Review of Port Everglades Facilities Maintenance Operations

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Report No. 06-19

Office of the County Auditor
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EXECUTIVE SUMMARY

The Office of the County Auditor conducted a review of the maintenance services performed and managed by the Public Works Section of Port Everglade’s Operations Division. This review was initiated as a result of observations made of Port Everglade’s facilities during our review of the Security Enhancements and Improvements contract. Our goal was to determine if a management control environment exists that is conducive to safeguarding and preserving the County’s assets, improving the general effectiveness of operations, and is consistent with the principles of facility maintenance best practices.

We concluded that Port Everglades Facilities Maintenance Operations is striving to perform their assigned maintenance responsibilities utilizing available resources. Current facility demands and the high volume of emergency calls limit the section’s ability to effectively respond and manage maintenance activities. As a result, PEFMO’s constant reactionary position has greatly impacted their ability to perform preventative and routine maintenance work, which would improve the condition of Port Everglades facilities. Although a computerized maintenance management system (CMMS) is available, it has not been fully utilized to help manage maintenance activities. Currently, Port Everglades has over $4.3 million in ‘immediate’ maintenance needs.¹ In order to adequately maintain Port Everglades assets, immediate action should be taken by PEFMO to improve identified operational deficiencies.

We have summarized our observations below.

1. PEFMO does not have a comprehensive routine and preventative maintenance program. (see page 5)
2. PEFMO does not utilize the available Computerized Maintenance Management System (CMMS) to track work order requests, activities and costs. (see page 7)
3. PEFMO does not have sufficient internal controls to properly track the purchase, storage, issuance and utilization of maintenance materials. (see page 8)
4. PEFMO does not have appropriate procedures to address maintenance repairs for tenant occupied buildings. (see page 10)

The findings of this review indicate that PEFMO management staff should take immediate steps to address the maintenance backlog, establish a preventative maintenance program, address Management Information System needs, assess and modify the current level of maintenance support provided at Port Everglades. The development of comprehensive routine and preventative maintenance programs, coupled with advances in automation technology will lead to improved services and extend the useful life of Port Everglades’ assets. We have included specific recommendations related to each of our observations in the detail sections of this report.

¹ The 2005 Operations and Maintenance Activity Biennial Condition Report of Port Facilities defines ‘Immediate’ as items which are a safety concern, or constitute violations of applicable laws, regulations and codes.
We would like to thank Port Everglades Facilities Maintenance Operations and all other County employees who aided in the completion of this review.

**SCOPE AND OBJECTIVE**

This review examines Port Everglades Facilities Maintenance Operations (PEFMO) current processes and management of maintenance activities as of July 31, 2006 and offers recommendations for improvements.

‘Maintenance’ in the context of this report is defined as the work necessary to realize the originally anticipated life of an asset. ‘Repairs’ are work completed to restore damaged or worn out facilities and assets to their normal operating condition. Repairs are curative, while maintenance is preventative. Preventative maintenance programs are essentially time based overhauls of assets. Activities can be scheduled at regular intervals based on calendar days or operating hours (change filter/provide routine service every six months vs. every 5,000 hours of use), depending on the needs of the equipment. Most manufacturers provide schedules of suggested maintenance designed to maximize the useful life of their machinery. This information can serve as a baseline for developing a preventative maintenance program.

The primary objective of the review was to assess the effectiveness of Port Everglades Facilities Maintenance Operations regarding:

- The delivery of preventative, routine and emergency maintenance services
- Inventory tracking and warehouse procedures
- The safeguarding of Port Everglades assets.

**METHODOLOGY**

To accomplish our objectives we reviewed:

- Available maintenance policies and procedures
- Maintenance work authorizations
- Port Everglades facility consultant reports
- Port Everglades Lease Agreements.

In addition to the review of the documents listed above we:

- Conducted interviews with Port Everglades Facilities Maintenance Operations staff
- Conducted site visits to various Port Everglades locations
- Applied other auditing procedures as deemed necessary.

