



Findings from an SFD for Durban

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Overview of the System

○ Onsite

- UD toilets → Buried on site / BSFL
- VIP toilets → LaDePa
- (VIP ablution blocks)
- Flush toilets → Septic / conservancy tanks → Centralised treatment
- (Pour flush → Soakaways)

○ Offsite

- Flush toilets → Centralised sewers
- Ablution blocks → Centralised sewers
- Flush toilets → Package plants
- (Flush toilets → DEWATS)



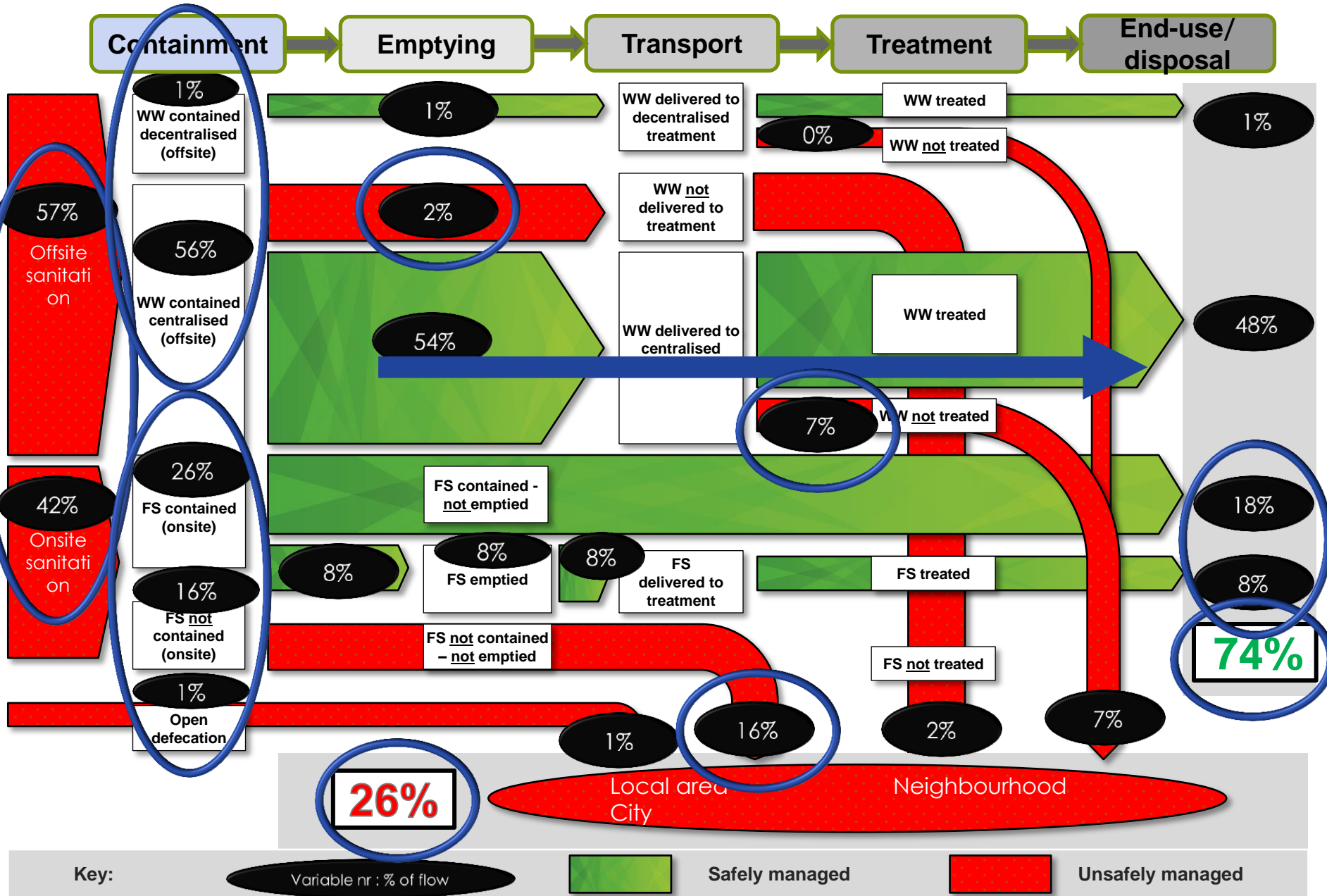
Shit Flow Diagram Figures

| Dwelling type | Total number of dwellings | Sanitation type per dwelling | | | | | |
|--|---------------------------|---------------------------------------|-------------------------------|--------------------|----------------------------------|-------------------------------------|-------------------------------|
| | | Serviced with Urine Diversion Toilets | Within 200m of Ablution Block | Serviced with VIPs | Serviced with Septic Tanks & PPs | Serviced with Waterborne Sanitation | Backlog in Sanitation Service |
| Informal Settlements | 265542 | 5194 | 111868 | | | 15533 | 132947 |
| Informal Settlements - Formal Informal | 3096 | | | | 3096 | | |
| Backyard Shacks | 48975 | | | | | 48975 | |
| Rural - Traditional | 103715 | 77059 | | | | | 26656 |
| Formal houses not in Rural area (A1) | 409210 | | | 35000 | 99282 | 274928 | |
| Flats (B1) | 110225 | | | | | 110225 | |
| Formal houses in Rural area | 5147 | | | | 5147 | | |
| Total | 945910 | 82253 | 111868 | 35000 | 105525 | 449661 | 159603 |
| Percentage | 100% | 9% | 12% | 4% | 11% | 48% | 17% |

| Dwelling type | Occupancy Rate |
|--------------------|----------------|
| Formal house | 3.86 |
| Formal Flat | 2.9 |
| Informal single | 3.6 |
| Informal Backyard | 3.9 |
| Rural | 5 |
| Rural formal house | 4.65 |

| Dwelling type | Population Proportion per dwelling type | | | | | |
|--|---|---------------------|-----------------|--------------------------------------|-----------------------------------|----------------|
| | People with UD | People with abluion | People with VIP | People with Septic or Package Plants | People with Waterborne to central | People Unservd |
| Informal Settlements | 18698 | 402725 | | | 55919 | 478609 |
| Informal Settlements - Formal Informal | | | | 11951 | | |
| Backyard Shacks | | | | | 191003 | |
| Rural - Traditional | 385295 | | | | | 133280 |
| Formal houses not in Rural area (A1) | | | 135100 | 383229 | 1061222 | |
| Flats (B1) | | | | | 319653 | |
| Formal houses in Rural area | | | | 23934 | | |
| Total | 403993 | 402725 | 135100 | 409113 | 1627796 | 611889 |
| Percentage | 11% | 11% | 4% | 11% | 45% | 17% |

