01 GENERAL CONTRACTOR (the "DB Entity") SCOPE OF WORK

A. Installation of all equipment and materials as provided by Technology Supplier.

B. Supply and installation of all sample pumps and sample piping as required for instrumentation provided by the Technology Supplier.

C. Provide support labor, equipment, materials and supplies in assistance to the Technology Supplier as required for start-up and commissioning of the Project, including Technology and process equipment oils and lubricants and any other machinery fluids and/or maintenance related chemicals.

D. Operator shall provide all analytical testing chemicals or process sampling reagents, laboratory testing equipment and laboratory facilities, analytical work and any other operating supplies required for the Technology start-up and process equipment adjustments during Technology commissioning and performance testing.

E. DUWA shall provide all utilities as required for start-up, commissioning and acceptance testing of the Technology and other ancillary process equipment for the Project.

F. Provide all anchor bolts and epoxy/adhesive for anchors of the Technology equipment and interconnect piping, manual isolation valves, including those provided by the Technology Supplier.

G. Supply and installation of all insulation and heat tracing for all tanks and piping subject to freezing temperatures.

H. Provide and install all piping and conveyance required to connect to the Technology Supplier's equipment.

I. Provide all support beams and/or structural components, concrete foundation slabs and pads, grating and covers, floor and toe plates, handrails, hatches, ladders, stairs, walkways and process equipment platforms as required by the Technology Supplier.

J. The DB Entity shall install and test all level floats, level transmitters, level alarms, and alarm communication devices prior to start-up and commissioning of Technology Supplier's equipment with feedstock biosolids.

K. Mechanical ancillary equipment (including fans, pumps and sumps) shall be accessible without requiring temporary access (e.g. ladders, hoists, cranes, man lifts, etc.)

L. Supply and install all Technology motor control centers, motor starters and breakers, main disconnects, power supply and transformers, electrical panels and variable frequency drives (VFDs) for the pumps provided by the Technology Supplier.

M. Installation of all control panels and instrumentation provided by the Technology Supplier in compliance with Section 3 (Electrical, Instrumentation and Controls) herein.

N. Supply and install all electrical power, control wiring and conduit to the Technology and Project, including field wiring, inter-connecting wiring and terminations at equipment and local control panels, power lines, cable trays, cable, junction boxes and local control panels, fittings, disconnects, conduit, etc. in compliance with Section 3 (Electrical, Instrumentation and Controls) herein.

O. The DB Entity shall coordinate the installation and timing of all interface points such as piping and electrical tie-ins with the Technology Supplier.

P. Supply and installation of any embedded pipe sections or wall inserts, if applicable, for any penetrations including but not limited to those for drop pipes and instruments.

Q. Documentation and reporting of training activities and field services provided by the Technology Supplier.

R. Supply and install the concrete service pad for the Technology as specified herein.

S. All other work not included in the Technology Supplier's SCOPE OF WORK.

1.02 TECHNOLOGY SUPPLIER SCOPE OF WORK

A. Technology Supplier shall be responsible for the biosolids thermal drying process design and equipment sizing, system models selection (e.g. dryer units and thermal oil heater), manufacturing and supply, and delivery required for the Technology at the DWTF. The Technology will be designed, manufactured, and supplied in accordance with this Section 1.02 of the technical specifications.

B. Technology Supplier shall provide comprehensive process design and engineering, and procurement support of its Technology package, including but not limited to:
   1. Process design basis, mass and energy balances, and performance criteria.
   2. Provision of drawings (e.g. process flow diagrams [PFDs] and piping & instrumentation diagrams [P&IDs] and Technology equipment specifications for use by the Technology Supplier or DB Entity in developing detailed Project design.

3. Sharing of installation concepts and process design calculations with the DB Entity and attendance of Project workshop by DUWA and/or DB Entity meetings as may be required for permitting, design approvals and constructability costing.
4. Preparation and submission of shop drawings and equipment system packages of its Technology supply for review by the DB Entity and approval by DUWA.

C. Services, equipment, and materials required for the Project that are not set forth or reasonably inferred in this Section 1.02 shall be provided by the DB Entity.

D. Technology Supplier shall provide all necessary design, installation instructions and operating information for Technology and related Project equipment within its stated scope of supply. Technology Supplier is not responsible for the Project design, equipment and materials supply, installation, training, start-up and commissioning of any system scope of work that will be completed by the DB Entity.

E. The Technology package and equipment supply shall be comprised of the following core process systems and meet the technical specifications of Section 2 (Equipment) herein:
1. Wet Cake Handling (Live Bottom Bin and Pumps)
2. Biosolids Belt Dryers (In-Direct Heating)
3. Dried Biosolids Conveyance (Extraction and Transport)
4. Drying Air Treatment System (Foul Air Exhaust Fans and Condenser)
5. Thermal Oil Heater System (Natural Gas Supply, Loops, Pumps and Tanks)
6. Compressor (Instrumentation Air Supply and Control Valves)
7. Control Descriptions

This information shall be supplied for all of the equipment supplied by the Technology Supplier.

F. Technology Supplier shall provide written documentation of its process design, engineering support and field services related scope of work for the Project as follows:
1. Basis of Design and Process Calculations
2. Technology Performance Criteria as Key Performance Indicators (KPI)
3. Process Flow Diagrams (PFDs)
4. Piping & Instrumentation Diagrams (P&IDs)
5. Mechanical, Electrical and Controls Diagram(s)
6. Dimensional Layout Drawings of Technology Systems
7. Equipment Cut-sheets and Shop Drawing Submittals
8. Equipment Erection Instructions and Installation Details
9. Technology Start-Up, Process Control and Shut-Down Instructions
10. Process Training Materials and Operations Checklists
11. Technology Commissioning Plan and Acceptance Testing Protocols
12. Standard Operating Procedures (SOPs)
13. Operations and Maintenance (O&M) Manuals
14. Manufacturer Stock Parts and Recommended Critical Spare Parts List(s)

G. Technology Supplier shall provide the following field services as necessary to start-up, test, and achieve the performance acceptance test(s) of the biosolids thermal drying system at the DWTF:
1. Advice during Technology delivery, erection and installation inspections
2. Equipment functionality check-outs and assistance in mechanical start-up
3. Instrumentation and controls calibration, program functions verifications
4. Coordination support in PLC programming and interfacing with DWTF's SCADA
5. Operator training and provision of equipment checklists and/or log forms

6. On-site assistance of DB Entity and Operator during Commissioning and Performance Acceptance Testing
7. On-site process optimization and operations troubleshooting for reliability
8. Other direct on-site assistance by direct equipment manufacturers as may be requested or required by DB Entity and/or Operator during the Warranty Period

H. Provide all necessary on-site engineers, sampling materials, testing supplies and trouble-shooting equipment as required for Technology start-up, adjustment and performance acceptance testing including any process chemicals, calibration or auxiliary gas cylinders and controls software and/or instrumentation hardware.

I. Technology and related process equipment furnished under this Section 1.02 shall be fabricated, assembled, erected and placed in proper operation condition in full conformity with the drawings, specifications, engineering data instructions, and recommendations of the Technology Supplier and/or direct equipment manufacturers.

1.03 SUBMITTALS

A. The Technology Supplier shall furnish for review, one original paper copy and one electronic copy (pdf format) of each submittal. The term “submittal” as used herein shall be understood to include equipment installation drawings, catalog and data sheets and other relevant direct manufacturer specified erection instructions. Unless otherwise required, these submittals shall be presented at a time sufficiently early to allow review by the DB Entity and approvals as to content and form by DUWA.

B. Submittals shall include the following:
   1. Drawings as required to provide the following details:
      a. Plan and Section Drawings of equipment
      b. Arrangement Drawings for shipped loose sub-assemblies.
      c. Details for field connections.
      d. Instructions for erection and field installation.
      e. Process sampling and instruments/sensors locations.
      f. Piping and Instrumentation Diagrams (P&IDs).
      g. Controls telemetry and HMI info. for SCADA integration.
   2. Descriptive literature, bulletins, cut sheets and/or catalogs of the equipment.
   3. Data on the characteristics, features, and performance KPI of the equipment.
   4. Electrical schematics, panel layouts, instrumentation sheets, and product data sheets for all electrical equipment being supplied by the Technology Supplier.
   5. The weight and footprint of the major equipment.
   6. Equipment list (including info. on motors, instruments and valves).

1.04 QUALITY ASSURANCE

A. American National Standards Institute (ANSI)

B. National Electric Manufacturer’s Association (NEMA)

C. American Society for Testing and Materials (ASTM)

D. American Welding Society (AWS)

E. National Electric Code (NEC)

F. Institute of Electrical and Electronics Engineers (IEEE)

G. International Society of Automation (ISA)

H. National Fire Protection Association (NFPA)

1.05 OPERATION AND MAINTENANCE MANUALS

A. Technology Supplier shall furnish operation and maintenance (O&M) manuals for all of the key process equipment that comprise the Technology system. These O&M manuals shall be prepared specifically for the DUWA Project and shall include all required cut sheets, drawings, diagrams, equipment lists, descriptions, and other information that is required to instruct the Operator for Technology performance and system reliability.

B. Technology Supplier shall provide one original paper copy and one electronic copy (in PDF form) of each O&M manual for its Technology and process equipment supply scope.

C. Technology Supplier shall use its engineers as well as factory trained representatives with adequate knowledge of the biosolids thermal drying system to provide instruction and training to the DB Entity and Operator on proper O&M of the Technology and ancillary systems and equipment as detailed and documented in the O&M manuals. The instruction shall be conducted in conjunction with the inspection of system installation, start-up assistance and commissioning as provided under Section 4 (Execution) herein.

1.06 TECHNOLOGY AND EQUIPMENT SYSTEMS HANDLING

A. Technology equipment, including spare parts will be shipped by the Technology Supplier or the Technology Supplier's vendor when the equipment is ready and available for shipment. The DB Entity will be responsible for receiving, unloading and properly storing the equipment in accordance with Technology Supplier's instructions. Upon the arrival of any equipment components at the DWTF or first shipping destination, the on-site supervisor of the DB Entity will inspect the equipment and prepare a Technology Supplier's receiving report and submit a copy thereof to the Technology Supplier. The receiving report will note the equipment receipt date and all evidence of damage in transit, if any. DB Entity will issue the receiving report no later than three (3) business days after receipt of delivery at the DWTF.

B. Finished iron and/or steel surfaces not required to be painted, such as flange faces, shall be properly protected to prevent rust, corrosion and damage.

C. Each box, crate, or package shall be properly marked to show its net weight and contents.

1.07 ACCEPTANCE TESTING AND PERFORMANCE

A. Upon substantial completion of Project by the DB Entity of the Project, Technology Supplier shall assist the DB Entity in the start-up, commissioning and acceptance testing of the Technology and Equipment systems in accordance with the following performance criteria:

1. Production of Class A dried biosolids in compliance with US. EPA's 40 CFR Part 503 Rule (e.g. solids content > 90.0 %TS and pathogen density < 3 MPN per 4 grams of dried solids).

2. Wet cake biosolids through-put processing (e.g. wet tons per hour) for a minimum continuous period of ten (10) days at both the daily average (5.91 WTPH) and maximum month (6.05 WTPH) loading levels (to be applied in aggregate for both dryer trains and proportionally in half values for each dryer train) as within the thirty (30) day performance testing period.
3. Daily average operating uptime for wet cake processing into specification dry solids product for at least twenty-two (22) hours per day during the continuous period of performance for the daily average and twenty-four (24) hours per day at the maximum month loading levels (as applied to each dryer train).
4. Operator assessment of dried solids product quality with respect to fitness and suitability of bulk hauling and final disposition as to degree of any nuisance factors (e.g. dust content, material temperature, odor, etc.).
5. Daily average consumption of natural gas to fuel thermal oil heater shall be equal to or less than 14.0 MMBtu/hour during the continuous operating testing period (e.g. ten [10] consecutive days at the specification minimum uptime level) at the daily average wet mass loading level of cake biosolids being processed by the Technology and Equipment systems.
6. Operator assessment of functional control and adjustments in flow and temperature of thermal oil for both the primary and secondary loops between heater and dryers vessels.
7. Operator assessment of functional control and condenser performance of foul air exhaust and treatment with respect to observed or measured parameters for volumetric rate, particular matter removal and other contaminant impacts in return flows to the DWTF.

