Flüssig Engineers
Level 4 - 116 Bathurst St
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# *1% AEP Temporary Carpark Overland Flood Path Analysis*

## 1. INTRODUCTION

Flüssig Engineers examines the behaviour of the existing overland flow path across the subject site during the 1% AEP event. The purpose of this study is to respond to the requirements of E15.7.5 of the Kingborough Interim Planning Scheme 2015 which relates to development within Riverine, Coastal Investigation Area, Low, Medium and High Inundation Hazard Areas. The assessment evaluates pre and post development flood behaviour, including flow direction, depth, velocity and hazard. The findings determine whether the proposed works maintain or improve current drainage conditions and ensure that flood risk to surrounding properties is not increased as a result of the proposed works.

## 2. MODEL RESULTS

### 2.1. 1% AEP Pre-Development Scenario (Figure 1)

The pre development hydraulic conditions of the existing lot were assessed to understand how overland flows behave during the 1% AEP event. The mapping outputs for velocity, depth and hazard show that the lot is influenced by a natural overland flow path that begins at the south eastern portion of the site and travels toward the north west. This flow corridor follows the existing shallow topography and forms the dominant route for stormwater movement across the paddock.

The velocity results show that most of the site is subject to very low flow velocities under 0.50 m/s, particularly across the grassed paddock areas where the gentle slope reduces flow energy and allows runoff to spread. Slightly higher velocities appear only along the centre of the natural drainage line where flows become moderately concentrated. There are no parts of the lot where velocities reach levels considered hazardous.

The depth mapping confirms that inundation across the site is shallow, with most of the flow path displaying depths between 0.03 and 0.10 m. A small portion of the natural depression shows slightly deeper water, however all depths remain below 0.30 m. This indicates that the site disperses runoff effectively and does not experience significant ponding or standing water during the 1% AEP event.

The hazard classification mapping shows that the majority of the lot falls within the lowest hazard categories. The shallow flow corridor contains limited areas of H2 and H3 hazard which reflect shallow but modestly concentrated flow within the natural drainage line. No higher

hazard zones occur within the site and remain restricted to steeper ground beyond the property boundary.

Overall, the pre development scenario demonstrates that the site conveys shallow, low energy overland flow along a natural drainage alignment. The flooding remains contained within this depression and does not generate depth, velocity or hazard levels that would pose a risk to the site or neighbouring properties.

### 2.2. 1% AEP Post-Development Scenario (Figure 2)

The post development arrangement introduces three main components that collectively reshape how the 1% AEP overland flow moves across the site. These components are the temporary carpark platform, the detention basin positioned downstream of the carpark and the cut off drain designed to intercept and convey the existing overland flow path toward the natural outlet. These measures formalise the drainage behaviour on the site and ensure that the existing flow direction from the south east to the north west is safely maintained.

The depth results show that the drainage pattern becomes more contained and predictable once the new works are in place. Instead of spreading broadly across the centre of the paddock, the flow is intercepted by the cut off drain which directs stormwater around the car park and discharges it to the northwest of the site. Depths across most of the lot remain shallow, generally under 0.10 m, and the temporary carpark remains free of inundation due to the diversion of the overland flow path around it. Slightly deeper water is confined within the drain itself where the alignment forms a controlled conveyance route.

The hazard mapping confirms that the post development layout reduces the spread of potential hazard zones across the site. Most of the land remains within the lowest hazard categories because the drainage system now controls and channels the flow. Minor H2 or H3 values only occur within the cut off drain where flow becomes concentrated, which is expected for a defined drainage channel. No high hazard values develop within the site and no adverse changes occur along neighbouring properties.

The velocity results show that the drain improves conveyance efficiency by directing flow along a defined channel rather than through a wide natural depression. Velocities remain low across the carpark and paddock area. Slightly higher velocities appear along the drain as water is carried toward the outlet, however these remain contained and do not pose a risk. The system preserves the natural south east to north west drainage direction without causing any deflection of water toward surrounding lots.

In summary, the temporary carpark, cut off drain and detention basin establish a controlled drainage system that conveys the existing overland flow path without increasing risk. The works maintain the natural flow direction, reduce uncontrolled spreading of water and prevent ponding or redirection of runoff toward adjacent residential properties.

