

# Drainage Design Approach

Conceptual Drainage Design and Constructability Report

B

# HUDSONS ROAD UPGRADE

CONSTRUCTABILITY REPORT  
19<sup>TH</sup> MAY 2023

PREPARED FOR RATIO

This report has been prepared by the office of Spiire  
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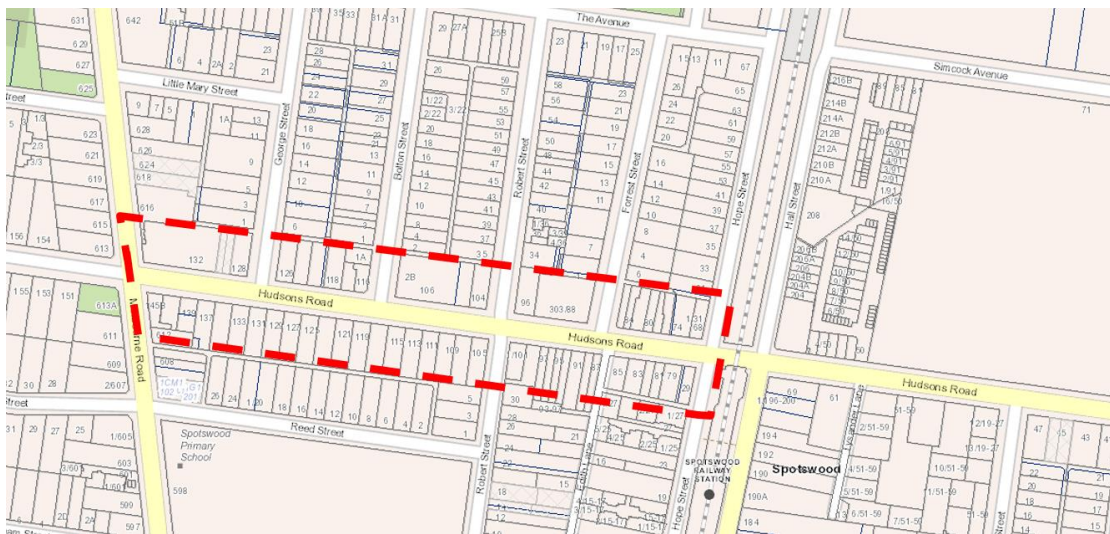
# 1. INTRODUCTION

## 1.1 PURPOSE

Spiire has been engaged by Ratio to provide a constructability report detailing preliminary site issues, constraints and opportunities associated with a proposed drainage upgrade and streetscape interventions, along Hudsons Road in Spotswood.

## 1.2 SCOPE

The report will focus on the section of Hudsons Road, illustrated in figure 1 below, bounded by Hope Street and Melbourne Road, herein referred to as the subject site.



**Figure 1 Subject Site**

The scope of this report includes:

- ▶ Project overview.
- ▶ Review of existing services within the subject site.
- ▶ Constructability assessment including a review on the site conditions, topography and proposed designs, both from a streetscape intervention perspective and drainage analysis. This will also include general observations from a site visit.
- ▶ Summary of findings.

## 1.3 METHODOLOGY

Prior to attending site, an internal Spiire meeting was held with the design team to understand any design considerations, opportunities or issues found during their high-level drainage review.

Spiire conducted a site visit on 12 May 2023 with a hard copy of the Spiire produced revision B preliminary drainage alignment in Appendix A (310932 – Proposed Drainage – B).

This plan includes proposed kerb and streetscape intervention provided by Ratio in January 2023. The existing services have been derived from a Before You Dig Australia (BYDA) inquiry lodged in December 2022.

The subject site was walked with all observations and constraints recorded on the plans.

## **2. PROJECT OVERVIEW**

### **2.1 PROJECT DESCRIPTION**

Hobsons Bay City Council (HBCC) has engaged Ratio Consultants to prepare a design concept for the Hudsons Road Streetscape Masterplan. As part of this scope, Ratio has engaged Spiire to provide drainage advice and a Constructability Report.

### **2.2 PROJECT LOCATION**

As outlined in section 1.3 this report will focus on the section of Hudsons Road between Hope Street and Melbourne Road.

Located in Spotswood, the subject site has a mixture of commercial and residential use.

### **2.3 PROJECT TIMELINE**

At the time of writing this report, the construction timeline is unknown.

## 3. EXISTING SERVICES

### 3.1 OVERVIEW

A BYDA request was submitted on the subject site and indicated the presence of the following assets:

- ▶ Stormwater Drainage (Hobsons Bay City Council, Melbourne Water)
- ▶ Electrical (Jemena)
- ▶ Gas (Ausnet, APA)
- ▶ Rail (Victrack)
- ▶ Telecommunication (NBN Co, Telstra, Optus, TPG, Vocus)
- ▶ Potable Water (Greater Western Water)
- ▶ Sewer (Greater Western Water, Melbourne Water)

The responsible authorities are discussed in the following sections. The BYDA data is indicative and should only be used as a guide. The location of services and above ground installations cannot be guaranteed. In many cases, the data won't provide the service offsets or include service fittings. Service proving and survey has not been completed at the time of this report and is the only means to verify the exact locations of these assets.

#### 3.1.1 STORMWATER DRAINAGE

While the BYDA data did not indicate the presence of stormwater within the subject site, further investigation revealed there is existing stormwater assets under HBCC management. Ratio provided the plans detailing the pipes and drainage around the study area in Appendix B.

