Every drop counts: efficient water management for greener aggregates!

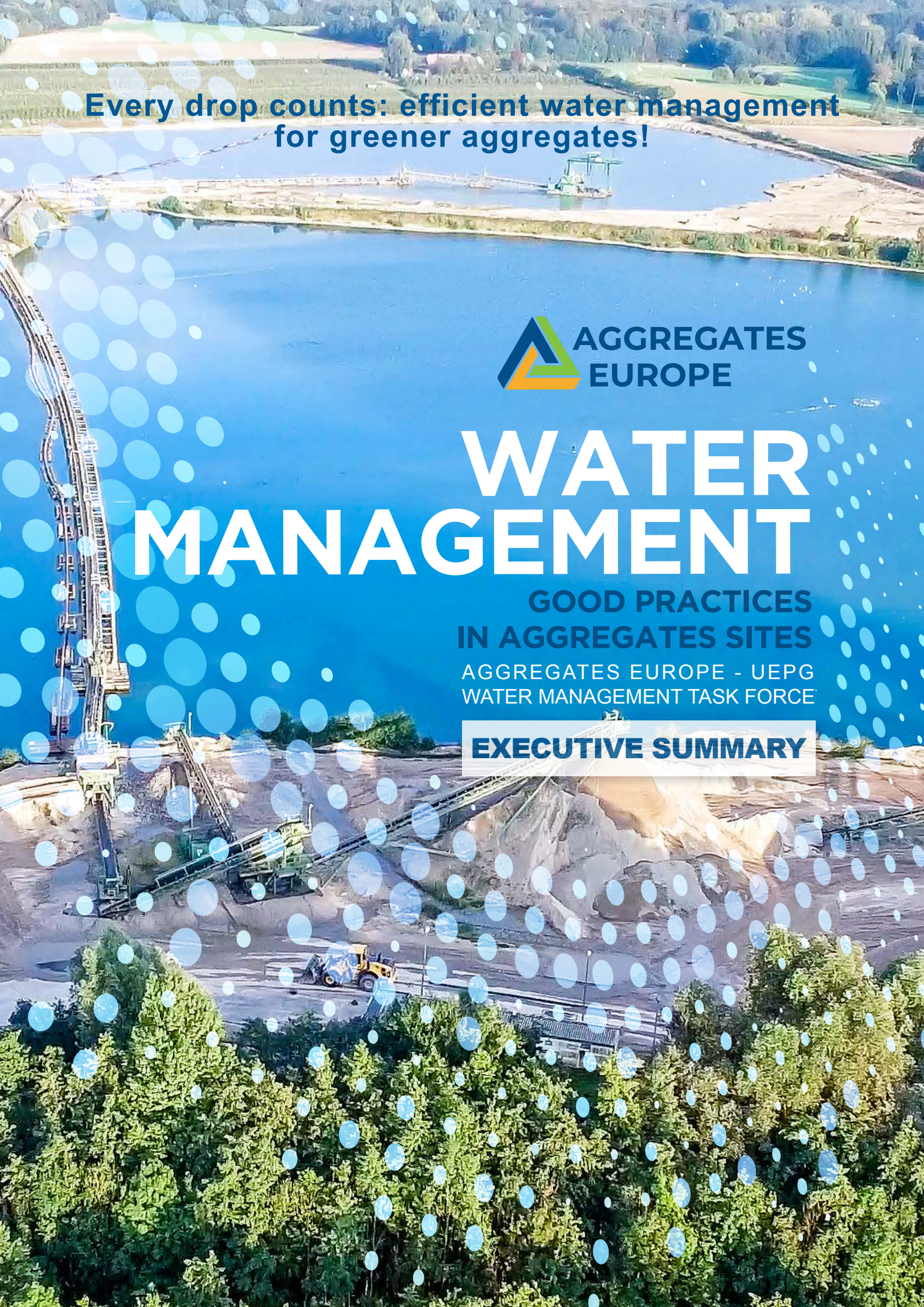
AGGREGATES EUROPE

WATER MANAGEMENT

GOOD PRACTICES IN AGGREGATES SITES

AGGREGATES EUROPE - UEPG
WATER MANAGEMENT TASK FORCE

EXECUTIVE SUMMARY



President foreword

Antonis Antoniou Latouros
President of Aggregates Europe – UEPG

Water is like aggregates; society direly needs it. Without water, there would not be life, and without aggregates, there would be literally nothing built around us. In fact, aggregates are the second most consumed materials on the planet… after water! As water is becoming a strategic good, water management turns out a growing topic for industries, including ours. Aggregates extraction needs water in several ways, which is why the topic of water management is to become paramount in the next decades.

This Guidance aims at updating the previous one dating back from 2011. It compiles the results and indicators from two research studies on water conducted by Aggregates Europe - UEPG between 2016 and 2019, covering 232 European sites across 11 countries.

It firstly recalls some facts, which are important to keep in mind when discussing water management in quarries and pits: the impact of the aggregates extraction industry on water quantity and quality is very limited. It also enumerates the positive contributions that our industry can have for societal needs, be it in terms of flood prevention or protection, creation of wetlands enhancing biodiversity, improvement of the water quality, etc. It thirdly illustrates said value-added by giving examples and sharing best practices.

