TYPE E HES basin

Overview

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WATER SOLUTIONS

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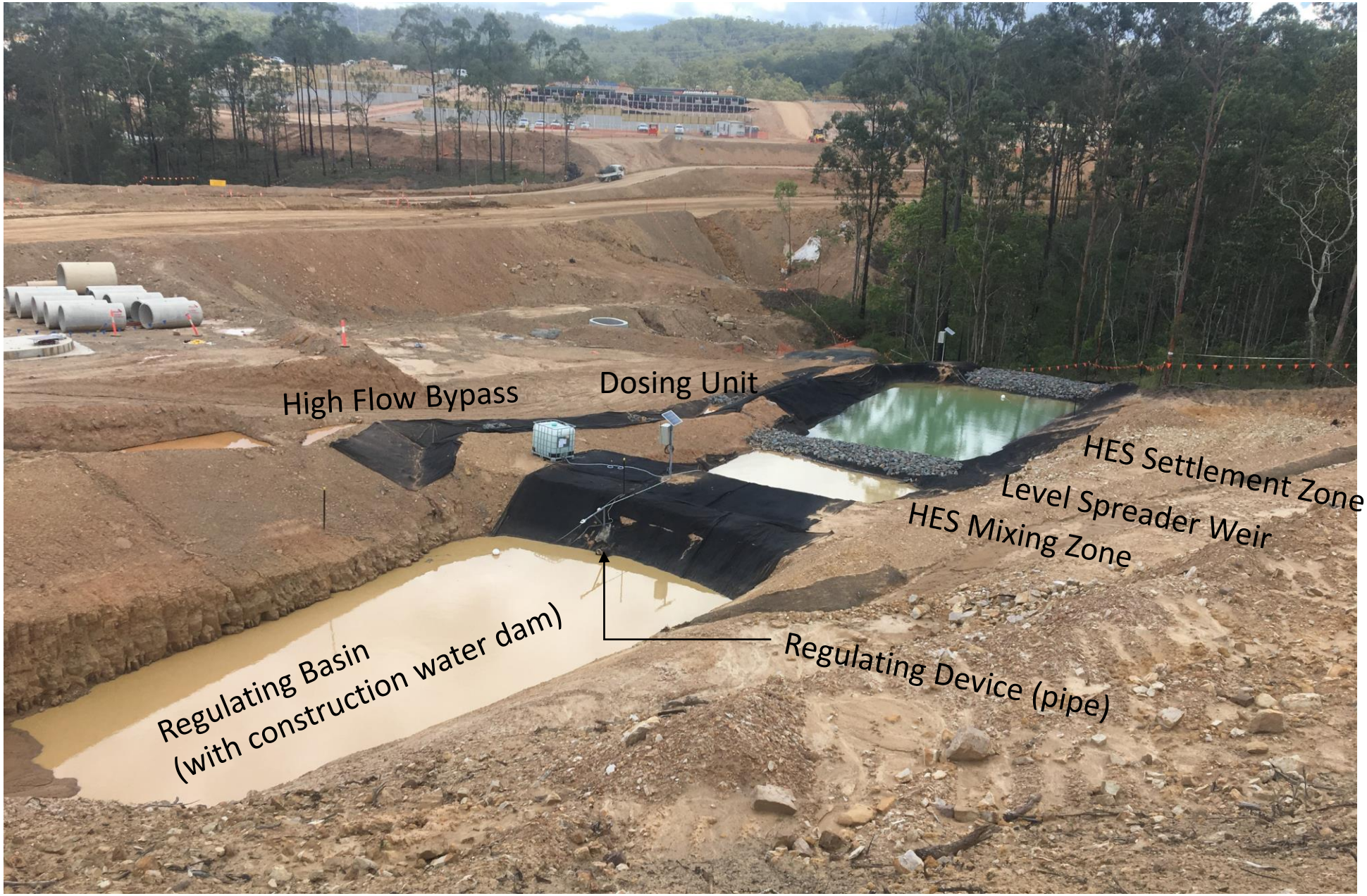
TYPE E HES basin - Overview