Shit Flow Diagram (SFD), Durban



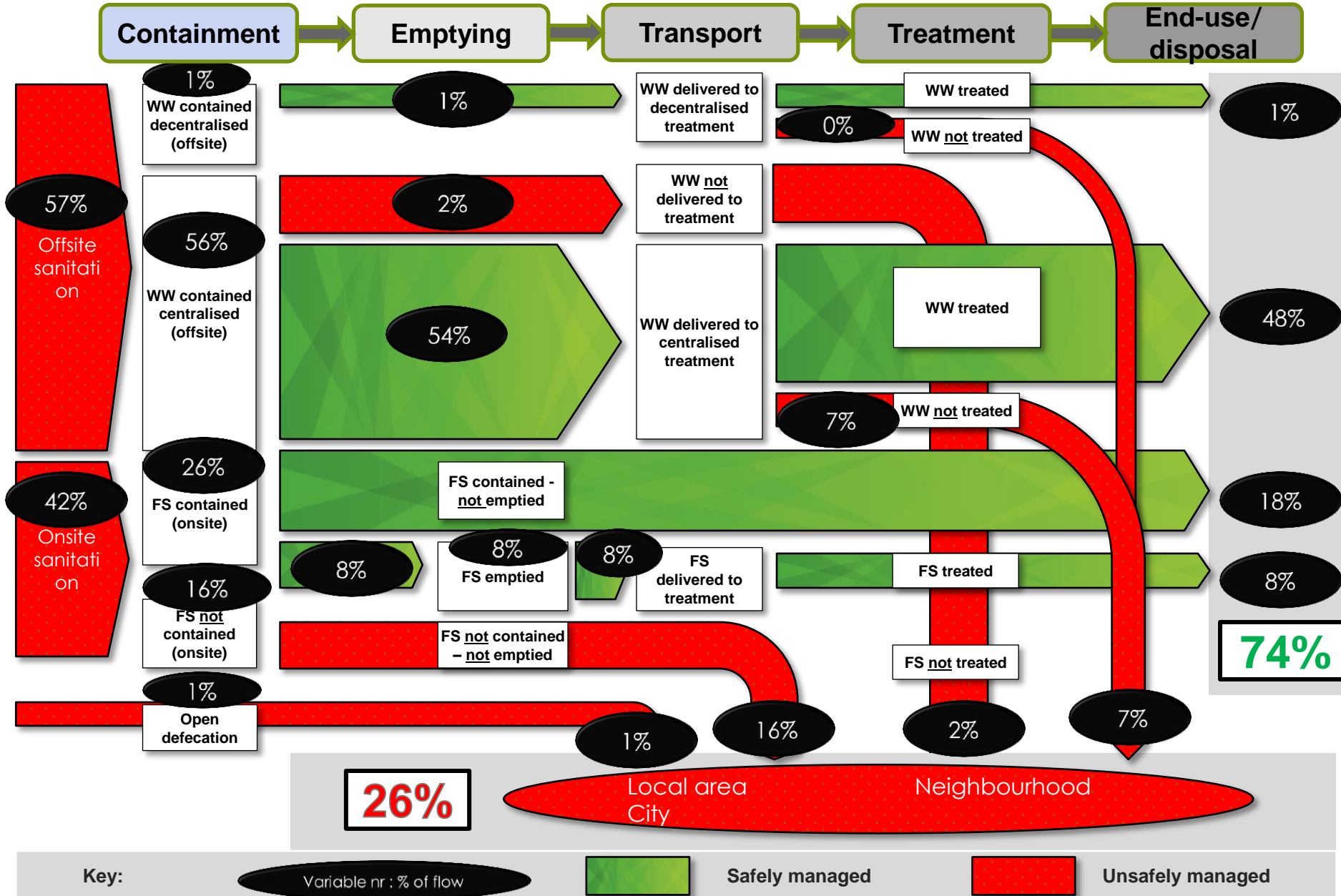
| City | Country | Proportion of population using sanitation type | | | Treated (Safe) | Main contributor to treated |
|---------------|--------------|--|---------|--------------------|----------------|---|
| | | OD | On-site | Off-site (sewered) | | |
| Dakar | Senegal | 2% | 73% | 25% | 31% | Mainly from on-site emptied and treated |
| Moshi | Tanzania | 2% | 81% | 17% | 36% | Equally mainly from centralized treatment and on-site closed pits |
| Nakuru | Kenya | 1% | 78% | 28% | 36% | Mainly from centralized treatment then on-site closed pits |
| Kampala | Uganda | 1% | 90% | 9% | 40% | Mainly from on-site closed pits |
| Dar es Salaam | Tanzania | 1% | 90% | 9% | 43% | Mainly from on-site closed pits |
| Maputo | Mozambique | 1% | 89% | 10% | 46% | Mainly from on-site closed pits |
| Kumasi | Ghana | 3% | 93% | 4% | 55% | Mainly from on-site emptied and treated |
| Durban | South Africa | 1% | 42% | 57% | 74% | From centralised works. 17% unserved population, 13% sewer loss Strong base to perform |

Comparison of SFDs across Africa

| City | Country | Proportion of population using sanitation type | | | Treated (Safe) | Main contributor to treated |
|------------|--------------|--|---------|--------------------|----------------|---|
| | | OD | On-site | Off-site (sewered) | | |
| Nashik | India | 4% | 54% | 42% | 85% | Equally mainly from centralized treatment and on-site closed pits |
| Nonthaburi | Thailand | 0% | 100% | 0% | 79% | Equally from treated FS emptied and closed pits |
| Durban | South Africa | 1% | 42% | 57% | 74% | 17% unserved population, 13% sewer loss Strong base to perform |

Comparison with other SFDs

Shit Flow Diagram (SFD), Durban



Summary of the Service Delivery Analysis

- ❑ Separate Policy and Legislation for sanitation
 - ❑ Sanitation defined as more than simply toilets
 - ❑ Goals in place for sanitation development
 - ❑ National and Municipal level
 - ❑ Plans to
 - ❑ Increase treatment capacity
 - ❑ Introduce reuse of FS
 - ❑ Increase reuse of UD FS
 - ❑ Provide temporary services
 - ❑ Increase UD toilet mapping
 - ❑ Relationship with private package plant and septic tank companies improving
- ❑ Potential Problem areas:
 - ❑ Growing no. of sewer connections without focus goals on sewer maintenance
 - ❑ Bottleneck at EIA stage
 - ❑ All services reactive rather than proactive

