APPENDIX A

PRELIMINARY TECHNICAL SPECIFICATIONS FOR BIOSOLIDS MANAGEMENT SERVICES

JEA Buckman Residuals Management Facility

1. Background

JEA is seeking biosolids management services from experienced biosolids management contractor(s) and service providers (the "Contractor" or "Company") that possess technical expertise in managing and beneficially reusing Class A, thermally dried biosolids pellets and Class B and unclassified dewatered cake biosolids for a large, municipal wastewater utility. JEA intends to award one continuing service contract for this work but reserves the right to issue more than one. Separate contracts may be utilized for management of biosolids from different JEA facilities. The operating contract(s) will remain valid for a minimum 10-year contract period.

1.1 Existing Facilities

Dewatered cake biosolids from JEA's Buckman Residuals Management Facility (RMF), Blacks Ford Water Reclamation Facility (WRF), Monterey WRF, and future Greenland WRF will be included in the contract(s) for biosolids management services. The Blacks Ford WRF and Monterey WRF produce primarily Class B, aerobically digested and dewatered biosolids. The Greenland WRF will be a similar facility to the Blacks Ford WRF and is predicted to begin operation about 2025.

The Buckman Water Reclamation Facility (WRF) and the Buckman Residuals Management Facility (RMF) are located at 2221 Buckman Street, Jacksonville, Florida, and are centrally located within JEA's service area. The Buckman WRF is JEA's largest wastewater treatment facility, with a permitted annual average daily flow (AADF) treatment capacity of 52.5 million gallons per day (mgd) and an AADF ranging from approximately 32 mgd in 2015 to 29 mgd in 2017. Residuals from the Buckman WRF and several other WRFs are transferred to the Buckman RMF for treatment.

Influent wastewater to the Buckman WRF passes through mechanical bar screens before entering an onsite influent pump station. This pump station sends the screened influent to an influent chamber where it combines with influent from offsite lift stations. This combined flow then enters two grit settling basins with three channels per basin. The degritted flow then passes through two mechanical fine screens and onto one of eight primary clarifiers. The primary effluent proceeds to secondary treatment, which is composed of four aeration tanks with fine bubble diffusers operated in series. The combined basin includes anoxic and oxic zones along with recycle pumping for nitrogen removal. The flow then proceeds to one of six secondary clarifiers and then to an ultraviolet (UV) disinfection system. Effluent is discharged to the St. Johns River with a permitted discharge capacity of 52.5 mgd AADF. Sludge from the primary and secondary clarifiers is transferred to the raw holding tank at the Buckman RMF.

The biosolids management process at the Buckman RMF begins with primary sludge, waste activated sludge (WAS), and the pumped or trucked residual solids from the JEA WRFs being combined in the raw sludge storage tank, then pumped to the gravity belt thickeners. Output from the gravity belt thickeners is then pumped into three anaerobic digesters. Biogas is harnessed from the digesters and used as fuel

for energy production. The approximately 3 percent total solids (TS) digested sludge is moved from the digesters to the centrifuges for dewatering where additional polymer is added. The dewatered biosolids, now at approximately 20 percent TS, are conveyed from the centrifuges to a thermal dryer where they reach 95 percent TS. The dried biosolids are stored in silos before being land applied or further processed by the vendor into other fertilizer products.

The Buckman RMF has an approximate design capacity of about 35 dry tons per day of solids loading based on the existing condition of equipment.

The biosolids dewatering and drying building has reached the end of its useful life and is not considered a viable candidate for rehabilitation because of the extremely high costs involved in rehabilitating the building and bringing up to current design and building code standards.

1.2 New Biosolids Process Facility

A new facility will be constructed for thickening, dewatering, and truck loading. The current concept for a new biosolids process facility at Buckman WRF is a three-story structure with thickening and polymer feed processes and two truck loading bays on the first floor. Conveyors would be located on the second level for safe and convenient access for maintenance. The third floor will house operations and dewatering. Existing thickening and dewatering equipment will be relocated to the new biosolids process facility. New biosolids cake storage bins and truck loadout facilities will be used to transfer dewatered cake from the Buckman RMF to the Contractor's trucks for hauling to the Contractor's biosolids processing, reuse, or disposal sites.

