

**How to translate risk into action:
tools for water stewardship**



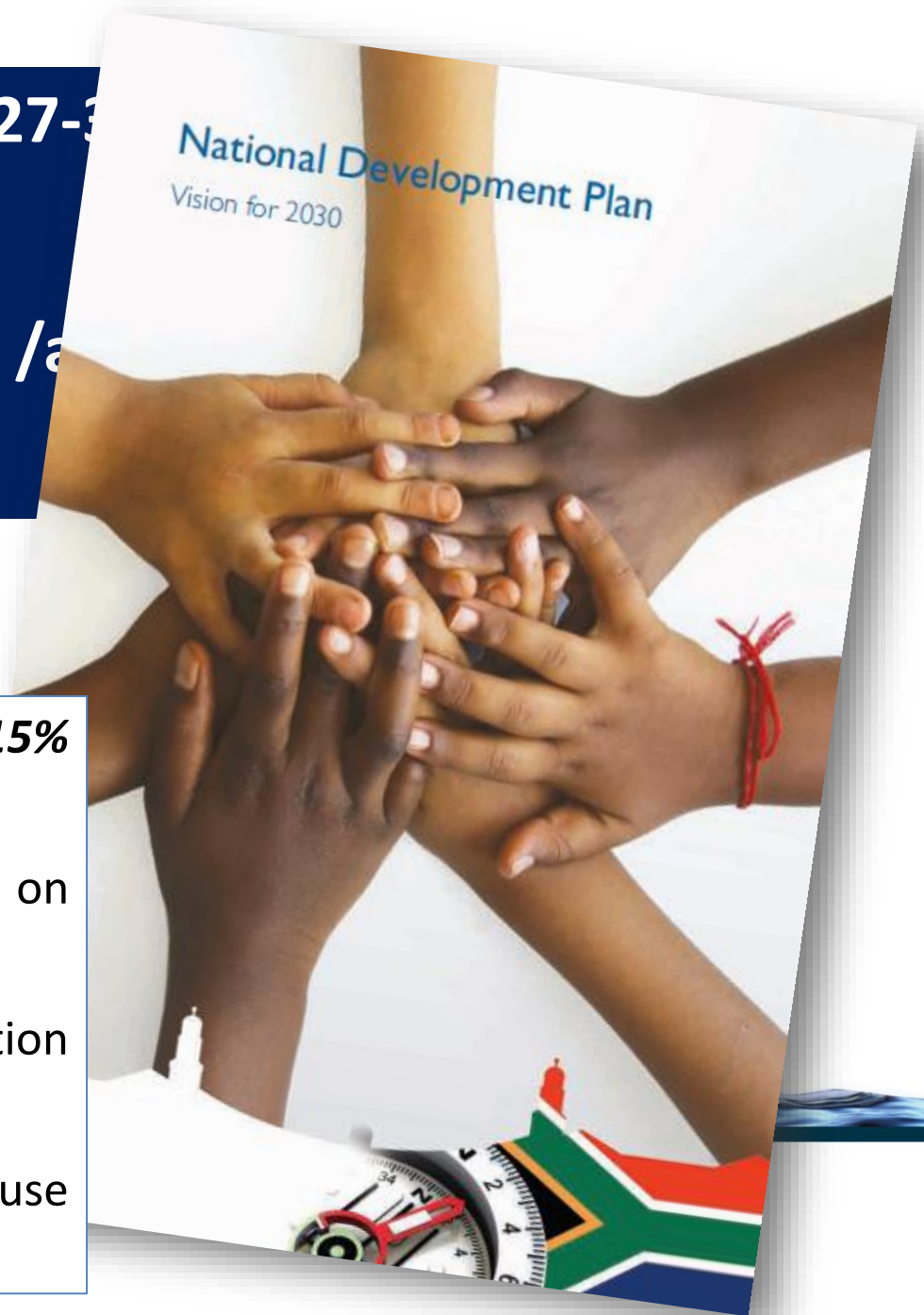
Risk Assessment Tool for Municipalities

28 October 2015



- Municipal water losses: 27-3
- NRW: 34-37%
 - 1100 – 1300 million kl /a
- R 6–7 billion /a

