



## FLOOD EMERGENCY MANAGEMENT PLAN

Proposed Development – Childcare Centre  
3/92 Chambers Flat Road, Waterford West  
Prepared for AELC Development 2 Pty Ltd

Ref: SF-25-0601-003

Revision 1

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### RPEQ Certification

As a Registered Professional Engineer of Queensland (RPEQ), engaged on behalf of StormFlood Engineering Pty Ltd, I certify that based on the provided data, and/or modelling undertaken as part of this projects requirements, that the assessment has been undertaken in accordance with the relevant assessment authorities, and in accordance with current engineering best practices.

| RPEQ Name                | RPEQ Number | Document Version | Signature |
|--------------------------|-------------|------------------|-----------|
| Martin Roushani-Zarmehri | 22549       | 1.1              |           |

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# 1 Executive Summary

This Flood Emergency Management Plan (FEMP) Report has been prepared to assess the existing flood sources and characteristics within the surrounding road and site at 3/92 Chambers Flat Road, Waterford West. This report also provides details on flood emergency procedures and appropriate management in the leadup to a flood event (up to the PMF event).

The Logan and Albert Rivers Flood Study, 2023 (LARFS), as supplied by Logan City Council (LCC), has been adopted as the flood model data source for this assessment. The LARFS model indicates that during the Defined Flood Event (DFE), a very slow-moving backwater flood characteristic is anticipated through the catchment.

The finished floor level of the proposed development is situated above the PMF peak flood level and is therefore considered flood resilient in accordance with the LCC Planning Scheme policy and Temporary Local Planning Instrument No1./2024 (TLPI). The flood model information has been used to provide recommendations to AELC Development 2 Pty Ltd of how to manage the flooding hazards.

The flood risk attributed to occupants (parents and children), staff and educators is low and can be mitigated with active evacuation measures. This FEMP outlines the identified flood hazards, risks and emergency management procedures within the site, in accordance with the *National Emergency Risk Assessment Guidelines* (NERAG 2020).

The outcomes of this report must be made aware to the owner and occupants of the site. The distribution of flood risk knowledge is to be the responsibility of a nominated person or group (e.g. Chief Flood warden of the site). It is recommended that this FEMP be a live document, and to be maintained and reviewed annually to ensure flood risk assessments are up to date, in the event new flood modelling is available by LCC.

## 1.1 Flooding Probability

In order for the reader of this FEMP to adequately interpret the likelihood of the flooding source, terminology is used which is expressed in terms of the statistical probability of a similar level being achieved in a given return period. The terms Annual Exceedance Probability (AEP) and Average Return Interval (ARI) is utilised to quantify the intensity of a storm against the standard event duration. ARI is commonly used, as this terminology simply expresses the percentage that a flood of a given level will occur within any 1-year period.

Alternatively, this ARI can be expressed interchangeably as a percentage (AEP), as demonstrated in Table 1 below.

Table 1: ARI and AEP Flood Quantification Terminology

| Annual Exceedance Probability (AEP) | Average Recurrence Interval (ARI) |
|-------------------------------------|-----------------------------------|
| 18%                                 | 5 yr                              |
| 10%                                 | 10 yr                             |
| 5%                                  | 20 yr                             |
| 2%                                  | 50 yr                             |
| 1%                                  | 100 yr                            |
| 0.5%                                | 200 yr                            |
| 0.2%                                | 500 yr                            |
| 0.05%                               | 2000 yr                           |

## 2 Site Information

### 2.1 Site Background

The subject site is located at 3/92 Chambers Flat Road, Waterford West, formally known as Lot 3 on GTP 101608 (here within the 'Subject Site'), which is within LCC LGA boundaries. The subject site area is approximately 4,123 m<sup>2</sup> (Source: LCC Interactive Mapping).

An aerial image of the site, surrounding properties and roads have been shown in Figure 1 below.



Figure 1: Aerial Imagery -Subject Site

## 2.2 Site Characteristics

Based off Publicly Available 2023 high-resolution LiDAR Data, the site is deemed to range between approximately 19 m AHD (south-eastern quadrant) to RL15.3m AHD (north-eastern quadrant). The site typically falls from the east to the west at an approximate average grade of 3.8%. Primary access to the site is via Chambers Flat Road, with secondary access via Moffat Road.

The proposed development will be designed above the peak flood level derived from the LARFS PMF peak flood level, estimated at RL 17.4m AHD from review of the mapped model outputs.

Figure 2: Local Topography (Source: 2023 LiDAR Data) shows the existing topographical characteristics for the site.

