

Paerata Culvert Replacement – Improving Water Quality Outcomes Through Water Sensitive Design

Holmes

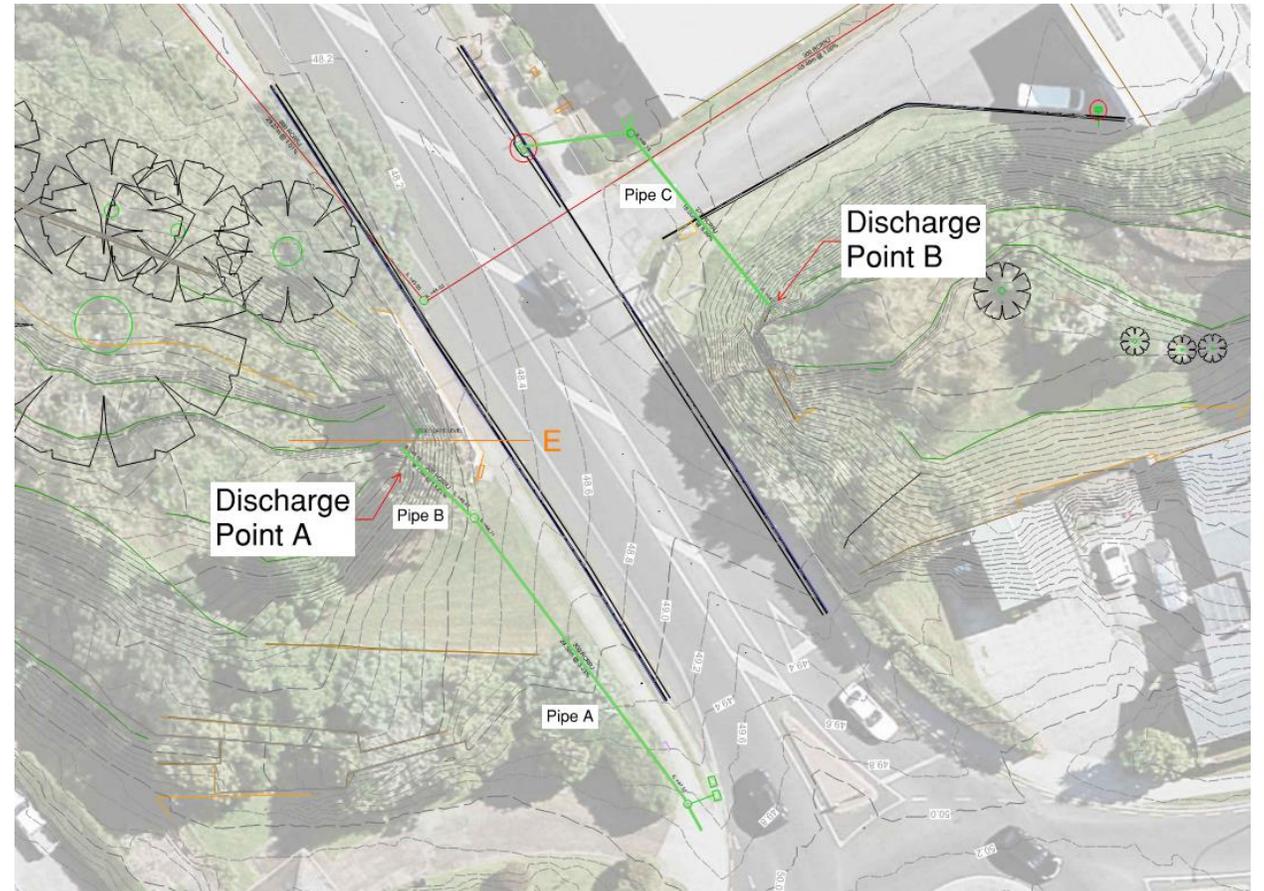
Presented by Emma Grigg
May 2023

Paerata Culvert



Existing Stormwater Discharges

- Two existing stormwater discharges
- No existing treatment or attenuation



What is the Why

- Improve water quality
- Enhance the natural environment
- Provide a water sensitive design