In terms of water (as on other topics), aggregates extraction and sustainability can and should go hand in hand, especially in the frame of the EU Biodiversity Strategy for 2030 and the Montreal Biodiversity Convention 2022. Aggregates Europe – UEPG is determined to bring a significant contribution to enhancing water quality across Europe and ensuring that all kinds of human activities that need water can continue to use it responsibly.

Water is like aggregates; society direly needs it

This guidance represents our contribution to the goals of the European Commission's Clean Industrial Deal. We emphasise the importance of water resilience and sustainable water management as essential elements of Europe's industrial transformation towards sustainability.

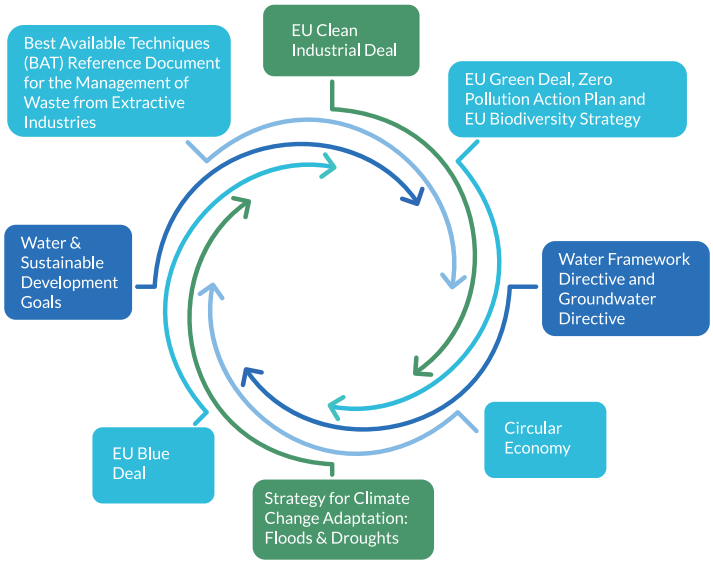
Introduction

Water is a critical resource for life and industry, including the aggregates sector, which is essential for construction and infrastructure. The Water Management Good Practices in Aggregates Sites guidance document provides a comprehensive framework to optimize water use, minimize environmental impact, and enhance sustainability in the aggregates industry. The guidance highlights that the industry's impact on water quantity and quality is limited and that responsible management practices can lead to positive environmental contributions.