- ... reduction in water demand of **15% below baseline levels in by 2030**
- ... achieving demand reductions on scale require **active programmes:**
 - reduce water leakage in distribution networks
 - increase the efficiency of water use by domestic & commercial users



'TO MEASURE IS TO KNOW'

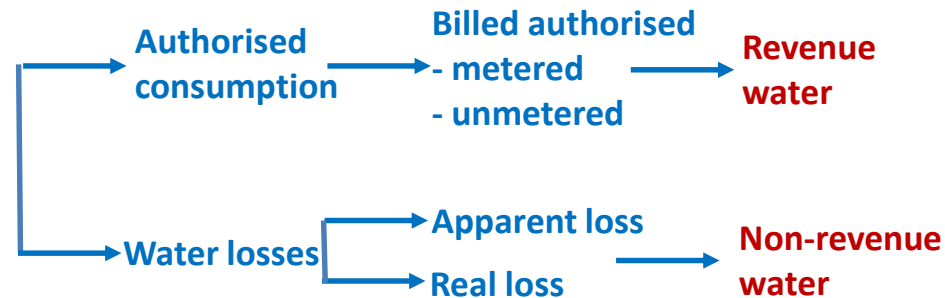


7 CRITERIA

- Strategy, planning, implementation
- Asset management
- Technical skills
- Credibility
- Compliance & performance
- Local regulation
- Customer care

IWA Water Balance

SIV



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'TO MEASURE IS TO KNOW'



IWA Water Balance

**Risk Assessment Tool
[PAT]**

**No Drop Risk Ratio
[NDRr]**

Ad hoc

**Hard&Fast
SNAPSHOT
of status of
water losses**



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Risk rating: No Drop vs Green Drop vs Blue Drop

NO DROP	GREEN DROP	BLUE DROP
Equation: $\text{NDRR} = A \times B + D$	Equation: $\text{CRR} = A \times B + C + D$	Equation: $\text{BDRR} = A + C + D$
<p>Where the indices represent:</p> <p>A : Water Use Targets (Recon and All-Town Strategy Targets)</p> <p>B : System Input Volume (SIV)</p> <p>D : Performance indicators (ILI + Commercial water losses + NRW + Efficiency)</p>	<p>Where the indices represent:</p> <p>A : Design capacity of the WWTW</p> <p>B : Operational flow of the WWTW</p> <p>C : Technical skill of the supervisor, process controllers and maintenance team</p> <p>D : Effluent quality performance</p>	<p>Where the indices represent:</p> <p>A : Treatment capacity of the WTP</p> <p>C : Technical skill of the supervisor, process controllers and maintenance team</p> <p>D : Water quality performance</p>
All risk elements (A, B, C, D) are weighted according to their respective risk representation.		



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NDRR inputs

Category/Descriptions	Weighting factors	Category/Descriptions	Weighting factors
A - Water Usage Targets (million kl/annum)		B - SIV deviation from Water Usage Target (%)	
≥110	8	≥150%	5
≥55 to <110	7	≤100 to <150%	4
≥30 to <55	6	≤80 to <100%	3
≥15 to <30	5	≤50 to <80%	2
≥8 to <15	4	0 to <50%	1
≥4 to <8	3	(Continued below)	
≥2 to <4	2		
<2	1		



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Risk Assessment Tool – *excel based*

Introduction

- Detail WSA
- List Systems & NDRR
- Assessor details & comment

WCWDM Graphs

- X-axis: Time in years
- y-axis: Water requirement (million kl/a)
- Y-axis: Budget allocate/req.

Scorecard: System1, 2, --

- ?? Risk A, B, D
- ?? Added info
- Risk weighting
- Risk ratings of A, B, D

Report Card

- Results / publication ready

Definitions

- IWA water balance
- Apparent losses
- Authorised consumption
- NRW
- Water loss team, etc.

