



Pinellas County

315 Court Street, 5th Floor
Assembly Room
Clearwater, Florida 33756

Staff Report

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Subject:

Division of Inspector General, Clerk of the Circuit Court and Comptroller, Report No. 2015-35 dated October 15, 2015 - Audit of Pinellas County GIS (Geographic Information Systems) Infrastructure Construction Water and Sewer Information.

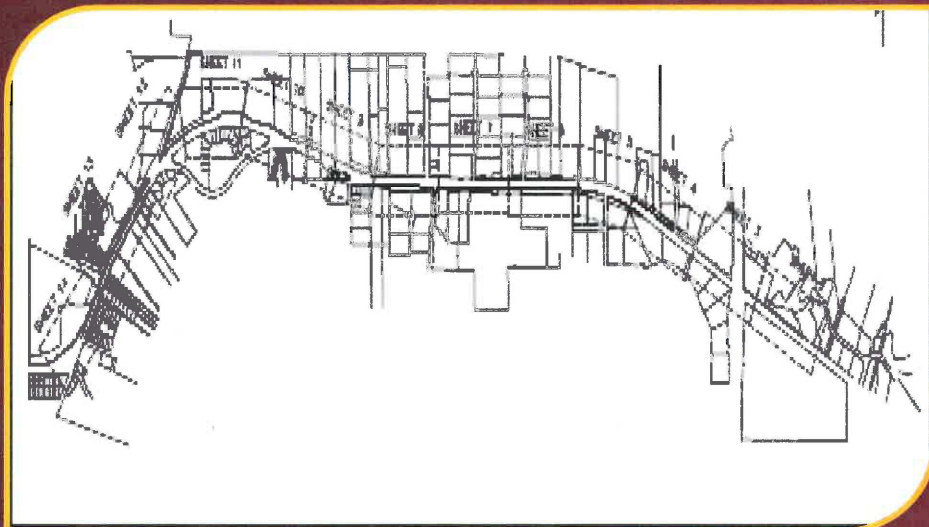
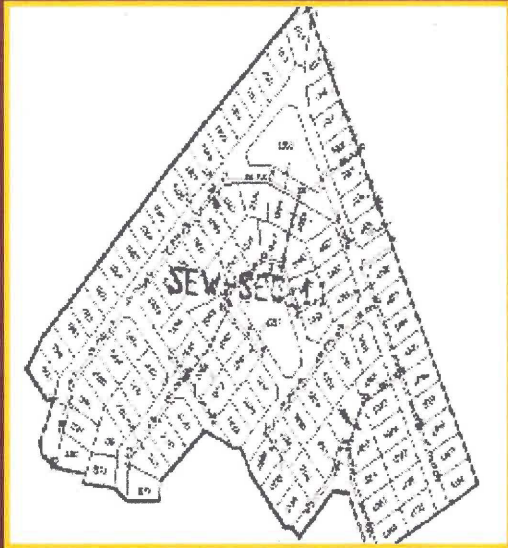


DIVISION OF INSPECTOR GENERAL

KEN BURKE, CPA

**CLERK OF THE CIRCUIT COURT AND COMPTROLLER
PINELLAS COUNTY, FLORIDA**

AUDIT OF PINELLAS COUNTY GIS INFRASTRUCTURE CONSTRUCTION WATER AND SEWER INFORMATION



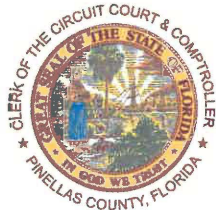
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**OCTOBER 15, 2015
REPORT NO. 2015-35**



Ken Burke, CPA

CLERK OF THE CIRCUIT COURT AND COMPTROLLER
PINELLAS COUNTY, FLORIDA

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October 15, 2015

The Honorable Chairman and Members of the Board of County Commissioners

We have conducted an audit of the Pinellas County GIS (Geographic Information Systems) Infrastructure Construction Water and Sewer Information.

