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Operations Annual Report - 2017

Message from the Director

Operations is committed to providing exceptional support to the students, faculty, staff, patients and visitors to the University of Virginia and our community. This goal is achieved through the commitment and dedication of individuals and teams who take great pride in supporting the University community by:

✓ committing to operational and environmental excellence

✓ achieving organizational goals which include
  o reducing carbon and nitrogen emissions
  o reducing energy and water use
  o increasing recycling and eliminating landfill waste
  o enhancing indoor environmental quality through green cleaning
  o maintaining the beauty of the Grounds
  o protecting waterways and local habitats

✓ stewarding this special place and contributing to a distinctive residential culture through the care of facilities and the Grounds

✓ measuring success through surveys, benchmarking, and key performance indicators

✓ promoting personal and professional growth and development

✓ engaging with faculty, staff, and students

✓ respecting the cultural and historical legacy of the University

Please let us know how we can improve our service and support your work here at the University. I welcome your calls (434-982-5887) and comments (clg9y@virginia.edu).

Cheryl Gomez, PE, LEED AP
Director

Operations encompasses the Office for Sustainability, Environmental Resources, Maintenance, Housing Facilities, Custodial Services, Landscape, Energy & Utilities, Automation Services, Geospatial Engineering Services, and Systems Engineering whose accomplishments are highlighted in this report. Please also see Dashboard in the appendix for discussions, charts, and data concerning progress in achieving organizational goals.
UVA Office for Sustainability

Leadership and Facilitation

A primary focus of UVA’s Office for Sustainability (OFS) is leadership, facilitation, and implementation of programs and projects towards achievement of the goals outlined in UVA’s Sustainability Plan, encompassing greenhouse gas, energy, water, materials and waste, food, engagement, curriculum, research, and using the Grounds as a learning tool.

OFS staff led, facilitated, or participated in dozens of subcommittees, working groups, and task forces throughout the year, and coordinated with numerous student organizations, departments, and individual staff, faculty, and students to advance sustainability throughout the culture and institution at UVA.

OFS also led and participated in state and regional sustainability discussions, presenting at the AASHE and Smart and Sustainable Campuses conferences, VASHE, and hosting the annual meeting of the Southeast Campus Sustainability Network, with 20 sustainability directors from across the southeast. These collaborations have built meaningful new connections across Grounds, the community, and beyond. Additional details are outlined in the 2016-2017 UVA Sustainability Annual Report.

Sustainable Buildings and Operations

Since FY08, $10.3 million has been invested in the Delta Force retro-commissioning initiative. With an avoided cost to date of nearly $24.9 million, the simple return on investment is approximately 2.4:1 since the program inception. This work often includes updating or replacing building controls.

In December 2016, UVA and its Darden School of Business entered into a 25 year power purchase agreement with Dominion Virginia Power (DVP) in which UVA committed to buying the entire electrical output of a new, 160-acre solar facility in King William. When operational in late 2018, the UVA Hollyfield Solar project is expected to produce 12 percent of the University’s electrical supply.
In a separate rooftop lease agreement with DVP, solar panels were installed on the roof of Ruffner Hall and the Central Grounds Bookstore in CY16. In addition, UVA installed a 126 kW-AC solar array on the roof of Clemons Library, which is expected to generate enough power to meet 15% of the building’s annual electricity use. These projects will result in over 600,000 watts of solar electric generation on Grounds.

UVA developed green building standards under the Facility Design Guidelines that prescribe minimum requirements for all new construction and major renovation projects. The most significant element is a requirement to achieve a minimum 25% reduction in energy use intensity (EUI), a measure of total energy use divided by the gross square feet of the building, from that of a similar building. Projects will also be required to evaluate the feasibility of deeper energy reductions and demonstrate that the project optimized decisions using energy modeling and life cycle costing.

FM is assessing all of its existing buildings to determine additional opportunities to install rooftop solar panels. Working with the Geospatial Engineering Services and Power & Light teams, we created a dataset of over 4,000 roof sections that we combed for the best possible rooftops. We also turned the dataset over to Professor Clarens’ class: CEE 3050 “Intro to Green Engineering.” With FM as mentors, each student group was tasked with selecting their top buildings, which helped inform the final list of rooftops. Some of these will be installed directly on existing rooftops, while other buildings will require a new roof. Currently the team is performing final vetting of potential sites, developing a phasing plan and working to secure funding.

**Recycling**

The installation of centralized recycling and landfill containers continued this year including new systems implemented in the AFC, Slaughter Recreation, Brooks Hall, Rotunda, and 1515 University Avenue. Sara Smith, Recycling Program Coordinator, joined the team this year to support the implementation of this integrated waste program across Grounds.

The ROSE (Reusable Office Supply Exchange) program was expanded into the Law School, Newcomb Hall, and Northridge this year.

This year marks a new, lower cost shredding agreement with Shred-It to collect and destroy sensitive and highly sensitive documents, including protected health information. The new agreement has reduced the cost of managing the destruction of these documents by nearly half of what we had been paying to our previous documentation destruction firm.
Outreach, Engagement, and Communication

The green labs program formally launched in late 2016, with the addition of a full-time green labs specialist, to optimize and reduce environmental impacts of energy-intensive lab spaces at UVA. The Green Labs Program brings together strategic building system improvements with engagement with lab occupants to achieve the highest reductions in energy, water and waste. This year the program facilitated UVA labs’ participation in the North American Freezer Challenge as well as other initiatives.

The annual Earth Week Expo brought statewide recognition for UVA’s growing renewable energy portfolio, with Governor Terry McAuliffe cutting the ribbon for UVA’s largest owned and operated on-site solar array on Clemons Library. An estimated 300 attendees listened to Governor McAuliffe’s remarks on the future of the solar industry in Virginia, as well to remarks from leaders across UVA.

