

SPARKLE | WATER | QUALITY

Micro-Distributed-Catchment Model and Flood Mitigation Support Model

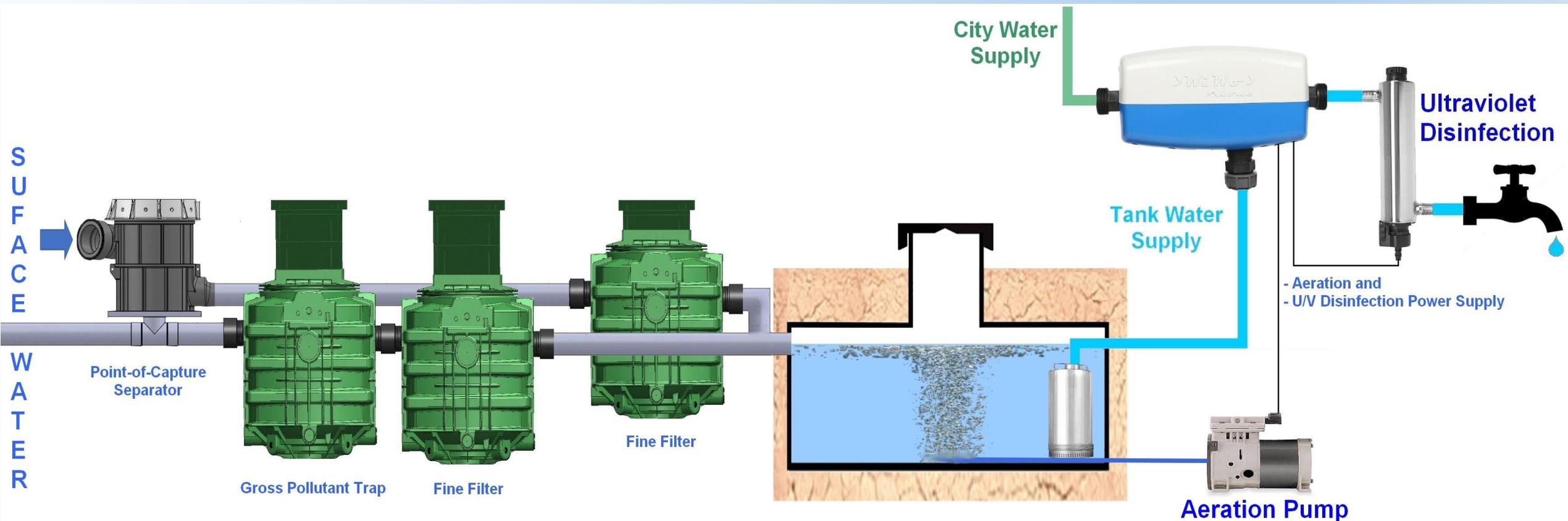
A systemised solution to Stormwater Harvesting and Stormwater Management

in tune with nature **One Water** *treat it naturally !*

The **SPARKLE | WATER | QUALITY** approach for Stormwater 'Water Quality Improvement' is a targeted contaminate reduction process (physical and in-solution) that is referred to as a **Harvesting** process for EITHER an available local water source or as healthy environmental flows - usually released to waterways

The **SPARKLE | WATER | QUALITY** approach operates in two modes

- 1) Engineered WSUD as a systematic networked Micro Distributed Catchment Model (MDCM) or a Flood Mitigation Support Model (FMSM) plus
- 2) a 4 step process of surface water capture, treatment and trapping, storage as HRT for support of natural biological process that provides a high quality water source for on-demand utilisation with chemical free disinfection or as environmental flow



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Overview

- Once rainwater reaches the ground and as a perfect solvent, it begins to collect pollutants and debris including from erosion and scouring as it flows towards the drainage network or on-line wetlands
- Ideally early capture of surface water in the MDCM avoids pollutants that otherwise must be separated and removed from the flow – with significant energy, operational risk and maintenance costs even before the water can be harvested or used as environmental flow.
- The MDCM is designed to reduce the major contaminate load in the water cycle flow to support the essential natural processes as well as capture the maximum volume of filtered stormwater, beginning at the top of the catchment where it is optimally managed.
- Often the first approach to stormwater management can be a series of vegetated interrupt devices serving impervious pavements, mostly directed to the bottom of an ever larger and complex catchment, or drained to a wetland that often overbournes nature with high velocity flows that may flush or damage the ecology at the time of the storm event when nature most needs its natural processes having resulted from the challenge(s) of urbanisation.

