CHARLOTTE

INTERNAL AUDIT

Audit Report
Airport Parking
December 21, 2016

City Auditor's Office
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Purpose and Scope

The purpose of this audit was to determine whether the City's Aviation Department (Airport) has effective internal controls in place for the collection, reporting, and remitting of parking revenues. Airport management requested the audit, recognizing that public parking revenue represents a significant asset subject to the risk of fraud and theft. Auditors tested FY15 and FY16 transactions, including cash collections, gate resets, lost tickets, voided tickets, and coupons.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

This report is intended for the use of the City Manager's Office, City Council and the Aviation Department.

Conclusion

Aviation has improved controls over parking operations in recent years, but needs to establish additional procedures to reduce the risk of unrecorded customer activity.

Summary Recommendations

Opportunities exist to improve controls and the monitoring of the Parking Service Agreement. The following findings are addressed:

1. Aviation has controls in place to adequately ensure the collection of parking revenue recorded in the Scheidt & Bachmann (S&B) automated control system, but needs to establish more effective controls to identify and monitor any unrecorded revenue.

   - Aviation implemented procedures to better monitor gate keys, is currently undergoing a large re-evaluation of security camera systems throughout the airport and is working on obtaining alterative technology to replace the License Plate Inventory (LPI) system.

2. Aviation should request a $9,948 reimbursement of revenue lost due to S&B system outages.

- Aviation agrees to review and enforce recommendation of recovering any lost revenue in accordance with S&B contract. Aviation has also modified the current outage log to ensure all S&B system outages are properly identified and well documented.

3. Aviation should ensure S&B is performing proper preventive maintenance as outlined in the S&B contract.

- Aviation recently hired an IT Parking staff member whose responsibilities include overseeing the enforcement of the S&B contract terms, including preventive maintenance.

4. Aviation should consider additional technology improvements for parking operations.

- Aviation is currently evaluating technology based solutions which will enhance parking revenue collection and controls. Aviation has undertaken an RFP for a complete Parking Master Plan, which will include an evaluation of the parking facilities, business model and technologies used at the Airport.

Background

The Airport has contracted with SP Plus Corporation (SP+) through June 2017 to manage parking operations. The three-year and three-month contract contains two one-year renewal options. SP+ uses the Scheidt & Bachmann automated parking revenue control system (PRCS) to process transactions and report revenues. Under a separate agreement (covering a concurrent period), Scheidt & Bachmann is required to provide sufficiently trained, qualified and experienced personnel to maintain a 99% availabilty of the PRCS.

As shown in the FY15 Charlotte Douglas International Airport Annual Report, total Parking Revenues were $47.6 million. (Total parking revenue for FY16 increased 8.4%, to $51.7 million, unaudited.) Public parking makes up 71% ($33.6 million in FY15) of annual revenues, with the remainder being curbside and business valet parking.

Overall, public parking revenues make up 17% of the Airport's operating revenues ($33.6 million of $193.7 million). Parking fees are collected via three payment methods: cashiers or unmanned machines at exit lane booths, and Pay-on-Foot (POF) machines within the parking deck. Excluding exception transactions (lost or unreadable tickets, insufficient funds, etc.), the S&B system automatically calculates the parking fee based on the duration and location of the customer's stay.

Of the total transactions, cash collections as a percentage of total parking revenue has decreased over the last three fiscal years, as customers have increased the use of credit card payments. For FY15, cash collections were approximately 7.5% of total parking revenue. For FY14 and FY13 it was approximately 10.3% and 11.8%, respectively.

A map detailing the revenue parking lots as of June 2016 is attached as Appendix A to this report.

Audit Findings and Recommendations

1. **Aviation has controls in place to adequately ensure the collection of parking revenue recorded in the S&B system, but needs to establish more effective controls to identify and monitor any unrecorded revenue.**

   Through observations, inquiries of staff members, and data analysis, auditors noted that Aviation has controls in place to adequately ensure the collection of public parking revenues as recorded by the S&B revenue control system. To increase control, Aviation should establish appropriate controls to identify and monitor potentially unrecorded revenue.

