



EXHIBIT [REDACTED]
JEA RFP NO. 156-18 CONTRACT
ENGINEERING SERVICES
FOR
Integrated Water Resource Plan (IWRP)

This Exhibit, when executed, shall be incorporated in and become part of the CONTRACT (RFP NO. 156-18) between JEA (OWNER), and CDM Smith Inc. (CONSULTANT), dated _____, 2019 for Integrated Water Resource Planning.

PROJECT BACKGROUND

The intent of the OWNER is to develop a holistic, comprehensive, integrated and sustainable plan and schedule for managing the supply, production, treatment, transmission, and delivery of OWNER's water supply for the next 50 years (to Year 2070).

OWNER is seeking options for the next beneficial incremental water supply and to increase the system flexibility and resiliency. The CONSULTANT will develop an Integrated Water Resource Plan (IWRP) and a Demand Side Management (DSM) study ("Project") which will consider in detail the alternatives for OWNER's future water supply and conservation program. It is essential that the IWRP and DSM Plan be sustainable, cost-effective, permittable, defensible and protect the local water resources.

As part of this Project the OWNER desires the CONSULTANT to develop recommendations, strategic goals, and include near-term & long-term actions to develop, manage and sustain OWNER's water resources.

The development of the scope of work of this CONTRACT is based on the introductory meeting held between OWNER management and staff, and CONSULTANT. At this introductory meeting, overall project goals for the JEA Integrated Water Resources Plan (IWRP) were established, as well as critical success factors.

The JEA IWRP project goals are as follows:

- Provide surety/certainty for OWNER's long-term water supply needs over the next 50-years
- Maximize the use of reclaimed water and minimize wastewater discharges to the river
- Demonstrate that IWRP recommendations are aligned with OWNER's four corporate measures: Financial, Environmental, Customer, and Community Impact; and will provide for continued supply reliability for next 50 years
- Develop a targeted and cost-effective Demand-Side Management (DSM) strategy, which includes specific recommendations for program implementation including required administration and management
- Develop specific recommendations for water supply projects, with implementation schedules for the next 5, 10, and 20 years

SCOPE OF WORK

Task 1 – Develop IWRP Evaluation Framework and Objectives

To help ensure that the IWRP and its recommendations are defensible and well-supported, it is important to develop an Evaluation Framework at the onset of the project that is mutually agreed to by OWNER and CONSULTANT. The Evaluation Framework will provide: (1) the overall methodology on how alternatives will be analyzed, compared and ranked; (2) details key planning assumptions regarding hydrologic period of record, financial parameters, range of population projections, and future climate scenarios; and (3) definition of IWRP objectives and performance measures used for evaluating alternatives. The Evaluation Framework will be used to support Tasks 8, 9 and 10 of this scope of work.

Objectives and performance measures are defined as:

- **Objectives:** Represent the major goals for the IWRP in broad, understandable and distinctive terms. Objectives will be defined to easily communicate the goals of the IWRP to all internal/external stakeholders. Examples of objectives might include ensure supply and system reliability, achieve cost-effective solutions, reduce risk and uncertainty, improve water quality, and protect environment. OWNER and CONSULTANT to work together to develop approximately 6–10 objectives and weigh them in terms of relative importance.
- **Performance Measures:** For each objective, one or several performance measures will be established, with the goal of establishing as many quantitative measures as feasibly possible. Where quantitative measures cannot be established, qualitative measures using best engineering judgment will be supplemented. Examples of performance measures might include life-cycle cost, probability of water shortages, likelihood of permitting hurdles, or environmental impacts.