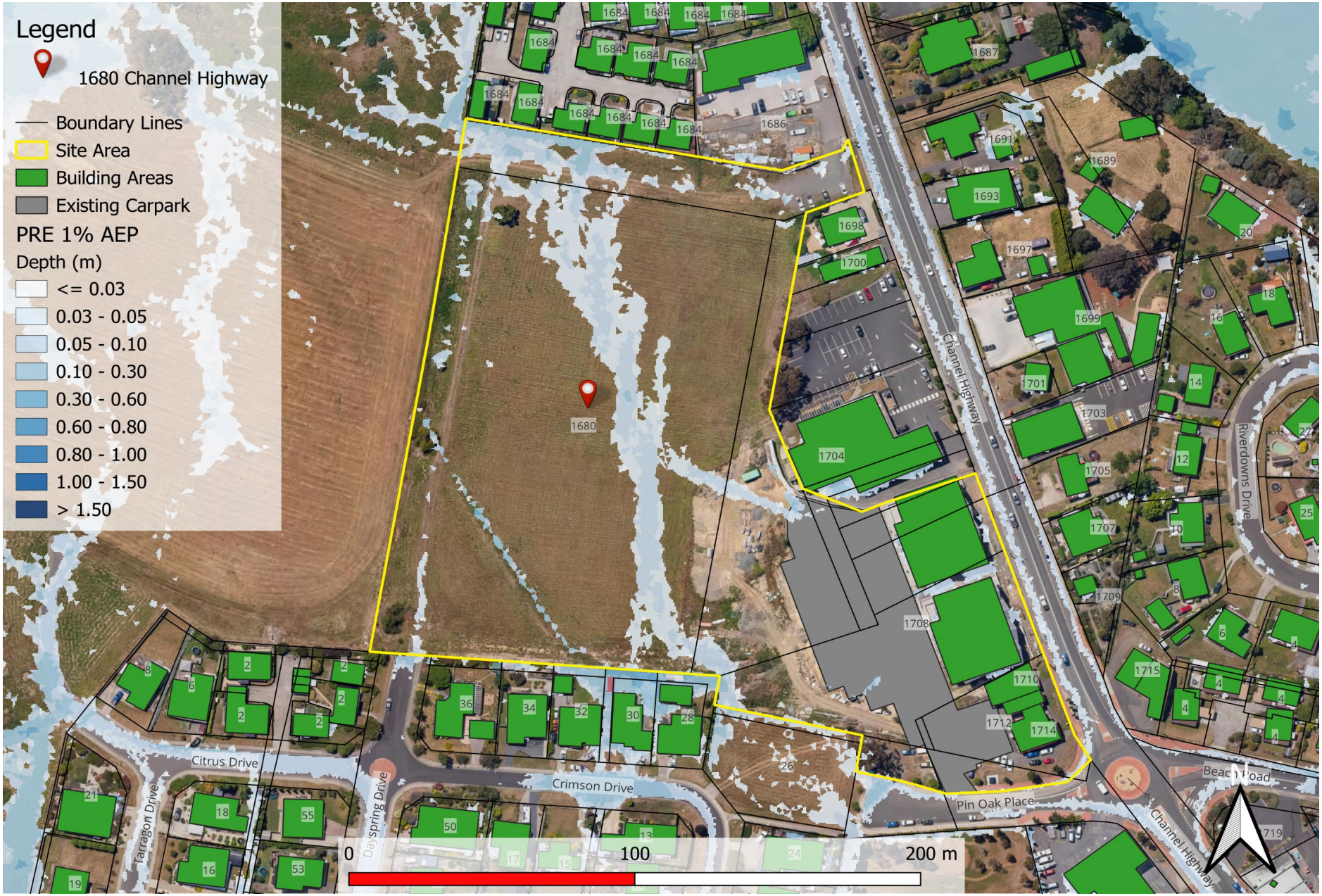


**Figure 1. Pre-development 1% AEP depth**

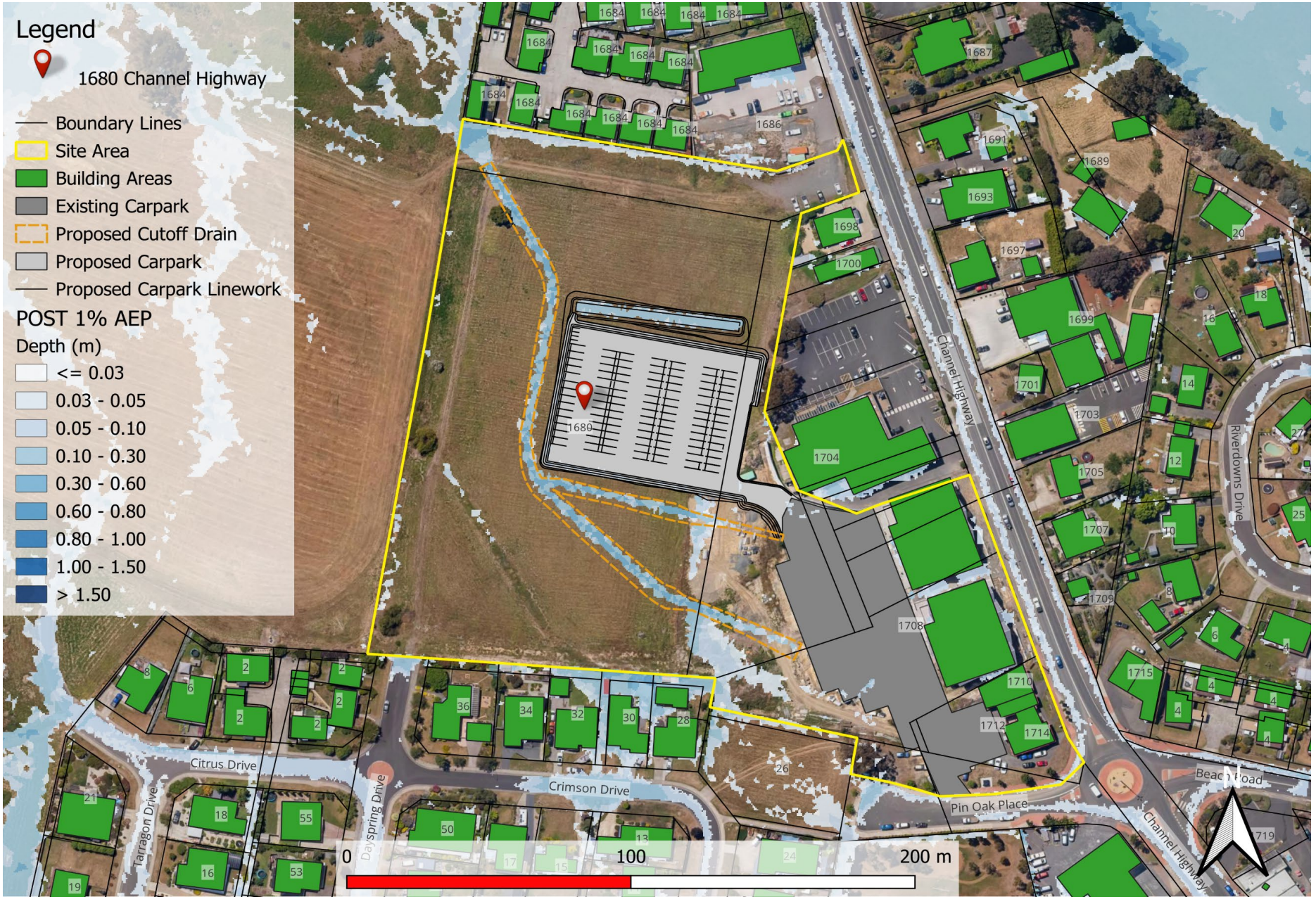


**Figure 2. Post development 1% AEP depth**

## 3. RESPONSE TO THE KINGBOROUGH INTERIM PLANNNG SCHEME 2015 CODE E15.

| E15.7.5 Riverine, Coastal Investigation Area, Low, Medium, High Inundation Hazard Areas | | | |
|---|---|---|---|
| **Objective:**<br>**(a) To ensure that landfill and mitigation works do not unreasonably increase the risk from riverine, watercourse and inland flooding, and risk from coastal inundation.** | | | |
| **Performance Criteria** | | | |
| **P1** | | | |
| Landfill, or solid walls greater than 5 m in length and 0.5 m in height, must satisfy all of the following: | | Response | |
| (a) | no adverse effect on flood flow over other property through displacement of overland flows. | (a) | No increase in flood risk from the proposed works that would cause flooding on third party property during 1% AEP storm event. |
| (b) | the rate of stormwater discharge from the property must not increase. | (b) | Rate of stormwater discharge between the pre-development and post-development scenarios does not increase as a result of the proposed works. |
| (c) | stormwater quality must not be reduced from pre-development levels. | (c) | As the proposed cut off drain intercepts the overland flow path redirecting it away from the proposed temporary carpark, this will not adversely affect the source of sedimentation into the flood waters with no increase in erosion potential. |

## 4. CONCLUSION

The assessment demonstrates that the proposed works maintain the natural overland flow path and does not increase flood risk under the 1% AEP event. Flows remain shallow and contained, with no adverse changes to depth, velocity or hazard on neighbouring properties. The drainage improvements provide a more defined and predictable flow route while preserving the natural south east to north west flow direction. Overall, the development performs safely within the requirements of the planning scheme.