B. Acceptance testing will consist of a DUWA specified testing protocol and monitoring procedures for an accrued and sustained operating duration of thirty (30) days. Technology Supplier shall be responsible for achieving all the performance criteria and issue satisfactory documentation (e.g. testing plan, protocols and results) to DUWA in a form and content that demonstrates functionality and overall reliability of the Technology and Equipment systems.

   Acceptance Test Performance Requirements (within 30-day period):

   - 10 days at Daily Average
   - 7 continuous days at Max Month Capacity
   - 7 continuous days at Full Capacity

Test Criteria	Daily Avg.	Max. Month	Capacity
Wet Mass Processed, WTPD	140.0	156.0	175.0
Dewatered Cake Solids, %TS	28.5	26.0	26.0

C. DUWA may require a second test (as a replication of the first acceptance test; 'performance or stress test'), at a time of its choosing within two (2) years of the date of the first acceptance by DUWA. Reasonable advanced notice (e.g. at least ten business days) will be issued by DUWA to the Technology Supplier as to performing a second acceptance test. It is expected this test will occur during the glycol season under which DWTP will be receiving significant deicing fluid into the DWTF.

D. Technology Supplier shall maintain a performance bond (or other suitable means of financial security) that its Technology and Equipment systems will meet the performance criteria (as specified herein) for a warranty period, as to be further detailed in Section 1.08. The

performance bond shall be issued at Technology and Equipment systems start-up and be maintained for the full duration of the warranty period in an amount equal to one hundred (100%) percent of the Technology Supplier's contract value.

1.08 TECHNOLOGY AND EQUIPMENT SYSTEMS WARRANTY

A. Technology Supplier shall warrant to DUWA that the Technology and Equipment systems shall materially conform to the description in Technology Supplier's documentation and shall be free from defects in material and workmanship. The warranty shall not apply to any Technology and Equipment systems that are specified or otherwise demanded by DUWA and are not manufactured or provided by Technology Supplier, as to which

Technology Supplier shall assign to DUWA, to the extent assignable, any warranties made to Technology Supplier and,

If DUWA gives Technology Supplier prompt written notice of breach of this warranty within thirty (30) months from equipment delivery or two (2) years from acceptance, whichever occurs last (the "Warranty Period"), DUWA shall, at its sole option and as its sole remedy, require the Technology Supplier to repair or replace the subject parts to the extent of the original scope of supply or refund the purchase price therefore at market value in effect at that time of exercising its option. If Technology Supplier determines that any claimed breach is not, in fact, covered by this warranty, Technology Supplier shall be paid its then customary charges for any repairs or replacements made by Technology Supplier.

Technology Supplier's warranty is conditioned on DB Entity's (a) storage (as may be applicable) and installation of the Technology and Equipment systems in accordance with Technology Supplier's instructions, (b) DB Entity and/or OPERATOR not making any unauthorized alterations to the Technology and Equipment systems, and (c) DUWA not being in default of any payment obligation to Technology Supplier. Technology Supplier's warranty does not cover damage caused by equipment misuse, improper installation or Technology alternations.

B. The Technology Supplier shall assume all costs of Technology patent fees or licenses for equipment or processes, which it provides, and shall indemnify and defend DUWA and their agents (e.g. Operator) from damages, judgments, claims and expenses arising from license fees or third party claimed infringements or any letters of Technology patent or patent right, or because of royalty or fee for the use of any equipment or process, which it provides; and the price stipulated for all such Technology patent fees, licenses, or other costs pertaining thereto.

SECTION 2 – TECHNOLOGY AND EQUIPMENT SYSTEMS

The Dryer Technology and Equipment (e.g. Wet Cake Handling, Dried Solids Conveyance and Thermal Oil Heating) systems shall be supplied by **[DRYER TECHNOLOGY SUPPLIER]** as the approved Technology Provider for the Project at the DWTF. Based on the DB Entity's and DUWA's consultation with the Technology Supplier, the following equipment and functional systems performance criteria have been incorporated into this Section 2 of the Specification.

2.01 GENERAL

A. The Technology equipment covered by this technical Specification is intended to be standard process equipment of proven ability as manufactured by reputable companies having long experience in the production of such equipment in the U.S. The equipment furnished shall be designed, constructed and installed in accordance with the best industry practices and application methods, and shall operate satisfactorily and reliably when installed as shown on Technology Supplier's drawings and related submittals.

B. All parts shall be so designed and proportioned as to have liberal strength and stiffness and to be especially adapted for the work to be done. Ample room and facilities shall be provided for inspection, repairs, and adjustment inside the DWTF Dewatering Building.

C. The nameplate rating for the motors shall not be exceeded, nor shall the design service factor be reduced when its piece of equipment is operating at any point on its characteristic curve.

D. All Technology and Equipment systems furnished under this Specification section shall be new and unused.

2.02 WET BIOSOLIDS CAKE HANDLING SYSTEM

A. The Wet Biosolids Cake Handling (WBCH) system shall be capable of feeding dewatered biosolids continuously and consistently to the Dosing Pumps while maintaining a positive suction pressure on the Dosing Pumps. Technology Supplier shall supply Wet Cake Pumps to be installed by DB Entity.

B. Wet cake biosolids piping interconnecting of the WBCH System components and the supply piping to the Dryers shall be designed, supplied, and installed by DB Entity. All wet cake biosolids piping shall be designed with long radius elbows.

C. Wet Biosolids Cake Pumps

1. Technology Supplier shall furnish four (4) Wet Biosolids Cake Pumps (two per Dryer) with cast iron body, progressive cavity type with open throat suction, screw auger appropriate for the dewatered cake solids concentration. Each Wet Biosolids Cake Pump shall be provided with a flanged discharge and run dry protection in the stator.

2. The Wet Biosolids Cake Pumps shall be of the compact, close-coupled design. The gear reducer shall be sized for a minimum service factor of 1.5 and designed with a thrust load capability of 150 percent of the actual thrust load.

3. The Wet Biosolids Cake Pumps shall have an inverter duty motor and be regulated via variable frequency drives.

4. Gear motors or gear reducers shall be designed in accordance with AGMA 6019-E (Class II). Motors shall be energy-efficient, TEFC motors.

5. Variable Frequency Drives shall be constant torque type.

6. Each Wet Biosolids Cake Pump shall be a four stage design employing a convoluted rotor operating in a similarly convoluted stator. The convolutions shall be configured to form a cavity between the rotor and stator, which shall progress from the pump's inlet to discharge port with the operation of the rotor. The fit between the rotor and stator at the point of contact shall compress the stator material sufficiently to form a seal and to prevent leakage from the discharge back to the inlet end of the pumping chamber. The stator shall be molded with a seal integral to the stator elastomer preventing the metal stator tube and the bonding agent from the elastomer from contacting the pumped liquid. Gaskets or O-rings may not be used to form this seal. Stators for pumps shall have Perbunan elastomer. The Wet Biosolids Cake Pumps rotors shall be constructed of C45 Tool Steel. Additionally, the Wet Biosolids Cake Pumps rotors shall have a chromium nitride coating (Duktil) with a hardness of 1250 Vickers and a minimum thickness of (0.0108 inches). Hard chrome plating or ceramic coatings are not acceptable due to the ease at which this coating will crack and the lack of diffusion into the rotor base metal.

7. Each Wet Biosolids Cake Pump rotor shall be driven through a pin joint or gear joint connected to the input shaft, unless otherwise approved.

8. Each Wet Biosolids Cake Pump rotor shall be driven through a positively sealed and lubricated pin joint. The pin joint shall have replaceable bushings, constructed of air-hardened tool steel of 57-60 HRc, in the rotor head and 60-65 HRc. The joint shall be grease lubricated with a high temperature (450° F), PTFE filled synthetic grease, covered with Buna N sleeve and positively sealed with hose clamps constructed of 304 stainless steel. A stainless-steel shell shall cover the rotor side universal joint assembly to protect the elastomer sleeve from being damaged by tramp metals or glass.

9. 150 (300, 600) - pound (ANSI B16.5) flanged connection shall be provided at the discharge port. The discharge casings shall each be provided with a 3/8-inch (or larger) tap to permit installation of pressure instruments. The suction casing shall be fabricated from corrosion resistant steel plate and designed with a rectangular opening which is 500 mm by 330 mm. The suction casing shall incorporate an oversized and detachable “extension tube” between the Wet Biosolids Cake Storage Hopper opening and the rotor and stator. A single helix ribbon-style auger shall run the entire length of the suction casing and the extension tube and shall transmit rotational movement from the drive shaft to the rotor. The ribbon-style auger and extension tube work in concert to apply additional shearing forces against thixotropic liquids to reduce the apparent viscosity of the biosolids, minimize air entrainment and improve the volumetric efficiency of the pumping elements. The ribbon-style auger diameter and pitch shall be designed to transport no less than 300% of the rated pumping capacity.

10. Each Wet Biosolids Cake Pump shall be provided with oil lubricated thrust and radial bearings, located in the gear motor, designed for all loads imposed by the specified service. The shaft shall be solid through the stuffing box area, but of a two-part design which allows the packing and all other wetted rotating parts to be removed from the pump without disassembly of the pump or gear motor bearings. The drive shaft shall be coated in the packing contact area with the same chromium nitride material of 1250 Vickers hardness that is used as the rotor coating. The mechanical seal housing shall be of ample depth for a single mechanical seal and be provided with a quench pot and pipe stand for barrier fluid lubrication.

11. The stator shall be fitted with a sensor sleeve and PT100 thermistor sensor.

12. Each Wet Biosolids Cake Pump shall be supplied with a silicone-filled isolation ring with a dual mounted gauge and single point pressure switch. The pressure ranges for the switch and gauge shall be selected specifically for each specified service. The isolation ring shall be mounted between ANSI flanges, be sized according to the discharge pipe on drawings, and be constructed with a carbon steel body and fittings with a Buna sleeve. The switch shall be SPDT, NEMA 4.

13. Each Wet Biosolids Cake Pump gearbox shall be fitted with a differential friction-type holdback designed to prevent reversal of flow when the pump is not in operation. The holdback shall be fitted as an integral component of the Wet Biosolids Cake Pump gear drive and the unit will be adequately protected against the entrance of dust, dirt and moisture. Anti-reversal holdbacks shall be adequately sized for the specified service.

14. Wet Biosolids Cake Pump critical spare parts to be furnished by Technology Supplier:
    a. One (1) Stator per Wet Biosolids Cake Pump
    b. Two (2) Mechanical Seals

15. Manufacturer
    a. Seepex
    b. Netzsch
    c. or Equal

2.03 WET BIOSOLIDS CAKE STORAGE HOPPER (WBCSH)

The following major components of the Wet Biosolids Cake Storage Hopper (WBCSH) system shall be supplied by Technology Supplier. Installation and assembly of these components shall be by DB Entity: **[to be completed upon Design Development by DB Entity]**

A. Hopper Vessel

B. Hopper Access Platform

C. Live Bottom Augers

D. Odor Exhaust System

2.04 IN-DIRECT HEAT (THERMAL) DRYERS (IDHD)

The following major components of the In-Direct Heat (Thermal) Dryers (IDHD) system are expected to be supplied by Technology Supplier. Installation and assembly of these components shall be by DB Entity: **[to be completed upon Design Development by Dryer Technology Supplier and DB Entity]**

A. Drying Air Treatment

B. Dryers Vacuum Air Fans

C. Thermal Oil Heater System

D. Air Compressor System

E. Insulation and Cladding

SECTION 3 – ELECTRICAL, INSTRUMENTATION AND CONTROLS

3.01 CONTROL PANELS

A. Technology Supplier shall furnish one (1) PLC Based Control Panel to control each Dryer I/O based on operator set points and specified control ranges. There will be one (1) local control panel supplied for each drying system. All I/O will be wired to field terminations and include surge arrestors and isolation as required. The PLC Control Panels will be completely assembled, tested, and programmed for the required functionality. The completed PLC Control Panels shall be UL labeled.

B. The PLC Control Panels will include the necessary input/output, I/O, capabilities as listed in the attached I/O listing as well as 20% spare wired IO. All I/O will be wired to field terminations and include surge arresters and isolation as required.

C. All required equipment, including signal wiring, piping, terminations, incidental conduits, necessary mounting and accessory equipment to provide a complete and operational system shall be supplied by DB Entity.