Our audit objectives were to:

- Evaluate the ability of the Utilities GIS unit to supply GIS service to utility users.
- Determine if the policies and procedures for the Utilities GIS function are adequate to assure the Munsys GIS Utility Layer is current and accurate.
- Determine the ability of the Utilities GIS unit to recover the data to update the Munsys GIS Utility Layer.
- Evaluate the BTS plan for application updates to assure it supports the Utilities GIS unit operations.

We conclude that:

- The Munsys GIS Utility Layer (Geographic layer containing Utilities infrastructure information present in the Munsys GIS current application) is up and running, but the data may not be current. The County Enterprise Geographic Information Systems (eGIS) Project (eGIS Project), to upgrade the application, is in the development stage. The Munsys GIS Utility Layer has not been updated since 2012. The Utilities Department's use of the Munsys GIS Utility Layer may be limited in areas where projects have affected the infrastructure areas.
- There are no operational policies and procedures for updating the eGIS Utility Layer (Layer for new GIS application currently being installed). The procedures were impacted by the major changes in the Utilities business process and responsibilities. The procedure issue will also impact the eGIS Project resulting in procedures that will need to be created rather than updated. We could not determine what data is available from completed projects to update the Munsys GIS Utility Layer. As-Built drawings for some completed projects may not be available.



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- The County eGIS Project Plans (New GIS application currently being installed) do not contain the level of detail to support the Utilities GIS unit for scheduling personnel for delivery of the unit's support for the project. A sub-plan is currently being developed by BTS and Utilities.

Opportunities for Improvement are presented in this report.

We appreciate the cooperation shown by the staff of the Pinellas County GIS Infrastructure Construction Water and Sewer Information during the course of this review. We commend management for their responses to our recommendations.

Respectfully Submitted,

A handwritten signature in blue ink, appearing to read 'H. Collazo', with a long horizontal flourish extending to the right.

Hector Collazo Jr.
Inspector General/Chief Audit Executive

Approved:

A handwritten signature in blue ink, appearing to read 'Ken Burke', with a long horizontal flourish extending to the right.

Ken Burke, CPA*
Clerk of the Circuit Court and Comptroller
Ex Officio County Auditor

*Regulated by the State of Florida

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INTRODUCTION

Synopsis

The Munsys GIS Utility Layer (Geographic layer containing Utilities infrastructure information present in the Munsys GIS current application) has not been updated since 2012. The information and data for past completed projects may not be available to update the layer. The County Enterprise Geographic Information System (eGIS) Project (New GIS application currently being installed) to upgrade the Geographic Information System (GIS) application is in the development stage.

Scope and Methodology

We have conducted an audit of the County GIS process covering the utility layer and the upgrade/implementation of the eGIS application. Our audit covered an evaluation of the related internal controls, the procedures controlling the related processes, and the timeliness of the data used to update the application layer.

The GIS System is an enterprise level application utilized by multi-county departments, municipalities, other elected official offices, and the public. Our audit scope was limited to the Utilities Layer that is affected by County infrastructure information.

In order to meet the objectives of the audit, we have:

- Interviewed the Utilities GIS Management teams, the Business Technology Service (BTS) GIS Database Manager, and the GIS Project Manager to understand the processes/procedures, internal controls, and application conversion status for the GIS application.
- Reviewed the current GIS project plan related to the eGIS Utility Layer (Layer for new GIS application currently being installed) and its ability to support the timely implementation of the application release.
- Evaluated the ability of the Munsys GIS Utility Layer function to maintain the services to support the Utilities operation requirements.

The objectives of our audit were to:

- Evaluate the ability of the Utilities GIS unit to supply GIS service to the Utilities users.
- Determine if the policies and procedures for the Utilities GIS function are adequate to assure the Munsys GIS Utility Layer is current and accurate.

- Determine the ability of the Utilities GIS unit to recover the data to update the Munsys Utility GIS Layer.
- Evaluate the BTS plan for the application update to assure it supports the Utilities GIS unit operations.

Our audit was conducted in accordance with the *International Standards for the Professional Practice of Internal Auditing* and the *Principles and Standards for Offices of Inspector General*, and accordingly, included such tests of records and other auditing procedures, as we considered necessary in the circumstances. The audit period was October 1, 2014 to May 30, 2015. However, transactions and processes reviewed were not limited by the audit period.