Viable thickening, dewatering, and conveyance equipment will be relocated from the existing solids process building to the newly constructed facility as needed. Once the new facility is operating, the existing facility will be demolished to alleviate safety concerns and provide available space for future plant upgrades as needed.

The Contractor's input will be considered in the design process for the new Buckman Solids Process Building by reviewing the truck loadout facility and providing input on loadout features and traffic flow that will facilitate the Contractor's operations when switching to the new Solids Process Building.

A DigestivorePAD™ (post-aerobic digestion process) is also planned to be added to the Buckman RMF between anaerobic digestion and dewatering. One of the anticipated benefits of this process is the reduction in total solids (TS) produced by approximately 10 percent through further volatile solids reduction.

1.3 Other Facilities

Solids from the existing Blacks Ford WRF and Monterey WRF and future Greenland WRF will also be included in the contract for biosolids management services. The Blacks Ford WRF expansion is under construction and when complete will consist of screening, biological treatment in an oxidation ditch in a 5-stage Bardenpho process configuration for biological nitrogen and phosphorus removal, secondary clarifiers, filtration, and UV disinfection. Alum may be added to polish residual phosphorus from the biological process when necessary. Waste activated sludge will be sent to aerobic digestion followed by centrifuge dewatering producing Class B dewatered biosolids.

The Greenland WRF is expected to be a similar facility to the Blacks Ford WRF, and is predicted to begin operation about 2025 as noted in Table 2-2.

2. Scope of Work

The work will consist of receiving Class AA thermally dried biosolids, Class B dewatered biosolids, or at times, unclassified solids from the designated truck loading stations at JEA's existing Buckman Solids Process Building while it remains operational until approximately 2020, and then switching the biosolids receiving location to the new Buckman Solids Process Building, where the material received will consist primarily of Class B dewatered biosolids (Project). The work will also consist of receiving primarily Class B dewatered biosolids from JEA's Blacks Ford and Monterey WRFs and future Greenland WRF.

The Contractor will transport the biosolids to permitted biosolids processing or land application sites, or to biosolids disposal locations such as landfills. Work areas and scope may include, but not be limited to, the following:

1. Design, construct, operate, and maintain biosolids processing facility (BPF), or biosolids land application, or biosolids disposal facilities at offsite locations either owned or operated by the Contractor with sufficient capacity to process JEA's biosolids, which have projections of mass quantities as shown in Tables 2-1 and 2-2, and general characteristics as described in Table 2-3, for a **10-year** contract operating period.
2. Receive dewatered cake biosolids or dried biosolids at designated interface connection points and transport them to the Contractor's BPF(s), land application, or disposal sites throughout the **10-year** contract operating period. The location of interface connection points at the Buckman RMF are shown approximately in Figures 2-1 and 2-2 (Process Schematics), Figure 2-3(Existing Site Plan) and Figure 2-4 (Future Site Plan), and will be determined more precisely at the Invitation to Negotiate (ITN) phase.
3. Design facilities for handling any recycle waste streams produced at the Contractor's BPF(s).
4. Design, construct, operate, and maintain all required utilities (water, sewer, electricity, natural gas, biogas) for the BPF(s).
5. Operate and maintain, or produce, biosolids end product(s) that can be marketed or disposed of.
6. Identify, obtain, and maintain all construction and operating permits required by local, state, and national jurisdictions. Permits will include those for site development, utilities, water and air pollution prevention, zoning, and environmental. All permits and licenses required for design and construction will be obtained and paid for by the Contractor.
7. Market the biosolids end product(s) to potential users, or properly handle and dispose of any other biosolids products.
8. Develop an appropriate monitoring, record keeping, and reporting program to accomplish the following:
   - Measure the quantity of materials processed
   - Identify and track where material is used
   - Maintain a record demonstrating the quality of the material produced
   - Record and maintain all regulatory reports
   - Maintain all accounting records, recording costs and revenues generated by the Contractor.
   - Perform all sampling and analyses required for the program; sampling and analyses must be performed in accordance with local, state, and federal regulatory requirements.

- Develop and implement an appropriate asset management and maintenance management program, perform all preventive and corrective maintenance for the new facilities, and perform asset replacement consistent with the asset management program.

9. Perform all work in accordance with the more stringent code or regulation should there be a conflict in applicable regulations.