D. The termination of all field wiring to terminal blocks with the PLC Control Panels shall be by DB Entity.

E. The Dryer's PLC Control Panels shall be located in a non-classified climate-controlled room within the DWTF Solids Handling Building, and shall be supplied in a NEMA 12 carbon steel enclosure suitable for inside use. The front panel of each Enclosure shall contain push buttons, as detailed within this Specification. The internal portion of the Enclosure shall contain all rack mounted PLC equipment, power supply, processor and interface cards. Relays, terminal strips and surge suppressors shall also be contained within the Enclosure. Terminal strips for all field wiring shall be furnished within the panel. The PLC Control Panels shall be manufactured by Saginaw.

F. One surge suppression device on the 120 VAC main supply line shall be installed. The power surge suppressor shall be equivalent to part #2856702 by Phoenix Contact.

G. On all analog input signals, current isolators shall be installed to galvanically separate external and internal 4-20 mA current loops. Current Isolators shall be equivalent to Phoenix Contact part #2864406.

H. All analog inputs and outputs shall also be protected from surges. The surge-arresting module shall combine coarse, medium and fine protection elements such as gas filled arrestors, varistors and suppressor diodes. The surge arresting modules shall be plug-in style allowing replacement of arrestors without removing field or panel wires. The analog surge arrestors shall be equivalent to Phoenix Contact part # 2838228.

I. All digital outputs shall be provided with isolated relay contacts.

J. Digital I/O will be wired from the PLC to field terminal blocks located inside the Dryer's PLC Control Panels. The terminal blocks shall be rated for 600 Volts, 30 Amps, 26-10 Gage Wire and shall be din rail mountable. Terminal blocks shall be equivalent to Phoenix UTTB 4 Double Level Terminal Block part # 3044814.

3.02 PROGRAMMABLE LOGIC CONTROLLERS

A. Programmable Logic Control (PLC) System Submittals shall include

a. Block Diagram: A diagram showing all major PLC components. Identify components by manufacturer and model number.

b. Bill of Materials: A list of all PLC components. Group components by type and include:
   i. Component manufacturer, model number and part number.
   ii. Component description.
   iii. Quantity supplied.
   iv. Reference to component catalog information.

c. Descriptive Information: Catalog information, descriptive literature, performance specifications, internal wiring diagrams, power and grounding requirements, and power consumption for all elements of the PLCS. Clearly mark all options and features proposed for this Project.

d. Interconnecting Wiring Diagrams: Diagrams shall show all PLC elements, their interconnecting cables, wiring terminations, and terminations to all interacting elements and subsystems. Terminations shall be numbered. Terminations for circuits extending outside PLC assemblies and/or having housing panels shall be labeled with circuit names corresponding to the Circuit and Raceway Schedule. The external circuit portion of this diagram shall be coordinated with the DB Entity and shall bear his mark showing that this work has been done. Wiring diagrams are not to scale to reflect component details for ease of wiring.

e. Outline Drawings: Equipment envelope drawings showing: external dimensions, enclosure materials, conduit connections, and installation requirements.

f. Installation Details: Any modifications or further details as may be required to supplement the Contract Documents and adequately define the installation of the PLC elements.

g. Input/Output List: For each I/O point list point type, tag number of the source or final control element, equipment description, PLC number, PLC terminal identification, and PLC address.

B. Factory Testing

a. All non-loop specific functions shall be tested, including, but not limited to:
   i. Failure mode and backup procedures: power failure, auto restart, and retentive outputs.
   ii. All IO (Analog Inputs, Analog Outputs, Digital Inputs, and Digital Outputs) will be confirmed for proper operation form the PLC to the terminals within the PLC Control Panels.
   iii. Programming and documentation methods and features.

C. Functional Requirements
   a. The PLC system shall be used for monitor and control of the drying process. The operations described herein are intended to identify minimum acceptable performance.
      i. PLC Processor (CPU): Allen Bradley Control Logix
      ii. PLC Power Supply: Allen Bradley Control Logix
      iii. PLC Chassis: Allen Bradley Control Logix
      iv. PLC Ethernet Communication Module: Allen Bradley
      v. PLC Digital Input Module: Allen Bradley Control Logix
      vi. PLC Digital Output Module: Allen Bradley Control Logix
      vii. PLC Analog Input Module: Allen Bradley Control Logix
      viii. PLC Analog Output Module: Allen Bradley Control Logix

   b. The Dryer Systems shall be designed and supplied and with a remote monitoring to allow for process monitoring, controls troubleshooting and maintenance assistance (e.g. alarming and annunciations for equipment functionality status).

3.03 FIELD INSTRUMENTS

A. Field Instruments will be supplied by Technology Supplier as required to meet the functionality of the Biosolids Thermal Drying System. It is the responsibility of DB Entity to install and terminate field wires for the instruments required for control and monitoring of the Dryers System.

B. Dryers System Instrumentation shall be field wired by DB Entity, unless otherwise noted, and shall be intrinsically safe wiring suitable for use in Class II, Division 2 locations.

C. All field wiring shall be provided and installed by DB Entity.

D. Field Instruments is anticipated to include:
   a. Loop Powered Pressure Indicating Transmitter: Endress & Hauser PMC71
   b. Conductive Level Probe for multiple point detection: Endress & Hauser FTW31
   c. Pressure Gauge w/Diaphragm Seal: Ashcroft 45-1279 w/50-201-SS Diaphragm Seal
   d. Roller Lever (Overtravel and travel Switch) Microswitch: Square D XCKL115
   e. Infrared Level Switch: Banner SMI91EQD Emitter, SMI91RQD Receiver
   f. Infrared Temperature Transmitter Raytek High Ambient Infrared model #RAYMI31OLTH-CBB MI3 Series Sensing Head, D:S=10:1, 26t preinstalled cable. RAYMI3COMM MI3 SERIES IR THERMOMETER I.O BOX WITH USB 2.0 COMMS AND SENSING HEAD. INSTALLED. SENSING HEAD TO BE SPECIFIED ON SEPARATE LINE ITEM. XXXMIACAJ Air purge jacket, no cooling.
   g. Condenser level switch
   h. Loop Powered Temperature Indicating Transmitter w/ RTD: Endress & Hauser Transmitter TMT162 w/ RTD TH13
   i. Laser Level Transmitter: ABB LM80
   j. Temperature Switch: Ashcroft LTS-N4-G-00
   k. Magnetic Flowmeter w/Transmitter: Endress & Hauser Mag 53W50 Polyurethane Liner 150 Pound ANSI Flange w/NEMA 4X Compact Housing Transmitter
   l. U-Tube Liquid Filled Manometer: Dwyer 1223-X-D

SECTION 4 – ERECTION AND INSTALLATION

4.01 ERECTION AND INSTALLATION

A. All Technology equipment furnished under this Technical Specification shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with detailed drawings, specifications, engineering data, instructions, and recommendations furnished by the Technology Supplier and equipment manufacturers.

B. It is the responsibility of DB Entity to provide contract drawings of the overall Project for review by Technology Supplier, prior to erection / installation of the Technology. B. Unless otherwise stated, all Technology equipment furnished by the Technology Supplier shall be shipped to the jobsite loose and installed by DB Entity. Unloading and storage of the Technology equipment furnished by Technology Supplier will be administered by DB Entity.

C. Unless otherwise stated, all Technology equipment shall be painted per manufacturers standard paint schemes and systems by DB Entity.

D. The interconnecting biosolids cake “Feedstock”) piping between the wet cake pumps from the Wet Cake Storage Bin and to each Dryer shall be supplied and installed by DB Entity. Interconnecting piping supplied by DB Entity shall be hydrostatically tested by DB Entity.

E. All external service water connection piping, hard drain piping, and service water supply shall be supplied and installed by DB Entity per the instructions given by the Technology Supplier. All valves provided by Technology Supplier to be installed in water piping shall be installed by DB Entity.

F. All interconnecting ductwork between Dryers, Vacuum Fans, and Condensers shall be designed by the DB Entity, supplied, and installed by DB Entity. All ductwork dampers shall be installed in ductwork by DB Entity. All ductwork shall be smoke tested for leaks.

G. Supply and installation of the Thermal Fluid (Paratherm HE oil) for filling the required volumes and tank(s) reservoirs for the Thermal Oil Heater/Loops provided by DB Entity.

H. Natural gas piping and any metering to the Thermal Oil Heater System shall be provided by DB Entity.

I. Main power line supply, switchgear, transformers, motor starters, breakers and disconnects from Motor Control Centers (MCCs) and related field wiring to supply power to the Dryers System equipment shall be provided by DB Entity. Interconnecting conduit, cable trays, wiring, junction boxes, hardware, wiring terminations at local control panels and equipment, including any local disconnects and/or electrical panels shall be supplied and installed by DB Entity.

J. Installation of the Dryers System equipment by DB Entity shall include furnishing the required oil and grease for initial operations and inclusive of the start-up, commissioning and acceptance testing periods. The grades of oil and grease shall be in accordance with the Technology Supplier’s recommendations. It is the responsibility of DB Entity to work with Operator to furnish

and install extended grease lines. These locations shall be in alignment with the Operator's standard maintenance procedures.

K. All structural work for equipment, components, piping, and appurtenances shall be installed by DB Entity as true to alignment and rigidly supported. All related work associated with housing the Dryers System equipment inside the DWTF Solids Handling Building, including HVAC and other related environmental controls shall be supplied and installed by DB Entity.

4.02 INSPECTION AND FIELD-TESTING SERVICE

A. Preliminary field testing, inspection, and checkout of the Dryers System and equipment following erection and installation by DB Entity, shall be performed by qualified representatives of the Technology Supplier. Inspections and field tests shall be conducted to demonstrate to the Design-Build Entity that all Dryers System equipment and components as furnished by the Technology Supplier shall be fully operational, that all connecting piping is leak-proof and properly anchored, and that the entire Dryers System furnished by the Technology Supplier is ready for start-up, commissioning and continuous safe operation. The purpose of the checkout shall be to ensure that each individual Dryers System equipment and component have been correctly installed; shall operate fully in the manner intended, and is ready to perform its function as part of an integrated system when placed in service for commissioning and continuous operation.

B. During the start-up period the process performance shall be evaluated on a per Dryer basis in accordance with Technology Supplier's site preparation forms and instructions. The DB Entity or Operator shall provide for any necessary sampling and analysis during the inspection, preliminary field testing and check-out periods. Technology Supplier shall then evaluate the entire Technology equipment as an integrated system to assess the entire system to meet satisfactory process performance requirements (or as required by the contract documents), prior to commencing with the acceptance testing.

C. The Technology Supplier or qualified representatives shall also provide instruction of the Operator's personnel in Dryers System equipment O&M, process control, and including step-by-step trouble-shooting procedures and necessary test equipment/tools.

ATTACHMENT B: DUWA PROCUREMENT AND WORKPLACE POLICIES

4. PURCHASE AND PROCUREMENT

4.01 General. In general, when purchasing goods and services, preference will be given to vendors located in one of the DUWA member communities, except in cases where either the price is greater and/or service and availability are limited. Further, for all purchases DUWA will endeavor to obtain the lowest prices for the purchase of any goods and/or services.

4.02 Purchase Approval & Limits.

a. Purchase Value - Under $500. The System Manager may authorize purchases up to $500.

b. Purchase Value - Between $500 and $10,000. The System Manager may authorize purchases up to $10,000. Prior to any purchase orders being issued for any purchases with a cost between $500 and $10,000, a minimum of three (3) informal quotes shall be obtained for the requested goods and/or services unless it is deemed impractical or impossible (in the System Manager's discretion) to get such quotes.

c. Purchase Value - Between $10,000 and $20,000. The System Manager, with the prior consent of the Commission Chairperson (or alternative person designated by the Board), may authorize purchases up to $20,000. Prior to any purchase orders being issued for any purchases with a cost between $10,000 and $20,000, three (3) informal bids shall be obtained for the requested goods and/or services unless it is deemed impractical or impossible (in the System Manager's discretion) to get such quotes.

d. Purchase Value - Over $20,000. The System Manager must present a request for expenditures exceeding $20,000 to the Board for approval. Formal bids shall be obtained for all purchases in excess of $20,000.

e. Exceptions. Exceptions to the above purchase limits for goods and/or services are as follows:

i. Payroll
ii. Debt Requirement
iii. Sewage Disposal Services
iv. Utilities
v. Professional Services (covered by Section 4.07)
vi. Emergency Purchases
vii. Any other recurring expenditure with an annual purchase value exceeding $20,000 which is approved by the Board through the budget process.

f. Informal Quotes. At least three (3) verbal quotes shall be obtained informally, either in person, or over the telephone or fax, providing that all telephone conversations and personal contacts are reduced to writing, including the name and title of the person providing the quote, and retained as specified in the records retention policy.

g. Informal Bids. At least three (3) written bids shall be obtained informally, either in person, in writing or over the telephone or fax, providing that all telephone conversations and personal contacts are reduced to writing, including the name and title of the person providing the quote, and retained as specified in the records retention policy.

h. Formal Bids. The procedure for formal bids is specified in Section 4.06.

i. Bidding Waived Expenditures. A bidding waived expenditure occurs when there are less than three (3) firms which are capable of supplying the goods and/or services needed. The Board must give its approval to waive the formal bidding procedure for a specific expenditure prior to any purchase orders being issued.

j. Emergency Purchases. An emergency purchase is any expenditure that is immediately required to protect the health, safety and/or welfare of a community or person(s). The authority for initiating such an expenditure rests with the System Manager (or approved designate). The System Manager shall immediately inform the DUWA Board of the need for, amount of, and nature of the emergency expenditure via email. At the next scheduled Board meeting, the System Manager will present documentation on the expenditure amount and appropriate justification of the emergency expenditure for approval.