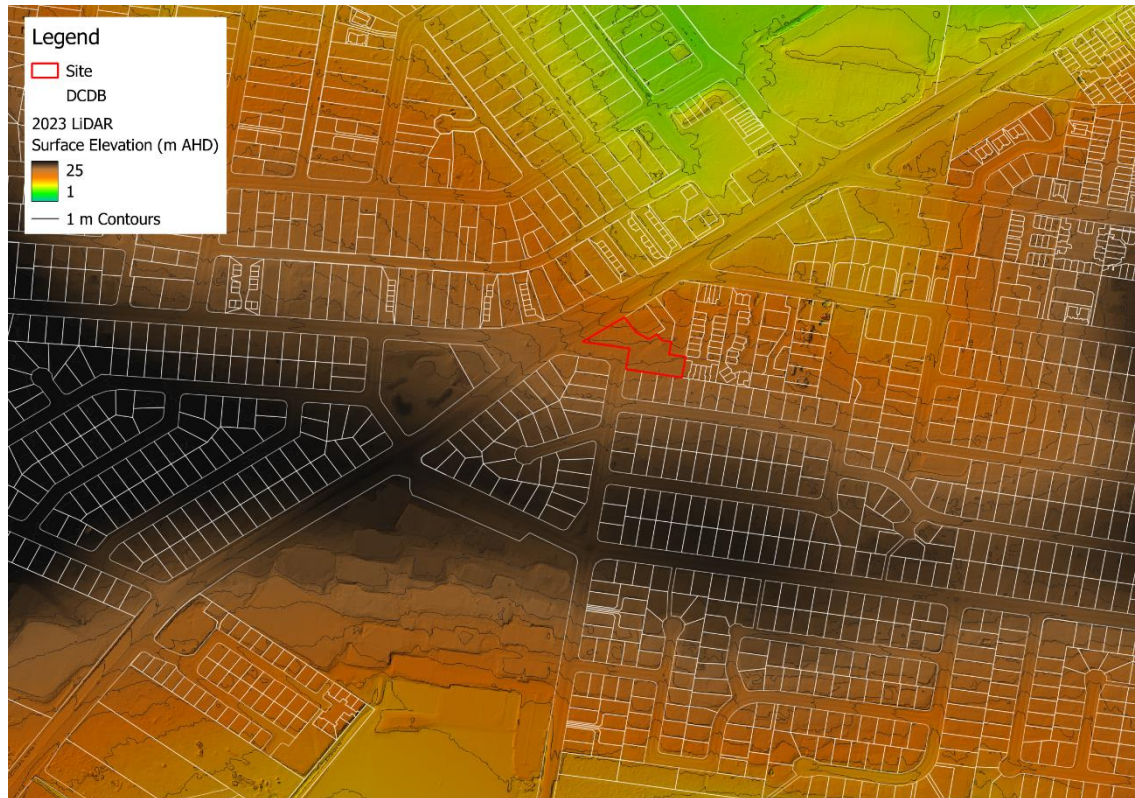


Figure 2: Local Topography (Source: 2023 LiDAR Data)

## 2.3 Adopted Data

In order to provide an adequate assessment for the site, the following data has been adopted for analysis:

- LCC Logan-Albert Rivers Flood Study 2023 (model provided by LCC via data agreement);
- Bureau of Meteorology Design Rainfall Data System 2016 for Subject Site Co-ordinates;
- Preliminary Design Drawings and Site Plan by Raymond Design (Project No: RD25009, June 2025, Issue P4) – attached as per Appendix A;
- LCC Interactive Mapping.

## 2.4 Rainfall Data

The sites rainfall intensities based off the Bureau of Meteorology (BOM) Design Rainfall Data 2016 have been provided below for reference.

The rainfall depth totals should only be utilised as a guide, however should never be relied upon solely. All weather warnings and flood warnings such as issued BOM warnings should be monitored closely in the leadup to a peak flood event.

*Table 2: BOM 2016 Design Rainfall IFD Depth – Site Co-ordinates (in mm)*

| Duration | Annual Exceedance Probability (AEP) Event |      |      |      |      |
|----------|---|------|------|------|------|
|          | 20%                                       | 10%  | 5%   | 2%   | 1%   |
| 10 min   | 22.7                                      | 26.7 | 30.6 | 35.7 | 39.5 |
| 15 min   | 28.8                                      | 33.9 | 38.9 | 45.2 | 50   |
| 20 min   | 33.4                                      | 39.4 | 45.2 | 52.7 | 58.4 |
| 25 min   | 37.1                                      | 43.8 | 50.3 | 58.8 | 65.2 |
| 30 min   | 40.1                                      | 47.4 | 54.6 | 64   | 71.1 |
| 45 min   | 46.8                                      | 55.7 | 64.4 | 76.1 | 85.1 |
| 1 hour   | 51.7                                      | 61.7 | 71.7 | 85.2 | 95.7 |
| 1.5 hour | 58.9                                      | 70.7 | 82.6 | 99   | 112  |
| 2 hour   | 64.4                                      | 77.6 | 91.1 | 110  | 125  |
| 3 hour   | 73.3                                      | 88.7 | 105  | 127  | 145  |
| 4.5 hour | 84  | 102  | 120  | 147  | 168  |
| 6 hour   | 93.1                                      | 113  | 134  | 163  | 187  |
| 9 hour   | 109                                       | 132  | 157  | 191  | 219  |
| 12 hour  | 122                                       | 149  | 176  | 215  | 247  |
| 18 hour  | 144                                       | 176  | 209  | 255  | 293  |
| 24 hour  | 162                                       | 199  | 236  | 289  | 331  |
| 30 hour  | 177                                       | 218  | 260  | 318  | 365  |
| 36 hour  | 190                                       | 234  | 280  | 343  | 394  |
| 48 hour  | 211                                       | 261  | 313  | 384  | 442  |
| 72 hour  | 239                                       | 297  | 358  | 442  | 510  |
| 96 hour  | 255                                       | 318  | 385  | 476  | 551  |
| 120 hour | 264                                       | 330  | 400  | 496  | 575  |
| 144 hour | 269                                       | 335  | 406  | 504  | 586  |
| 168 hour | 270                                       | 335  | 406  | 504  | 587  |