** Reference tables: dropdown lists*



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Water Services Authority Name

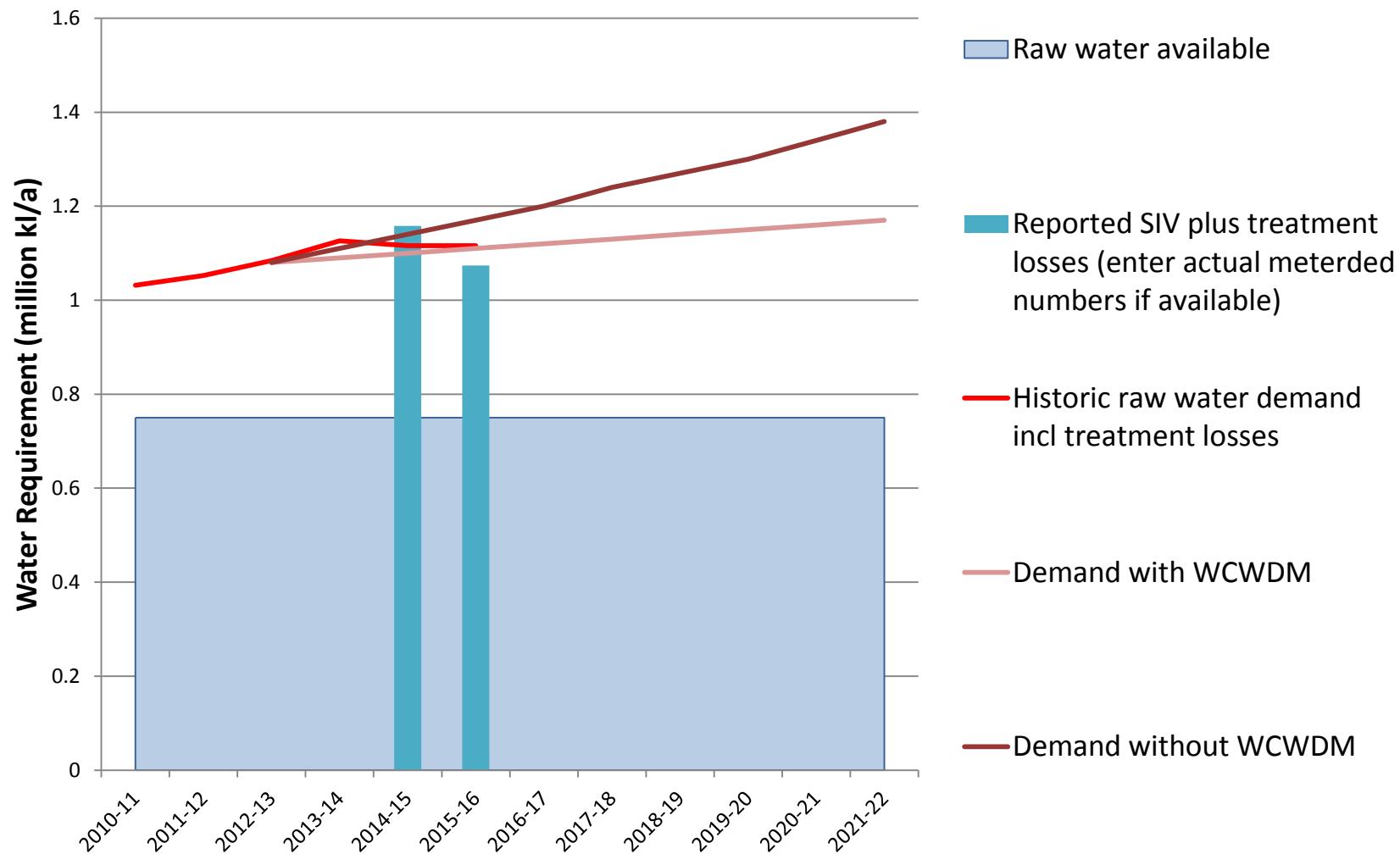
System name 1

NDRR

Name of the WSP:	Name of WSP	Area served :				
General comments pertaining to the municipality, network age, general condition, general problems, etc.				NDRR/NDRRmax		
				69.2%		
Inspector's comments on the audit with respect to areas of the audit which have been problematic or requires further consideration.				WCWDM Plan Risk		
				13.3%		
				HR Risk Rating		
				35.7%		
Key Risk Area	Key Risk Elements	Data input	Enter notes and comments as needed below	Risk	Score	Max Score
	NDRR and NDRRmax calculation			NDRR	9.00	13.00
	What is the source of the water use target for the WSA?	Reconciliation study	State the title and the revision date of the document here			
Water Availability Targets	What is the water usage target (kl/annum) stated for the assessment period? (Also refer further questions regarding future usage targets stated lower in this PAT)	1 000 000		A =	1	1
	What is the source document used in obtaining the <u>authorised</u> source abstraction volume, e.g., WUL, WARMS Registration, Existing Lawful Use, etc?	WUL	State the document name, reference number and date here			
	What is the current authorised source abstraction volume or WARMS registration of SLA supply limit (kl/annum)?	1 100 000				
	Provide a copy of the relevant sections from the above mentioned sources	Append source information				
Current Usage	What is the SIV (System Input Volume) for the 12 months under review (kl/annum)=	850 000	This must tie up with the "WCWDM Graphs" tab	B =	3	5