4.03 Procedures for Purchase Orders. Purchase orders and backup documentation shall be maintained by the Accountant. Purchase orders shall be numbered consecutively and tracked via a purchase order log. The status of every purchase order shall be entered into the log, including the notation "VOID" where applicable.

4.04 Non-recurring Purchases. Prior to the purchase of goods and/or services, the individual placing the order shall complete a purchase order form and forward it to the Accountant with the appropriate backup documentation attached. Upon satisfactory review and coding of the account information, the Accountant will then route the purchase order and attachments to the System Manager for approval. Once approved, the purchase orders will be routed to the Accountant, to be attached to the invoices when received.

4.05 Recurring Purchases. Recurring purchases of goods and/or services shall follow the informal quote, informal bid, or formal bid procedure as designated in Section 4.02 based on the value of the recurring purchases for the fiscal year.

a. Recurring purchases of services does not include professional services, which are covered in Section 4.07. A purchasing quotes/bids form must be completed. The order shall be placed with the supplier offering the best combination of price, service and availability. An effort will be made to purchase from businesses located in the member communities. A purchase order form is completed next and is forwarded with the purchasing quotes form and all pertinent backup documentation to the Accountant, who upon satisfactory review and coding of the account information, shall route the purchase order and attachments to the System Manager for approval. Once approved, the purchase orders will be routed to the Accountant, to be attached to the invoices when received.

b. Once the initial quote and bid process is completed for reoccurring purchases, DUWA may continue to use the same vendor for those recurring purchases, however, DUWA should periodically request new quotes or bids for recurring purchases to ensure maximum value for DUWA funds.

c. If there are less than three (3) suppliers from whom the goods and/or services can be purchased, the purchasing quotes/bids form shall include as many quotes/bids as are available with a notation indicating that no other vendors offer the good and/or services.

4.06 Formal Bids Procedure

a. It shall be the policy of DUWA to obtain formal written bids from multiple vendors whenever goods and/or services are required, the purchase value of which exceeds $20,000.

b. The formal bidding procedure may however be waived by the Board if documentation is presented to the Board that the goods and/or services being sought were available only from a sole source. An example of this would be an exclusive distributorship for a region, a patent protected part or piece of equipment. A sole source is not defined as the only known supplier or the only supplier in the area.

c. Formal Bids are any solicitation in which an advertisement is placed in the local paper and/or any appropriate trade journal and/or electronically on a website such as the Michigan Intergovernmental Trade Network (MITN) or BidDirect soliciting a written bid for the goods and/or services requested. Purchases that are made through a recognized regional or state purchasing program that meets DUWA's formal bidding requirements is deemed to meet the intent of this policy.

d. In conducting formal bids, DUWA's staff or System Manager must perform the following procedural steps:

i. DUWA must prepare the specifications, potential list of bidders or target bidders, a schedule for when the goods and/or services is required, duration of advertisement, copy of advertisement defining the date and time of the bid opening. This information must be presented to the Board prior to placing any notice or advertisement in any publication. A copy of the proposed advertisement and any supplementary information will be included in the Request for Board Action sheet. A copy of the complete final proposal document will be available at the Board Meeting.

ii. DUWA then prepares and places the advertisement. There should be a minimum of fourteen (14) calendar days between the time of advertisement and the opening of bids.

iii. Bids received are to be date stamped and filed in a secure location until the opening.

iv. Bids are opened publicly in the DUWA administrative office at the exact time specified in the publication. Once bids are opened and reviewed, the System Manager prepares a Request for Board Action for the Board indicating the name of the bidders, the amount of the bid and a recommendation as to award of bid. Staff also notifies all bidders when the bid is to be awarded by the Board.

v. If all bids are equal in price, quality and service, the contract shall be awarded to the vendors located in the DUWA member communities.

vi. The DUWA reserves the right to reject any and all bids, proposals or statements of qualifications, and to select the bid, proposal or statement of qualifications deemed in the best interest of the DUWA.

vii. All formal bids are to be kept on file as specified in the records retention policy.

viii. Any and all of these procedures may be waived by the Board per their rules and regulations.

ix. The use of state or federal purchasing consortium pricing or bids within the last 18 months shall be considered in compliance with the requirements of this policy.

4.07 Procurement of Professional Services Policy

a. Because it is difficult to objectively evaluate and compare professional services, public policy and the laws of the State of Michigan do not require that the State or any local community pursue a competitive bidding procedure for the procurement of such services. Such services include, for example, legal services, accounting, and engineering services. The DUWA, however, utilizes Request for Proposals/Qualifications for the procurement of professional services.

b. Where Board or System Manager deem it necessary to pursue competitive bidding for professional services, DUWA shall post at its offices, and publish in a print media or by website, a notice requesting proposals/qualifications for professional services contracts. Said notice shall specify the type of service(s) requested, the duration of the proposed contract, if possible, and any special qualifications required by DUWA under the particular contract.

c. DUWA shall accept proposals for professional services for a period of no less than fourteen (14) calendar days from the initial date of posting or publication.

d. After the expiration of the bid period, the DUWA staff shall review the proposals to select a group of qualified applicants for interviews by the Board. As part of this process the System Manager and/or Board may request and/or appoint a committee to review the proposals for the purpose of recommending preferred firm(s) to the Board. The DUWA Board may conduct interviews of selected individuals or firms, providing each Commissioner the opportunity, at a public meeting, to question the potential service provider(s).

e. The DUWA Board will then review the proposals for professional services submitted and select the firm that best satisfies DUWA's requirements under said contract for professional services.

4.08 Processing of Claims for Payment/Invoices

a. Employees and/or independent contractors of the DUWA have a list of the dates by which invoices must be received to be included in the current month's check run; the deadline is generally seven (7) calendar days prior to the Board meetings. All vendors should be made aware that the DUWA pays invoices within thirty (30) calendar days of receipt when received by the deadline; however, checks are prepared and signed once a month. A special check run will only be done if there are checks that need to be issued to avoid service charges being added or loss of service or in the event of an emergency expenditure. Therefore, those invoices received after the deadline will be approved for payment at the next Board Meeting.

b. When placing an order, the vendor must be notified that the DUWA is exempt from sales and use taxes. Requests for written verification of the DUWA's tax-exempt status shall be forwarded to the Accountant for handling.

c. When goods or services are ordered, a purchase order is required. Required information includes description of the item(s) being purchased, item price(s) or vendor-supplied quote(s), itemization of any additional charges such as shipping and handling or labor, department which will be using the item(s) purchased (e.g., operations and maintenance or administration), location at which the item(s) shall be primarily used, and the budget account number(s) or line item description to be charged for the purchase.

d. Purchase orders are then approved by the System Manager. The original signed purchase order is then forwarded to the Accountant, to be matched to the invoice when received. If the employee and/or independent contractor who initiated the purchase order needs a copy, one should be made before they forward the original to the Accountant.

e. The employee and/or independent contractor and/or independent contractor accepting delivery of the merchandise must verify receipt of the correct merchandise by signing packing slip or other documentation and forwarding them to the Accountant to be included as backup documentation for that purchase.

f. Purchase orders will not be required for minor purchases, such as gas and when parts are purchased from local stores. Employees and/or independent contractors must obtain a receipt, sign the receipt and note on the receipt where the costs are to be charged. This receipt is to be forwarded to the Accountant. Purchase orders are also not required for normal recurring items, such as utilities, floor mats, etc.

g. All purchases are subject to the availability of budgeted funds.

4.09 Selection of Official Newspaper(s) or Online Publication

a. The selection of an official newspaper(s) for the publication of the DUWA's notices and records is accomplished through a Request for Proposals/Qualifications process, the timing and frequency of which is determined by the Board upon the recommendation of the System Manager. In the alternative, the Board may elect to place all notices online at www.duwauthority.org.

b. In the event that the Board decides to select an official newspaper, the System Manager will establish a listing of potential print sources. These sources are notified and provided opportunity to respond. Additionally, DUWA posts at its office and in a print media

a notice requesting proposals/qualifications for official newspaper services. The prepared Request for Proposals/Qualifications must assure that prospective bidders are advised of the following prerequisites and requirements:

i. Newspapers submitting bids are required to be qualified to publish legal notices under the laws of the State of Michigan.

ii. Bidders are required to quote an advertising rate per column inch for the publishing of DUWA Board' proceedings, notices and other records required by the By-Laws of the DUWA to be published, or that the DUWA determines it wants published.

iii. Newspapers must also submit as part of their bid a sworn statement of circulation within the confines of the DUWA's service area. Such statement should set forth the average paid subscriptions and/or free circulation of said newspaper over the last three-month period.

4.10 Anti-Nepotism Policy

a. A member of the DUWA Board shall not participate in any vote, selection, discussion, interview or other official action regarding the awarding of purchasing contracts or professional service contracts in which he/she, or anyone within the sixth degree of consanguinity or affinity to him or her, will derive a direct financial benefit. This includes the following:

i. Spouse

ii. Parents or spouse's parents

iii. Grandparents or spouse's grandparents

iv. Children

v. Siblings or spouse's siblings

vi. Brothers-, sisters-, sons- or daughters-in-law.

11. ETHICS, HARASSMENT, CONFLICT OF INTEREST, AFFIRMATIVE ACTION

11.01 Ethics

a. DUWA is a public body and seeks to avoid all appearances of impropriety or other behavior inconsistent with the highest level of integrity. Behavior inconsistent with the highest standards of integrity and business or personal ethics is subject to discipline, up to and including discharge.

b. DUWA has zero tolerance for intentional acts of deception or illegal behaviors.

11.02 Discrimination or Harassment Prohibited

a. DUWA is committed to a work environment in which all individuals are treated with respect and dignity. Each individual has the right to work in a professional atmosphere that promotes equal employment opportunities and prohibits discriminatory practices, including harassment. Therefore, DUWA expects that all relationships among persons in the workplace will be businesslike and free of bias, prejudice, and harassment.

b. DUWA expressly prohibits discrimination and/or harassment on the basis of race, sex, color, age, religion, height, weight, national origin, marital or familial status, handicap, genetic information or participation in the armed services. DUWA specifically prohibits illegal harassment, including by way of example, derogatory or objectionable conduct or comments, based upon any characteristic protected by federal or state civil rights laws. DUWA does not condone illegal discrimination or harassment of its employees by their supervisors, co-workers, or third parties on DUWA premises and over whom DUWA has control. Conduct in violation of this policy will result in discipline, up to and including discharge, at the discretion of DUWA.

