PAPER 14

IMPORTANCE OF COMPLIANT MUNICIPAL ASSET REGISTERS AND IMPROVEMENTS WITH THE AID OF GIS APPLICATIONS

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ABSTRACT

In terms of the Municipal Financial Management Act (Section 63) a municipality should have an up-to- date and complete asset register. The Municipal Manager should ensure that the provisions in terms of specific duties of Asset Management (safeguarding, Maintaining, internal controls, register) are implemented. Failure to account for these assets accurately leads to unaccounted assets and misleading information on the capital value of assets which raises non-compliant audits of a municipality by the Auditor General.

A further drawback is the often-non-existing visual information of the type and condition of the asset. The information is either non-existent or it is in a photo folder without any geographic reference or link to the asset. This in turn makes it very difficult to have a complete and up-to-date asset register and a historical record of the asset condition and functionality.

In view of the above it is proposed that a GIS based software application be used to assist the asset manager and municipal official to obtain both numerical and as well as visual information of all assets in an efficient manner. The GIS application is part of the ESRI ArcGIS software which is widely used by most municipalities to manage and store all municipal infrastructure and assets in a digital format. The GIS application allows the field inspector to capture both the condition as well as type and locality of the asset in a geo-database.

The geo-database has links to every photo taken of the asset and hence makes it very easy to on a virtual basis inspect all asset components with a geo-referenced and linked photo of the asset. An interface was then developed between the geo-database and the SAP (System, Applications and Products) proprietary software developed by a German company, (SAP AG) which is used by most municipalities for their accounting and asset registers used by most municipalities.

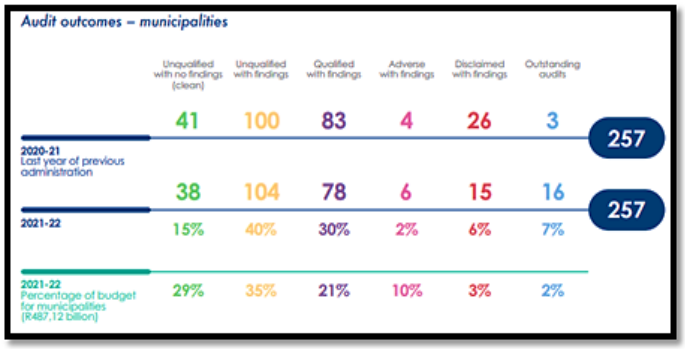

FIGURE 1: *Auditor General Report Outcomes (The Auditor General (AG) reported-MFMA report 2022/23)*

This paper presents a case study on how the above GIS based approach can assist in obtaining and capturing field data of the assets in an efficient manner for easy visualisation and integration with the SAP system at a municipality.

1. INTRODUCTION AND BACKGROUND

It was reported that out of 257 municipalities, only 38 (15%) received a clean audit as shown on Figure 1 below.

Combining the outcomes from previous reports, we have established and confirmed the trending downward outcomes as graphically shown on Figure 2 below.

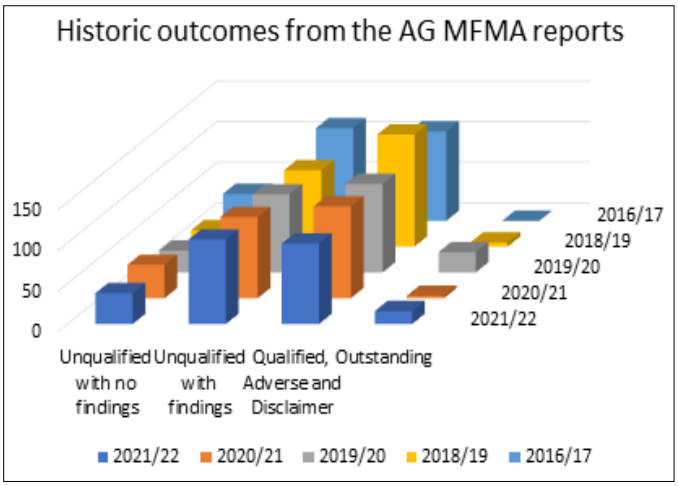

FIGURE 2: *Auditor General Report trends (Adopted from the Auditor General (AG) reported-MFMA report 2022/23)*

If the trend continues, we will not be able to recover unless steps and measures are put into place rather sooner than later.