Table 2-1. Solids Production Forecast for the Buckman RMF*

Year	**TS to Buckman RMF (dry tons/day)** ADF	**Peak 3 Month (dry tons/day)** 1.11 x ADF	**TS after Digestion (dry tons/day)** 62% x TS to Buckman RMF	**Peak 3 Month After Digestion (dry tons/day)** 1.11 x TS after Digestion
2018	46.0	51.1	31.3	34.7
2019	46.1	51.1	31.3	34.8
2020	46.1	51.2	31.4	34.8
2021	46.2	51.3	31.4	34.9
2022	46.6	51.7	31.7	35.2
2023	47.0	52.2	32.0	35.5
2024	47.4	52.6	32.2	35.8
2025	47.8	53.0	32.5	36.1
2026	48.3	53.6	32.8	36.4
2027	48.8	54.1	33.2	36.8
2028	49.3	54.7	33.5	37.2
2029	49.8	55.2	33.8	37.6
2030	50.3	55.9	34.2	38.0
2031	50.8	56.4	34.5	38.3
2032	51.3	56.9	34.9	38.7
2033	51.8	57.5	35.2	39.1
2034	52.3	58.0	35.5	39.4
2035	52.7	58.5	35.9	39.8
2036	53.2	59.1	36.2	40.2

*Updated from JEA Biosolids Management Study, CH2M, 2017. Values do not account for anticipated 10% mass reduction in biosolids if post-aerobic digestion (PAD) is implemented as planned at Buckman RMF.

Table 2-2. Solids Production Forecast for the Blacks Ford and Greenland WRFs

Year	Blacks Ford WRF TS (dry tons/day) ADF	Greenland WRF TS (dry tons/day) ADF	Monterey WRF TS (dry tons/day) ADF
2018	2.5	0	0.96
2019	2.7	0	0.99
2020	2.8	0	1.01
2021	3.0	0	1.01
2022	3.2	0	1.02
2023	3.4	0	1.02
2024	3.6	0	1.02
2025	3.7	0.8	1.02
2026	3.2	1.5	1.02
2027	3.4	1.5	1.02
2028	3.5	1.6	1.02
2029	3.7	1.6	1.02
2030	3.4	2.1	1.03
2031	3.6	2.2	1.03
2032	3.7	2.3	1.03
2033	3.8	2.4	1.03
2034	3.9	2.5	1.03
2035	4.1	2.6	1.03
2036	4.2	2.7	1.03

Table 2-3. Characteristics of Biosolids Produced at the Buckman RMF			
Type of Biosolids	**Total Solids Concentration, %**	**Ratio of volatile solids to total solids (%)**	**Regulatory Standard Met**
Class AA Dried Pellets	88-95% TS	65-75% TS	EPA Class A pathogen reduction Vector attraction reduction Pollutant concentrations under EPA Table 3 limits
Class B Dewatered Cake	18-22% TS	60-80% TS	EPA Class B pathogen reduction Vector attraction reduction Pollutant concentrations under EPA Table 3 limits
Unclassified, dewatered cake	17-22% TS	n/a	Does not meet Class B pathogen reduction, vector attraction reduction, or pollutant concentration limits, so it must be landfilled or processed further at Contractor's BPF provided it meets pertinent requirements