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3 Excerpt from Maintenance Technology Online; www.mt-online.com
BACKGROUND

Port Everglades (PE) is one of the nation’s busiest seaports, providing services to twenty cruise lines, thirty five cargo shipping lines and thirteen privately owned petroleum terminals. The Port is also South Florida's primary bulk cargo depot, is a major petroleum storage and distribution hub and a favorite U.S. Navy liberty port. The Port's grounds encompass a total of 2,190 acres with 356,800 square feet of warehouse space and over thirty deep-water berths.4

Public Works is a section of Port Everglades’s Operations Division. This section is responsible for maintaining over 2.9 million square feet of facilities throughout the Port with an FY 07 forecasted budget of $10,586,260. As such, PEFMO responsibilities are extensive. PEFMO provides maintenance and repair services for PE facilities including: cargo transit sheds, cruise terminals, cruise passenger loading bridges, vehicle fleet, marine fendering systems,5 yard lighting, air conditioning systems, restrooms, plumbing, fresh water supply and waste water removal. Additional responsibilities include general custodial and landscaping services.6

PEFMO currently has a staff of eighty five employees, including managers, superintendents, supervisors, direct maintenance service personnel, and warehouse and administrative support workers. Tradespeople are experienced plumbers, electricians, air conditioning technicians, painters, welders, carpenters, general mechanics, equipment operators, construction workers and groundskeepers. As necessary, work beyond the capabilities of in-house labor may be completed by local vendors, following appropriate County bidding processes.7 An organizational chart depicting staff structure and the reporting relationship between PEFMO and PE Operations Division is included in Appendix A (page 12).

Challenges facing PEFMO are significant due to tenant needs as well as the unique environment present at Port Everglades. A high volume of cargo, cruise and petroleum activities occur at the Port each day placing increased demands on Port structures. Furthermore, the harsh salt water environment accelerates the rate of deterioration of equipment and facilities. Typically, security needs are often given priority, and ‘emergency’ calls are frequent. Port operations are ongoing throughout the day, and maintenance services are ideally completed with minimal disruption to these activities.

Every two years Port Everglades commissions periodic assessment reports in order to determine the ongoing condition of its grounds and assets. The latest evaluation, entitled “2005 Operations and Maintenance Activity Biennial Condition Report of Port

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4 Excerpts from Port Everglades website; http://www.broward.org/port/aboutus.htm
5 Marine fenders protect pier structures and ship hulls during docking.
6 Information obtained from Program Review Forms contained in 1/27/06 memorandum from the Office of Management and Budget Services to the Vice Mayor and Commissioners.
7 Information obtained from Operational Procedures of the Port Everglades Public Works Section, Memorandum dated 10/25/04.
Facilities” was completed by DeRose Design Consultants.\textsuperscript{8} The report offers a listing of each PE structure and its observed maintenance needs.\textsuperscript{9} Repairs are classified by area and priority (immediate, moderate and low). Photographs included in exhibits highlight the most immediate and significant concerns. The report also provides a detailed breakdown of estimated costs for the required repairs, which are in excess of $7.5 million,\textsuperscript{10} of which $4,352,689 were designated as immediate priority.

In April 2006, HPA\textsuperscript{11} completed an Underwater Inspection and Baseline Survey Assessment of Port Everglades, Berths 1-33. The resultant report provides detailed observations of the underwater conditions at Port Everglades. The report also identifies potential root causes of the maintenance concerns as well as suggested improvements and estimated costs to complete repairs ($215,000).

As demonstrated by both reports, maintenance concerns at Port Everglades are significant. This review examines PEFMO’s current processes and management of maintenance activities and offers recommendations for improvements. As Port Everglades serves as a center for trade and tourism in Broward County, ensuring the appropriate care and upkeep of its grounds and structures can provide both short and long term benefits to the County.

\textsuperscript{8} DeRose Design Consultants is the Bond Engineer for Port Everglades.

\textsuperscript{9} All of the Condition Report findings were based solely on visual, non-destructive observations at Port Everglades. Additional efforts to expose potential problems, in-depth testing, or evaluation were not within the scope of the services provided by DeRose Design Consultants.