A major milestone was reached this year during Game Day Challenge Basketball, which achieved a 93.4 percent diversion rate (zero waste = 90%+) at the sold-out men’s basketball game against UNC. This achievement was the result of OFS, UVA Dining, UVA Recycling, JPJ staff and UVA Athletics’ strategic coordination and the dedication of 75 student volunteers minimizing materials sent to the landfill.
The civic engagement subcommittee, in partnership with UVA Dining and the City Schoolyard Garden hosted UVA’s first environmental justice speaker as part of the annual Community Martin Luther King Celebration to highlight and advance dialogue around food justice issues in the Charlottesville and UVA communities. Bryant Terry, a James Beard Award winning chef and food justice advocate’s keynote address Jefferson School brought together 300 community members.

An Equity and Environment Fund, initiated via the Civic Engagement Subcommittee, catalyzed projects across UVA to explore the intersections of equity and sustainability issues. Some of these ideas were presented at a social-justice focused SustainaPitch Night during Earth Week.

The Outreach Working Group and the UVA Career Center collaboratively developed the Green Career Series, a collection of workshops, networking sessions and career fairs that focused on building students’ skills and connections in sustainability-related careers. The series was developed in response to student demand as well as meeting the goals within the Engage section of the Sustainability Plan. For a more comprehensive overview of sustainability at UVA, visit www.sustainability.virginia.edu.

**Environmental Resources**

**Stormwater**

Environmental Resources (ER) staff continue to refine UVA’s stormwater pollutant accounting system showing that UVA is still on track to meet our required total maximum total daily loads (TMDLs) for sediment, phosphorous, and sediment for the Chesapeake Bay program. In addition, to address the Rivanna River Combined Benthic and Bacteria TMDL recently added to our stormwater compliance requirements, ER prepared and has implemented a TMDL Action Plan. ER also worked with Parking and Transportation to develop at Chesapeake Bay TDML Action Plan to address runoff from their facility.
Over this year, a number of new stormwater BMPs have come online including biofilters at Clark Hall and Engineer’s Way, the Dawson’s Row bioswale and infiltration trench, and the infiltration system at the Education Resource Center at the Medical Center. We also conducted the second dredging of the Dell forebay since the pond’s construction and did maintenance on the safety bench around the perimeter of the pond and forebay. It appears that based on current sediment accumulation rates forebay cleanings will be required every five to six years. This work was done totally in house by FM Utilities and Landscaping at a significant savings over the previous cleaning that was done by a contractor. As a result of these efforts at the Dell, UVA received the first place award for the best maintained BMP in the Chesapeake Bay Watershed by the Chesapeake Stormwater Network. UVA also received a third place award for the best Ultra-Urban BMP for the Hospital green roof.

Air

ER worked with DEQ to renew our Title V permit, which is required every five years, to incorporate Boiler MACT requirements, update emergency generator lists and remove burdensome remnant requirements applicable to the cabinet shop. The new permit was effective February 2, 2017. UVA’s new enforcement officer at DEQ conducted an audit on April 27, 2017 and found UVA to be in compliance with all the terms of the Title V permit.

Stack testing was conducted this winter on the coal boilers at the Main Heat Plant, which demonstrated continued compliance with permit and Boiler MACT emission limits. ER also worked with DEQ on air permits for the proposed Boiler 6 at the Main Heat Plant and several new emergency generators around Grounds.

ER Project Services

ER completed eight Environmental Impact Reports (EIRs) for new UVA projects. EIRs are required by the State for all large projects, >$500K, involving exterior disturbances. ER conducted approximately 350 individual erosion and sediment control inspections of UVA projects. In addition, ER completed several Environmental Site Assessments for property acquisitions for both UVA and the UVA Foundation.

Student Involvement - Sustainability

ER collaborated with the water + stormwater working group, Madison House and the Westminster Presbyterian Church to bring awareness to the detrimental effects that littering and polluting our streams and rivers does to our local ecosystem. Like last year, we took action by cleaning the area under Beta Bridge, which is situated near the top of a tributary to Meadow Creek. Since this area is within the right-of-way of the railroad, Buckingham Branch Railroad agreed to supervise the event to ensure the safety of the participants. But the effort didn’t stop there; UVA’s Landscape Department agreed to help take away the excess waste that could not be recycled by UVA’s recycling program.

Beta Bridge cleanup crew at Westminster Presbyterian Church 2017.
Overall, 50 volunteers collected over 1,500 pounds of trash and recycling. The cleanup was also featured in the Cavalier Daily and can be viewed at: http://www.cavalierdaily.com/article/2017/04/uva-sustainability-tends-to-beta-bridge-stream.

Another collaborative effort with the water + stormwater working group was the planting of the Clark Nook bioretention facility. This project was the final piece in a project that started a few years back. The stormwater working group identified several areas around Grounds that could have downspouts disconnected and discharged to a biofilter instead of leading straight to the storm system. Clark nook was identified for this and for its failed landscaping with erosion issues. With the joint effort of FM Utilities, Landscaping, Project Services, and ER, along with the UVA Architects Office, this project not only helped in further achieving our TMDL goals, but it improved the aesthetics and accessibility of the area as well as pedestrian safety. In total, an abandoned heating tunnel was removed, the former tortuous steep path of the sidewalk was straightened and put in a safer grade, the site was regraded to for the biofilter, and was planted by students.
Maintenance

Maintenance Zones Overview

The FM-Operations maintenance zones provide planned, routine, and reactive facilities services in over 10 million square feet of academic and auxiliary buildings. More than 100 building trades professionals are organized into five geographical zones to meet the exact needs of the customers in their area. This organizational approach has proven to be the most effective method of delivering comprehensive facilities stewardship.

To further FM’s commitment to Lean Management practices, this year each zone added a Maintenance Coordinator position that will focus on work flow improvement. In addition to planning and scheduling all routine work, Coordinators will assist the supervisory staff with work order processes, materials acquisition, and outage coordination. The goal is to increase the ‘wrench time’ for frontline staff, making them as productive as possible.

Assignment to maintenance zones is also the principal way that FM trains its apprentices – the next generation of career professionals who will care for the University’s built environment. Two of the 15 apprentices in maintenance zones will complete their four-year terms in 2017, but six more have been recruited to begin their participation in this important program.

