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- Weaknesses in the Results
- Key Points of Interest
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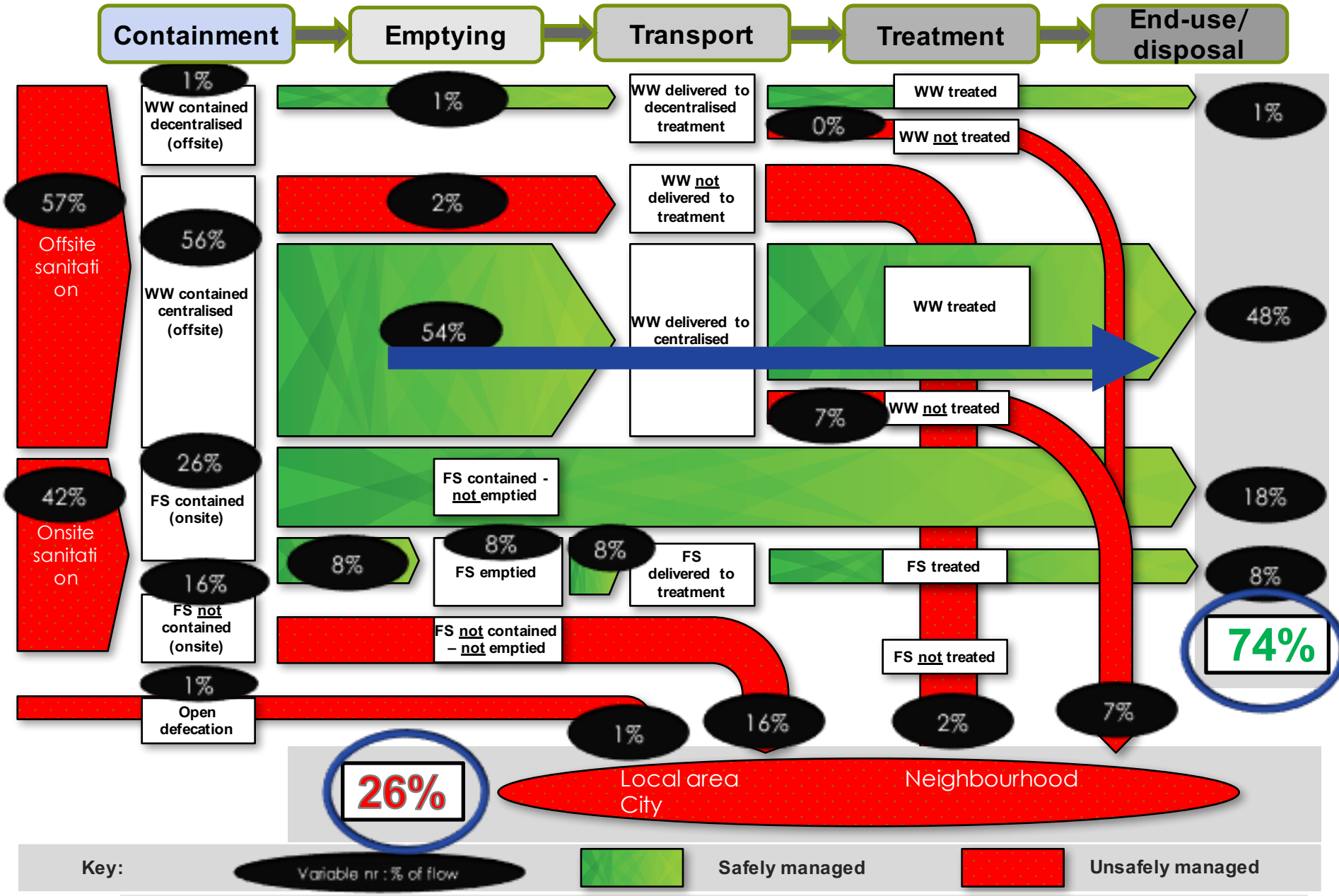
Shit Flow Diagram Figures

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 ablution	People with VIP	People with Septic or Package Plants	People with Waterborne to central	People Unserved
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 centralizsd 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

Data from SuSanA SFD Promotion Initiative Documents

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

Data from SuSanA SFD Promotion Initiative Documents

Overview of the System

- Onsite
  - UD toilets
    - to BSF
    - contents buried on site
  - VIP toilets
  - Ablution block onsite
  - Septic Tank flush toilets
  - Conservancy tanks flush toilets
- Offsite
  - Flush toilets to central sewer network
  - Ablution block to central sewer
  - Decentralized package plants

