CITY OF DURHAM

Date: **January 21, 2020**

To: **Thomas J. Bonfield, City Manager**
Through: **W. Bowman Ferguson, Deputy City Manager**
From: **Jina B. Propst, Interim Director, General Services Department**
Subject: **Purchase Contract with SAS Institute, Inc. for the Smart Building Analytics Platform Expansion**

Executive Summary
The City, like many organizations that operate facilities, recognizes the challenge of accurately monitoring energy consumption and proactively responding to equipment failures or comfort complaints. As more than $8M is spent on utilities in the City, there is a need to look at ways to reduce energy consumption with better technology. In February 2018, City staff selected SAS Institute, Inc. (SAS), through a Request for Proposals process (RFP), as the most qualified bidder for a Smart Building Analytics Platform project. Together, SAS and its partner, Building Clarity, LLC were chosen to provide energy consumption analytics for the General Services building. The analytics project has brought together data from old and new systems, so it can be organized into relevant information to improve energy usage while proactively monitoring building performance and boosting operational longevity.

The General Services Department requests authority to execute a contract amendment with SAS for the continuation of the Smart Building Analytics Platform at General Services and expansion to City Hall and Police HQ. These additional services are needed to provide access to real-time energy consumption information and optimize analytics on building automation systems for two of the highest energy facilities in the City.

Recommendation
The General Services Department recommends City Council authorize the City Manager to execute a contract with SAS Institute, Inc., for the Smart Building Analytics Platform Expansion, for an amount not to exceed $605,403.

Background
A Request for Proposals for Smart Building Analytics was advertised in November 2017. Fifteen firms submitted qualifications to the evaluation team in December 2017. The evaluation committee selected SAS Institute, Inc. as the most qualified and responsive consultant for the project and staff began working with that firm to refine the scope of work for a pilot at the General Services building.

The Smart Building Analytics Platform is a SAS-hosted platform that uses event stream processing to capture real-time data and trigger real-time alerts. Modeling is supported by a combination of algorithms to provide standard operational analytics and the latest machine learning and cognitive computing capabilities. For deep dive reporting and historical review, the platform provides a front-end dashboard for City facilities staff who need to understand the efficiency outlook, evaluate interventions and plan for improvements. The dashboard portal

augments staff in order to provide recommended maintenance based on changes in system performance and allows staff to quickly identify deviations from normal operating behavior to transition maintenance needs from reactive to proactive. In addition, the entire platform is supported by the building services expertise of SAS's partners, Building Clarity, who has been implementing comprehensive building and energy efficiency solutions for more than 55 years. Both partners are proudly NC-based, community-oriented companies and locally accessible to the City.

The project is directly linked to the Sustainable, Natural and Built Environment goal and the key initiative to reduce energy consumption and enhance life cycle of buildings with the use of building automation systems, sensors, and analytics. The project also supports the Sustainability Program and Roadmap to meet the City's goals for energy efficiency. Together, these technologies will enable the City to ensure the optimization of building systems and to use advanced analytics to monitor and manage those systems. The General Services Department created the business case which was presented and approved to the IT Governance Steering Committee.

Issues and Analysis

The initial contract for the Smart Building Analytics Platform has uncovered a multitude of insights around building operation and performance at the General Services building. When data began streaming to the SAS cloud the total building energy data was visualized in a public-facing kiosk dashboard built specifically for the City. Even from this high-level building perspective it quickly became apparent that energy use during the weekend was higher than expected. The issue was verified and corrected in the building automation system; and it was identified that the equipment in the building was not properly setting back on the weekends.

In addition to identifying the scheduling issue, the portfolio-level dashboard also highlighted an issue with natural gas use in the building. Due to the availability of real-time visualization, it quickly became apparent that the amount of natural gas being used was much higher than expected. Building knowledge pointed to warehouse unit heaters as the only equipment using natural gas, and on-site investigation revealed that these heaters were turned on and set to run 24/7. This issue was quickly brought to the attention of staff and resolved.

Additionally, the zone temperature report highlights the zones in a portfolio that are most frequently operating outside the building's standards of comfort, helping facilities staff prioritize the least comfortable zones. This report highlighted one zone in particular that was consistently operating above its setpoint, with certain instances of the temperature climbing upward of 85°F. When the space was investigated, staff discovered the thermostat was located next to electrical equipment that was periodically exhausting heat directly on to the thermostat. The thermostat was relocated, allowing the zone to maintain the space setpoint and the air handling unit to turn off when satisfied.

The pilot project cost $30,000 including the initial hardware and gateway device necessary to establish integration between all systems. The results of issues identified and corrected during the pilot have provided cost savings, energy reduction, smarter investments in our building systems, and strategic deployment of staff. Data from the deployment of the platform reveals $9,000 in savings in annual utility cost for the 2019 calendar year compared to historical data from previous years. Additionally, an estimated savings of $3,750 was achieved in avoided capital expenditure due to prolonged equipment life. The platform also provided mobile based alerts for facilities staff to find root-causes. The platform enabled staff to more effectively manage, track and control the operational environment proactively.