Design Principles



Provide more than minimum treatment requirements



Improve natural environment



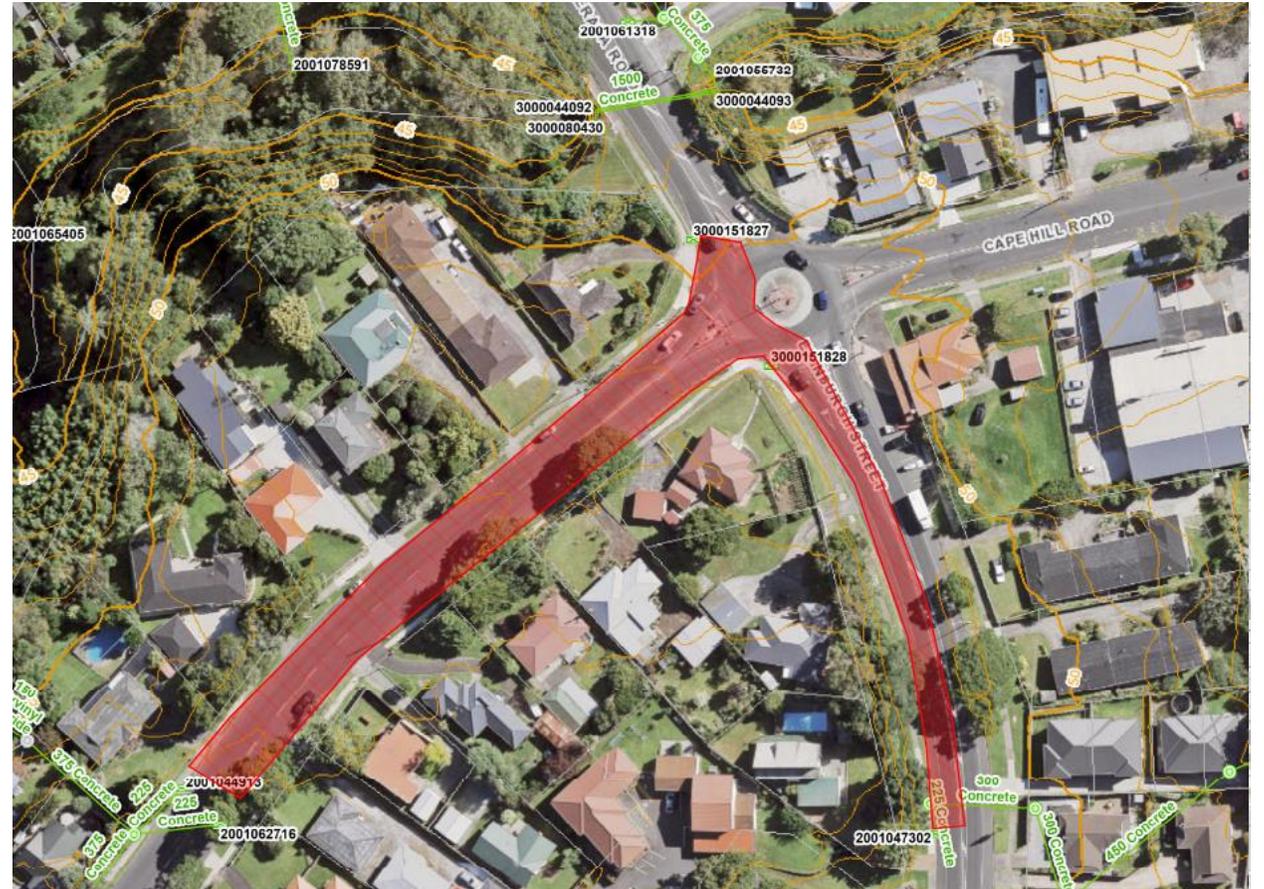
Use of green infrastructure



Mimicking natural systems

Catchment A

- Runoff collected via two double sumps
- Total catchment area = 4960m²
- Trafficable area = 2435m²



Existing Stormwater Discharges

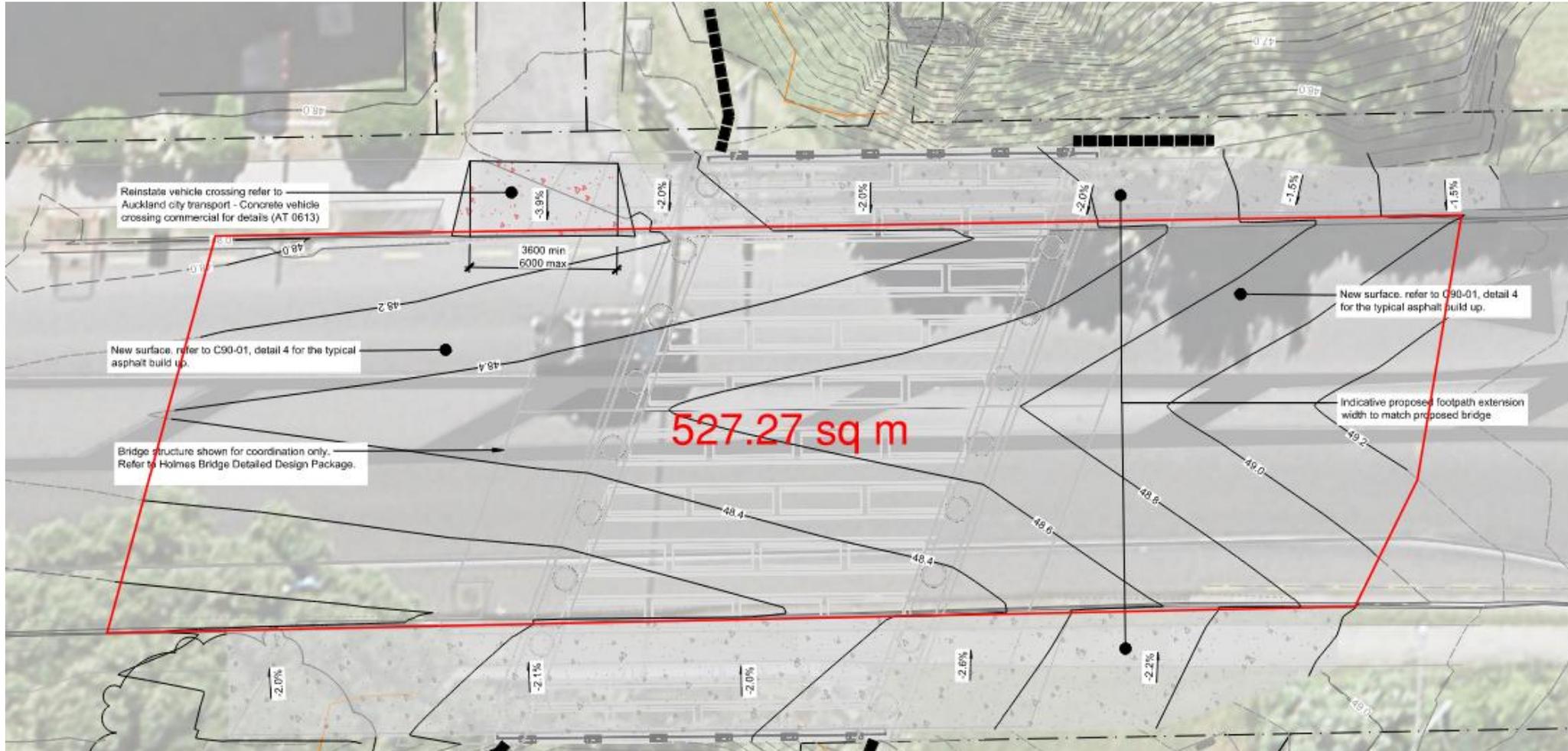
Outfall A



Outfall B



Proposed Redevelopment



Proposed Treatment Catchments

Proposed areas of redevelopment



Proposed area for treatment



Design Flows

Catchment A

Water quality volume (WQV)

- 6.42 L/s

10-year design storm

- 130.2 L/s

100-year design storm

- 199.3 L/s

Catchment B

Water quality volume (WQV)