11.03 Conflicts of Interest Prohibited

a. DUWA expects its employees to perform their work according to the highest ethical standards of conduct. Employees are expected to devote their best efforts to the interests of DUWA. Business dealings that appear to create a conflict between the interests of DUWA and an employee and/or independent contractor are unacceptable. DUWA recognizes the right of employees to engage in activities outside of their employment which are of a private nature and unrelated to DUWA. However, the employee and/or independent contractor must disclose any possible conflicts so that DUWA may assess and prevent potential conflicts of interest from arising. A potential or actual conflict of interest occurs whenever an employee and/or independent contractor is in a position to influence a decision that may result in a personal gain for the employee and/or independent contractor or an immediate family member (i.e. spouse or significant other, children, parents, siblings) as a result of DUWA's actions.

b. If an employee and/or independent contractor has any question whether an action or proposed course of conduct would create a conflict of interest, he/she should immediately contact the System Manager to obtain advice on the issue. A violation of this policy will result in immediate and appropriate discipline, up to and including immediate termination.

c. Employees may not engage in any business transaction or have financial or other personal interest, direct or indirect, which is incompatible with the proper discharge of official duties in the public interest or which would tend to impair independence of judgment or action in the performance of official duties. No employee and/or independent contractor shall solicit or accept from any person, business or organization any gift of greater than minimal value (including money, tangible or intangible personal property, food, beverage, loan, promise, service, or entertainment of greater than minimal value) for their personal benefit if it may reasonably be inferred that the person, business or organization:

i. Seeks to influence action of an official nature or seeks to affect the performance or nonperformance of an official duty; or

ii. Has an interest which may be substantially affected directly or indirectly by the performance or nonperformance of an official duty.

11.04 Affirmative Action and Equal Opportunity Employer Policy

a. It is the policy of the DUWA to provide for and promote equal employment opportunity in employment compensation and other terms and conditions of employment without discrimination based on age, race, creed, color, national origin, gender, sexual orientation, disability, marital status, veteran status, genetic predisposition, or carrier status.

b. The DUWA is committed to assuring equal employment opportunity and equal access to services, programs and activities for individuals with disabilities. It is the policy of the DUWA to provide reasonable accommodation to a qualified individual with a disability to enable such individual to perform the essential functions of the position for which he/she is applying or in which he/she is employed.

c. Further, it is the policy of the DUWA to provide reasonable accommodation for religious observers. The policy applies to all employment practices and actions. It includes, but is not limited to, recruitment, job application process, examination and testing, hiring, training, disciplinary actions, rate of pay or other compensation, advancement, classification, transfer, reassignment and promotions. The DUWA designated person for issues concerning Affirmative Action/Equal Employment Opportunity is the System Manager.

12. SAFETY AND DRUG-FREE WORKPLACE

12.01 Weapons and Safety

a. Weapons Prohibited.

i. Employees, vendors and subcontractors may not, at any time while on any property owned, leased or controlled by DUWA, in any location in which the employee and/or independent contractor represents the DUWA for business purposes, or while engaging in DUWA business, possess or use any weapon. This restriction applies regardless of whether an individual possesses a concealed weapon permit or is allowed by law to open carry or possess a weapon.

ii. Weapons include, but are not limited to, guns, knives or swords with blades over four inches in length, explosives, and any chemical whose purpose is to cause harm to another person.

iii. Possession of a weapon can be authorized by the Board to allow security personnel or a trained employee and/or independent contractor to have a weapon on DUWA property when this possession is determined necessary to secure the

safety and security of DUWA employees. Only the Chairman, or his designee, may authorize the carrying of or use of a weapon.

iv. Employees who violate this policy will be subject to disciplinary actions, up to and including employment termination. The employment termination would be characterized as termination for cause. Contracts with vendors or subcontractors may be contractually terminated for violation of the policy.

b. Employee and/or independent contractor safety

i. All employees with access to areas beyond the administrative offices, must sign the Employee and/or independent contractor Safety Awareness form. Those employees with access to hazardous areas must sign the Release, Waiver and Indemnification for Access to Hazardous Areas of the DUWA Facilities form. The Administrative Assistant will develop and maintain these forms.

c. Drug-free workplace

i. DUWA intends to help provide a safe and drug-free work environment for our employees.

ii. This policy also applies to any contractors or subcontractors doing business for or on behalf of DUWA.

iii. The DUWA explicitly prohibits:

1. The use, possession, solicitation for, or sale of narcotics or other illegal drugs, alcohol, or prescription medication without a prescription on DUWA premises or while conducting DUWA business.

2. Being impaired or under the influence of legal or illegal drugs or alcohol away from the DUWA premises, if such impairment or influence adversely affects the employee and/or independent contractor's work performance, the safety of the employee and/or independent contractor or of others, or puts at risk DUWA's reputation.

3. Possession, use, solicitation for, or sale of legal or illegal drugs or alcohol away from the DUWA premises, if such activity or involvement adversely affects the employee and/or independent contractor's work performance, the safety of the employee and/or independent contractor or of others, or puts at risk DUWA's reputation.

4. The presence of any detectable amount of prohibited substances in the employee and/or independent contractor's system while at work, while on the premises of the DUWA or while conducting DUWA business. "Prohibited substances" include illegal drugs, alcohol, or prescription drugs not taken in accordance with a prescription given to the employee and/or independent contractor.

iv. The DUWA may conduct drug and/or alcohol testing under any of the following circumstances:

1. **Random Testing**: Employees may be selected at random for drug and/or alcohol testing at any interval determined by the DUWA.

2. **For-Cause Testing**: The DUWA may ask an employee and/or independent contractor to submit to a drug and/or alcohol test at any time it feels that the employee and/or independent contractor may be under the influence of drugs or alcohol, including, but not limited to, the following circumstances: evidence of drugs or alcohol on or about the employee and/or independent contractor's person or in the employee and/or independent contractor's vicinity, unusual conduct on the employee and/or independent contractor's part that suggests impairment or influence of drugs or alcohol, negative performance patterns, or excessive and unexplained absenteeism or tardiness.

3. **Post-Accident Testing**: Any employee and/or independent contractor involved in an on-the-job accident or injury under circumstances that suggest possible use or influence of drugs or alcohol in the accident or injury event may be asked to submit to a drug and/or alcohol test. "Involved in an on-the-job accident or injury" means not only the one who was or could have been injured, but also any employee and/or independent contractor who potentially contributed to the accident or injury event in any way.

v. If an employee and/or independent contractor is tested for drugs or alcohol outside of the employment context and the results indicate a violation of this policy, or if an employee and/or independent contractor refuses a request to submit to testing under this policy, the employee and/or independent contractor may be subject to appropriate disciplinary action, up to and possibly including discharge from employment. In such a case, the employee and/or independent contractor will be given an opportunity to explain the circumstances prior to any final employment action becoming effective.

ATTACHMENT C: COST PROPOSAL FORM

ARTICLE 1 – PROPOSAL RECIPIENT

1.1 This Submittal is provided to:

DOWNRIVER UTILITY WASTEWATER AUTHORITY via OHM ADVISORS, Livonia, MI

1.2 The undersigned Offeror proposes and agrees, if this Submittal is accepted, to enter into a Contract for the Project.

1.3 The party to which the Proposal is submitted should be the specific entity that will enter into the Agreement with the Successful Bidder.

ARTICLE 2 – ACKNOWLEDGEMENTS

2.1 Offeror accepts all of the terms and conditions of the RFP.

ARTICLE 3 – OFFEROR'S REPRESENTATIONS

3.1 In providing this Proposal Submittal, Dryer Technology Supplier represents that:

A. Offeror has examined and carefully studied the RFP Documents, and any data and reference items identified in the RFP, and hereby acknowledges receipt of the following Addenda:

Addendum No.	**Addendum, Date**
_____	_____
_____	_____
_____	_____
_____	_____

B. Offeror has examined and carefully studied the Progressive Design/Build Services for a Thermal Biosolids Drying System at the DWTF RFP, and any data and reference items identified in the RFP, and herby acknowledges review of the RFP.

_____

ARTICLE 4 – BASIS OF INDICATIVE PRICE

SECTION 4.1 – CAPITAL PRICING

The Offeror shall provide its indicative capital pricing for the supply of the dryer technology and ancillary equipment, and its related services as the Scope of Work (SoW) previously described in this RFP, including the acceptance and performance testing periods. The proposed Fixed Fee of the Offeror for its SoW of the Project is an indicative offer (on a best efforts pricing basis, and not binding) to enable DUWA to evaluate capital cost relative to target budget.

B.1.1 Numerical Fixed Fee for Capital Pricing (SoW) = $ _____USD

B.1.2 Written Fixed Fee for Capital Pricing (SoW) =

_____

_____

SECTION 4.2 – OPERATIONS COST

The Offeror shall provide its assessment of operating expenses for utilities (electricity and natural gas) consumption on a unit basis per wet ton of feedstock processed. The proposed Unit Rates for utilities consumption by the Offeror for its engineered basis of operating metrics impacting cost for the Project is an indicative offer (on a best efforts basis and not binding) to enable DUWA to evaluate operating cost relative to a life-cycle budget of the Project and target Operating KPI.

B.2 Consumption Basis for Electricity = _____ KWh/wet ton of feedstock processed

Consumption Basis for Natural Gas = _____ Therms/wet ton of feedstock processed

The consumption basis for electricity and natural gas shall be determined on an operating basis of 91.5% uptime (e.g. 22.0 hours per day, 52 weeks per year or equivalent to 334.5 days per year on a 24 hours per day schedule). The average daily feedstock of wet cake biosolids to be processed is 140.0 WTPD (at 28.5 %TS for drying to 92.0 %DS), for an annual equivalent wet mass quantity of 51,100 wet tons per year (WTPY) as the “feedstock processed” basis for utilities consumption to assess unit operations cost metrics relative to electricity and natural gas.

SECTION 5.3 – NET PRESENT WORTH ANALYSIS

The Offeror shall provide a 20-year net present worth analysis. See RFP Section 5.2.6 for price considerations.

ATTACHMENT D: MINIMUM REQUIRED GENERAL CONDITIONS BETWEEN DRYER MANUFACTURER AND DESIGN-BUILD ENTITY

SAMPLE TERMS AND CONDITIONS

This Agreement is made this ____ day of _____ by and between _____ ("Buyer") a _____ whose address is _____ and _____ ("Supplier") a _____ whose address is _____.

1. DEFINTIONS.

a. "Contract" means these Terms and Conditions, together with any Order and the Progressive Design Build Agreement ("PDB Agreement") between the Downriver Utility Wastewater Authority ("DUWA") and Buyer, attached as Exhibit A, and the Contract Documents incorporated in it. Supplier assumes toward Buyer all obligations and responsibilities that Buyer assumes toward DUWA; Buyer has the benefit of all rights and remedies against Supplier that DUWA has against Buyer.

b. "Contract Documents" means that term as defined in the PDB Agreement.

c. "Goods and Services" means the equipment, materials and services described in the Scope of Work attached as Exhibit B and purchased by Buyer under this Contract.

d. "Order" means any written purchase order, release, contract, or agreement that attaches, incorporates or references these Terms.

e. "Terms" means these Terms and Conditions for the purchase of Goods and Services

2. ACCEPTANCE. Supplier's acceptance of this Contract occurs when (a) Supplier confirms acceptance of the Contract in writing or (b) Supplier commences performance of the Work, provided that Buyer may, in its sole discretion, unilaterally cancel the Contract without cost or liability prior to receiving Supplier's written, unqualified, unconditional acceptance hereof. Supplier's acceptance of this Contract shall be unqualified, unconditional, and subject to and expressly limited to these Terms. Buyer shall not be bound by any terms additional to or at variance with these Terms that may appear in Supplier's quotation, acknowledgment, confirmation, invoice, product data sheet, or in any other document or in any communication from Supplier to Buyer, regardless of when and/or in what form those additional or varying terms are provided to or otherwise made available to Buyer. All previous offers are hereby rejected by Buyer. Buyer's acceptance of and/or payment for the Goods or Services shall constitute acceptance of such Goods or Services subject to the provisions hereof only, and shall not constitute acceptance of any counterproposal submitted by Supplier not otherwise accepted by Buyer in a signed writing. The Contract constitutes the entire agreement between Buyer and Supplier, and shall supersede all prior negotiations, discussions, and dealings. Supplier cannot modify the Contract except by a writing signed by both Supplier and Buyer.

3. PRICE/TAXES. All prices and terms are firm and fixed. This Contract does not contain an open price or quantity term and shall not be filled at prices or quantities higher than identified in the Order. No additional charges will be allowed for import duties, transportation, packaging, returnable containers, and/or documentation, unless the parties otherwise agreed in writing. Unless specifically stated otherwise in the Order, all sales, use, excise, or similar taxes are deemed included in the Contract price and shall be itemized on all invoices.