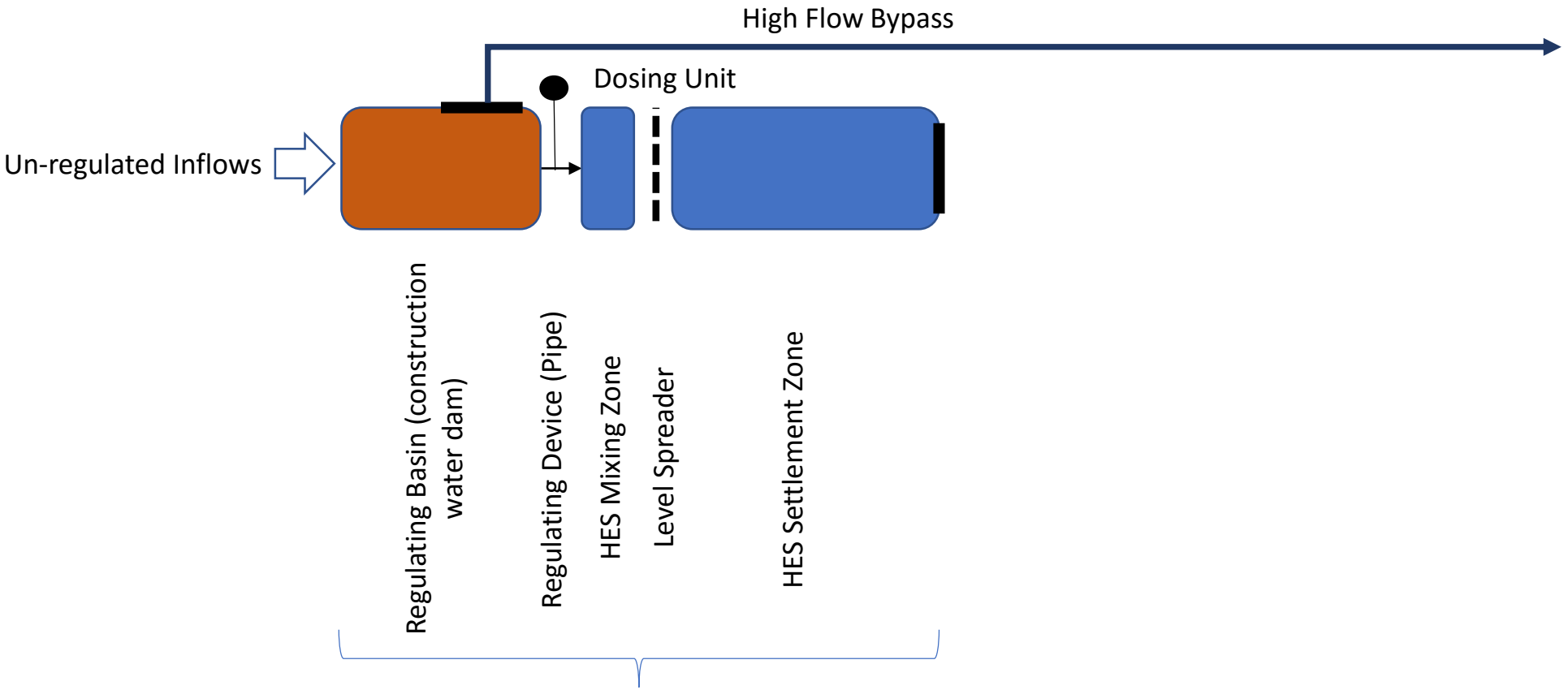
- New type of sediment basin that adopts a “treatment train” approach.
- Three discrete treatment zones:
  - Regulating Basin (with high flow bypass) for coarse sediment capture, construction water storage (optional) and flow regulation to downstream treatment zones. The larger the Regulating Zone the smaller the downstream treatment zones.
  - HES Mixing Zone (with level spreader) to mix flocculating agent for fine sediment capture and to establish ‘plug flow’ conditions in downstream treatment zone.
  - HES Settlement Zone for capture of flocked sediment discharged from mixing zone and to discharge treated supernatant to receiving environment.
- Automatic dosing:
  - Fitted with an Automated Dosing Unit to administer a flocculating agent into the water stream as it enters the Mixing Zone.
- Continuous flow through operation:
  - Continuously treats influent water requiring hydraulic resident times typically less than 2hours to achieve discharge water quality.