Weaknesses in the Results

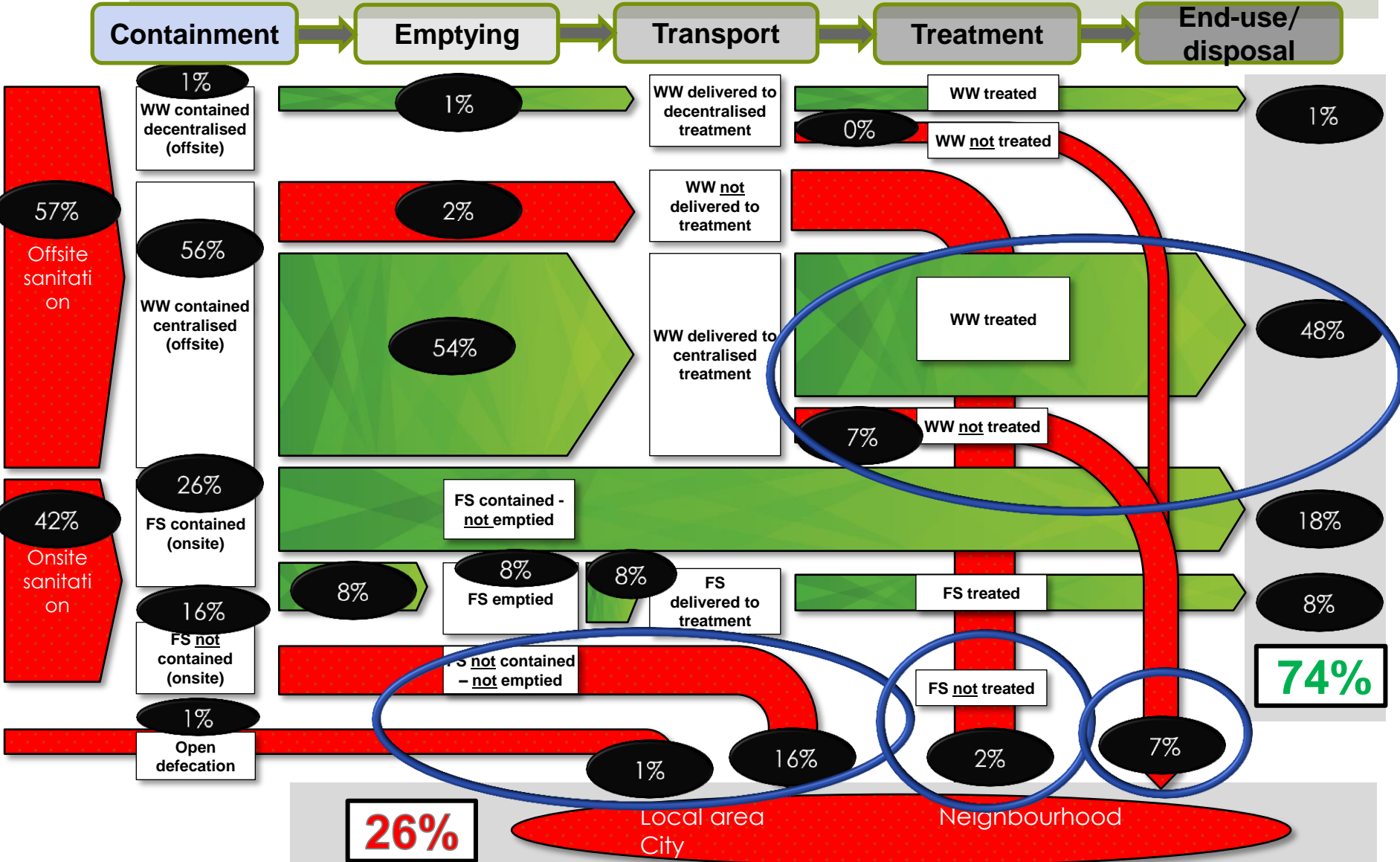
- ❑ Transport by sewers
 - ❑ Blockages estimation:
 - ❑ 60MI/d sewer trunk
 - ❑ 140 blockages per day
 - ❑ 4 to 24 hours to respond
- ❑ Details on the sludge treatment
- ❑ Proportion of WW treated
 - ❑ Centralised WWTW
 - ❑ Green Drop Report
 - ❑ Package Plants
 - ❑ Top ten meeting standards
- ❑ Proportion of FS treated at WWTW





Weaknesses in the Results

- ❑ Unserved Sanitation choices
 - ❑ Divided by informal or rural dwellings
- ❑ Means of measuring unserved homes
- ❑ No interviews with:
 - ❑ social services for public view
 - ❑ Septic tank services
 - ❑ Pit emptying contractors
 - ❑ Sludge treatment operators



Key Points of Interest



The Way Forward

- Confirm areas of weakness in my research
 - Proportion delivered to the treatment works
- Decision-support tool
 - Confirm need for reducing backlog
 - Need for sewer maintenance
 - Need for pelletizing sludge
- Part of the global awareness project

Acknowledgements

- Chris Buckley from PRG
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- Lars Schoebitz from Eawag



SFD Promotion Initiative

sustainable
sanitation
alliance

giz Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH

On behalf of
Federal Ministry
for Economic Cooperation
and Development


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water and
sanitation program