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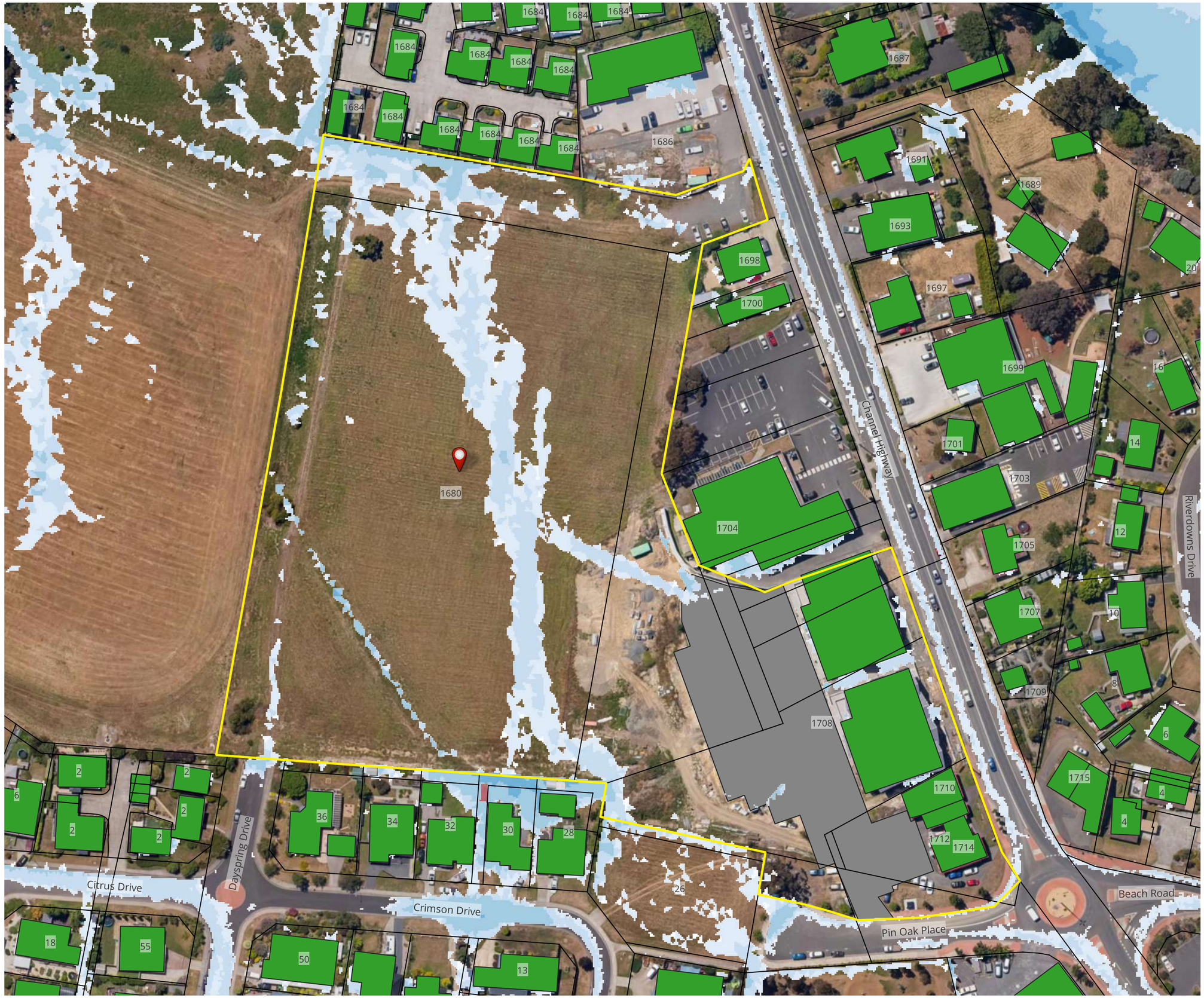
# Appendix A: Overland Flow Maps