	What are the treatment and bulk transport losses up to the WSP/WSA custody handover point as a % of raw water from abstraction?	6.0%	This must tie up with the "WCWDM Graphs" tab			
	What is the source of this information? (provide a copy of the input calculation)	Append source information				
	The abstraction required (kl/annum) to supply the SIV based on % losses =	904 255	This must tie up with the "WCWDM Graphs" tab			
	Water Usage vs Resource Availability =	82.2%				
Performance indicators	In terms of the IWA water balance, as formulated and issued by the Department for the review period, what are the performance numbers for the following indicators:	Append the IWA water balance		D =	6.0	8.0
	a) ILI =	6.89		D1 =	1.5	2.0
	b) Apparent or Commercial Losses (% of total water loss)=	15.0%		D2 =	1.0	2.0
	c) Non-revenue water (% of SIV)=	33.0%		D3 =	1.5	2.0
	d) Per Capita Consumption (SIV/population) (litre/capita/day)=	343.0		D4 =	2.0	2.0
	e) Real or Physical water losses (% of SIV)=	12.0%				

Risk Assessment Tool Scorecard

NO DROP PAT	NDRR & NDRr	$NDRr = NDRR / NDRR_{max}$	90% - 100% Critical Risk WSI	
			70% - <90% High Risk WSI	
			50% - to 70% Medium Risk WSI	
			<50% Low Risk WSI	
	Additional Risk Indicators	WCDMP	P1 = WCDMP in place?	
			P2 = WCDMP implemented?	
		Technical Skills	C1 = Population served	
			C2 = Municipal Category	
			C3 = Availability of competence	
			C4 = WDM team	
	Additional information	WCDM Initiatives	Initiatives?	
			Measurable targets: 2017? 2022?	
		Source water availability targets	WDM targets vs	
			Recon/All Town targets	