The intent of this paper is to make the reader aware of the current state of asset registers of municipalities, the importance of having a up-to-date register and how a GIS application can assist is capturing and validating assets in an efficient manner and integration with the SAP thereby having a up-to-date and credible asset register. In a simple short statement, it is getting the basics right.

2. ASSET MANAGEMENT 101

Asset Management and an up-to-date asset register is important for any municipality to ensure that all existing assets are taken care off and maintained so as to sustain and improve service delivery .The adoption and institutionalisation of good asset management practises enables the municipality to function optimally and reduce expenditure. Asset Management covers aspect of planning, asset information, project execution, maintaining, disposing all supported by strategies and plans (Asset Master Plans and Maintenance plans).

In view of the above having an up-to-date asset register is fundamental for a well-functioning and financially viable municipality. This assists a municipality in obtaining grant and donor funding, proactive budgeting for maintenance of assets as well as having an accurate measure of its capital asset value.

Asset Management is an international and national standard (ISO 55000, ISO 55001, ISO 55002, SANS 55000, SANS 55001 and SANS 55002). The standard helps an organisation understand the need for asset management practices and provides the framework for implementation. The typical asset management lifecycle is shown on Figure 3 below.

FIGURE 3: *Typical asset management life cycle (Generally recognised Accounting Practice (GRAP) Standards, 2022)*

While most organisation focus on the lifecycle delivery wheel, it is underpinned by asset information. If we fail in this regard, we threaten the collapse of the lifecycle delivery cycle.

The asset information we are looking for consists mainly of what asset and types we have, to know where they are located and what condition they are in after all, we can only manage what we know!

3. IMPORTANCE OF GETTING THE BASICS RIGHT

By knowing what assets a municipality has and their conditions, a municipality can better plan and budget for maintenance activities. In knowing where the assets are, a municipality can better respond to faults and repairs.

A further benefit is the improved service delivery by being able to respond quicker and more efficiently to faults. Maintenance costs can be linked to assets allowing a municipality over time to move from Non-tactical to Tactical maintenance strategies.

A municipality is governed by the Municipal Systems Act, 2000 (Act No. 32 of 2000) (Systems Act), the Municipal Finance Management Act, 2003 (Act No. 56 of 2003) (MFMA), the financial reporting standards which are Generally Recognised Accounting Practices (GRAP) and Municipal Standard Charts of Accounts (mSCOA). Underlying this all is the constitutional right to provide services to the citizens. A brief overview of the main legal and compliance requirements is given below.

3.1 The Systems Act

The Systems Act is a legislation that sets out the framework for the governance and administration of municipalities in the country. The act provides guidelines and regulations that municipalities must follow in order to promote good governance, transparency, and accountability.

There are six (6) key provisions of the Systems Act which are:

» Municipal Systems
» Structures and Functions
» Municipal Planning
» Financial Management
» Municipal Oversight
» Performance Management

The Systems Act also outlines asset management practices that should be in place. These are:

» Asset Management Plans
» Asset Registers
» Accounting for Assets
» Asset Verification
» Asset Management Systems

The typical framework and organisational strategic plan is shown in Figure 4 below.

FIGURE 4: *Organisational Strategic Plan (Generally recognised Accounting Practice (GRAP) Standards, 2022)*

3.2 The MFMA

The MFMA is a key legislation that governs financial management in municipalities across the country. The purpose of the MFMA is to promote sound financial management and ensure transparency, accountability, and good governance in municipal finance.

There are seven (7) key provisions of the MFMA which are:

» Financial Management Framework.
» Budgeting.
» Financial Reporting and Auditing.
» Supply Chain Management.
» Internal Controls and Risk Management.
» Municipal Borrowing and Investment.
» Financial Accountability and Oversight.

The MFMA also references to asset management specifically in the following sections:

» Section 14: Accounting System and Financial Records
  • This section requires municipalities to establish and maintain an accounting system and financial records that accurately reflect the financial transactions and position of the municipality. These records would include information related to assets, liabilities, revenues, and expenses.
» Section 15: Asset Management
  • This section stipulates that municipalities must establish and maintain an asset management system, which includes keeping records of their assets. The system should enable municipalities to account for and manage their assets effectively.
» Section 16: Asset Register
  • The MFMA requires municipalities to establish and maintain an asset

register, which is a comprehensive record of the municipality's assets. The asset register should include information such as the description, location, condition, and value of each asset.

