THE MUNICIPAL ENGINEER'S RESPONSIBILITY TO PRACTICE LIFE CYCLE INFRASTRUCTURE ASSET MANAGEMENT AND INTEGRATED COMMUNICATION TO THE FINANCIAL ASSET REGISTER

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ABSTRACT

The paper will deal with highlighting the demands on municipal engineers for the effective control and registering of all their engineering infrastructure assets and managing them in accordance with the GAMAP/GRAP life cycle asset management principles. The perception that asset registers only being the responsibility of the financial departments will be highlighted with the facts that when engineers do not get involved in the asset registering, huge discrepancies can be created to the detriment of effective service delivery. The concept of integrated infrastructure asset management to achieve effective asset registering and life cycle asset management will be used to demonstrate the importance of engineering involvement on a day to day basis in the establishment and creation of the engineering infrastructure as well as the management of those assets and successfully incorporating that into their infrastructure asset register.

INTRODUCTION

The introduction of Generally Recognised Accounting Practice (GRAP) within local government focussed attention on asset management, and National Treasury additionally issued a number of asset management practice and reporting requirements. These include the need to identify, componentise, value and track the health of assets, to establish programmes and provide resources to care for assets, and to report on these matters. Given that these requirements are driven from an accounting perspective, the municipal engineer may be tempted to ignore them, and instead to leave all responsibility for asset management to the chief financial officer.

However, not only is the value of the municipal engineer indispensible in the process, there are unprecedented opportunities for engineering professionals as a result of the introduction of GRAP. This paper identifies regulatory asset management requirements, the role of the municipal engineer in relation to these requirements, and the opportunities available towards ensuring adequately funded engineering networks and operations.

THE MUNICIPAL ENGINEER AND INFRASTRUCTURE ASSETS

Municipalities are responsible for the provision of essential engineering services that include potable water supply, sanitation, electricity reticulation, the provision of roads and stormwater, and solid waste collection and disposal. Whilst municipalities also have obligations towards governance, community safety and health, and development services, the success or failure of a municipality is substantially measured by the availability and quality of infrastructure services. As such a municipality is an asset intensive business. In a large metropolitan municipality such as Ekurhuleni, the replacement value of immovable engineering and community assets has been placed at R83 billion (2010).

South Africa needs infrastructure not only for social stability and well-being, but also for economic growth. The World Bank estimates that in the order of R637 billion is required to eradicate service access backlogs, provide infrastructure for economic growth and to renew infrastructure networks[1] in the period 2007 - 2017. Over time, as we as a society become ever more dependent on infrastructure assets, so does the importance of asset management increase.

REGULATORY ASSET MANAGEMENT REQUIREMENTS

Within local government in South Africa, asset management of infrastructure is largely regulated through the Municipal Finance Management Act and GRAP 17. This accounting standard stipulates the appropriate accounting treatment for property, plant and equipment which is the asset class covering infrastructure. Specifically, GRAP 17 provides the principles according to which assets held for production purposes are identified, recognised, measured, depreciated and how lifecycle costs are to be dealt with[2].

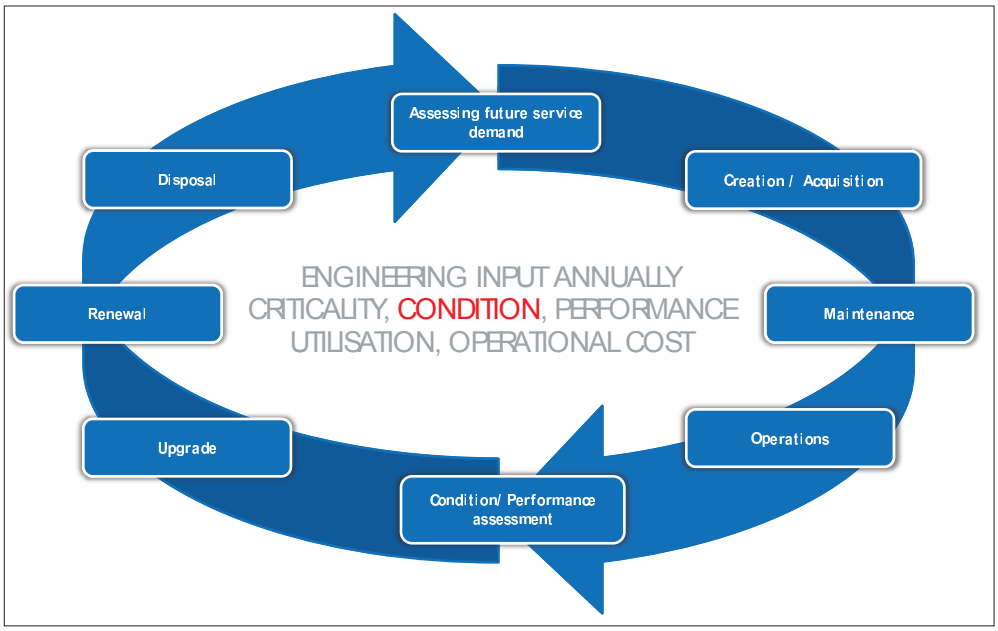
There are also a number of other accounting standards and regulations dealing with specific asset management issues. In this regard this paper limits its focus to only the accounting and draft accounting standards referred to as exposure drafts that deal with the impairment of assets.