\textsuperscript{10} DeRose Design Consultants, Inc. Cost Estimate 2005

\textsuperscript{11} DeRose Design Consultants, Inc. subcontracted the underwater inspection services to HPA.
Observations and Discussion

The following sections of this report provide detailed information regarding observations made during our review. As necessary, additional information is provided in referenced appendices.

1. PEFMO does not have a comprehensive routine and preventative maintenance program.

Our review revealed that PEFMO does not have a comprehensive routine and preventative maintenance program. Although PEFMO supervisors report performing some routine maintenance activities, the majority of maintenance work is completed on an 'emergency' basis. Staff is frequently called from one job in order to respond to another request. As a result, minimal attention is paid to preventative type maintenance work. While it is recognized that PE is a dynamic environment, the absence of a routine and preventative maintenance program has long term effects such as increased repair costs and reduced useful life of PE assets. A recent Organizational Analysis report of Broward County Construction and Planning Division also cited several instances of “poor or non-existent maintenance” work.

As part of this review process, our office completed an extensive tour of PE facilities. Appendix B, (page 13) contains a map of PE, noting the locations we visited. Also attached are digital images of PE locations where maintenance was found to be deficient. Our survey revealed the following conditions:

- Several poorly maintained buildings and equipment
- Unattended garbage was found piled and scattered
- Areas of spalled concrete with corroded and exposed rebar
- Dilapidated fences

Although research shows that 50-60% of total maintenance work is reactive, nearly all of PEFMO maintenance activities are reactionary in nature. As a result, routine maintenance is not scheduled and avoidable equipment failures occur. The absence of routine maintenance contributes to increased numbers of emergency repairs. This in turn continues to limit the section’s ability to take proactive steps which would reduce the numbers of emergency repairs. For example, roof top air conditioning systems and pier fendering systems would benefit greatly from comprehensive routine and preventative maintenance programs.

12 Staff comments regarding preventative maintenance activities vary; however, it appears that efforts are made on a limited basis to provide service to air-conditioning units, sanitary sewer lift stations, loading bridges, overhead doors, painting, roof drains and fleet vehicles.

13 This report was completed in the winter of 2005 by Connie Hoffman to provide an analysis of Seaport Construction and Planning Division; PE maintenance issues were also reviewed as a part of the 2005 analysis and as such, have been included in this report.

14 Spalling is a condition where the outer layers of masonry or concrete break off or flake away.

15 Rebar is the abbreviated term for reinforcing bars embedded in concrete that helps resist loads.

16 Excerpt from Maintenance Technology Online; www.mt-online.com
preventative maintenance programs. Likewise, regular exterior painting and protective surface coating would also extend the useful life of PE structures while improving the general appearance of Port grounds.

During our review we noted that the Operational Procedures of the Port Everglades Public Works Section (dated October 2004) briefly addresses the topic of ‘recurring maintenance’ for vehicles, construction equipment, air conditioners and sewage lift stations. While the policy acknowledges the need for routine maintenance, it does not adequately define the type of work to be completed. Without additional detail, it is unlikely PEFMO supervisory staff will effectively schedule required maintenance activities.

A well-defined maintenance program identifies the role of PEFMO staff as they identify, classify, plan, and schedule the work to ensure it is performed effectively. In basic terms, the maintenance program should prescribe what maintenance does, how it is done, who does what, when and why.

**Recommendations**

Our observations, coupled with the findings of the “2005 Operations and Maintenance Activity Biennial Condition Report of Port Facilities” indicate that immediate action should be taken to promote the longevity of buildings and structures within the entire Port. We recommend that the Board direct the County Administrator to:

Develop and implement a comprehensive routine and preventative maintenance program for PE facilities. This may be accomplished through the following actions:

- Establishing the level of maintenance effort for PE facilities and assets.
- Utilizing the information contained in the 2005 Condition Report of Port Facilities and this report, to identify and prioritize needed repairs to facilities.
- Implementing a CMMS system to assist in the scheduling, estimating and assignment of maintenance activities and allocation of resources (refer to Observation #2 on the following page).
- Developing an appropriate preventative maintenance schedule for PE facilities, as part of regular PEFMO staff activities.
- Ensuring staff accountability for preventative maintenance activities.