While HBCC provided some depths on existing drainage- the capacity, invert levels, pit and pipe size are unknown at the time of this report. Further service proving would be required to obtain such information.

The existing house drains that discharge directly into kerb are not shown on BYDA data. This is no longer the preferred approach by HBCC. There is a need to confirm a like for like replacement is acceptable in this scenario. It is expected the proposed drainage and pavement works will require the replacement of many of these house drains due to their shallow depth.

#### 3.1.2 ELECTRICAL

Jemena is the responsible authority for electrical supply within the subject site.

The majority of the electrical assets within Hudsons Road reserve are overhead lines with minimal clearance. These will likely trigger a permit to work with visual warnings e.g. tiger tails and the presence of an electrical spotter.

There are numerous poles located at back of kerb which will limit excavation beside the pole to 900mm before entering the Exclusion Zone. See Figure 2 below outlining the limitations for excavation around Powerpoles. The contractor should arrange a site inspection with Jemena

for any works near the exclusion zone to determine if a permit to work is required or not. If a permit is triggered, this will detail the conditions and methods the contractor must adhere to carry out the works and typically involve control measures such as tiger tails and an electrical spotter.

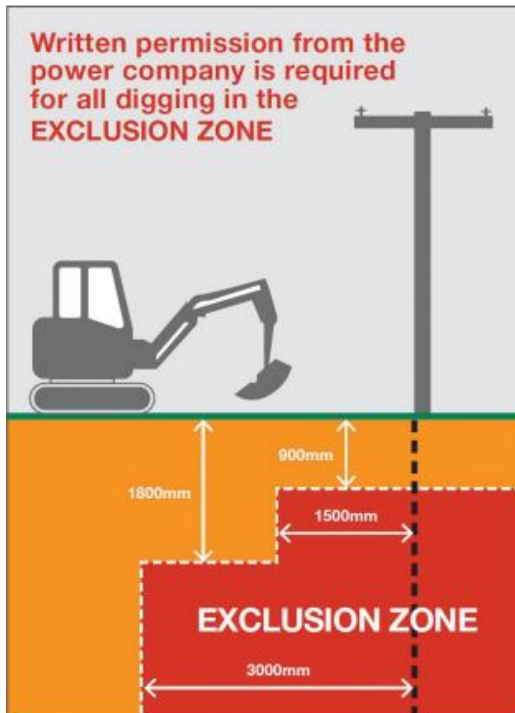


Figure 2 Exclusion Zones around Powerpoles

There will be a requirement for the re-alignment of proposed side entry stormwater pits on George Street, Forrest Street and Bolton Street to maintain clearance.



Figure 3 Overhead Electrical Assets within Hudsons Road





**Figure 4 Overhead Powerlines with minimal clearance**

### 3.1.3 GAS

Ausnet is the responsible authority for gas supply within the subject site.

The proposed stormwater crosses existing gas lines at many locations throughout the design. Service proving will be required prior to detailed design finalisation to ensure no vertical clashes. It is highly likely that there will be clashes at these crossings, as stormwater is a gravity service, the gas will need to be raised or lowered to facilitate the design. Without flexibility in the gas the drainage outfall is unlikely.

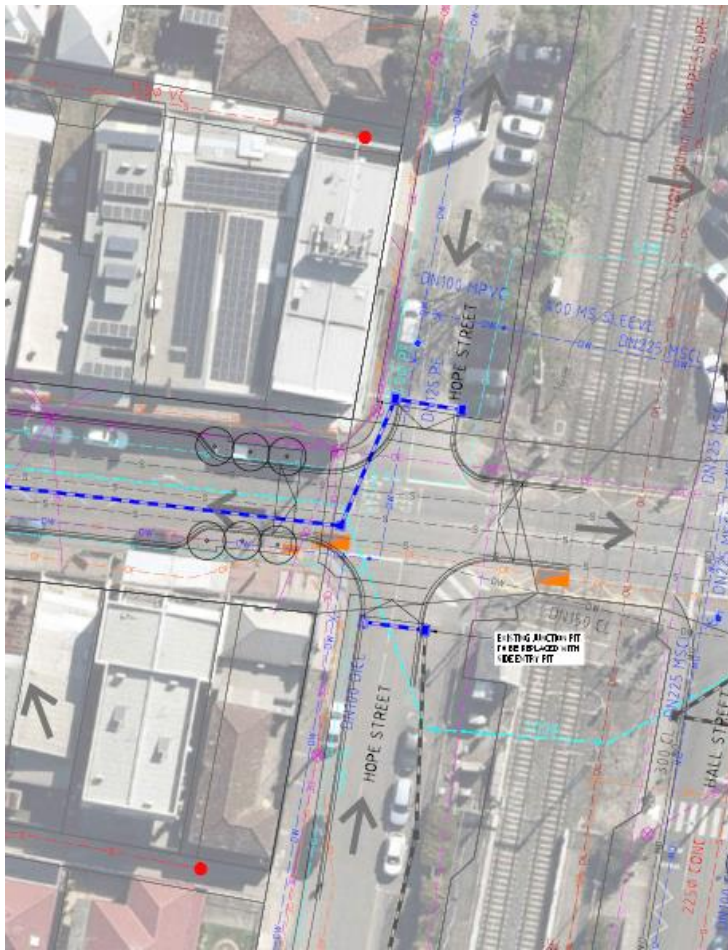
The BYDA data also does not show individual lot connections to houses and commercial buildings. The appointed contractor will need to consult with Ausnet during construction to ensure these assets are protected during works or replaced correctly if necessary.