 **WEDC**  Loughborough
University

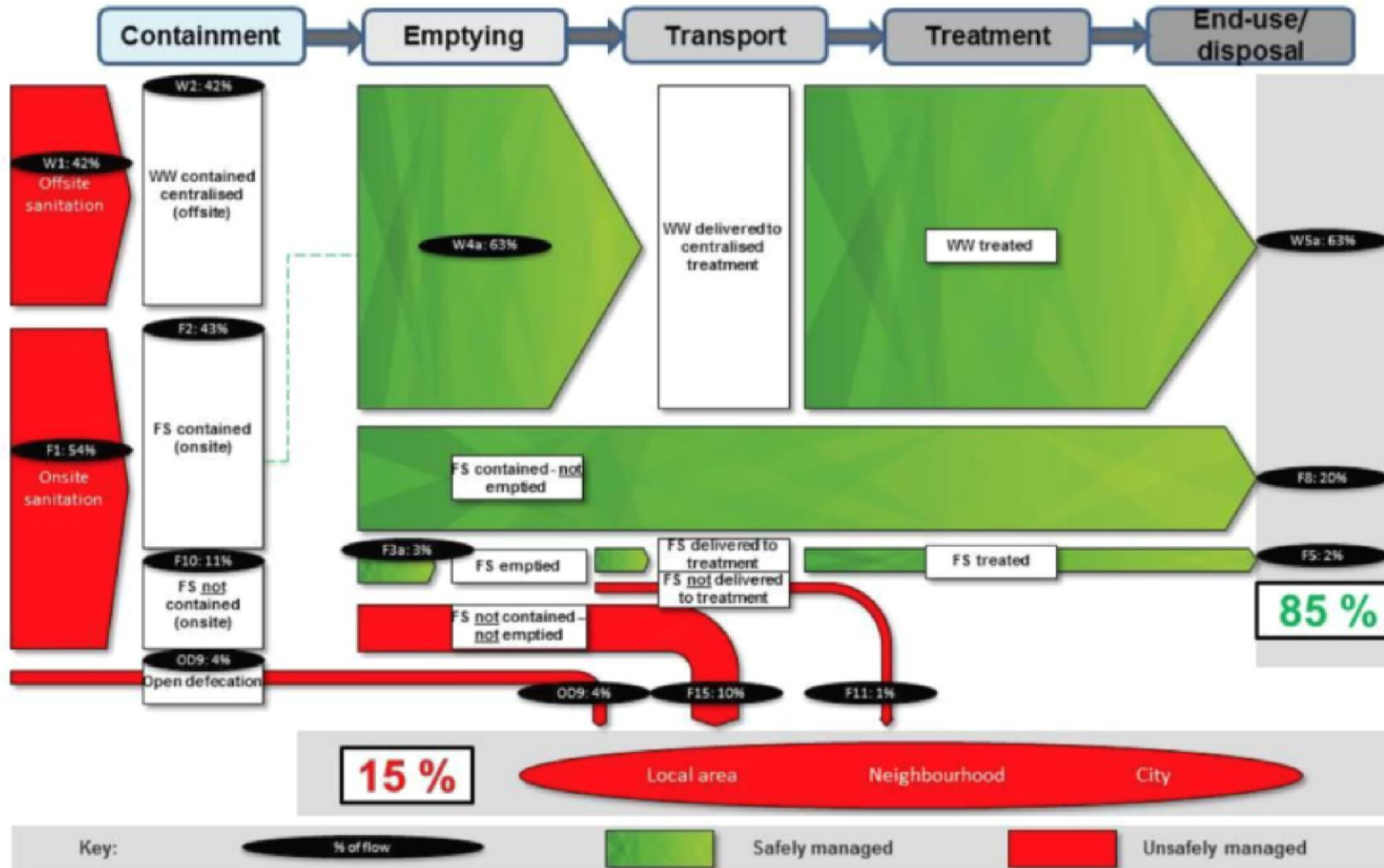


eawag
aquatic research
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Sanedec
Sanitation, Water and
Solid Waste for Development



