



SUBMISSION FORM

All submission forms must include the following information. Separate submission forms must be turned in for each eligible program. **Deadline: July 1, 2022.** Please include this submission form with the electronic entry. If you do not receive an email confirming receipt of your entry within 3 days of submission, please contact [Gage Harter](#).

PROGRAM INFORMATION

County: Buckingham County

Program Title: Solid Waste Recycling, Collection, and Management through Technology and Innovation

Program Category: Customer Service/ Information Technology

CONTACT INFORMATION

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SIGNATURE OF COUNTY ADMINISTRATOR OR DEPUTY/ASSISTANT COUNTY ADMINISTRATOR

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Signature: 

**SOLID WASTE RECYCLING, COLLECTION, AND MANAGEMENT
THROUGH TECHNOLOGY AND INNOVATION**

<https://youtu.be/HKKgdqfv-u0>



Solid Waste Recycling, Collection, and Management through Technology and Innovation

EXECUTIVE SUMMARY:

At a local government level, each area is responsible for planning, executing, and maintaining solid waste services for its citizens. While approaches vary between counties, cities, and/or municipalities, the general goals, among others, are to provide valuable services to its taxpayers, while also maintaining innate responsibilities to the environment and community aesthetics and being fiscally responsible with tax payer funds. In a novel approach to meet these goals, Buckingham County implemented a series of technological advances at its public solid waste collection sites, including remote site surveillance, and electronic gate controllers that read the new system-compatible Radio-frequency identification (RFID) decals (Vehicle License Decals) issued to tax paying citizens. This new access system also yields data logs that provide previously non-existent information such as frequency of individual site usage, records in the event of abuse of services or damages, and overall access for planning and improvement of the Solid Waste Management Plan.

DETAILED PROJECT OVERVIEW:

Buckingham County, at the onset of the project, had a total of nine (9) solid waste collection sites. Of these sites, five locations were gated and staffed with solid waste monitors to maintain cleanliness, verify County residency, and report non-compliance with posted rules and regulations. The remaining four sites were open access without permanent staffing. While the County regularly updated policies and procedures to meet the Solid Waste Management Plan, it became evident that the challenges faced for many years would not be able to be overcome without intervention of technology.

In planning for this multi-faceted project, County staff project contributors identified the following issues as priorities to address in order to improve the Solid Waste Management Plan:

- 1) Non-Residential Usage - Several surrounding areas charge its residents for solid waste disposal, whereas Buckingham County did not impose such a fee. Several of the unmanned sites, especially those near County lines or on major highways, were being used by residents from other localities to avoid fees in their own region. In turn, the significant costs of transportation and tonnage fees of non-residential dumping was being incorporated into County expenditures. These recurring expenditures became a burden to the County budget and, as a result, the taxpayer. A significant goal of this project was to cease ability of non-residents to access our solid waste collection sites.
- 2) Site Control - The main goals of this project for site control were three-fold.
 - a. Environmentally, Buckingham County hoped to impede citizens from illegal dumping of restricted materials and encourage proper sorting of materials into designated receptacles.
 - b. At gated and staffed sites, citizens had previously only been able to dispose of household waste during posted hours. As a convenience for citizens, Buckingham County wanted to improve access and availability to these sites.
 - c. Due to a compilation of reasons, unmanned sites were not aesthetically in line with the vision of beautiful Buckingham County, despite regular maintenance and attention from County staff. Moving to all controlled sites to improve cleanliness and community value was a priority.
- 3) Tax Account Management – Fiscally, Buckingham County depends on tax revenue collection to maintain its services to its citizens. In past decades, Buckingham has required purchase of a County decal for all vehicles registered and garaged in Buckingham. One strategy to ensure tax collection has been to issue County decals only to citizens who have current and paid in

full personal property tax accounts. This project was intended to continue that strategy and to offer County services to paid taxpayers.

In a collaborative effort with Buckingham County Administrative personnel, Information Technology and Solid Waste departments, Treasurer's Office, and Board of Supervisors' Committee Members, we were able to conceptualize and execute a project that fully met the evolving needs addressed above. Buckingham County has consolidated to seven (7) fully-functional controlled access solid waste collection sites. Each site is equipped with a RFID reader with entry granted only to citizens with a RFID-embedded Vehicle license decal. Full electronic access records are available to County staff for troubleshooting, reliable data for budgeting and planning, and for recourse in the event of unlawful activities or abuse of County services. Sites are constantly surveilled and recorded for similar purposes. In Virginia, these sites are leading edge solutions for a topic not previously considered as an arena for technological advancement. Additionally, as sites were reworked for the purpose of access and control, we were able to rearrange and allow for easier access for recycling of paper, plastic, and metal. This has allowed the citizens of Buckingham to continue their efforts of recycling and improving the county's approach to being more conscious of the environment.