## 2.5 Development Details

The proposed development consists of a 112-space childcare centre located at the central portion of the property; and 32 car parking spaces at the front of the property. The carparking is an extension of the existing commercial premises carparking and hardstand on 2/92 Chambers Flat Road, Waterford West.

The proposed site plan for the site has been attached as Appendix A for further information.

The proposed development's building is located at or above the required peak flood level, being the Probable Maximum Flood (PMF). Chambers Flat Road provides the primary access route between the site and the major road network, with Moffat Road serving as a secondary access route. Access to the site will be supported by appropriate emergency management procedures.

The following assumptions can be made at this stage of this proposal.

### 2.5.1 Staff and Visitors

The anticipated maximum number of staff and visitors onsite is assumed as 150 persons (though likely less under the updated design), being a combination of permanent and casual staff employed, and occupants (children and parents), however given the nature of the proposal, can vary significantly.

The proposal assumed approximately 32 carparking spaces.

### 2.5.2 Hours of Operation

It is assumed the childcare centre will operate during normal business hours, approximately between 6:30am to 6:30pm, with cleaning crews outside of business hours, thus the risk of being isolated within the site is deemed relatively very low risk, given the leadup time of the Logan-Albert Rivers flood source.

### 3 Flood Hazard Identification and Risk Assessment

#### 3.1 Sources of Flooding

##### 3.1.1 Scrubby Creek

The site is not impacted by flooding derived from Scrubby Creek, including the Probable Maximum Flood. For an appreciation of peak flood extents derived from the SSCFS, the PMF peak flood depth map has been provided in Figure 3.



Figure 3: PMF Peak Flow Depth (Source: Logan Flood Portal)

### 3.1.2 Logan-Albert Rivers Flood Assessment

Flooding from the Logan-Albert River is characterised by a slow rise in water levels, providing considerable lead time (often several days) before the peak flood level is reached.

The site is immune from flooding up to PMF Event. The design AEP peak flood levels from the LARFS flood model for the Probable Maximum Flood (PMF) event is provided in **Table 3**.

*Table 3: Peak Flood Levels – Logan Albert Rivers 2023 Flood Levels*

| Design AEP Event             | Peak Flood Level (mAHD)  |
|------------------------------|--------------------------|
| 20% AEP 2100                 | N/A: Does not reach site |
| 10% AEP 2100                 | N/A: Does not reach site |
| 5% AEP 2100                  | N/A: Does not reach site |
| 2% AEP 2100                  | N/A: Does not reach site |
| 1% AEP 2100                  | N/A: Does not reach site |
| 0.5% AEP 2100                | N/A: Does not reach site |
| 0.2% AEP 2100                | N/A: Does not reach site |
| 0.05% AEP 2100               | N/A: Does not reach site |
| Probable Maximum Flood (PMF) | 17.4                     |

For an appreciation of the LARFS flood extent, the 0.05% AEP event is illustrated below in Figure 4, and the PMF event in figure 5.



Figure 4: LARFS 0.05% AEP Peak Flow Depth Extent Mapping (Source: Logan Flood Portal)