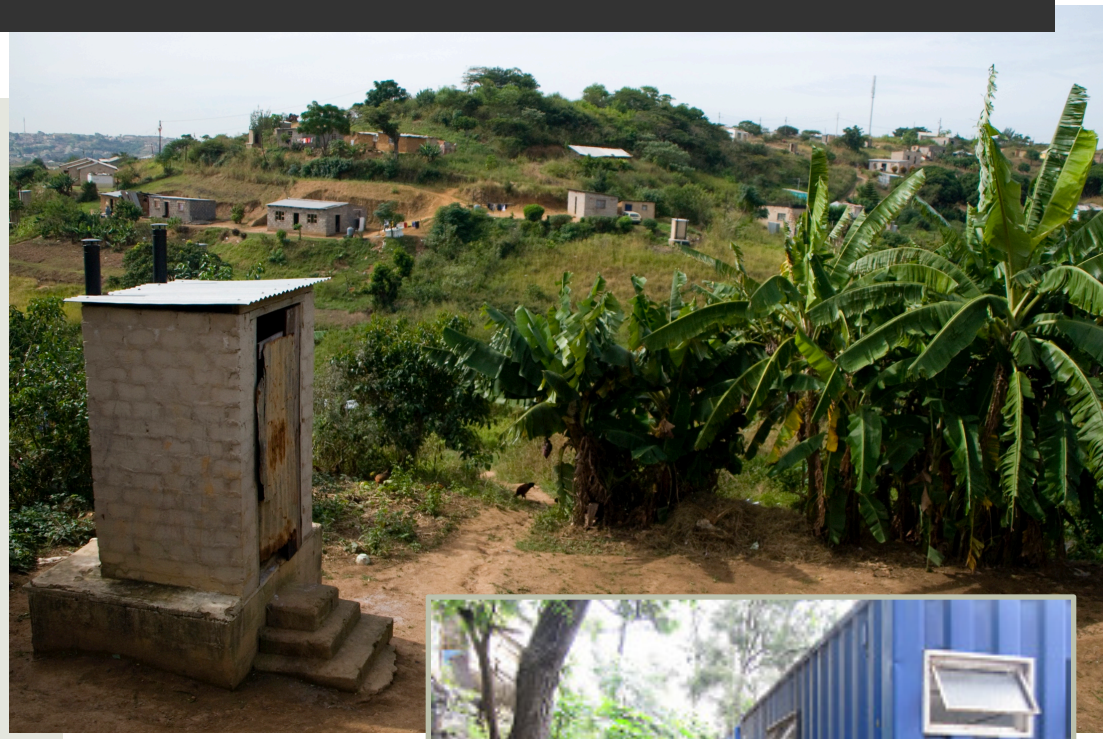
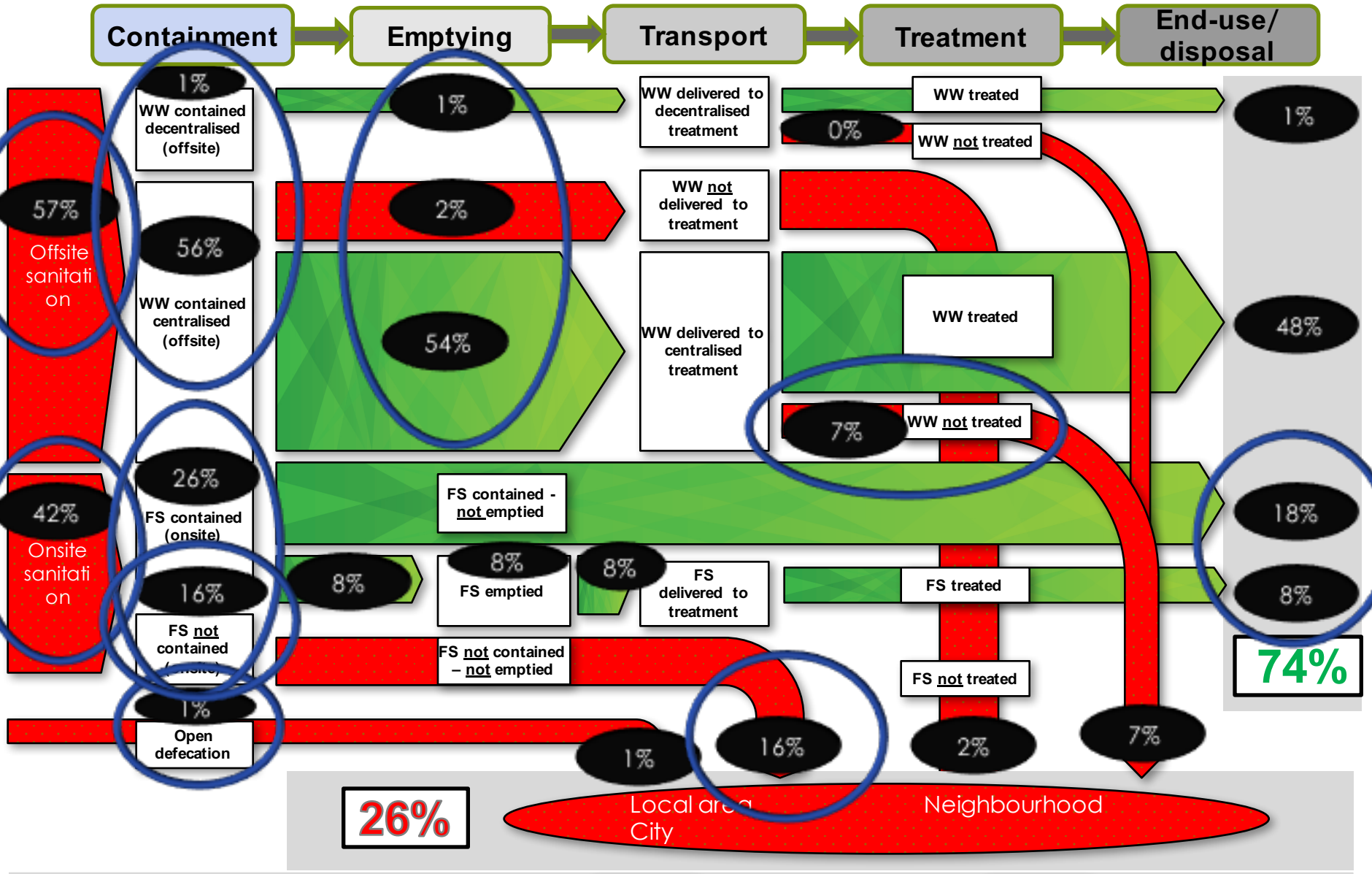


Image from:
http://flickrhivemind.net/flickr_hvmnd.cgi?method=GET&page=3&photo_number=50&tag_mode=all&search_type=Tags&originput=durban,sanitation&sorting=Interestingness&photo_type=250&noform=t&search_domain=Tags&sort=Interestingness&textinput=durban,sanitation

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 PP 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

Image from: http://tcktcktck.org/2011/12/staring-down-the-wrong-side-of-history/

Weaknesses in the Results

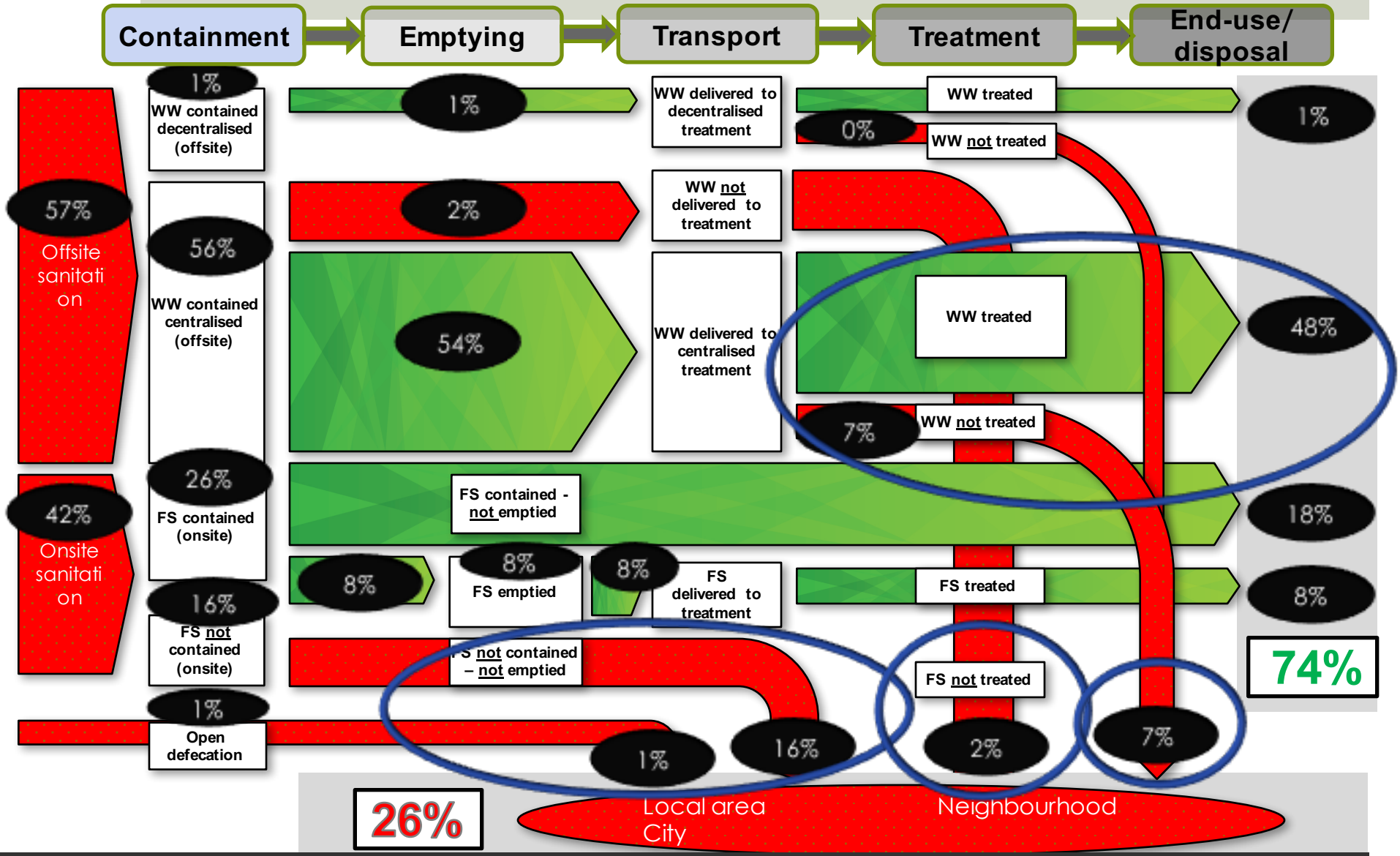
- Transport by sewers
  - Blockages estimation:
    - 60Ml/d sewer trunk
    - 140 blockages per day
    - 4 to 24 hours to respond to
- Details on the sludge treatment
- Proportion of WW treated
  - Centralised WWTW
    - Green Drop Report
  - Package Plants
    - Top ten meeting standards
- Proportion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