Thank you

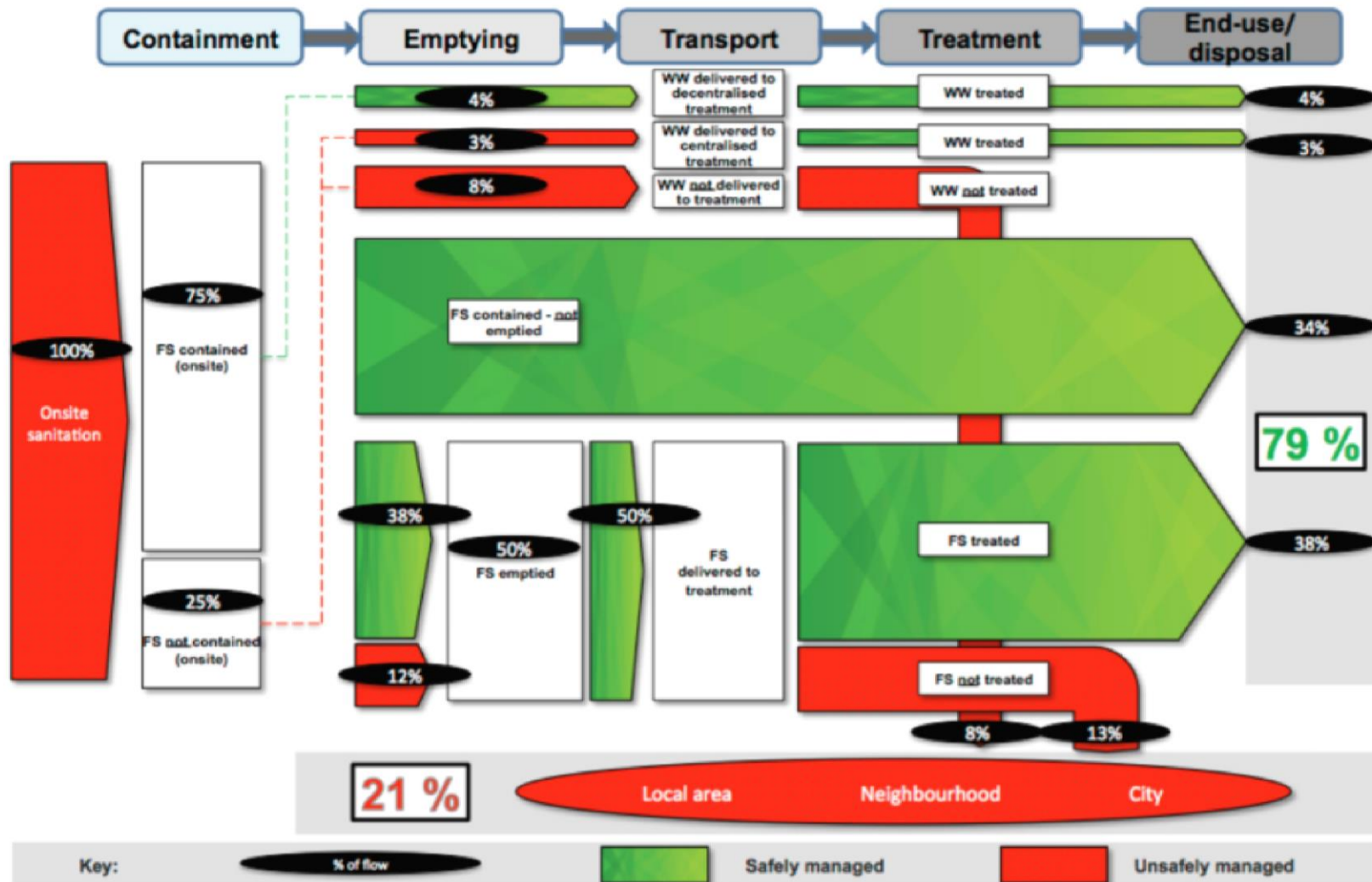




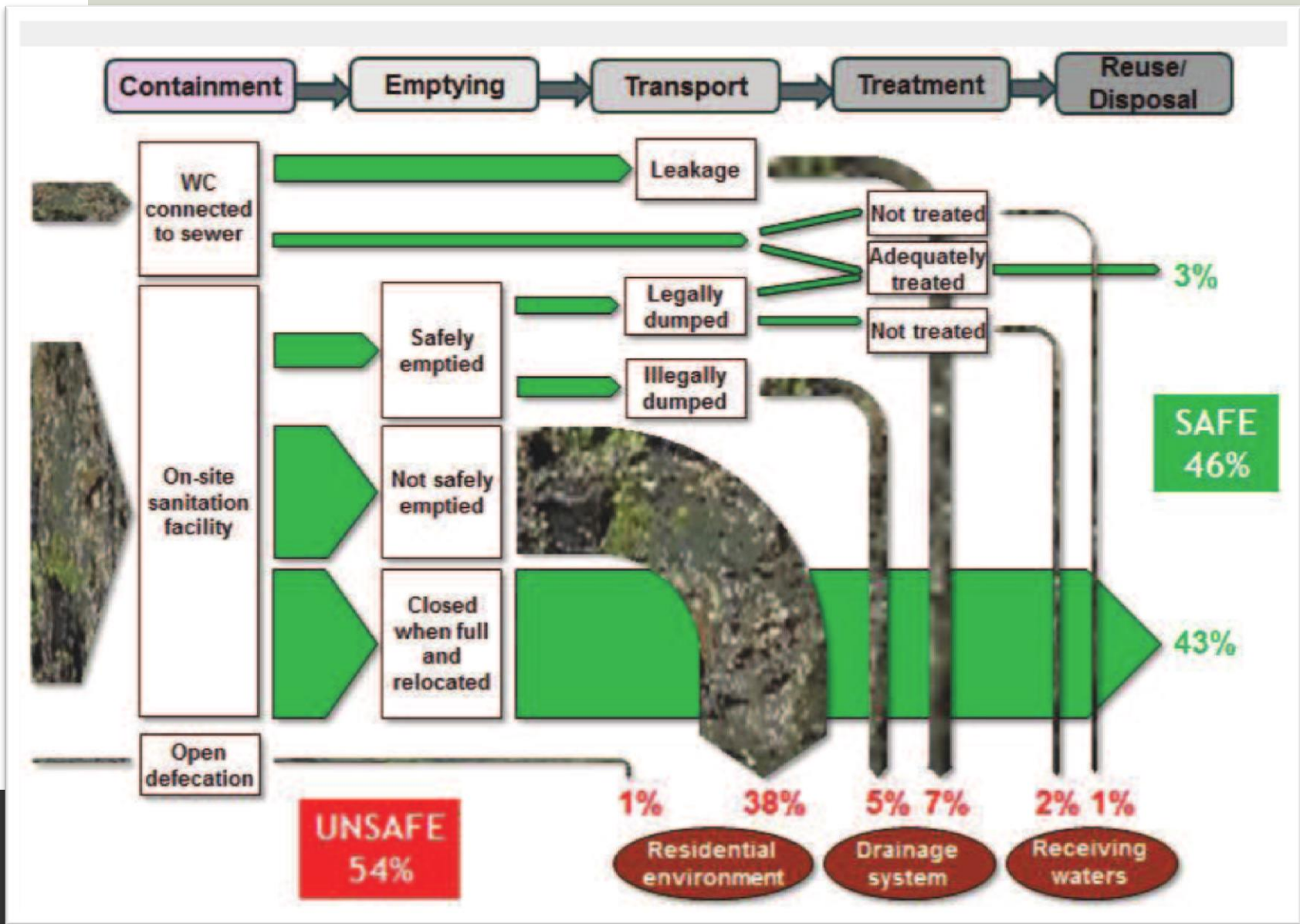
SFD that has been completed for the initial WSP study for Nashik, India

Nonthaburi, Thailand, 11.11.2015

Desk based assessment



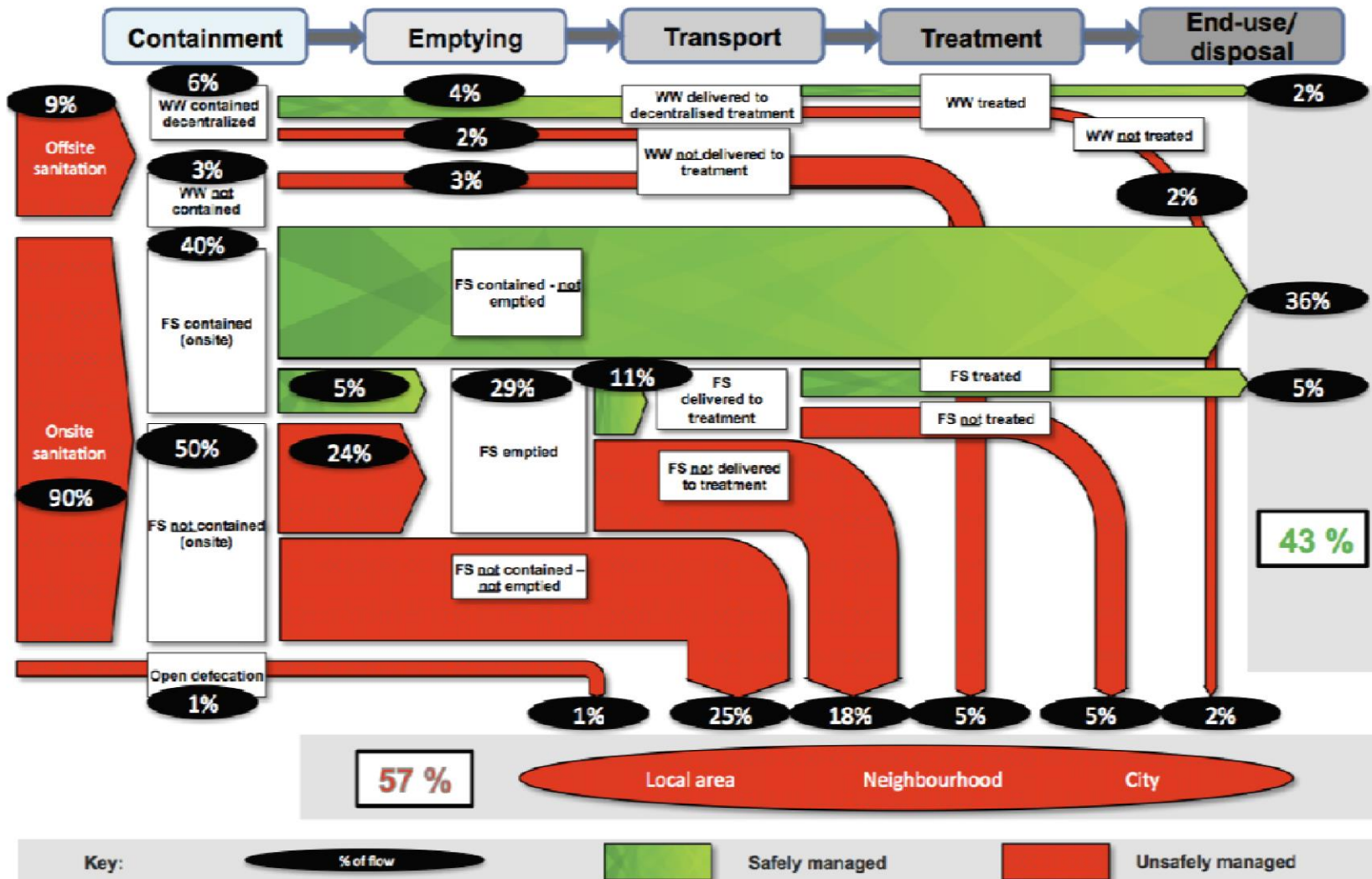
SFD that has been completed for the initial WSP study for Nonthaburi, Thailand