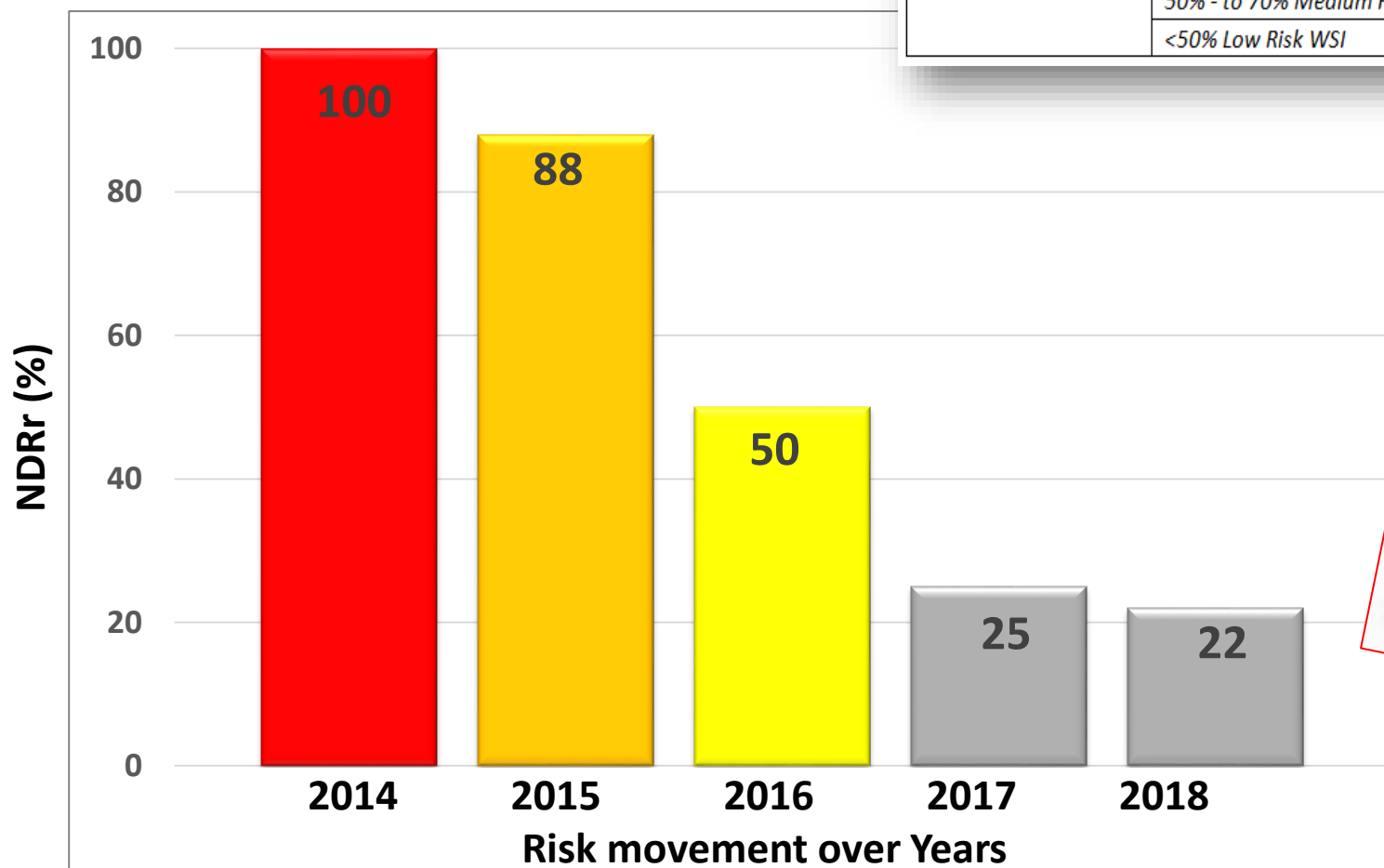
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Example: WSA