In 2008 National Treasury furthermore issued the Local Government Capital Asset Management Guidelines and the new budget format. The former describes the scope of asset management practice, articulates key principles, provides implementation techniques and sets out institutional arrangements[3]; whilst the latter specifies the structure and manner of preparing and reporting on budget requirements.

GRAP 17

GRAP 17 in its essence is aimed at ensuring that all production assets under the control of the municipality are identified, and that accurate asset values are posted in the organisation's statement of financial position. To this end there are some critical requirements that warrant the involvement of the municipal engineer. The first is the need to componentise assets,

FIGURE 1 Life cycle asset management "activities"



often referred to asset "unbundling" by accountants. This process is aimed at identifying asset components to a level where significant components have differing useful life expectations to that of the parent asset, to enable more nuanced and realistic depreciation charges to be set, and thus more accurately model their consumption. For this process to be effective, an asset hierarchy must be in place according to which componentisation is done, and component-level unit rates based on replacement costs, useful life expectations and residual values must be known.

The second is the approach to establishing and updating asset values. A municipality can adopt either the cost or revaluation model. Following the cost model, a municipality would typically establish the value of its infrastructure assets on the basis of depreciated replacement cost, and would thereafter revert to the actual cost incurred, and would update the asset register on that basis. In the event that the depreciated replacement cost method is used, a municipality will also need to employ a condition grading index or some other measurement system to quantify the extent of deterioration of the assets assessed. When circumstances change to the extent that asset values can no longer be considered accurate or representative, such as in the case of sustained high levels of increases in the cost of construction, a municipality would have to revalue its assets. This revaluation interval following the cost model is typically between three to five years. A municipality must however annually review the useful life expectations of assets. This in itself is a critical responsibility of the municipal engineer. Alternatively a municipality can adopt the revaluation model that requires that all assets are revalued on an annual basis.

Regardless of the recognition model chosen, asset data must be incorporated in a structured asset register and the register must be maintained and updated on an ongoing basis. As a result of the componentisation requirement, asset registers have become bulky. The immovable production assets register of a metropolitan municipality such as Ekurhuleni contains almost 2 million asset records, whilst the same register in a mid-sized high capacity local municipality such as Steve Tshwete features in the order of 100 000 records. A municipality must further implement an asset management policy that states its approach to asset management, including the valuation model chosen, on the basis of its interpretation of the accounting standards, the nature and extent of its assets, all this with due consideration of its operating environment. The policy must clearly indicate the useful life expectations adopted.

Impairment of assets

Impairment is defined as the loss of future economic benefits or service potential of an asset over and above the systematic recognition of the loss of the asset's future economic benefits or service potential through depreciation[4]. Asset impairment is an event-driven occurrence where the loss of value is both substantial and enduring. Impairment can be caused by a range of factors, such as vandalism or theft, natural or man-made disasters, changes in technology or changes in customer demand. In the absence of a GRAP standard on the impairment of assets, municipalities are expected to comply with the provisions of the International Accounting Standard 36: Impairment of Assets (IAS 36). The Accounting Standards Board has however published two exposure drafts dealing with asset impairment. Exposure draft 28 provides the principles in assessing the impairment of assets that generate income, whilst Exposure draft 45 focusses on the assessment of impairment of non-income generating assets.

A municipality, and in particular the municipal engineer, must annually test its assets for impairment and adjust asset values in accordance with the magnitude of impairment events. Provision has been made for the reversal of impairments where circumstances warrant it.

New budget format and reporting requirements

The National Treasury published the new budget and reporting formats and requirements in 2009. A key feature of the new requirements is the specific attention it pays to asset management, in particular on maintenance and renewal provisions. The budget format has been designed in such a manner that it is reflective of a municipality's asset management strategy[5]. More emphasis is placed on performance, and municipalities are expected to link budgeted financial outcomes to measurable results.