### 3.1.4 RAIL

The eastern limit of works for the subject site is bounded by a Victrack Rail Reserve. The kerb linework and raised pavement extent provided by Ratio extend into this reserve. Further consultation with Victrack will be required to determine associated requirements.

A media release by Victorian Premier Daniel Andrew in October 2022 committed to the removal of the level rail crossing on Hudsons Road by 2030. Early indications are to build an elevated rail bridge rather than lower the road reserve below the railway.

There has been no consideration from a stormwater perspective within this rail reserve in the latest design.



**Figure 5 Victrack Rail Reserve**

### 3.1.5 TELECOMMUNICATIONS

The BYDA indicates the presence of optic fibre within the subject site. NBN Co, Optus, Uecomm, Telstra and TPG all have assets within Hudsons Road.

Smaller pits and property connections have been left off our design plans for clarity, only the manholes are detailed. These may present additional consideration and protection once service proving is completed.

### 3.1.6 POTABLE WATER

Greater Western Water (GWW) is the responsible authority for the water assets within the subject site.

The BYDA data suggests that only potable water supply is within the area, so it is assumed that there are currently no non-potable assets.

Some of the surface fittings such as valve and hydrant covers are not detailed on the plans and will require consideration during construction, particularly with altering finish surface levels. Coordination with GWW will be required to ensure works are completed in accordance with relevant standards. Approvals must be sort for any works on GWW assets.



**Figure 6 Surface Fittings within Road Reserves**

### 3.1.7 SEWER

Greater Western Water is the responsible authority for the sewer reticulation within the subject site.

The BYDA data also indicated the presence of Melbourne Water de-commissioned Sewer Rising Mains. Further discussion with Melbourne Water and Heritage Victoria has uncovered that the mains are listed on the Victorian Heritage Inventory (Hudsons Road Rising Mains, H7822-2358).

Consent from Heritage Victoria is required prior to any construction on or around this asset.

Spiire has raised this with Ratio and HBCC and been directed by to assume that removal is agreed to in-principle.



## 4. CONSTRUCTABILITY ASSESSMENT

### 4.1 SITE CONDITIONS

The subject site is a built-form environment with a mixed use of commercial and residential land.

There are street trees on both sides of the Hudsons Road reserve between Melbourne Road and Forrest Street. Many of these trees have had major impact within their tree protection zone with the construction of pavements, existing services and structures in close proximity. It is expected works will further impact the health of these trees. The proposed rain gardens would require the removal of some street trees altogether.



**Figure 7 Existing Street Tree**

The site is heavily disturbed from its natural form with construction dating back to at least 1890's. There is a possibility of contamination. Some potential sources include asbestos mains, fuel and other hydrocarbons within the soil, rubble backfill or heavy metals.

With nearby attractions, local cafes and a connection onto Melbourne Road, traffic and pedestrian volumes on Hudsons Road are high. The impact to residents and businesses with traffic management and potential road closures will need to be considered. While the design will minimise impact where possible, much of the alignment is dictated by existing services and authority conditions. It is recommended that the contractor's construction methodology is assessed at tender and required as part of the submission.

Both Appendix A and Section 3 of this report give an indication to the existing services within the subject site. These present the largest obstacle from a construction perspective. Accurate service proving, adequate planning and flexibility in design will be critical in ensuring project success. Service relocations and flexibility to raise or lower non-gravity services will also be important to retrofit a stormwater outlet within Hudsons Road.

## **4.2 TOPOGRAPHY**

A feature survey has not been provided for the subject site.

1m contour levels have been sourced from datashare and Ratio's Site Analysis Map shown in Appendix C. The available data suggests the Hudsons Road grades at a consistent 1 in 120 grade. As it is quite flat, this reduces the flexibility with stormwater to change grades to avoid existing services due to minimum cover and grade requirements.

Overland flow routes and likely catchment are an assumption based on the contours and street mapping. The site visit has uncovered a few minor discrepancies that would need to be resolved in detailed design.

## **4.3 DESIGN REVIEW**

### **4.3.1 PROPOSED DRAINAGE ALIGNMENT**

#### **4.3.1.1 Horizontal Alignment**

The horizontal alignment is largely governed by the location of existing services. In a greenfield scenario, stormwater would sit directly behind or below to the kerb so that side entry pits could discharge directly into a main drain. However, there are existing services preventing this standard arrangement.

The next ideal location would be the nature strips, as the location would reduce the impact on traffic and is typically cheaper with only earth backfill requirements. This location is not possible whilst maintaining clearances to existing services.

After a process of elimination, the horizontal alignment was selected to minimise impact on live services. Though the alignment will likely trigger the removal of sections of the decommissioned heritage listed sewer rising main, it was advised by HBCC that it was ok to assume that removal is approved in principle. It was centred between the two rising mains to minimise the disturbance; however, service proving and detailed design may determine that this is not feasible. The removal process will need further planning as these assets were constructed in the 1890's and are believed to be cast iron in material. Backfilling to a trafficable standard will be expensive and onerous.