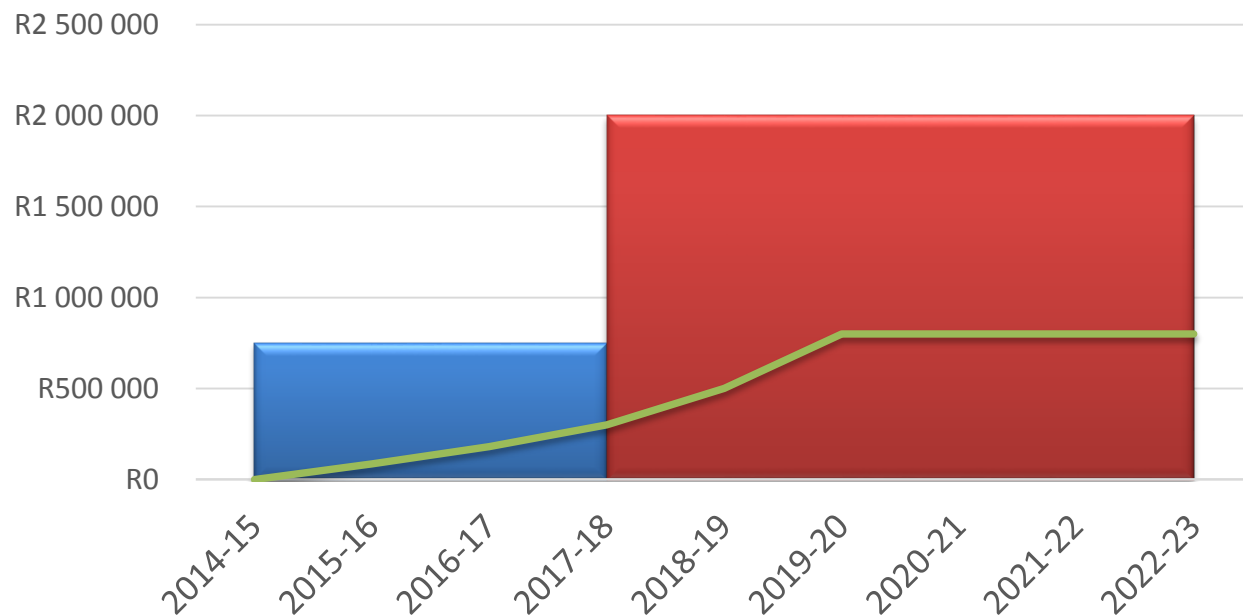
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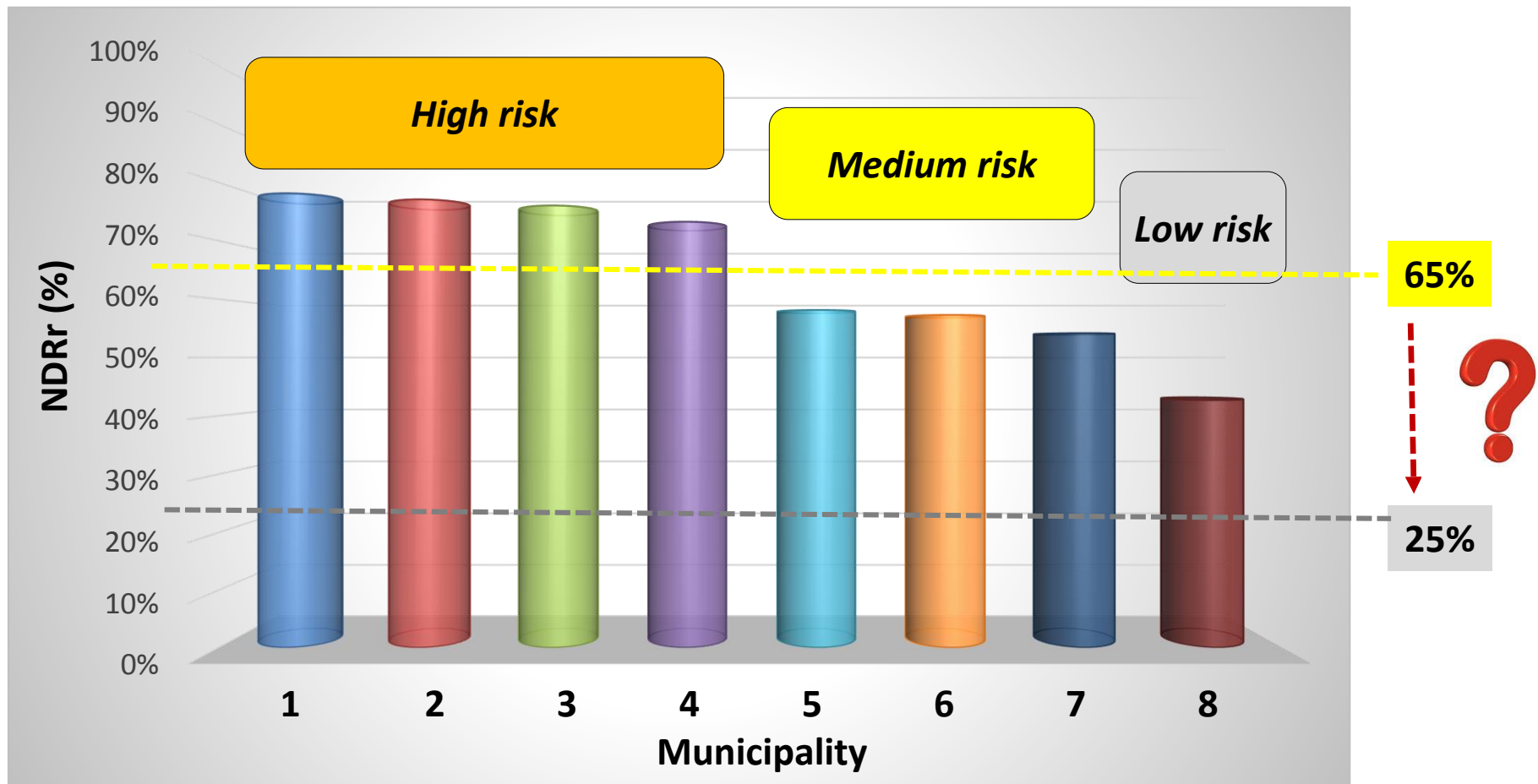
Top 5 Projects	Targeted performance in 2017 and 2022		Budget requirement
Pressure management - Phase 1 reduce from 64m - 50m average pressure, Phase 2 reduce 50m- 42 m	10% NRW	4% NRW	R177m over 5 yrs
Leak detection and repair - 6000km per annum	2	2	R7.5m p/a
Meter upgrades (Industrial and Commercial) - 19000 connections = 40% of consumption	2	2	R133m over 5 yrs
Informal area bulk metering - usage in 280,000+ dwellings	1	1	R 10m p/a
Rural area connection metering (consumer metering). Budget allocated R15m. Pilot run to meter 3000 properties.	0	1	R15m p/a
TOTAL (Baseline 2012 = 45%)	30% NRW	22% NRW	