# PRE 1% AEP




## Legend

1680 Channel Highway

- Boundary Lines
- Site Area
- Building Areas
- Existing Carpark

PRE 1% AEP

Depth (m)

- <= 0.03
- 0.03 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- > 1.50

0 40 80 m

meters

N

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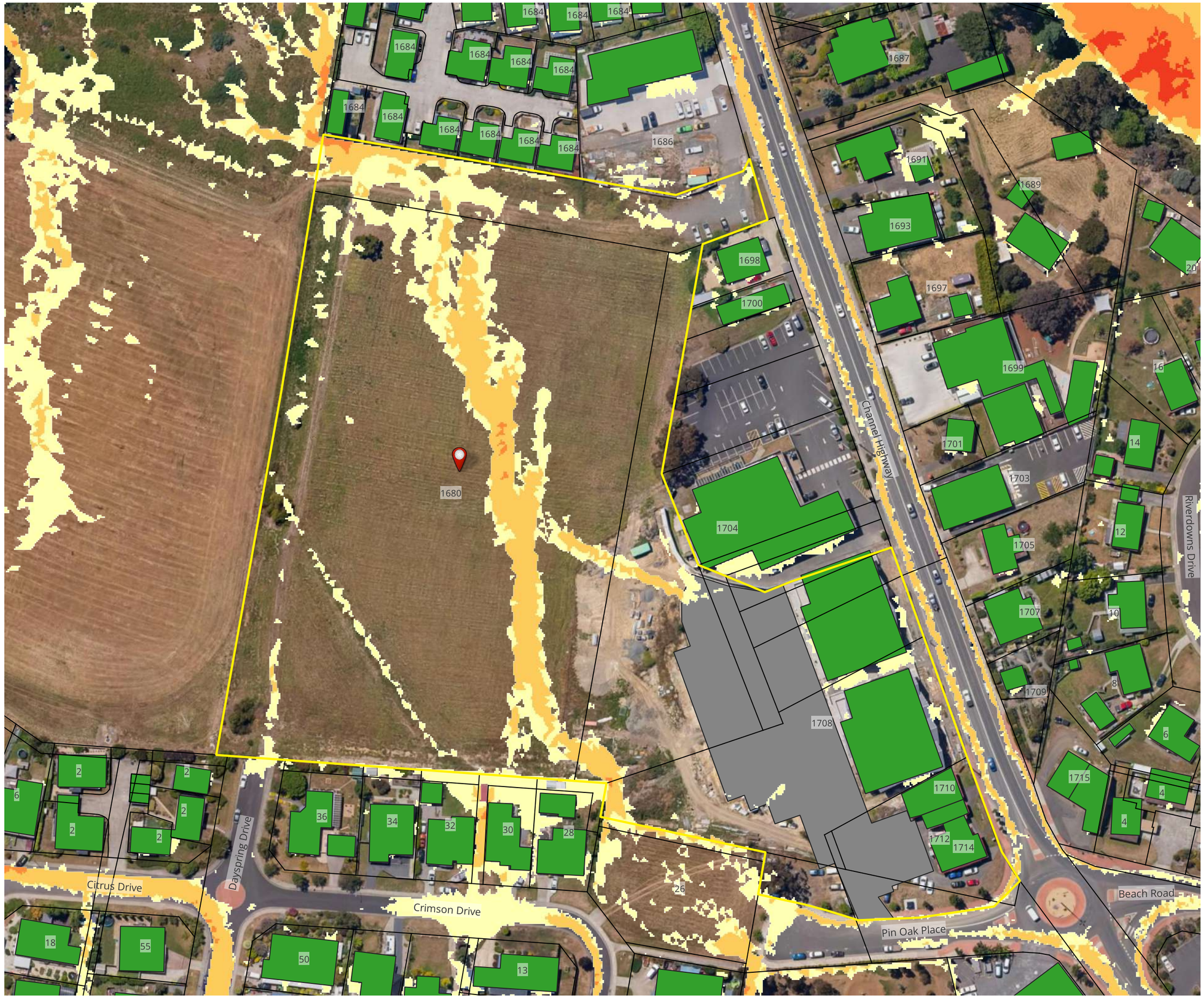
- 10-12-2025 - Flussig Engineers  Map CRS: GDA94 / MGA zone 55  EPSG:28355

# PRE 1% AEP




## Legend

1680 Channel Highway

Boundary Lines
Site Area
Building Areas
Existing Carpark

PRE 1% AEP

Velocity (m/s)

