CITY OF MUTARE

GIS-based Cadastral and Infrastructure Mapping

Connective Cities Workshop



Starting Point

Challenges intended to be addressed:

- →Most Mutare City Council (MCC) land & infrastructure records are on hardcopy maps and drawings, some of which are blurred beyond legibility
- →MCC's failure to establish an accurate property database (officials have been estimating between 34 000 and 60 000)
- →High Non-Revenue Water (NRW) @ 61% in 2018 while current bill collection ratio has not exceeded 10% in 2019
- Failure to model the water supply network from the source to the end user.





Institutional Setting:

→MCC runs on a ProMun billing system. Over the years, there has been virtually no new investments in integration of this system with geographic data of the city.

- MCC has a dysfunctional housing database, current land information registers are in hardcopy & excel format with inconsistencies in updating mechanisms.
- → Registers have an inherent inability to dynamically link physical properties (hence inadequate basis for urban management), disintegrated by district & to be synchronized with parent database. Digital Microsoft Excel Spread sheets makes command querying (a daily municipal routine) a nightmare.
- Overally, current registers are porous & allow for omission of stands from Council records & inevitably allow occupiers to enjoy free-riding on services-Council loses millions of dollars in potential revenue.



Approach

- Provide a well-resourced GIS office with adequate equipment, software, qualified human capital and accurate updated data.
- Develop stakeholder specific management systems to better track and report on projects, requests/issues, and tasks.
- ➔ Establish and implement GIS data standards throughout the organization to ensure consistency and quality of GIS data over the long term.
- Provide effective and efficient co-operate GIS model for optimal use of resources.
- Develop and implement a consultative strategy to incorporate identified user input to improve GIS systems.
- Capacitate all stake holders in the access and use of Slide 3 Mutare's GIS applications and data





Approach cont...

Create and implement an Applications Strategy to address specialized application requirements, including real time, mobile, and responsive application design.

- ➔ Promote an integration strategy to help with identifying and prioritizing integration initiatives with GIS and other systems within the organisation.
- → Sustain and improve existing partnerships to further integrate and streamline workflows and improve knowledge sharing.
- Provide GIS-based decision support tools and data to support major City initiatives identified in the City's Strategic Plan.
- Enhance revenue collection through systems integration.



Mapped stands and the township boundaries

Hobhouse Pilot mapping:

Properties with access to water/properties with water meters.

- →As can be seen from above, there are several queries we can run on the system depending on the type of data we want and the intended use.
- It is important that all data is cleaned and checked before being integrated for processing.
- → Currently we have limited IT infrastructure to setup a fully functional and integrated GIS Platform. The vision is to have the platform up and running and easily accessed by management as an efficient decision-making tool.
- ➔ It is key to have management involvement in the data processing exercise for authentication and thorough checking since this data will be used for further analysis and evaluations by other heads/ decision making bodies.



3792 properties using Council Water





2698 properties with watermeters (71.1%)

1703 properties with functional water meters (63.1%)

Situation after implementation

- The following information has so far been obtained from the polygons created for the City of Mutare's masterplan as well the Hobhouse pilot mapping
- There are over 62 000 surveyed properties within City of Mutare boundaries
- Hobhouse Township has 5396 surveyed properties according to the cadastral layout.
- ProMun database has 4341 accounts for Hobhouse Township.
- →After merging the data from our ProMun database (with some cleaning up), Field Survey and Cadastral layout using the stand number as a common identifier, it emerged that there are 889 properties in Hobhouse that are without accounts in the ProMun system!!

Outputs

- Reduced errors and confusion in updating mechanisms.
- →Solution to the inefficiencies in planning, engineering and governance challenges.
- operational efficiency- MCC employees able to make effective decisions
- Transformation of MCC's spatial data into digital formats.
- ➔ Foundation for the MCC to link spatially its various departments and program its routine operations.
- Tool for updating of maps and tracking of services delivery near-real time.



A portion of Hobhouse as surveyed in February 2019

- Brown: no water meter
- *Cyan*: working water meter
- *Purple: non-working water meter*

Lessons learnt

- →GIS can be effectively used to reduce Non-Revenue Water
- →GIS can also be used to improve billing.
- →GIS can store and manage large volumes of spatial data
- It can provide multiple access to the database at the same time
- →GIS enables synchronisation of Interdepartmental information.
- Sharing of information across the organisation is made easy
- It enables the centralisation of data storage and management.

Lessons learnt cont'

- →GIS requires capitalisation to enable setting up and maintenance of the system.
- Collection of data may require more personnel than normal to reduce time for the exercise.
- →GIS can quicken decision making since its an easy tool for analysis
- It can improve communication through graphic data presentation.
- Implementation of GIS requires capacitation of personnel