Additional recommendations made throughout this report will further assist PEFMO in expanding their ability to adopt a proactive maintenance schedule.

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17 Excerpt from Maintenance Technology Online; www.mt-online.com

18 Ibid
2. PEFMO has not utilized the available Computerized Maintenance Management System (CMMS) to track maintenance requests, activities and costs.

Although PEFMO has the Datastream MP2 Enterprise™ computerized maintenance management system (CMMS) since 1999, the application has not been consistently utilized. The system was designed to assist medium to large sized multi-site operations to organize and track inventory, manage equipment costs, track equipment history, schedule preventative maintenance tasks, generate and track work orders, and purchase and requisition inventory. The CMMS is Windows-based, and is advertised as requiring no prior computer experience for its use.\(^\text{19}\)

Although PEFMO Operational Procedures require that all work orders be generated through the CMMS, the system has not been consistently utilized by staff. Instead of employing the automated system, PEFMO staff typically creates and tracks work orders manually or through independent (non-integrated) software programs.\(^\text{20}\)

Currently, work order requests are accepted via telephone call, fax, or email. The requests can be made by tenants, Broward Sheriff’s Office (BSO), PE Property Management Staff, and PEFMO trade staff. The requests are forwarded to supervisory staff members who typically create manual work orders which are then posted by trade. Emergency repairs/work orders may be communicated via radio for quick responses. Work orders can also be developed by supervisors for repairs to correct safety hazards identified by inspecting fire departments and the maintenance/repair needs listed in the Biennial Facility Conditions Report.\(^\text{21}\) Regularly scheduled activities such as lawn maintenance are also dispatched through this manual work order system.

As the requested work is completed, the work order form is filled out by the trade supervisor and/or employee, who note the number of men and hours needed to complete the job. Materials used in the work are recorded with varying levels of consistency, often dependent upon whether or not required parts were readily available or needed to be purchased (refer to Observation #3, page 8 for additional discussion). Once a work order is finished, the paper copy is returned to the supervisor and filed.

PEFMO Operational Procedures also describe work orders as being assigned on a ‘first in, first out (FIFO)’ basis. However, with the increased utilization of automated maintenance management systems, this methodology can be enhanced. A CMMS can assist in the effective prioritization and scheduling of work orders based on a variety of factors including the nature of the request, estimated time to complete the work, availability of supplies and date the request was made.

\(^{19}\) Information about Datastream MP2 gathered from web page http://www.datastream.net/products/mp2.asp

\(^{20}\) Work orders may be created and tracked manually or through Word and Excel programs.

\(^{21}\) Operational Procedures also require that repairs identified in the Bi-Annual Assessment of Port Facilities and Hollywood and Fort Lauderdale Fire Department inspection reports be entered into the CMMS system.
Considering the volume of ongoing activity at PE, the poor condition of older structures and the critical nature of many repairs, a manual work order system is not capable of effectively managing the needs of this section. Without utilizing the system as intended, PEFMO is losing important functionality and historical data that would increase their overall effectiveness and efficiency. In fact, the value of a CMMS system was fully outlined in a 1998 report by Public Works to the Board. This report clearly defined the need for such a system and expounded upon the multiple uses and benefits it could provide.

A properly integrated CMMS is an essential operational and management tool that can assist staff in capturing and tracking inspection, maintenance and repair information. A CMMS can also facilitate the prioritization and scheduling of work orders, the collection of cost details for labor and materials and enables the analysis of maintenance trends.22

**Recommendations**

We recommend that the Board direct the County Administrator to:

Assess PEFMO’s automation needs and create a plan to fully utilize and integrate a CMMS system as a regular part of their routine and preventative maintenance program. This may be accomplished through:

- Analyzing current system capabilities.
- Exploring options for integrating CMMS with existing County property management programs.
- Developing comprehensive CMMS policies and procedures that complement PE maintenance activities.
- Providing CMMS terminals at appropriate and accessible work locations.
- Educating and training PEFMO staff.
- Tagging all assets and inputting baseline data on equipment, routine services, and prioritized repairs from facility reports.
- Requiring PEFMO staff accountability for the use of CMMS.