West Grounds Zone

The West Grounds Maintenance Zone (WGZ) has a diversified portfolio of buildings. WGZ has full stewardship of approximately 500,000 square feet of E&G space located on Grounds, Fan Mountain, Milton Airport, and Mountain Lake Biological Station in Giles County. The zone also provides maintenance services for many Auxiliary customers, including: Athletics, IMREC Sports, Housing, Parking and Transportation, Dining Services, VDOT, National Radio Astronomy Observatory, Kluge Ruhe Aboriginal Art Museum, and the Copley Child Development Center. The WGZ team is comprised of 22 skilled tradesmen and apprentices that take great pride in their work and strive to support the mission of Facilities Management and the University.

New air handler at Shelburne Hall.
Some notable projects over the last year are as follows:

- Relining the chimneys of over one dozen buildings at the Mountain Lake Biological Station
- Replacement of the High Energy Physics Equipment Hoist
- Replacement of four air handlers at Shelburne Hall (VDOT)
- Boiler and pump control panel replacement at Aero Research Lab
- Lighting controls high efficiency fixture installation at Aquatics and Fitness Center and Zehmer Hall
- HVAC setback schedules establishment and sequencing at AFC
- HVAC improvements at Slaughter Recreation Center

In addition to executing improvement projects and performing routine maintenance activities, WGZ has identified two exceptional team members who are taking on new roles to improve the stewardship of the zone. Eric Luedecking has been promoted to Maintenance Coordinator and is dynamically planning and scheduling the daily work within the zone to ensure that the resources of the team are optimally deployed to meet changing priorities. Josh Humphries has stepped up as a leader in advancing sustainability as a function of good maintenance practices. As an HVAC Mechanic he is working actively to identify energy improvement opportunities (system deficiencies) in WGZ buildings, while collaborating with peers in the Office for Sustainability and spreading knowledge about sustainability amongst his crew.

**McCormick Zone**

The face of Southwest McCormick Zone has been ever-changing with the rising needs for supporting small and large scale capital construction projects with the Gilmer Hall and Chemistry Projects being the most prominent and challenging. Continuing our commitments to excellence in service through teamwork, our preventative maintenance program reached a near 100 percent completion rate monthly. Team building exercises involving our staff who are encouraged to share their experiences, whether at UVA or elsewhere relevant to our core values or initiatives and discuss their experience in a group setting. With McCormick Zone being such a diverse group of trades technicians, it makes for interesting conversation.

Lastly, Lean Management work practices and material management such as inventory reduction, LED light conversions and the Viledon Filter Implementation Project have been another area of focus, which has contributed to several of the University’s sustainability efforts. Two of our goals for the coming year are; implementation of Condition-Based Maintenance and Condensate and Rain water capture and reuse.
Central Grounds Zone

The Central Grounds Zone (CGZ) assumed maintenance responsibility of the Rotunda once it opened in August following a $58 million renovation, and the zone worked hand-in-hand with the project team to help complete various tasks in the building prior to its opening. In addition to the Rotunda project, the CGZ team supported various renovations and projects throughout the zone, including major renovations at Hotels A and B, Old Cabell Hall, Pavilions III, VI, and VII, and Wilson Hall. The CGZ worked closely with the University’s Historic Preservation Team to effectively maintain and preserve historic buildings, including performing critical inspections of the suspended balconies of six Pavilions, Birdwood Mansion, and Faulkner House to ensure the balcony rods were structurally sound. The CGZ also identified and repaired structural issues with the lobby stairs in Brooks Hall, which was determined to have been caused by a fire that occurred over 100 years ago.

In addition to maintaining the buildings in Central Grounds, the team continues to play significant roles in supporting major University events by helping to plan and execute various ceremonies and events during Final Exercises, Reunions weekends, Opening Convocation, and Lighting of the Lawn. Of particular note, UVA’s Angel Society recognized Dave Roberts, the CGZ electrical and plumbing supervisor, for his positive contributions to the well-being of the University community. The CGZ lost an important member of its carpentry team, when Robbie “Hot Dog” Campbell retired after 38 years of service to the University. The zone team added two HVAC personnel to perform HVAC preventative maintenance work in the evenings, and a new mechanic was hired to provide maintenance services to the facilities, boats, and vehicles at the Anheuser Busch Coastal Research Center in Oyster Point.

North Grounds Zone

The North Grounds Zone Maintenance team keeps very busy all year round and has the reputation of being true stewards to its building customers. In addition to the services you would normally expect a maintenance team to perform, the team also puts effort toward installing energy efficient lighting (Caruthers Hall and TJAG School in 2017), and improvements to the aesthetics in the zone, such as pressure washing outdoor seating areas, painting, and replacing carpet throughout the Law School.
In addition to routine maintenance activities and aesthetic improvements, the team takes on HVAC repairs and the replacement of mechanical and electrical components. They successfully installed 36 electrical circuits at the Carruthers Data Center, replaced 11 failing fan coil units at the Miller Center, replaced a failed compressor at Montesano, and corrected deficiencies in the HVAC sequence of operations at Sponsors Hall.

**Newcomb Zone**

The Newcomb Maintenance Zone team has been undergoing a major cultural shift to improve efficiency within its operations, and help improve the buildings it maintains. Satellite storage of material has been streamlined to better support the maintenance needs of the zone and reduce wasted time and inventory costs.

Newcomb Zone employee Jerry Schwartz was promoted to the position of Maintenance Coordinator, assisting Jamie Joyner in managing these efforts. The group has participated in and continues to support several new and exciting efforts to renew and improve its buildings in the heart of the UVA Grounds, including:

- Assistance with three rooftop solar PV projects at Ruffner Hall, University Bookstore and Clemons Library.
- Installation of sustainable light fixtures at Monroe Hall and the Snyder Tennis Area.
- Installation of plumbing fixtures at Monroe Hall.
- Support of HVAC controls upgrades working with both the Delta Force and the BOT teams in multiple buildings.
- Replacement of Air Handling Units in Newcomb Hall.

