

Municipal engineering's impact on communities

Presented by: Vuyani Gxagxama

Northern Provinces Branch Chairperson, IMESA



Municipal Engineering



Municipal engineering is concerned with municipal infrastructure.

- ▶ This involves specifying, designing, constructing, and maintaining streets, sidewalks, water supply networks, sewers, street lighting, municipal solid waste management and disposal, public parks and cycling infrastructure.
- ▶ In underground utility networks, it also includes local distribution networks of electrical and telecommunications services. It can also include the optimizing of garbage collection and bus service networks.
- ▶ Some of these disciplines overlap with other civil engineering specialties, however municipal engineering focuses on the coordination of these infrastructure networks and services, as they are often built simultaneously and managed by the same municipal authority.

IMESA



VISION/MISSION

To promote excellence in the engineering profession for the benefit of municipalities and their communities.

CONSTITUTION

1.2 Objectives: The objectives of the Institute shall be:

- (i.) To promote the knowledge, art, science and practice of infrastructure engineering in all its aspects;
- (ii.) To promote and support the interests of infrastructure engineering professionals and the engineering fraternity involved;
- (iii.) To develop knowledge, products, and services to support members in their profession;
- (iv.) To develop strategic partnerships with government, semi-government, academic, research and other institutes to the benefit of the Institute, its members and the profession in general.

IMESA

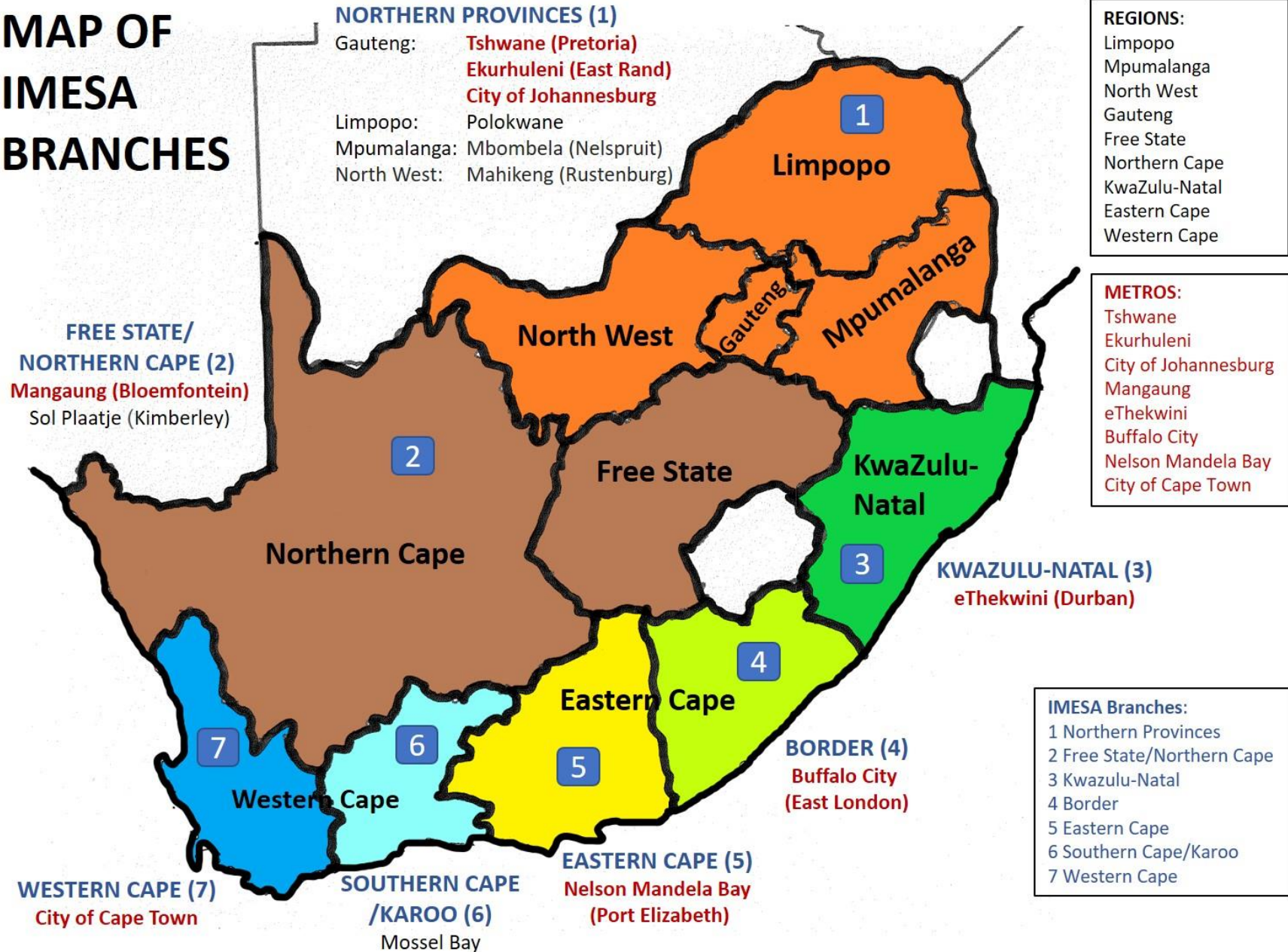
Membership benefits:

- Quarterly branch meetings with seminars and technical tours registered with ECSA for Continuous Professional Development (CPD).
- Mini-conferences and training courses to network and share knowledge.
- Monthly IMIESA technical journal
- Knowledge base of guidelines and best practice documents

Southern Africa:

Membership extends to neighbouring countries Namibia, Botswana, Zimbabwe and Mozambique, as well as Zambia, Tanzania and Kenya.

MAP OF IMESA BRANCHES



Municipal Challenges

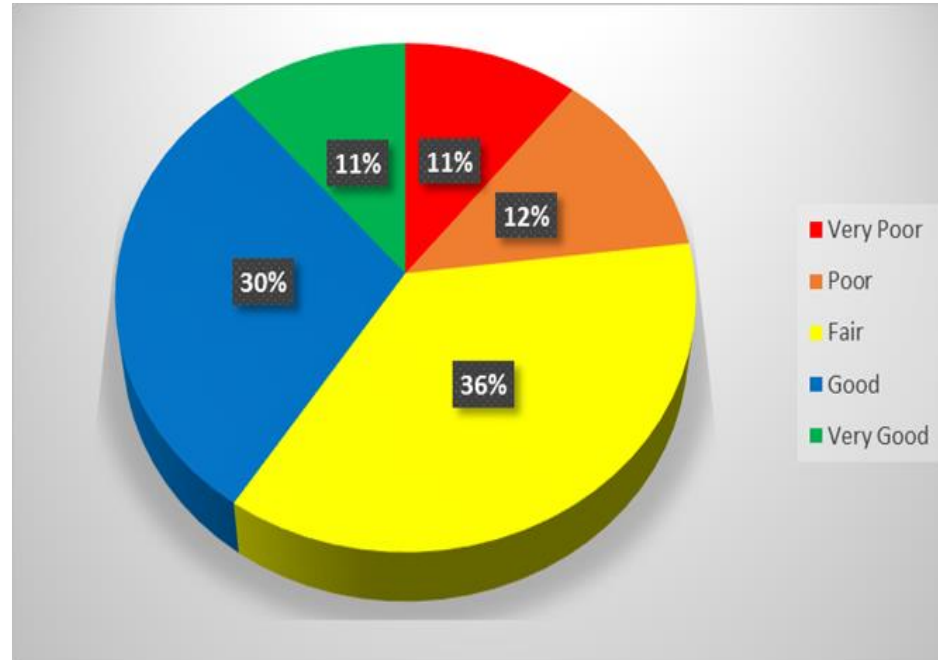
SERVICE DELIVERY = INFRASTRUCTURE



- ▶ Lack of technical capacity at smaller municipalities
- ▶ Focus on Capital Cost, should be on Lifecycle Costing
- ▶ Budgets are not aligned for provision of routine maintenance
- ▶ 15% of Grant for maintenance is not being allocated
- ▶ More Reactive maintenance than Proactive maintenance due to lack of funding.
- ▶ Consultants forced to focus on lowest price, not given enough time on engineering design, planning and quality control
- ▶ Procurement processes causing delays
- ▶ Record keeping, e.g. as-built plans, essential for long term infrastructure maintenance

Infrastructure Backlogs

Example: City of Joburg (Jhb Water)