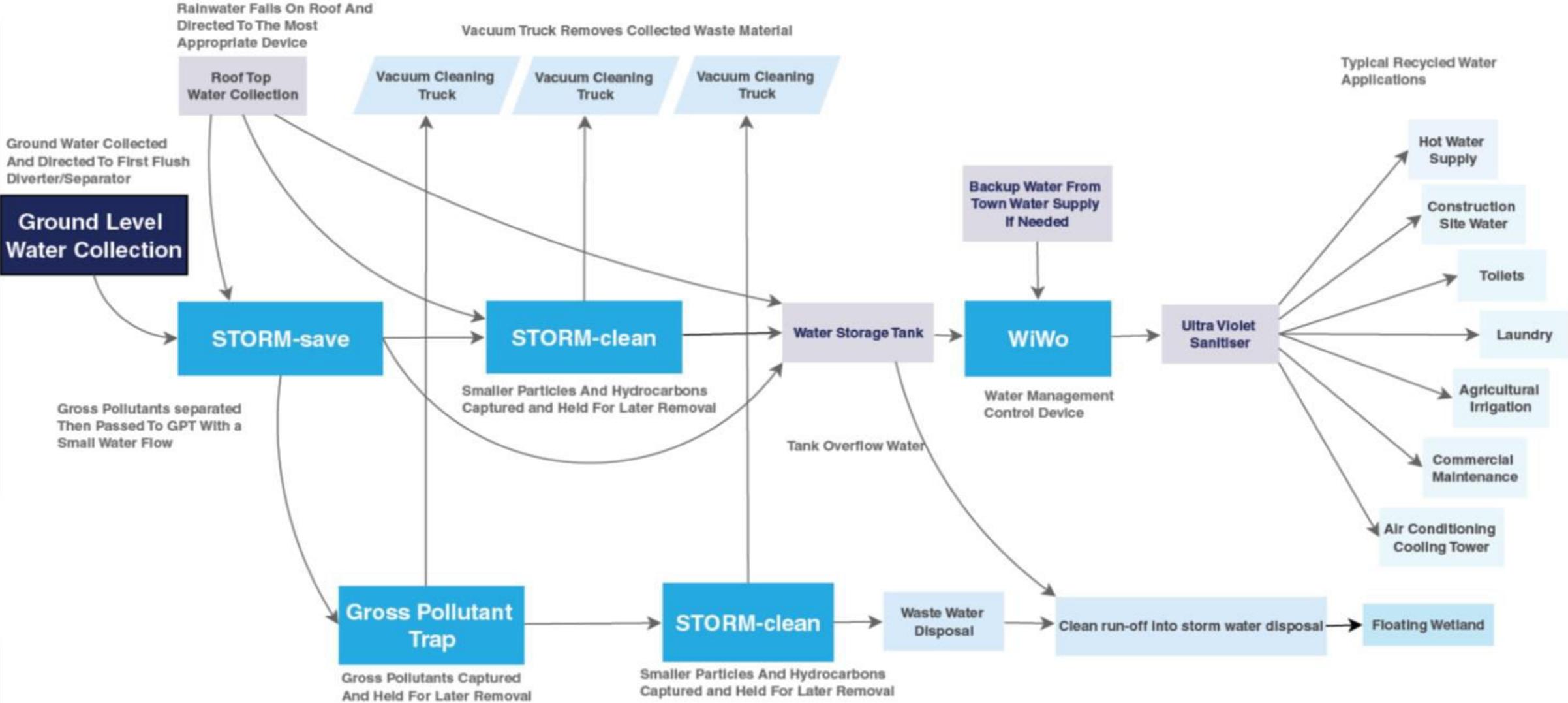
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Overview

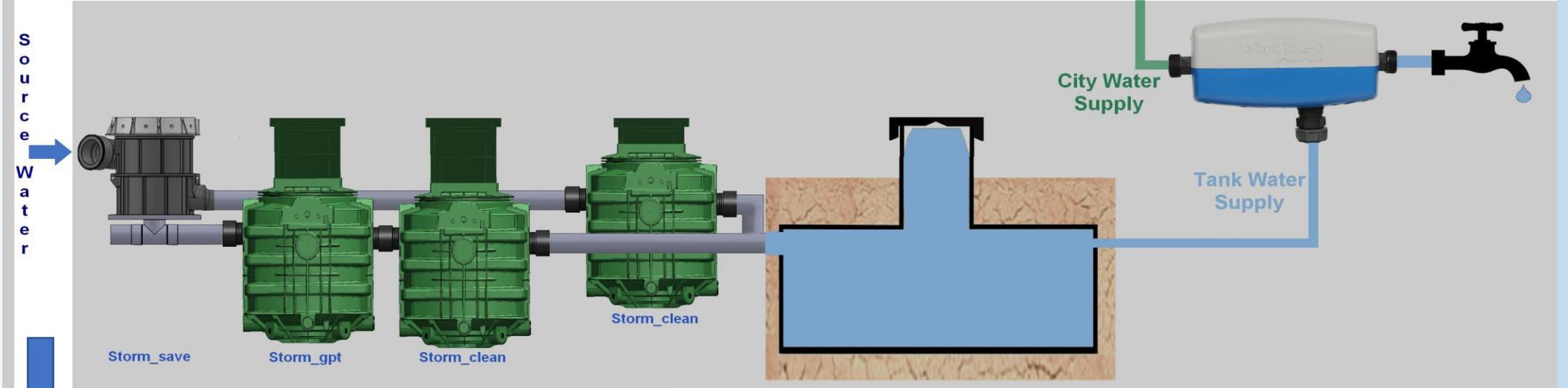
- Over reliance on natural treatments in wetlands and streams is typically limited when suffering from sludge and silt depositing, high turbidity, anoxic conditions with oxygen depletion, temperature stratification and later algal growth etc. The current mechanical outlet model alternative at the bottom of the catchment is a stand-alone GPT with high flow bypass that will contaminate the whole of the water flows to the highest level of contamination from the whole catchment flowing through a GPT, with limited water quality improvement before release!
- An innovation is the engineered networked model MDCM approach that improves the quality of the full flows of the captured stormwater and maintains it at the best quality possible.
- It is no longer acceptable for the contaminate load to be ignored as hidden waterway disposal that seriously impacts nature's ecology! Beside the fact many of the contaminants are useful, gross pollutants are better managed in a land-based process where the otherwise contaminate waste can be metamorphosed into an available resource!
- **SPARKLE|WATER|QUALITY** is focused on water as a resource with easy routine low-cost maintenance that resets the whole catchment management for the subsequent storm event and better manages flooding mitigation as a logical innovation in Best Practice Management (BPM)

Schematic Overview of System

One System Water Capture, Treatment, Storage, and Distribution System



System Components

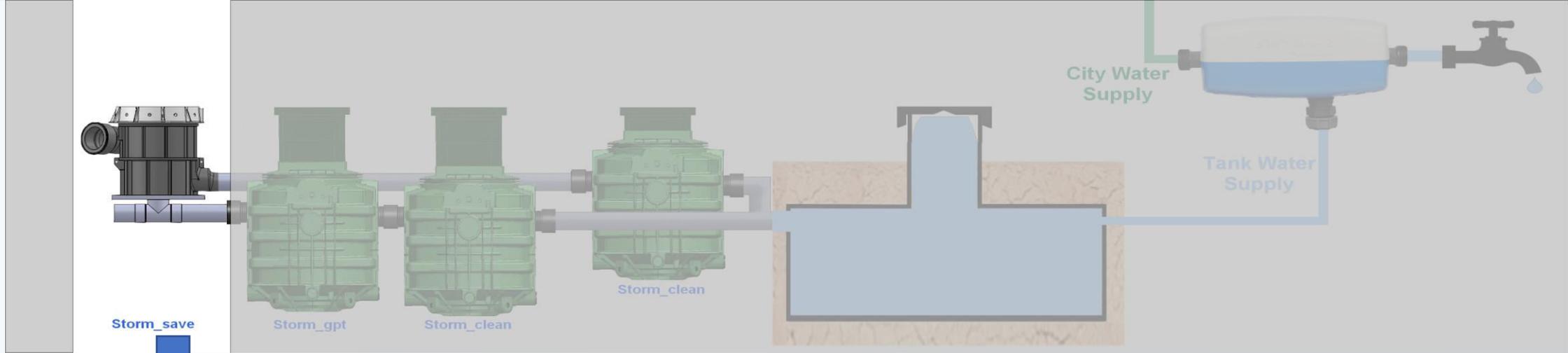


Water Sources



Rainfall and stormwater can be collected from a wide variety of sources including large commercial roofs, domestic roof tops, site runoff, impervious and vegetated catchments like roadways, bio-swales etc.