- 7.39 L/s

10-year design storm

- 96.7 L/s

100-year design storm

- 148.2 L/s

Site Constraints



Site Constraints

Catchment A



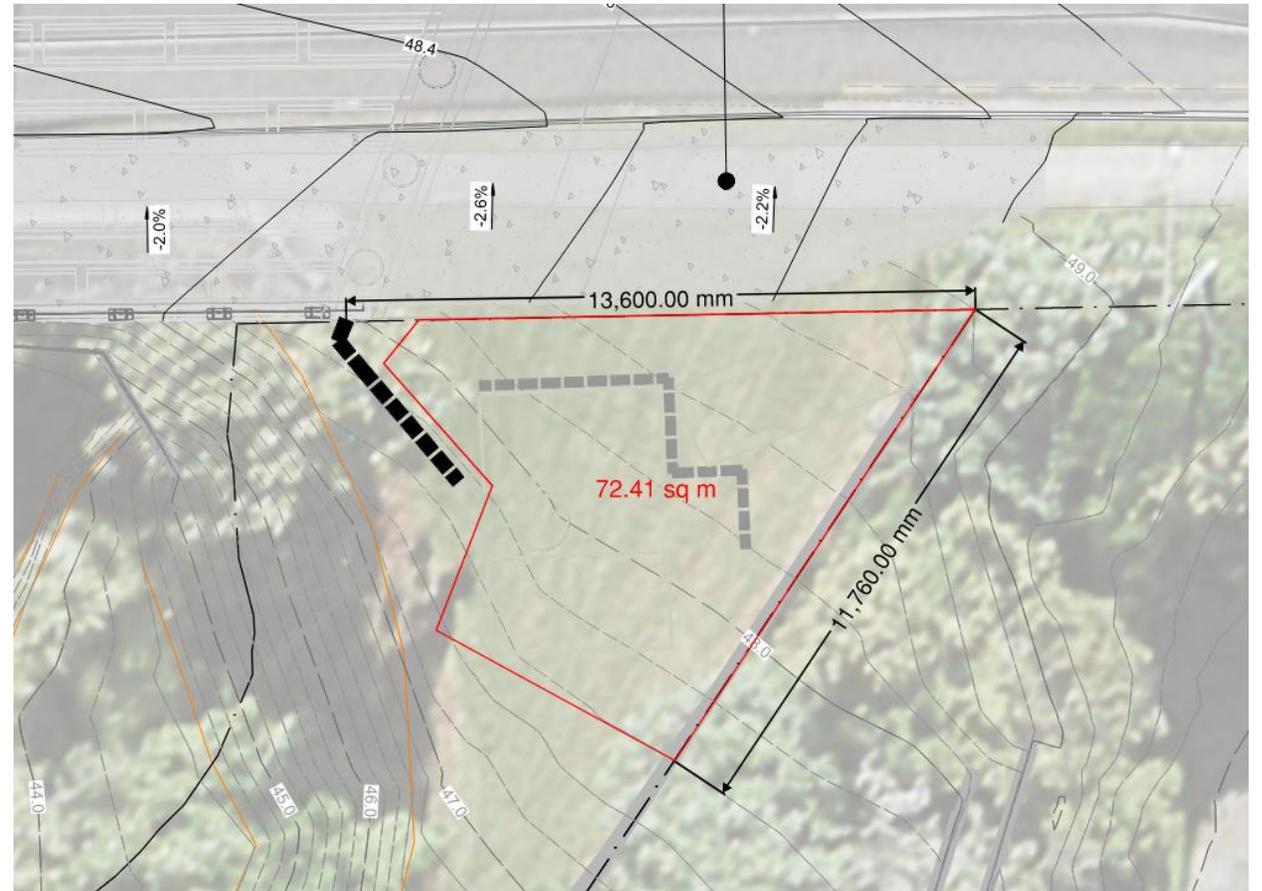
Catchment B



Outlet A Treatment

Options considered:

- ~~Swale~~
- Conventional raingarden
- Proprietary raingarden
- ~~Cartridge treatment~~