» Section 17: Accounting for Assets
  - This section mandates municipalities to account for their assets in accordance with generally recognized accounting practice. It includes provisions for recognizing, measuring, depreciating, and disclosing assets in the municipality's financial statements.

» Section 18: Asset Verification
  - The MFMA requires municipalities to conduct regular asset verification exercises to ensure the accuracy and completeness of their asset registers. The purpose is to physically verify the existence, condition, and value of assets.

» Section 19: Asset Management Performance Reports
  - This section requires municipalities to prepare and submit asset management performance reports. These reports should provide information on the condition, utilization, and management of assets within the municipality.

3.3 Accounting standards – GRAP

GRAP is a set of standards setting out accounting principles to be applied and adhered to. There is a comprehensive set of standards. The two most important standards applicable to the treatment of assets are found in GRAP 16 and GRAP 17.

GRAP 16 – Property, Plant and equipment

Covers the accounting for property, plant, and equipment, including recognition, measurement, depreciation, revaluation, and disclosure aspects.

GRAP 17 - Investment in Property, Plant, and Equipment

Provides guidance on accounting for investment in property, plant, and equipment by lessees, lessors, and custodians.

3.4 Asset information requirements

All assets should have a description that indicates its nature and purpose. Other description attributes should include identifying details such as serial numbers. As part of the identifying features, an asset location and photographic record should be captured with a geographic locality.

Furthermore, the condition of an asset must be recorded and up-to-date. This impacts the remaining useful life of an asset and in turn the financial value thereof. Other information required by GRAP is financial information such as the cost, depreciation, accumulated depreciation, revaluation, impairment, disposals, and disclosures.

4. CASE STUDY OF IMPROVING AN ASSET REGISTER FOR COMPLIANCE ASSISTED BY ARCGIS SOFTWARE APPLICATIONS

The main objective of the study was to assist the municipality in having an accurate and complete asset register. The project involved the compilation and updating of an asset register of some 17 wastewater treatment works (WWTW) for a municipality. The first step was to establish on site all existing assets of the WWTW and categorise them into their respective asset categories. The on-site data capture was assisted by the ArcGIS Survey 123 application as part of the ESRI ArcGIS software. The Survey 123 application has a customised data capture menu allowing quick and efficient capturing including a photographic record of all the assets in a Geo-database with co-ordinates of the photo taken for easy access and retrieval of the data. In this way substantial time and cost savings are achieved as the asset components can be viewed virtually in an office environment giving an accurate position as well as a unique ID to a photographic record. An example of the process follows as well as deliverables is given below for the Refilwe WWTW.

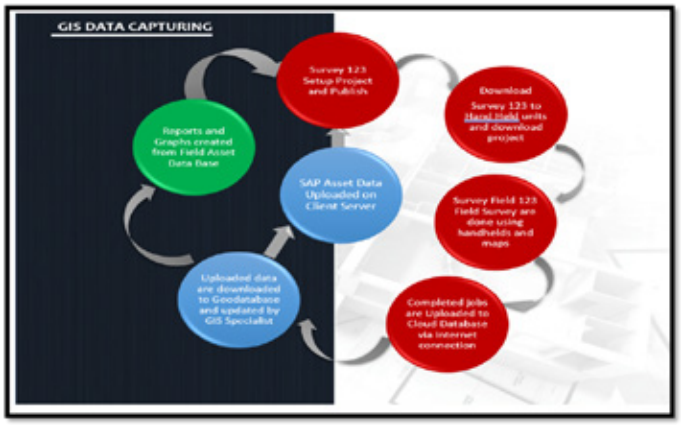

FIGURE 5: *Example of a data collection process (Adapted from ESRI ArcGIS applications ,2021)*

4.1 The ArcGIS survey 123 application for field data capture and storage

It was established from several studies of municipal asset registers that the filed data and information is often not geo-referenced and hence is very difficult to position and visualise the asset. It is there recommended that a data capturing tool such as the ArcGIS survey 123 be utilised. The ArcGIS survey 123 is a powerful in the field data capturing application as part of the ESRI ArcGIS software. The application allows the user to carry out the following:

» Customisation of a data capture template with drop down menu;
» Obtain a photographic recorded of each asset linked to a geographic coordinate;
» Exporting the data to a Google kmz file;
» Uploading the data to a cloud storage facility for easy access by the user and the client.