The type of catchment will define the system components required to install an efficient system to provide high quality harvested stormwater as a resource or as an environmental imperative.

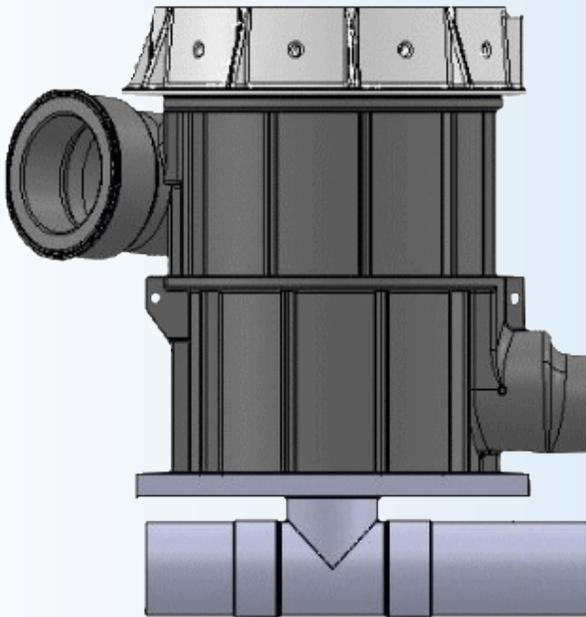


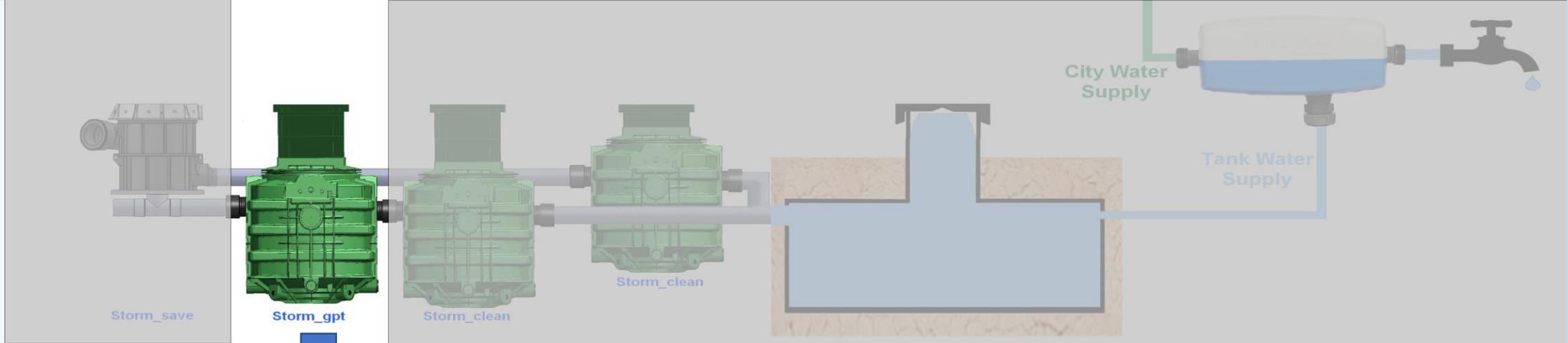
Initial Pollutant Separation

The primary stormwater quality improvement device (SQID) **STORM_save** accepts inflow water from a variety of catchments and provides full flow separation. A First Flush device can also be fitted if required that reduces the soluble and sediment contaminate loading nearly 50%. The design concept uses a distributed network of devices beginning at the top of the catchments to manage the catchment inflows and reduce potential contaminate uptake. The primary (harvested) stream carries the cleaner, filtered water – **approx. 2/3 flow** - and sends it for further treatment to reduce any remaining fine particles and soluble contaminants. The secondary (waste) stream – **approx. 1/3 flow** - directs the physical and particulate pollutants and first flush segment towards the gross pollutant trap (if needed) for bulk removal.

Specifications

- Primary inlet DN300/DN225
- Primary outlet DN250/DN200
- Secondary outlet DN300/DN200
- 1,000 mm high
- 850 mm diameter