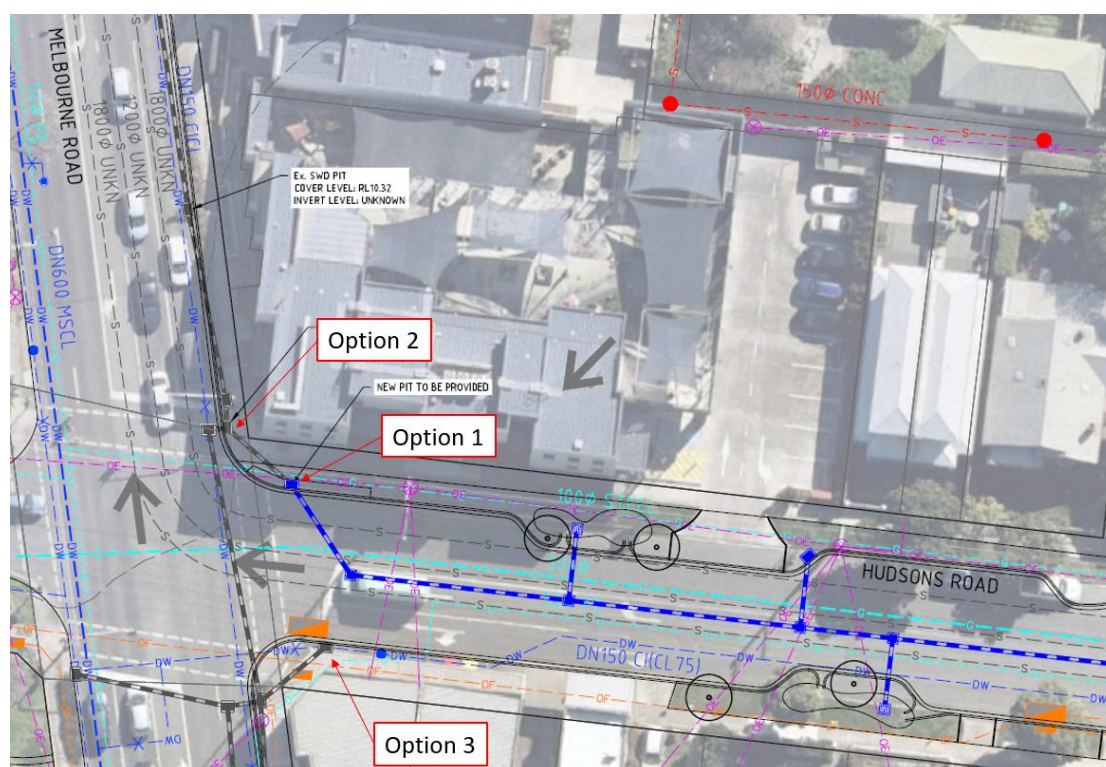
Side entry pits connecting into the main drain were located at kerb outstands to collect any water at trapped low points at the downstream end of the parking bays. There needs to be flexibility with these pits due to existing services. Many may require conversion to grated side entry pits to extend into the pavement rather than behind kerb. Similar with the pipe outlets to the outfall drain. The depths will be governed by the existing services.

#### **4.3.1.2 Vertical Alignment**

At the time of writing this report, the vertical alignment has not been determined on the drainage.

Asset recording data provided by HBCC suggests the proposed pit for connection is only 440mm deep. A box culvert arrangement with reduced cover on minimum grade may enable connection. Alternatively, the next side entry pit downstream has a depth of approximately 820mm. This would also introduce new service crossings and constraints, running through a signalised intersection beside a commercial building.

As a third option the side entry pit on the south side has a depth of 1.1m according to HBCC data and may be an option.



**Figure 8 Possible Stormwater Connection Points**

As much flexibility as possible is required on the vertical alignment to allow stormwater to work around existing services. As stormwater needs to be on-grade it is expected there will be some scenarios where clashes cannot be avoided and contingencies need to be made to re-route existing services. The extent of which can only be determined after existing services have been proved.

#### 4.3.1.3 Size, Capacity and Treatment

The size and capacity of both the existing downstream stormwater network and the proposed network has not been determined.

Typically, the drainage network would be sized to cater for a specific design rainfall event, for example, a 5 or 10 year average recurrence interval (ARI). In this scenario, it is likely that the drainage design will be limited by the downstream capacity and ability to construct a certain size outfall drain between existing services. If the downstream system doesn't have the capacity, then it will choke flows back within the proposed network affecting its ability to cater for targeted events.



There may be an opportunity to re-direct flows into existing stormwater pits identified within Hope, Forrest and Bolton Streets. This would reduce inflows into the proposed main drain connecting in at the Melbourne Road junction. Depths and capacity of these drainage lines would need to be obtained from HBCC for further investigation.

Treatment of stormwater is proposed in roadside raingardens. Similar to the pipe capacity constraints mentioned above, existing services and trees limit the ability to include raingardens of sufficient size and number, to treat the whole catchment to best practice. Therefore, we anticipate that best practice treatment targets cannot be met. However, as there is currently no stormwater treatment in this catchment, any level of treatment is an improvement on the current situation.

#### 4.3.2 STREETScape INTERVENTIONS

##### 4.3.2.1 Kerb Alignment

As the majority of the road reserve consists of hard surfaces, the kerb will have little to no flexibility with respect to vertical alignment. The lip of kerb needs to tie into existing asphalt and where the footpath abuts back of kerb the height consideration.



**Figure 9 Impermeable Surfaces on Hudsons Road**

Due to the lack of flexibility in the kerb, isolated low spots where water is pooling will remain, unless a drainage pit can be constructed.

