# Mamre Road Precinct - Regional stormwater scheme optimisation summary

December 2023

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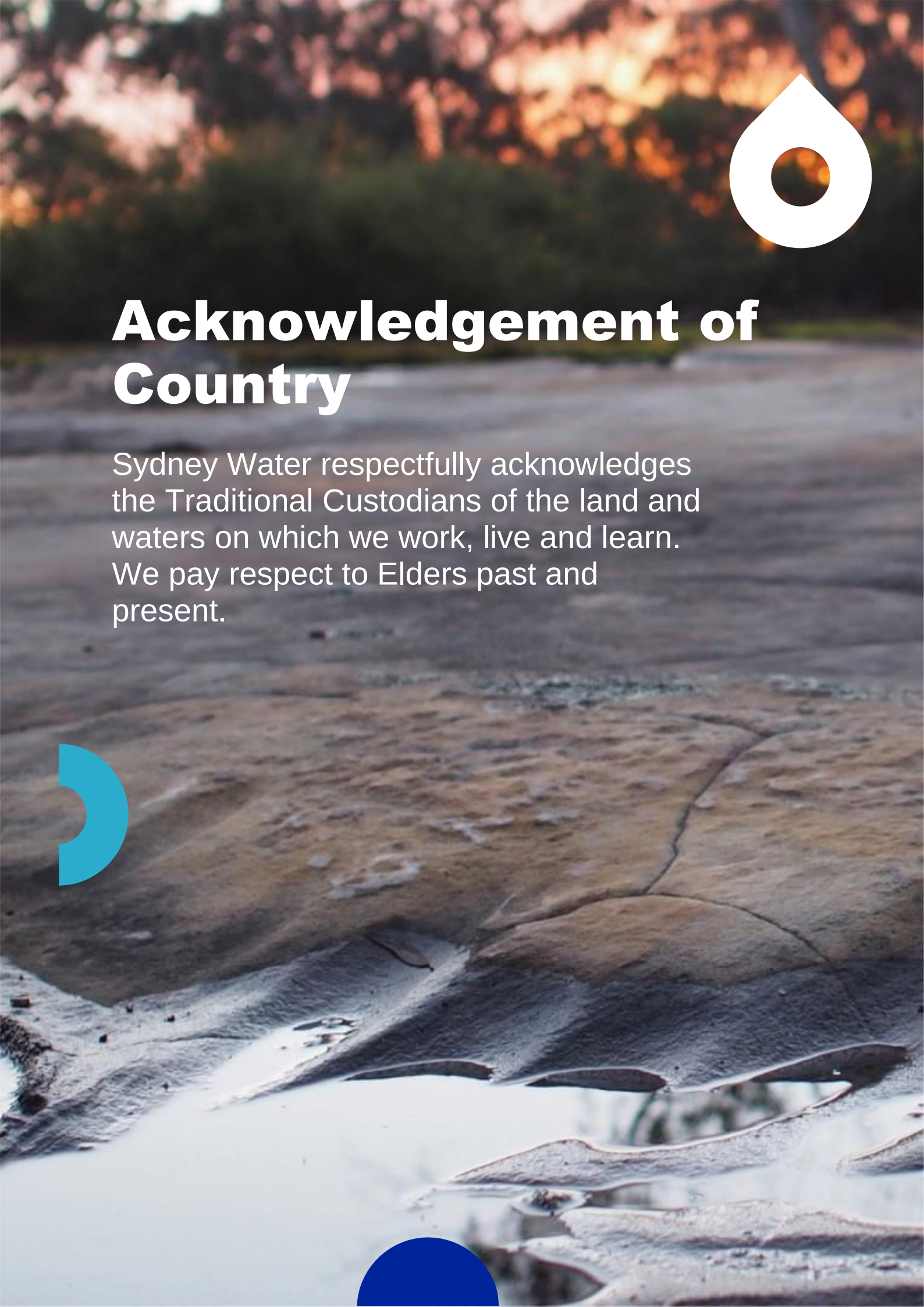
12/2023



# Acknowledgement of Country

Sydney Water respectfully acknowledges the Traditional Custodians of the land and waters on which we work, live and learn. We pay respect to Elders past and present.