Overall Conclusion

The Munsys GIS Utility Layer is up and running, but the data may not be current. The County Enterprise Geographic System (eGIS) Project to upgrade the application is in the development stage. The Munsys GIS Utility Layer has not been updated since 2012. The Utilities Department's use of the utility layer may be limited in areas where projects have affected the infrastructure areas.

There are no operational policies and procedures for updating the eGIS Utility Layer. The procedures were impacted by the major changes in the Utilities business process and responsibilities. The procedure issue will also impact the eGIS Project, and procedures will need to be created rather than updated. We could not determine what data is available from completed projects to update the Munsys GIS Utility Layer. The As-Built drawing for some completed projects may not be available.

The plans for the County eGIS Project do not contain the level of detail to support the Utilities GIS unit for scheduling personnel for delivery of the unit's support for the project. A sub-plan is currently being developed by BTS and Utilities.

Action Plan

| FINDING NO. | FINDING (CAPTION) RECOMMENDATIONS | MANAGEMENT RESPONSES | | | IMPLEMENTATION STATUS | |
|-------------|--|----------------------|------------------|---------------|-----------------------|---------|
| | | Concur | Partially Concur | Do Not Concur | In Progress | Planned |
| 1. | <i>Policies and Procedures Were Not In Place To Support The Munsys System Data Update For The Munsys GIS Utility Layer.</i> | | | | | |
| | A. Develop and implement a clearly written manual readily available to all departments. | | ✓ | | | ✓ |

| FINDING NO. | FINDING (CAPTION) RECOMMENDATIONS | MANAGEMENT RESPONSES | | | IMPLEMENTATION STATUS | |
|-------------|--|----------------------|------------------|---------------|-----------------------|---------|
| | | Concur | Partially Concur | Do Not Concur | In Progress | Planned |
| | <p>B. Written Policies and Procedures should, at a minimum, include:</p> <ol style="list-style-type: none"> 1. Policies for each major department responsibility with corresponding procedures that list the instructions, step-by-step, on how to complete the related job tasks. All examples, reports, or forms mentioned in the procedures should be included in the manual as exhibits. 2. A requirement that reviews, verifications, and approvals be documented to ensure data reliability. Each person involved in the process flow for updating eGIS data needs to be accountable for the information's accuracy and completeness. 3. Standard methods to correct errors, including the uniformity of notations and forms to be used, such as corrections on drawings or equipment size specifications. 4. Samples of unusual or past problems and their solutions. This information would decrease the amount of research time needed to investigate and resolve similar current problems. 5. An individual assigned responsibility for updating the manual and distributing the changes. | | ✓ | | | ✓ |

Introduction

Pinellas County GIS Infrastructure Construction Water And Sewer Information

| FINDING NO. | FINDING (CAPTION) RECOMMENDATIONS | MANAGEMENT RESPONSES | | | IMPLEMENTATION STATUS | |
|-------------|--|----------------------|------------------|---------------|-----------------------|---------|
| | | Concur | Partially Concur | Do Not Concur | In Progress | Planned |
| 2. | <i>The Data To Update The New eGIS Application, GIS Utility Layer When Implemented, Is Not Available In An Organized Structure To Assure The Utility Layer Will Be Current.</i> | | | | | |
| | Develop and implement a plan for bringing Water and Sewer Information map data current. The plan should be based and included in their policies and procedures for capturing As-Built information. | | ✓ | | | ✓ |
| 3. | <i>A Sub-Level Project Plan Is Needed For The eGIS Project To Support Development And Implementation Of The eGIS Utility Layer.</i> | | | | | |
| | Continue to partner with BTS to develop a project plan for the eGIS Water and Sewer Information System at the sub-project level showing what is needed to make the system operational. | | ✓ | | ✓ | |

Background

GOVERNANCE

The Business Technology Services Board (BTS Board) established the Enterprise Geographic GIS Steering Committee (Executive Committee) in June 2010. The primary mission of this committee is to process and assess information, develop a plan to provide GIS services at an enterprise level, and make recommendations to appropriate entities, constitutional officers, appointing authorities, and the Board of County Commissioners (BCC). The GIS service initiative was named Enterprise Geographic Information System (eGIS).