Beyond the project work and routine maintenance, the zone grew this year with the addition of Building 1515, beginning by commissioning the building systems in the new facility. The zone has been active among FM’s commitment to safety, initiating a comprehensive Lockout-Tagout Program, and ARC Flash Hazard training for all employees working around electrical components.
Fire and Life Safety

The Fire and Life safety team has taken on several initiatives over the past year and two of those involved the implementation of asset barcoding and data collection along with geolocating each fire extinguisher and fire damper asset during annual compliance testing processes. The product of this effort will provide a structured PM program around each asset.

Another major initiative has been the implementation of an electronic NFPA code compliance documentation software tool, Inspect Point. In addition to fire protection, the Emergency Power Systems group in this team has implemented a robust emergency power systems PM program with the inclusion electronic documentation through Aim, Fuel polishing, oil analysis and monthly load bank testing. This team is also building strong relationships with other faculty and staff members to expand their business into servicing commercial grade UPS systems. These initiatives are just a few examples of how this department is contributing to more sustainable cost effective approached for compliance services.

Elevator

The FM Elevator team has long functioned as two groups with half serving the Health System and the other half serving the academic, housing, and auxiliary areas of Grounds. This summer, the teams merged and now share a renovated office space in the West Complex designed to be the central headquarters and home base for the entire 14-person team.

Through a progressive year of studying and adopting Lean practices, the department is also undergoing some significant structural changes to its “business as usual.” First among these changes is the consolidation of its approximately 350-unit equipment inventory into five distinct maintenance routes. Each route has a dedicated two-person team consisting of a mechanic and an assistant.

The Elevator team worked with leading industry experts and the Office of the University Building Official to enact an official electronic maintenance control plan, which granularly spells out very distinct frequency and best practice for maintenance activities, which incorporates a wide range of technical criteria.

UVA hosted the 2017 Elevator U conference on June 19-22 at Boars Head. This special nationwide event was made possible in part through Eddie Morris’ affiliation with the higher-ed elevator trade association and his newly appointed position as the president of Elevator U.
Roofing

In 2017, the Roofing team self-performed roofing work on Pavilion III, Morea, Lambeth Field, University Chapel, Dawson’s Row, and Booker House. The department is looking to new ventures in the support of the University’s rooftop solar ambitions, as well as new technologies which can be installed in-house and allow life extension of certain roof systems.

Several members of the department are also very active participants in FM’s focus group on fall protection safety. This group is working closely with the FM’s office for OHS, and making strides by reducing fall hazards that face scores of FM tradespeople across many disciplines.

Access Control and Lock Shops

The FM Lock shops maintain an excess of 70,000 Access points across grounds – and have been dedicated stewards of space access and security over the last 50 years.

This year was a pivotal year in the long history of the department as the two shops prepare to consolidate resources under one roof at Lacy Hall and work to digitize lock and key records for all FM employees, existing department master keys, and all new key issuances.

Operations in FY17 required the use of two parallel approaches that 1) supported current business practices and 2) began the planning and transition to a new set of best practices defined by the new University Lock and Key policy.

The department is in the process of rolling out a phased transition of enhanced key control and leveraging new technology in the industry including the use of electronic key vaults, remote key tracking devices, and enterprise data management tools. Concurrently, the department continues to support the large number of new construction and renovation projects, which FM turns over on a regular basis.
Building Envelope Assessments

UVA saw more Unmanned Aerial Vehicle (drone) traffic in the last year than any year previous in its history. While most of this activity was for recreational purposes or the collection of marketing footage and post-card images, FM commissioned a groundbreaking use of drone technology to provide eyes in the sky in stewardship of its buildings and to collect thousands of high-resolution images of the physical characteristics of five of its historic and significant buildings.

Working with a team of experts from Toronto and the FM zone maintenance staff, building inspectors and Office for Sustainability, personnel teamed up in January and February to collect infrared and high-res RGB images of the Rotunda, Clark Hall, Rouss-Roberston, Wilsdorf Hall, and Ruffin Hall. Nearly 200 thermal and weatherproofing anomalies in the facades and roofs of these buildings were identified. These anomalies are being reviewed so that repairs can be implemented that will lead to a longer building materials lifespan, significant energy benefits, and a promising return on investment.
Housing Facilities

Throughout the past 12 months, the Housing Facilities (HF) group continued to make progress toward the goals it developed in early 2016: increasing operational performance as well as customer satisfaction. The HF maintenance and custodial organizations worked closely together to handle the summer 2016 turnover and conference operations, and utilization of new scheduling and staffing patterns led to significant operating efficiencies. The HF maintenance group also added capabilities in order to be more self-sufficient and to handle routine needs more effectively.

Continuing to build a strong relationship between Facilities Management and Housing & Residential Life was also a major focus. Considerable progress was made between the two departments toward aligning services with needs and expectations, and a number of information sharing and decision-making processes were developed to create a stronger partnership. At the same time, Operations supported condition assessment processes and reinvestment in facilities at higher levels in order to lay the groundwork for future success.

Custodial Services

Goal: Improve Processes & Gain Efficiencies

One contract for goods and one contract for services were awarded this year via competitive procurement processes. We now have one vendor for products, supplies and equipment and a second for custodial services. Both contracts have resulted in numerous benefits such as increased flexibility to meet our needs, expansion of a vendor managed inventory program into 90% of our buildings, specialized individual and group trainings, as well as savings in labor and product costs.
Having one source for products and equipment has also helped us standardize product dispensers in all restrooms across Grounds. By year-end, we will have one type of dispenser, which will simplify product ordering, reduce costs and also make it simpler to transfer supplies from one building to another when needed.

New equipment technology, called Kaivac, was introduced to staff this year, which led to improved user ergonomics, timesavings, and improved results. These advantages permit Custodial Services to refresh more restroom floors across Grounds faster and better as well as improving the maintenance of stainless steel surfaces.