   Controls in Place – Auditors noted that Aviation has established the following controls:

   - Daily reconciliation of the parking revenue accounts to S&B revenue reports.

   - Independent review and verification of each daily SP+ revenue package.

   - Review and deposit of the year-end true-up for the over-reimbursement of expenses ($148,250 for FY15) paid to SP+ in a timely fashion, as required by the contract.

   - Documentation standards have been established for cashiers, and procedures are in place to verify compliance. These standards detail the support for voids, cancellations, insufficient fund transactions and other unusual items.

   The above controls help to ensure that revenue associated with transactions captured by the S&B system is received by the City and properly recorded. However, these controls are not sufficient to identify potentially unrecorded revenue due to the following scenarios:

   - Manual lifting of gate arms via unlocked gate boxes
   - False claims of lost tickets
   - System outages resulting in the inability to collect revenue
   - Switching of tickets whereby a long-term parking customer obtains a more recent entry ticket

   Additional Controls – Other airports report that the above scenarios are commonly used by customers to circumvent revenue control systems. To combat the risk associated with these scenarios, the following controls are typically established:

   A. Limiting the number of employees with access to gate keys
   B. Recording/monitoring manual gate openings
   C. Utilizing license plate inventory (LPI) and recognition (LPR) technology
   D. Monitoring unaccounted for tickets

Each of these is addressed below:

A. Key Access

During field observation, auditors noted instances where entry/exit boxes were left unlocked. This creates a risk as each box has a button that manually raises a gate arm without needing to pull a ticket to enter (or pay to exit) *and* without the S&B system recording the event. Subsequent to the audit observation, Aviation established procedures to better monitor key access to manually open the gate boxes. Gate box keys are now kept in the Aviation Parking supervisor's office and are paired with the Aviation Parking Shift Supervisor truck keys. These vehicles are checked in and out daily.

B. Remote Gate Openings

When customers or vendors call into the Parking Dispatch Room (PDR), they provide their name and company (if a vendor). SP+ staff records this information on a hand-written log and opens the gate from the control center. Neither SP+ nor Aviation has established a control to reconcile the number of recorded remote gate openings to S&B reports. During limited testing, the manual logs kept by SP+ staff and the S&B system-generated gate reports did not agree.

This control deficiency could result in a loss of revenue if SP+ employees accidentally or intentionally allow customers to exit without paying. In addition, vendors are not being tracked by their assigned gate transponders, nor charged dwelling fees when they're allowed to exit without using the gate transponders provided to them.

C. License Plate Inventory Technology

Completing a daily inventory of vehicle license plates is an important control which is necessary to help ensure accurate customer transactions, and overall revenue reporting by the contractor. Article 6.15 of the SP+ Parking Services Agreement (the Agreement) states, in part:

> "The Company shall be responsible for conducting a nightly license plate inventory of the self-park lots."

The requirement to provide nightly parking inventory via the LPI system was acknowledged by Aviation in the McGladrey Turn Over Review Follow Up Audit Report issued by City Internal Audit (August 2015), "Aviation Parking staff to monitor and ensure compliance with the LPI requirement."

For FY15, SP+ did not conduct nightly license plate inventories from December 2014 through June 2015. This was reportedly due to the LPI system not always functioning properly and because of the parking lot/deck construction requiring the

reprograming of parking lot "tours" (predetermined routes). Not only does this affect service when a customer needs to locate a lost car, it affects revenue as cashiers are forced to rely on customers' accuracy when reporting lost tickets. In FY15, $98,280 was budgeted to pay SP+ employees to perform LPI inventory.

D. Unaccounted For Tickets

According to a survey by the Association of Airport Internal Auditors, some airports have established limits for unaccounted for tickets ranging from 0.2% to 1.0%. Penalties for failing to meet these requirements range from fines being assessed equaling the average of the month's unaccounted for tickets to termination of the contract. However, Aviation has not set an acceptable level of unaccounted for tickets and has no process to calculate unaccounted for tickets.