# 1. Updates to the Regional stormwater scheme conceptual designs

Since the release of the conceptual designs in December 2022 Sydney Water have been focusing on optimising the regional stormwater scheme to reduce costs while still meeting the NSW Government's stormwater management targets for Wianamatta-South Creek.

Sydney Water has been working with subject matter experts and key stakeholders to review these designs. The main groups that have provided input include:

- The development industry via the Land Owner Group (LOG) and UDIA (Urban Development Institute of Australia)
- a Technical Working Group (TWG) with Sydney Water, DPE-Water and DPE-Planning and consultants
- Internal technical design review meetings with Sydney Water and consultants.

As a result of this optimisation work Sydney Water are releasing the following as of December 2023:

- Mamre Road Precinct stormwater scheme plan – December 2023
- Mamre Road Precinct - Regional stormwater scheme optimisation summary (this report)
- GIS files of assets in the scheme plan
- Mamre Road Precinct MUSIC models
- Civil CAD/12D files of key assets

Sydney Water is planning to release a scheme report and updated versions of the scheme guidelines and conceptual designs in early 2024.

## 1.1. Main updates/changes as of December 2023

### 1.1.1. Stormwater flow into regional stormwater scheme

The following table highlights the main changes to optimise how stormwater enters the regional stormwater scheme with the outcome of reducing land take and optimising infrastructure.

| Old requirement | New Requirement | Reasoning |
|---|---|---|
| Offline sediment basins only | Either online or offline sediment basins | • It was identified there is significant land take having all sediment basins offline and suggested they become online, when possible.<br>• Online sediment basins were adopted as the preferred arrangement after design investigation works and consultation with Queensland Councils.<br>• Note, offline sediment basins are still the preferred option when the trunk drainage is piped into the regional stormwater assets. |
| Every inlet to have a GPT | GPT only required for high litter catchments | • Private GPT's are required on-lot for IN1 zoned land.<br>• A GPT upstream of the regional WSUD scheme isn't required as it is effectively double treating the stormwater at a major cost. |

| | | |
|---|---|---|
| | | • These pollutants (especially sediment and organics) are captured by the sediment basin and litter screens will reduce transfer of floating litter into the wetland.<br>• High litter catchments, including those with town centres, schools, and sporting precincts, might require a GPT or litter trap. Sydney Water will provide advice as to when a GPT is required. |

**Table 1 - The main changes to optimise how stormwater enters the regional stormwater scheme.**

### 1.1.2. Increase efficiency of water quality treatment

The following table highlights the main changes to optimise the stormwater quality treatment efficiency of the regional stormwater scheme with the outcome of reducing land take and maximising treatment prior to the storage ponds.

| Old requirement | New Requirement | Reasoning |
|---|---|---|
| No Bioretention | Adding bioretention systems | • Due to the reduction in the modelled performance of the passively irrigated street trees additional stormwater quality treatment was required to meet the stormwater quality target.<br>• Bioretention systems were added to the regional scheme as they are the most cost-effective treatment measure to meet this water quality gap. |
| N/A | Max cell size to 3,000m². | • Most NSW councils have a max bioretention cell size of 1,000m².<br>• Increasing the max cell size to 3,000m² would reduce associated infrastructure (access paths, batters etc.). |
| N/A | Coupled wetland and bioretention system | • The bioretention and wetland extended detention (EDD) should be coupled (or shared) to increase the water quality efficiency of the wetland/bioretention system.<br>• This coupling will ensure the water flowing through the wetland will need to also pass through the bioretention before entering the storage pond. |
| N/A | Low flow bypass from wetland | • To assist to meet the MARV requirements a low flow diversion is required to ensure the base or low flows are allowed to bypass the storage pond and not harvested. This will ensure these flows continue to the waterway, which is important for its ecological health.<br>• This bypass is to occur in the wetland to ensure some treatment has occurred before these flows drain into the trunk drainage/waterway. |

**Table 2 - The main changes to optimise the stormwater quality treatment efficiency.**

The following images represent the difference between how the stormwater flows through the regional WSUD scheme in December 2022 compared to the 2023 scheme.

