

WATER CONSERVATION AND WATER DEMAND MANAGEMENT TOOL

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MINERALS COUNCIL
SOUTH AFRICA



The Minerals Council of South Africa has taken the lead in developing a user-friendly tool to assist the mining sector to implement the principles of WC/WDM

The principle of water conservation and water demand management (WC/WDM) is critical to ensuring sustainable water supply in our water scarce country. It has become essential to incorporate these principles and subsequent measures in the water management of a mine site. It is with this focus, that the Minerals Council South Africa (Minerals Council) has taken the lead in developing a user-friendly tool to assist the mining sector to implement the principles of WC/WDM.



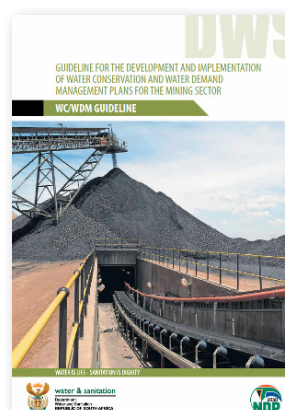
WHAT IS THE TOOL

The water conservation and water demand management self-assessment reporting tool (WSART) as its name suggests is a tool that can be used by the mining industry to conduct a self-assessment of the implementation of WC/WDM on the mine site.

WHY WAS IT DEVELOPED

Through this tool the Minerals Council aims to demonstrate its leadership role in the development and implementation of environmental best practices as articulated in strategic goal 4 of the organisation's strategic plan.

This tool was developed to support the Implementation Guideline for WC/WDM as published by the Department of Water and Sanitation (DWS) and the call from the industry for guidance in implementing the methodology prescribed in the Implementation Guideline.



WHAT IS THE PURPOSE OF THE TOOL

The key purpose of the tool is to simplify the implementation of WC/WDM. Other purposes include:



Ensure consistency with the approach of conducting water balances in the mining industry.


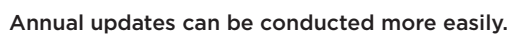
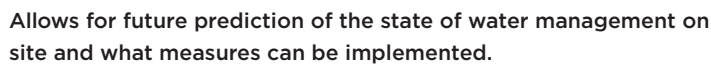
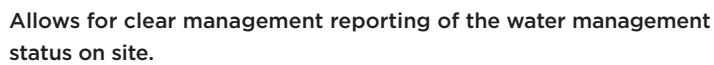
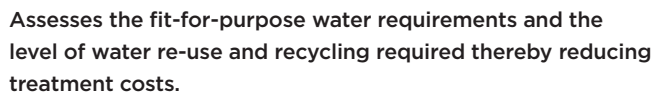
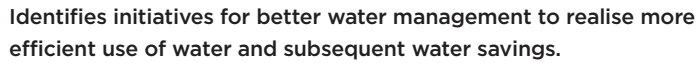
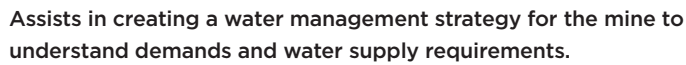


Ensure consistency with the calculation of WC/WDM in the mining industry.



Allow for consistent reporting of WC/WDM plans in the mining industry.

The tool allows the mines to implement WC/WDM as well as develop the site water balance that is required for implementation of WC/WDM. Other benefits include:



The Minerals Council developed this tool in line with the Guideline for the Development and Implementation of WC/WDM for the mining sector. It is a voluntary tool whose use is encouraged by the DWS and the Minerals Council.

The front page of the WSART provides the user with a simplified menu on what can be done on the tool. The tool is developed in the Microsoft Excel platform. It is user-friendly and compatible with most Windows-based operating systems. The user is guided in a step-by-step format from the inputting of data to the final development of the 5-year WC/WDM plan. The progression of the plan's implementation and the reporting of results is supported in the tool.



The different steps in the tool for development of the 5-year WC/WDM plan is listed below:

STEP 1:

This step allows the mine personnel to capture data that is relevant to the water balance of the site. This can be done at a simplified or detailed level based on the information available for the mine and the complexity of the mine operation.

STEP 2:

The tool uses the inputs to develop a standardised water balance for the mine site. The water balance is the foundation for the implementation of WC/WDM as it calculates the baseline water use efficiencies for the mine site.

STEP 3:

Allows the mine to set WC/WDM targets based on company-specific standards and water management goals. These targets and baseline WUE values are compared to the benchmarks as reported in the WC/WDM Benchmarks Report.