Based on a manual inventory process (not LPI), the S&B system produces a "Parking Ticket Analysis" report. This report appears to calculate unaccounted for tickets on a daily basis. However, based on interviews with the SP+ manager and Aviation staff, this report is not considered accurate and is not utilized. To be useful, the report would require an accurate inventory and reconciliation to known "exceptions" such as lost, unreadable and destroyed tickets as well as recorded manual gate vends for valid reasons.

Recommendation 1A: Aviation should require that SP+ record all of the information necessary (transponder number, company, etc.) to properly add vehicle exits manually processed in the PDR to the vehicle's related billing account.

Aviation Response: Aviation implemented procedures to better monitor gate keys, which allow access to manually open the parking exit/entrance gate boxes. Gate box keys are now kept in the Aviation Parking supervisor's office and are paired with Aviation Parking Shift Supervisor's truck keys. These vehicles are checked in and out daily. Aviation, along with SP+, has developed a form and procedures for ensuring all information needed is properly documented for identifying vehicles exiting via manual gate opening.

Recommendation 1B: Aviation should install security cameras at each exit gate. PDR staff members currently monitor various parking security cameras (via the PDR room), however, no camera views allow them to verify the identity of drivers calling to request exit.

Aviation Response: Aviation is currently undergoing a large re-evaluation of security camera systems throughout the airport, called Airport Master Camera Plan. We have included all parking operations as part of this re-evaluation process.

Recommendation 1C: Aviation should enforce the contract terms with SP+ regarding daily vehicle license plate inventories. Aviation should require S&B to

reprogram parking lot "tours" for lots no longer affected by construction and for SP+ to restart vehicle inventories for these lots.

Aviation Response: Aviation is working to obtain alterative technology which will replace the LPI system, due to ongoing LPI system failures. A replacement inventory system, LPR (License Plate Recognition) is being evaluated by Aviation. An LPR System would be installed at entrance and exit of parking lots. Such system would have the ability to log vehicle tag numbers, and to reconcile tag numbers with tickets pulled by customers.

Recommendation 1D: Aviation should establish a limit on an acceptable level of unaccounted for tickets. Once a limit is determined, Aviation should establish contract language to be incorporated in future contract revisions and periodically monitor compliance to the established standard.

Aviation Response: Aviation agrees with this recommendation and will determine an acceptable level of unaccounted tickets consistent with industry standards. Aviation will seek to include recommended contract language in future contracts with SP+ or other contractor selected for this purpose.

2. ***Aviation should request a $9,948 reimbursement of revenue lost due to Scheidt & Bachmann system outages.***

Exhibit A, Section E-3 of the Scheidt & Bachmann Monitoring and Maintenance Contract (the Contract) states:

> "In the event that an issue is caused by Contractor software, hardware or the acts or omissions of Contractor employees, agents or other representatives that results in the loss of parking revenue, Contractor will be responsible for repayment of that lost revenue that occurs after the point of time notification was made to the Contractor regarding the issue."

To accurately calculate lost revenue during a system outage, Aviation needs to keep the collected tickets and record detailed notes for each event (date/time of event, time S&B was notified, and a specific reason for outage). In January 2015, Aviation started tracking system outages using some of the above criteria but has not recouped lost revenue from S&B. Based on the recorded reason, S&B was at fault for five of the 36 system outages noted in CY15. Due to insufficient documentation, the responsibility for 24 of the recorded outages could not be determined. For the majority of these outages, the reason provided was general and did not provide enough explanation to assign responsibility, such as "gate problems" and "credit card issues."

Follow-up procedures/inquiries on machine failures or gate malfunctions should be done, with S&B assistance, and records updated to better identify the cause of errors.

Depending on the frequency of outages and dollar amount of revenue lost each time, batching the events into monthly or quarterly reimbursement requests may be most efficient. Total CY15 revenue lost (as determined by summing the tickets collected while the system was down) was $39,051. Based on Aviation documentation, the amount of lost revenue attributed to S&B for gate malfunctions was $9,948.