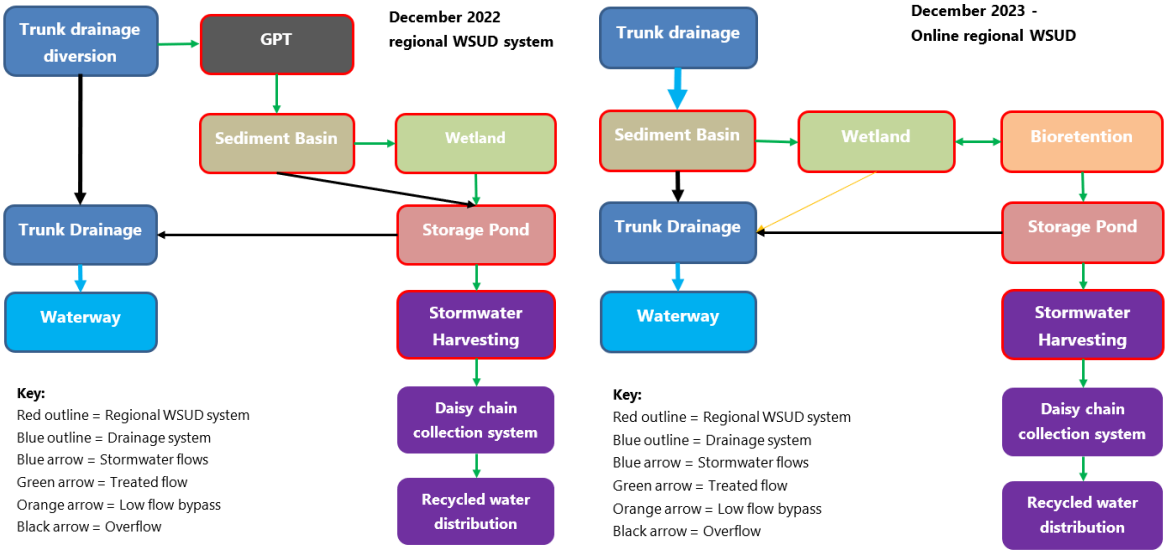



**Figure 1 - The difference between how the stormwater flows through the regional scheme.**

### 1.1.3. Improving the efficiency of the Storage Pond

The following table highlights the main changes to optimise the storage ponds within the regional stormwater scheme with outcomes of reducing land take and optimising infrastructure.

| Old requirement | New Requirement | Reasoning |
|---|---|---|
| Storage Pond depth max 1.5m | Storage Pond depth max 3m | • The max 1.5m depth was to reduce the likelihood of thermal stratification and impacts from the groundwater, such as ingress and liner heave. Also, the groundwater depths were generally unknown.<br>• During the last 12 months Sydney Water have received information on groundwater depths, which indicated they were deeper than originally predicted in many locations.<br>• During further analysis many of the ponds could be deeper and on average the pond depth is predicted to be approximately 2m (ranging from 1.5 to 3m deep). The pond depth should be maximized, when possible, to reduce the pond footprint.<br>• Note, some ponds are to remain at 1.5m depth due to site and groundwater constraints. |
| Internal sandstone rock shelf below safety bench | 1 in 3 (V:H) batter below safety bench | • The sandstone wall below the safety bench of the storage pond was to reduce the risk of attracting birds and to allow for steeper internal walls (reducing footprint).<br>• During a review of the scheme costs it was determined that was a significant cost and required review.<br>• During this review the feasibility of an alternative approach of no internal sandstone wall and 1 in 3 (V:H) batters was tested. The resulted indicated the alternative provided a higher cost reduction compared to the minimal additional land take of flatter batters. Therefore, Sydney Water has removed the internal sandstone wall requirement as seen in the images below. |