The applications can be uploaded onto any hand-held Cell phone and/or Tablet used in the field. The typical process flow chart is given on Figure 5 above. This application was now used to assist the Municipality in updating and verifying their asset register of the WWTW.

4.2 Field data capturing template

A field data capturing template including easy to use drop down menus was set up for the field inspection and capturing of the data as shown on Figure 6.

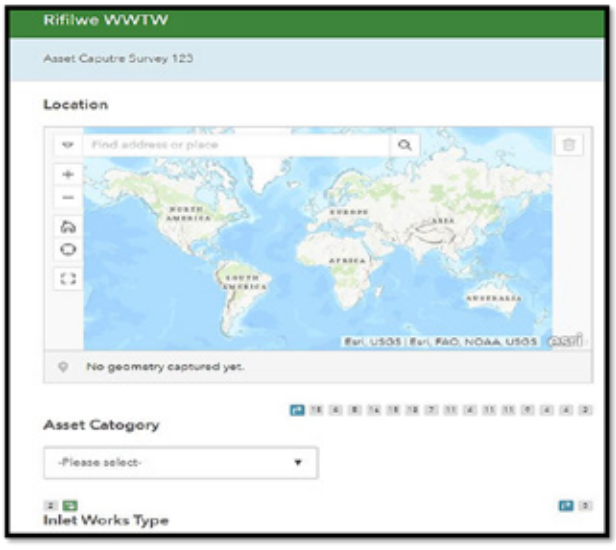

FIGURE 6: *Typical Survey 123 field data capturing template*

The field data template then has various drop-down screens to capture relevant information as shown on Figure 7 below.

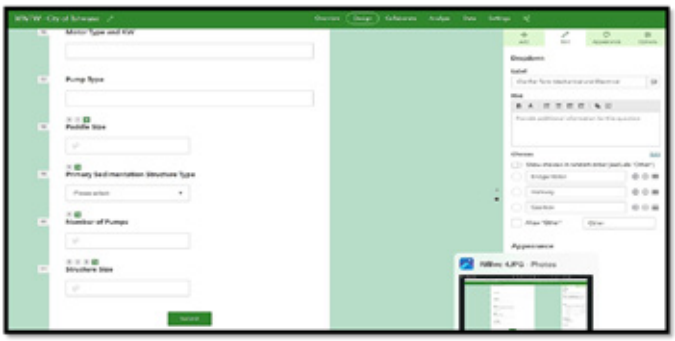

FIGURE 7: *Typical Survey 123 field data drop down screen*

4.3 Geographic representation of the asset component

The Survey 123 application was then also used to take relevant photographic records of each of the identified assets. Each photo is then captured with a geographic x, y co-ordinate which assists the user to later review and use the photos in an office environment with the exact location. A typical example is shown on Figure 8 below.

FIGURE 8: *Example of geographic representation of the asset components and geo-referenced locality of the photographic records*

4.4 Compilation of the geo-database

Once all the data had been captured and verified it was exported to an Excel and MS Access data base for use by the client. A geo-database was also compiled for use of the data in a GIS environment. A typical example of the exported data is given in Figure 9.

4.5 Upload files for the SAP system

The final stage of the study was to determine the asset value of each asset component as well as the total asset value of the WWTW for both the present-day value and including depreciation.

4.6 Benefits of an accurate and up-to-date asset register assisted by the GIS application.

4.6.1 Accurate and up-to-date asset register

The following benefits were derived:

- Compliance with the Municipal Financial Manage Act (Section 63);
- Accounting for all assets and knowing the condition and present asset value;
- Improved forward planning and budgeting for upgrading and maintenance requirements of municipal infrastructure;
- Improved access to loans, and grant funding by having a complaint audit and assess register;
- Improved service delivery regarding the operation and maintenance of all municipal infrastructure;
- Improved quality of life of all residents.

4.6.2 GIS data capture and storage application

The following benefits were derived from the above approach:

- Easy to use and customised data input template for the field workers thereby eliminating errors in data capturing.
- Time saving by needing no on-site paperwork and plans.
- Cost savings by being able to capture all data effectively and efficiently.
- Geographically linked location of all photographic records for the use in an office environment eliminating having to go back to site.
- Easy and seamless interface with Excel, MS Access and the SAP system used by most municipalities.