3. **PEFMO does not have sufficient internal controls to properly track the purchase, storage, issuance and utilization of maintenance materials.**

Our review revealed inadequate and inconsistently applied internal controls in PEFMO inventory management. PEFMO responsibilities currently include the management and oversight of multiple warehouses which typically stock the majority of parts, tools and materials utilized by maintenance staff. Materials and supplies represent a significant part of the PEFMO’s overall operating expenses, totaling $1.6 million, or 46% of the budget.23 Maintenance supplies and materials are stored in several scattered sites

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22 Information gathered from Maintenance Technology Online; www.mt-online.com

23 Total FY06 approved budget for other Operating Expenses (not including personnel) is $3,465,100.
throughout the Port, increasing PEFMO’s challenges in maintaining a sufficient system of controls.

Warehouse personnel maintain their own inventory records and order new supplies as needed based on anticipated usage patterns. PEFMO staff requesting supplies from the warehouses are required to ‘sign out’ materials. Maintenance staff is also issued commonly used tools and parts that are stored in their vehicles. These parts are referred to as ‘truck stock’.

Warehouse and truck stock are not routinely reconciled with work orders and material invoices. Although staff is required to list material usage on the work order form, materials are charged to individual jobs with varying degrees of consistency. Incomplete charges to work orders is problematic as some of these material expenses can be recovered through charges to lessees (refer to Observation #4, page 10 for additional discussion).

Due to the varied nature of the work performed and equipment used, the materials necessary to complete assigned jobs are not always readily available through warehouse stores. In these instances, warehouse personnel may order the needed part from a supplier; however, in many cases, staff obtains the supplies themselves from sources such as local vendors, catalog suppliers/distributors, mobile tool sales, or online auction services using a procurement card (P-card).

Although the P-card purchases are approved by supervisors and subject to standard County limitations, the items purchased are not consistently tracked. For example, tools purchased through the warehouse are inventoried and engraved as County property; however, tools purchased via P-card may directly become part of the individual’s ‘truck stock’ without being properly recorded. Likewise, parts or supplies purchased with a P-card or used from available ‘truck stock’ may not be charged to the applicable work order.

Inventory controls are a key part of any maintenance and repair operation. Without the proper materials, work orders cannot be completed and overall operations may be affected. Maintaining proper inventory improves staff productivity through the avoidance of ‘down time’ that may be spent searching for needed supplies and/or leaving the jobsite to obtain required materials. Ensuring that regularly utilized materials are readily available through in stock stores is the primary responsibility of warehouse personnel. It is generally recognized that not every part for every piece of equipment can be kept in storage; in these instances warehouse staff should be able to readily order parts from suppliers and have them delivered in an expedient manner. Anticipating and preparing for these material needs improves the efficiency of the entire maintenance operation.

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24 Section 21.15 of the Broward County Code of Ordinances defines the authority of the Purchasing Director regarding the administration of the Purchasing Card program.

25 This is often referred to in maintenance literature as a ‘just in time methodology’.
Tracking the distribution and return of supplies is also a fundamentally critical part of inventory control. A comprehensive CMMS can play an essential role in helping to manage all aspects of the inventory system. Parts used to repair facilities and equipment should be charged to the appropriate work order. Materials not consumed should be returned to a centralized location, available for future use as well as preventing excessive ordering of parts already in stock. Tools distributed to staff for daily or occasional/specialty use should be tracked and returned to storage as applicable. Broken or misplaced items should be reported. As appropriate, tools and equipment should be cataloged and clearly labeled as County property to avoid the appearance of impropriety.

**Recommendations**

We recommend that the Board direct the County Administrator to:

1. Implement comprehensive inventory controls at PE including appropriate tracking, labeling and charging of materials to appropriate work orders.
2. Explore use of integrating inventory tracking with a CMMS bar code system.

### 4. PEFMO does not have appropriate procedures to address maintenance repairs for tenant occupied buildings.

PE conducts much of its business through the use of leasing and vendor agreements with cruise and shipping lines. Leased spaces include warehouses, office spaces and other buildings. All other port business is governed by the use of tariffs. At PE, tariffs are utilized to regulate user charges and fees for Port services, including the use of berth space for docking ships. In both instances, controls and remedies are provided for the care and maintenance of PE owned property and facilities as described below.