STEP 4:

Based on the baseline results, and the targets set for the mine, a site-specific WC/WDM plan can be developed within the mine's own governed timelines and budgets. The effectiveness of the WC/WDM plan is measured by comparing WUE values with previous years' values, the targets set as well as the benchmarks for the industry.

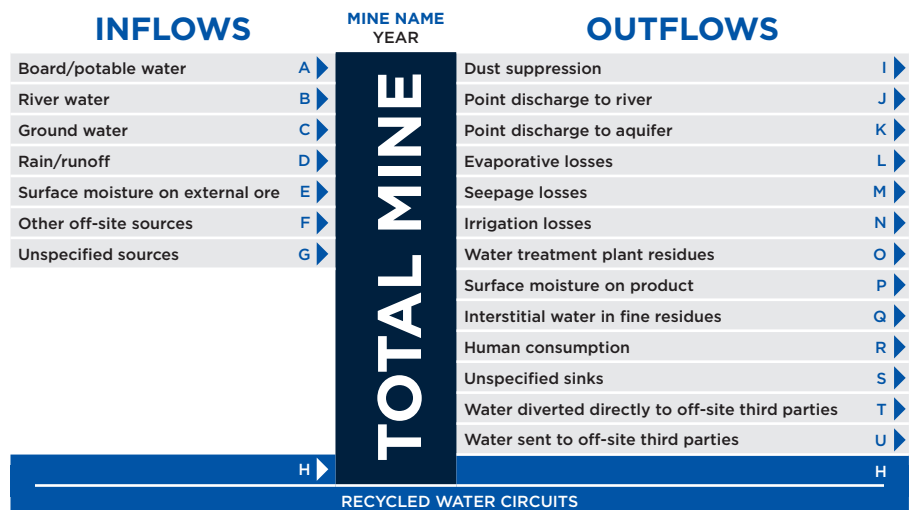
STEP 5:

Finally, a review and update of the WC/WDM plan based on the updated water balance after the implementation of the selected WC/WDM initiatives. The annual water balance and WC/WDM updates can be performed based on the results or management changes at the mine.

The summary water balance creates the foundation for the WSART Tool. The water balance inputs and outputs are used to calculate the recommended water use efficiency (WUE) indicators as listed below:

Total water use	Consumptive water use	Volumes of wastewater lost	Total specific water use
Consumptive specific water use	Percentage of total wastewater not used	Recycle ratio	

These indicators form the basis of WC/WDM and mines are encouraged to find ways of reducing, reusing and recycling water to achieve the targets they set over the 5-year period.



Water indicators			GRI metrics		
Total water use		m ³ /day	GRI 303-1: Water withdrawal by source		m ³ /day
Consumptive water use		m ³ /day	GRI 303-3a: Total volume of water recycled and reused		m ³ /day
Volumes of waste water lost		m ³ /day	GRI 303-3b: Total volume of water recycled and reused as % of total water withdrawal		%
Total specific water use		m ³ /ton	GRI 306-1: Water discharge by quality and destination		%
Consumptive specific water use		m ³ /ton			
Percentage of total waste water not reused		%			
Recycle ratio		%			

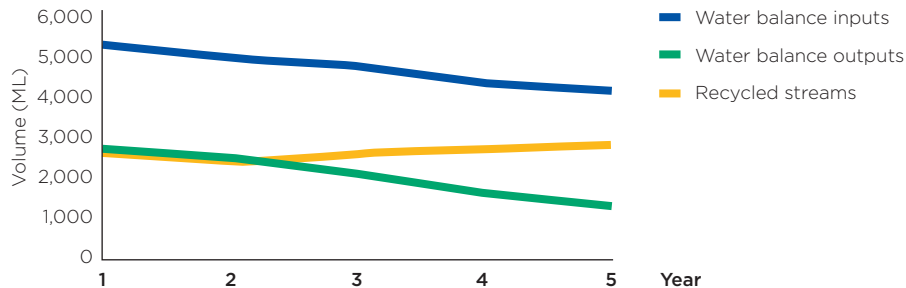
Users of the tool develop a site-specific WC/WDM strategy based on the potential to improve water use efficiency for their site. A list of management actions can be populated by the user. The tool captures the budget allocated, the timelines and the annual targets for each management action. The annual WUE targets and the actual progress of the WC/WDM plan is compared to indicate to the mine whether the initiatives undertaken are effective or insignificant. The user has the option to adjust the site-specific targets set annually should they wish to further challenge themselves to save water above and beyond their initial targets.