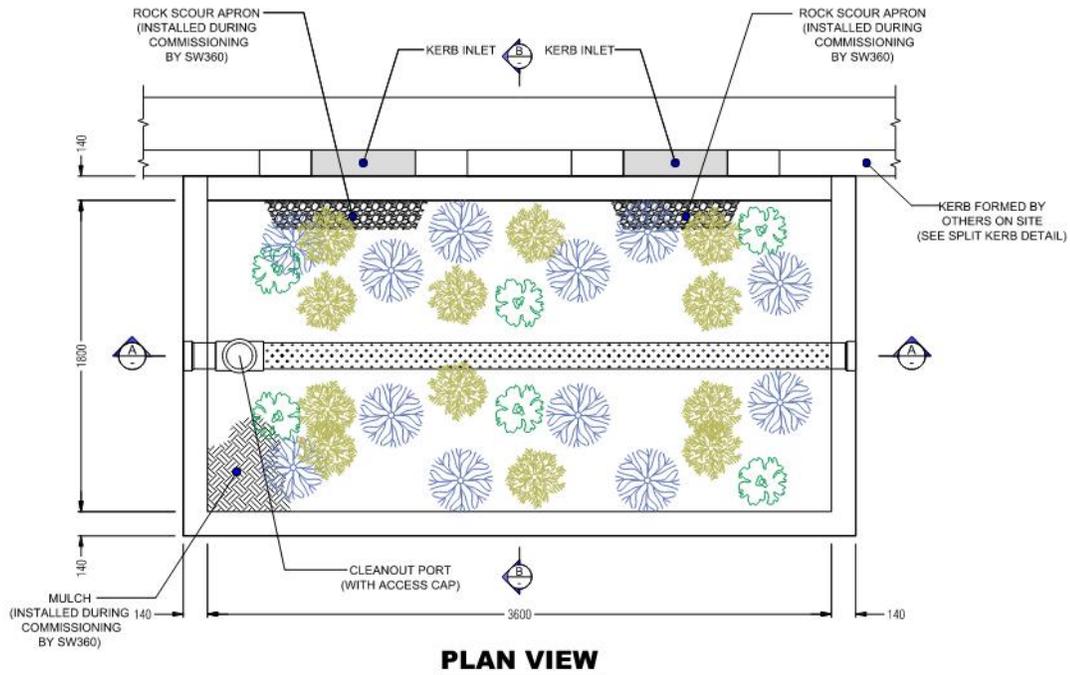


Conventional Raingarden

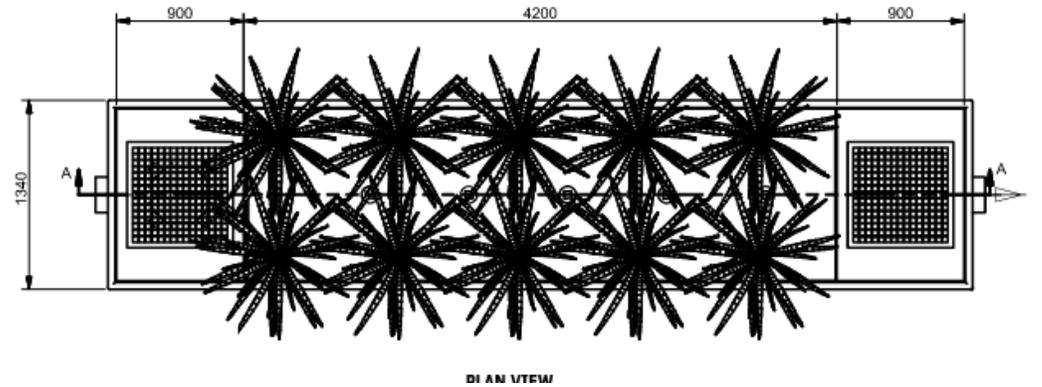


Proprietary Device Options

Stormwater360 - Filterra

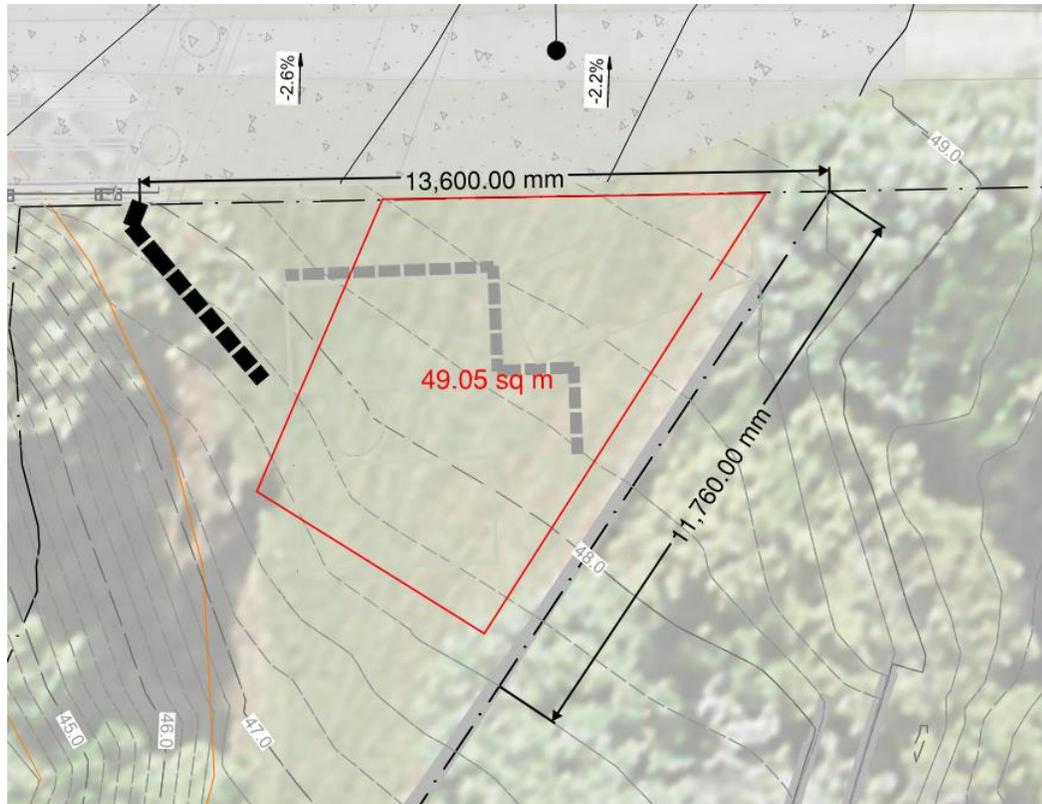


SPEL – SPEL Basin

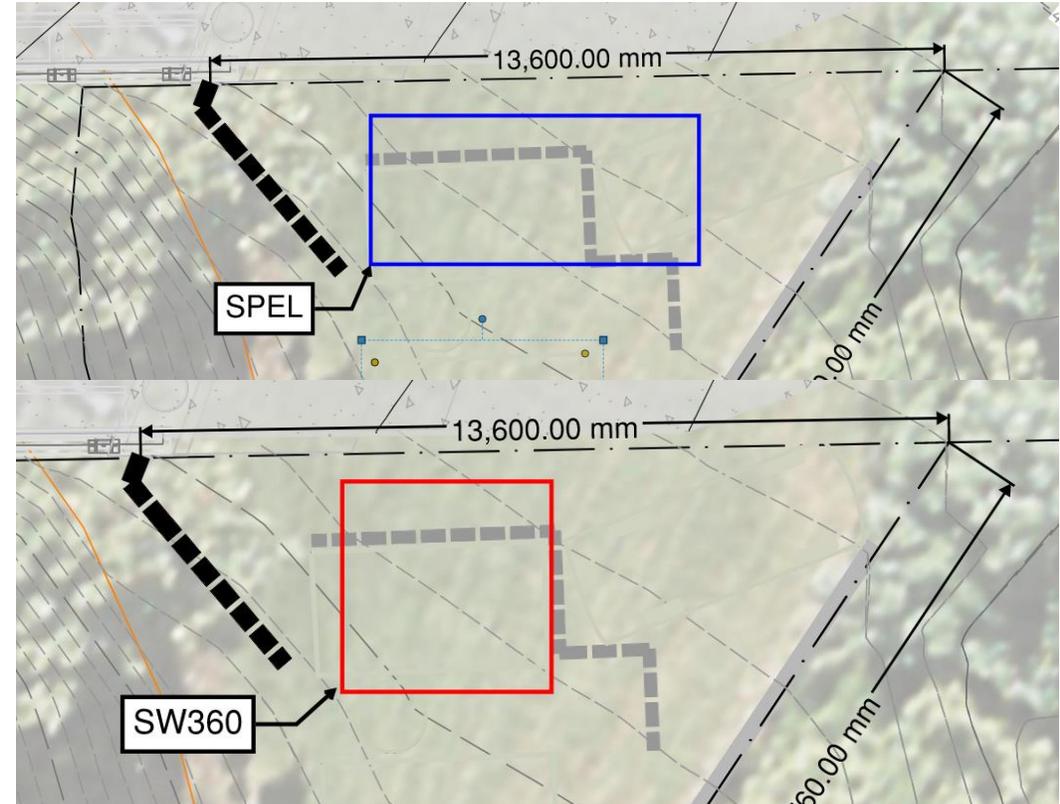