The anticipated schedule for expansion is as follows:

- City Council Approval – February 17, 2020
- Design, Modeling, and Installation – March 2020-June 2020
- Ongoing Managed Service – Through June 2025

Alternatives

The City could elect not to proceed with the amendment to the contract for the Smart Building Analytics Platform. Staff recommends against this alternative for several reasons. Not proceeding with this project will negatively impact key outcomes from the Strategic Plan and will prolong the initiative to reduce energy consumption and enhance life cycle of buildings with the use of building automation systems, sensors, and analytics. Not proceeding will also impact goals and targets in the Sustainability Program for greenhouse gas reduction, energy efficiency, and renewable energy, contained in plans and resolutions approved by City Council.

Financial Impact

The financial impact of this request is authorization to amend the existing contract by $605,403. Funds for the initial project expansion are currently budgeted and available as follows:

PROJECT COSTS

City Hall	
Modeling:	$35,438
Annual Managed Service:	$44,596
Total:	$80,034
Police HQ	
Modeling:	$49,562
Annual Managed Service:	$42,019
Total:	$91,581
General Services	
Modeling:	$0
Annual Managed Service:	$13,385
Total:	$13,385
Total Install/Modeling:	**$85,000**
Total Managed Service (Year 1):	**$100,000**
Initial Project Total:	**$185,000**

The initial project total for expansion of $185,000 for the three buildings include platform coverage for one and a half years. Expansion of the platform to the City's two highest energy use buildings, City Hall and Police HQ, will allow for the same results identified during the pilot including cost savings, energy reduction, smarter investments in our building systems, and strategic deployment of staff. After the first year and half, renewal of managed service agreement will be determined based on system performance. The General Services Department anticipates roughly $125,000 reduction in utility costs and $14,000 reduction in outsourced services from the three buildings within the same period. The savings are achieved through the continuous monitoring to maintain optimization of the mechanical systems and sequences controlling the building. An additional $45,000 is anticipated through cost savings for avoided capital expenditure in maintenance due to reduction of emergency repairs and

improvement of equipment life. Simple payback is predicted at two and a half years with additional value through improved productivity of facilities staff time to diagnose issues resulting in efficiencies as well as getting to more work orders in same or less amount of time.

Annual Managed Service for years 2 through 5 are contingent on funds available in FY22-FY25. The General Services Department will have both monthly meetings and an annual project check-in to measure progress towards the City's goals prior to extension. An annual update will also be provided to City Council in conjunction with the Sustainability Program annual report.

Period	Annual Fee
Year 2	$102,000
Year 3	$104,040
Year 4	$106,120
Year 5	$108,243

Equal Business Opportunity Summary
This is a new contract for expansion. This project had no UBE goals.

Workforce Statistics

SECTION D - EMPLOYMENT DATA

JOB CATEGORIES	HISPANIC OR LATINO		NOT-HISPANIC OR LATINO												OVERALL TOTALS
	********** MALE **********								********** FEMALE **********						
	MALE	FEMALE	WHITE	BLACK OR AFRICAN AMERICAN	NATIVE HAWAIIAN OR PACIFIC ISLANDER	ASIAN	AMERICAN INDIAN OR ALASKAN NATIVE	TWO OR MORE RACES	WHITE	BLACK OR AFRICAN AMERICAN	NATIVE HAWAIIAN OR PACIFIC ISLANDER	ASIAN	AMERICAN INDIAN OR ALASKAN NATIVE	TWO OR MORE RACES	
EXECUTIVE/SR. OFFICIALS & MGRS	0	0	11	0	0	1	0	0	4	0	0	0	0	0	16
FIRST/MID OFFICIALS & MGRS	12	1	627	17	1	74	0	0	369	13	0	18	0	2	1134
PROFESSIONALS	76	42	2313	137	2	440	6	24	1453	104	1	268	11	19	4896
TECHNICIANS	1	0	5	3	0	0	0	0	6	7	0	0	0	0	22
SALES WORKERS	7	10	225	3	0	6	0	1	124	5	1	2	0	1	385
ADMINISTRATIVE SUPPORT	3	12	79	7	0	21	0	2	240	38	1	24	1	1	429
CRAFT WORKERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIVES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LABORERS & HELPERS	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
SERVICE WORKERS	5	5	90	38	0	5	0	0	131	71	0	6	1	1	353
TOTAL	104	70	3350	205	3	547	6	27	2328	238	3	318	13	24	7236
PREVIOUS REPORT TOTAL	102	71	3371	196	3	527	8	28	2385	225	2	304	13	21	7256

Attachments
SAS Contract with Exhibits