Typical Type E HES basin layout

Target Particle Size: Coarse >125micron Fine/Colloidal <125micron

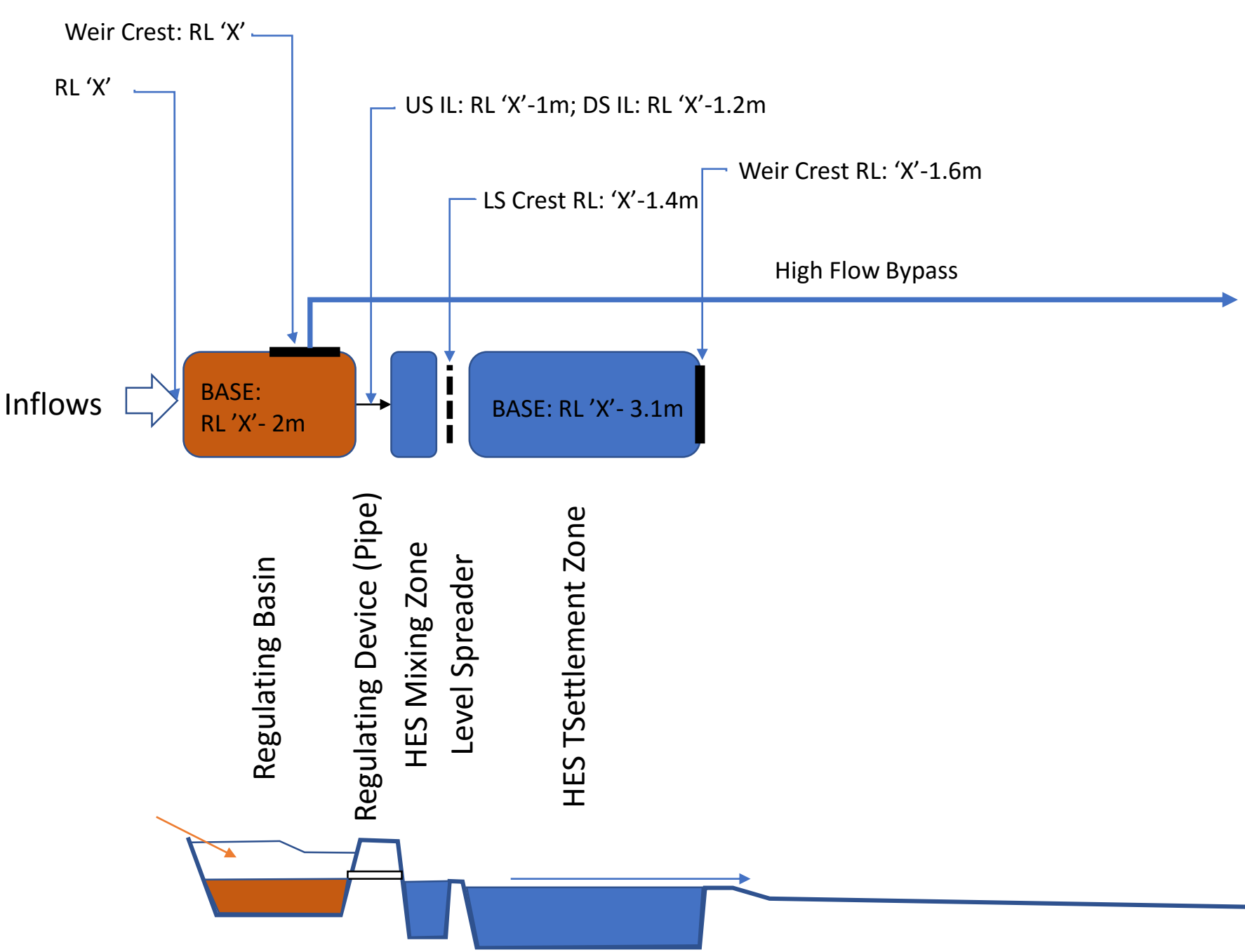
Desilting Frequency: Regular (monthly) Infrequent (annually)



Type E HES basin

(regulate and treat flows up to Q3mth during earthworks and build out of upstream catchment)