Image from: http://www.balkandraincleaning.com/main-sewer-clog-causes-solutions/

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

Image from: http://sasdialliance.org.za/wp-content/uploads/docs/reports/Havelock%20settlement%20report.pdf



Key Points of Interest

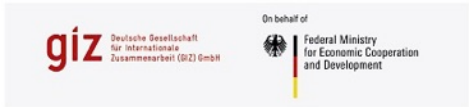
The Way Forward

- 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

Image from: https://www.travelground.com/blog/daycationing-in-durban/

Acknowledgements

- Chris Buckley from PRG
- eThekwini Water and Sanitation
- Lars Schoebitz from Eawag



Thank you

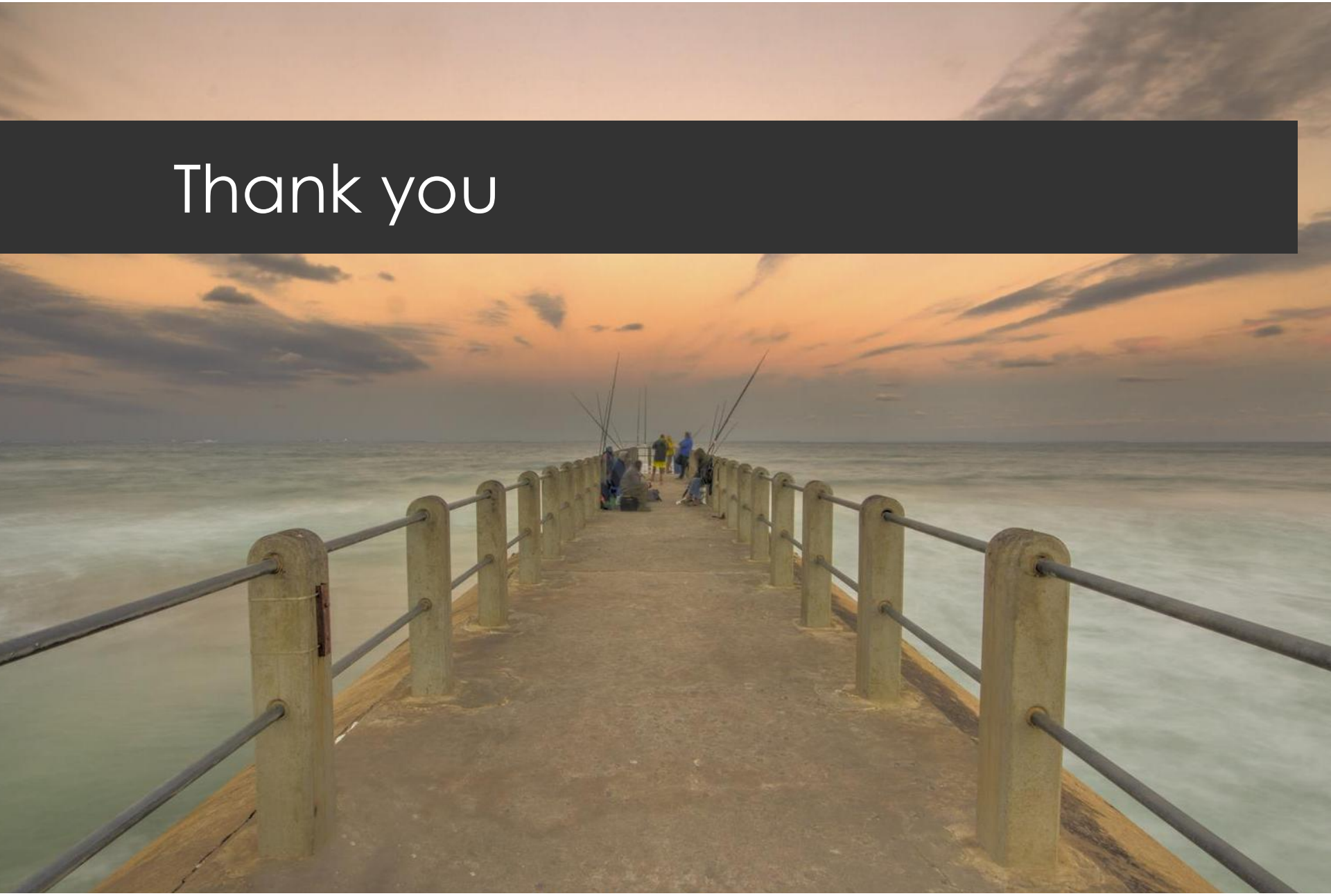
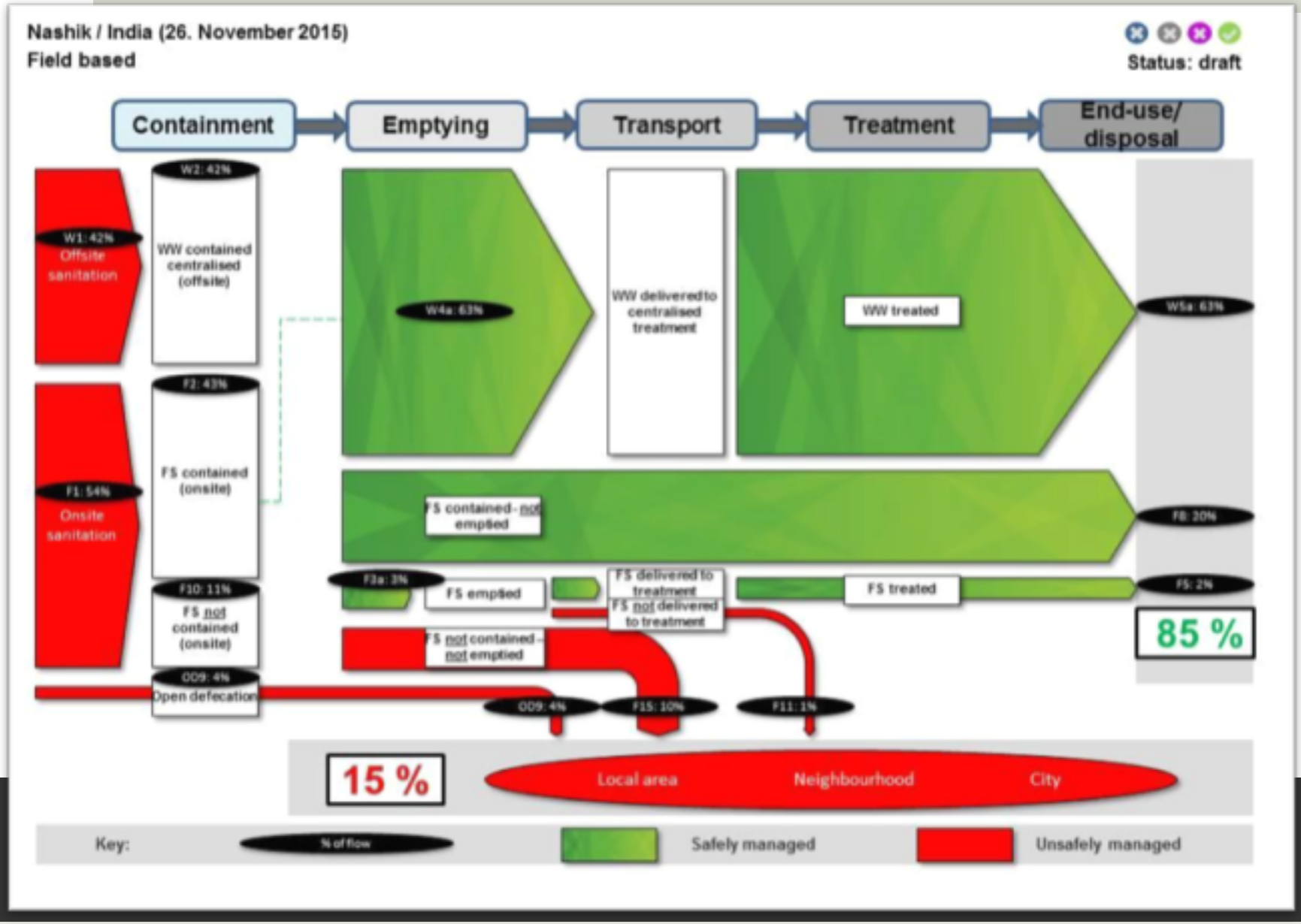
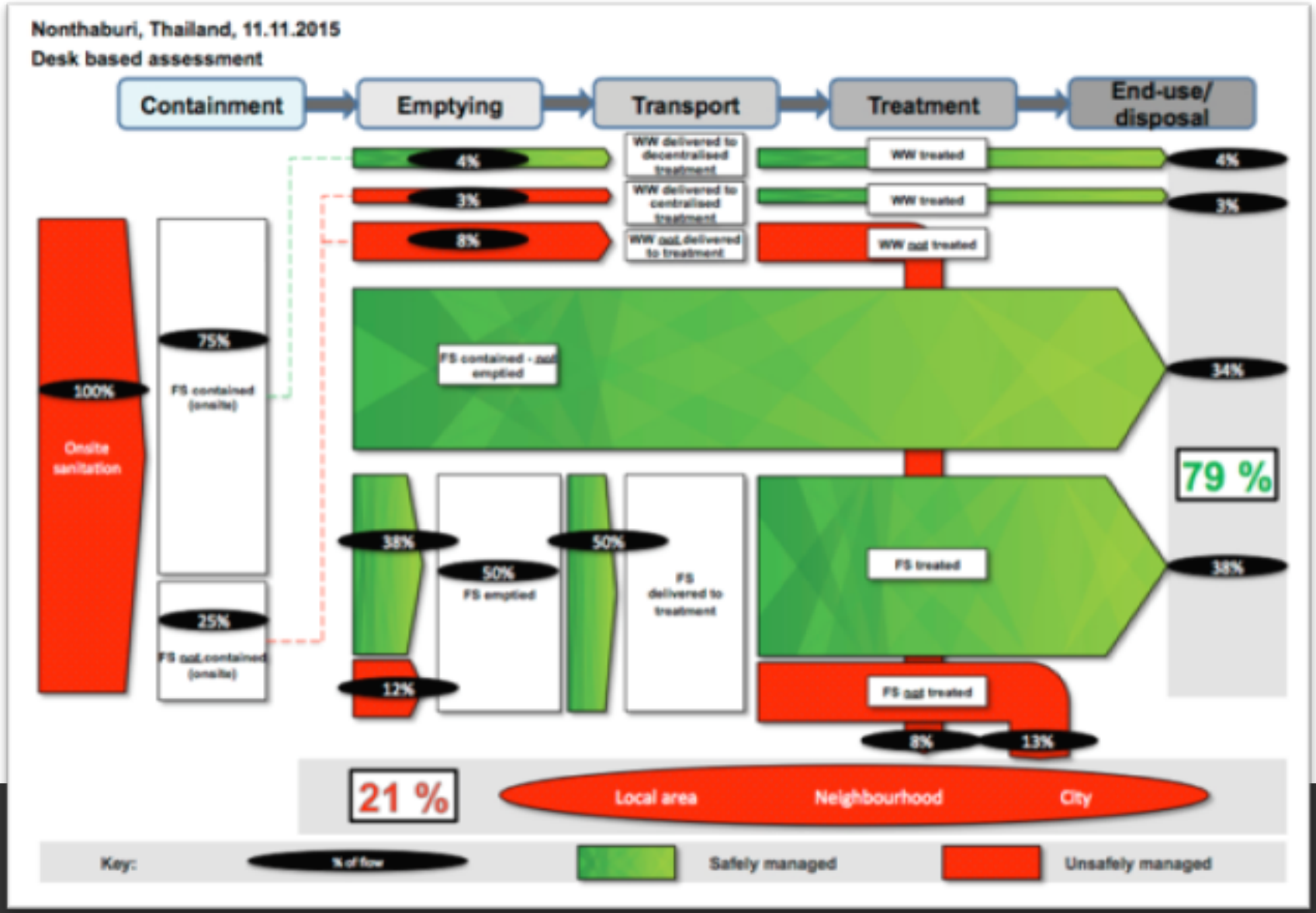