It was noted the kerb outstands will reduce street parking on-site, however they will provide additional protection for existing trees and an opportunity for more planting.

#### 4.3.2.2 Raised Pavement

The raised pavement sections have important considerations from a drainage perspective.

Currently where raised sections have been retrofitted, the kerb is left operational with a heel safe grate to bridge the gap between the pavement and kerb.



**Figure 10 Current Raised Pavement Arrangement**

If the raised pavement were to match in with back of kerb or footpath level, drainage inlet pits will need to be introduced at any trapped low points which typically result when introducing raised pavements.

#### 4.4 GENERAL OBSERVATIONS

- 4.4.1 Any work around Jemena infrastructure will require significant lead up time. Trenching beside a pole could require Jemena design which can take many months.
- 4.4.2 Many surface fittings will require adjustment. For example, water main valve and hydrant lids and communication pits among others. Authority approvals for works on existing assets would need to be sought.
- 4.4.3 Tree removal process to be confirmed with HBCC. Offsets and biodiversity impact to be confirmed.
- 4.4.4 Melbourne Road is a Vicroads asset. Given traffic and existing services considerations, any works within this road reserve will introduce significant cost and time implications.
- 4.4.5 Kerb outstands can induce low points behind back of kerb. Surface flows will either need to be shaped out of these low points or drainage will need to be introduced.
- 4.4.6 Shop canopies extend to back of kerb in some areas. Work in these areas to be avoided or minimised.
- 4.4.7 Works within the railway reserve will require stringent controls and potentially supervision by Victrack.
- 4.4.8 Footpath and crossover/driveway re-instatement may need to be non-compliant against current standards to match new works into existing.
- 4.4.9 Due to the poor condition of many assets, a dilapidation report would be advised prior to construction.
- 4.4.10 Authority service clearances and minimum cover may need to be re-considered to ensure construction is possible.

## 5. SUMMARY

In summary, construction on Hudsons Road will present many challenges. The drainage outcome will provide an improvement on the current situation, although it is unlikely to meet best practice for treatment and flow conveyance. If this project was to progress to construction, flexibility in design outcomes and construction methodology is imperative to ensure project success.

It is expected that the project will be expensive and require both time and cost contingency allowances. These will need to be in place to facilitate management of risks associated with existing services, access and traffic, working around structures, latent conditions and the environment.

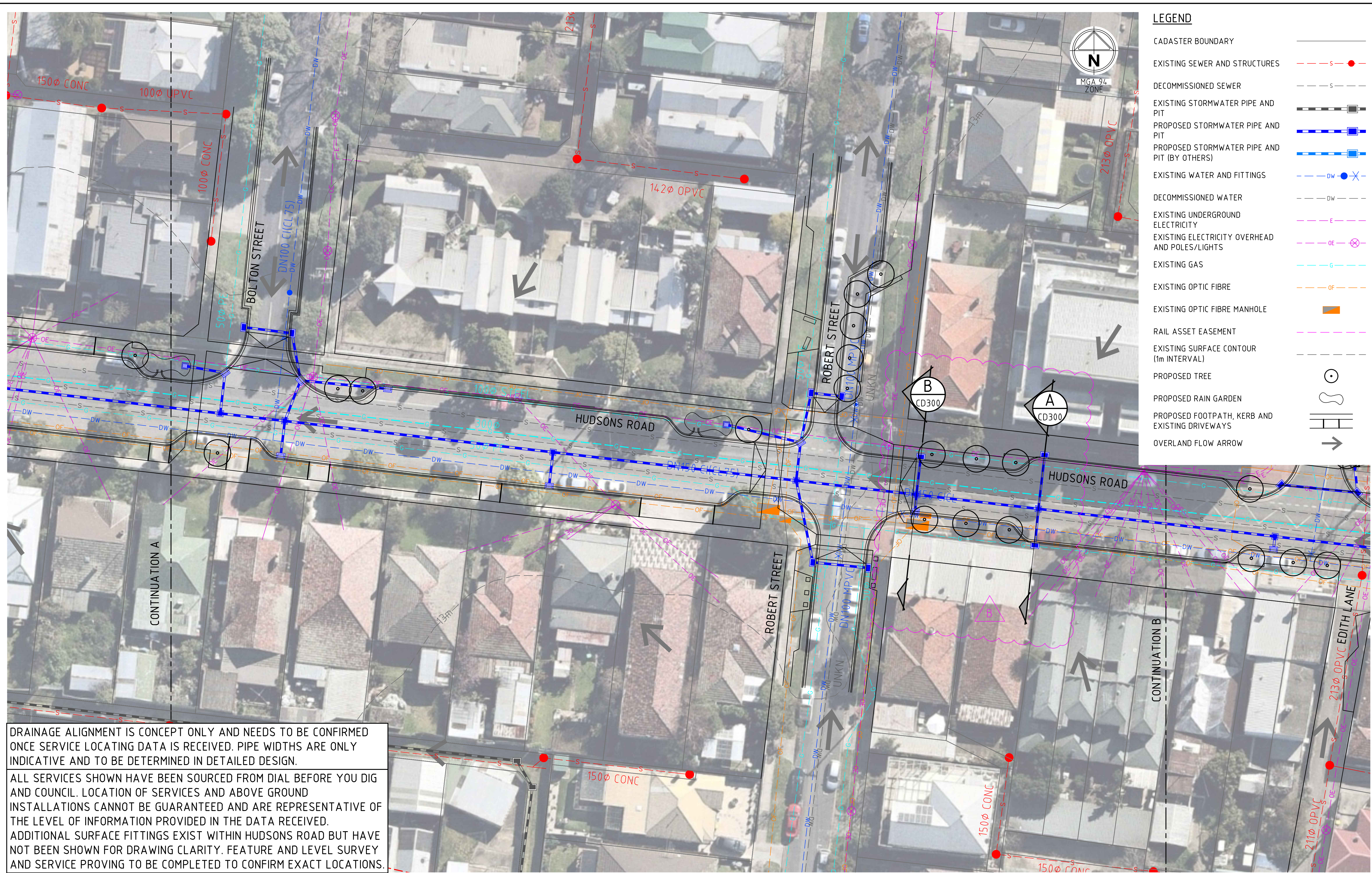
Service proving and clear communication and coordination with service authorities, will be required in detailed design to unlock a successful construction outcome.