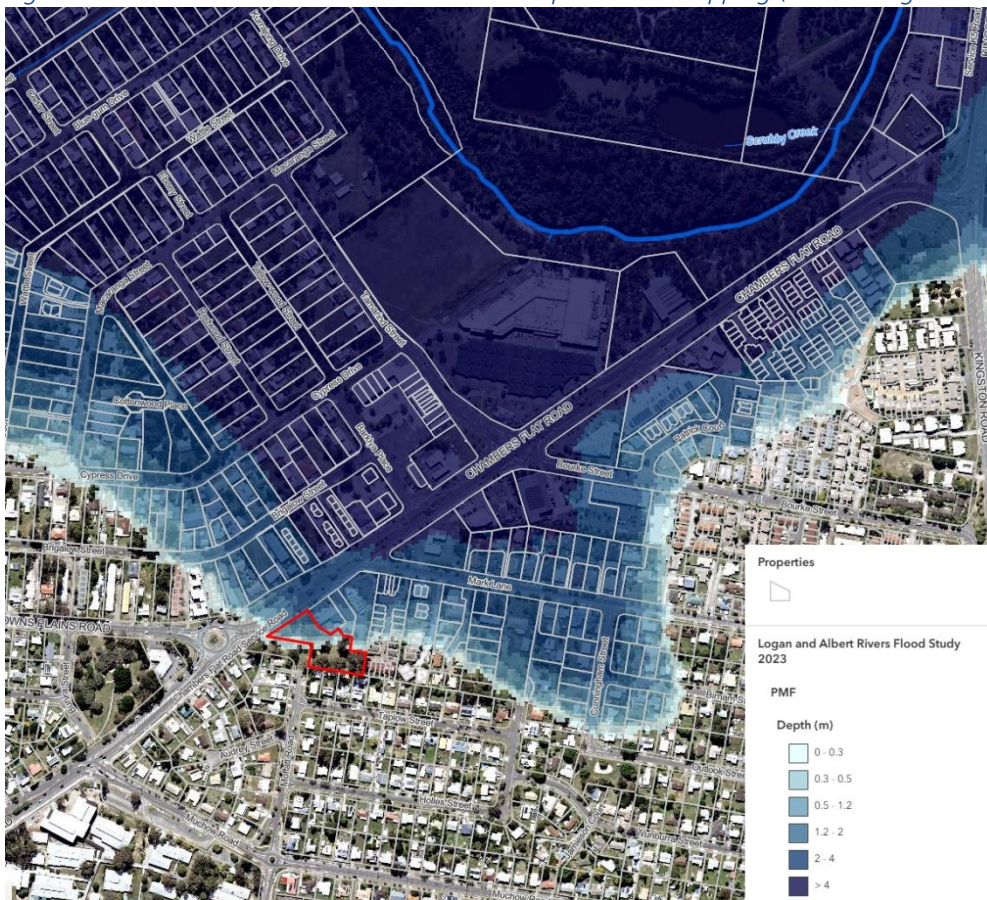


Figure 5: LARFS PMF Peak Flow Depth Extent Mapping (Source: Logan Flood Portal)

### 3.1.3 Evacuation Flood Route

An early evacuation approach is recommended for the site. Road access via Chambers Flat Road is cut in events rarer than the 0.05% AEP Year 2100 design event; however, access is maintained via the secondary access on Moffat Road, enabling staff and occupants to safely reach the wider road network. Given the large lead times to the peak flood level, and assuming Bureau of Meteorology (BoM) flood warnings are actively monitored, it is very unlikely that staff and educators will be accessing or remaining on the site when hazardous flood conditions develop.

For rare flood events (more extreme than the 0.05% AEP event), it is likely that a directive to evacuate or cease operations will be issued by the relevant authorities. In the event that the BoM issues a Major River Flood warning, it is anticipated that access to the site will become restricted and that the site will be free of occupants. Additionally, it is not reasonably expected any personnel will attempt to reach the site in the major river flood events.

Typically, Severe Weather Warnings are issued by the BoM when intense rainfall cells are detected by radar. This is usually the first indication that a significant flood event may develop if intense or prolonged rainfall begins and continues to fall across the catchment.

Refer to Appendix B for the Evacuation Route Plan, which highlights the safest evacuation routes to the Logan Motorway.

### 3.1.4 River Level Alerts

Generally, riverine Flood Warnings are issued by the Bureau of Meteorology when the river heights exceed the Minor Flood Warning level. For the Logan River Catchment, the closest river gauge is the Logan River at Waterford Alert (Station 040878), with the Logan River at Logan Village Alert located upstream.

At Waterford Alert (Station No. 040878), the Minor and Major level trigger is set at 6.0 m AHD and 11.0 m AHD, respectively. When a flood warning is issued for the Logan River, it is expected that staff and occupants monitor these gauges in the lead up to the event, and escalate response measures as required, as they provide most representative flood warning information for the site.

For the Scrubby Creek Catchment to the north of the site, the Minor Flood level at Scrubby Creek at Marsden (First Avenue) Alert (Station No 540078) and Scrubby Creek at Kurrajong is currently set at RL 9 m AHD and is currently set at RL 8 m AHD, respectively. These Scrubby Creek gauges should be reviewed in parallel with the Logan River gauges, particularly in circumstances where one or more Logan River systems are offline or unavailable.

The locations of these stations are illustrated below in Figure 6 for clarity.

Direct Hyperlinks to the above noted stations are below:

**Logan River at Waterford Alert (Station No. 040878):**

<https://www.bom.gov.au/fwo/IDQ65388/IDQ65388.040878.plt.shtml>

**Logan River at Logan Village (Station No. 540596):**

<https://www.bom.gov.au/fwo/IDQ65388/IDQ65388.540596.plt.shtml>

**Scrubby Creek at Marsden (First Ave) (Station No. 540078)**

<https://www.bom.gov.au/fwo/IDQ65388/IDQ65388.540078.plt.shtml>

**Scrubby Creek at Kurrajong (Station No 540091):**

<http://www.bom.gov.au/fwo/IDQ65388/IDQ65388.540091.plt.shtml>



Figure 6: BOM River Height Gauge Locations

### 3.2 Consequences of Flooding

Flooding poses major and/or fatal risks on persons and property if not managed adequately. The more dangerous risks to persons within this site include injury or death to any person who may be isolated in rising floodwaters.