**Goal: Improve Customers Satisfaction & Relationships**

Formal, electronic surveys have their place and purpose, but we wanted a process that was more efficient, executed in real time, and strengthened our relationships with customers. Our P.U.L.S.E. process uses five simple questions to help understand customers’ perception of E & G custodial area managers’ performance. To help facilitate more candid opinions, customers respond with numbers 1 through 5, with 5 being “best” and ratings of 1, 2 or 3 responses prompt Custodial Managers to generate plans or solutions to address customer concerns. We view responses 4 and 5 as opportunities to recognize front line and supervisory team members. This year, our goal is to finish with 85% of responses being 4 or 5. The P.U.L.S.E. program has been set up on a web-based program, which permits iPad usage in the field and automatic calculation and reporting capabilities.

**Goal: Maintain Position as Industry Leaders:**

APPA’s Director of Knowledge Management informed E&G Custodial Services that it published two articles in its May-June 2017 e-magazine (APPA e-magazine May-June, 2017 issue) and two others are scheduled to appear in other APPA publications later this year. Article topics submitted were: our innovative P.U.L.S.E. customer satisfaction survey, a multi-purpose process and employee engagement tool, ‘Walks & Talks’, why fun at work is good for customer satisfaction, and a description of our Good Starts! program designed to energize and empower front line employees.

Custodial Services AD is a SRAPPA representative and as a member of its Emerging Professionals Committee, she participates on monthly SRAPPA conference calls. This May she participated in a SRAPPA event on industry best practices at George Mason University. This July, she’ll present our P.U.L.S.E. program at APPA’s national conference in San Francisco. Later this year, at the invitation of a UNC facility director, the AD will speak on Emerging Professionals at SRAPPA’s annual conference. Also in July, Custodial Services QA and Staff Development Manager will present a 90-minute program on ‘Walks & Talks’ to attendees of the annual conference for Network for Change and Continuous Innovation (NCCI).
Goal: Improve Workplace Satisfaction & Add Doses of Fun!

Q: What happens when you make “Fun at Work” a SMART performance goal? A: Management teams become serious about making it happen! This year, we made practicing inclusion, games, talent shows and ‘crazy sock’ days part of a goal to improve workplace satisfaction and inclusion for our front line staff and supervisors. Our goals were to help employees feel more included and less stressed on-the-job, as well as deliver high level cleaning to our customers to increase added-value to them as well.

With a theme of “It’s Up to You!” two three-hour retreats asked supervisors and managers to brainstorm ideas on how to make having fun at work part of each workplace culture. Improving productive dialogues and ensuring all team members felt valued and included were equal goals. Retreat outputs included action plans that mapped out where, when and how each zone would encourage laughs, inclusion and feelings of positivity. Every month, managers report on their efforts and best ideas implemented. The next phase is to measure how our efforts have impacted employee engagement and customer satisfaction levels.

Goal: Improve Working Relationships between QA Program and Operational Customers

Inspecting others’ work is never a popular thing to do. Most people take pride in their work and ‘own’ the results. When someone suggests improvements, it’s not always viewed in a positive light. Our QA program has been in place for four years and during that time we’ve had overall good experiences but we felt the time was right to create opportunities to truly listen to our operational team members and improve the working relationships between us.

To bring focus to this issue, we planned some ‘get acquainted’ sessions. Our QA inspector tagged along on zone walks with supervisors and in some cases sat down with front line employees to explain the ins and outs of conducting an inspection. We also asked front line and supervisors to share what concerns them about the QA experience and what ideas they might have to improve what we do and how we do it? In “Come Together” sessions managers, supervisors and QA reviewed these suggestions together and jointly decided which ideas to implement. The final step was a commitment to continue the positive momentum by creating and living by a set of self-prescribed Guiding Principles.
Goal: Improve Processes & Engage Employees

Our Walks & Talks tool gives structure to workplace tours through a series of theme-based prompts. While the tool spans multiple purposes, it simply helps us improve how we do what we do, including having fun at work and improving the quality of our service.

Managers have always practiced Managing By Walking Around (MBWA). But now, the web-based Walks & Talks tool uses prompts to help managers walk their workplaces with more focused observation and conversation. On any given day, a manager will select one key theme on which to focus, such as:

What is the mood of our employees?
Can they ‘teach me’ how to perform a self-inspection?
Do our customers have any upcoming events that need our help?
Who can I recognize today with a song, pantomime or STAR-Talk?

Goal: Make Learning & Development More Participatory & Engaging

This year’s primary development goal is to help managers build more positive and engaging workplaces. We kicked this initiative off with Fun at Work retreats and re-worked existing classes such as Good Starts! to increase the fun and participation quotient. We developed other new highly interactive programs, such as our Good Progress! class where supervisors and front line staff join together in role-play activities that help improve workplace openness, comfort and productive dialogues.

On a technical training level, we are currently developing a formal refresher course that will give team members an opportunity to gain individual certification in GS-42 (green cleaning).
One more training milestone for this year is our fully operational Learning & Development site on SharePoint. This site achieves a number of objectives including housing a full training history on each team member. It also offers a position-specific onboarding tool to help new team members ‘hit the grounds running.’ A robust library of customized videos, PowerPoints and other tools give users on-demand access to relevant knowledge.