Conventional vs Proprietary

Conventional

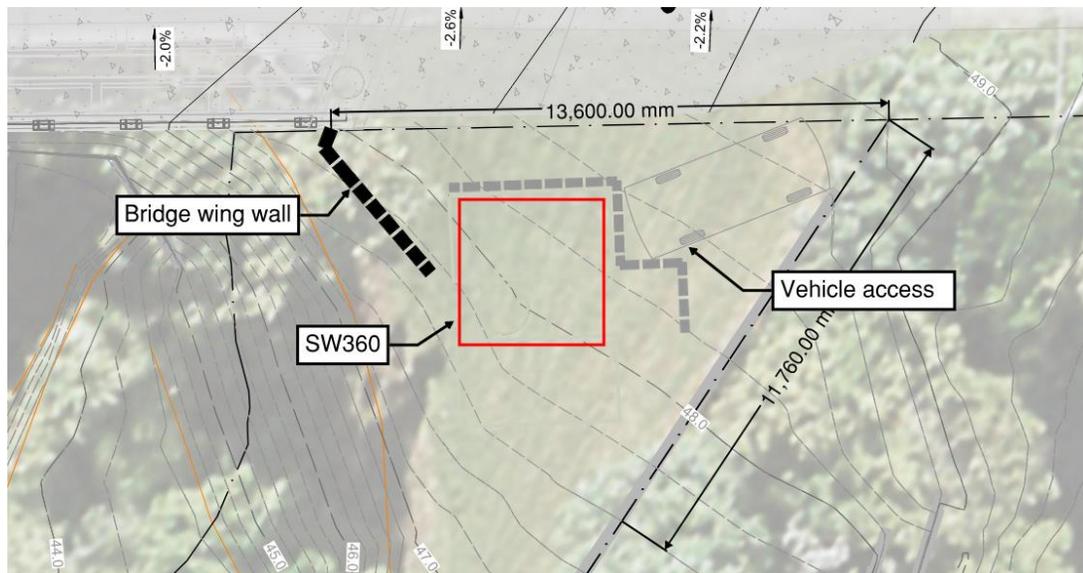


Proprietary

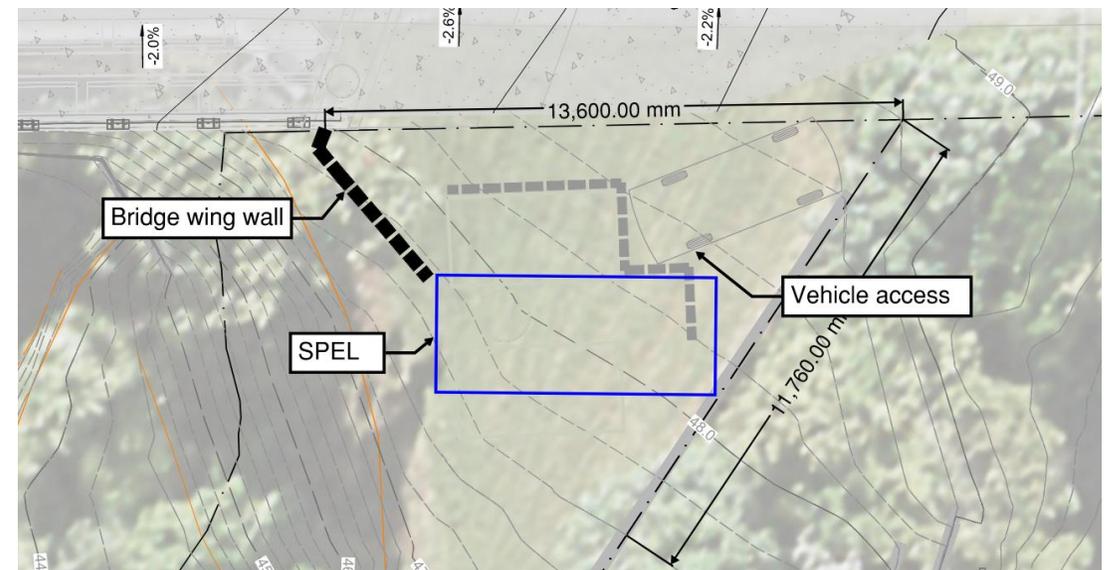


Proprietary Device Selection

Stormwater 360

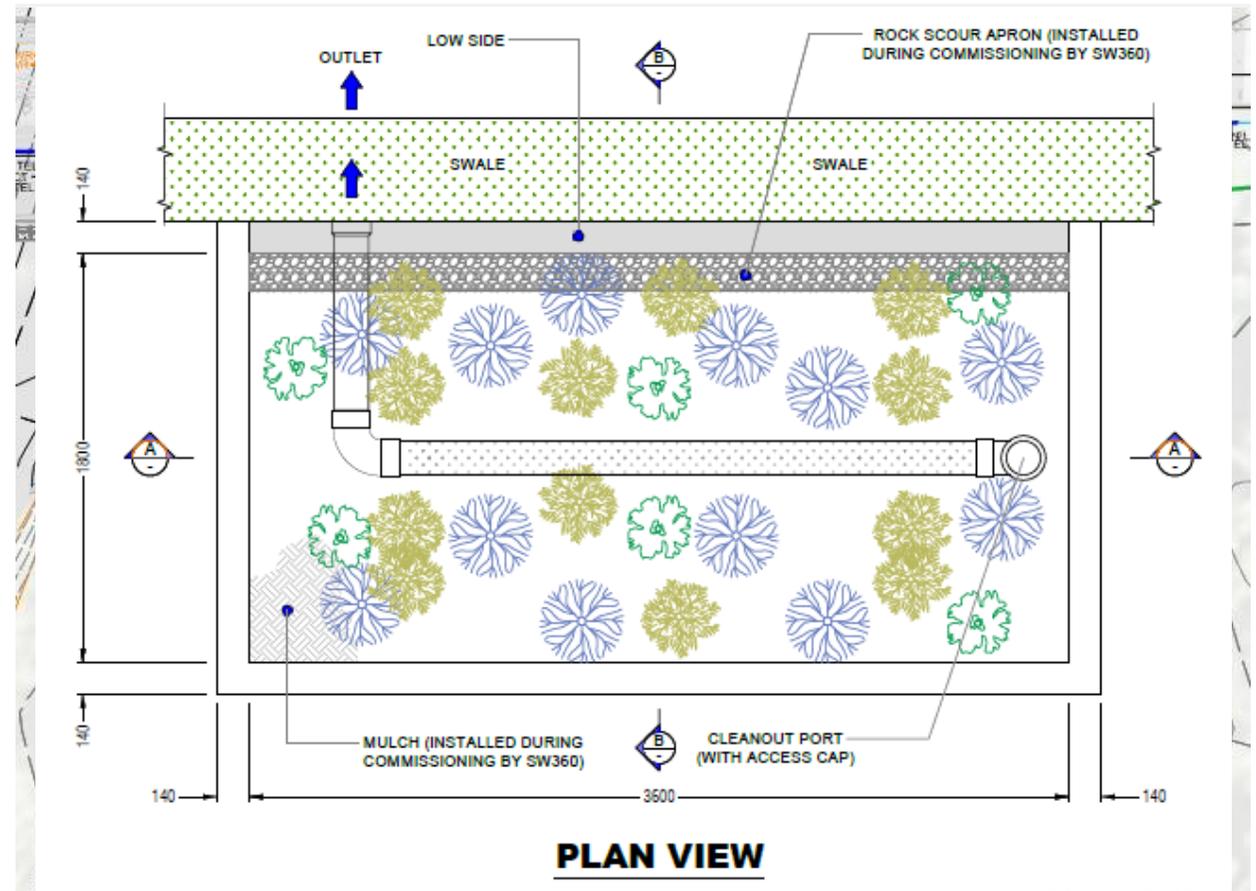