Risks can be in the form of direct risks, such as physical injury from floodwater or debris, or drowning, or indirect risks, such as disease and infection carried in floodwaters or isolation from essential provisions or medical assistance.

It is important to stress that these risks are present to all people, including those that are physically fit and able.

Accordingly, it is recommended that all staff and educators refrain from wading through (unless to higher parts of the site), or driving a vehicle through floodwater at any time, as hazards and actual depths may be unknown, and the flood water characteristics may be underestimated.

### 3.3 Duration of Flooding

The site is located above the Defined Flood Event (DFE) peak flood level and would not be directly inundated in a DFE event. There is, however, potential for road inundation along the driveway connecting to Chambers Flat Road during the extreme PMF event. In the rare circumstance that an event of this magnitude were to occur, and noting the low probability of staff and educators or occupants being present on site, egress should be via the secondary access on Moffat Road, enabling evacuation to the west via Chambers Flat Road (and flood free access to Browns Plains Road).

Under the Probable Maximum Flood event, Chambers Flat Road may be briefly inundated, with the PMF peak level of approximately RL 17.4 m AHD expected to recede within an estimated maximum of 12 hours back down to a level that enables safe egress along Chambers Flat Road. The PMF represents the design event with the longest duration of inundation. In the event of flooding of this magnitude, occupants have an estimated lead time of approximately 30 hours to safely evacuate the site prior to loss of access.

Given the potential for temporary isolation during extreme flood events, flood risk should be minimised through early evacuation and proactive closure of the site prior to inundation of Chambers Flat Road. Site staff and educators should remain vigilant during periods of significant rainfall and respond promptly to official warnings issued by the relevant authorities.

**Sufficient warning and evacuation time would be available to ensure staff and educators can mobilise from the site during a major flood event.**

## 4 Risk Management Assessment

This risk assessment has been prepared in accordance with recommendations and guidance included in the Australian Institute for Disaster Resilience's (AIDR) *Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia – Handbook 7, Australian Disaster Resilience Handbook Collection (2017)*; and *National Emergency Risk Assessment Guidelines* (AIDR, 2020).

These documents deal specifically with the steps required in determining risk, and in this instance, flood risk associated with a particular situation and/or development. Based on the existing use of the site, the greatest risk is to the occupants of the site with regards to flooding, is the option of not evacuating the site to alternate flood immune premises or locations, well before inundation of the access roads commences, based on available flood warnings. Additionally, the same risk is present too personnel attempting to enter or exit the site via the access roads when flooding is occurring.

The risk of flooding to the carpark and ground-level areas of the site is considered low, with impacts anticipated only during Logan River flood events rarer than, and including, the 0.05% AEP design event (i.e. events with a 1% or lower chance of occurring over a 30-year period). Chambers Flat Road, the primary access route to the site, is predicted to be inundated only in events rarer than the 0.05% AEP 2100 design event (noting egress from the site to Chambers Flat Road being flood free). In such circumstances, it is recommended that egress from the site be via the secondary access on Moffat Road as a precautionary measure.

To mitigate residual risks associated with extreme flood events, the following risk management measures are proposed:

- Early warning and monitoring of Bureau of Meteorology and Council flood warnings, with clear triggers for action before the access roads are cut;
- Early evacuation and site closure procedures to ensure the site is vacated well ahead of hazardous conditions; and
- Staff awareness and training to reinforce early action and avoid unsafe entry or exit during flood events.

A qualitative risk analysis assessment for the existing site, based on the National Emergency Risk Assessment Guidelines (Australian Institute for Disaster Resilience, 2020) was undertaken. The result of the assessment is presented in Tables 4-8 with respect to the Logan-Albert River flood source.

## 4.1 Flood Risk Identification

A qualitative assessment of the likelihood and consequences of flooding has been undertaken for consideration in the design of buildings, structures and access ways and the development of emergency procedures.