COMPLIANCE AND CONSEQUENCES

Annual auditing for compliance

Compliance with accounting standards is verified annually by external auditors appointed by the Office of the Auditor General. Audits typically involve the assessment of the principles and processes adopted to yield asset management results, as well as verifying their application. A key point to note is that auditors are guided by published regulations and accounting standards, and not by best practice guides, even if these are issued by the National Treasury or some other government department. And the margin for error is slim. The materiality limit – the amount above which a municipality will receive a qualified audit opinion in the event of non-compliance or an error – translates into an error margin of ± 0.2%.

Consequences of non-compliance

The municipal engineer may be tempted to believe that compliance with the accounting standards and audits are the concern of only the Chief Finance Officer. This is not the case. A qualified audit opinion (or worse, a disclaimer) affects the whole municipality in a number of ways. It limits a municipality's ability to access finance from financial institutions. It raises a municipality's credit risk profile so that even in instances where the municipality can access finance, it pays an additional risk premium in the form of higher interest charges. A negative audit opinion further erodes stakeholders' trust in the ability of a municipality to manage its affairs. This depleted confidence can manifest itself in a number of ways: investors that become unwilling to invest in the area, thus constricting economic growth, existing or potential taxpayer associations that believe that negative audit opinions justify them withholding payments to the municipality, or provincial governments that place municipalities under administration.

Typical errors and other issues leading to qualifications and disclaimers

There are numerous possibilities that can lead to qualified statements or disclaimers, some of which are:

- the absence of a structured, rational approach to asset assessment and valuation, or the inconsistent application of that approach
- an approach that is not aligned with the relevant accounting standards, or that deviates from the approved asset accounting policy
- including assets in the asset register on the basis of ownership as opposed to control
- lack of componentisation, or the inconsistent application of componentisation criteria
- applying capital thresholds, or including assets at zero value or a nominal R1 value
- using inappropriate capital cost unit rates, for example using the same rates for both paved and unpaved roads
- not including all assets or all asset components. Common mistakes include for example the inclusion of road surfaces, but ignoring road kerbs and underlying earthworks
- inconsistent data, such as reported marginal remaining useful life when its condition is very good or the opposite
- insufficient evidence to support declarations
- inappropriate classification of expenditure
- ignoring servitudes and land associated with infrastructure
- not addressing intangible assets associated with infrastructure
- not capitalising landfill provisions for eventual rehabilitation, or weak assumptions that inform such calculations

- inappropriate useful life expectations and residual values
- calculation errors relating to asset values, impairments, depreciation charges and remaining useful life
- insufficient or ineffective location and unique identification data
- lack of, or inappropriate processes, for annual asset reviews.

Increasing engineering focus in audits

Whereas in the past external audit teams tended to consist solely of accounting specialists, it is becoming practice for auditors to employ engineers to focus on asset management aspects during audits. This trend directly affects the municipal engineer who provided the asset useful life estimates, reported on asset extent and calculated asset impairment. In a number of recent audits, the audit team's asset specialists focussed on a number of issues, some of which are listed below to illustrate the increasing engineering focus of audits:

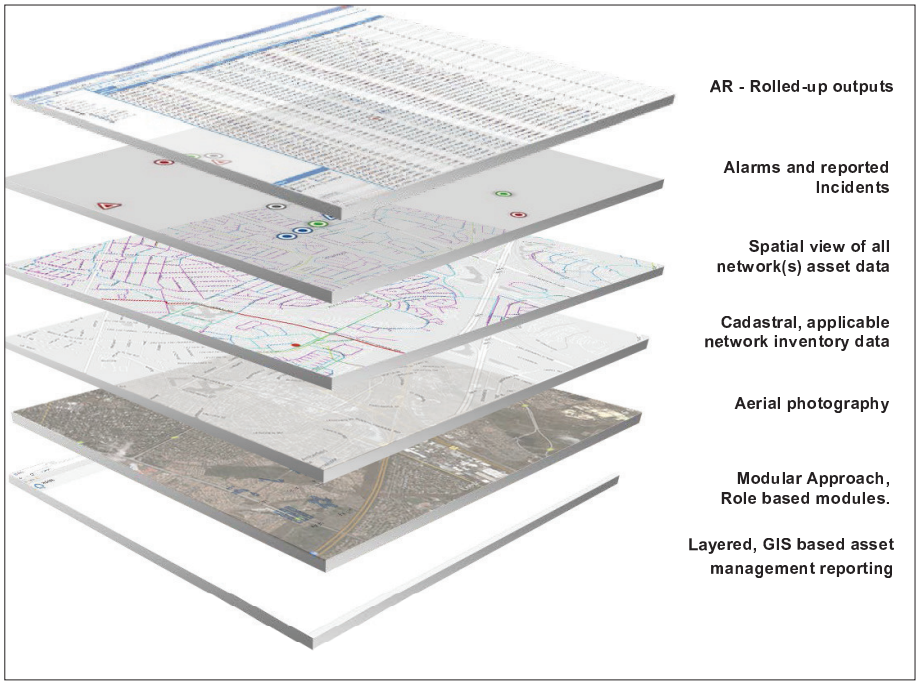
- assumptions on asset useful lives, expected deterioration curves and supporting data
- calculated economies of scale in unit cost rates at various capacity levels
- capital cost price indices to which unit costs are linked
- impairment methodology, triggers, processes and calculations
- valuation methodology and consistent application
- process for annual review and application
- motivations and corporate approvals for de-recognitions
- criteria for not undertaking a re-valuation
- supporting evidence to adjustments in the prior year.