CTMM Asset Category	Sub Facility	Comp Code Level 6 Description	Comp Code Level 7 Description	Asset Description	Lat	Long	Size_Quantity_Extent	Unit of Measure	Inventory Note (Condition)	Photo Path	Photo	Hyperlink
BNR	BIOLOGICAL NUTRIENT REMOVAL 2 - CH2	RC STRUCTURE	SHUTTERED RC ENG STRUCTURE - WATER RETAINING----	BIOLOGICAL NUTRIENT REMOVAL 2 - CH2	-25.649412	28.536906	12	CUB M	GOOD	C:\Tshwane\FD\Photos\9b904497-467d-4b63-914a-4e5f8f238757\d6f7b610-d7d8-e676-a0b9-e44e6a34e366\c69ecc55-a692-4e02-b178-		C:\Tshwane\REFILWE\Photos\BNR\WWTW BNR1 CH 2.jpg
DRYING BEDS	DRYING BEDS (3)	RC STRUCTURE	SHUTTERED RC ENG STRUCTURE----	DRYING BEDS (3)	-25.649228	28.537313	412	CUB M	GOOD	C:\Tshwane\FD\Photos\fd6ae896-81c5-4139-938d-0471d255ddd5\d6f7b610-d7d8-e676-a0b9-e44e6a34e366\f82a8336-df3d-4487-8557-		C:\Tshwane\REFILWE\Photos\DRYING BEDS\WWTW DRYING BEDS 3 RC STRUCTURE.jpg
TERTIARY TREATMENT	CHLORINE DOSING ROOM	MASONRY STRUCTURE	GENERAL----	CHLORINE DOSING ROOM	-25.649167	28.536579	18	CUB M	GOOD	C:\Tshwane\FD\Photos\118ed32a-20a7-40c8-9279-2093a15762a9\d6f7b610-d7d8-e676-a0b9-e44e6a34e366\448e8a8f-5ddd-454e-935c-		C:\Tshwane\REFILWE\Photos\TERTIARY TREATMENT\WWTW CDR STRUCTURE MASONRY.jpg
TERTIARY TREATMENT	CHLORINE DOSING ROOM	PUMP - SEWER	PUMP - SEWER-50---PUMP OUTFLOW PIPE DIAMETER (MM)	CHLORINE DOSING ROOM	-25.649167	28.536579	1	NO	GOOD	C:\Tshwane\FD\Photos\118ed32a-20a7-40c8-9279-2093a15762a9\d6f7b610-d7d8-e676-a0b9-e44e6a34e366\d0541658-362f-49e4-8d02-		C:\Tshwane\REFILWE\Photos\TERTIARY TREATMENT\WWTW CDR BOOSTER PUMP 1.jpg

FIGURE 9: *Extract of the excel data base for the Refilwe WWTW*

5. CONCLUSIONS

The following is concluded:

i. Most municipalities have outdated and inaccurate asset Registers;
ii. Only 38 out of 257 municipalities in South Africa obtained a clean audit;
iii. There is very little to no visual information on assets;
iv. The condition and functionality of the assets are unknown;
v. Insufficient forward planning and budgeting for upgrading and maintaining municipal infrastructure.
vi. Insufficient to non-exiting service delivery.
vii. Non-compliance with Municipal Financial Management Act (section 63);
viii. Field data capturing is carried out via non-digital methods (hard copy notes and drawings) with a high risk of losing the data and having non-consistent and misleading data.

6. RECOMMENDATIONS

The following is recommended:

i. Municipalities invest in getting up-to-date and accurate asset registers;
ii. Municipalities to improve their audit reports so as to be compliant;
iii. Asset components be captured in the field using the ArcGIS Survey 123 application;
iv. Visual information be captured by the Survey 123 application giving a geo-referenced locality of the photographic record;
v. Municipalities to improve the forward planning and budgeting of required upgrading and maintenance activities of all municipal infrastructure;
vi. Municipalities to improve on the current insufficient service delivery.

7. ACKNOWLEDGEMENTS

The authors wish to acknowledge the opportunity given by the municipality for assisting in updating and refining the WWTW asset registers with the assistance of specialist software applications such as the ArcGIS Survey 123.

8. REFERENCES

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Generally recognised Accounting Practice (GRAP) Standards, 2022

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Municipal Finance Management Act, 2003 (Act No. 56 of 2003) (MFMA),

Municipal Standard Charts of Accounts (mSCOA),2001

SAP (System, Applications and Products) ,SAP AG (https://www.learning.sap.com/products/financial-management/management-accounting)

The Auditor General (AG) reported-MFMA report 2022/23