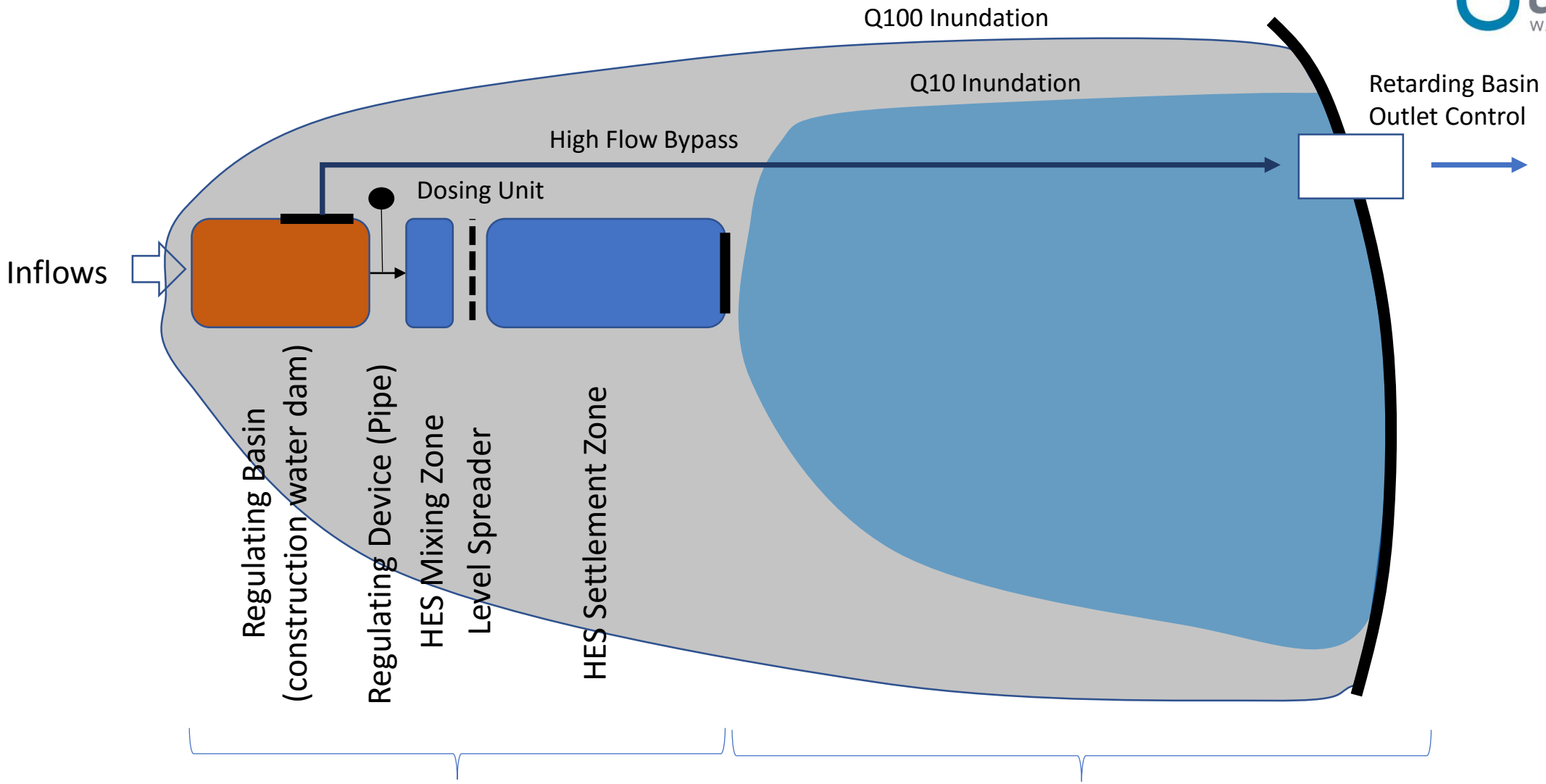
Typical Type E HES basin layout (Plan View)