**Goal: Common Goal for all FM Managers**

We strive to embody these goal competencies in all that we do. Examples:

**Focus on people:** communicate effectively; share vision; inspire success; initiate positive change

Make workplace fun and satisfaction a formal performance goal

Share our innovations with industry peer groups

Bring QA and operational staff together to improve trust, relationships and communication

**Break from status quo:** challenge processes

Move from traditional MBWA (manage by walking around) to walking with purpose and focus

Take customers’ PULSE one-on-one, replacing anonymity with relationship-building

**Foster collaboration:** value differences; maintain safe, sustainable work environments

Learning & development uses these competencies in many of its educational initiatives

Safety is rewarded with stars, certificates, public recognition and celebrations

Sustainability efforts continue as we help implement & maintain waste management systems in multiple buildings. The development of our customized individual GS-42 certification program reinforces our commitment to green cleaning philosophies

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**Landscape**

This past year the Landscape department continued to build on the momentum from the previous year’s efforts creating the Landscape Management Plan for the university Grounds. Implementation of the plan began with our focus on turf care and achieving the turf care standards set in the plan. The new staffing efficiencies that we identified helped us to drop the service calls for un-mowed turf down to near zero this past year. We began the next step in our Grounds Management program by testing a process to identify the current condition of the Grounds and identify locations in need of rejuvenation. This Planned Renewal Program has identified multiple locations in need of improving and we will have the program implemented during the coming year.
Stormwater management was prevalent in multiple projects on Grounds improving the quality of and slowing the rate of rainwater leaving the University. These projects each occupy very prominent locations on Grounds (Rotunda north patio, Clark Hall east courtyard basin and Mechanical Engineering stormwater BMP for example) demonstrating how the Grounds of the University can not only be one of the most beautiful in the country but can also perform a critical environmental task. The efforts of multiple Facilities Management departments was recognized with the selection of the Dell as the best maintained BMP in the Chesapeake Bay watershed. In addition, the green roof on the Lobby of the Medical Center was named as third best ultra-urban stormwater structure.
Energy & Utilities

Sustainability - Dell Stormwater Management

The Dell is a BMP (Best Management Practice) Storm water detention pond used to collect silt, sediment and debris before it enters a major stream. In order to maintain it, the Dell is cleaned every 5 years. The Utilities and Landscape Departments worked together to remove 58 cubic yards (72 Tons) of soil from the Dell Forebay.

The project was awarded the best maintained BMP in the bay award for 2017. The work was performed by our own in house services making it substantially less expensive than an outside contractor.

The Utilities and Landscape Departments cleaning the Dell.

The impeccable water quality after the Dell Forebay was cleaned and returned to service.
Sustainability - North Plant Chiller Removal

The 1980s-era chillers at the North Chiller Plant contained refrigerant R-11, which is assigned an ozone depletion potential of 1 (the highest classification). Each of the removed chillers contained 2,500 pounds of R-11, for a total of approximately 12,500 pounds. Instead of recovering the R-11 and reselling it to the global market, we chose to hire a third party business to purchase and destroy all the R-11 safely. We did not receive carbon credits from this transaction, rather the third party business sold them in the California market. We could have realized more economic return if the R-11 had been recovered and resold, however we chose to permanently retire the refrigerant and use the funds generated by the carbon credits to offset the cost of removal.

Sustainability - Chemistry Addition Domestic Water Heat Exchangers

The existing steam-powered domestic hot water tanks were removed and replaced with a semi instantaneous medium temperature hot water converter. The ultimate goal is to eventually stop using steam and instead use Low Temperature Hot Water. The work was performed with in-house staff, which contributed to the highest quality installation. These two pictures illustrate the reduction in volume of water storage required.
Stewardship - Gooch Chilled Water

The project removed a small chiller from Gooch and tied the facility to the West Grounds Chilled Water Loop. A water exchanger was added to separate the primary and secondary side of the chilled water. Additionally, a new pump was added to maintain the differential pressure for the chilled water. This project replaced the aging and inefficient equipment with central plant capacity, which saves electricity, and significantly reduces thermal loss.

Stewardship - Heat Plants

By purchasing coal with a lower sulfur content and through improving processes that the plant, lime costs were cut in half this heating season for a net saving of $58,000.

An Operations-led Continuous Improvement program included increasing the steam generating capacity of 3R and 4R boiler. The problem was thought to be a furnace draft issue as both boilers approach full load exiting into a common breaching. Flue gas damper drives were replaced with improved design to reduce furnace pressure swings.

Breaching pressure taps were installed for data collection, the breaching duct was modeled for at various flows to identify potential issues, and ultimately furnace pressure draft trips were reset to the OEM recommended value. The program resulted in an additional 20,000 pounds per hour of steam capacity (full load steam flow of 90,000 pph is now simultaneously achievable from each boiler).

Stewardship - Davenport Stadium Duct Bank Extension

Power and Light team worked on the installation of duct bank, which allowed Davenport Stadium to be added to UVA power distribution system. The scope of work included approximately 900 feet of 4-way concrete encased duct bank, medium-voltage switch, and transformer. The duct bank installation was complete during February and March, and the service was energized in May. The team shifted work hours to accommodate customer needs and completed well in advance of the project timeline. The power and light team saved $180,000 by self-performing this work.
Stewardship - Chiller Overhauls

Being able to self-perform nearly all maintenance activities has been a hallmark of the Chiller Plant team for years. Until recently though, we have not self-performed major overhauls of the chillers. Through hard work and dedication, Jeremy Wood has propelled the team into a position where we now are beginning to self-perform the major overhauls of chillers. Through offsite training and onsite work with vendor assistance for several overhauls, Jeremy has gained the requisite knowledge and skill so that we no longer must depend solely on vendor support for this service. By performing this essential maintenance in-house, we save over 30% per overhaul ($75,000). While cost savings is most certainly a driver, the most significant value comes in deepening the team’s knowledge, skills, and abilities with regard to maintaining our critical assets.

Stewardship - Automatic Tube Cleaning System

What began in 2012 as a test of an innovative solution (which appeared too good to be true), has evolved into a reliable and effective answer to an age-old problem of tube fouling. Over the past five years, we’ve implemented condenser tube cleaning systems in several of our chiller plants. The overall concept is simple; clean tubes = best efficiency. Implementation of the system in existing plants requires a fair amount of design consideration and project coordination.

When considering the system for installation at the Aquatics and Fitness Center chiller plant, Dusty Buck stepped up to lead this project. Dusty prepared and submitted a project package to UBO. Following UBO approval, Dusty coordinated and oversaw the installation and start-up of the system.

A subtle, but important note, this project contained $0 for engineering services and the total project cost was on the order of $150K. While the concept is simple, the process of seeing a project like this through from conception to operation is often challenging. Having front-line employees leading these efforts, embracing the challenges, and learning in the process is incredibly exciting and empowering for the entire chiller plant team.