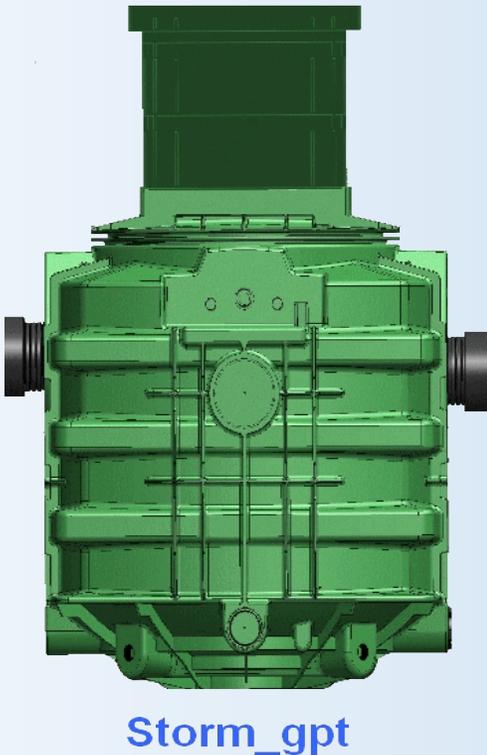
Gross Pollutant Capture

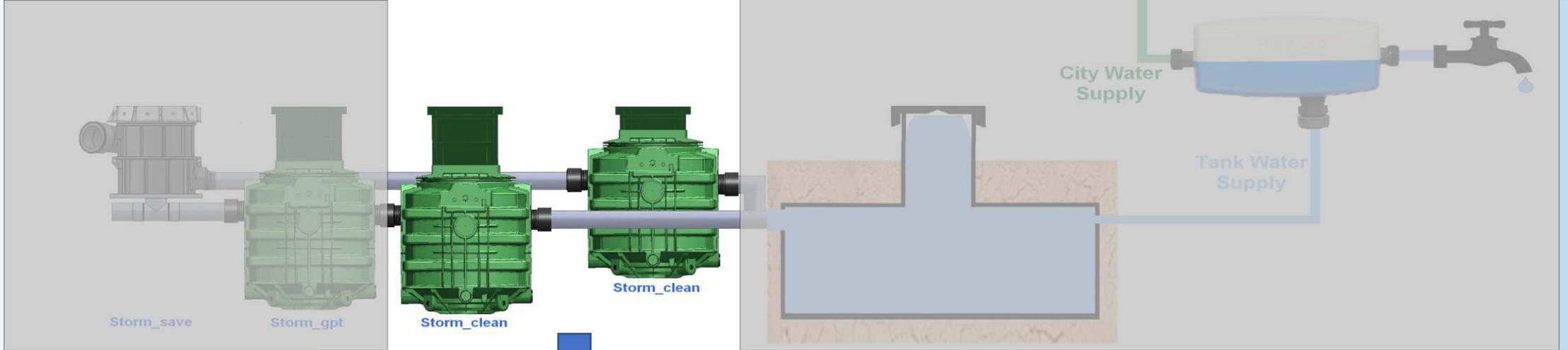
The gross pollutant trap (GPT) **STORM_gpt** receives the contaminated outflow water from the waste outlet of the primary separator and captures the larger contaminants and segregates them within the GPT for post-storm removal and land-based processing for recycling.

The **STORM_gpt** is manufactured from medium density polyethylene which provides long term stability and is easily cleaned using a vacuum removal process. The GPT filtered water is passed to the fine filter **STORM_clean** where remaining soluble and fine particles are particulated and captured.

Specifications

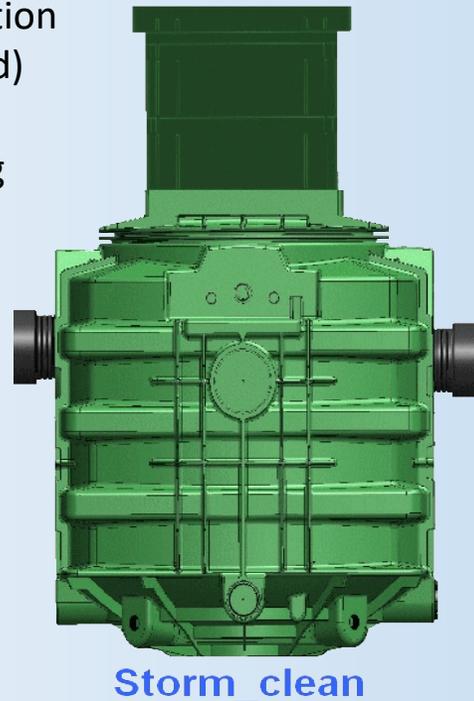
- 6 K or 8 K litre tank configuration (multiple tanks can be installed in a network)
- Up to DN600 inlet & outlet and pipe types can be used
- 600 x 900 mm access opening
- 2100 or 2500 mm deep
- 2300 x 2300 L x W
- Optional riser available





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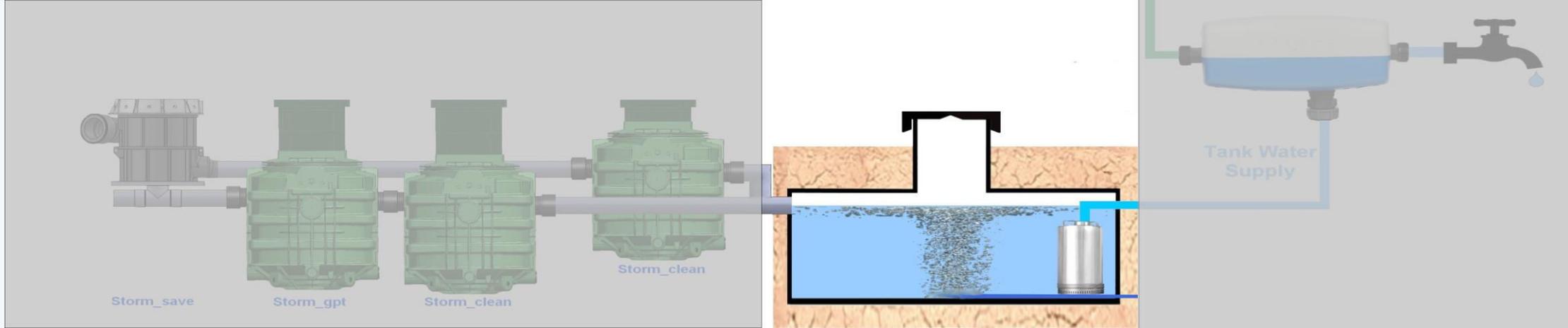


Advanced Filtration STORM_clean Product

The **STORM_clean** is a fine filter which further processes the screen-filtered outflow water from either the **STORM_save** primary separator or **STORM_gpt** that also provides a downstream barrier for remaining gross pollutants including small micron level contaminants and low density floating material.

STORM_clean applies science based treatment processes that target soluble and particulate contaminate loading without the added maintenance and wastewater loss of membrane systems.

Once the water has passed through the **STORM_clean** it is a higher quality resource that is generally suitable for low cost natural biological processing in storage or wetlands even before release for environmental flows.