## 6. APPENDIX A- PROPOSED STORMWATER ALIGNMENT







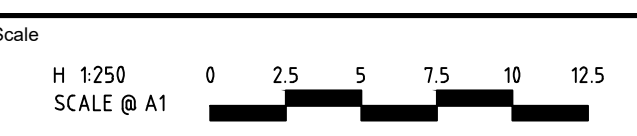


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DECOMMISSIONED SEWER	- - - S - - -
EXISTING STORMWATER PIPE AND PIT	— S —■—
PROPOSED STORMWATER PIPE AND PIT	— S —■—
PROPOSED STORMWATER PIPE AND PIT (BY OTHERS)	— S —■—
EXISTING WATER AND FITTINGS	— DW —●—
DECOMMISSIONED WATER	- - - DW - - -
EXISTING UNDERGROUND ELECTRICITY	— E —
EXISTING ELECTRICITY OVERHEAD AND POLES/LIGHTS	— OE —
EXISTING GAS	— G —
EXISTING OPTIC FIBRE	— OF —
EXISTING OPTIC FIBRE MANHOLE	■
RAIL ASSET EASEMENT	—
EXISTING SURFACE CONTOUR (1m INTERVAL)	—
PROPOSED TREE	○
PROPOSED RAIN GARDEN	○
PROPOSED FOOTPATH, KERB AND EXISTING DRIVEWAYS	—
OVERLAND FLOW ARROW	→

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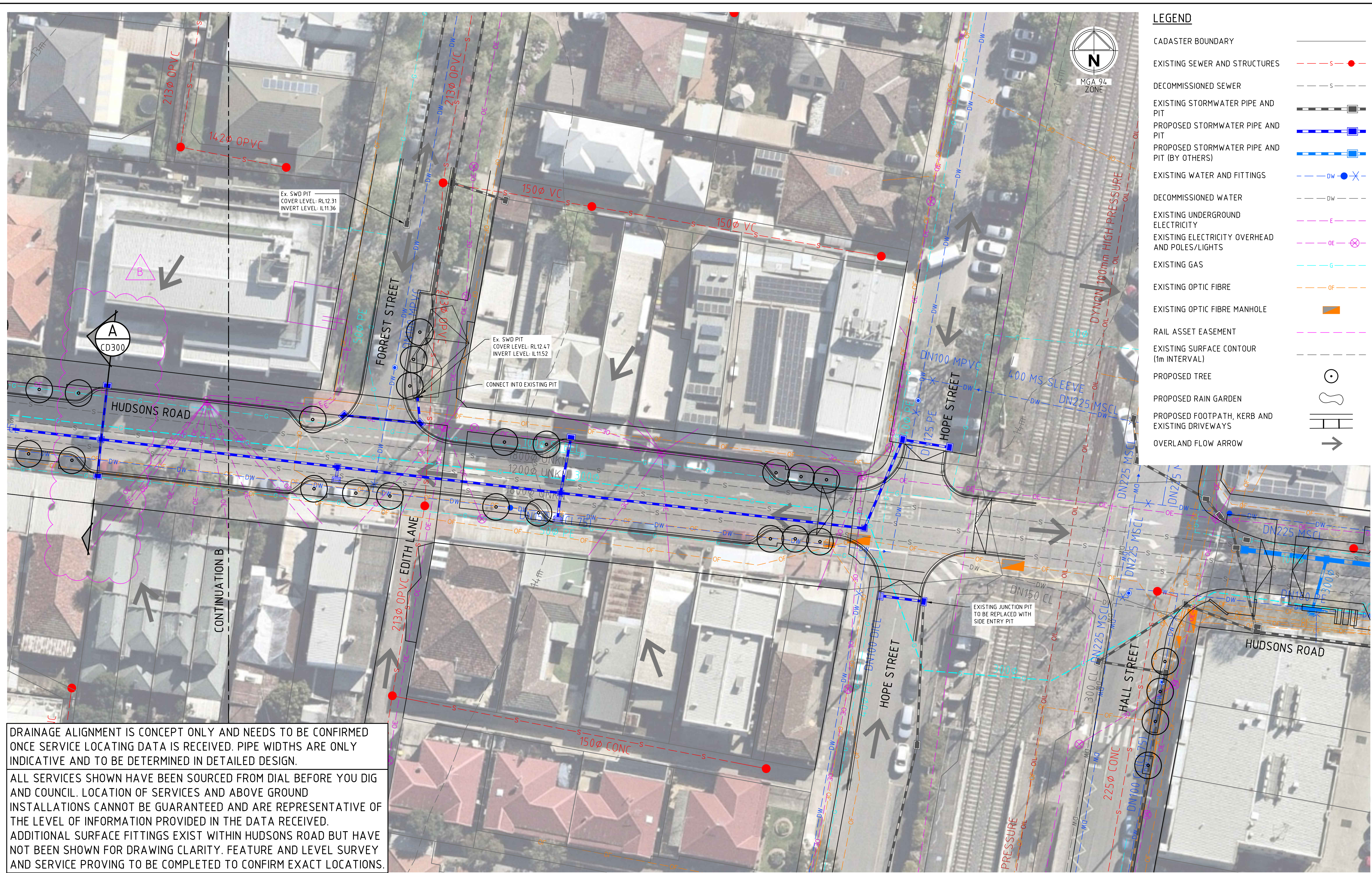
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**HUDSONS ROAD DRAINAGE UPGRADE**