CONSULTANT will participate in the following meetings with the OWNER to develop the IWRP Evaluation Framework and finalize the objectives and performance measures:

Meetings:

- One project kick-off meeting with OWNER members and key consultant staff to develop evaluation framework and draft objectives.
- One follow-up conference call with OWNER to review final draft recommendations for objectives and evaluation framework
- One conference call with OWNER to finalize objectives and evaluation framework

Deliverables:

- Technical memorandum (TM) on IWRP evaluation framework and objectives

Task 2 – Review OWNER Reports and Collect Data

CONSULTANT will review relevant past studies, reports and plans prepared for OWNER. Consultant will request specific data, models and information from OWNER, and will collect other supporting data required for the IWRP.

Meetings:

- One conference call with OWNER to go over requested data from OWNER

Deliverables:

- Data log sheet

Task 3 – Conceptualize Supply Options

CONSULTANT will fully leverage OWNER past studies, reports and plans to develop a preliminary list of feasible water supply options. CONSULTANT will augment any information gaps or identify up to two other supply options that were not previously evaluated by OWNER. At the outset of this task a complete list of potential water supply options will be reviewed with the OWNER for consideration and selection for evaluation. Upon the conclusion of this review, the list of potential water supply options will be finalized by the OWNER and used as the basis for consultant conceptualization. For scoping purposes, a total of eleven (11) supply options will be conceptualized from existing OWNER reports and studies and two (2) other supply options that were not previously evaluated by the OWNER will be developed by the CONSULTANT, with guidance given by the OWNER. The likely eleven (11) supply options preliminarily selected for conceptualization are listed below:

Preliminary Screening of 2019 JEA IWRP Supply Options for Evaluation
Additional Traditional Floridan Groundwater (Assumes CUP SCs Are Met)
Indirect Potable Reuse via Groundwater Recharge
Desalination: Brackish Groundwater
Desalination: Lower St. Johns River near NSGS (seawater quality)
Desalination: Upper St. Johns River (brackish quality)
Regional Surface Water Reservoir for Potable Water Supply
Regional Surface Water Reservoir for Irrigation Water Supply
Non-Floridan Source Private Irrigation
Direct Potable Reuse (Targeted Large Industrial Users for Potable Offset)
Distributed Stormwater Collection for Supplemental Reclaimed or Direct Irrigation
Distributed Stormwater Collection for Potable Use

Each supply option for consideration in the IWRP will be conceptualized in terms of:

- 1) Project description, potential siting/locations within OWNER service area, and identification of key facility components (e.g., treatment, distribution, pump stations, storage)
- 2) Project yield and potential hydrologic variation in yield
- 3) Project capital cost estimate
- 4) Project O&M cost estimate

- 5) Water quality attributes, permitting/regulatory ease, customer acceptance, distribution system integration challenges, and other attributes (e.g., environmental benefits, social benefits, etc.)

Meetings:

- One conference call with OWNER to go over preliminary list of supply options
- One conference call with OWNER to finalize list of supply options

Deliverables:

- Preliminary list of supply options
- TM that summarizes conceptualized options, with key attributes

Task 4 – Spatial Forecast of Water Demand

CONSULTANT will utilize OWNER's existing water demand forecast and population projections for its service area as the basis for spatially disaggregation into specific planning neighborhoods, which will be required for hydraulic analysis of water supply options (Task 5) and evaluation of DSM measures (Task 7). The disaggregated demand forecast will be calibrated to water production and customer sales (billing) data by the grid networks. Population projections will be used to project water demand by sector and neighborhood to the year 2070. This task includes close coordination and iterative collaboration between the OWNER and the CONSULTANT's Demographer sub-consultant, CONSULTANT's DSM Expert and Hydraulic Engineer, as outlined below:

- 1) The DSM Expert, Demographer and OWNER will work together to define neighborhood boundaries and evaluate them based upon property appraiser data, census data and geocoded customer billing data. Neighborhood averages of characteristics such as percent residential/commercial/industrial, development density/ lot size, age of housing and development, values of land and buildings, unit occupancy, persons per household, household income, planned development/redevelopment and water use by customer type will be used to delineate neighborhoods into relatively homogenous groupings. Neighborhood delineations will be reviewed with OWNER staff. If possible, neighborhoods may be classified into a limited number of higher-level classifications for DSM planning, such as "large lot, affluent residential", "older, high density residential", "light commercial", etc. The definition of the higher-level classifications will likely evolve from analysis of the data and be defined in collaboration with OWNER staff.
- 2) The Demographer will use available geocoded customer data to develop representative water use factors by sector per neighborhood. Sectors may include residential, commercial and industrial users or may be further defined as single-family, multifamily, commercial, industrial, recreation, and irrigation water use depending upon the clarity of customer data. The DSM Expert will review the water use factors for anomalies and a reasonable range of factors, including recommendations for updating and refining, as needed. Final definition of sectors will be developed in collaboration with OWNER staff. A water use factor per unit will be estimated for each sector for each neighborhood. The 'units' may be population, acreage or square footage depending upon the sector definition. It is noted that not all OWNER water

customer accounts have been geocoded and therefore it will be necessary for the CONSULTANT to approximate a geocode for those accounts that are not currently geocoded.

- 3) The DSM Expert will use the sector water use factors and current population, acreage or square footage by neighborhood to estimate current water use by sector by neighborhood. The estimated current water use by neighborhood will be compared with current consumption (sales) data and the existing demand forecast at either the neighborhood or grid level for calibration of the water use model. The current water use by sector and neighborhood will be formatted by the DSM Expert as an input for the Task 6 analysis of current water use by sector and neighborhood by end use. Differences in current water use across neighborhoods within the same customer sector will provide the basis for developing DSM targets by sector and neighborhood. The high-level classification information by neighborhood will be used by the DSM Expert to develop DSM target characteristics.
- 4) Current (January 2018) population projections for the OWNER service area from 2020 to 2045 will be expanded to 2070 and updated with the latest county population forecasts from BEBR by the Demographer. This includes developing forecasts of both population and non-residential development for Duval, St. Johns, Nassau and Clay Counties using its GIS-based, parcel-level models. Because population models were developed for OWNER as recently as 2017, some elements of those models will be leveraged for efficiency. Updated property appraiser and planned development data will be used to capture new development, and the models will be extended in five-year increments to 2070. The population forecasts will be controlled to the county-level forecasts from the Bureau of Economic and Business Research (BEBR), which are the official state numbers. Those county-level forecasts will also be extended from 2045 to 2070 in consultation with BEBR's lead demographer. Non-residential development will be forecasted for the first time, and it will be done based on a combination of historical trends and future land use data. This forecast will also be extended to 2070 in five-year increments. Recent trends in nonresidential development by neighborhood will be used to extrapolate from the current nonresidential development to a forecast of 2070 development using Future Land Use data. Thus, a projected set of sector units will be developed for each neighborhood to 2070 in five-year increments.
- 5) The DSM Expert will input the sector water use factors and projected sector units into a Microsoft Excel spreadsheet model to estimate the future water consumption by sector for each neighborhood from 2020 to 2070. Estimates of system losses (i.e., non-revenue water or unaccounted-for water) by grid network will be determined and system loss will be added to the water demand of each neighborhood. Summaries and averages by customer grouping will also be developed to help guide DSM planning.
- 6) The Hydraulic Engineer will review the spatial characteristics of the water demand forecast as it pertains to high-level hydraulic modeling of supply options in Task 5.

Meetings:

- One conference call with OWNER to discuss key assumptions for water demand forecast
- One meeting with OWNER to present water demand forecast

Deliverables:

- TM that summarizes water demand forecast
- Spreadsheet/database with detailed, spatially allocated forecast of water demands

Task 5 – High-Level Hydraulic Analysis of JEA Water/Reclaimed Water Distribution System

Using OWNER’s existing hydraulic models, CONSULTANT will analyze current groundwater and recycled water sources under several scenarios of future peak water demands (based on 5, 10 and 20-year forecasts) to determine major system deficiencies and/or constraints in delivery of water to customers. Specifically, this analysis will include simulations of the existing systems with superimposed future demands to determine the extent of areas in each system where the desired customer level-of-service (e.g. supply volume, system pressures) cannot be met.