This guidance underscores the dedication to supporting the objectives of the European Commission's Clean Industrial Deal, emphasizing the vital role of water resilience and sustainable water management in driving Europe's industrial shift towards sustainability. It compiles the results and indicators from two research studies on water conducted by Aggregates Europe - UEPG between 2016 and 2019, covering 232 European sites across 11 countries.

European Water Policy & Regulatory Framework

The aggregates industry operates within a robust European regulatory framework, including:



A responsible industry

A limited impact on water quantity

- Use of very little water
- Good practices to minimise water consumption
- Water efficiency and recycling

A limited impact on water quality

- Very low risk of water pollution
- Inert raw materials
- Free of dangerous substances
- Technical project subject to an Environmental Impact Assessment
- Measures to prevent accident pollution

A responsible Industry

- Positive interaction with River Basin Management plans
- Positive contributions to water

Key principles of water management

Key principles of water management in aggregates sites

Prevention of water pollution

- Deterioration of water quality must be prevented wherever possible and minimised
- Measures to control possible spillage of fuel, oils, etc.
- Not to dump slime from washing into rivers

Implement water efficiency strategy using water in a rational way

- Water recycling
- Water users within the site must be provided with water of a quality as poor as possible
- Losses of water and consumptive use of water must abe minimised
- Offset and detect leaks

Extraction plan must be sustainable over different hydrological cycles

- Once the activity is over, to leave assured the free flow of waters along their course in conditions similar to those originally found
- Control underground water levels as well as the quantity and quality of refill flows for aquifers
- Avoid making variations in the course of water in aquifers and remove leakage seepage points
- Set up a drainage network for water

Implement structural consolidation actions

- Maintain sludge ponds or reservoirs properly
- Protect and maintain the state of the banks of watercourses that border onto the site
- Ensure watercourses are protected and erosion is limited
- Control the stability of extraction waste and quarry backfill

Key Contributions of the Aggregates Industry to Water Management

The aggregates industry plays a crucial role in water management through:

Positive contribution to water of the aggregates industry

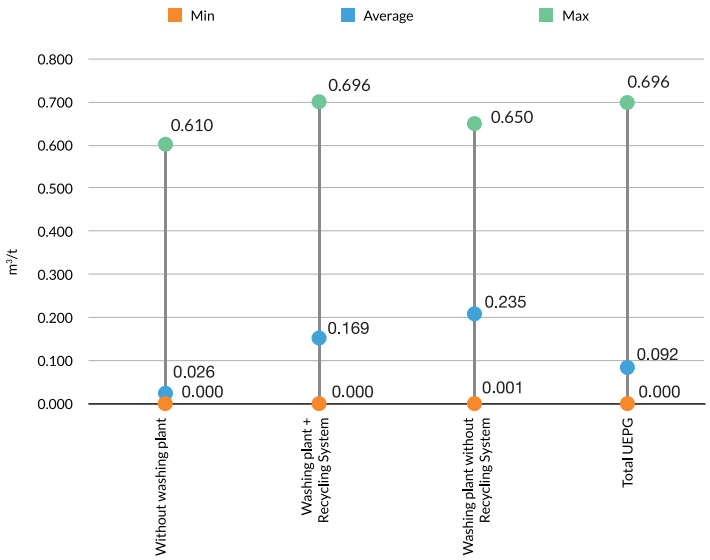
Flood prevention and protection	Water supply, storage capacity and water table reinjection	Basin management and dialogue	Rehabilitation, creation of wetlands and biodiversity conservation
Improvement of water quality	Contribution to the circular economy	A permanent commitment to minimise impacts	Leisure

- Flood Prevention & Protection – Supporting river basin management by widening waterways, creating supplementary channels, and constructing flood defences.
- Water Supply – Extracting and managing groundwater responsibly to maintain water quality and availability.
- Basin Management & Dialogue – Engaging in collaborative efforts to manage water resources effectively.
- Rehabilitation & Biodiversity Conservation – Restoring quarries into wetlands and other ecosystems to support biodiversity.
- Water Quality Improvement – Utilizing natural filtration processes in sand and gravel deposits to enhance water quality.
- Circular Economy Contribution – Increasing water efficiency through recycling and reuse in quarrying operations.
- Commitment to Impact Minimization – Implementing strict regulations, best practices, and innovative technologies to reduce environmental effects.
- Leisure & Community Engagement – Repurposing rehabilitated sites for recreational use, such as lakes and wildlife areas.