Stewardship - Lean Efforts in Chiller Plants

While most everyone likely practices Lean Management in some way, each and every day often without even knowing, the chiller plant team is learning the value of systematically searching for, and eliminating, Muda (waste). As senior FM leadership has identified the Lean concept as a powerful tool for continuous improvement, the chiller plant team has begun to implement several Lean methodologies to our business. In the forefront of our Lean efforts is a focus on inventory and material management.
Removal of the chillers from the old Newcomb Chiller Plant created a space for designated storage. We’ve begun the process of auditing our other plants to identify our true storage needs. Through this process we’ve already been able to begin reducing and combining inventory and materials. Skip Simpson has been our leader regarding this effort and, while we’ve made some major strides, we’re just now beginning to see how much potential value these efforts hold for our business. In addition to inventory and material management, we’re also beginning to use Lean techniques to reduce the number of overrides in our plant control system and will begin to use similar techniques to better manage and control keys.

The Newcomb Chiller Plant before. New storage space resulting from LEAN efforts.

Safety - Arc Flash Hazard Analysis Program

The UVA In-House Arc Flash Hazard Analysis program, started in February of 2016, is on track to complete the study and labeling of 100% of all significant buildings on grounds within 5 years, at which point the studies will be reviewed and updated per NFPA 70E 130.5(2). In fiscal year (FY) 2016-2017 studies and labeling were completed for 26 buildings, totaling 3,384,548 GSF or more than 23% of the total square footage under consideration. Major buildings completed include the University Hospital, Medical Research Buildings 4, 5, and 6, Law School, and Wilsdorf Hall. Reports from these studies are now available through GIS, and include electrical one-lines which can be accessed directly via QR code installed on the main service entrance for each building. This critical safety program is being performed in-house by William Evans, Associate Electrical Engineer in the Power and Light team.
Another example of our commitment to improving safety across FM is our support of incident investigation via the Cause Mapping root cause analysis method. The Cause Mapping method is widely used in industry and health care as the primary root cause method.

Pete Kowalzik (right) is facilitating investigations and training other FM folks as facilitators in this technique.

Automation Services

In FY17, one of the focus areas for Automation Services was a cybersecurity assessment of the building automation systems (BAS) at UVA. This effort was conducted by Automation Services in partnership with the Technology & Innovation department, ITS, and ISPRO. The assessment started with a self-evaluation of our BAS using the Department of Homeland Security Cybersecurity Evaluation Tool (CSET) and was followed by an outside consulting firm conducting an assessment with FM. Several opportunities for BAS cybersecurity improvement were brought to light during the assessment and FM will be working on implementing these strategies in the coming months.

The controls engineering and installation team finished the upgrade of chilled water plant controls with the completion of the Clark/Bryan chiller plant. Now that all of the chiller plants have upgraded controls, Automation Services is working with the Chiller Plant staff to optimize the operation of the various chilled water loops. Automation Services also performed new BAS installations on the lower level Leake project, Hotel B, Pavilion VI, and Materials Science.
The controls maintenance/service team implemented numerous Lean Management initiatives this year and because of these initiatives was able to complete over 1,000 work orders with less service technicians than in previous years. The team will continue to assess Lean strategies going forward as they focus on continuous improvement.

In partnership with Delta Force, the Building Optimization Team continued the upgrade and optimization of controls in several buildings, including Clark Hall, Newcomb Hall, and AFC. Significant energy savings have been realized from these efforts, as documented in the Sustainability section of this report.

Geospatial Engineering Services

Space Management

The team is currently in the process of implementing a new space management system. Some of the accomplishments are:

- Migrated over 1,800 floors, and approximately 60,000 rooms of data representing over 17 million GSF of space to the new designed data schema and processes in FMInteract.
- Developed floorplan drawing standards to standardize the creation of floorplans for publishing to the system.
- Quality controlled, standardized, and published approximately 1,200 AutoCAD drawings.
- Identified the gaps in the space drawing portfolio to include approximately 400 floors of Housing space without an AutoCAD drawing.
- Developed a plan to contract for services to obtain the additional AutoCAD floorplans that are needed to complete the Housing and other auxiliary portfolios.
- Developed color code graphic themes to display departmental assignments on the floorplans.
- Developed data schema to track the custodial service provider and frequency at the room level.
- Designed the data schema, user interface, and business process to migrate the Building Data Repository application content and processes into FMInteract.
- Migrated the Provost classroom inventory worksheets into FMInteract.
- Designed the data schema for the migration of ProLease information.
- Developed the data structure and survey processes to facilitate quality control and reporting of changes in space assignments.
- Trained approximately 45 School of Medicine survey respondents and approvers on the new space management annual survey tools.
• Developed a process to track principal investigators to rooms including the percentage of the space used in their research.
• Developed reports to show the amount of space used in research activities by principal investigators and departments.
• Developed a survey to track types of space that are reported to the National Science Foundation.
• Developed a survey to track space that is reported in the four year F & A cycle.
• Continued to work on integrations with core university business systems such as the Human Resources Workday application to track occupants to spaces as faculty, staff, and students are hired, transferred, and terminated.
• Continued to work on integrations with ResearchUVA to track research space associated with grant financial information and principal investigators.
• Conducted general system use training with the space management and planning teams in the SOM, College of A&S, SEAS, Provost, Office of the Architect, and Health System.

**Damage Prevention**

The team continued to expand our damage prevent outreach to teams in FM and our contractors performing excavation on Grounds. Staff from Project Services, Energy & Utilities, Occupational Health & Safety, Landscape, and many outside contractors totaling over 300 people were trained this year.

The team participated on the Excavation Safety Committee, presented at contractor safety days, exhibited equipment and outreached to 811 Day, GIS Day, and FM Girls Day attendees.

The team has also provided review of utility projects and provided tracer wire and marker ball specification for each project.

Monthly, the team averaged processing 200 utility locate ticket requests for excavation.