4. PAYMENT. The following are conditions precedent to Buyer's payment to Supplier for the Goods or Services: Supplier's timely and proper delivery of the Goods and performance of the Services; verification that the quality of Goods or Services conform to the Contract requirements and are not defective; Buyer's receipt of a correct invoice; and Buyer's receipt of payment from its customer for the Goods or Services. If an invoice includes provisions additional to or at variance with these Terms, those

provisions are hereby rejected by Buyer and of no effect, regardless of whether Supplier ships the Goods covered by the invoice, Buyer accepts the Goods covered by the invoice, and/or Buyer pays any part of the invoice. If an invoice subject to cash discount is not mailed on the date of shipment, the discount period will be calculated from the date Buyer receives the invoice; if an invoice is improperly executed with regard to the terms and conditions of the Order, the discount period shall not commence until Buyer receives a proper invoice.

5. DELIVERY. Time is of the essence. Deliveries shall be made at the time and in the manner Buyer specifies. If Supplier does not comply with Buyer's delivery schedule, Buyer, in addition to any other available remedy, may at its option approve a revised delivery schedule or terminate the Order. In either case, Buyer may hold Supplier accountable for all losses and damages arising from Supplier's failure to comply with Buyer's delivery schedule. Whenever any actual or potential delay may occur that threatens to delay delivery, Supplier shall immediately notify Buyer. Supplier shall endeavor at its cost to mitigate the effects of such delay, including expediting delivery.

6. CHANGES. Buyer may make changes regarding the specifications of any Goods to be manufactured for Buyer, the methods of shipment or packing, the place and/or schedule of delivery; and/or the size or amounts of the quantities ordered. If any such change increases or decreases the cost of or the time required for performance of an Order, an equitable adjustment will be made in the Contract price or delivery schedule, or both. Any claim by Supplier for adjustment is irrevocably and unconditionally waived and released unless asserted in writing within ten (10) calendar days from Supplier's receipt of Buyer's requested change.

7. TRANSPORTATION/PACKAGING. On all shipments, Supplier shall promptly notify Buyer of the shipping point and the initial carrier; and, if Buyer is to assume freight charges, routing must be secured before shipment. Irrespective of the shipping terms, until the Goods are physically delivered to Buyer at the Project (or other destination Buyer authorizes in writing) and accepted by Buyer, all risk of loss or damage to the Goods (irrespective of cause) shall be on Supplier. Supplier is liable for damages and costs incurred by Buyer resulting directly or indirectly from improper packaging. No charges will be allowed for packaging, boxing, crating, returnable containers, drayage, cartage, demurrage, or dunnage. Shipments sent C.O.D. without Buyer's prior written consent will not be accepted and will be at Supplier's sole risk.

8. INSPECTION AND REJECTION. All Goods and Services will be subject to inspection and rejection or acceptance by Buyer during manufacture, after delivery at final destination, and at such times as operating tests, if any, are required. Buyer may also reject any Goods and Services found to be defective, non conforming, or failing to meet any warranty. Upon rejection, Buyer may return such goods to Supplier, at Supplier's sole risk and expense, for rework and/or replacement, in which case Supplier agrees to ship conforming goods as Buyer directs. If Buyer determines, in its sole discretion, that Supplier is unable to rework or replace the Goods within the time Buyer requires, Buyer may rework or have another supplier rework the Goods; return the Goods to Supplier for full credit and obtain replacement goods from an alternate source, at Supplier's expense; or produce replacement goods, at Supplier's expense. Services found to be defective, nonconforming, or failing to meet any warranty shall be re performed at Supplier's expense. Buyer's rights under this Article are in addition to any other rights that it may have under this Contract or otherwise.

9. TERMINATION AND CANCELLATION. (A) Termination for Convenience: Buyer may terminate all or any part of this Contract or any Order at any time for any reason for its convenience by notifying Supplier in writing. Upon such a termination, Buyer's liability shall not exceed the actual and

reasonable costs of furnishing the Goods or Services to the date of termination. Buyer shall not be liable for loss of anticipated profit, unabsorbed overhead, interest on claims, unamortized depreciation, or general administrative burden charges, or similar items. Termination for Convenience is not a breach of contract and shall not limit or affect the right of Buyer to terminate this Contract or any Order for cause, or otherwise limit any other remedy of Buyer. (B) Termination for Cause: Without incurring any liability for damages to Supplier, Buyer may terminate this Contract or any Order, in whole or in part, including reducing the quantity of Goods to be delivered hereunder, if: (i) the Goods or Services do not conform to the specifications or requirements of Buyer or its customer; (ii) Supplier fails to meet Buyer's delivery schedule; (iii) Supplier is insolvent, a petition is filed for reorganization of Supplier or for its adjudication as a bankrupt, Supplier makes an assignment for the benefit of creditors, a receiver or trustee is appointed for any of Supplier's assets, or any other type of insolvency proceeding of Supplier is commenced; (iv) Supplier breaches this Contract or any Order, including without limitation the breach of any warranty, or takes or fails to take action that, in Buyer's sole discretion, creates a reasonable possibility that Supplier will not timely fulfill its obligations under this Contract or any Order and does not correct such breach, failure, or action within ten (10) days (or such shorter period of time as is commercially reasonable under the circumstances) after receipt of written notice from Buyer; (v) any representation by Supplier was materially false or misleading; (vi) there is an allegation that the Goods or Services infringes any patent, trademark, or copyright, or violates any statute, ordinance, or administrative order, rule, or regulation. Supplier shall be liable to Buyer for all costs and damages arising out of or relating to the termination and the events giving rise to it. If it is determined that a for cause termination was not warranted, the termination will be deemed one for convenience pursuant to the terms of this Article. (C) No Waiver: No termination is a waiver by Buyer of any other right or remedy it may have. Buyer's rights and remedies shall survive the termination or expiration of this Contract.

10. QUALITY ASSURANCE. Supplier will maintain a quality assurance system that is adequate to detect and prevent shipment of nonconforming Goods or Services. Buyer may evaluate the adequacy of Supplier's quality assurance system. Upon request, Supplier shall provide Buyer with appropriate quality assurance documentation, manuals, or certifications.

11. WARRANTIES. Supplier warrants to Buyer and to Buyer's customer(s) that the Goods and Services furnished shall be: (a) new, of good quality, and free from latent and patent defects in material, design, and workmanship; (b) merchantable and fit and sufficient for their intended purpose(s); (c) in strict accordance with the principal contract and the contract documents, including the plans and specifications, and with Supplier's samples, if any, previously approved by Buyer; and (d) free of any third party claim. Buyer's approval of Supplier's samples, prototypes, or first articles is not a waiver by Buyer of any express or implied warranties or requirements of the Contract or of any Order. If Supplier delivers defective or non conforming items or breaches a warranty, Buyer may, at its option and in addition to any other rights or remedies it may have, recover from Supplier any costs of repairing or removing such items from property, equipment, or products in which such items have been incorporated and any additional costs for reinstallation, re inspection, and re testing, and (a) return the items at Supplier's sole risk and expense and recover from Supplier the price paid therefore and, if elected by Buyer, purchase or manufacture similar items and recover from Supplier the costs and expenses thereof; (b) accept or retain the items and equitably reduce their price; or (c) require Supplier, at Supplier's sole expense, to promptly replace or correct the items. If Supplier fails to promptly replace or correct such items as Buyer directs, Buyer may repair them or have them repaired at Supplier's expense or purchase or manufacture similar items and recover from Supplier the costs and expenses thereof. In any case, Buyer may hold Supplier accountable for all losses and damages caused by Supplier's failure to comply with Supplier's warranty obligations. These warranties shall remain in effect until Buyer is no longer bound to properly perform or correct its work or to repair

damage under Buyer's contract with its customer. NONE OF THE REMEDIES AVAILABLE TO BUYER FOR THE BREACH OF ANY OF THE FOREGONG WARRANTIES MAY BE LIMITED EXCEPT TO THE EXTENT AND IN THE MANNER AGREED UPON BY BUYER IN A SEPARATE WRITTEN AGREEMENT, SIGNED BY SUPPLIER AND BUYER, SPECIFICALLY AND CONSPICUOUSLY DESIGNATING SUCH LIMITATION. All provisions of this Article shall survive inspection or acceptance of, payment for, and use of the Goods and Services and completion, termination, or cancellation of this Contract.

12. INDEPENDENT CONTRACTOR. Supplier is an independent contractor. Buyer shall have no control over Supplier's means, methods, or techniques. Neither Supplier nor any of Supplier's employees, agents, or servants shall be entitled to receive any benefits to which Buyer's employees are entitled.

13. DRAWINGS AND DATA. All drawings, data, designs, engineering instructions, models, specifications, or other technical information, written, oral, or otherwise, supplied by or on behalf of Buyer or prepared by Supplier specifically in connection with performance of an Order ("Buyer Information") shall be and remain Buyer's property. Buyer Information shall not be furnished to others without Buyer's prior written consent.

14. INSURANCE. Supplier shall, at all times material hereto, maintain in full force and effect, and shall furnish Buyer with current certificates of coverage of Supplier for, workers' compensation insurance, commercial general liability insurance, motor vehicle insurance, and such other insurance sufficient for Supplier to meet and perform its indemnity and other obligations hereunder. Supplier shall maintain all such insurance coverage for the benefit of Supplier's own employees, shall name Buyer as an additional insured on all policies (excluding workers' compensation), and shall furnish Buyer with certificates of renewal coverage.

15. INDEMNITY. To the fullest extent permitted by applicable law, Supplier shall indemnify, defend, and hold harmless Buyer and its agents, directors, shareholders, officers, employees, affiliates, parents, subsidiaries, sureties, insurers, independent contractors, invitees, and customer(s) from and against any and all demands, claims, suits, actions, causes of action, liabilities, losses, damages, judgments, and expenses, including without limitation attorney fees, expert witness fees, and court and/or mediation and/or arbitration costs and fees, which, in whole or in part, arises out of, relates to, or is actually or allegedly caused by any of the following: (a) Supplier's breach of this Contract; (b) strict liability or negligence premised on an actual or alleged defect in the Goods and/or Services; (c) property damage, death, and/or personal injury that arises out of, relates to, or is actually or allegedly caused by an act or omission of any of the following: Supplier, Supplier's subcontractors, suppliers, manufacturers, materialmen, anyone directly or indirectly employed by any of them, and/or any person or entity for whose acts any of them may be liable (collectively, the "Supplier Parties"); (d) a claim of a violation of any OSHA, federal, state, or local standard, law, rule, order, or regulation which arises out of, relates to, or is actually or allegedly caused by an act or omission of any of the Supplier Parties; (e) the use of Buyer's personnel or equipment; (f) any Workers' Compensation claim or claim under similar laws, and any payment made by Buyer under any Workers' Compensation Act or similar law, based upon injuries, sickness, disease, death, or disability claimed by an employee of Buyer or of any of the Supplier Parties, which arises out of, relates to, or is actually or allegedly caused by an act or omission of any of the Supplier Parties; (g) any claim that the manufacture, use, sale, or resale of any of the Goods or Services infringes any patent, copyright, trademark, trade name, brand or slogan, or constitutes unfair competition. Supplier's defense/indemnity/hold harmless obligations shall not be limited by any limitation on the amount or type of damages, compensation, or benefits payable to or for any third party (including, for example, an employee of Supplier) under any Workers' Compensation Act, Disability Benefits Act, or other Employee Benefit Act. Supplier's

obligations under this Article shall survive inspection or acceptance of, payment for, and use of the Goods and Services and completion, termination, or cancellation of this Contract.

16. NO WAIVER/RIGHTS CUMULATIVE. Any waiver or failure of Buyer to require strict compliance with the terms of the Contract must be in writing, signed by Buyer, and shall not be deemed a waiver of Buyer's right to insist upon strict compliance thereafter. Buyer's rights and remedies under the Contract are cumulative and are in addition to any other rights and remedies available at law, in equity, or otherwise.

17. ASSIGNMENT. Neither this Contract nor any of Supplier's rights and obligations are assignable by Supplier without Buyer's prior written consent.

18. CONFORMANCE AND COMPLIANCE WITH LAWS. Supplier certifies and represents that, in performing the Contract, it will be bound by, and at its own cost comply with, all applicable laws, orders, codes, rules, and regulations, including without limitation equal employment opportunity, minority business enterprise, women's business enterprise, disadvantaged business enterprise, safety, tax, and fair labor standards. Any law, order, code, rule, or regulation that is applicable to this Contract is hereby incorporated into the Contract as if fully re written herein. Supplier warrants that the Goods will be produced in compliance with the Fair Labor Standards Act of 1938, as amended.