The Executive Committee will oversee the establishment and adoption of eGIS Project policies, procedures and standards. The Executive Committee will also review, approve, prioritize and obtain funding for all Pinellas County GIS initiatives including any GIS application development activities and the purchase of GIS technology, data, and consulting services. The Executive Committee will be responsible for:

- Ensuring that GIS solutions are implemented when required to support legislative mandated requirements.
- Improve efficiency to enhance the accountability of our business.
- Provide more effective delivery of services to our internal users.
- Provide more effective delivery of services to our external customers and citizens.

Initially, the tasks will be prioritized by the Executive Committee based on the factors of quality, business understanding, and effective cost management. Geospatial data-management is one of the essential components for addressing the management of the business of government, and for supporting the effective and economical use of tax dollars.

In May 2014, Pinellas County eGIS Project staff began migrating legacy spatial applications and databases into its eGIS Project environment, and leveraging the local government data model and associated applications. At the same time, the Steering Committee and Working Group have been formed as part of the County's governance process. These groups are chartered with the formation and prioritization of all eGIS projects and initiatives, and fostering high level communication between internal and external stakeholders. The development of a centralized, enterprise-wide GIS database through a well-established governance process is part of Pinellas County's strategic technology plan.

BTS is still in the process of moving from the legacy Munsys System to eGIS. One of the major tasks is to develop the new application interface, which will allow the user staff to view account, work order, and Utilities infrastructure data for each customer through a new mapping interface.

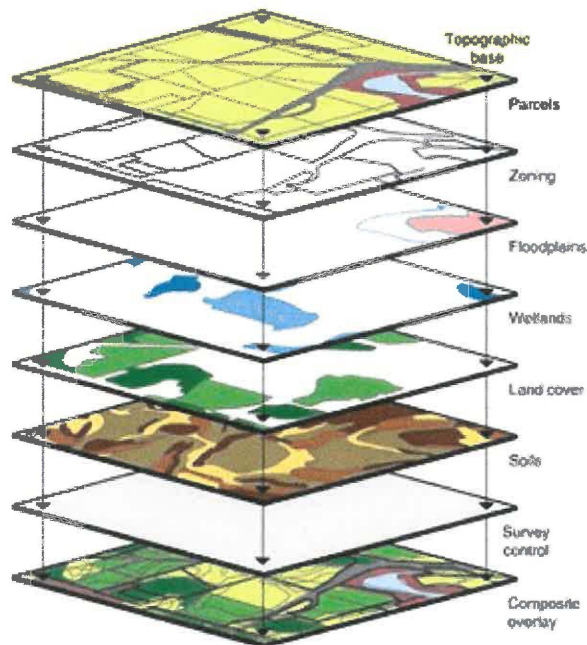
At the time of completing our audit fieldwork in May 2015, the Water and Sewer Information System was not yet operational for eGIS. The anticipated date of the project completion has

not yet been revised from June 1, 2015. The scope of this audit only includes the Utilities level of the GIS application.

GEOGRAPHIC INFORMATION SYSTEMS INFORMATION

At the simplest level, GIS can be thought of as a high-tech equivalent of a map. The key word to this technology is Geography. This usually means that the data is spatial (data that is in some way referenced to locations on the earth).

GIS stores and manages information as a collection of layers linked together through geographic references.



In addition to the Infrastructure information, the Pinellas County GIS Data Sets are:

| | | |
|----------------------------|-------------------------|---------------------------|
| Parcels | Congressional Districts | Commission Districts |
| Roads | EMS (911) Grid | Soils |
| Municipal Boundaries | Fire Districts | Street Lighting Districts |
| County FEMA (Flood Maps) | Homeowner Associations | Traffic Analysis Zones |
| Pinellas County Boundary | House Districts | Zip Codes |
| 2000 Census Tracts | Marquis Pinellas Trail | Voter Precincts |
| Annexation Planning Areas | Pinellas County Schools | Basins |
| Large Commission Districts | Section Grid | County Senate Districts |

OPPORTUNITIES FOR IMPROVEMENT

Our audit disclosed certain policies, procedures, and practices that could be improved. Our audit was neither designed nor intended to be a detailed study of every relevant system, procedure, or transaction. Accordingly, the Opportunities for Improvement presented in this report may not be all-inclusive of areas where improvement may be needed.