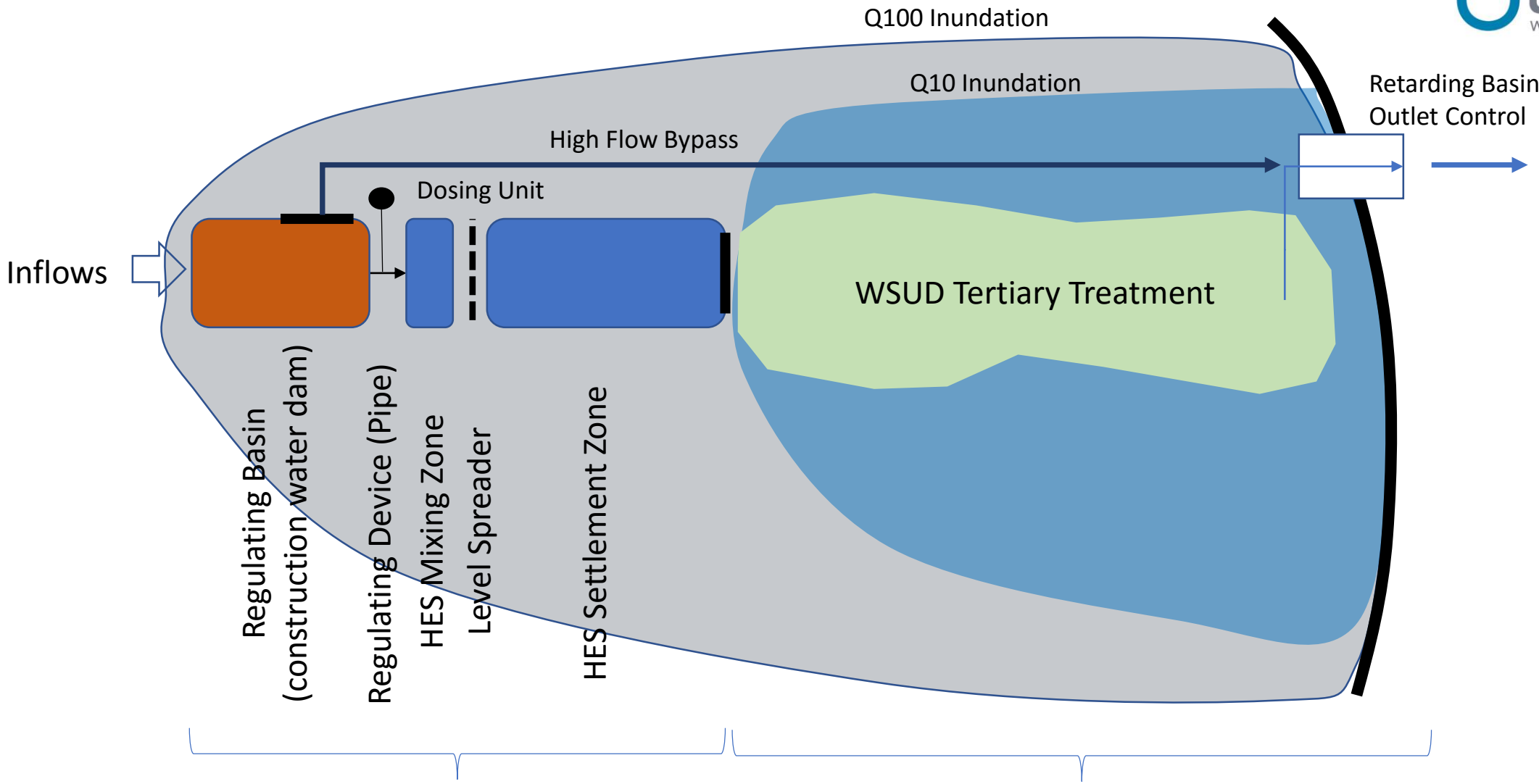
Typical Type E HES basin Design Levels (Plan and Section Views)

TYPE E HES basin – What are the Benefits?

- Smaller overall footprint
- More efficient to maintain – typically only requires desilting of the Regulating Basin during operating life.
- More accurate and efficient dosing of flocculating agents – flows entering Mixing Zone are regulated (typically by a submerged pipe) thereby reducing the peak and range of flows to be dosed with a flocculating agent.
- Less flocculating agent required (if construction water drawn from Regulating Basin).
- Can be better integrated with operational phase stormwater management infrastructure (WSUD)