<= 0.50
0.50 - 1.00
1.00 - 1.50
1.50 - 2.00
> 2.00

0 40 80 m

meters

N

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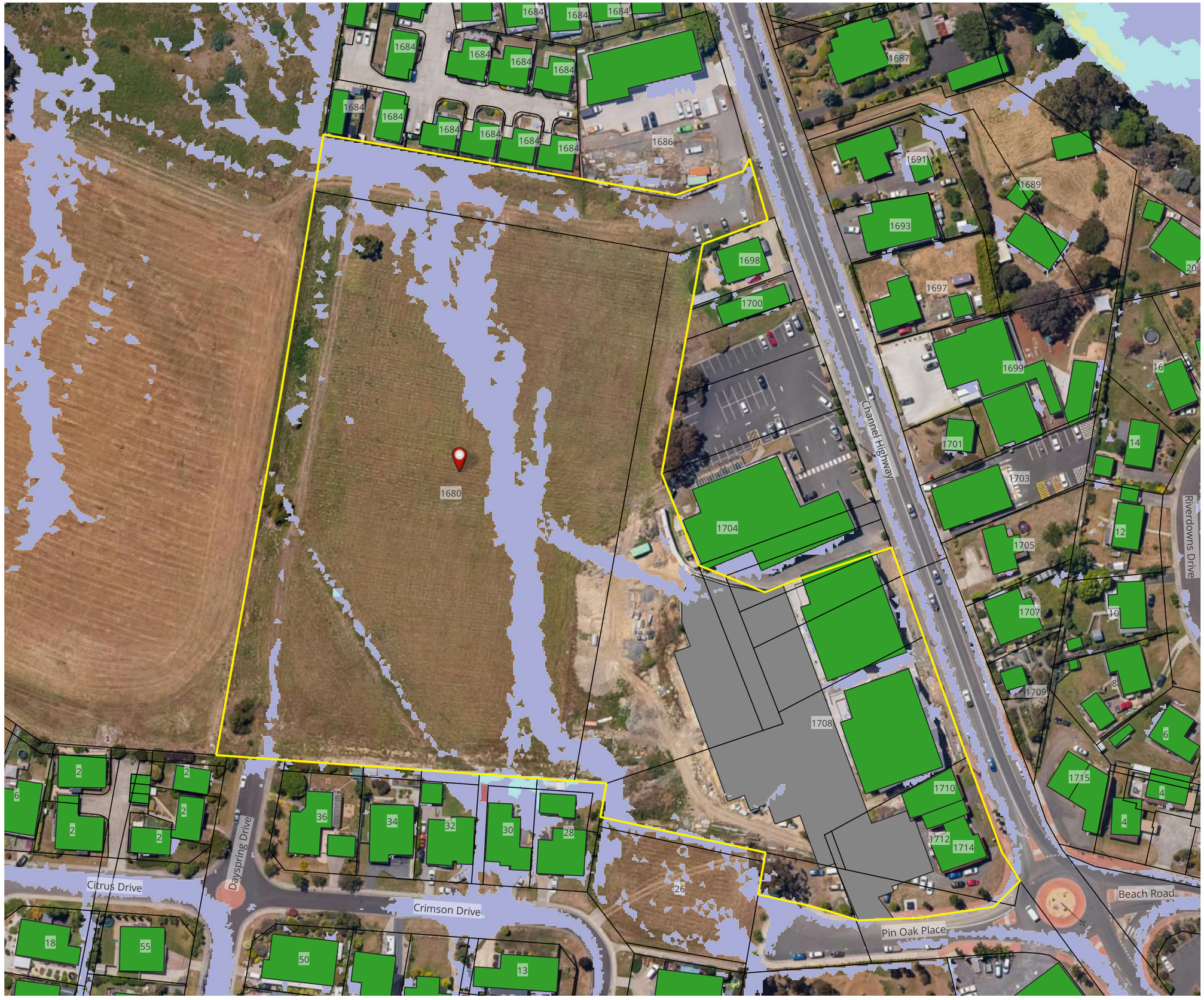
# PRE 1% AEP




## Legend

1680 Channel Highway

Boundary Lines

Site Area

Building Areas

Existing Carpark

PRE 1% AEP

Hazard

H1

H2

H3

H4

H5

H6

0 40 80 m

meters

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# POST 1% AEP


## Legend

1680 Channel Highway

- Boundary Lines
- Site Area
- Building Areas
- Existing Carpark
- Proposed Cutoff Drain
- Proposed Carpark
- Proposed Carpark Linework