**Table 3 - the main changes to optimise the storage ponds.**

**2022** **2023 – Indicative design only**

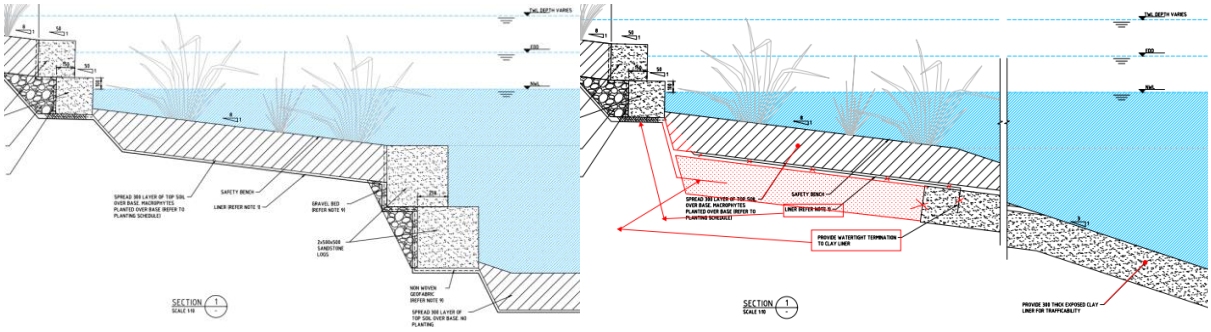


**Figure 2 – change in storage pond design to remove the internal sandstone wall.**

## 1.1.4. Modelling changes

The following table highlights changes to the MUSIC modelling assumptions that were used to determine the size of the regional stormwater assets.

| Old requirement | New Requirement | Reasoning |
|---|---|---|
| Development area calculated as 15% perviousness | Development area calculated as 22% perviousness | • 15% is the minimum allowable DCP requirement for permeable land.<br>• Through review of existing development applications, it was determined there is components, such as electricity easements, that can't be developed and therefore the perviousness percentage in the MUSIC model needed to be updated. |
| Road imperviousness modelled as 84% | Road imperviousness modelled as 77% | • The total road impervious area was reviewed, and it was determined that of road was over-estimated. |
| Floodplain not included in MUSIC model | Floodplain included in MUSIC model | • Including an agreed portion of the adjacent floodplain in the MUSIC model reduced the amount of runoff requiring harvesting and treatment to meet the targets. |
| Recycled water demand of 571 ML/year | Recycled water demand of 460 ML/year | • Sydney Water conducted a review of the predicted recycled water demand for the Mamre Road precinct.<br>• This review led to a reduction in the total recycled water demand, which led to an increase in pond storage volumes to meet MARV. |

**Table 4 - changes to the MUSIC modelling assumptions.**

## 1.2. Outcome of updates on regional Stormwater scheme conceptual design and modelling

Sydney Water has used the design updates listed above to modify the original scheme MUSIC models and mapped the required infrastructure in 12D to create new scheme footprints.

The outcome of the modelling and mapping has led to significant cost savings as the regional stormwater scheme infrastructure has reduced in area considerably and, in the process, removed a large portion of the regional assets from developable land. The main cost savings occur through reducing infrastructure footprint, resulting in reducing both the CAPEX and OPEX costs and reducing land acquisition and associated land tax as most of the infrastructure is now off developable land, as indicated in the table and images below.

| **Numbers are regional WSUD footprint only** | | **Total Footprint (Ha)** | **Footprint on IN1 (Ha)** |
|---|---|---|---|
| **Jun-22** | **First draft scheme release for public consultation** | 109 | 36 |
| **Dec-22** | **Revised Scheme released after public consultation:**<br>- reduced basin and trunk drainage areas and impact on IN1 land. | 88 | 19 |
| **Jul-23** | **Revised Scheme after further industry consultation:**<br>- reduction of street tree service<br>- inclusion of Wianamatta precinct in modelling<br>- bioretention systems<br>- removal of GPTs | 76 | 12 |
| **Dec-23** | **Revised Scheme after TWG sessions**<br>- pond deepening<br>- changes to spoil reuse assumptions<br>- further optimising off IN1 land<br>- value engineering of basin design | **67** | **9** |