Image from: https://snapflycook.wordpress.com/



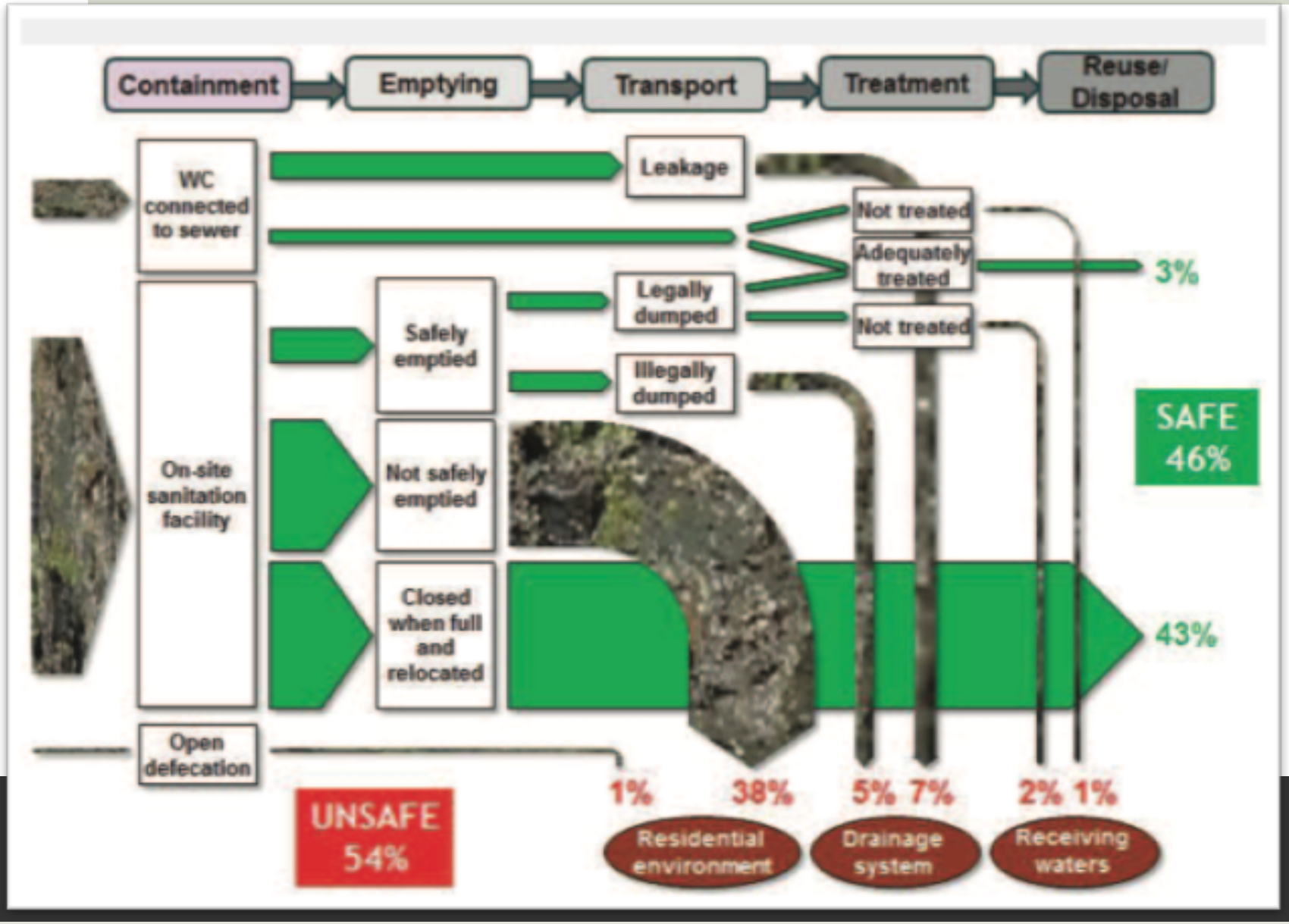
SFD that has been completed for the initial WSP study for Nashik, India

Image from SuSanA SFD Promotion Initiative Documents



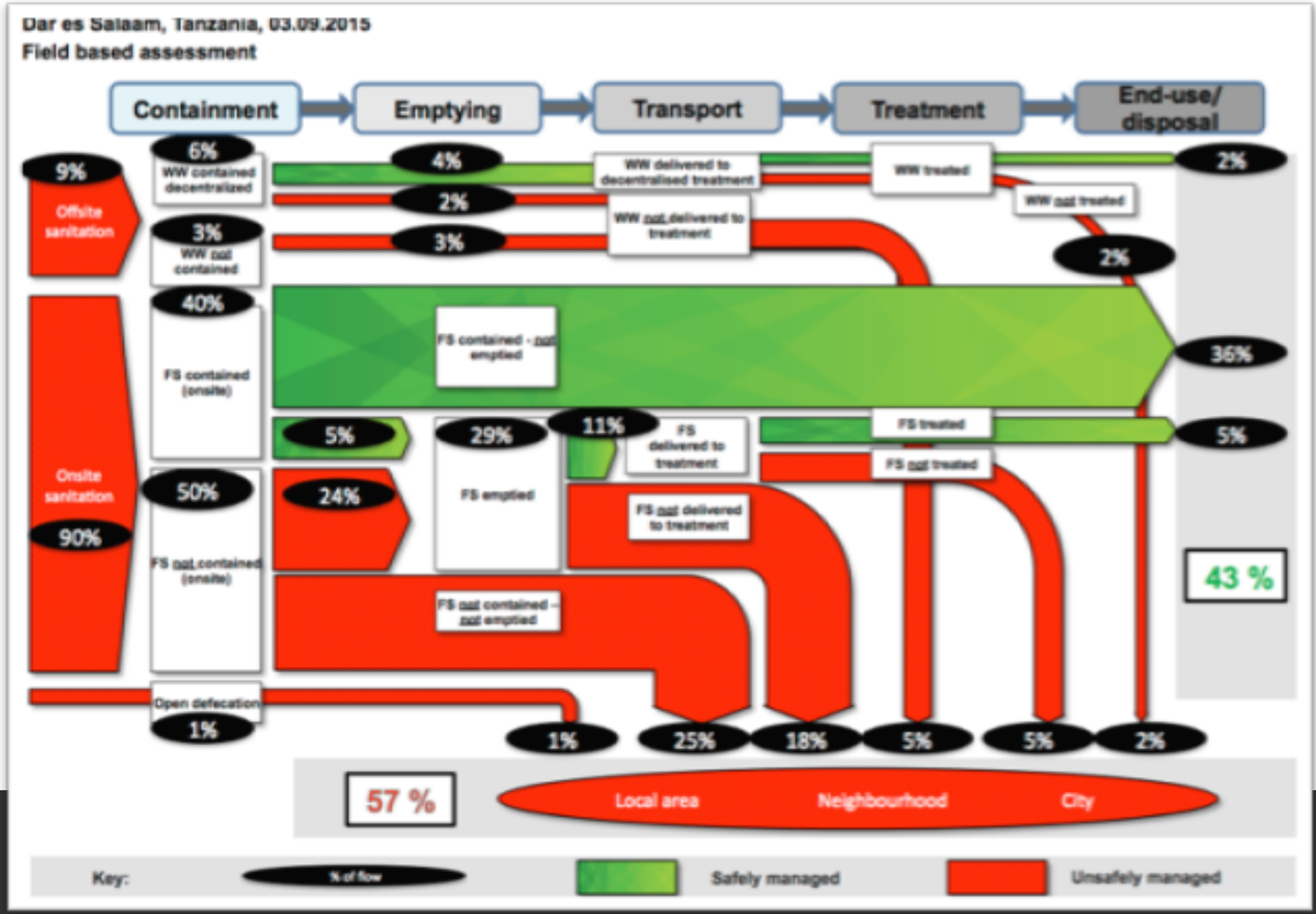
SFD that has been completed for the initial WSP study for Nonthaburi, Thailand