The analysis of OWNER’s water and recycled water distribution system will be used to refine the supply options conceptualized in Task 3, by correlating potential supply points to areas of need. The hydraulic analysis will then be used to screen supply alternatives by determining what storage and transmission facilities (approximate length and size of pipelines, need for pump stations, and diurnal storage for the supply options) will be needed based on defining the needs by either mid-term needs (10-years or less) or long-term needs (greater than 10-years out). These screening analyses will consider both delivery and the net supply throughput by considering impacts on other supplies (e.g., does a new supply cause other existing supplies to deliver less flow due to changes in system hydraulics). Additionally, the results of this task are used by the CONSULTANT in support of developing future conceptual capital and O&M costs related to supply options and developing the portfolio of alternatives that will be evaluated in subsequent tasks.

It should be noted this task represents a high-level hydraulic analysis for refined conceptualization of water supply alternatives and not intended for detailed distribution system analysis that is typically used for master planning.

Meetings:

- One conference call with OWNER to discuss OWNER hydraulic models and system assumptions
- One conference call with OWNER to present findings from hydraulic analysis

Deliverables:

- TM that summarizes hydraulic analysis

Tasks 6 – Assessment of Current Water Use Efficiency, Future Passive Conservation and End Use Model of Water Demand

Using a combination of OWNER billing data by sector (e.g., single-family, commercial, industrial, etc.), parcel level data that was used in Task 4, census data, and literature and research studies on end uses of water, consultant will breakdown OWNER’s sector water use data into major end uses

such as toilet flushing, clothes washing, landscape irrigation, food processing, industrial processing, and others. This information will also be used to estimate the current levels of water use efficiency.

This task includes the CONSULTANT providing support to the OWNER who will conduct a customer survey to obtain information on water use practices and attitudes towards water conservation. This survey will help improve the assessment of current levels of water use efficiency and willingness to participate in future OWNER DSM programs that may be recommended as part of this project. The survey and analysis of survey results will need to be completed before this task begins. The cost proposal outlined in the budget section below includes support from the CONSULTANT to develop the survey, working with OWNER, and with OWNER administering the online survey. The target survey objective is to survey up to 1,500 JEA Customers. The survey task includes the CONSULTANT drafting the survey, reviewing the draft survey with the OWNER, and the CONSULTANT finalizing the survey questions and summarizing and reviewing the results of the survey with OWNER. OWNER would be responsible for administering the survey and providing the survey results to the CONSULTANT, so the CONSULTANT can summarize the results.

CONSULTANT will estimate future passive water conservation for OWNER's service area. Passive conservation is defined as that which is expected to occur from adherence to federal and state plumbing codes. As new development occurs, it is expected that per home/per business water use will be lower than existing development due to toilets, showerheads and urinals being more water efficient per plumbing codes. It is important to reflect future passive conservation in the demand forecast because it will provide a better indication of where targeted DSM measures should be implemented.

A spreadsheet DSM model of end uses will be developed in this task. The DSM model will be used to determine the remaining potential for DSM measures, spatially within OWNER's service area. This will help ensure that the overall DSM Program is targeted to where the biggest potential conservation savings are for areas that also have water supply (including reclaimed supply) constraints.