**Table 5 – change in regional stormwater scheme total footprint and footprint in IN1 zoned land.**

**2022 - Scheme plan**

**December 2023 – Scheme plan**

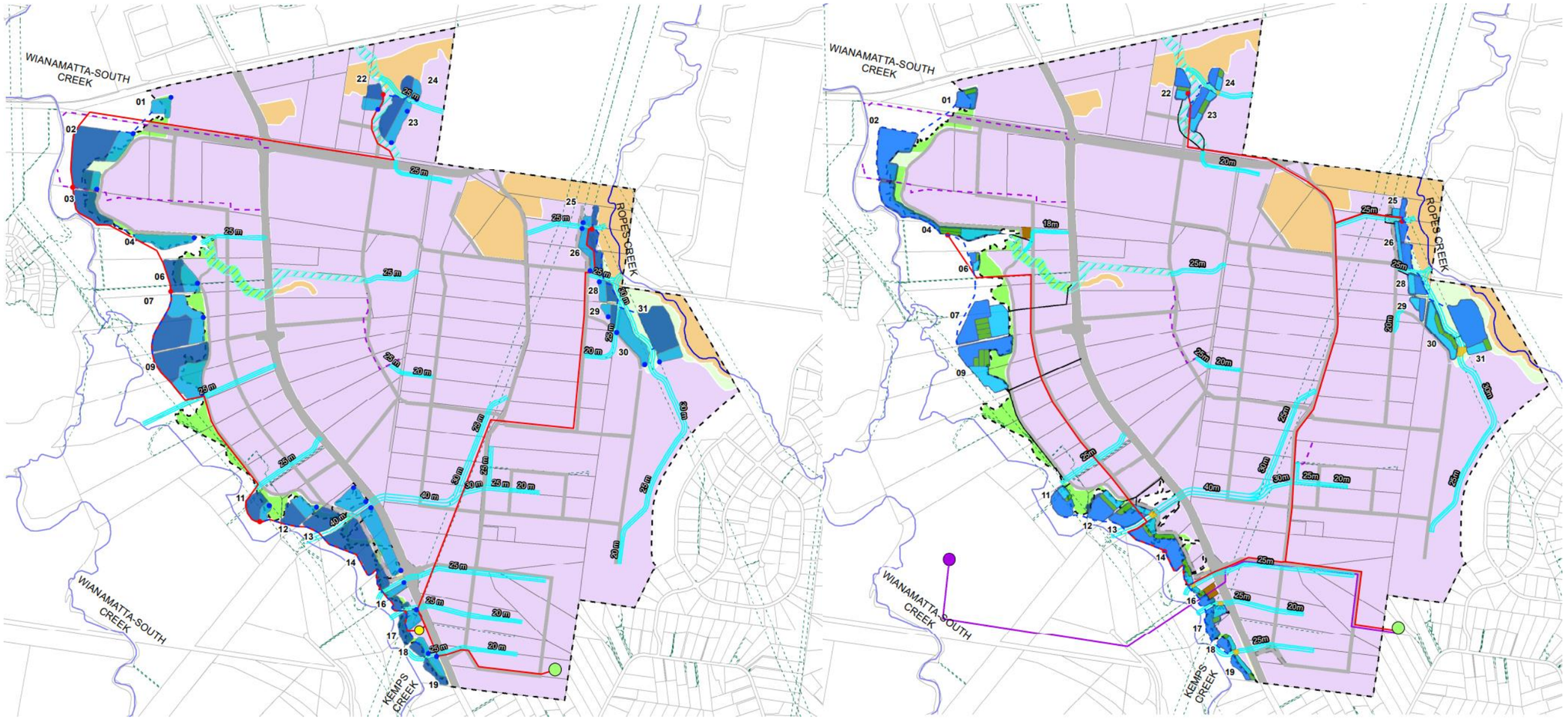