Water and Sewer Backlogs

- ❑ Water Main Replacement R 1.4 billion
- ❑ Sewer Replacement R 3.4 billion
- ❑ Water and Sewer Capacity Upgrading backlog = R 12.6 billion

Wastewater Treatment Works Backlogs

- ❑ Backlog for wastewater treatment works plant and equipment replacement R 2.5 billion

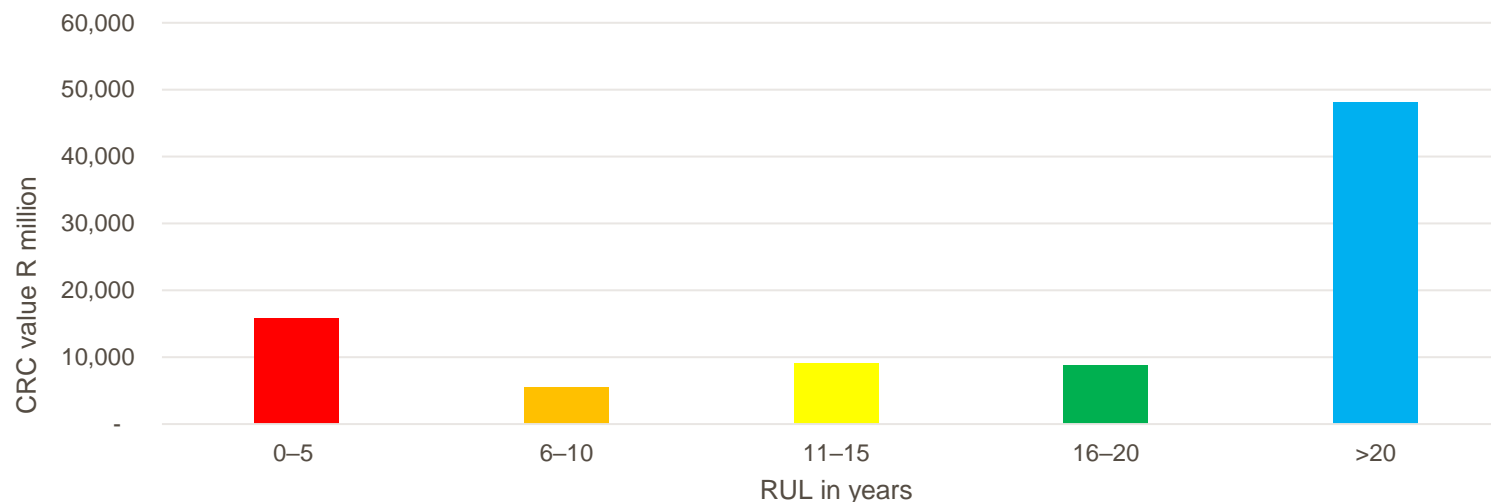
**TOTAL INFRASTRUCTURE BACKLOG:
R 20 BILLION**

- ❑ Critical Assets that require replacement/renewal - R 20.4 billion (Over next ten year period) based on RUL.
- ❑ This equate to requirement of R2 billion per annum over the next 10 years for capital replacement/renewal which is currently a barrier due to funding allocation/ availability.

Infrastructure Backlogs (cont.)

Problem Statement: Remaining Useful Life

Remaining useful life (RUL) asset portfolio level



| Asset group | Remaining useful life (years) (CRC amounts – R million) | | | | | Total |
|----------------------------|---|--------------|--------------|--------------|---------------|----------------|
| | 0-5 | 6-10 | 11-15 | 16-20 | >20 | |
| Water supply network | 7 772 | 1 997 | 4 175 | 696 | 20 502 | 35 142 |
| Wastewater network | 6 534 | 764 | 4 532 | 5 212 | 24 370 | 41 412 |
| Wastewater Treatment works | 1 265 | 2 530 | 355 | 2 762 | 3 084 | 9 996 |
| Operational buildings | 205 | 160 | 51 | 125 | 92 | 633 |
| Total | 15 777 | 5 451 | 9 113 | 8 795 | 48 048 | 87 183* |
| Composition | 18% | 6% | 10% | 10% | 55% | 100% |

*Land and servitudes to the value of R 1.11 billion are excluded from this summary to avoid skewering the 0-5 year RUL band