It is evident from the last auditing period that they will not only focus on asset registers and financial matters, but will also concentrate on performance management across the municipal organisation and in particular the municipal engineer's input to the asset register.

THE BENEFITS TO THE MUNICIPAL ENGINEER

Whilst this paper touched only on some asset management requirements, it is abundantly clear that these are onerous, and the process is fraught with the risks associated with non-compliance. Whilst the risks of non-compliance present a compelling argument for the involvement of the municipal engineer, they do not answer the question of what the benefits are for this class of professional. Equally, they do not sufficiently answer the question as to whether such requirements merely serve the requirements of the accounting profession, or whether there are benefits for the municipal engineer in supporting the accounting standards highlighted in this paper.

FIGURE 2 Layered database construction for full geo referenced and integrated asset management



Asset componentisation

As noted, accounting requires that asset componentisation should calculate depreciation more accurately. This however presents the municipal engineer with a number of opportunities. Given that asset componentisation and the coupling of appropriate useful life expectations are done appropriately, relatively short life assets, such as electrical and mechanical components, are depreciated at a faster rate, providing a mechanism for establishing the funds for timeous renewal or replacement. And not only is asset componentisation good accounting practice, if approached correctly assets will be componentised to the level where maintenance-significant items are identified, thus enabling targeted asset lifecycle planning and control.

Review of useful life expectations and asset values

Compliance with these requirements provides useful information to model and forecast expected asset failure time frames, risk exposure and the cost of appropriate lifecycle interventions. There is also the benefit that, with the periodic review of asset values, there is generally an increase in accumulated surpluses that bolsters the municipality's ability to leverage its balance sheet. This is particularly important for municipalities that wish to secure funding on the capital markets for large scale infrastructure projects. If the municipal engineer does not apply his mind in the setting of the expectations of the useful life of assets, tariffs may increase beyond customer affordability levels when asset lives are set too low, or insufficient funding may be available for asset renewal where asset lives are set too high.

Asset impairment testing

Assessing asset impairment and reporting on the results thereof not only has the benefit of highlighting causes of asset failure, but also provides the motivation for appropriate correction, whether in the form of improved employee recruitment or training practices, improved safeguarding measures or protective structures and funding to restore affected assets or other appropriate steps. Since impairment is reported on in the financial statements, it is difficult for political office bearers to ignore.

Preparation of asset registers, improved asset knowledge, and asset management decision making capabilities

National government is serious about achieving clean audits, and has set the target that all municipalities will achieve a clean audit by 2014. Provincial government, municipal councils, audit committees, municipal managers and CFOs across the country are all anxious about receiving clean audits. Asset management and the municipality's debtors book are areas where a municipality is the most likely to receive a qualified audit. All these parties are dependent on the expert knowledge of the municipal engineer to achieve the coveted clean audit, and are generally very willing to invest the necessary resources to establish asset registers to this end.

Modern infrastructure asset registers are no longer merely inventory lists to suit basic accounting criteria. Componentised asset registers not only satisfy accounting requirements, but provide data on aspects such as asset physical characteristics and capacity, failure mode status, criticality rating and remaining useful life. As such an asset register should be a common and accurate dataset used to inform decision-making in the areas of services planning, risks assessments, asset lifecycle planning and investment prioritisation.