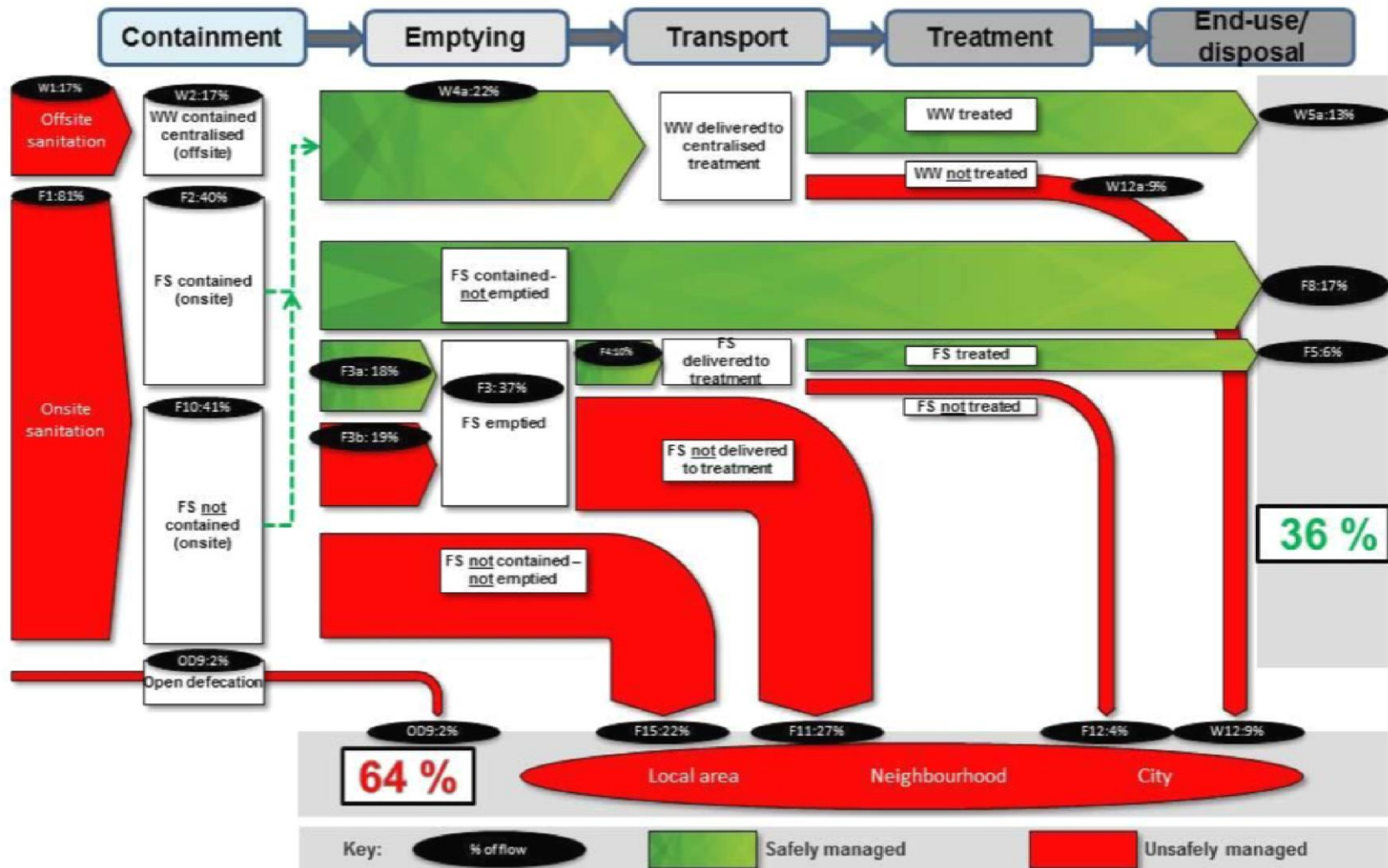
SFD that has been completed for the initial WSP study for Maputo, Mozambique

Dar es Salaam, Tanzania, 03.09.2015

Field based assessment



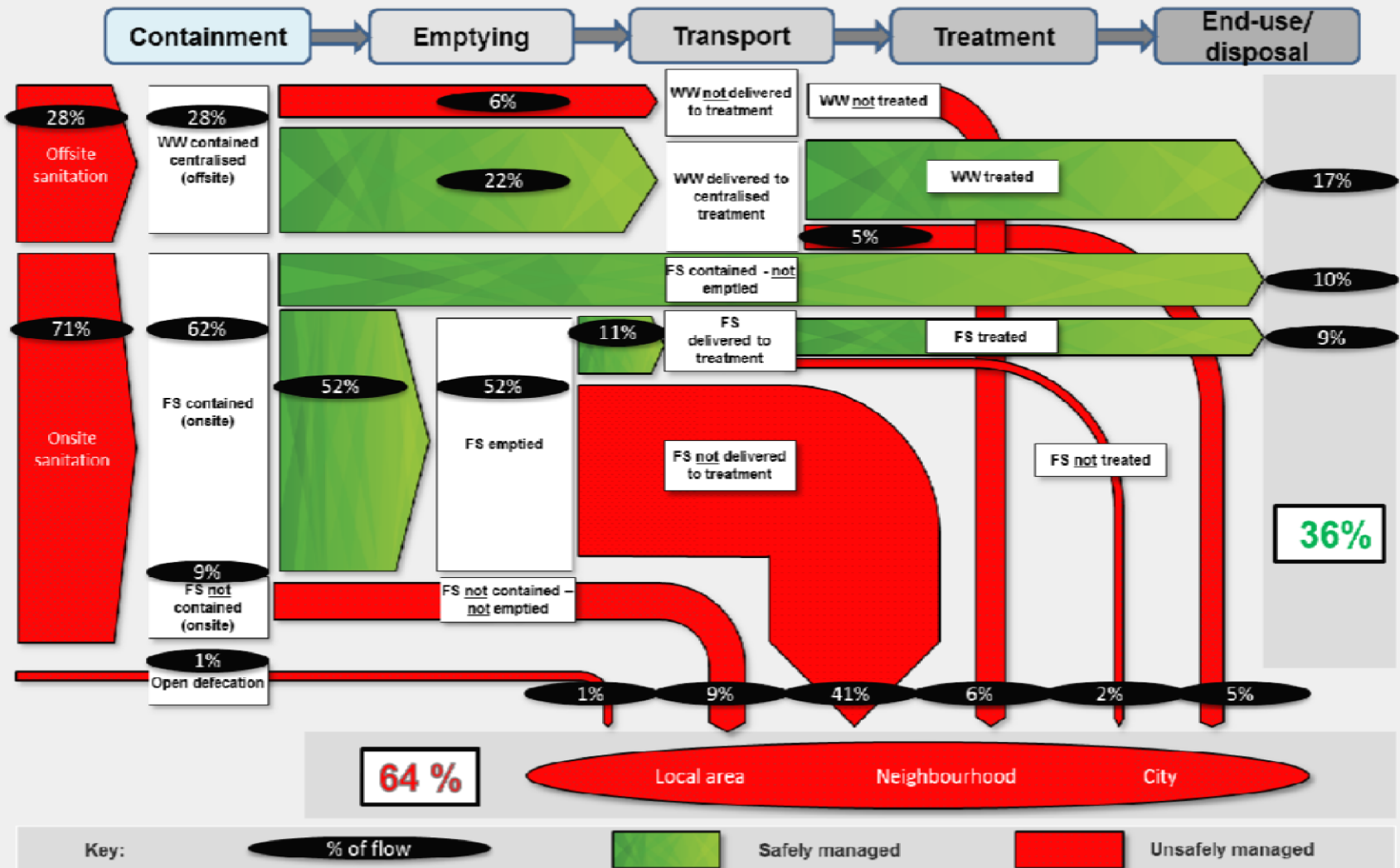
SFD that has been reviewed and finalised for Dar es Salaam, Tanzania