POST 1% AEP

Depth (m)

- <= 0.03
- 0.03 - 0.05
- 0.05 - 0.10
- 0.10 - 0.30
- 0.30 - 0.60
- 0.60 - 0.80
- 0.80 - 1.00
- 1.00 - 1.50
- > 1.50

0 40 80 m

meters

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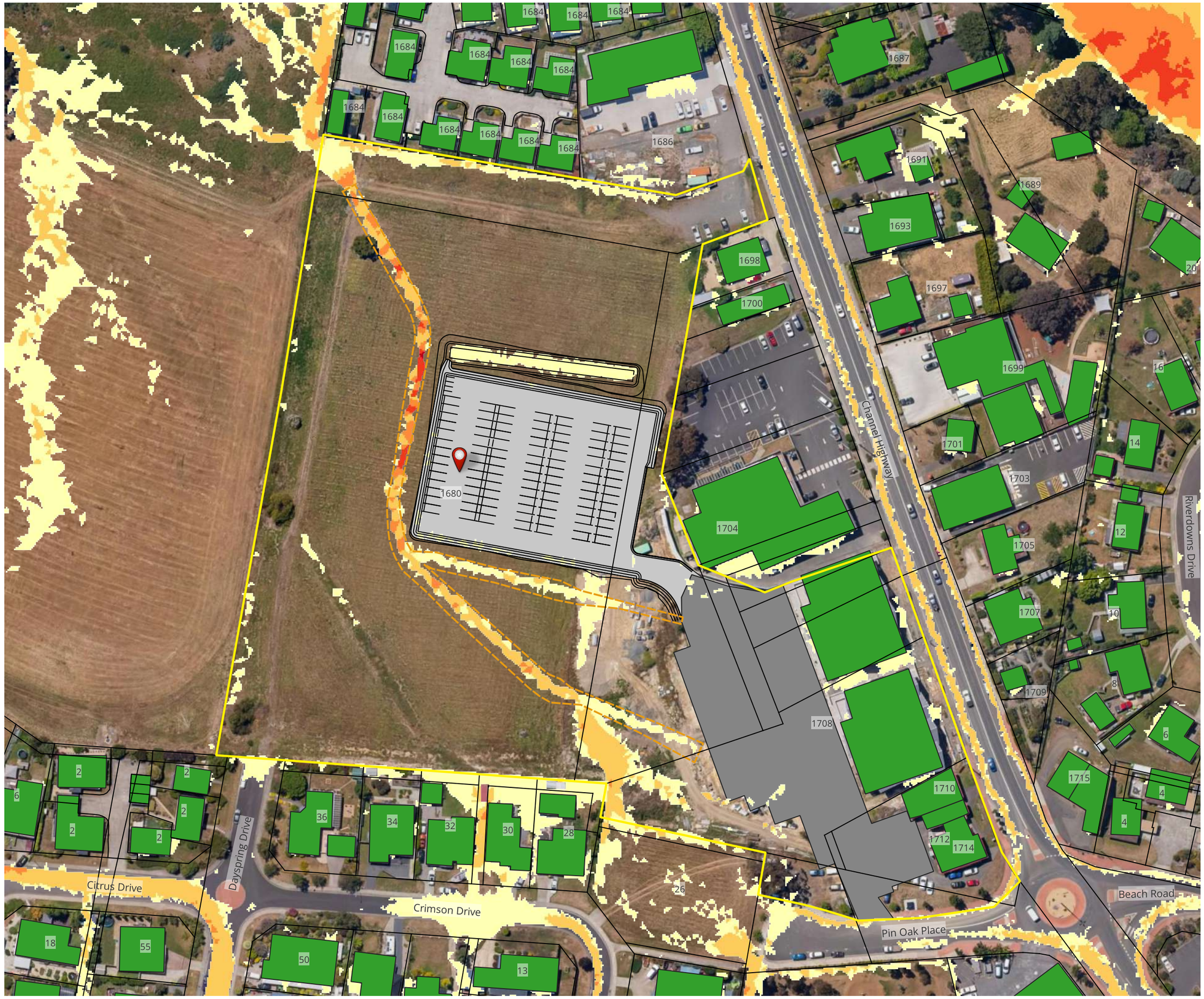