Recommendation 2A: Aviation should recover $9,948 owed by Scheidt & Bachmann due to CY15 system outages.

Aviation Response: Aviation Parking staff accounts for all collected tickets the airport received during S&B system outage. This information is then included as part of Daily Revenue Report submission to Aviation Finance.

Recommendation 2B: Aviation should keep more detailed documentation of system outages and request related lost revenue reimbursements from S&B.

Aviation Response: Aviation agrees to review and enforce recommendation of recovering any lost revenue in accordance with S&B contract. Aviation has also modified current outage log to ensure all S&B system outages are properly identified and well documented.

3. ***Aviation should ensure S&B is performing proper preventive maintenance as outlined in the S&B contract.***

Per Section C, article 1.4 of Exhibit A of the S&B Agreement for Monitoring and Maintenance Services Contract, S&B is required to perform certain preventive maintenance services "at least four times per year (quarterly)." Additionally per Section 3.2, S&B should be scheduling and completing annual equipment reviews. Lastly, Article D of Exhibit A of the Agreement states:

> "The Contractor shall maintain a written or electronic Maintenance Log of all Preventative Maintenance Services, Routine Maintenance Services and Emergency Maintenance Services performed during the term of the Maintenance Agreement. The Maintenance Log shall be organized in a manner that allows the Airport and Contractor to readily identify chronic or recurring service problems by component or lane. The Maintenance Log shall include entries for any upgrades performed on any component so any unforeseen negative effects may be quickly isolated and reported. The Maintenance Log shall be in service report format and shall be available for inspection by the Airport at any time. A monthly Maintenance Log will be attached to each invoice submitted by Contractor under this Agreement. The Maintenance Log shall be turned over to the Airport at the end of this Maintenance Program."

For the 10-month period July 2015 through April 2016, S&B was only able to provide preventive maintenance logs for one month – August 2015. Through April 2016, no preventive maintenance had been recorded for FY16. By not performing necessary preventive maintenance, machines may be abnormally wearing down and causing unnecessary disruptions in service and higher repair costs. This has the potential effect of impacting revenue, expenses, and customer service.

Recommendation: Aviation should obtain preventive maintenance logs every quarter and monitor and enforce contract terms.

Actions Taken: Aviation recently hired an IT Parking staff member whose responsibilities include overseeing the enforcement of the S&B contract terms, including preventive maintenance.

4. ***Aviation should consider additional technology improvements for parking operations.***

Aviation has established a list of preferred airports for benchmarking purposes. The list includes airports in Houston, Las Vegas, Miami, Phoenix, Portland, Raleigh, St. Louis and Salt Lake City. The Transportation Research Board has issued the "Guidebook for Evaluating Airport Parking Strategies and Supporting Technologies." The guidebook was created by interviewing nearly one hundred employees, vendors and parking operators at airports in the United States, Canada and Europe (including all of Aviation's identified preferred benchmarking airports listed above) and identifying the most innovative parking strategies and technologies. The guidebook identified several strategies that are not currently in use at CLT (extracted or paraphrased below):

A. Credit Card In/Out

According to the guidebook, credit card in/out parking lots can improve customer service by reducing exit delays. The use of this strategy also can reduce costs as the number of exit lanes and cashiers can be reduced. In addition, there is less opportunity for theft or fraud since there is less need for staff to handle cash and there is a reduced potential for ticket swapping.

Customers entering credit card in/out lots insert their credit cards into the entry gate card readers, which read the credit card numbers and open the gates. To exit, customers drive to exit gates and insert the same credit cards into the readers. The revenue control system calculates the fee, charges the customer's credit card account, returns the card to the customer, issues a receipt and opens the gate. Airport operators have reported usage levels exceeding 75% within two years of implementation. This technology is currently in use at Denver, Portland, Salt Lake City, Tampa and San Francisco, among others.

According to the S&B technician at CLT, the equipment installed at the Airport is already capable of being utilized as a credit card in/out system.