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**DRAINAGE**  
**DRAINAGE LAYOUT PLANS - SHEET 2**  
 HOBSONS BAY CITY COUNCIL  
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**PRELIMINARY** Drg No **310932CD201** Rev **B**

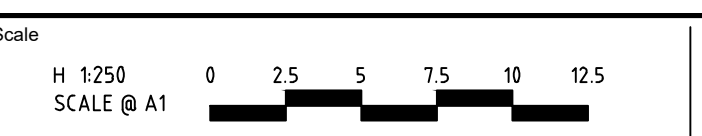




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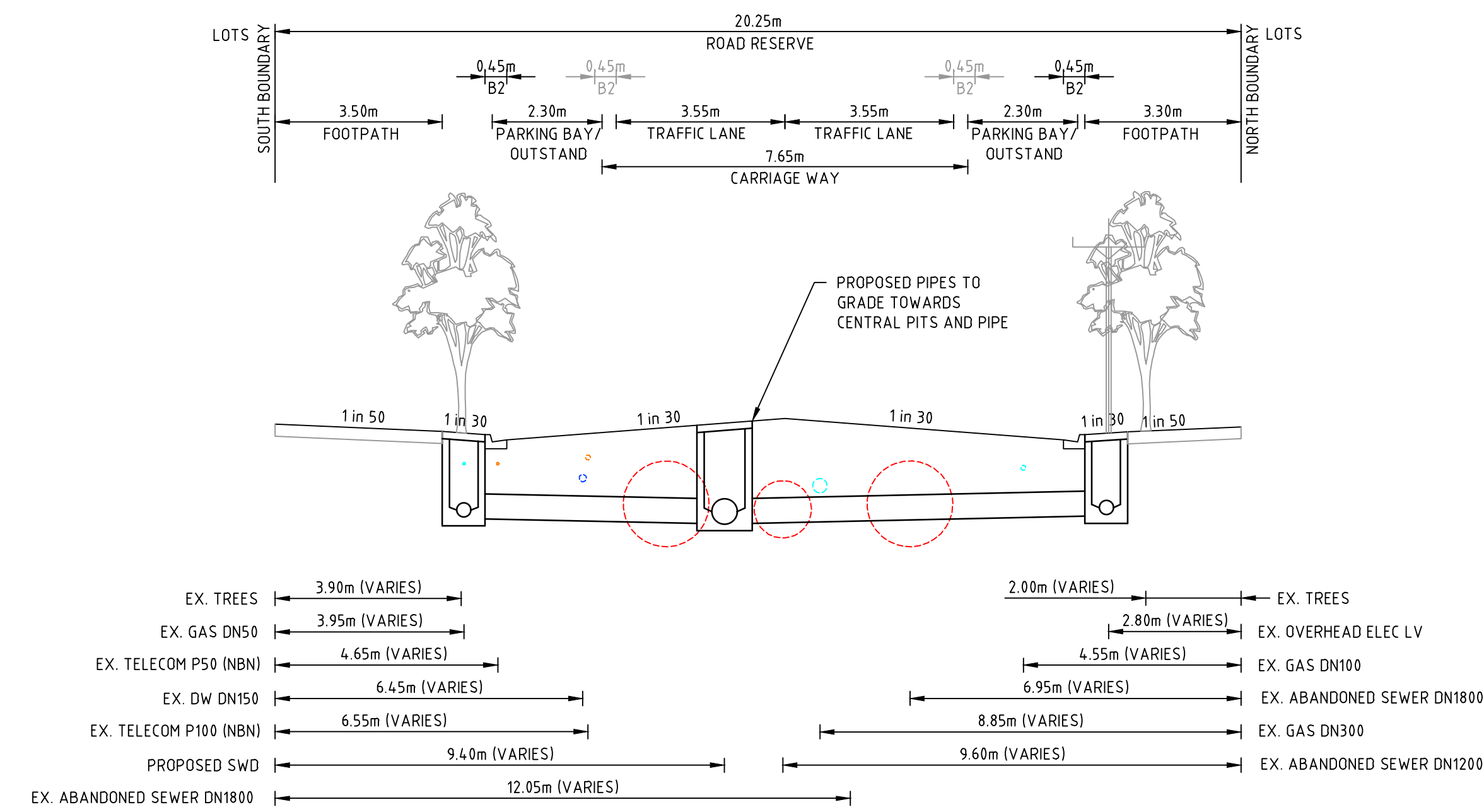
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**HUDSONS ROAD DRAINAGE UPGRADE**  
 DRAINAGE LAYOUT PLANS - SHEET 3  
 HOBSONS BAY CITY COUNCIL  
**PRELIMINARY** Drg No **310932CD202** Rev **B**