## Legend

1680 Channel Highway

- Boundary Lines
- Site Area
- Building Areas
- Existing Carpark
- Proposed Cutoff Drain
- Proposed Carpark
- Proposed Carpark Linework

POST 1% AEP

Velocity (m/s)

- <= 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

0 40 80 m

meters

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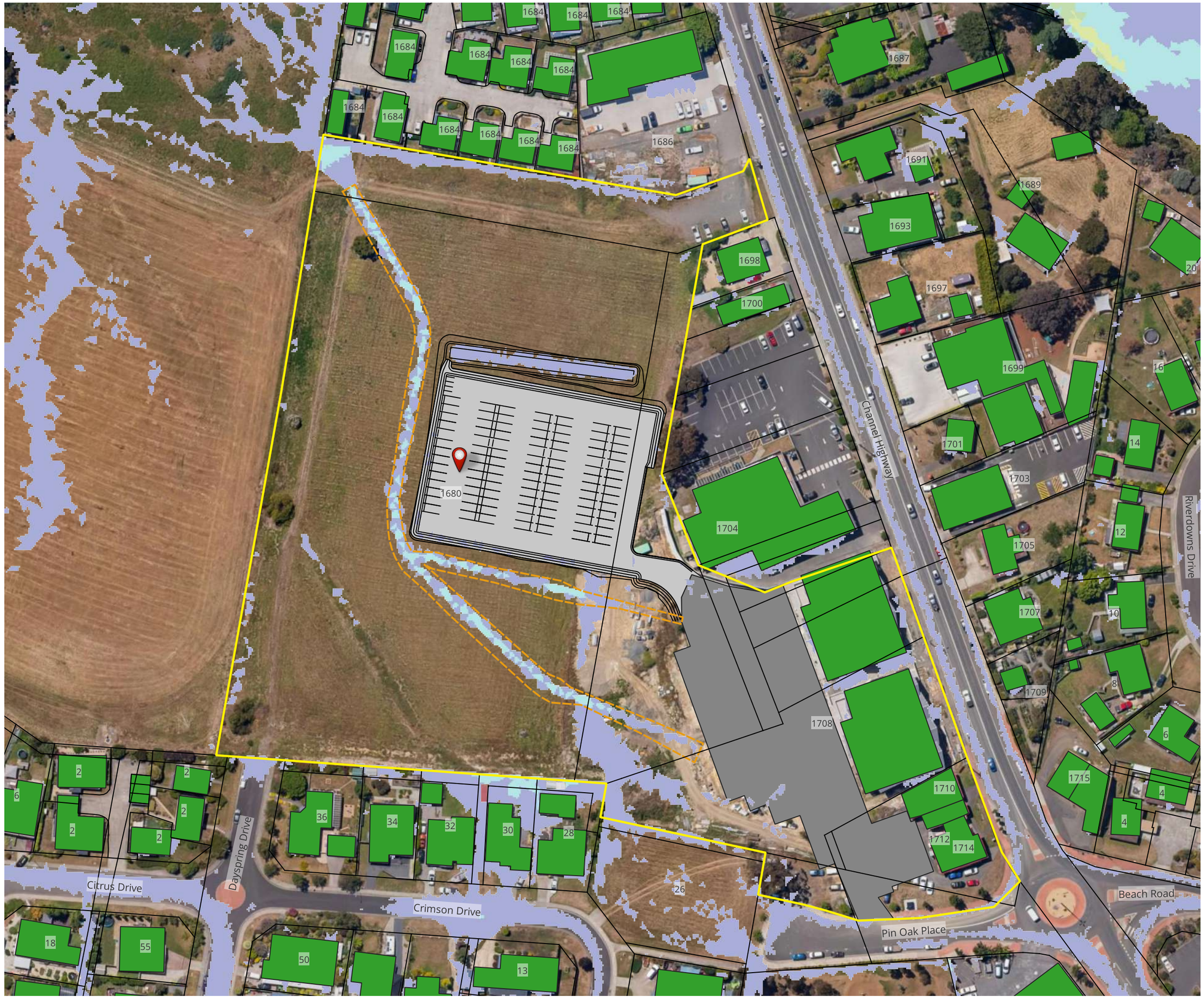


## Legend

1680 Channel Highway

- Boundary Lines
- Site Area
- Building Areas
- Existing Carpark
- Proposed Cutoff Drain
- Proposed Carpark
- Proposed Carpark Linework

POST 1% AEP

Hazard

- H1
- H2
- H3
- H4
- H5
- H6

0 40 80 m

meters

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