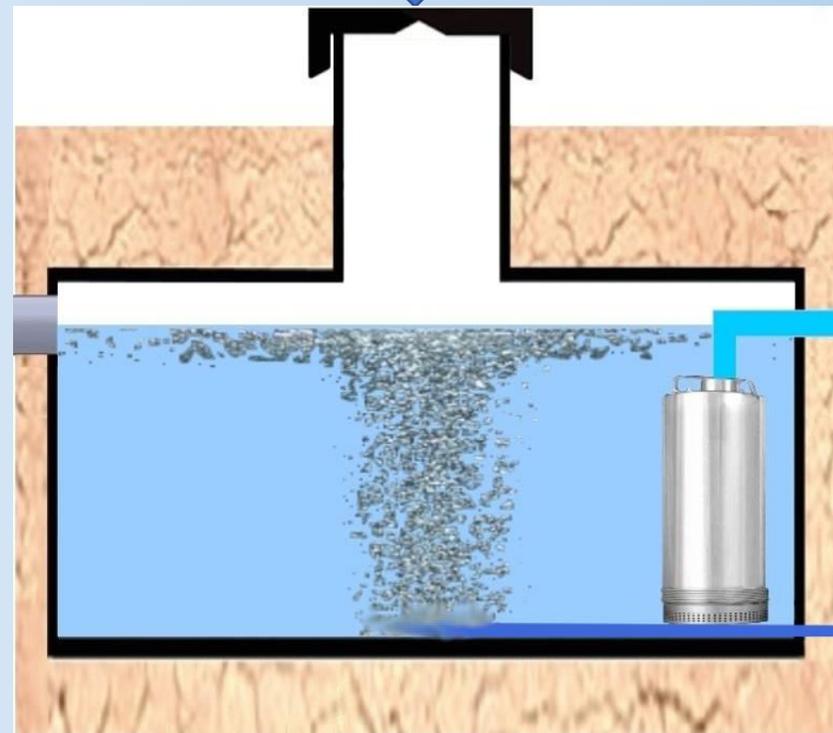


Harvesting – Wetlands and Tank Storage

The quality improved stormwater can be stored in a variety of natural or engineered containment like wetlands or underground water tanks ideally to support nature's sustainable biological processes.

Stored water can be maintained at the highest quality possible by using managed and viewable systems as applied through the **WiWo** smart controller.

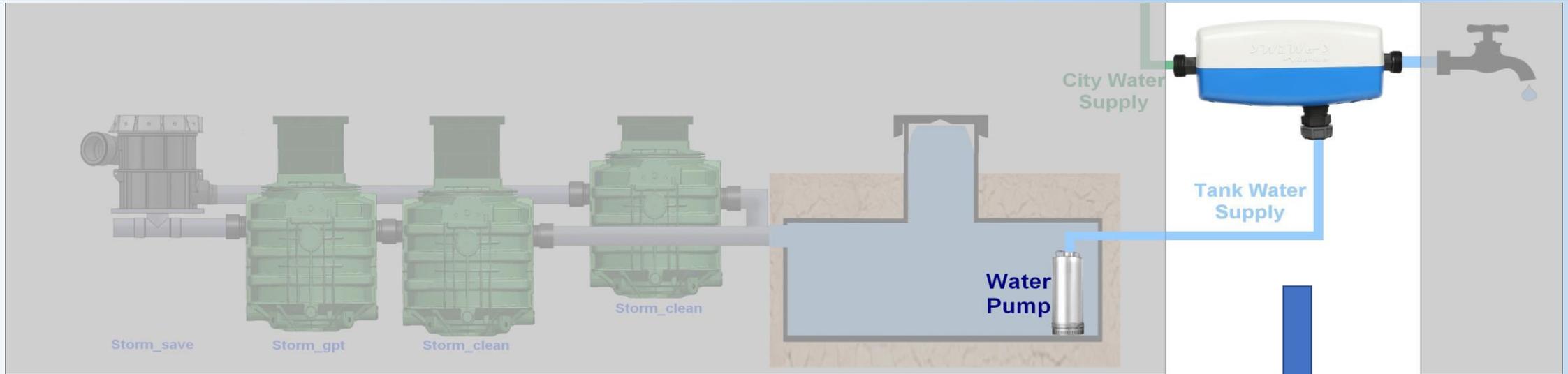
Disinfection is recommended for utilisation and ultraviolet light can be used during the delivery process to ensure that the water resource is optimised before being used.



Specifications

- Tank capacity 8 M³ modules
- Modules can be used from 100 M³ to any capacity as needed

STORM_cubic
tank storage system



WiWo is a water source controller for household and commercial level operations, incorporating an aeration pump controller, U/V disinfection management and on-demand pressurised distribution to ensure that stored water is available well after the storm and prioritises the use of stored water as a healthy and valuable water resource.

WiWo will monitor the level of stored water and deliver it to the connected applications whenever it is available. When the stored water is depleted, **WiWo** will seamlessly switch to the town water to ensure continuous water supply. When stored water is available again, **WiWo** will seamlessly switch back to the tank supply.

WiWo is a smart device that is connect ready for cloud based management of the **SPARKLE | WATER | QUALITY** stormwater networked system.



Specifications

- 25 mm pipe diam.
- 2kW pump output
- 500W U/V output supply
- 500W aeration output supply

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System Maintenance

System maintenance is problematic and often challenged for funding in municipal regions.

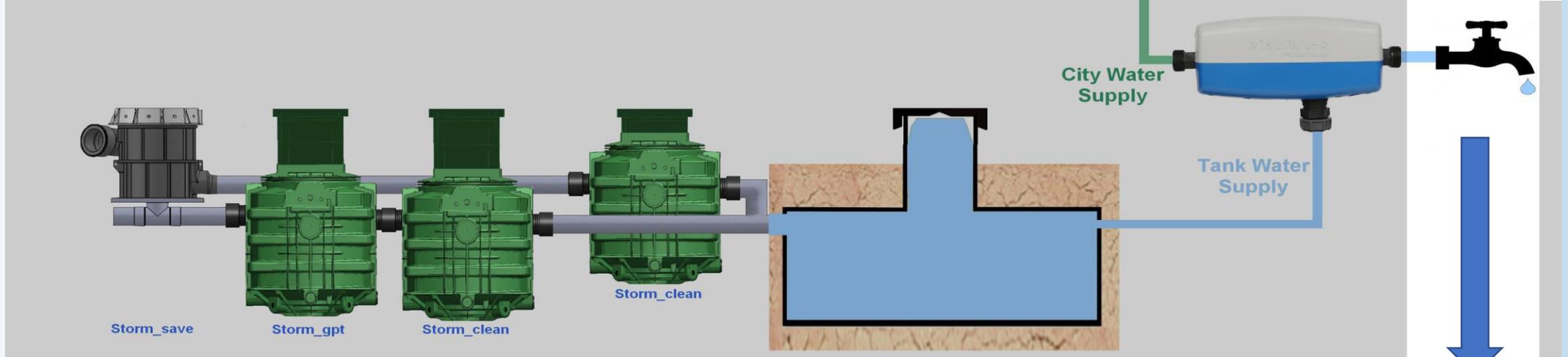
System maintenance is crucial to improving water quality, flood mitigation outcomes and environmental protection for each and every stormwater event.