19. NON SEGREGATED FACILITIES. Supplier certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. Supplier agrees that a breach of this certification is a violation of the Equal Opportunity Clause of the Contract. "Segregated facilities" means any waiting rooms, work areas, restrooms, and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

20. EQUAL EMPLOYMENT OPPORTUNITY. If this Contract is subject to 41 CFR 60 1.4(a), 60 300.5(a) and 60 741.5(a), Buyer shall abide by the requirements of those regulations, and they are hereby incorporated by reference into this Contract. These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or veteran status.

21. GOVERNING LAW. This Contract and all claims and/or controversies relating to and/or arising out of it, regardless of the nature of the cause of action, shall be governed by Michigan law. Any claim and/or controversy arising out of or relating to this Contract and/or the project, whether based in contract, statute, tort, equity, or otherwise, shall be resolved by binding arbitration in Columbus, Ohio, administered by the American Arbitration Association.

ATTACHMENT E: VEOLIA'S TECHNICAL MEMORANDUM RE BIOSOLIDS GENERATION @ DWTF

DUWA – Biosolids Cake Generation Analysis
Downriver Wastewater Treatment Facility in Wyandotte, MI
Technical Memo – Performance Based Design (Sept. 2019)

FROM:
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Summary

This Veolia prepared Technical Memo (**TM**) is provided to historical context and updated cake biosolids quality and dewatering data at the Downriver Wastewater Treatment Facility ("**DWTF**"). The biosolids cake generated at the DWTF is the basis for conceptual design criteria and performance metrics of the ***Biosolids Drying Facility Project*** ("**BDFP**"). This analysis is also used as the technical basis for interested respondents (dryer equipment/technology supply bidders and progressive DB teams) of DUWA's procurement RFPs for the BDFP.

The BDFP design criteria have been developed on recent performance of the dewatering centrifuges. The analysis relies upon the recent months of quasi "*steady-state*" dewatering performance (e.g. May thru Aug. 2019), Veolia's process modeling and O&M contract basis, as well as context of the historical dewatering data.

Dewatering Data

The **Downriver Wastewater Treatment Facility** (**DWTF**) produces raw (undigested) dewatered cake biosolids from its treatment of wastewater. Veolia's biosolids processing and management scope of the O&M Agreement is based upon the collection and hauling of the dewatered cake biosolids to existing or approved disposal sites.

Veolia's biosolids fee is based upon an annual production of 47,981 wet tons for hauing and disposal. On a planned seven (7) days per week dewatering schedule, the contract budget allows for a calculated annualized cake production level of 131.5 wet tons per day (WTPD). At a target dry solids (%TS) content for the dewatered cake biosolids of 25.0% (based upon a blended operation of the existing dewatering equipment (belt filter presses and centrifuges), the equivalent annual and daily dry mass of cake biosolids for processing and final disposition is approximately 11,995 dry tons (or 32.9-DTPD). This data is the contract baseline that Veolia used to launch its assessment of the technical design criteria for the BDFP.

Historical Analysis

Veolia has analyzed the historical data for DWTF biosolids cake production on the basis of hauling information from Wayne County. The daily percent dry solids (%TS) data of the dewatered cake during these historical monthly and annual hauling periods was also analyzed to assess the dry mass levels and seasonal variations.

The following table summarizes the biosolids cake production (wet tons) as hauled away from the DWTF over the past six years (2013 thru 2018). Also provided in Table 1 is the annualized variation level (actual wet tons as compared to the annualized average wet tons over the six-year historical period). As indicated in the high-lighted contract values (last row in the table as target key performance indicators – KPI), the variation (ratio) of 1.12 is essentially double the highest prior years (2015 & 2016) as compared to the six-year annual average.

The abnormally values in 2018 reflect the apparent back-logging of biosolids in the DWTF by Wayne County. When discounting the 2018 historical data, the daily wet mass average in 2013 thru 2017 was 122.0-WTPD. The corresponding average variation in annualized wet mass in the prior four-years (2014 thru 2017) in which a complete set (all twelve months of historical data was available and analyzed) is computed to be ~1.055. Using this variation ratio as the basis of the maximum range in daily wet mass levels, the corresponding daily average wet mass level was determined to approximate 115.6-WTPD. As such, this historical daily average level of **~116-WTPD** for hauled away cake biosolids was the original basis of process modeling for the BDFP.

Table 1 – Summary of Historical Biosolids Cake Production (2013 – 2018)

Operating Year	*Wet Mass (WTPY)*	*Daily Mass (WTPD)*	*Variation (Ratio)*
2013	*43,232*	*118.4*	*1.01*
2014	*44,855*	*122.9*	*1.05*
2015	*45,305*	*124.1*	*1.06*
2016	*45,207*	*123.9*	*1.06*
2017	*43,960*	*120.4*	*1.03*
2018	*34,133*	*93.5*	*0.80*
6-Yr. Avg.	***42,782***	***117.2***	***1.00***
Excluding 2018	*44,512*	*122.0*	
Contract Values / KPI	***47,981***	***131.5***	***1.12***

The historical data was further analyzed on a monthly basis to assess any indicative seasonal fluctuations and the percent dry solids (%TS) of the dewatered cake was also calibrated to the monthly hauling wet mass levels to determine the monthly and annual dry mass of cake production. Table 2 (shown at the top of the following page) highlights the historical data for dry solids content and mass for the Wayne County operating years of 2015 through 2018. The data for 2013 through 2017 appeared to be reasonably consistent for further analysis.

Table 2 – Summary of Historical Biosolids Cake Solids & Dry Mass (2016 – 2018)			
Operating Year	***Cake Solids (%TS)***	***Daily Mass (DTPD)***	***Annual (DTPY)***
2016	*23.4*	*29.0*	*10,578*
2017	*29.9*	*36.0*	*13,144*
2018	*28.4*	*26.6*	*9,694*
3-Yr. Avg.	***27.25***	***30.5***	***11,139***

The biosolids cake data shown above in Table 2 indicates a predominate BFPs dewatering operation in 2016 and then centrifuge operations in 2017 and 2018. Relative to the prior comments of the "*bias low*" production numbers in 2018 as reflected in Table 1 as compared to the prior five years of cake solids haul-away data, the most relevant historical information with respect to annual and daily dry mass of dewatered biosolids is in 2017.

Accordingly, Veolia's initial assessment for baseline capacity and processing through-put for the BFDP was premised on 36-DTPD, which at nearly 30 %TS cake solids, yields a wet mass rate of 120-WTPD. The plant's management team reported their cake haul away operations in early 2019 was around 110-WTPD at two trips per day of dual gravel-train trailers with a nominal solids hauling weight capacity of fifty-five (55) wet tons each. Consequentially, the mid-point of 115-WTPD was selected as the initial basis of process modeling and life-cycle cost of the BDFP in comparison with the "***current situation***" status-quo of cake solids hauling to landfills.

Table 3 – Summary of Historical Monthly Biosolids Characteristics (2016 & 17)			
Operating Month	***Wet Mass (WTPD)***	***Cake Solids (%TS)***	***Dry Mass (DTPD)***
January	*105.7*	*22.8*	*24.0*
February	*122.3*	*21.9*	*26.7*
March	*129.3*	*23.8*	*30.7*
April	*147.2*	*23.1*	*33.9*
May	*126.2*	*25.5*	*32.2*
June	*129.9*	*28.3*	*36.8*
July	*122.7*	*29.6*	*36.3*
August	*107.1*	*30.1*	*32:2*
September	*115.8*	*31.1*	*36.0*
October	*110.3*	*30.0*	*33.1*
November	*117.9*	*28.7*	*33.8*
December	*113.2*	*29.5*	*33.4*
Annual Total	***44,000***		***11,855***
Monthly Average	***120.6***	***27.0***	***32.5***

Table 3 (prior page), summarizes the historical monthly data for dewatered biosolids on an average basis for the apparent "*more accurate*" operating period of 2016 and 2017. As indicated, the average month for wet mass of cake production approximates 121-WTPD with a maximum month rate above 145-WTPD. Based upon the historical cake solids content, average dry mass levels reach monthly levels at ~32.5-DTPD and a sustained maximum months (e.g. during the warm weather months in summertime) to a level of ~36.5-DTPD.

The DWTF provides treatment of the high-strength organic waste (glycol) from the Detroit Airport, which does intermittently and seasonally impact the elevated production of secondary biological solids production from the oxygen activated sludge (OAS), which changes both the composition and overall mass quantity of cake solids.

A focused analysis of the historical data during various periods of glycol treatment over the past six years (2014 through 2019 year-to-date) to isolate those months in which higher levels of cake biosolids have been generated. As such, the monthly average has approximated 4,910 wet tons (or at approximately 161-WTPD). The corresponding average solids content during these months was 25.1 %TS, which is reflective of the average blend of cake solids from the belt filter presses and the centrifuges. The corresponding dry mass on a daily average is approximately 40.25-DTPD (or 1,225 dry tons in those peak months of biosolids generation).

Current Situation

Table 4 (following) summarizes the biosolids cake quality (%TS) and production (wet tons and dry tons) over the past four months (May thru Aug. 2019) that most accurately reflects the current situation for dewatering at the DWTF. Prior months in 2019 include Veolia's dewatering operations of excess biosolids (eliminating the backlog by Wayne County of plant solids inventory) as well as wintertime months of cake production (as also inclusive of the impacts of elevated secondary biosolids from glycol discharges from the Detroit Metro. Airport).

As highlighted in Table 4, the quantity of cake biosolids has steadily declined over the past five (5) months and yields a year-end forecast that is slightly higher than Veolia's modeling for its contract baseline level for wet cake mass disposal to landfill. Veolia's annual contract value limit of 47,981 wet tons per year is equivalent to approximately 131.5 wet tons per day (WTPD) on average daily (7 days per week) dewatering schedule, as will be required to optimize the new thermal drying system. Table 4 also shows a steady increase in the dry solids quality of the cake biosolids over the past four (4) months as a result of Veolia's optimization of dewatering operations with a focus on the cake solids via the two (2) centrifuges and minimizing any reliance on the BFPs. Accordingly, the target design values for the BDFP and related key performance indicators (KPI) are shown in the last row of Table 4 with respect to daily average levels of biosolids cake mass production and solids quality.

Table 4 – Summary of Biosolids Cake Production & Quality (Apr. – Sept. 2019)

Operating Month	*Wet Mass (WTPD)*	*Solids (%TS)*	*Dry Mass (DTPD)*
April	*181.3*	*27.7*	*50.2*
May	*158.0*	*27.0*	*42.7*
June	*130.5*	*27.3*	*35.6*
July	*127.5*	*28.2*	*36.0*
August	*101.5*	*31.7*	*32.2*

September	*102.7*	*30.5*	*31.3*
6-Month Average	***133.6***	***28.7***	***38.3***
Yr-End Forecast	*137.4*	*28.3*	*39.7*
Target Design / KPI	***140.0***	***28.5***	***39.9***

Seasonal Variations

It is known that the mass ratio of thickened primary sludge and waste activated sludge (secondary biosolids) changes on a seasonal basis as primarily driven by the wintertime period of glycol discharge from the Airport.

Table 5 (below) summarizes the empirical seasonal variations in biosolids cake production as differentiated between primary sludge and secondary solids as to be centrifuge dewatered and then to be upgraded via thermal drying. As shown, the mass ratio of primary sludge is constantly more than thickened secondary biosolids and only balances for the couple of months in late winter/early spring when higher rates of activated sludge are generated from the processing of glycol from the Airport. During the summer / fall time months, the ratio of primary sludge to secondary solids peaks to a general mass ratio of three to one (3:1), which impacts the dry solids content of the dewatered cake and the highest fiber content in the biosolids as drying feedstock.

Table 5 – Summary of Seasonal Changes in Biosolids Feedstock Composition			
Operating Month	***Primary Sludge***	***Secondary Solids***	***Mass Ratio (TN/TN)***
January	*67%*	*33%*	*2:1*
February	*60%*	*40%*	*1.5:1*
March	*50%*	*50%*	*1:1*
April	*50%*	*50%*	*1:1*
May	*60%*	*40%*	*1.5:1*
June	*67%*	*33%*	*2:1*
July	*71.5%*	*28.5%*	*2.5:1*
August	*75%*	*25%*	*3:1*
September	*75%*	*25%*	*3:1*
October	*75%*	*25%*	*3:1*
November	*71.5%*	*28.5%*	*2.5:1*
December	*67%*	*33%*	*2:1*
Annual Avg.	***66%***	***34%***	***~2:1***
Max. Month	*75%*	*25%*	*3:1*
Target Design / KPI	***67%***	***33%***	***2:1***

Based upon the seasonal variations in the composition of the cake biosolids, Table 6 (below) illustrates the forecasted impacts on the dry solids content and mass yield of the dewatered feedstock for the BDFP. As indicated, the monthly average of wet mass of cake biosolids approximates 140 WTPD, with a monthly maximum of nearly 156-WTPD (peaking factor of ~1.12X). During the glycol treatment months (typically Feb. through May) the monthly average cake production is analyzed to approximate 150.5-WTPD (or 39.9-DTPD).