**Figure 3 - The scheme plans from December 2022 and December 2023.**

**2022 – scheme plan**

**December 2023 – scheme plan**

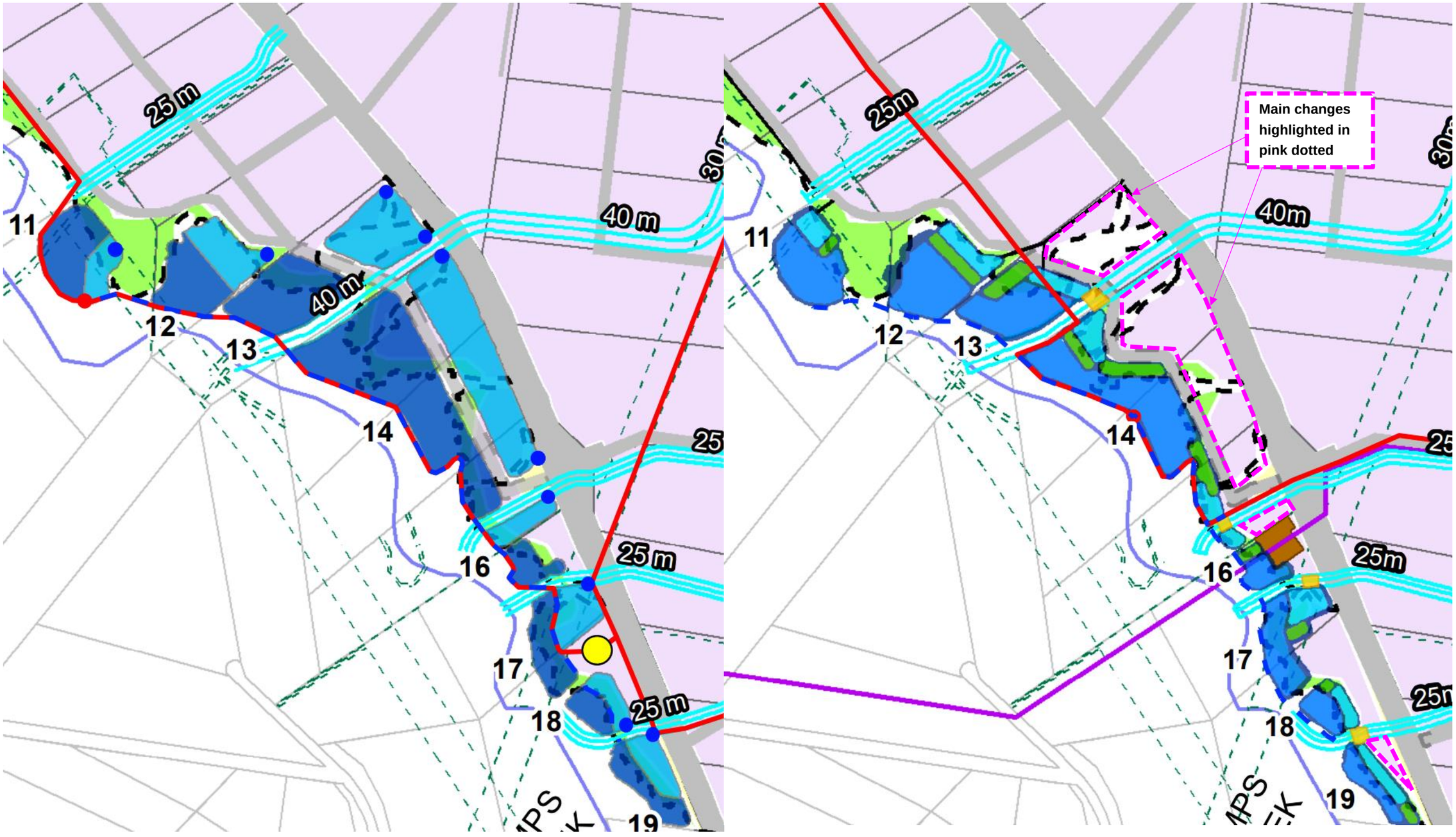



**Figure 4 - An example of the how the regional stormwater scheme has reduced in footprint.**