1. Policies and Procedures Were Not In Place To Support The Munsys System Data Update For The Munsys GIS Utility Layer.

There are no written policies and procedures in place and operational for updating Water and Sewer Information for the Munsys GIS Utility Layer for the Munsys application. In addition, over the past few years, even procedures for receiving As-Built drawings (Final Engineers and Surveyors drawings for the project) have not been operational.

Since there are no current policies and procedures based on the business process, when the new County eGIS Project application becomes operational for water, sewer, and reclaimed water lines, policies and procedures will need to be created rather than just modified.

The eGIS Steering Committee has issued a two page Policies and Standards document that touches on passwords and security, importing and sharing data for the eGIS database, and ArcGIS (online data entry Application). However, the eGIS Steering Committee policies do not address Water and Sewer responsibilities to update eGIS with As-Built information.

In the Fieldwork Exit Meeting with the Utilities GIS unit management, they expressed concerns that the pending additional changes in business structure and staff responsibilities within the unit may impact the ability to develop and deliver new procedures for the Utilities GIS process.

The department reorganizations were cited as the reason that the business process for capturing As-Built information in the Munsys GIS Utility Layer seemed to stop. The utility layer business process in the past received the As-Built information from Internal Design Projects, Consulting Designed Projects, and other projects from Engineering and Technical Support).

The reorganization and changes in the business process had a major impact. Utilities and Public Works engineering functions were combined in 2010. The reorganization affected the submitting of As-Built drawings.

In 2014, the Department of Environment and Infrastructure (DEI) was reorganized into the Public Works Department, Utilities Department, Office of Business Support, and Engineering and Technical Support, under which the Utilities GIS unit now reports. The changes may impact the flow of the GIS project data update process.

Without functioning policies and procedures for the Utilities GIS process, the Munsys GIS Utility Layer database has not been updated. Management confirmed that the layer was not updated for the required project since 2012.

Current policies and procedures for the Utilities GIS process are a requirement to assure that the appropriate project data is updated to the Munsys GIS Utility Layer. The source of the information, such as the proper name/number of the form, certificate, or report, is needed.

We recommend management:

A. Develop and implement a clearly written manual readily available to all departments.

B. Written policies and procedures should, at a minimum, include:

1. Policies for each major department responsibility with corresponding procedures that list the instructions, step-by-step, on how to complete the related job tasks. All examples, reports, or forms mentioned in the procedures should be included in the manual as exhibits.
2. A requirement that reviews, verifications, and approvals be documented to ensure data reliability. Each person involved in the process flow for updating eGIS data needs to be accountable for the information's accuracy and completeness.
3. Standard methods to correct errors, including the uniformity of notations and forms to be used, such as corrections on drawings or equipment size specifications.
4. Samples of unusual or past problems and their solutions. This information would decrease the amount of research time needed to investigate and resolve similar current problems.
5. An individual assigned responsibility for updating the manual and distributing the changes.

Management Responses:

Partially Concur. Management concurs that there were some disconnects in providing information to update the Munsys GIS due to the reorganization; however, the system was never compromised to the point of having inaccuracies that would impact operations. To address this recommendation and to avoid similar situations in the future, a process workflow will be developed, which will identify the responsibility for each work unit as well as the proper flow of information.

2. The Data To Update The New eGIS Application, GIS Utility Layer When Implemented, Is Not Available In An Organized Structure To Assure The eGIS Utility Layer Will Be Current.

The Utilities GIS unit has not maintained information and data that is needed to update the Munsys GIS Utility Layer. However, the As-Built drawing for some completed projects may be available, such as the Keystone Project. In addition, management did not maintain a list of completed projects that require GIS updates, which were not completed. Based on our analysis, Utilities did not have a process in place to:

- A. Determine what projects would generate the requirement to update the Munsys GIS Utility Layer.
- B. Maintain the date/information needed to update the Munsys GIS Utility Layer (i.e., As-Built drawings).
- C. Review the project data for errors or additional information required.