Water Usage in Aggregates Sites

The aggregates industry primarily uses water for processing activities such as aggregate washing, dust suppression, site maintenance, and domestic needs. On average, 92 litres of water are consumed per ton of aggregates.

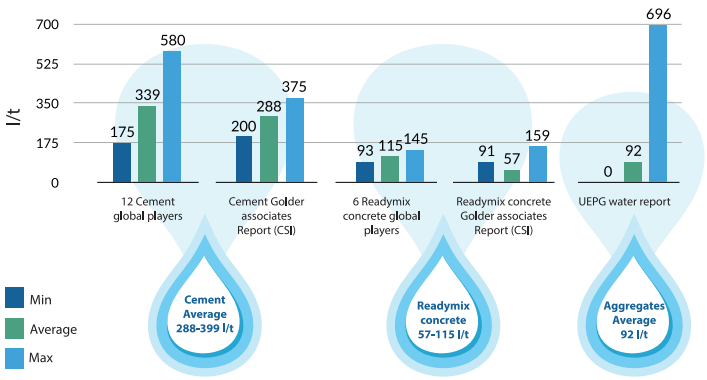
Water consumption in m³ by produced ton of aggregates. Relationship with washing plant – AE – UEPG



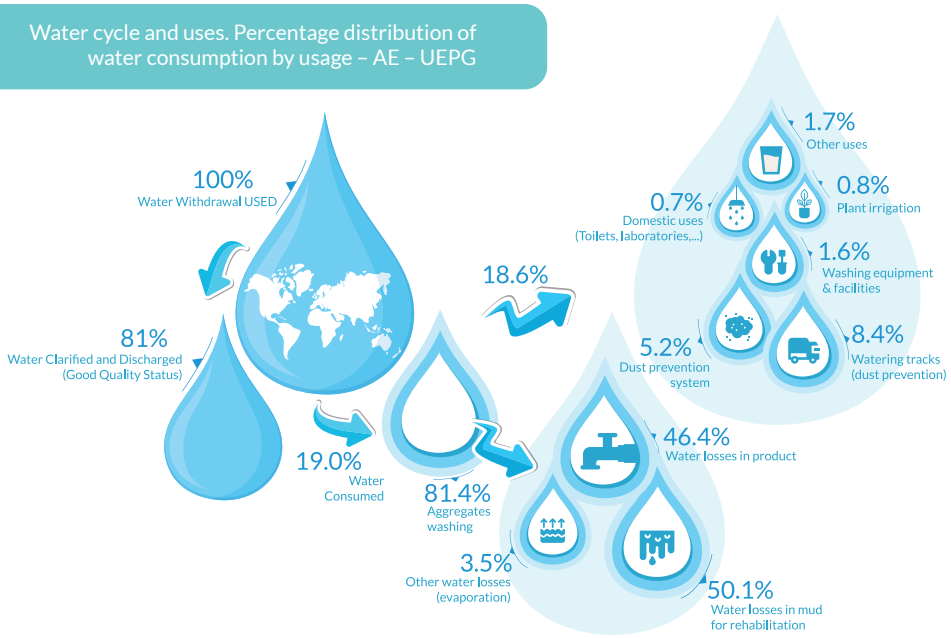
Approximately 81.4% of total water consumption is allocated to aggregate washing. Washing plants are present in 48% of sites, mainly in sand and gravel pits, where the average water consumption is 169 litres per ton when recycling systems are in place, increasing to 235 litres per ton in their absence. In contrast, 52% of sites do not wash their production, predominantly in hard rock quarries, where water usage is significantly lower at just 26 litres per ton.