SPEL

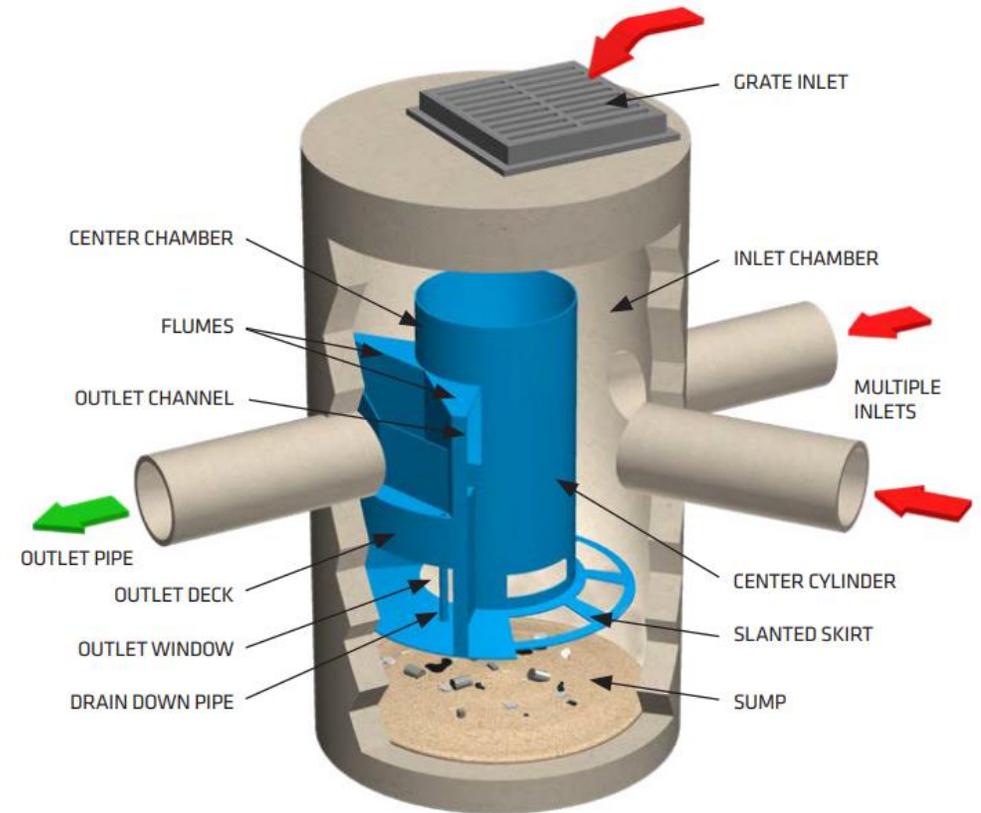
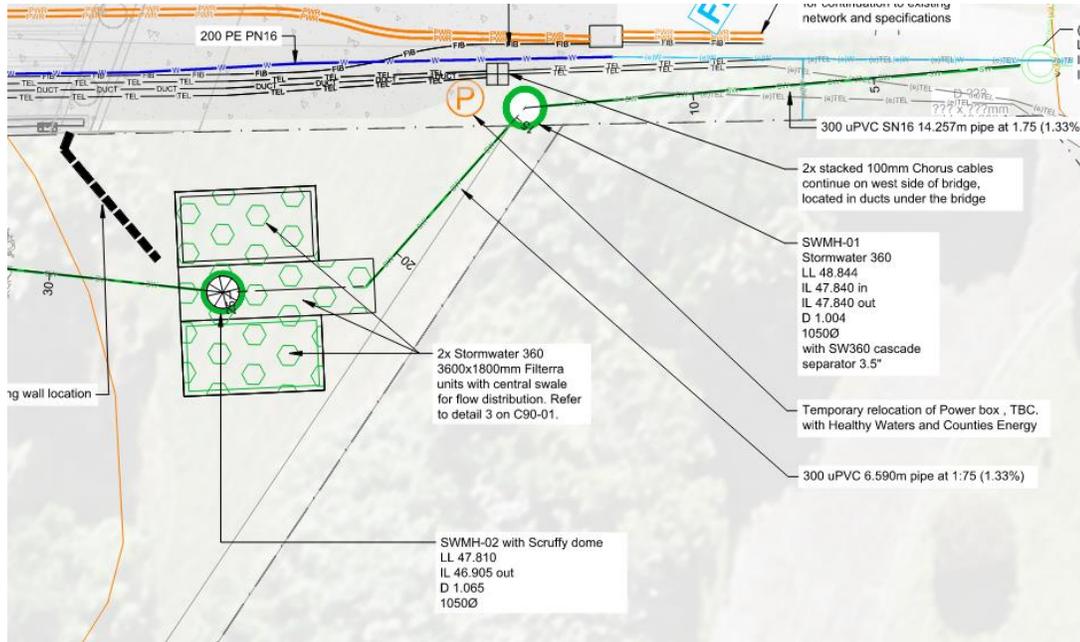


Stormwater360 Filterra

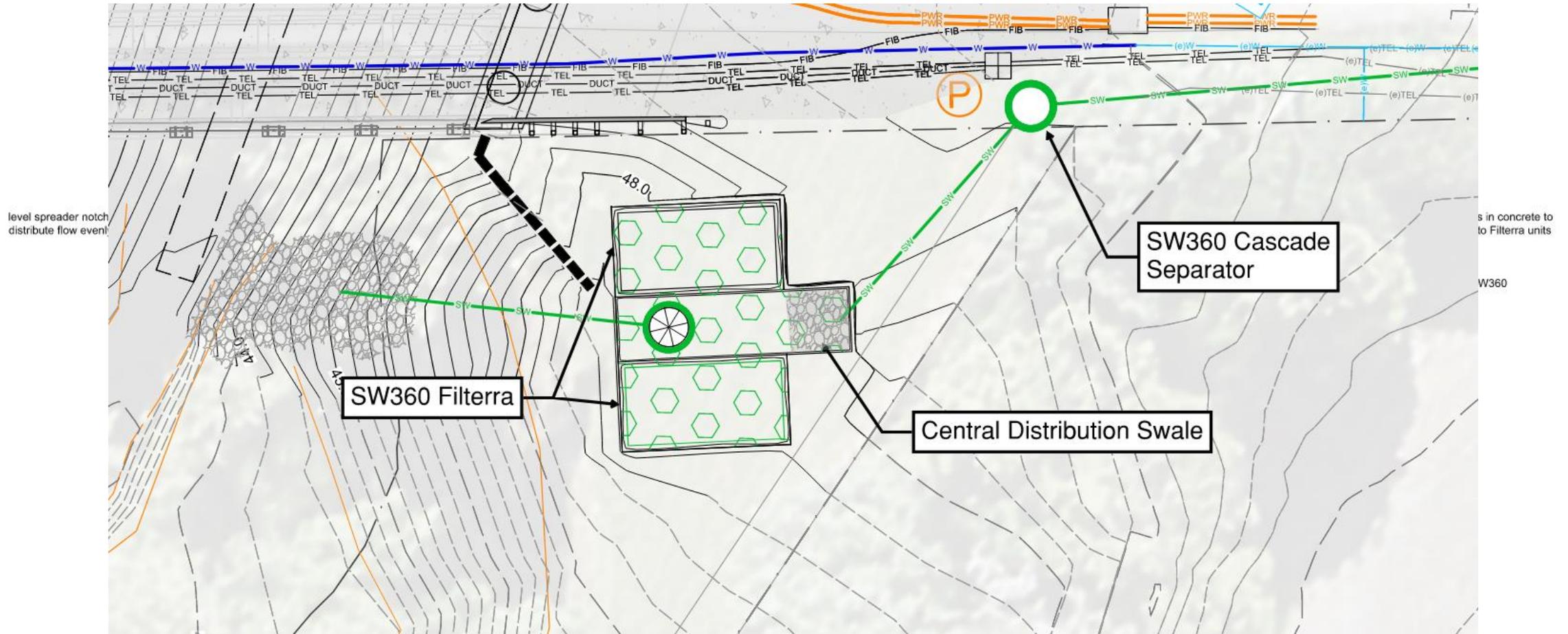
- Two 6.48m² Filterra devices required
- Flow distribution to devices via central planted swale