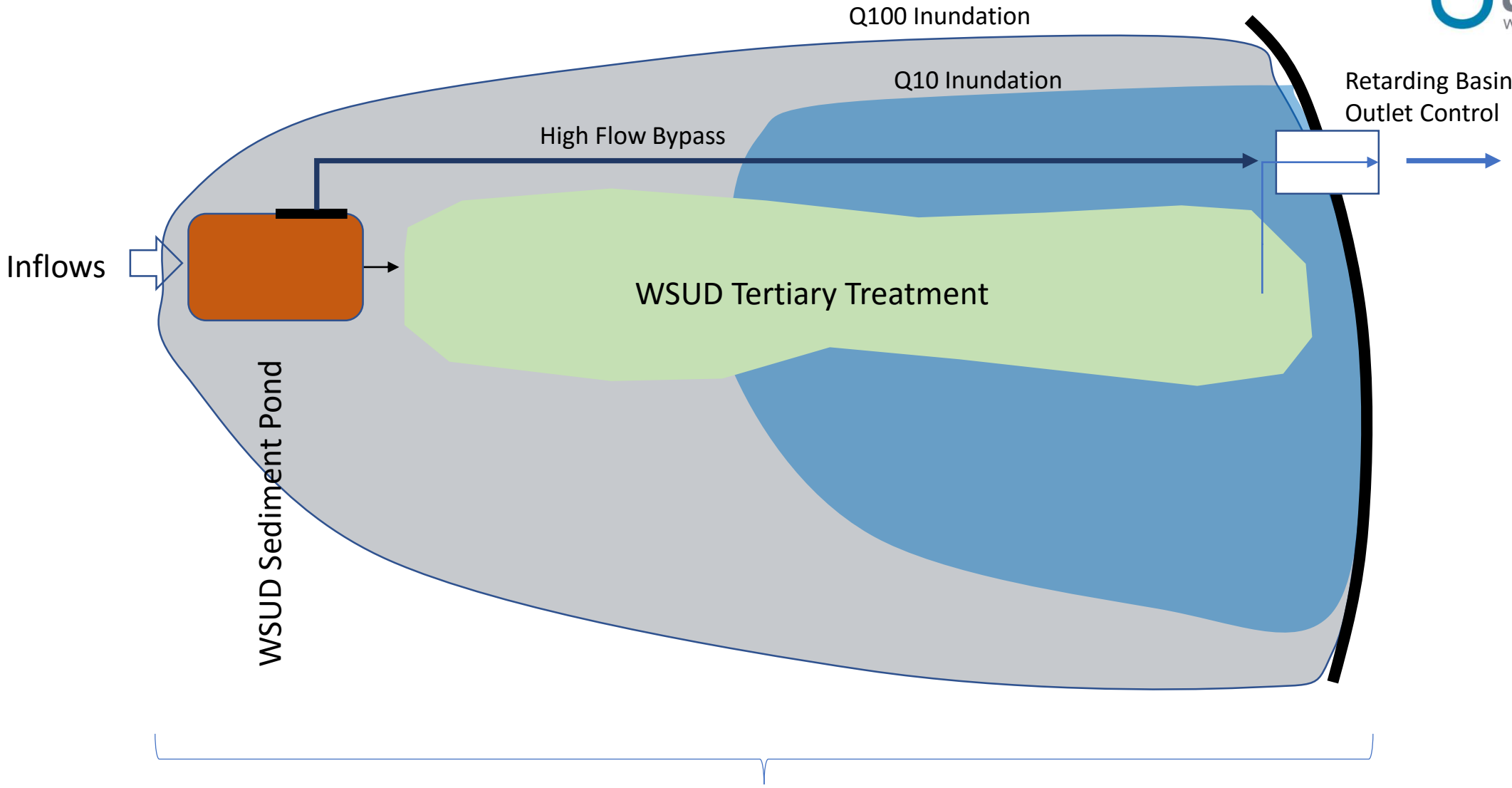
Typical Type E HES basin integrated with downstream Retarding Basin (Plan View)



Type E HES basin
(regulate and treat flows up to Q3mth during earthworks and build out of upstream catchment)

Phase 1 WSUD Treatment within Retarding Basin
(treat flows up to Q3mth and regulate peak flows up to Q100 during catchment build-out)

Typical Type E HES basin integrated with downstream Phase 1 WSUD + Retarding Basin (Plan View)



Ultimate WSUD Treatment within Retarding Basin
(treat flows up to Q3mth and regulate peak flows up to Q100)

Typical Ultimate WSUD + Retarding Basin (Plan View)

TYPE E HES basin – Design Method

- Step 1: Size Regulating Basin
  - Maximum practical size based on site constraints.
  - If integrating with WSUD requirements size and locate to match ultimate WSUD sediment basin requirement.
  - Use continuous simulation rainfall/runoff model (e.g. MUSIC or similar) with ten years of sub-daily rainfall to determine the maximum regulated flow into Mixing Zone based on the available detention storage within Regulating Basin and ensuring at least 80% of the average annual volume of runoff entering the Regulating Basin is directed as a regulated flow to the Mixing Zone.
- Step 2: Size Highflow Bypass
  - Size the highflow bypass weir and channel to ensure adequate protection to Mixing Zone and Settling Zone (recommend sizing bypass to not less than 10yr ARI unless located within a regional flood detention basin).
- Step 3: Size Settlement Zone and Mixing Zone
  - Use Turbid's Type A and Type B HES basins design tool (www.turbid.com.au) to size the Settling Zone and Mixing Zone by forcing the design flow to equal the maximum regulated flow determined in Step 1 above.
  - Recommend increasing the residence time used for the settling zone by 50% as an additional factor of safety.

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