Image from SuSanA SFD Promotion Initiative Documents



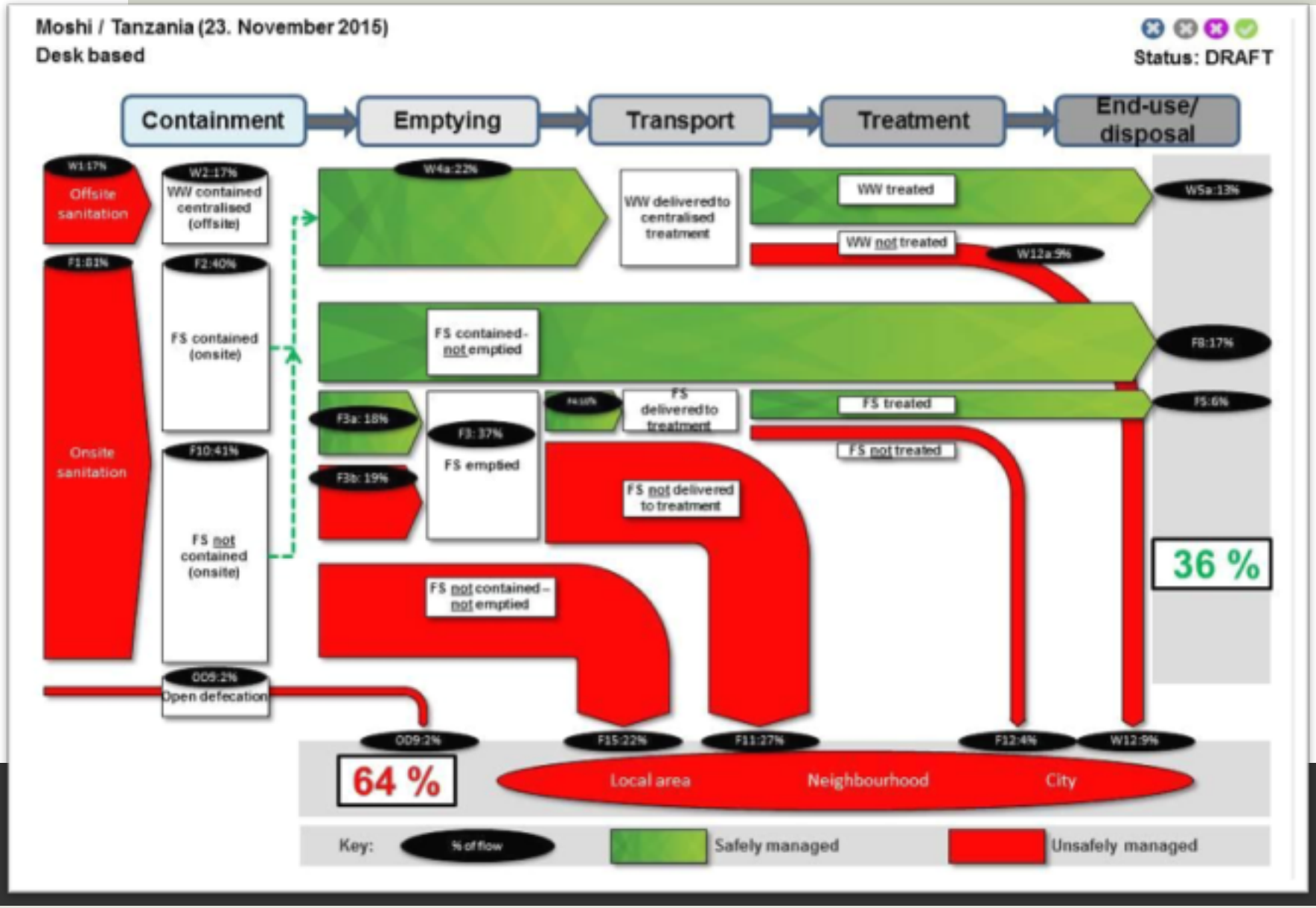
SFD that has been completed for the initial WSP study for Maputo, Mozambique

Image from SuSanA SFD Promotion Initiative Documents



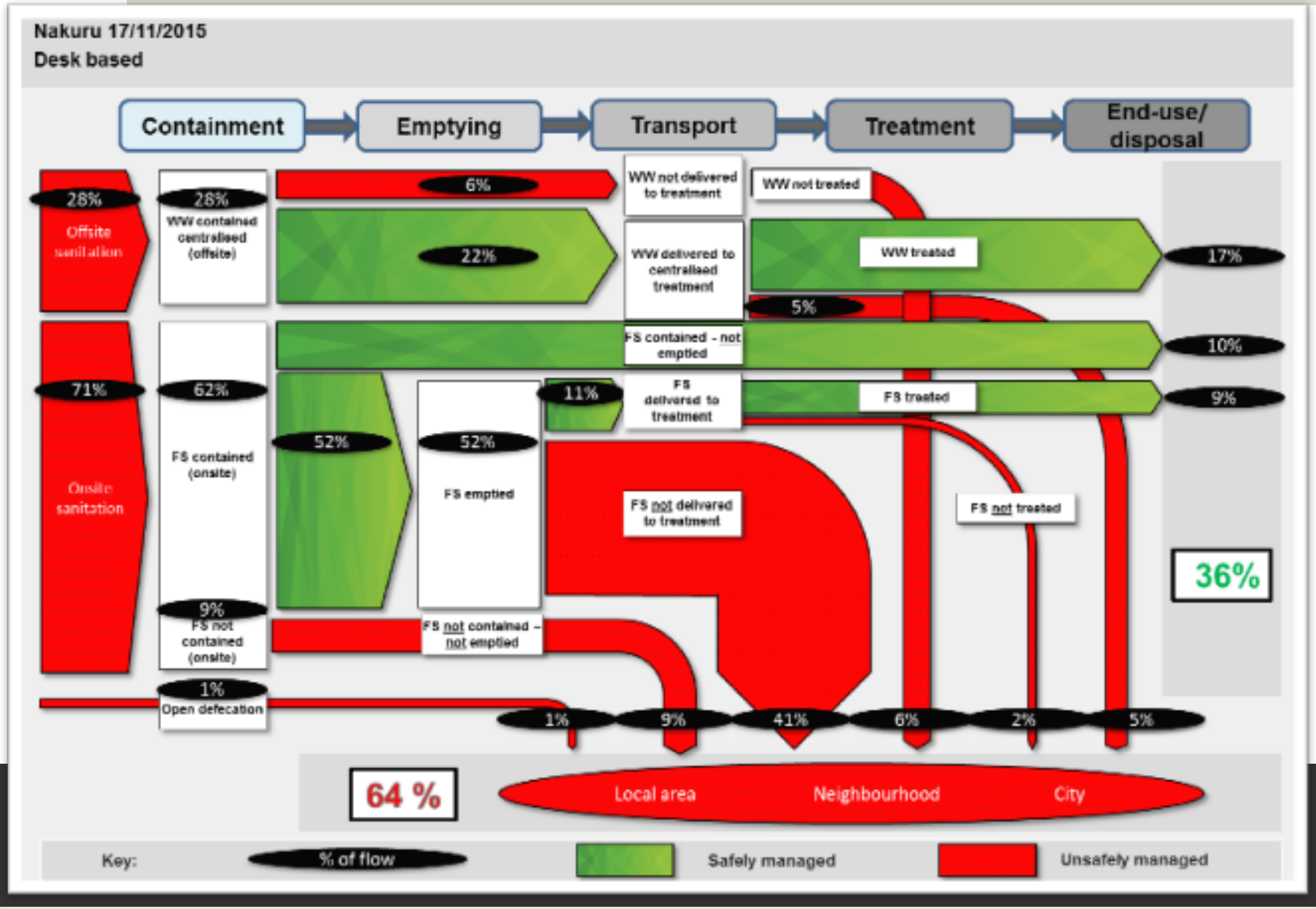
SFD that has been reviewed and finalised for Dar es Salaam, Tanzania