Water consumption for product manufacturing – Different sources

Water consumption in litres per ton of product for cement, ready-mix concrete and aggregates – Different sources



Water cycle and uses. Percentage distribution of water consumption by usage – AE – UEPG



The primary water source for aggregate sites is surface water (47%), followed by groundwater (33%). Notably, 53% of sites do not discharge water.

Only 39% of aggregate production involves washing, requiring efficient water management strategies. Of the total water withdrawn, 81% is clarified and discharged, with only 19% being consumed. Additionally, 50% of sites have implemented water recycling systems, achieving an average recycling rate of 87.6%.

Good Practices in Water Management

Aggregates Extraction Sites

Good practices in water management in aggregates extraction sites

Treatment & Recycling in Aggregates Plants

Good practices in water management in aggregates treatment plants

Optimise use of water in processing plant and treatment of effluent including vehicle washing water

- Settling systems
- Recycling systems
- Drying system
- Waste spillage prevention systems
- Treatment
- Substance replacement

Other

- Making a study of the dumping point, where this exists
- Regular supervision of water quality (processing and dumping)
- Mobile fuel tanks double skinned
- **Water reuse plan**
  Minimise the consumption (or purchase) of good quality water
  Minimise the pollution effect of the site and its impact on the surrounding environment.
  Minimise water losses from the water reticulation system and maximise reuse opportunities.
  Save cost

PROFITABLE REUSE

- Washing sludge
- Surface and underground water drainage and waste-pipe networks.
- Systems for cleaning the treatment plant and equipment.
- Systems for treating and finishing end products.
- Transport systems for mineral resources.

Recovery of water to be used in:
- The treatment processes.
- Dust control systems.
- Sprinkling systems for revegetated areas.
- Work equipment cleaning.

Recovery of the solid phase to be used as:
- Material for restoration (refilling or improving the ground.
- By-product.
- Raw material for other processes (recovering clays).

WASTEWATER TREATMENT

- Settling pond or reservoir using natural sedimentation
- Settling pond or reservoir using forced sedimentation
- Forced sedimentation cell
- Thickening or clarification tank
- Press Filter
- Flocculants

Digitalization & AI in Water Management:

- Real-Time Monitoring – Using IoT devices to track water consumption and pollution risks.
- Predictive Analytics – Employing AI-driven models to optimize water allocation and efficiency.

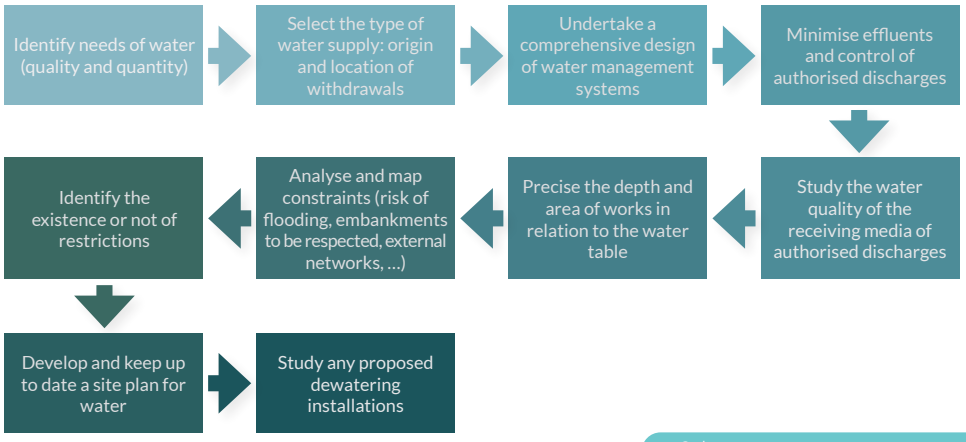
Water Management Plans for Quarries

A three steps approach

A structured three-step approach is recommended for water management:

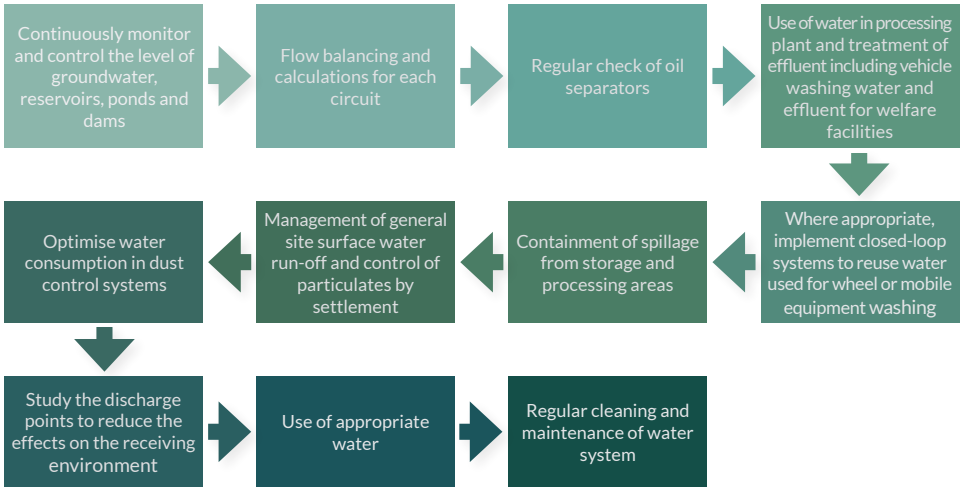
1st step: to know

1. Knowing – Identifying site-specific water needs, sources, and constraints.



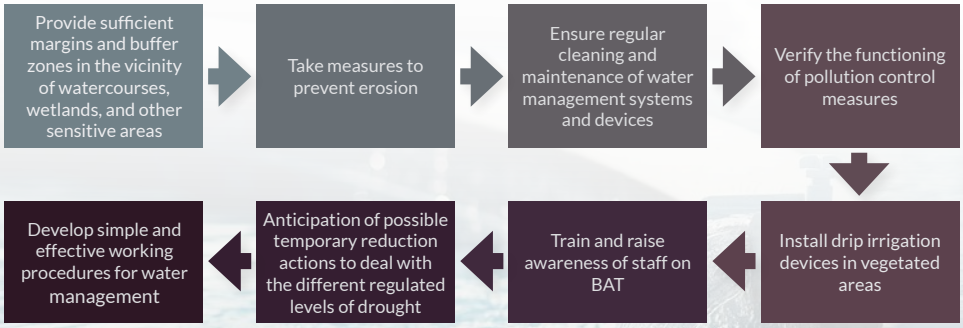
2nd step: to manage

2. Managing – Implementing efficient water use strategies, monitoring systems, and pollution control measures.



3rd step: to anticipate

3. Anticipating – Proactively addressing potential risks, improving staff training, and integrating drought management plans.



Conclusion

The aggregates industry has a limited negative impact on water resources but a significant potential for positive contributions through responsible water management. This guidance document serves as a blueprint for sustainable water use in the industry, aligning with European water resilience and sustainability goals and global environmental commitments.

By implementing the best available techniques, regulatory compliance, and innovative water management practices, the sector can enhance efficiency, protect ecosystems, and contribute to climate resilience.

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Executive Summary

Water Management Guidance

2025

Environment Committee
Water Management Task Force
Chairman and Coordinator of the document: Dr. César Luaces Frades

Aggregates Europe - UEPG, as a member of the International Advisory Board of the ROTATE Project (GA #101058651), has contributed to the preparation, dissemination of this document by endorsing it by its Board and launching it under its umbrella.

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