Based on our analysis, the main cause of not properly maintaining project update data and information was the reorganization that left a gap in the assignment of responsibility of the Utilities Department deliverables. A secondary cause was the lack of policies and procedures noted in Opportunity for Improvement No. 1.

The Munsys GIS Utility Layer database has not been updated for the past few years. Staff stated that the updates stopped in approximately 2012. The impact of the update issue on operational use of the Munsys GIS Utility Layer has not been defined. The completed projects have to be reviewed to determine update requirements associated with the changes resulting from the replacement and relocation of infrastructure.

The Utilities GIS unit should assure that the data and information from completed projects are available to update the Munsys GIS Utility Layer.

We recommend management:

Develop and implement a plan for bringing Water and Sewer Information map data current. The plan should be based and included in their policies and procedures for capturing As-Built information.

Management Responses:

Partially Concur. While there has been a lapse in updating the Munsys GIS Utility Layer with some of the As-Built information due to reorganization and workload issues, the three

individuals working on the Utilities GIS have provided numerous updates and corrections to the system. In addition, they have been preparing the data for the migration from the Munsys GIS to the new ESRI eGIS platform. This endeavor has required a tremendous amount of effort and coordination between both the Engineering GIS staff and the BTS GIS staff. As the Engineering GIS staff merges with BTS on October 1, 2015, an internal evaluation of the Utilities GIS infrastructure data and the workflows that govern the management of this information will be undertaken by BTS to address this recommendation.

Inspector General Comments:

Management's response that *"individuals working on the Utilities GIS have provided numerous updates and corrections to the system"* was not supported during the audit process. During meetings with GIS Utilities staff, they repeatedly stated, *"Updates stopped in approximately 2012."* We did request GIS Utilities to provide documentation related to the updates, but since updates stopped during 2012, they could not provide the requested documentation.

3. A Sub-Level Project Plan Is Needed For The eGIS Project To Support Development And Implementation Of The eGIS Utility Layer.

The overall eGIS Project Plan (Plan) does not contain the sub-project information necessary to plan the allocation of resources to bring the eGIS Water and Sewer Information layer operational. The Plan, following the Agile Scrum methodology (Software Development Life Cycle), does not have a formal written project plan. The tasks are developed in six-month time frames. BTS is performing the overall project management under PMBOK (a system project building process used by BTS) through Clarity (on-line project tracking software used by BTS) by task.

A sub-project plan would allow the user (Utilities GIS unit) to see how the completion of the sub-projects in each six-month release contributes to the final implementation for the eGIS Utility Layer. The sub-project plan is needed for the Utilities GIS unit to schedule their personnel to help with the deliverables they would be involved in, such as data conversion verification, user acceptance testing, training, and implementation. The Utilities GIS unit also has their department responsibilities to accomplish, particularly implementing the policies and procedures and catching up on the backlog of As-Built drawings.

The Utilities GIS unit has been meeting with the BTS eGIS project team to obtain the additional information for the sub-project plan. The additional information will be updated and shared by both parties.

The BTS Project Management processes for the overall eGIS Project provides a suitable model. However, the Utilities GIS unit does not see a project plan and schedule that when finished will have Water and Sewer Information map layers that they can update, view, and share. Currently, there is no stated date when Utilities will be able to use their layer.

The project plan needs to be at sufficient levels to permit the layer level users adequate information to support the project in a timely manner. In addition, the eGIS Project stated that the need for department plans be communicated so that anticipated tasks can be completed for their section of the project.

We recommend management:

Continue to partner with BTS to develop a project plan for the eGIS Water and Sewer Information System at the sub-project level showing what is needed to make the system operational.

Management Responses:

Partially Concur. While migrating to a new software platform inevitably has its challenges, BTS has worked closely with Engineering GIS staff to address issues during the conversion process. The success of the methodology employed by BTS will be realized in mid-October 2015 when the final migration of data to the ESRI eGIS platform is completed. Since the Munsys GIS will be obsolete by the time this report is published, no further action is necessary for this recommendation.



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