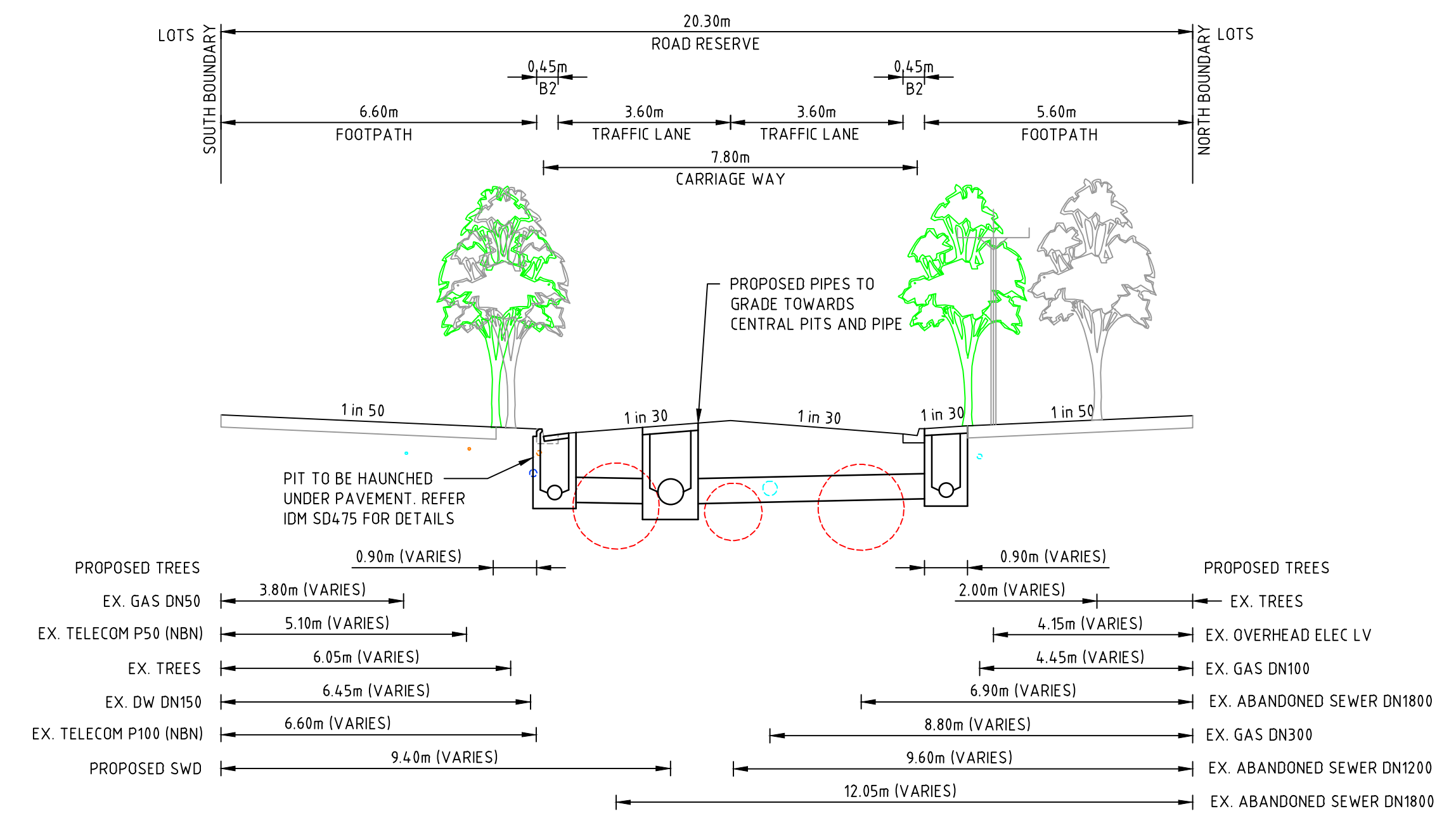
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**SECTION A - 20.25m ROAD RESERVE**

HUDSONS ROAD  
(REFER CD201)



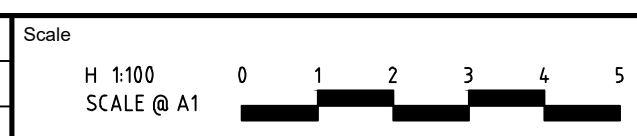
**SECTION B - 20.30m ROAD RESERVE**

HUDSONS ROAD  
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**HUDSONS ROAD DRAINAGE UPGRADE**  
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**DRAINAGE**  
**DRAINAGE SECTIONS - SHEET 1**  
HOBSONS BAY CITY COUNCIL  
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**PRELIMINARY** Drg No **310932CD300** Rev **A**

file name: 310932CD300.dwg, layout name: CD300, plotted by: Georgia Christopoulos, file location: \\spiire\georgias\Drawings\310932\CD300.dwg, plot date: 12/04/2023 5:30 PM, Sheet 4 of 4, Sheets

## 7. APPENDIX B- RATIO PIPES AND DRAINAGE AROUND STUDY AREA



## 8. APPENDIX C- RATIO SITE ANALYSIS MAP



# 3. Site Analysis