Key considerations for facilities considering credit card in/out parking include:

- Procedures for misplaced or mismatched credit cards
- Proportion of frequent travelers (common for the percent of use among business travelers to exceed 70%)
- The ability to create well-designed pre-implementation, marketing and advertising material
- Backup systems to allow customers to exit in case of power failure or disconnection with the credit card processing system

B. License Plate Recognition

License plate recognition (LPR) is typically a complementary technology to other parking payment systems. It is not widely used as the primary method of identifying vehicles because of insufficient accuracy rates. When a customer enters a facility and pulls a ticket, the LPR system records a digital image of the customer's license plate. Optical character recognition software "reads" the license plate number and codes the number into the ticket before the ticket is issued to the customer. As the customer exits the facility, the LPR system records a second digital image of the license plate and the software again "reads" the license plate number and matches that to the parking ticket. If the plate numbers do not match, the vehicle is typically not allowed to exit until a supervisor or staff member can confirm that the plates were correctly read. When functioning well, the LPR system significantly reduces the ability of patrons to "swap tickets" or engage in other fraudulent activity to avoid paying parking charges.

Discussions with SP+ staff members that have experienced License Plate Recognition (LPR) installations at other airports suggest that the installation of an LPR-type system, over time, results in a decline of lost ticket claims.

Key considerations for an airport reviewing LPR systems include accuracy, license plate variety, lighting and the potential percentage of plates that may be obscured by mud, snow, salt and dirt. LPR systems are currently used in Phoenix, Raleigh, San Francisco and Atlanta.

C. Automated Overnight License Plate Inventory

LPI is a key component of an overall parking revenue control system. Parking duration is determined by inventorying/recording the license plate number of each vehicle on a daily basis. This can be helpful in accurately charging customers with reported lost tickets. LPI data can also prove useful for customer service (finding lost vehicles) and law enforcement (e.g., identifying stolen vehicles, and unpaid parking fines).

Traditionally, LPI is conducted by staff walking or driving through a lot and manually recording the license plate numbers of parked vehicles, which provides opportunities for error. However, LPI can be conducted using vehicle-mounted or mobile LPR readers. Mobile LPR allows parking lot inventories to be conducted more quickly and accurately while reducing the required staff hours.