Meetings:

- One conference call with OWNER to discuss assumptions for the DSM model
- One meeting with OWNER to present DSM model and passive conservation savings estimate
- Two meetings to review the draft online survey and review the results of the survey

Deliverables:

- Spreadsheet DSM model
- Draft write-up of the OWNER customer survey, execute an online OWNER customer survey and summarize the results and present results to OWNER

Task 7 – Evaluation of Future DSM Measures and Development of DSM Strategy

The DSM model of end uses developed in Task 6 will be used to evaluate the water conservation savings, cost-effectiveness and benefits to OWNER of future DSM measures. To this end,

CONSULTANT will utilize its past experience in evaluating DSM measures, with focus on those measures that are technologically superior and proven to work (e.g., smart irrigation systems tied to weather stations). This experience will be augmented by literature of emerging trends and OWNER-specific information on customers. CONSULTANT will also estimate the economic benefit of implementing future DSM measures to OWNER in terms of reduced water treatment and delivery costs, deferment of large capital infrastructure, and potential rate impacts to customers (if any). Several metrics will be used for cost-effectives such as net present value, levelized unit cost, and internal rate of return.

To estimate “representative” administrative/implementation costs for OWNER’s DSM Program, consultant will conduct an informal survey of water conservation managers around the country. Further, consultant will assess likely implementation challenges and/or customer acceptance issues regarding future DSM measures. Each future DSM measure will be ranked in terms of overall cost-effectiveness, economic benefit to OWNER, and implementation challenges.

CONSULTANT will deliver to OWNER a DSM Strategy Report that has the following components:

1. Recommended list of DSM measures with targeted location and timing for implementation, anticipated water savings, recommended incentive levels, and overall cost-effectiveness ranking.
2. Representative administrative cost and required management for overall DSM program, including different options for turn-key vendors to administer the program.

Meetings:

- One conference call with OWNER to discuss potential DSM measures
- One conference call with OWNER to present draft findings of ranking DSM measures
- One meeting with OWNER to present final ranking of DSM measures and summarize recommendation for overall DSM Strategy

Deliverables:

- TM that summarizes the evaluation of DSM measures and provides recommendations for overall DSM strategy

Task 8 – Update OWNER’s IWRP Model

CONSULTANT will update OWNER’s IWRP model, developed using the STELLA systems software in 2012, using the information from previous tasks of this project. The IWRP model represents OWNER’s water, wastewater and recycled water by service zone. The model runs quickly and allows for alternatives to be evaluated in a more holistic, interconnected manner.

Alternatives, representing combinations of supply and demand-side management options, can be developed on the fly with the IWRP model and tested under different planning scenarios of demand growth, climate and other factors.

The IWRP model presents the following output:

- Reliability of water and recycled water system in meeting future water demands
- Identification of major conveyance and treatment capacity needs in the future
- Levelized unit costs

Meetings:

- One conference call with OWNER to discuss potential gaps in need using the IWRP model without new investments

Deliverables:

- Updated IWRP model with a Technical Memorandum that summarizes the updates that were made to the existing model.

Task 9 – Develop and Analyze Alternatives

CONSULTANT will work closely with OWNER to identify up to five initial integrated alternatives, representing combinations of various supply and demand-side management options. These integrated alternatives will be developed around themes, such as: high resiliency, lower-cost, higher adaptability, higher sustainability, etc.

CONSULTANT will use the IWRP model to analyze the performance of the initial integrated alternatives and then use a multi-criteria decision software called Criterium Decision Plus, to rank the alternatives by the objectives developed in Task 1.

Based on the results of evaluating the initial integrated alternatives, consultant will work with OWNER to develop up to three (3) hybrid alternatives that take the best elements from the initial alternatives. The intent is to create super performing alternatives that can be tested. The IWRP model and use of the decision software will be used to rank the hybrid alternatives.

Meetings:

- One conference call with OWNER to develop the initial integrated alternatives
- One conference call with OWNER to present results of evaluation the initial alternatives
- One conference call with OWNER to develop hybrid alternatives
- One meeting with OWNER to present results of ranking hybrid alternatives

Deliverables:

- TM summarizing the ranking of alternatives

Task 10 – Test Alternatives Under Uncertainty and Develop Recommendations

The top two performing alternatives from Task 9 will be tested under a range of uncertainty using scenario planning. Anticipated scenarios might include: (1) baseline growth with historical climate; (2) higher growth with historical climate; and (3) higher growth with warmer/drier future climate.