SPARKLE|WATER|QUALITY is a safe and simple process that only requires scheduled removal of the collected contaminants with a vacuum extraction vehicle. Maintenance is logged, predicted and verifiable and there is no need generally for workers to enter confined spaces in comparison to the limited performance, high maintenance solutions in the current market

The frequency of clean-out is dependent in-part on the quality of the catchment area, the types of material collected, and the density profile of the contaminants. Protection for catchments is another quality part of the engineering design that the **SPARKLE|WATER|QUALITY** MDCM applies.

SPARKLE|WATER|QUALITY product solutions are modular for large and small projects in a micro distributed region-wide approach to stormwater management. Our broad capability in engineered products is now evolving to smart, networked and viewable solutions in the field with a system of maintenance built into our design and engineering.

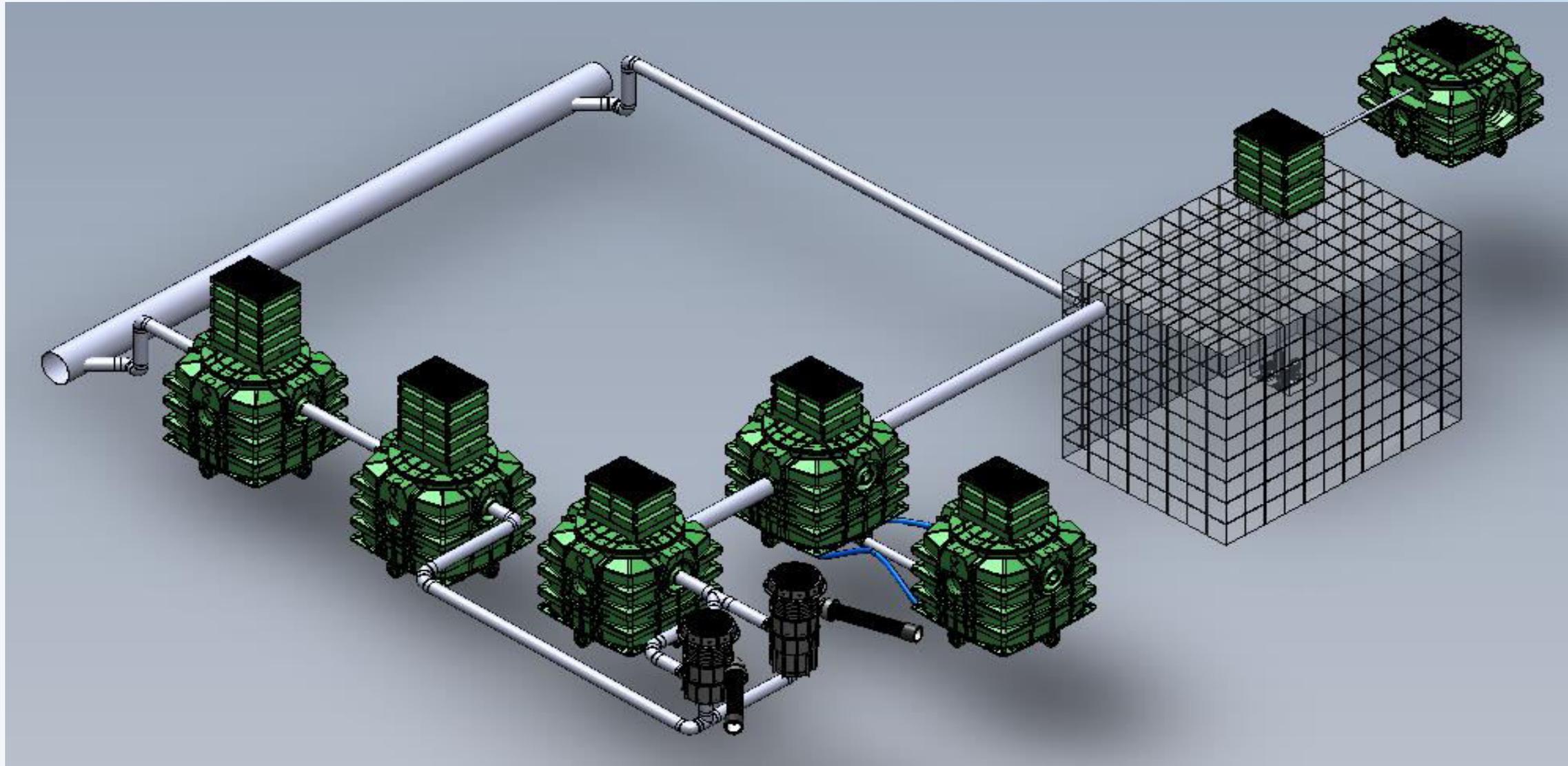




Applications for Harvested Water

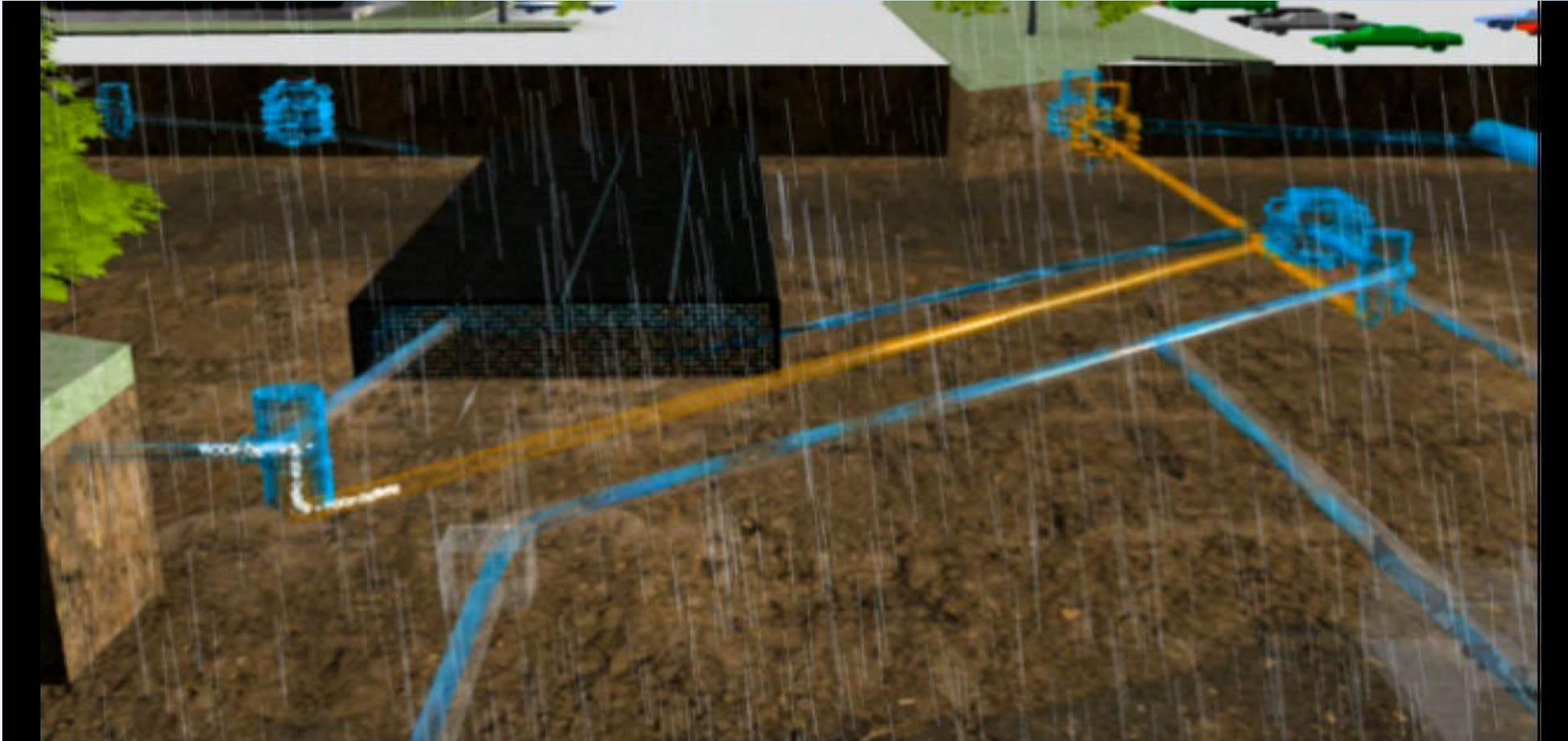
Harvested water can be applied to a broad range of applications from domestic toilet flushing, supply for washing machines and hot water systems, landscape and municipal irrigation, servicing needs for apartments, businesses and industrial processes.

Utilizing this abundant and renewable source from harvesting can extend the use and application of rainwater, conserve energy, support nature and allow expanding economic development while protecting the environment and preserving our potable water supplies for future generation.