*Table 4 Flood Risk Identification*

| Vulnerable Element                    | Risk  | Consequences   |
|---------------------------------------|---|--|
| <b>Employees and occupants.</b>       | <p>Employees and visitors (children and parents) can mobilise from the site up to and including the PMF flood event. Egress is maintained via Moffat Road and Browns Plains Road to the site.</p> <p>For occupants seeking to head north-east, Chambers Flat Road is considered non-trafficable from and including the 0.5% AEP 2100 event, with the northbound lanes designated a H2 hazard category at the Bourke Street intersection – unsafe for small vehicles and children.</p> <p>Under these conditions, flood hazards may include entrapment in vehicles, floating debris and impacts from adjacent vehicles, with an associated risk of drowning.</p> | A person may be injured, drowned, or electrocuted causing loss of life.  |
| <b>Vehicles &amp; Property</b>        | Inundation of vehicles and machinery parked in the carpark or elsewhere on site when floodwaters reach the PMF flood level.   | Damage to or loss of vehicles and property.  |
| <b>Access</b>                         | <p>The Chambers Flat Road access is cut in events rarer than the 0.05% AEP 2100 design event, once floodwater depths exceed approximately 300 mm for small cars and 500 mm for large 4WD vehicles.</p> <p>When Chambers Flat Road is inundated, egress from the site is to be via Moffat Road, with evacuation to the west via Browns Plains Road.</p>  | Potential for long term cutoff to access into the site, that in an emergency may require emergency service evacuation.   |
| <b>Buildings and Fixed Structures</b> | The proposed allotments are not susceptible to inundation up to and including the PMF level. The proposed building floor level is above the PMF level.  | <p>Minor or Major Damage to building requiring repairs or rebuild.</p> <p>Post-flood centre operations may be disrupted (temporary closure of rooms or outdoor play areas while cleaning and safety checks are completed).</p>   |
| <b>Dangerous &amp; Unfixed goods</b>  | The presence of dangerous goods is likely to be rare, in light of the intended use case for the site. In the instance that dangerous goods are present, it is anticipated that these will be immune of flooding and positioned at or above the building floor level (not contained outside).  | <p>Damage to goods and equipment.</p> <p>Loss of stock.</p> <p>Centre unable to operate for a period of time (temporary closure of the service)</p> <p>Injury/ Death to persons struck by unfixed goods.</p> <p>Dangerous Materials entering the floodplain and floodwaters (i.e. Public Risk)</p> |
| <b>Critical Facilities</b>            | Emergency services vehicles will be denied access once the surrounding streets have been inundated to a depth of 300-500mm (rarer than the 1% AEP 2100 flood event)   | <p>Potential inability to reach isolated occupants and staff (i.e. medical emergency)</p> <p>Unable to undertake emergency rescue (i.e. only</p>   |

|                          |  |  |
|--------------------------|--|--|
|                          |  | airborne rescue can be undertaken).  |
| <b>Centre Operations</b> | Loss of Asset Value or Reduction in Service Capacity proceeding rare flood events (rarer than the 0.05% AEP flood event) | Service disruption with potential long-term impacts on the viability and continuity of the childcare centre. |

## 4.2 Flood Risk Analysis

All risks associated with flooding have been summarised in a risk matrix in which details the likelihood and consequences of the hazard occurrence, both before and after controls are implemented. The criteria for assessment of likelihood and consequence can be determined using the qualitative methods as detailed in the NERAG 2020. The criteria adopted to determine the likelihood of hazard occurrence is detailed in the below tables.

Reference should be made to the NERAG 2020 Tables 3-6 for consequence levels for people, injuries/illness, economic and environmental criteria's.

**Table 11:** Qualitative risk matrix

| LIKELIHOOD     | CONSEQUENCE LEVEL |          |          |         |              |
|----------------|-------------------|----------|----------|---------|--------------|
|                | INSIGNIFICANT     | MINOR    | MODERATE | MAJOR   | CATASTROPHIC |
| ALMOST CERTAIN | Medium            | Medium   | High     | Extreme | Extreme      |
| LIKELY         | Low               | Medium   | High     | Extreme | Extreme      |
| UNLIKELY       | Low               | Low      | Medium   | High    | Extreme      |
| RARE           | Very low          | Low      | Medium   | High    | High         |
| VERY RARE      | Very low          | Very low | Low      | Medium  | High         |
| EXTREMELY RARE | Very low          | Very low | Low      | Medium  | High         |

*Figure 7: Qualitative Risk Matrix (Source: NERAG 2020 Table 11)*

**Table 5:** Likelihood Level Definitions

| Likelihood     | Annual Exceedance Probability (AEP) |
|----------------|-------------------------------------|
| Almost Certain | 63% AEP or more frequent            |
| Likely         | 63% AEP – 10% AEP                   |
| Unlikely       | 10% AEP – 1% AEP                    |
| Rare           | 1% AEP – 0.1% AEP                   |
| Very Rare      | 0.1% AEP – 0.01% AEP                |
| Extremely Rare | 0.01% or less frequent              |

Table 6: Qualitative Flood Risk Analysis

| Vulnerable Element             | Likelihood Rating | Consequence Level | Risk Rating |
|--------------------------------|-------------------|-------------------|-------------|
| Employees and Occupants        | Extremely Rare    | Major             | Medium      |
| Vehicles & Property            | Extremely Rare    | Moderate          | Low         |
| Access                         | Extremely Rare    | Moderate          | Low         |
| Buildings and Fixed Structures | Extremely Rare    | Moderate          | Low         |
| Dangerous & Unfixed goods      | Extremely Rare    | Moderate          | Low         |
| Critical Facilities            | Rare              | Moderate          | Medium      |
| Centre Operations              | Very Rare         | Moderate          | Low         |