■ Funding required for 2017 target
 ■ Funding required for 2022 target
 — Budget allocated



Example: REGION /CATCHMENT



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The Risk Assessment Tool (PAT) will serve its purpose if distributed and used widely in the sector.

It will play a significant role in focussing water users' efforts and identify opportunities for stewardship and partnerships to manage and mitigate shared water risk.

THANK YOU

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Stewardship helps companies identify and manage water-related business risks and allows them to contribute to and help enable more sustainable management of shared freshwater resources. Stewardship also reduces operational costs; protects the company from ensuing water stress; and improves the company's image in the eyes of consumers, investors, and nearby communities.

Benefits of effective corporate water stewardship:

- **Ensure social and legal license to operate in a specific location;**
- **Prevent or react to operational crises resulting from inadequate water availability or management;**
- **Gain competitive advantage;**
- **Assure investors and markets that business operations will continue to be profitable;**
- **Uphold corporate values and ethics.**



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≥4 to <8	3	(Continued below)	
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Category/Descriptions	Weighting factors
D – WCWDM Performance Indicators $D = D_1 + D_2 + D_3 + D_4$	
D₁ - ILI	
ILI ≥ 8	2
6 ≤ ILI < 8	1.5
4 ≤ ILI < 6	1
2 ≤ ILI < 4	0.5
ILI < 2	0
D₂ - Commercial Water Loss	
> 30%	2
≥ 20% to < 30%	1.5
≥15% to < 20%	1
≥10% to < 15%	0.5
< 10%	0

Category/Descriptions	Weighting factors
D – WCWDM Performance Indicators $D = D_1 + D_2 + D_3 + D_4$	
D₃ - Non-Revenue Water	
≥ 40%	2
≥30% to < 40%	1.5
≥20% to < 30%	1
≥10% to < 20%	0.5
< 10%	0
D₄ – Per Capita Consumption	
≥300 l/c/d	2
≥ 250 l/c/d to < 300 l/c/d	1.5
≥ 200 l/c/d to < 250 l/c/d	1
≥ 150 l/c/d to < 200 l/c/d	0.5
< 150 l/c/d	0



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Additional risk indicator : Technical Team

C_1 : Population serviced by the WSI;

C_2 : Municipal Category

C_3 : Requirement and availability of a competent Technical Team

$C_3 = C_{3A} \times C_{3B}$ where:

C_{3A} = Technical skills requirements based on population size as per available benchmarks

C_{3B} = Vacancies in the technical staff positions

C_4 : Impact of a structured Water Loss Management Team (WLMT)

Lawless, A (2007) Numbers and Needs in Local Government: Addressing Civil Engineering – The Critical Profession for Service Delivery. SAICE, Midrand.



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Table 3 : HR Risk Weighting Factors

C - Technical Skills	
Technical Skills C = (C1 * C2) + C3 + C4	
C1 = Pop sizes in SA	
Population ≥4 million	3
Population ≥3 to <4 million	2.5
Population ≥2 to <3 million	2
Population ≥1 to <2 million	1
Population ≥750 000 to < 1 million	0.9
Population ≥500 000 to <750 000	0.8
Population ≥350 000 to <500 000	0.7
Population ≥250 000 to <350 000	0.6
Population ≥150 000 to <250 000	0.5
Population ≥100 000 to <150 000	0.4
Population ≥75 000 to <100 000	0.3
Population ≥50 000 to <75 000	0.2
Population <50 000	0.1
C2 = Municipality Category weighting factor	
Metropolitan areas	6
Secondary Cities (B1)	5
For Large Towns (B2)	4
For Small Towns (B3)	3
Districts (C2) (WSP function)	2
Mostly Rural (B4)	1
Districts (C1) (no WSP function)	0