Action No.	Management action short name	Description	Budget (R'000)	Estimated start date	Estimated completion date
1	Line PCD with HDPE	Line the PCD dam to reduce seepage	500	Apr 2020	Oct 2020
2	Expand WTP	Expand the North WTP to treat 14ML/day	5,000	Jan 2021	Jan 2022
3	Improve water monitoring	Install ten additional critical flowmeters	2,000	Jun 2021	Dec 2021
4	Reduce dependency on river supply	Reduce the abstraction to 4ML/day	300	Jan 2022	Jan 2023
5	100% reuse for dust suppression	100% of dust suppression is reused from the PCD	500	Jan 2023	Mar 2023
6	Expand WTP	Expand the North WTP to treat 20 ML/day	7,000	Jan 2023	Mar 2024
7	Improve water monitoring	Install 20 additional non-critical flowmeters	2,000	Jan 2024	Dec 2024
8	Install evaporators for pit water	Install 6 evaporators to reduce pit water volumes	10,000	Feb 2025	May 2025

WHAT DO YOU ACHIEVE BY USING THE WSART?

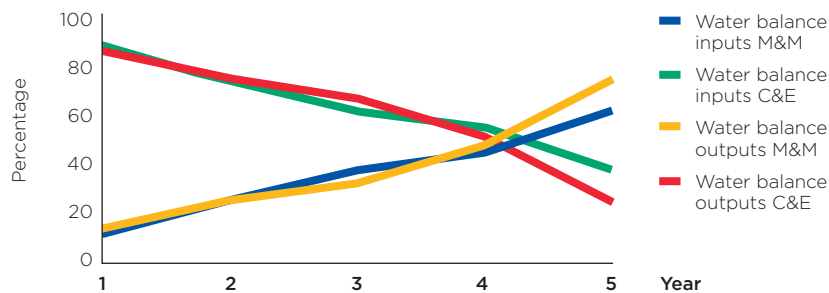
The water balance inputs, outputs and recycled streams are reported by the WSART over the 5 years. The mine personnel can gauge the amount of water coming into their site, the amount leaving, and the amount being recycled over the period. This would indicate the impact of the WC/WDM plan as it is carried out.

Water balance inputs, outputs and recycle streams



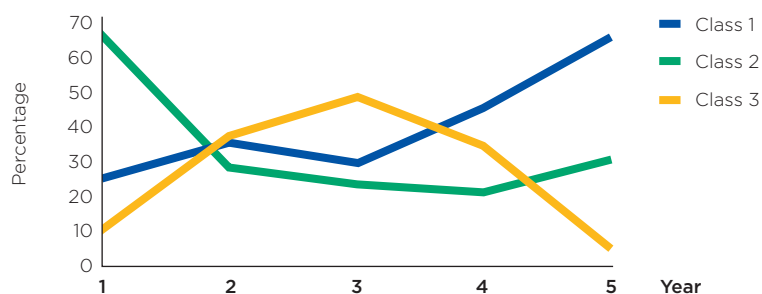
The tool not only assesses the water usage performance of your mine, but also addresses the quality of the water data inputted into it. Data is categorised as measured, modelled, calculated and estimated and the accuracy of the WC/WDM indicators is determined from the percentage of data added. You can visually observe the improvement in monitoring water data accuracy over the years.

Water balance accuracy trends



Furthermore, the water quality of the water used on the mine is categorised and the water quality category percentage is shown as a trend for the 5-year WC/WDM plan.

Mining operations water quality



Using the tool will provide you with:

- A standardised water balance summary for your mine.
- A site-specific 5-year WC/WDM plan
- Site-specific calculated water efficiencies and comparisons to the benchmarks
- Reporting graphics to visualise your improvements

The WSART assists the mine to report standardised water balances and WC/WDM plans efficiently and quickly. The mine can evaluate the WC/WDM initiatives implemented, update targets on an annual basis and assess ongoing performance. The tool empowers the mine to become a responsible user of water and helps a mine to know, manage and improve their water management status.

REFERENCES

- Department of Water and Sanitation (DWS), 2016: Benchmarks for Water Conservation and Water Demand Management (WC/WDM) in the Mining Sector
- Department of Water and Sanitation (DWS), 2016: Guideline for the Development and Implementation of Water Conservation and Water Demand Management Plans for the Mining Sector
- Minerals Council South Africa, 2019. A user manual and computerised WC/WDM self-assessment reporting tool for the SA mining industry

“The tool empowers the mine to become a responsible user of water and helps a mine to know, manage and improve their water management status.”

CONTACT THE DEVELOPERS

The developers are keen to assist with any queries on the WSART as well as training on the tool. A dedicated team can train mine personnel at various levels on the use of the tool. Kindly contact the personnel below should you require any further information.



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