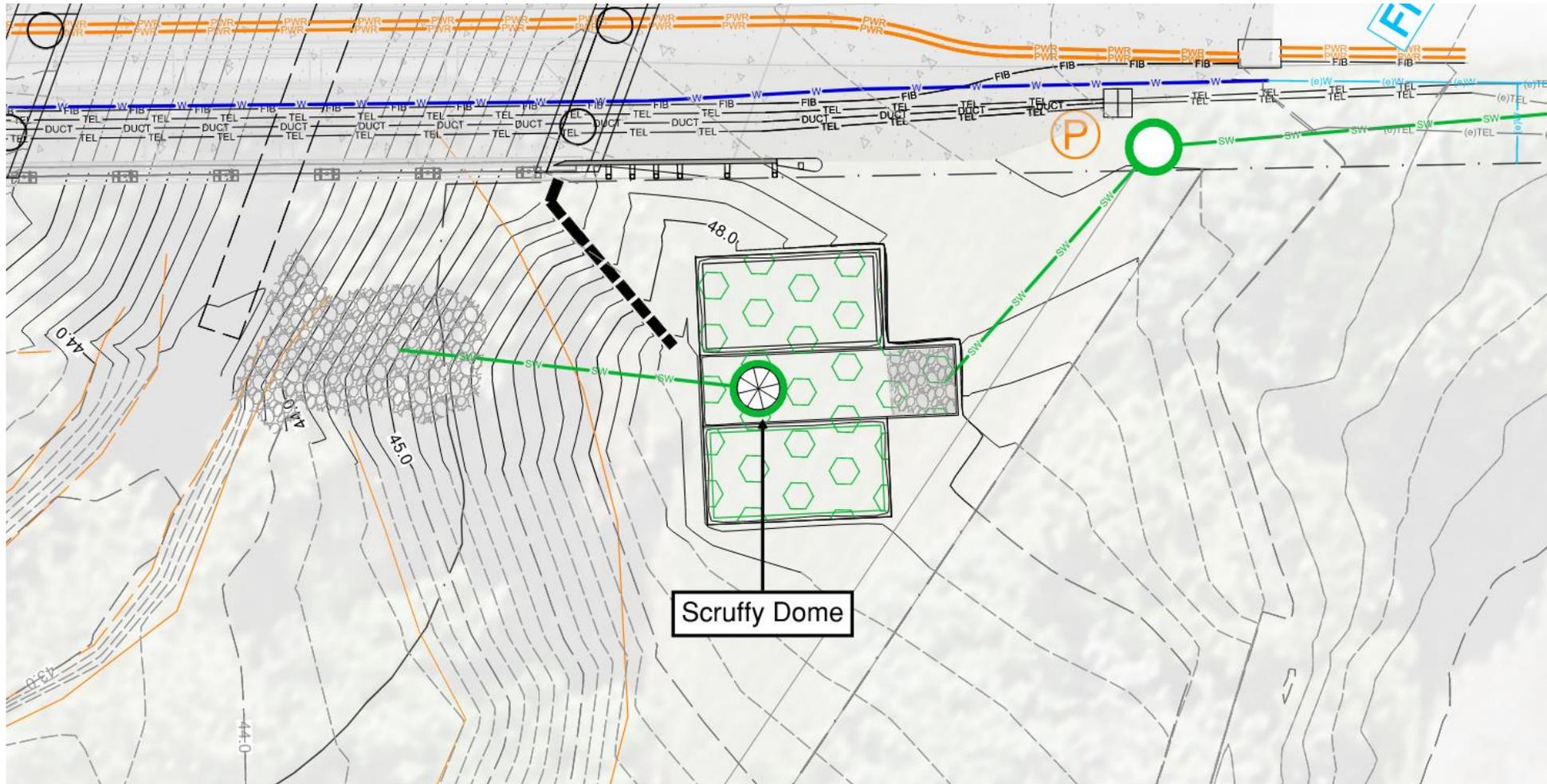
Pre-Treatment



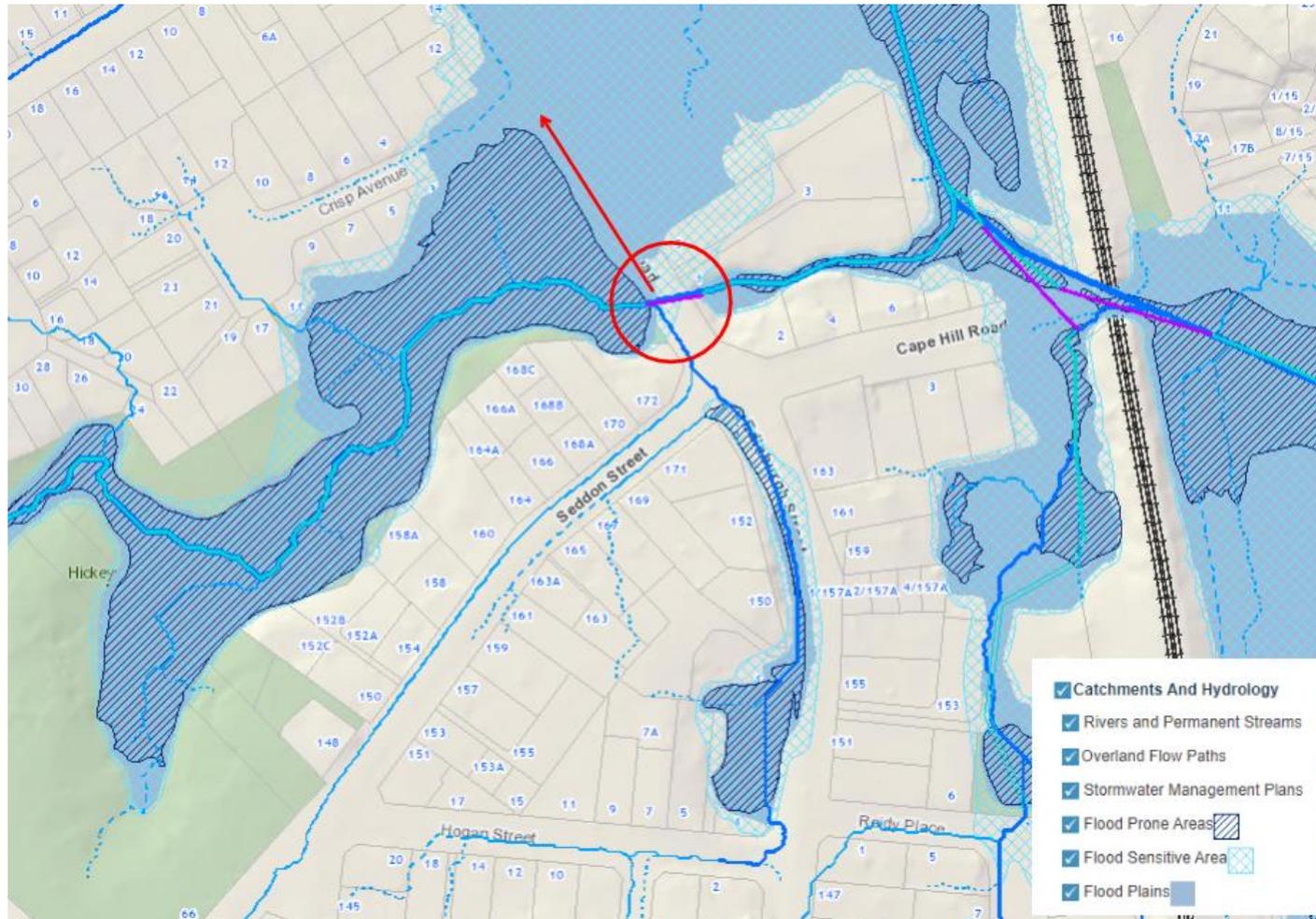
Flow Distribution



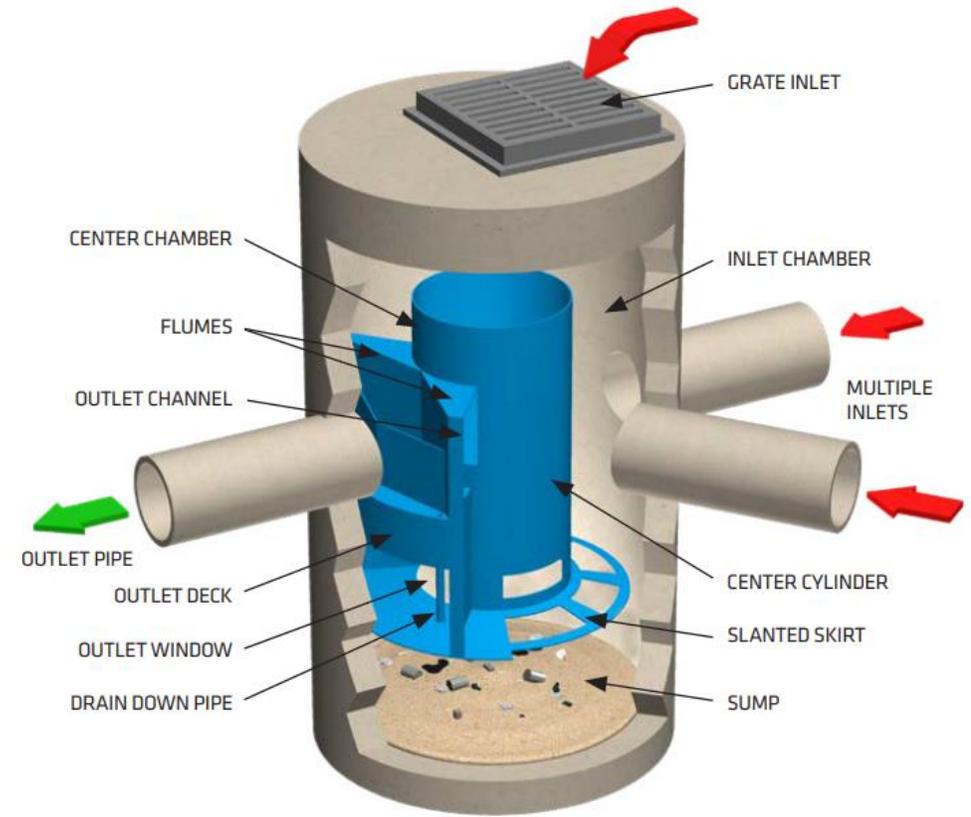
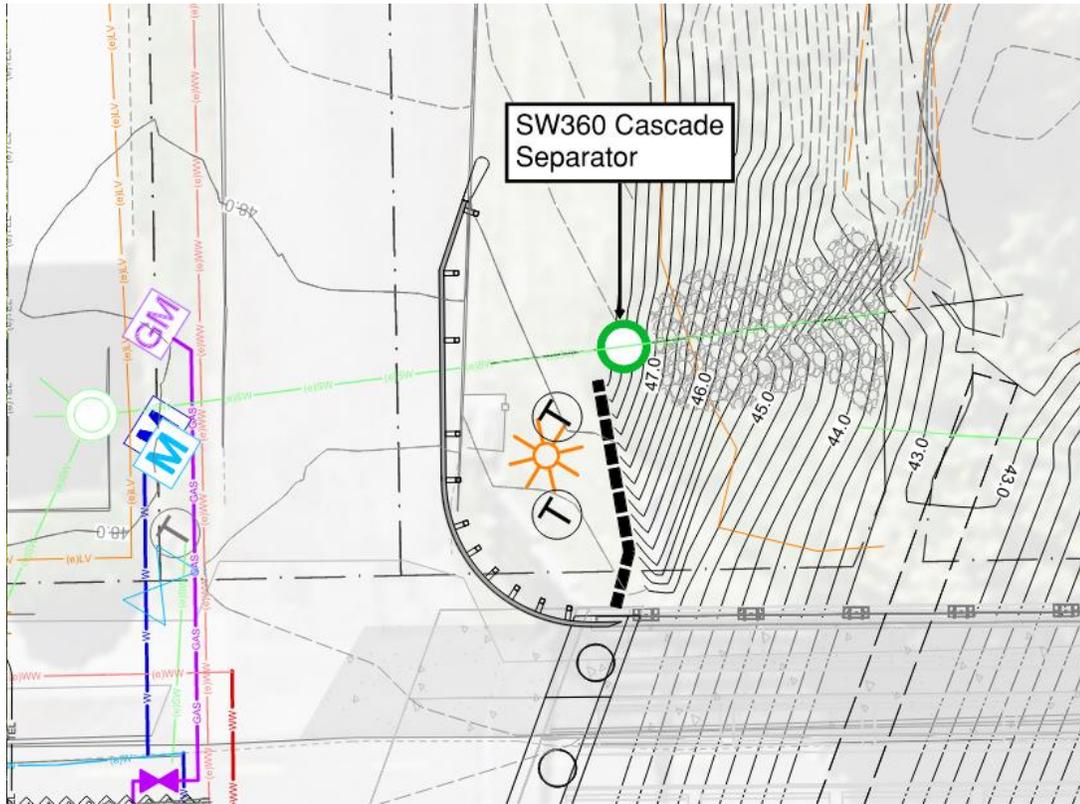
Overflow



Overland Flows



Outlet B Pre-Treatment



Outcomes



- Protection and restoration of Whangapouri Stream
- Exceed minimum treatment requirements
 - 2435m² treated
 - Plus additional 2800m² pre-treated
- Use of green infrastructure where practicable



Thank you

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