Impact of municipality/ population size and lack of competent or sufficient skills = C3 = C3a* C3b	
C3a = (Tech Skill Req/ Population weighting factor : Req Team Size	
Population ≥4 million= 5000	3
Population ≥3 to < 4 million= 4000	2.5
Population ≥2 to < 3 million= 2500	2
Population ≥1 to < 2 million= 1300	1
Population ≥ 750 000= 650	0.9
Population ≥500 000 to < 750 000 = 500	0.8
Population ≥350 000 to < 500 000 = 400	0.7
Population ≥250 000 to < 350 000 = 300	0.6
Population ≥150 000 to < 250 000 = 250	0.5
Population ≥100 000 to < 150 000 = 150	0.4
Population ≥75 000 to < 100 000 = 100	0.3
Population ≥50 000 to < 75 000 = 70	0.2
Population <50 000 = 50	0.1
C - Technical Skills	
C3b** = Staff Vacancies weighting factor	
Less than 50% of organogram filled and No Pr.Eng or Pr.Tech.Eng Civil engineer in service	8
Less than 60% of organogram filled and fewer than 50% of Pr.Eng or Pr.Tech.Eng Civil engineers in service as compared to the guideline	7
Less than 70% of organogram filled and fewer than 60% of Pr.Eng or Pr.Tech.Eng Civil engineers in service as compared to the guideline	6
Less than 80% of organogram filled and fewer than 60% of Pr.Eng or Pr.Tech.Eng Civil	5



engineers in service as compared to the guideline	
Less than 90% of organogram filled and fewer than 60% of Pr.Eng or Pr.Tech.Eng Civil engineers in service as compared to the guideline	4
Less than 70% of organogram filled and fewer than 80% of Pr.Eng or Pr.Tech.Eng Civil engineers in service as compared to the guideline	3
Less than 80% of organogram filled and fewer than 80% of Pr.Eng or Pr.Tech.Eng Civil engineers in service as compared to the guideline	2
Less than 90% of organogram filled or fewer than 90% of Pr.Eng or Pr.Tech.Eng Civil engineers in service as compared to the guideline	1
≥90% of organogram filled with technically and suitable qualified staff	0

Impact of municipality of WLMT / population size and lack of competent or sufficient skills = C4 = C4a* C1

C4a = WLMT weighting factor

'Structured' and Capable* WLMT with <90% vacancies	1
Structured and Capable WLMT with <70% vacancies	2
Structured and Capable WLMT with <50% vacancies	3
'Unstructured' WLMT which lacks ≥ 50% of positions	4
No WLMT structure:	5

****Note :** Where vacancies for professionally registered staff and vacancies for the total organogram place the WSA in more than one risk category, the category with highest weighting must be selected.



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Additional risk indicator : WCDMP

P ₁ = WCDM Plan in place		P ₂ = WCDM Plan being implemented	
WCDM Plan absent	3	No Plan, no implementation	5
WCDM Plan in place, but lack >3 of the basic 6 requirements	2.5	Implementation of <50% of planned interventions	4
WCDM Plan in place, but lack at least 2-3 of the basic 6 requirements	2	Implementation of ≥50% of planned interventions	3
WCDM Plan in place, but lack at least 1 of the basic 6 requirements	1.5	Implementation of ≥80% of planned interventions	2
WCDM Plan in place compliant with all 6 of the basic requirements:	1	Implementation of 100% of planned interventions	1
<p><i>Basic requirements:</i></p> <p><i>i) signed by WSI executives ii) Water balance iii) Multi-year targets from NDP / Recon / All Town Strats iv) Interventions to achieve targets v) Financial resources to implement interventions vi) Assign to Technical & Managerial responsible persons</i></p>		<p><i><u>Note:</u> An intervention should be at least within 3 months of the planned timing <u>or</u> have at least 75% of planned budget expended to be considered as implemented</i></p>	



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