Staff complete Excavation Competent Person Training and have been working toward completed the revised SCC Damage Prevention Train the Trainer Certification.
Document Management

The team has been preparing for an Enterprise Document Management System (EDMS). The document and business process discovery phase is currently underway. Individual team interviews across FM are occurring and project plans continue to be developed.

Daily team accomplishments:

- 388 new projects were added to the repository.
- 2,372 sheet data entries were created for 140 record drawing sets and other documents.
- Averaged 15 requests for information per day.
- Processed approximately 1,200 OUBO Review Transmittals.
- Printed many newsletters, training manuals, posters, and announcements.
- Provided facility historian research and support services for various projects throughout the year including the naming and dedication of Skipwith Hall, and the street naming of Morris Franke Rd at the former Milton Airfield site.

Geographic Information Systems

The team hosted our first annual International GIS Day celebration. This included presentations of existing services and technology available to our customers, a map gallery, equipment demonstrations, and education and outreach through mapping activities.

The team has provided mapping and data analysis support to a variety of customers this year. Some of the projects to highlight include:

- Landscape vegetation and tree data collection.
- Parking infrastructure data collection.
- Fire Extinguisher Maintenance app.
- Emergency response planning for the fire systems at Scott Stadium.
• Solar panel potential analysis for existing buildings and student project support to expand on the initial analytics.

• Drafted a new interactive public mapping application.

The team collaborated with student interns to collect data and support the student experience at UVA with a living lab style of collaboration with industry practitioners.

The team also reviewed utility projects to help coordinate marker ball and tracer wire installation. Through the review process and coordination with the PM, the 35kV project and other utilities were updated through design, construction and active phases in the GIS.

The team has collected GPS data of utilities on most projects before backfill. This is a challenging goal with continued progress.

The team started mapping project coordination and phasing logistics to support the many projects in the Health System area of Grounds.

On a daily basis, the team continued to provide maps and application support to our customers.
Systems Engineering

Metering & Billing

**Data Integrity, Data Reconciliation, and Data Visualization** are the three primary focus areas for the Metering team, which is entrusted with growing and maintaining the breadth of University meters for billing and, to some extent, plant or building operations. Over 200 meters this year were newly installed, upgraded, or connected via automation systems for the first time and there are currently almost 2,700 active University physical and virtual meters in metering and billing information systems. The team has a goal of greater than 95% reconciliation between University distribution systems and consumers and for fiscal 2017, the team achieved almost 99.4%, on a billed unit basis.

The team also has a goal of greater than 95% on a per plant or distribution system basis, for total unit volume and total dollars. This goal has not yet been achieved but positive steps were taken this year towards these goals. These include: adding steam and medium temperature hot water (MTHW) distribution meters and regional reconciliation definitions to help target areas of greatest opportunity. The team also successfully experimented with different communications strategies for digitally integrating meter information to our central information systems. These experiments have led to a shift to incorporate more meter data into the primary electric meter monitoring system, and away from direct building automation system (BAS) integration, with exceptions based on a variety of factors. The team continued to use Veoci software this year to manage the monthly process for billing, including acquiring manually read meter readings, tracking issues and overall progress in the billing process using work flows and tasks. The team also worked this year to create a new Meter Plan to help guide upgrades and replacements in the coming years.

Information Systems

Information Systems includes a multitude of technologies, such as Microsoft (MS) .Net, MS SharePoint, MS SQL Server, MS Reporting Services, Building Automation and Supervisory Control and Data Acquisition Systems (BAS and SCADA), and also physical resources, such as server hosts and virtual machine (VM) servers. Our goal is to provide state-of-the-art tools for FM and University staff for analyzing and visualizing the variety of information we develop and maintain.

General information systems initiatives focus on data development, analysis, and reporting. Some of the team efforts this year included: Carbon emissions calculation improvements, Mobile (iPad) forms for heat plant shift/daily data entry, ICONICS history data improvements, high-frequency trending, and solar data structures for the new Solar web site.
Other highlights from the year include:

• Working with master’s degree program students of the Data Science Institute on forecasting and modeling of building electric data and heating plant information.

• Providing data to FM, University, and consulting staff.

• Supporting Delta Force and Office for Sustainability efforts.

• Work was initiated on a solar web site to highlight the University’s solar projects.

We continue to leverage the ICONICS platform to develop and enhance information, trending, and visualization for buildings, plants, and distribution systems. Visualizations and associated trends and calculations were added this year for solar array information on Grounds. Improvements were also made relating to distribution systems real-time reconciliation, especially for steam and medium temperature hot water (MTHW).

Sample ICONICS visualizations:
Systems Control Center

Mission Overview

The Systems Control Center (SCC) serves a multifunctional purpose within Facilities Management, operating around the clock throughout the year, providing real-time monitoring of utility and building systems, while serving as the after-hours emergency call center for utility interruptions and facility emergencies. Systems Control strives to reduce both the duration and impact of outages of utilities and building systems, through the effective monitoring of 272,663 virtual and physical building system points, along with timely and high quality communications and alerting, while tracking progress of incidents. On any given day, the Systems Control Center is challenged by system vulnerabilities and natural (weather) threats of various size and scope. In addition to the 13,179 work orders dispatched, SCC coordinated recovery of more than seventy significant utility outages and other facility events affecting the University and Medical Center.

This year Systems Control moved into a newly renovated space that took into account our growing team and technological needs, providing enough workstations to support six people at a time, assuring adequate staffing during emergencies. In addition, the new design incorporated three windows, a first for the Control Center, improving the overall morale of the Control Center.

Training & Development

A main focus of the Systems Control Center is the continued training and development of our team. This year 100% of our staff received advanced level building automation training (BAS) on at least one of our two systems. This training is crucial to Systems Control for achieving the continuous improvement and optimization of the building automation systems. Continuing with the focus on BAS improvement, the Systems Control Center staff has created multiple workflow used in the turnover process of freezers and building systems, assuring proper alarming and trending for critical systems.