### 4.3 Flood Risk Evaluation

Table 7: Flood Risk Evaluation

| Vulnerable Element             | Risk Rating | Risk Evaluation  | Risk Priority |
|--------------------------------|-------------|--|---------------|
| Employees and Occupants        | Medium      | Although risks can be reduced with appropriate education identifying the dangers in driving in floodwaters and early evacuation of the site, staff, educators and occupants (children and parents) may still be injured, drowned or electrocuted where warnings are ignored. | 3             |
| Vehicles & Property            | Low         | Although risks can be reduced by implementing an early warning trigger for evacuation of the site well in advance of the site being inundated, there remains the risk that some cars will be stranded on site when flood levels reach above the PMF level.                   | 4             |
| Access                         | Low         | Access to the site is viable via Moffat Road up to and including the PMF Flood Level. In the instance that an event of this magnitude were to occur, access through the catchment is limited and caution should be exercised when vacating the site.                         | 4             |
| Buildings and Fixed Structures | Low         | The proposed building allotments are not subject to inundation, with the building floor level above the PMF Peak Flood Level. The surrounds may be subject to minor flood damage.  | 4             |
| Dangerous & Unfixed goods      | Low         | The presence of dangerous goods on the premises is expected to be rare given the intended use of the site. Accordingly, the risk of contamination of floodwaters by dangerous goods is considered very low.  | 4             |
| Critical Facilities            | Medium      | Upon inundation of the roads (including external to the site), from critical facilities such as hospitals, the risk will remain that access will be unachievable when flood levels reach above the 1% AEP 2100 peak flood level.   | 3             |
| Centre Operations              | Low         | The risk of failure of the centre operations due to extended closure or a reduction in clients is low, with the building floor level higher than the PMF peak flood level.   | 4             |

## 4.4 Flood Risk Treatment

A qualitative assessment of the likelihood and consequences of flooding has been undertaken for consideration in the design of buildings, structures and access ways and the development of emergency procedures. The assessment includes an exploration of potential improvements of the existing use with respect to future flood event risks.

*Table 8: Flood Risk Identification*

| Vulnerable Element             | Risk Priority       | Treatment Strategy/Plan   |
|--------------------------------|---------------------|---|
| Employees and Occupants        | 3 – Medium Priority | <p>Employees and all on-site management staff to undergo initial and on-going education identifying the dangers of flooding and driving in floodwaters. Education on flood monitoring and warnings to be undertaken regularly.</p> <p>Employees and all on-site management staff are to be advised that the surrounding streets have the potential to flood and the site may be closed where flood forecasts indicate rainfall that could result in flooding of the roads.</p> <p>All employees and all on-site management staff are to be included in a register such that they can be contacted at all times. All employees and all on-site management staff are to be made aware of the flood emergency management procedures to be implemented at each trigger level.</p> <p>Where forecasts indicate the possibility of access routes being inundated by floodwaters, regular and registered users to the site are to be informed by on-site management as to the risks in driving through floodwaters and to evacuate (if safe to do so) or stay away as appropriate.</p> |
| Vehicles & Property            | 4 – Low Priority    | Implementation of an early warning trigger for evacuation of the carpark in advance of the site and access routes being inundated.  |
| Access                         | 4 – Low Priority    | <p>Employees and all on-site management staff to undergo initial and on-going education identifying the dangers of flooding and driving in floodwaters. Education on flood monitoring and warnings to be undertaken regularly.</p> <p>Employees and all on-site management staff are to be advised that the surrounding streets have the potential to flood and the site may be closed where flood forecasts indicate rainfall that could result in flooding of the roads.</p> <p>All employees and all on-site management staff are to be included in a register such that they can be contacted at all times. All employees and all on-site management staff are to be made aware of the flood emergency management procedures to be implemented at each trigger level.</p> <p>Where forecasts indicate the possibility of access routes being inundated by floodwaters, regular and registered users to the site are to be informed by on-site management as to the risks in driving through floodwaters and to evacuate (if safe to do so) or stay away as appropriate.</p> |
| Buildings and Fixed Structures | 4 – Low Priority    | If practicable, the buildings should consider flood resilient materials that can be readily cleaned or hosed  |

|                                      |                     |   |
|--------------------------------------|---------------------|---|
|                                      |                     | down to minimise cost associated with replacing or repairing (where possible).  |
| <b>Dangerous &amp; Unfixed goods</b> | 4 – Low Priority    | In the event of a major flood event, staff and educators can easily move dangerous and unfixed goods to higher ground.  |
| <b>Critical Facilities</b>           | 3 – Medium Priority | In the event of a critical emergency after flood depths on access roads have exceeded safe trafficable depths for emergency vehicles (>1% AEP 2100, to the Logan Hospital), access by emergency services will either need to be via helicopter or boat. |

## 5 Flood Emergency Management Plan

The Flood Risk Safety Management Team (or nominated Site Manager) shall prepare and implement ongoing procedures to implement this Flood Emergency Management Plan. The following triggers are crucial to effective flood risk mitigation for the site.

### 5.1 Prior to a Flood Event

The centre manager of the site is to ensure all staff, educators and occupants are aware of the potential flood threats within and external to the site, including within any staff induction and family enrolment/orientation procedures at the centre. Regular (i.e. annual) training of all staff and teachers, for evacuation considerations should be provided.