ISSUE/PROBLEM:

Illegal dumping by non-residents of Buckingham County, along with delinquent tax payers of the County, has been an issue for a number of years. Coupled with improper use of facilities and the toll such actions have on the physical conditions of collection sites, these inconsistencies and irregularities have impeded the County from maintaining an effective Solid Waste Management Plan. Buckingham was long overdue for a solution that tackled access, control, and monitoring of collection sites in a manner that was consistent with its technological growth.

METHODOLOGY:

First and foremost, there was a decision to perform all conceptual designs, installation, and implementation using in-house staff. This would allow cost savings to the project and taxpayers by eliminating subcontractors, custom designed systems, and expensive equipment. This afforded additional cost avoidance by yielding the opportunity for in-house training and troubleshooting as a permanent solution.

Through coordination between Buckingham County Administrative personnel, Information Technology and Solid Waste departments, Treasurer's Office, and Board of Supervisors' Committee Members, the most pressing goals of the project were planned and executed as follows:

1) Non-Residential Usage - The project team first decided to eliminate all non-gated and unmanned roadside sites. Two of the four of the previously non-gated and unmanned sites were built out as fully fenced sites, and the other two sites in less populated areas were permanently closed. All sites were then equipped with controlled access RFID readers and access control arm gates. A vehicle decal license issued by Buckingham County to its citizens is required for the readers to accept entry and open the arm gate. The control arm gate will not open to non-residents. In the event that a non-resident attempts to access the site by vehicle or foot, the sites are under video surveillance and each offender's license plate is recorded for ticketing or other formal recourse.

2) Site Control - Trying to provide the citizens of Buckingham with services that meet everyone's needs, we chose to make the site 24/7 access for all valid stickers. This allows everyone to dispose of their solid waste during the most convenient time of the individual. Buckingham County Staff,

through the use of technology, can also control access to the sites with permissions based on the vehicle license decals number. If staff is made aware of abuse, stolen, or loss of decal, access to the sites can be removed and the citizen can now be made aware of the reasoning. Staff can complete this from any location with internet access, as all sites are connected via VPN tunnel technology. Additionally, video surveillance was added to each site in order to verify identities as well as monitor site usage. The addition of video surveillance and remote viewing have allowed our solid waste department to identify materials being placed in the wrong containers, quantity at the site, as well as frequency of use. The frequency of use will allow us to tailor our monitors to certain times of day, to assist with the disposal of trash.

3) Tax Account Management - With each solid waste collection site now equipped with control gate arms and an RFID reader, access is only available through procurement of a vehicle decal license. As per the Buckingham County ordinance, personal property tax accounts must be paid in full in order to obtain a vehicle decal license. These vehicle decal licenses are required regardless of desire or intent to use solid waste collection sites. However, with sites more stringently controlled, the only way to use solid waste services is to have this decal. This strategy is intended to incentivize citizens to pay taxes in a timely manner, as vehicle decals expire and thus eliminate access to sites after the tax deadline.

CONCLUSION & RESULTS:

The new system was designed to fully achieve the goals listed above. In addition to meeting these goals, we have achieved noticed measurable results in three key areas:

- 1) *Decline in yearly tonnage of solid waste collected.* Since implementation of the controlled sites, the collection sites have yielded significantly less actual waste. Buckingham County pays per ton

to the local landfill for final disposal of the collected waste. Measurable declines in the amount of solid waste collected at our dumpsters result in cost savings and benefits for the County and taxpayers. Less waste has also been an aesthetical benefit for the community.

- 2) *Uptake in vehicle license decals / paid tax accounts.* Because a County decal is required to access the sites, and issuance of decals is dependent on paid personal property taxes, we have achieved a positive correlation and upward trend of paid decals and taxes based on data available from previous years.
- 3) *Electronic data availability.* The data gathered at each site is filtered back to a central recording system. Key information, such as frequency of usage per day, week, or other time period, is helpful in determining most used sites and busiest days of the week. This data that was previously unmeasurable has been invaluable in transportation routing, staffing for maintenance, and planning for forward build out of services at each site. Additionally, this has allowed Buckingham to identify abuse of the system or dumping in the wrong location. This has been critical for continuing to maintain and make sure that our recycling efforts are being accomplished.

We are proud of our advances, our capabilities to complete this project in-house, and our growth in the Solid Waste field through use of technology. The system allows interconnection of all current electronic devices and allows for future expansion, when necessary. Buckingham has received numerous inquiries about the implementation, functionality, and positive results of our new sites as a means to form their own models based on our approach. A video has been linked at the top of this submission showing one of our sites in operation.