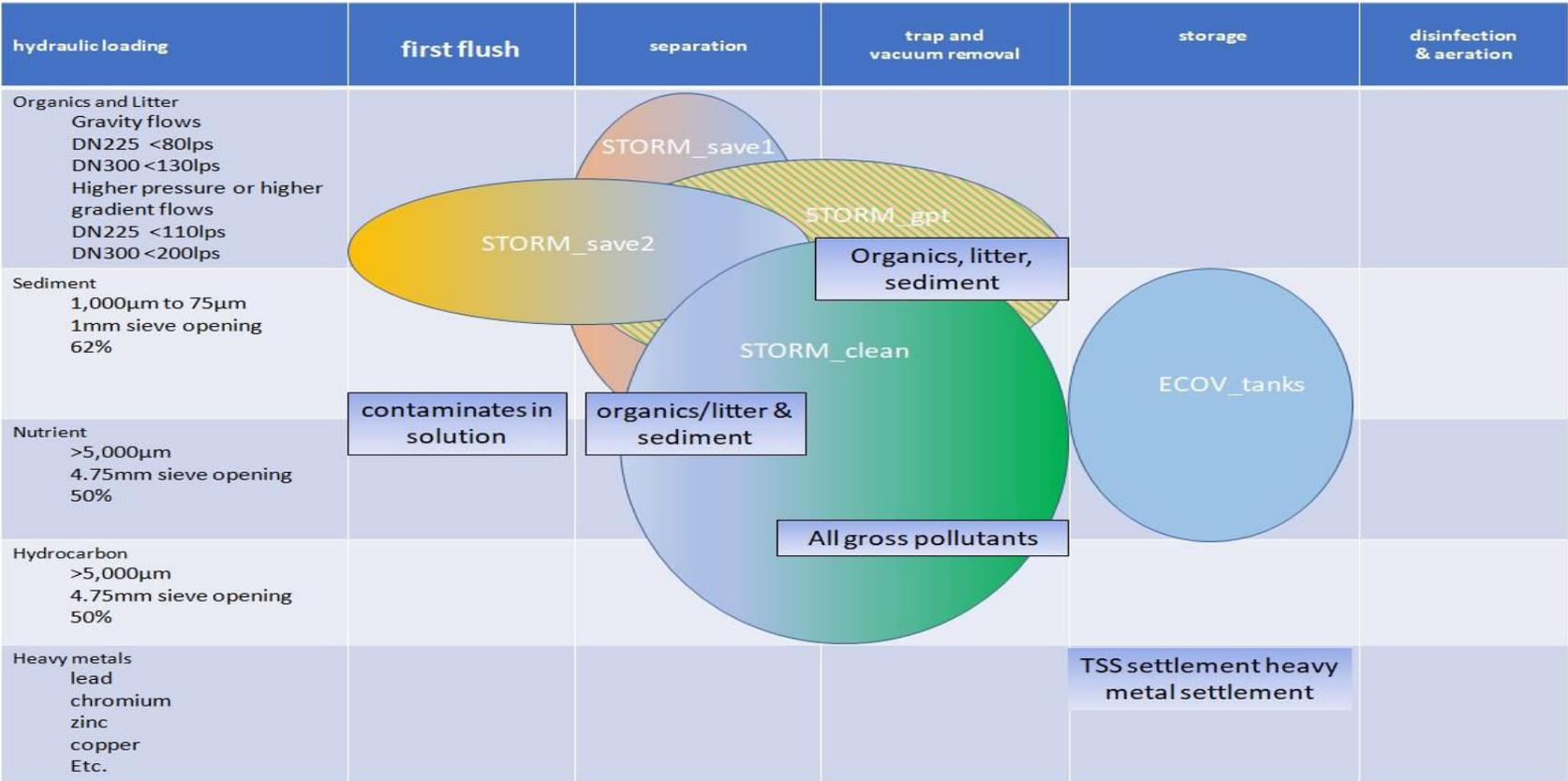


Micro Distributed Catchment Model

Stormwater Harvesting and Management System



systemised
contaminate
reduction
treatment
train



Maximum potential contaminate reduction(s)

STORM_save
(Mechanical)



GPT
(Absorption)



STORM_clean
(Electrolysis)



Retention Tank
(Carbonising)

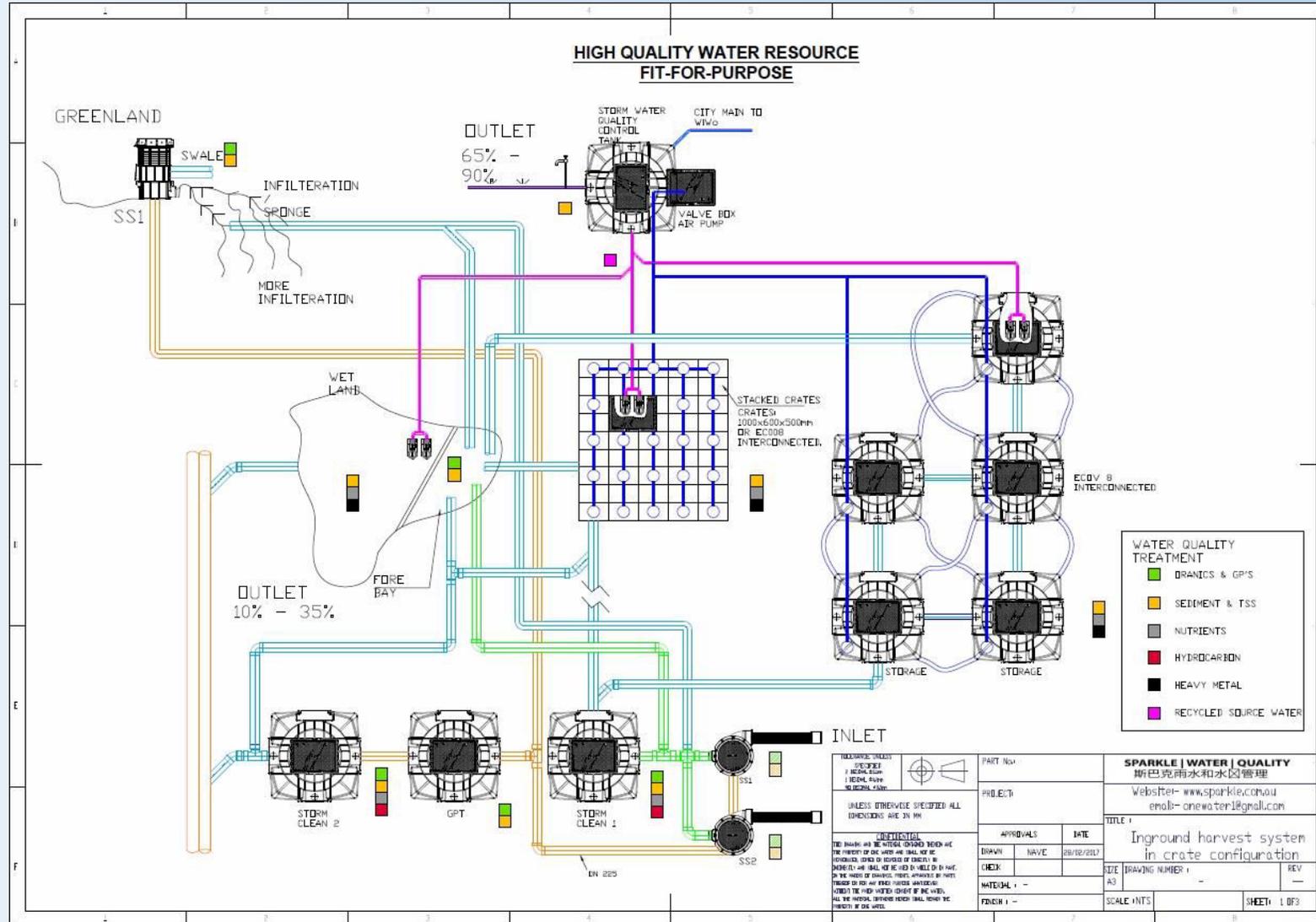


Water Flow →

Pollutants	STORM_save	GPT	STORM_clean	Retention Tank	Optimal Residual Contaminate Load (Harvest Stream 2/3 flow)	Residual Contaminate Load (Waste Stream 1/3 flow)	Optimal Combined Harvest and waste stream water quality reductions
P	50% ↓	10% ↓	50% ↓	36% ↓	14.4%	28.8%	81%
N	71% ↓	10% ↓	40% ↓ (including 95% of ammonia)	32% ↓ (including 80% of DON and 100% of CON)	10.7%	36.7%	80%
SS	66% ↓	0%	45% ↓	0%	2.8%	8.25%	95%
Hydro Carbon	0%	50%	90% ↓	0%	5%	5%	95%
Trash/Organic/Sediment	85% ↓	75% ↓	75% ↓	0%	0.94%	6.25%	97%

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Typical System Schematic



in tune with nature **One Water** *treat it naturally !*

For additional information, please visit

www.onewater.com.au

*never forget the critical role and sustainability of nature
and its superior and original performance capability that we rely upon!*