Image from SuSanA SFD Promotion Initiative Documents



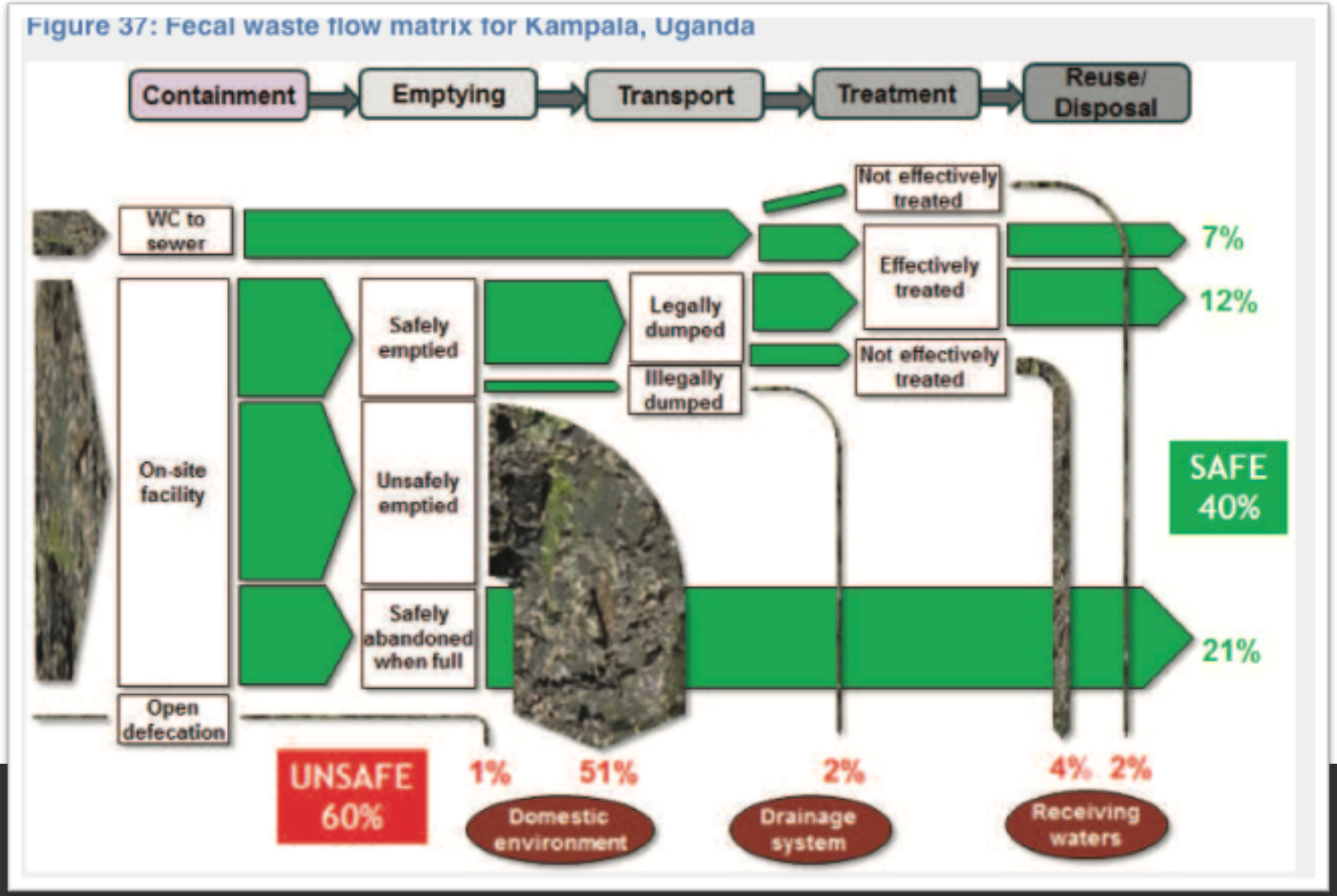
SFD that has been reviewed and finalised for Moshi, Tanzania