The upkeep and maintenance of leased areas is addressed within the standard PE lease agreements for buildings and office space. Sections 12 of these agreements state that the maintenance and upkeep of the premises is the responsibility of the Lessee, including damages due to the acts or negligence of the Lessees or its’ representatives. The language also provides the Lessor the ability to make such repairs to the property at the expense of Lessee.

PE Tariff #232, Damage to Port Everglades Property requires the immediate reporting of damages to PE facilities. Dependent upon the circumstances, “users shall, at Broward County’s option, either repair said damage to Broward County’s satisfaction or reimburse the Broward County for expenses and costs incurred in correcting same”.

Tariff #235, Cleanliness of Premises requires that “users of PE property and/or facilities shall be responsible for maintaining the property and/or facilities assigned to them in a clean and orderly manner to the satisfaction of Port Everglades”. The tariff goes on to

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26 Information gathered from sample lease agreements provided by PE Business Administration Division; Broward County and Worldwide Shore Services, Inc. and Broward County and Eller & Company.
state that “Port Everglades reserves the right to do any required cleaning with its own personnel and charges the user at rates specified in Item 745”.27

PE maintenance supervisors report that maintenance repairs and garbage removal services are often provided to Lessees and/or docking ships without charging them for the services rendered. Staff noted that garbage has often been left on pier berths by departing ships, and it falls upon PEFMO to remove the debris. Occasionally, the circumstances are reported to PE Business Administration for appropriate action in identifying the offenders, but often the clean up is completed without charging the responsible parties. In other instances, Lessees may request that PEFMO tend to maintenance needs which are the Lessee’s responsibility. Typically, work order requests are received by PEFMO, and staff is dispatched to remedy the complaints without an initial determination of responsibility. As a result, the costs for such services are not charged to the Lessee.

Failure to recover these costs results in a loss of revenue for PE. Additionally, PEFMO staff is spending time and materials performing tasks that may not be their responsibility while other tasks such as routine and preventative maintenance are not being completed. This reallocation of resources results in increased expense and liability for the County. Work orders should be developed in a manner which clearly identifies the funding sources, and charges should be recovered as applicable.

This is another instance where a comprehensive CMMS can be beneficial. An automated system can help identify if the property to be repaired is leased to another entity and whether or not the requested services are covered by a leasing or tariff agreement. Once the repair is completed, the work order should properly reflect the work effort as well as costs of supplies and materials used. This information would serve as a basis for developing the job cost that would then be billed to the appropriate party.

**Recommendations**

We recommend that the Board direct the County Administrator to:

- Ensure that work orders for tenant occupied building are created identifying the responsible party and scope of work.
- Ensure that PE Lessees and docking ships are charged for maintenance services as applicable.

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27 Tariff item #745, Schedule of Labor Rates and Equipment Charges describes and establishes various charges for PE supplied labor and equipment as well as a 15% overhead and administrative charge to reimburse PE for additional associated costs.
Appendix B
Appendix B (continued)

1 - Torn canopy, broken windows and damaged concrete – Building #16

2 - Close-up of rust damage on passenger loading bridge – Terminal #24 (scheduled for demolition)

3 - Close-up of stucco damage on Terminal #21 – Bus parking

4 - Close-up of rust damage on footbridge between Terminals #25 and #26
Appendix B (continued)

5 - Close-up of rust damage on footbridge between Terminals #25 and #26

6 - Damaged bollards in front of SOC exposing re-bar

7 - Close-up of rusted bollards - Midport

8 – Exterior of Building #28A
Appendix B (continued)

9 - Close-up of damaged overhead door – Building #29

10 - Close-up of building damage – Building #29

11 - Close-up of damaged seawall and rusted re-bar in Berth 30 Southport

12 - Rusted fencing in Berth 30 Southport
13 - Damaged fencing and debris

14 - Damaged gate

15 - Exposed re-bar in Berth #33 A and B

16 - Damage to seawall in Berth #33 A and B