Currently, Aviation and SP+ do not use LPR readers and LPI, when performed, is input manually. Aviation has not calculated potential "lost" revenue or calculated the percentage of unaccounted for tickets. Before considering additional technological solutions, Aviation will need to establish accuracy goals and monitor the achievement of those goals and estimate parking revenue lost (as discussed in finding #1). Only then can a cost-benefit analysis can be performed to determine if any additional solution is financially justifiable.
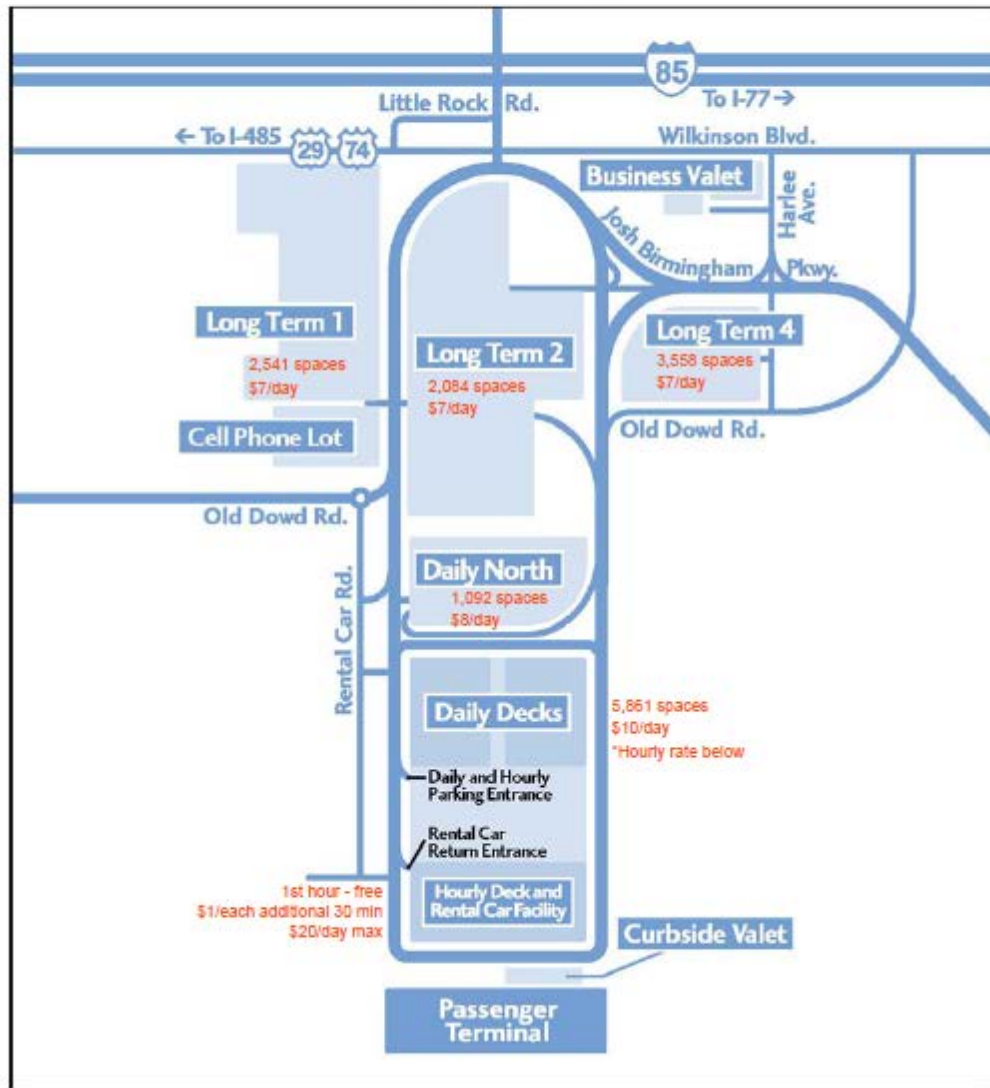
Recommendation: Aviation should consider the cost-benefit of the following additional parking enhancements:

- Credit card in/out
- License plate recognition
- Automated overnight license plate inventory

Aviation Response: Aviation is currently evaluating technology based solutions which will enhance parking revenue collection and controls. Aviation has undertaken an RFP for a complete Parking Master Plan, which will include an evaluation of the parking facilities, business model and technologies used at the Airport. This multi-phase study will provide Aviation with specific recommendations such as: use of technology (including online pre-booking) to improve business intelligence, form a basis for robust customer communication and provide a platform for yield management.

Notwithstanding the findings of the Parking Study, Aviation is working to obtain alterative technology replacing LPI system, due to ongoing LPI system failures. A replacement inventory system, LPR (License Plate Recognition) is being evaluated by Aviation, as described in Recommendation 1 above.

CLT Airport Parking Facilities Map

Charlotte·Douglas®
INTERNATIONAL AIRPORT

85

Little Rock Rd. To I-77 →

← To I-485 29 74 Wilkinson Blvd.

Business Valet

Harlee Ave.

Josh Birmingham Pkwy.

Long Term 1
2,541 spaces
$7/day

Long Term 2
2,084 spaces
$7/day

Long Term 4
3,558 spaces
$7/day

Cell Phone Lot

Old Dowd Rd.

Old Dowd Rd.

Rental Car Rd.

Daily North
1,092 spaces
$8/day

Daily Decks
5,861 spaces
$10/day
*Hourly rate below

— Daily and Hourly Parking Entrance

╱ Rental Car Return Entrance

1st hour - free
$1/each additional 30 min
$20/day max

Hourly Deck and Rental Car Facility

Curbside Valet

Passenger Terminal

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