SFD that has been reviewed and finalised for Moshi, Tanzania

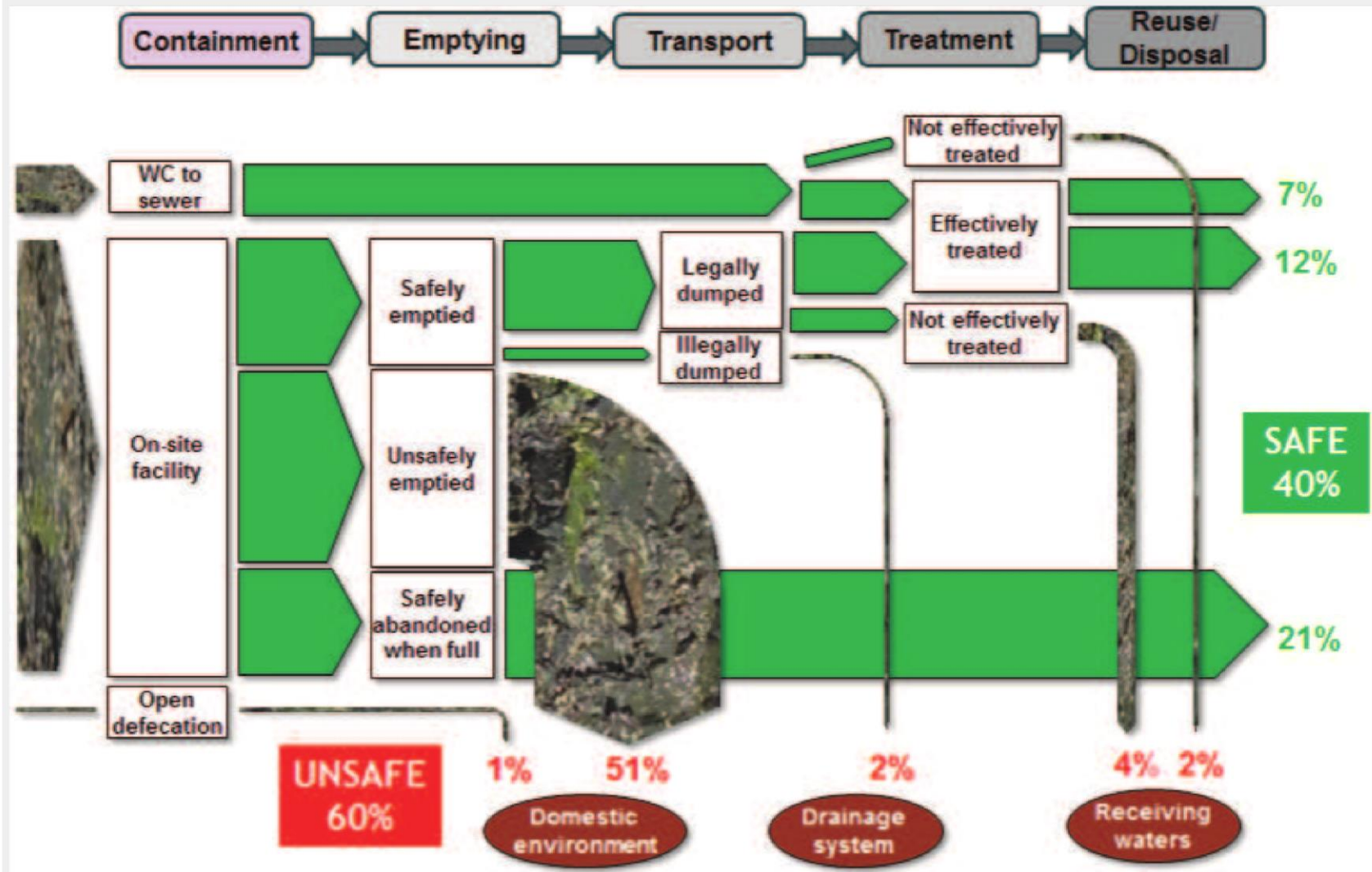
Nakuru 17/11/2015

Desk based

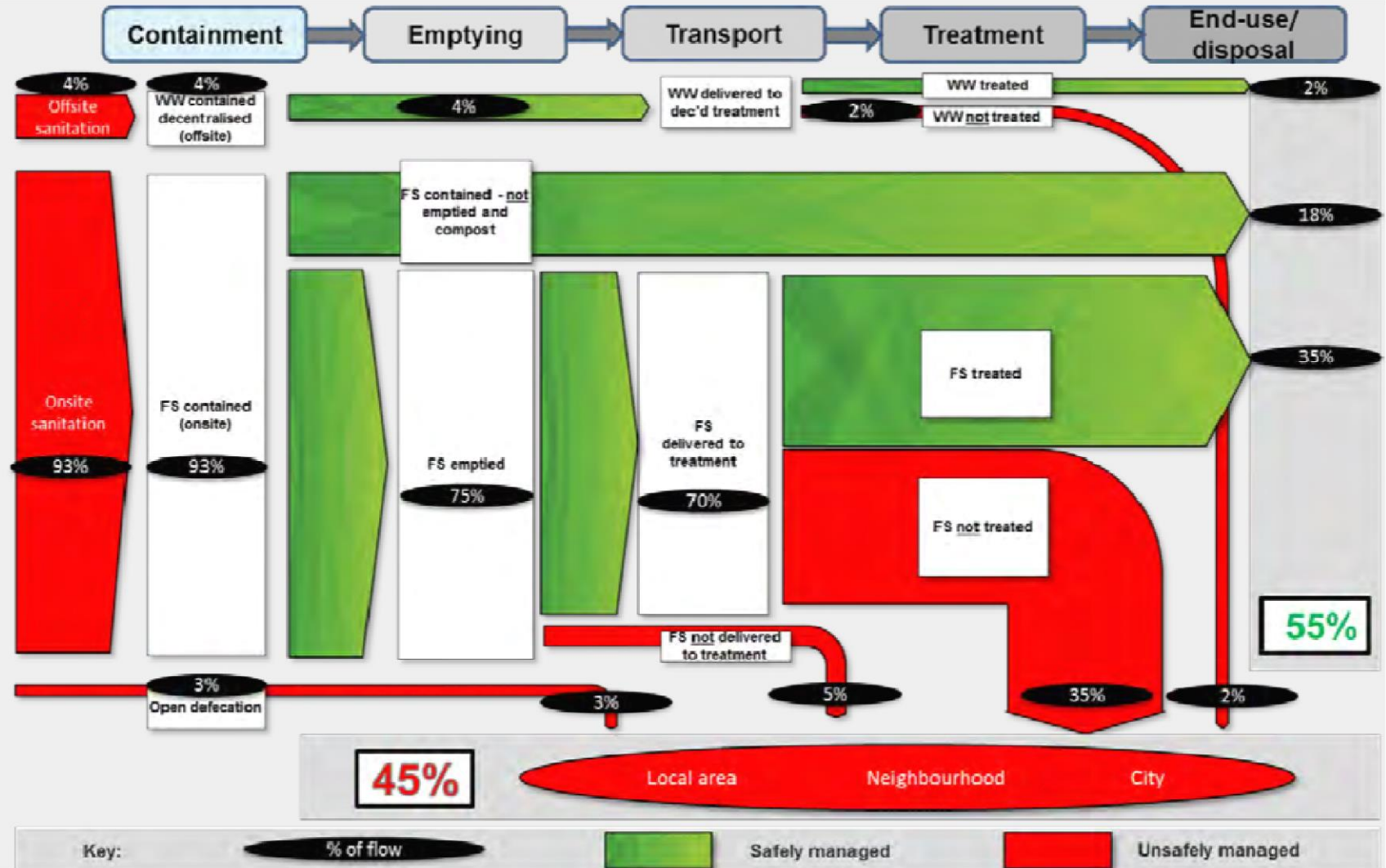


SFD that has been reviewed and finalised for Nakuru, Kenya

Figure 37: Fecal waste flow matrix for Kampala, Uganda