CONSULTANT will analyze the results and develop draft recommendations for implementation of specific water supply projects and DSM programs for short-term, mid-term, and long-term planning horizons. For the short-term horizon, CONSULTANT will recommend timing and location of specific water supply projects and DSM programs for 5, 10, and 15 years. This will also include “conceptualized” construction cost estimates. Because the future becomes more difficult to anticipate after 15 years, CONSULTANT will identify triggers for OWNER to monitor for longer-term implementation of projects and programs. Triggers might include: (1) levels of population growth; (2) performance of OWNER under existing CUP; (3) potential changes to the CUP; and (4) changes in long-term climate. These triggers can be used by OWNER for adaptive management and implementation of projects and programs for the long-term planning horizon after 15 years.

Meetings:

- One conference call with OWNER to develop planning scenarios and assumptions
- One conference call with OWNER to present draft recommendations for 5, 10, and 15-year implementation of projects and programs
- One meeting with OWNER to present final recommendations with adaptive management

Deliverables:

- TM summarizing the IWRP recommendations

Task 11 – Prepare IWRP and DSM Reports

CONSULTANT will prepare the IWRP and DSM reports, using the TMs and other information from the previous tasks. CONSULTANT will work with OWNER to determine the format of these reports.

A first draft of the IWRP and DSM reports, representing and 80% completion, will be delivered to the OWNER for review. CONSULTANT will incorporate comments from the OWNER and prepare a final draft of the IWRP and DSM reports for OWNER review. CONSULTANT will incorporate comments from the OWNER and prepare the final reports.

Meetings:

- One conference call with OWNER to review comments on first draft reports of IWRP and DSM
- One conference call with OWNER to review comments on final draft reports of IWRP and DSM

Deliverables:

- First draft reports for IWRP and DSM
- Final draft reports for IWRP and DSM
- Final reports for IWRP and DSM

Task 12 – Project and Quality Management

Activities performed under this task consist of those general functions required to maintain the project on schedule, within budget, and that the quality of the work products defined within this CONTRACT is consistent with CONSULTANT's standards and OWNER's requirements. This includes following the issuance of the Notice to Proceed (NTP) from OWNER, CONSULTANT will perform an internal project quality management meeting and a project planning and scope review meeting. Additionally, CONSULTANT maintains a Quality Management System (QMS) on all projects. CONSULTANT will hold Technical Review meetings, in accordance with QMS, prior to transmitting documents to OWNER. Technical Review comments will be addressed prior to moving forward with finalizing deliverables for the OWNER's review. CONSULTANT will maintain and submit to OWNER on a periodic basis a Comment and Response Spreadsheet that will track OWNER comments and CONSULTANT's response and intended actions to address the comments.

OWNER'S RESPONSIBILITY

OWNER will be responsible for the following listed items and other items as specifically included in this CONTRACT:

- Provide Notice to Proceed.
- Provide the available and requested data, reports and references to CONSULTANT.
- Provide existing OWNER IWRP model from the 2012 IWRP project (programmed in STELLA).
- Provide review of CONSULTANT submittals of documents and return comments to CONSULTANT within 15 business days.

ASSUMPTIONS

The following assumptions have been prepared in support of the CONSULTANT's basis of estimate:

- The basis for developing most of the conceptualized supply options as part of Task 3 will come from existing work products and OWNER will provide the necessary existing references and previous reports/studies including Alternative Water Supply Studies, Total Water Management Plan and Updates, Consumptive Use Permit (CUP 88271-16), Alternative Water Supply Facilities Master Plan (2015), Wellfield Water Quality Management Plan (CUP condition 49), Integrated Water Supply Testing, Evaluation, and Rehabilitation (iWater) and OWNER's 2018 Annual Water Resource Master Plan.
- The existing OWNER IWRP model from the 2012 IWRP project (programmed in STELLA) will be used for the base systems model development in Task 8.
- The existing hydraulic models used in support of Task 5 will not require model calibration.