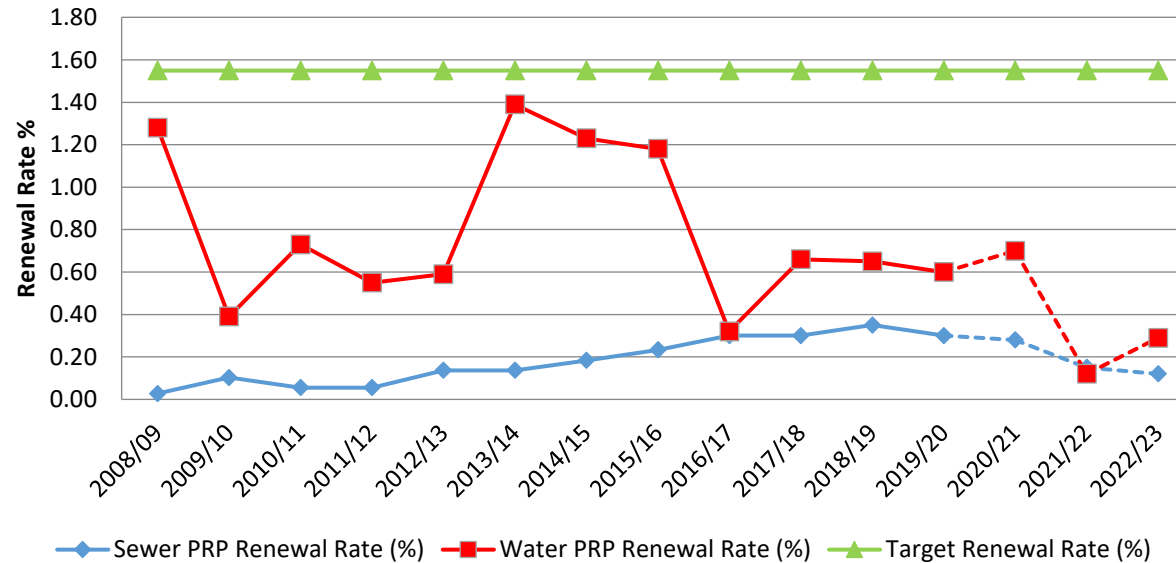
*Based on 2019/20 asset base

Infrastructure Renewal & Refurbishment



- ❑ JW has a total Infrastructure Assets with Current Replacement Cost (CRC) of R 88.3 billion.
- ❑ Asset Management Plans dictate a Renewal Rate of 2% p.a. is required.
- ❑ Current expenditure pattern indicate an average renewal rate of 1.1% has been achieved with current funding allocations.
- ❑ An infrastructure renewal backlog of approximately R 20 billion has resulted because of underfunding.
- ❑ 24% of asset base has Remaining Useful Life of less than 10 years.

Water & Sewer Infrastructure Renewal Rate



- ❑ Critical Assets that require replacement/renewal (poor and very poor condition – R 20.4 billion (Over next ten year period).
- ❑ This equate to requirement of R2 billion per annum over the next 10 years for capital replacement/renewal which is currently a barrier due to funding allocation/availability.

IMESA Support



- ▶ Data collection/survey on technical capacity/skills requirements
- ▶ Development of technical manuals and best practice guidelines (Small Coastal Stormwater Outlets, Capacity Building in Urban and Regional Planning, Water Reclamation/Reuse, Design Flood Estimation, etc)
- ▶ Training interventions
- ▶ Branch level development activities
- ▶ Bursaries/student support
- ▶ Conference networking and knowledge sharing opportunities
- ▶ Strategic liaison to represent local municipal engineers and present their issues to government authorities and agencies



Way Forward

- ▶ Correct technical staff should be employed by municipalities
- ▶ Continuous training is critical for the officials not only for the CPD points but to keep abreast with most recent technology.
- ▶ Sufficient budget needs to be allocated for maintenance so that municipalities can focus on proactive maintenance.
- ▶ Proactive maintenance is the more cost effective solution.
- ▶ Clear guidelines for municipalities is required to implement asset management road map
- ▶ IMESA can assist in rolling out this training
- ▶ It is critical that we train municipal officials continually
- ▶ We work with CESA on Biennial Excellence Awards

Thank You!!!