Image from SuSanA SFD Promotion Initiative Documents



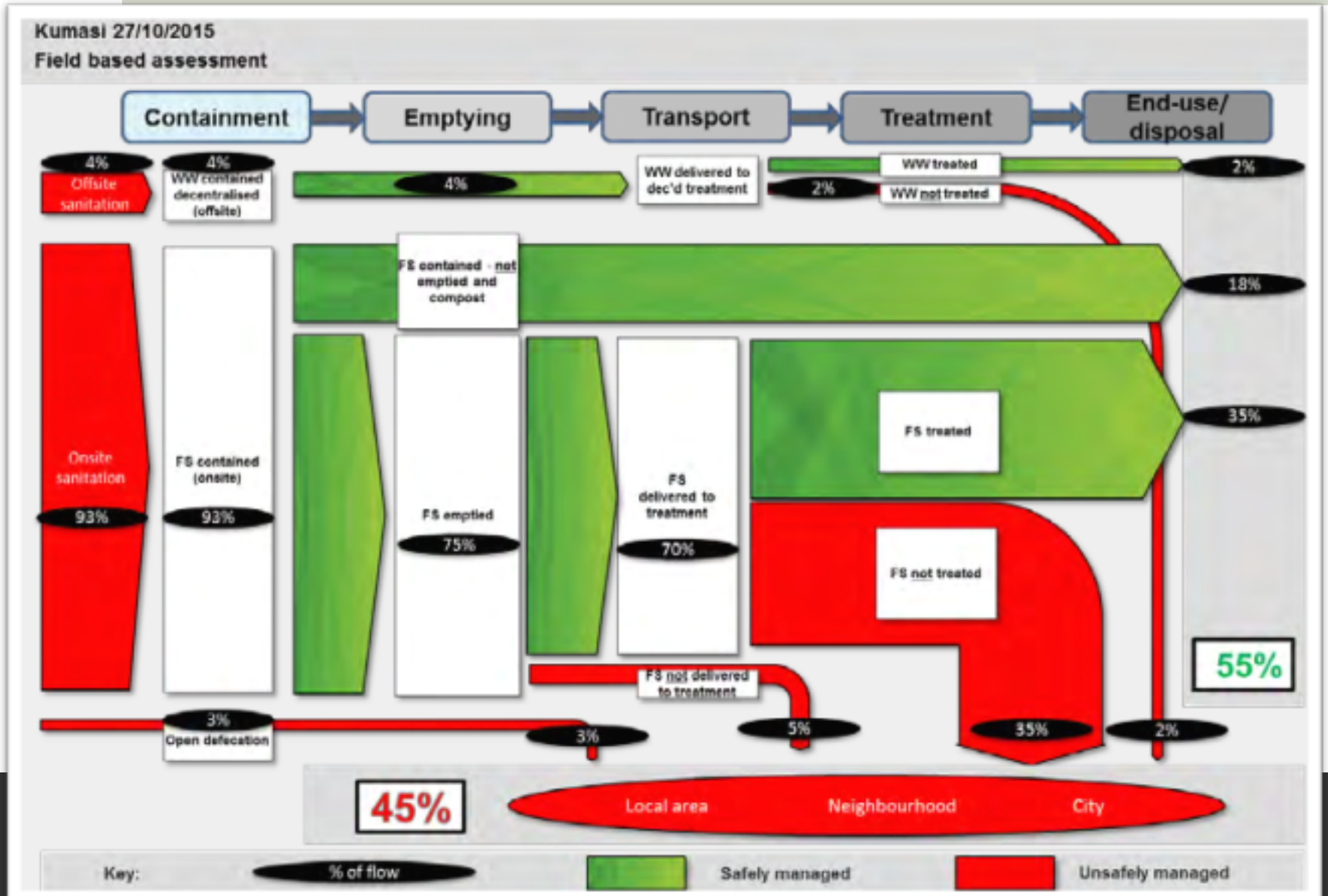
SFD that has been reviewed and finalised for Nakuru, Kenya

Image from SuSanA SFD Promotion Initiative Documents



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

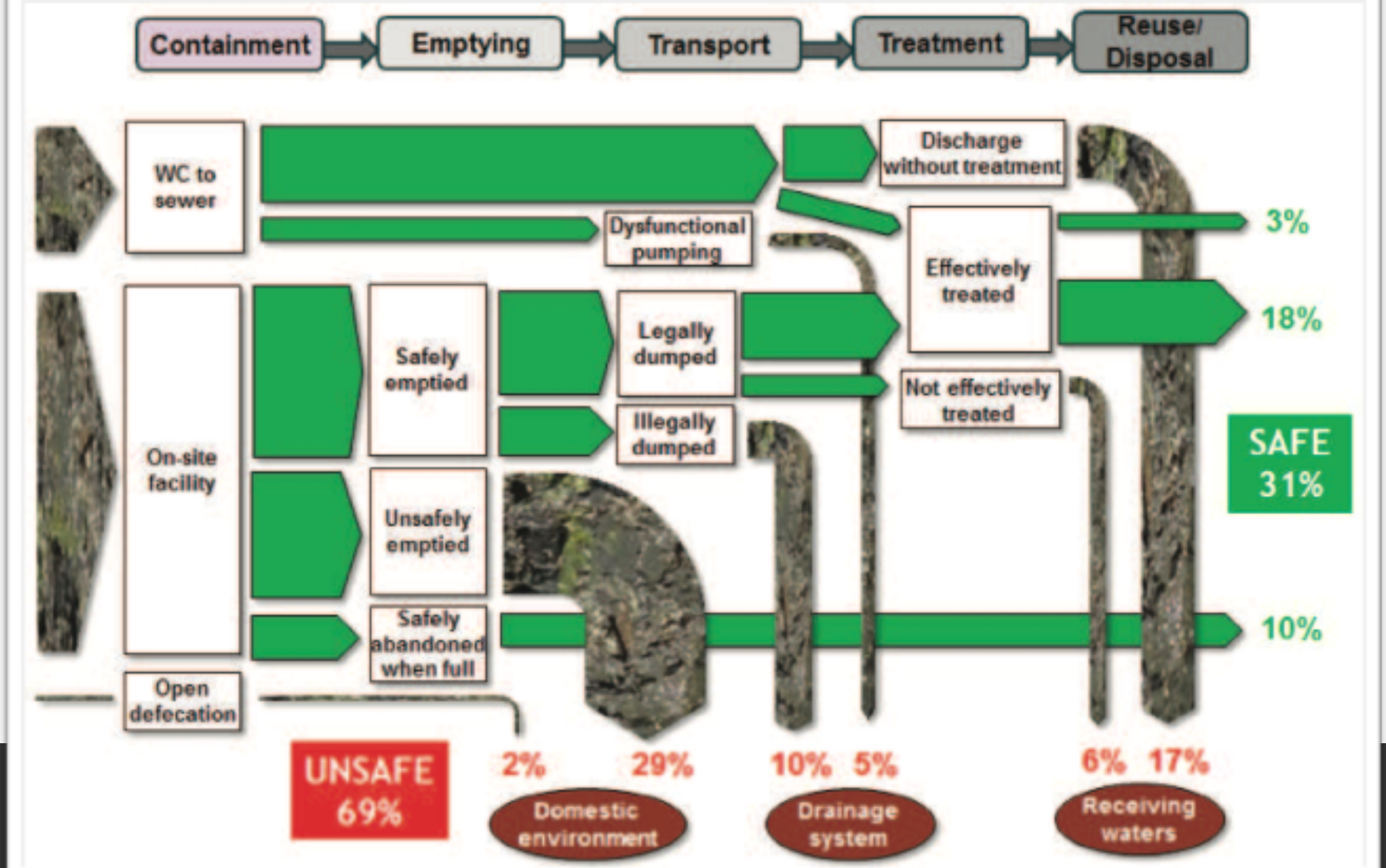
Image from SuSanA SFD Promotion Initiative Documents



SFD that has been reviewed and finalised for Kumasi, Ghana

Image from SuSanA SFD Promotion Initiative Documents

Figure 34: Fecal waste flow matrix for Dakar, Senegal



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

Image from SuSanA SFD Promotion Initiative Documents