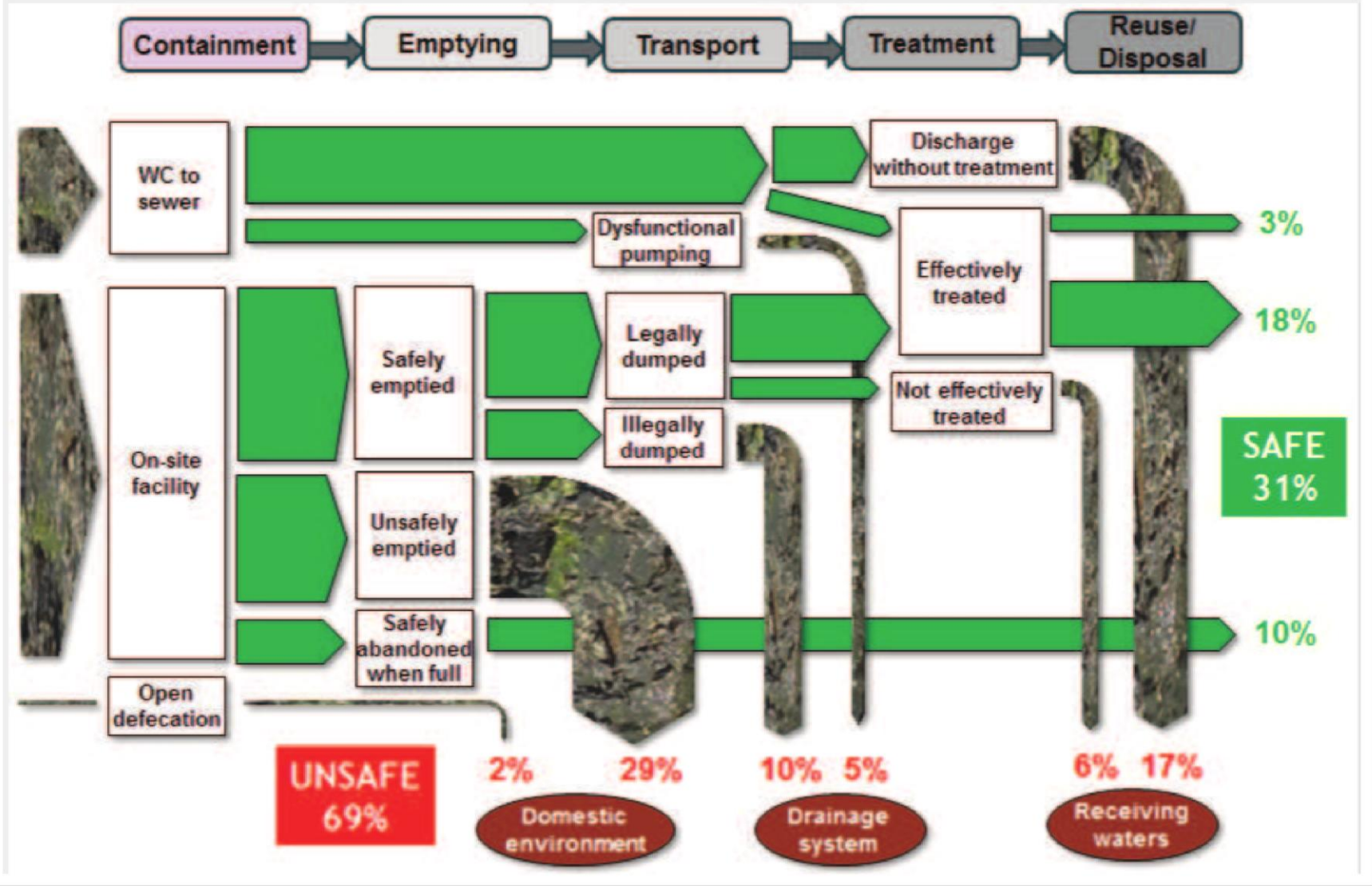


SFD that has been completed for the initial WSP study for Kampala, Uganda



SFD that has been reviewed and finalised for Kumasi, Ghana

Figure 34: Fecal waste flow matrix for Dakar, Senegal



SFD that has been completed for the initial WSP study for Dakar, Senegal