The introduction of the generally recognised accounting practice standards has not only highlighted the value of the specialist asset knowledge of engineers, but has placed the municipal engineer in a position to negotiate funding for the establishment of asset registers and associated asset management planning instruments way beyond accounting compliance needs. There are also opportunities for the updating of engineering surveys such as pavement analysis and water hydraulic modelling linked to some dataset.

Appropriate funding for asset lifecycle activities

A host of literature points to sustained underfunding of asset maintenance and renewal activities. The new budget format ensures that funding for asset maintenance and renewal is considered, and underfunding is reported and motivated under the watchful eye of the National Treasury.

SOME PRACTICAL CONSIDERATIONS

The following are some practical arrangements to assist the municipal engineer to obtain optimum value from an asset management initiative, and to deliver successful results:

- Appoint specialist asset management service providers with a proven track record to assist in navigating the numerous compliance pitfalls and practical challenges – although an initiative of this nature is expensive, negative results can be disastrous, and rework equally expensive.
- Establish a clear, documented and rational framework for the valuation of assets – this is the first critical hurdle to overcome, and a target focus area of auditors.
- Prepare a data collection plan that quantifies the extent of assets, the assessment approach and asset samples sizes assessed for physical inspection, and the data quality assurance processes to be adopted.
- All assets must be accounted for, not just those that form the typical engineering planning focus. Whilst electrical infrastructure, water and sewer pipes, and road surfaces are typically high value assets, the auditors will focus on all asset components, as well as on land and servitudes.
- Utilise available asset data such as the results of pavement analysis, but do not overly rely on such data sets, especially where the data sets are not current (asset registers must reflect the asset position at a particular date). Regardless of the quality of previous technical data sets, the assets therein typically require componentisation, valuation and verification.
- Consider the acquisition of an electronic asset management system that complies with accounting requirements, and that supports best practice infrastructure asset management practice, such as advocated in the International Infrastructure Management Manual.
- There are huge advantages in having a geo-referenced asset inventory that is integrated with the financial asset register and therefore ensuring that the day to day operations and asset register changing activities are captured on all levels and particularly in the asset register.
- For best value, scope an asset management intervention that looks beyond GRAP compliance and that also includes the establishment of asset management practice and asset management planning instruments (as referenced in the Local Government Infrastructure Asset Management Guidelines and the Local Government Capital Asset Management Guidelines).
- Many municipalities (and consultants) believe that obtaining that first clean audit result on a GRAP compliant asset register is the most difficult task, and that once a clean audit has been achieved, that the same methods will automatically produce the next clean audit. This is not the case. Auditors themselves are coming to grips with compliance requirements and audits can be expected to become more robust over time as more compliance requirements are introduced every year. It also tends to be more difficult to maintain an asset register than to establish it. There are a number of reasons why this is the case. Some of these include the need to move away from informed and rational engineering assumptions to precise reconciliation with asset transactions, the difficulties associated with cost apportionment, and the need to track and accurately report on asset movements.

CONCLUSION

Municipal infrastructure networks today are complex configurations of multiple assets spread over geographically significant areas. These networks are not static: networks are extended, upgraded, they age and require renewal, de-recognition or complete replacement, and are reconfigured over time.

All measurable variables of an infrastructure network constantly change: extent, age, value, capacity, condition and cost of operation being some of these variables. With the loss of a skilled, experienced work force with decades of accumulated knowledge of the location, characteristics and needs of assets, the need exists to capture that asset knowledge in an integrated geo-referenced system. An appropriately planned asset register not only addresses accounting requirements, but provides the municipal engineer with a powerful tool in improving asset management decision-making.

An integrated geo –referenced asset register also provides the basis for "connecting the ground" with the asset register. This would support the incorporation of daily operational and maintenance actions that might have an asset register changing effect in an integrated manner. This will further support estimating asset care funding requirements for an asset's entire life cycle.

The introduction of the Municipal Finance Management Act and Generally Recognised Accounting Practice highlights the importance of assets to the success or failure of a municipality, and gives proper recognition to the standing of asset management as a critical, multi-faceted business process, and to the need for appropriate funding of asset activities. The asset management path is rocky and there is a multitude of compliance pitfalls. However, as with all risky enterprises, there are substantial rewards and ways to reduce risks. More importantly, given the background and position of the municipal engineer, and the desire for compliance by senior municipal management and politicians alike, there are opportunities for the engineer to be positioned in the center of critical corporate processes, and to negotiate funding for asset management planning, practice improvements and asset care activities to a level not possible in years past.

REFERENCES

(Endnotes)

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