A deeper dive in the cake production data during the glycol treatment period seems to indicate a peak monthly level of 175-WTPD (peaking factor of ~1.25X). This through-put value becomes the design basis for the ultimate capacity level for the BDFP. This capacity level reflects a consistent peaking factor of 1.12X for the maximum month of wet mass of cake biosolids as shown in Table 6 below (e.g. 155.8 x 1.12 = 174.5 WTPD).

Table 6 – Summary of Seasonal Changes in Biosolids Feedstock & Cake Production

Operating Month	*Dry Mass (DTPD)*	*Solids (%TS)*	*Wet Mass (DTPD)*
January	*40.0*	*28.5*	*140.5*
February	*39.2*	*27.0*	*145.2*
March	*40.5*	*26.0*	*155.8*
April	*40.5*	*26.0*	*155.8*
May	*39.2*	*27.0*	*145.2*
June	*40.0*	*28.5*	*140.5*
July	*38.0*	*28.0*	*135.7*
August	*36.9*	*29.0*	*127.2*
September	*36.9*	*29.0*	*127.2*
October	*36.9*	*29.0*	*127.2*
November	*38.0*	*28.0*	*135.7*
December	*40.0*	*28.5*	*140.5*
Annual Avg.	***38.9***	***27.9***	***139.7***
Max. Month	*40.5*	*29.0*	*155.8*
Target Design / KPI	***39.9***	***28.5***	***140.0***

Accordingly, the following values are recommended as the basis for the daily average, maximum month and peak capacity operating scenarios and related conceptual process design criteria for the BDFP:

- o Daily Average = 140.0 WTPD at 28.5 %TS (39.9-DPTD)
- o Monthly Maximum = 156.0 WTPD at 26.0 %TS (40.5-DTPD)
- o Peak Capacity = 175.0 WTPD at 26.0 %TS (45.5-DTPD)

The following three (3) pages as **Attachment A** – provides conceptual modeling of these BDFP scenarios.

VEOLIA NORTH AMERICA					TJM
Downriver Utility WW Authority, MI Project - Biosolids Management					vs.6
Biosolids Thermal Drying Ops. (Daily Avg. - Yr. 2021)					09/27/19
DUWA BIOSOLIDS					
Dewatered Wet Mass	140	WTPD		51,100	WTPY
Dewatered Cake Solids	28.5	%TS			
Dewatered Dry Mass	39.9	DTPD		14,565	DTPY
Cake Solids Bulk Density	64.0	lb/CF			
Dewatered Cake Volume	162	CYPD		59,145	CY/YR
CAKE BIOSOLIDS STORAGE					
Cake Storage Hopper (Live Bottom Augers)	1	No.		8'(W) x 12'(L) x 18'(H)	
Cake Storage Level Control	85.0	%		64.0	CY
Cake Storage Volume Utilization	54.5	CY			
Cake Storage Retention Time	8.1	hrs.			
Cake Storage Hopper Turnover	3.0	No./DY			
THERMAL DRYING					
Thermal Dryers in Service	2	No.			
Thermal Dryers System Uptime	**91.5**	**%**	52.0	364	dys/Yr
Thermal Dryers System Schedule	7.0	dy/wk			
Thermal Dryers System Runtime	22.0	hrs/dy		8,010	hrs/Yr
Cake Pumping to Thermal Dryers	12.7	GPM			
Cake Solids Loading to Thermal Dryers	1,815	lb/hr			
Cake Wet Mass Loading per Dryer	3.2	WTPH			
Moisture Loading Rate per Dryer	2.3	TPH			
Wet Cake Solids Loading per Dryer	6,365	lb/hr			
Thermal Dryer Loading Capacity	7,290	lb/hr			
THermal Dryer Loading Utilization	87	%			
In-Direct Dryer System Solids Recovery	96.5	%			
Entrained Solids Discharge to Dryer Condenser	1,395	lb/dy		256	DTPY
Condenser Service Water Flow Rate per Dryer	140	GPM		67.3	MGPY
Condenser Water Recycle Solids Conc.	905	mg/L			
Dried Solids Dry Mass per Dryer	19.5	DTPD	135	7,085	DTPY
Dried Solids Content	92.0	%DS			
Dried Solids Wet Mass per Belt Dryer	21.0	TPD	145	7,630	TPY
Moisture Rate in Dried Solids Product	0.1	TPH			
Thermal Dryer Evaporation Demand	4,415	lb H_2O/hr			
Thermal Dryer Evaporation Capacity	5,500	lb H_2O/hr			
Thermal Dryer Capacity Utilization	80	%			
Energy Required for Drying Demand	13.1	MMBtu/hr	1,480	Btu/lb H_2O evap. effcy.	
Thermal Energy Required for Drying	15.4	MMBtu/hr		86.0%	Effcy.
Natural Gas Demand (LHV Basis)	1,015	BTU/cf			
Natural Gas Demand	334.0	Kcf/dy		121,560	Kcf/Yr
Natural Gas Consumption	3,455	Therms/dy		125,745	DTherms/Yr
DRIED SOLIDS HAULING & DISPOSITION					
Dried Solids Mass for Hauling & Disposition	42.0	TPD	295	15,295	TPY
Dried Solids Hauling Weight	55.0	TN/Load			
Dried Solids Hauling Demand	0.8	Loads/Day	**5.4**		Loads/Wk

VEOLIA NORTH AMERICA					TJM
Downriver Utility WW Authority, MI Project - Biosolids Management					vs.6
Biosolids Thermal Drying Ops. (Max. Month - Yr. 2021)					09/27/19
DUWA BIOSOLIDS					
Dewatered Wet Mass	156	WTPD			WTPY
Dewatered Cake Solids	26.0	%TS			
Dewatered Dry Mass	40.6	DTPD			DTPY
Cake Solids Bulk Density	64.0	lb/CF			
Dewatered Cake Volume	180	CYPD			CY/YR
CAKE BIOSOLIDS STORAGE					
Cake Storage Hopper (Live Bottom Augers)	1	No.		8'(W) x 12'(L) x 18'(H)	
Cake Storage Level Control	85.0	%		64.0	CY
Cake Storage Volume Utilization	54.4	CY			
Cake Storage Retention Time	7.3	hrs.			
Cake Storage Hopper Turnover	3.3	No./DY			
THERMAL DRYING					
Thermal Dryers in Service	2	No.			
Thermal Dryers System Uptime	**100.0**	**%**	8.7	61	dys/Yr
Thermal Dryers System Schedule	7.0	dy/wk			
Thermal Dryers System Runtime	24.0	hrs/dy		1,460	hrs/Yr
Cake Pumping to Thermal Dryers	12.9	GPM			
Cake Solids Loading to Thermal Dryers	1,691	lb/hr			
Cake Wet Mass Loading per Dryer	3.3	WTPH			
Moisture Loading Rate per Dryer	2.4	TPH			
Wet Cake Solids Loading per Dryer	6,500	lb/hr			
Thermal Dryer Loading Capacity	7,290	lb/hr			
Thermal Dryer Loading Utilization	89	%			
In-Direct Dryer System Solids Recovery	96.5	%			
Entrained Solids Discharge to Dryer Condenser	1,420	lb/dy			DTPY
Condenser Service Water Flow Rate per Dryer	140	GPM			MGPY
Condenser Water Recycle Solids Conc.	845	mg/L			
Dried Solids Dry Mass per Dryer	19.5	DTPD	134		DTPY
Dried Solids Content	92.0	%DS			
Dried Solids Wet Mass per Belt Dryer	21.0	TPD	148		TPY
Moisture Rate in Dried Solids Product	0.1	TPH			
Thermal Dryer Evaporation Demand	4,685	lb H_2O/hr			
Thermal Dryer Evaporation Capacity	5,500	lb H_2O/hr			
Thermal Dryer Capacity Utilization	85	%			
Energy Required for Drying Demand	13.6	MMBtu/hr	1,450	Btu/lb H_2O evap.	effcy.
Thermal Energy Required for Drying	16.0	MMBtu/hr		86.0%	Effcy.
Natural Gas Demand (LHV Basis)	1,015	BTU/cf			
Natural Gas Demand	378.5	Kcf/dy			Kcf/Yr
Natural Gas Consumption	3,915	Therms/dy			DTherms/Yr
DRIED SOLIDS HAULING & DISPOSITION					
Dried Solids Mass for Hauling & Disposition	42.0	TPD	295		TPY
Dried Solids Hauling Weight	55.0	TN/Load			
Dried Solids Hauling Demand	0.8	Loads/Day	**5.4**		Loads/Wk.

VEOLIA NORTH AMERICA					TJM
Downriver Utility WW Authority, MI Project - Biosolids Management					vs.6
Biosolids Thermal Drying Ops. (Peak Capacity - Yr. 2021)					09/27/19
DUWA BIOSOLIDS					
Dewatered Wet Mass	175	WTPD			WTPY
Dewatered Cake Solids	26.0	%TS			
Dewatered Dry Mass	45.5	DTPD			DTPY
Cake Solids Bulk Density	64.0	lb/CF			
Dewatered Cake Volume	205	CYPD			CY/YR
CAKE BIOSOLIDS STORAGE					
Cake Storage Hopper (Live Bottom Augers)	1	No.		8'(W) x 12'(L) x 18'(H)	
Cake Storage Level Control	85.0	%		64.0	CY
Cake Storage Volume Utilization	54.4	CY			
Cake Storage Retention Time	6.4	hrs.			
Cake Storage Hopper Turnover	3.8	No./DY			
THERMAL DRYING					
Thermal Dryers in Service	2	No.			
Thermal Dryers System Uptime	**100.0**	**%**	8.7	61	dys/Yr
Thermal Dryers System Schedule	7.0	dy/wk			
Thermal Dryers System Runtime	24.0	hrs/dy		1,460	hrs/Yr
Cake Pumping to Thermal Dryers	14.5	GPM			
Cake Solids Loading to Thermal Dryers	1,895	lb/hr			
Cake Wet Mass Loading per Dryer	3.6	WTPH			
Moisture Loading Rate per Dryer	2.7	TPH			
Wet Cake Solids Loading per Dryer	7,290	lb/hr			
Thermal Dryer Loading Capacity	7,290	lb/hr			
Thermal Dryer Loading Utilization	100	%			
In-Direct Dryer System Solids Recovery	96.5	%			
Entrained Solids Discharge to Dryer Condenser	1,590	lb/dy			DTPY
Condenser Service Water Flow Rate per Dryer	140	GPM			MGPY
Condenser Water Recycle Solids Conc.	945	mg/L			
Dried Solids Dry Mass per Dryer	22.0	DTPD	152		DTPY
Dried Solids Content	92.0	%DS			
Dried Solids Wet Mass per Belt Dryer	24.0	TPD	169		TPY
Moisture Rate in Dried Solids Product	0.1	TPH			
Thermal Dryer Evaporation Demand	5,235	lb H_2O/hr			
Thermal Dryer Evaporation Capacity	5,500	lb H_2O/hr			
Thermal Dryer Capacity Utilization	95	%			
Energy Required for Drying Demand	15.2	MMBtu/hr	1,450	Btu/lb H_2O evap. effcy.	
Thermal Energy Required for Drying	17.9	MMBtu/hr		86.0%	Effcy.
Natural Gas Demand (LHV Basis)	1,015	BTU/cf			
Natural Gas Demand	422.0	Kcf/dy			Kcf/Yr
Natural Gas Consumption	4,365	Therms/dy			DTherms/Yr
DRIED SOLIDS HAULING & DISPOSITION					
Dried Solids Mass for Hauling & Disposition	48.0	TPD	335		TPY
Dried Solids Hauling Weight	55.0	TN/Load			
Dried Solids Hauling Demand	0.9	Loads/Day	**6.1**		Loads/Wk.