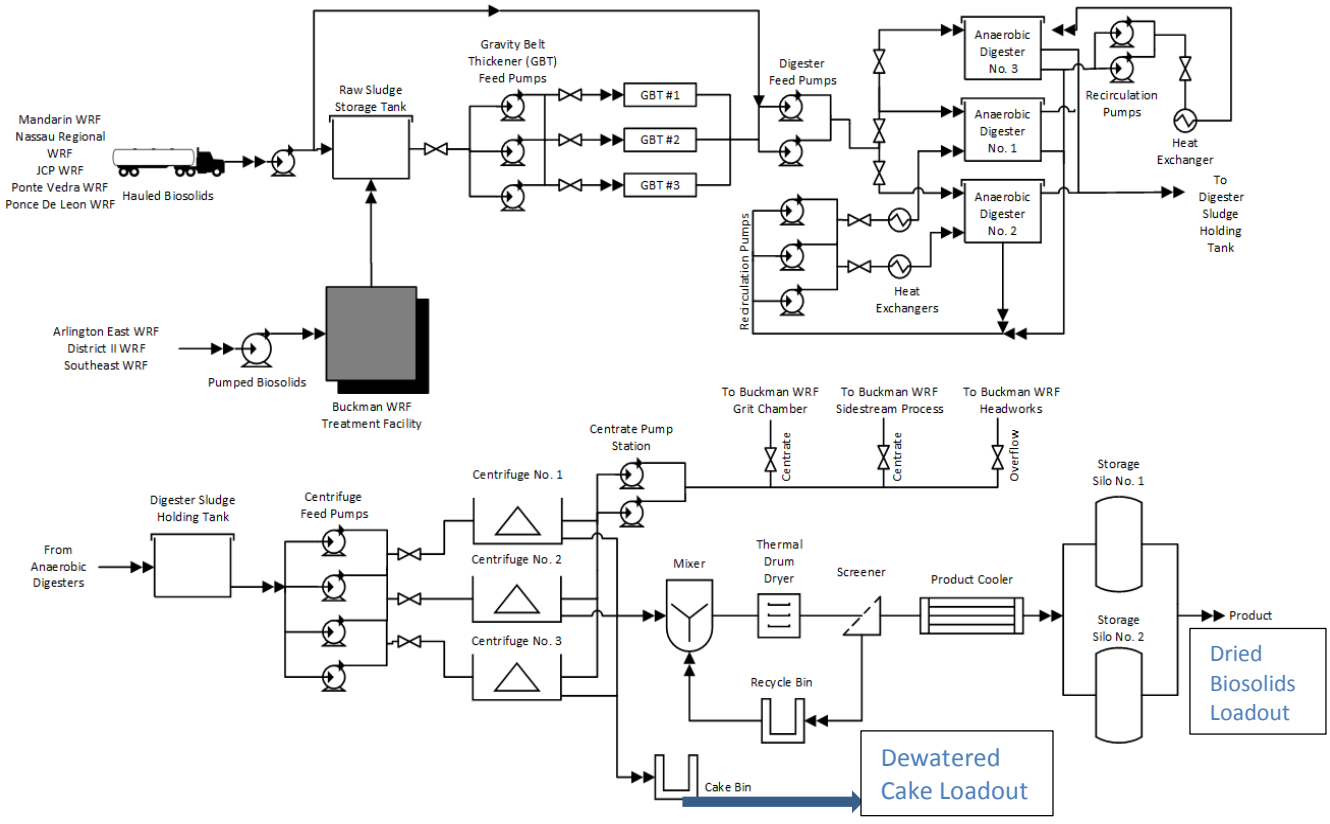

Figure 2-1. Existing Buckman RMF Process Flow Diagram

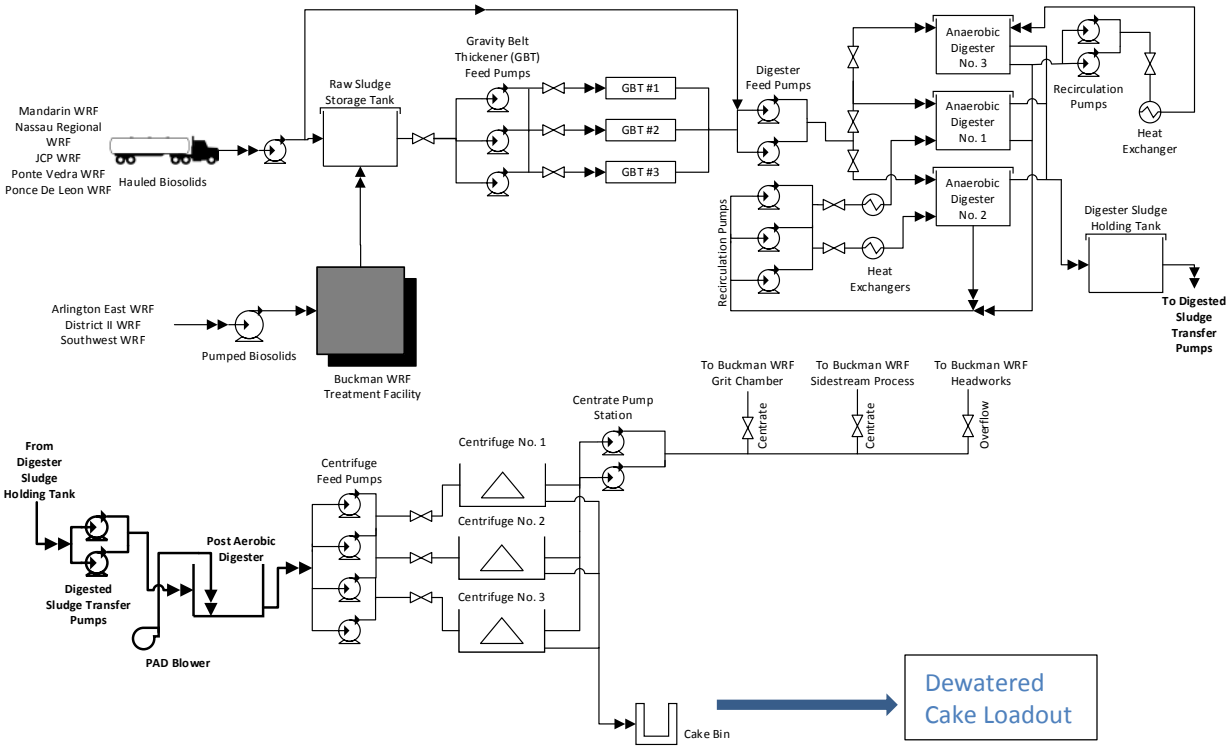

Figure 2-2. Future Buckman RMF Process Flow Diagram

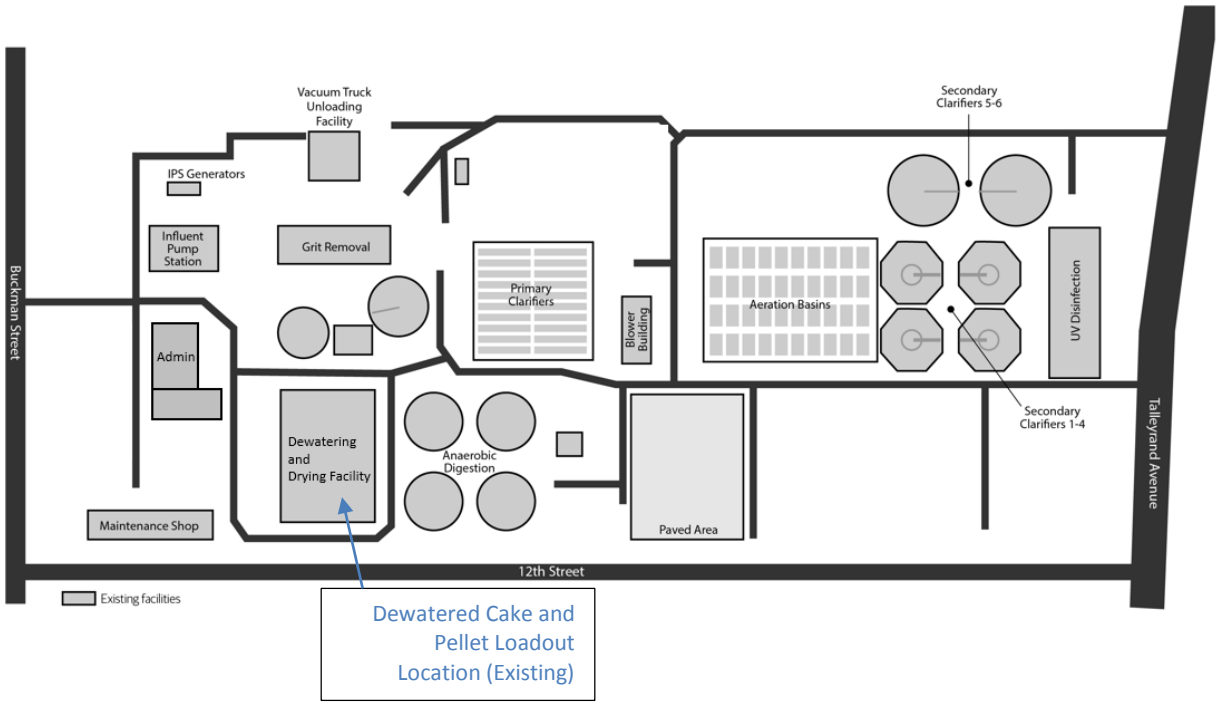

Figure 2-3. Buckman RMF Existing Site Plan Concept

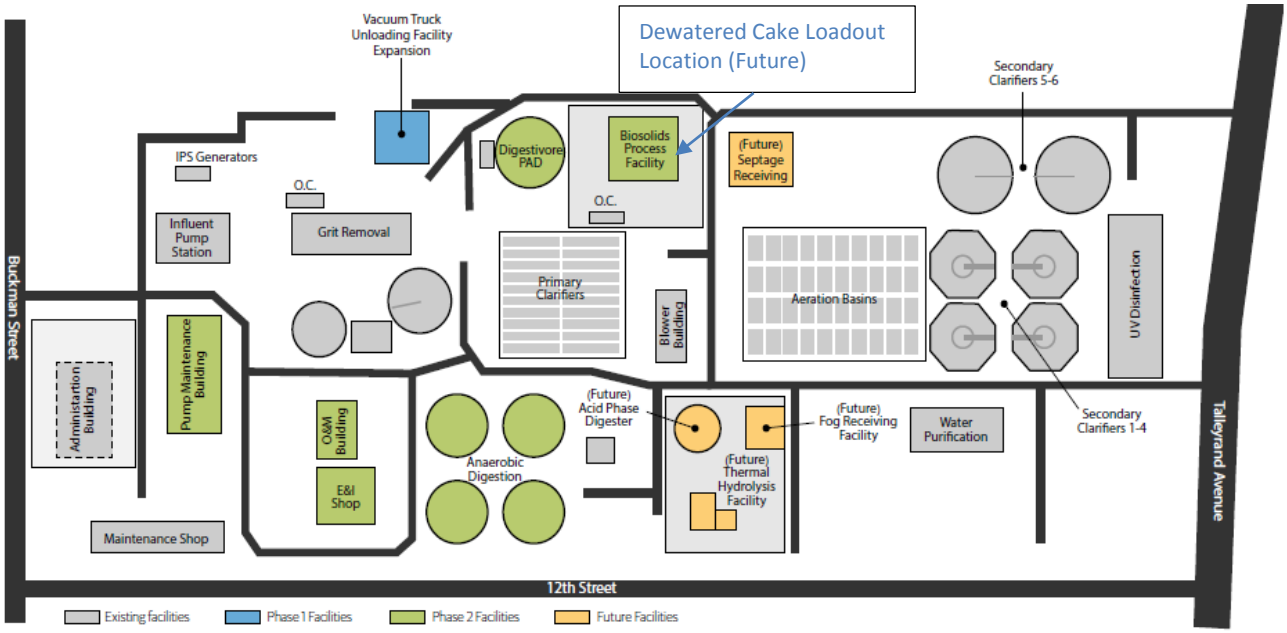

Figure 2-4. Buckman RMF Future Site Plan Concept

3. Technical Qualifications and Capability

The Procurement Committee will evaluate each Respondent's technical qualifications and capability in accordance with the following criteria as stated in the Request for Qualifications (RFQ):

A. Introduction and Administrative

B. Organization and Management

C. Technical Experience, Capabilities, and Project Understanding

D. Financial Capabilities and Experience

The content and format that the Statements of Qualifications are to follow are described in the RFQ.

The Procurement Committee will evaluate each Respondent's financial qualifications and capability in accordance with the extent and depth of equity members' experience in investing equity and structuring financing sources to obtain firm financing commitments for proposals for, and achieving financial close on, similar projects using a diverse range of financial products (including bank loans, taxable and tax-exempt bonds, government credit assistance programs, letters of credit, and other financing sources).

The Respondent team should demonstrate their overall financial strength and capability to carry out the Project responsibilities potentially allocated to it, as evidenced by the financial statements of the equity members, lead contractor and lead contractor team members, level of support and financial statements of any guarantor and information contained in the financial officer certificates and surety letter provided in accordance with the requirements of the RFQ.

4. Other Considerations

4.1 Ineligible Firms

The following firms are not eligible to respond to this RFQ, to assist in preparing a Statement of Qualifications (SOQ), or to participate on any Respondent's team:

- Jacobs