PROJECT SCHEDULE

It is anticipated that the Project will take 18 months to complete, starting within two weeks of receipt of a formal notice to proceed (NTP). The estimated schedule by task is shown in Figure 1. CONSULTANT will prepare an updated detailed schedule within the first thirty (30) calendar days after Notice to Proceed.

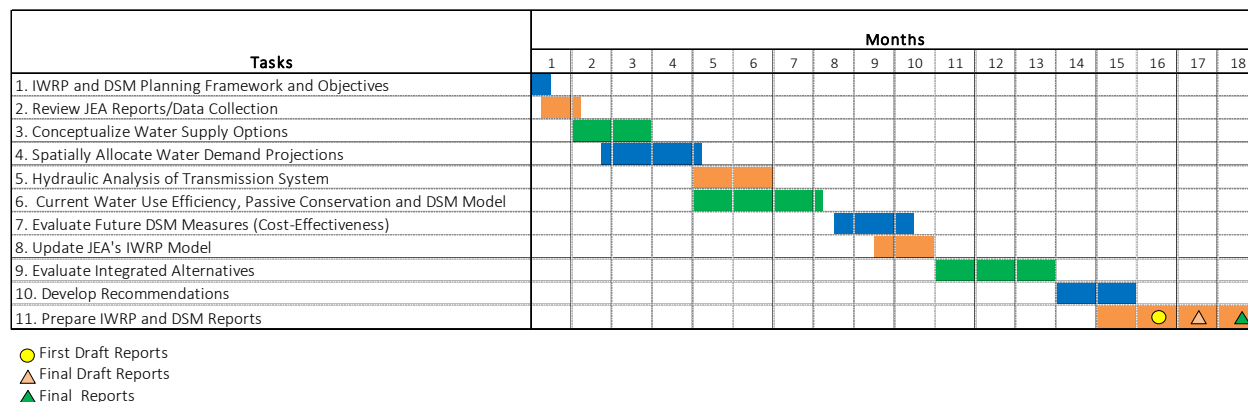


Figure 1. Project Schedule based on NTP

COMPENSATION AND PAYMENT

For performing the services in Task 1 to 12 of this Contract (Exhibit), OWNER agrees to pay CONSULTANT a lump sum amount of \$1,095,792 for its labor, subconsultants, and direct costs. For invoice purposes only, the value breakdown is shown in **Table 1** below. The CONSULTANT will submit monthly invoices based on the percentage of the work completed by task during the period of the invoice.

Table 1
 JEA 2019 Integrated Water Resource Plan and Demand Side Management Plan
 Budget Estimate
 Wednesday, January 29, 2019
 CDM Smith

Task Description	Total Dollars By Task
Task 1 – Develop IWRP Evaluation Framework and Objectives	\$30,772
Task 2 – Review OWNER Reports and Collect Data	\$54,375
Task 3 – Conceptualize Supply Options	\$60,021
Task 4 – Spatial Forecast of Water Demand	\$107,730
Task 5 – Hydraulic Analysis of OWNER Water/Recycled Water Distribution System	\$84,161
Task 6 – Assess Water Use Efficiency, Passive Conservation, End Use Model Water Demand	\$151,340
Task 7 – Evaluation of Future DSM Measures and Development of DSM Program	\$56,550
Task 8 – Update OWNER’s IWRP Model	\$68,450
Task 9 – Develop and Analyze Alternatives	\$123,050
Task 10 – Test Alternatives Under Uncertainty and Develop Recommendations	\$148,985
Task 11 – Prepare IWRP and DSM Reports	\$140,627
Task 12 – Project and Quality Management	\$69,731
Total Lump Sum Budget	\$1,095,792