This FEMP is to be incorporated into general operation procedures and safety toolbox meetings. Flood wardens are to be assigned in addition to a site manager, in the event no site manager is present during the flood event, in order to carry out the evacuation management strategy noted within this FEMP.

#### **Trigger for Action: Always**

The Centre Manager is to ensure this FEMP is incorporated into general site operation procedures;

- The Centre Manager shall appoint sufficient flood wardens, including nominating a Deputy Warden/s who will fill the Chief Wardens role in the event of their absence, to undertake activities as specified within the Flood Emergency Management Plan;
- During their induction process, all Managers (Room Leaders or educators) and suitable employees are to be made aware of the FEMP and requirements for evacuation as directed by the Centre Manager;
- The Centre Manager shall maintain a register of contact details for all wardens and Managers such that the notification of flood warnings and flood management procedures can be relayed as necessary;
- The Centre Manager shall ensure adequate equipment for the effective implementation of the Flood Emergency Management Plan is provided and maintained;
- The Centre Manager shall test the flood emergency management plan procedures annually. This may include drills with Managers and employees but at a minimum must include drills with nominated flood wardens and testing of equipment and communication measures;
- The Centre Manager shall follow this FEMP or directions received from Emergency Services (which take priority over this FEMP) in event of a flood being likely or occurring;
- The Centre Manager shall adopt a precautionary principle with respect to site evacuation in that when it is safe to do so, the preference should always be to evacuate the site rather than refuge in place;
- The Centre Manager shall ensure the FEMP is reviewed annually and following any significant flood event to see if any improvements can be made; and
- The Centre Manager shall ensure any updates to the Flood Emergency Preparedness and Management Plan be registered with the Local Disaster Management Coordination Centre (where required).

The Centre Manager shall monitor all available flood warnings and rainfall forecasts issued by the Bureau of Meteorology (BoM) and Logan City Council (as outlined in this FEMP).

### 5.2 Procedures when Flooding is Likely

**Trigger for Action: When the Bureau of Meteorology issues either a Flood Watch for the Logan-Albert River or Scrubby Creek catchment**

- The Centre Manager or nominated delegate will notify the Managers that there is a possibility that the site and access routes may be subject to flooding and to remind them of the flood emergency procedures should the order to evacuate the site is taken;
- Regular monitoring of creek and river levels from the noted warning stations (Logan River stations and Scrubby Creek Stations) as per Section 5 of this report is to be undertaken, until flood warnings have been cancelled.

- The Centre Manager will decide whether to close the site early (i.e. prior to flood levels rising to the Minor Level trigger in either of the stations noted) based on weather forecasts and/or initial Flood Watch warnings provided by the Bureau of Meteorology;
- The Centre Manager or Flood Wardens shall monitor any backwater flooding or rising water in the local drainage channel on or adjacent to the site as an evacuation trigger; cancel all off-site excursions and external activities immediately.
- The Centre Manager or nominated wardens should notify all Managers, together with those scheduled to attend (children/parents) the site in the next 24 hours i.e. children scheduled to attend, that the centre may be closed in the event that further significant rainfall is forecast that would inundate the access routes and the site.
- Service providers and scheduled deliveries for the next 24 hours are to be advised that the centre may be closed due to flooding and should make alternative arrangements.
- If a flood watch has been issued for the Logan Albert River or Scrubby Creek catchments, all staff are to ensure easily relocatable equipment and records (e.g. portable files, medical records, electronic devices) are secured or moved to higher ground, where safe to do so; and, outdoor play equipment, loose items and any chemicals or cleaning products are to be secured or relocated away from potential floodwater.
- The Centre Manager or nominated wardens will continue to monitor, at least every three hours, all available flood warnings, rainfall forecasts issued by the Bureau of Meteorology (BoM) and LCC (as outlined in this FEMP);
- The Centre Manager or nominated delegate will notify the Managers and staff when the forecast warning is cancelled; and
- All notifications to staff and families are to be via a combination of SMS, email, centre app, PA system and/or face-to-face communication, as appropriate.

### 5.3 Procedures During a Flood

**Triggers for Action: When either the Bureau of Meteorology issues a Moderate (or higher) Flood Warning for the Logan-Albert River or Scrubby Creek catchment; or, where visible inundation has occurred within the local drainage system near the centre; or, when Council or Emergency Services direct the centre to evacuate.**

- The Centre Manager or nominated delegate will notify Managers and employees that the site is to be evacuated immediately and that all parents/guardians are to pick up their children immediately, if safe to do so. Notification is to be provided as necessary via the PA system, SMS and/or face to face where required;
- Room Leaders/Flood Wardens will:
  - o calmly and promptly assemble children in their rooms;
  - o collect class rolls, medication boxes (e.g. EpiPens, Ventolin), first-aid kits and any essential items specified in the emergency kit;
  - o ensure child/staff ratios are maintained during evacuation;.
- Regular monitoring of creek and river levels from the nominated warning stations is to continue until flood warnings are cancelled.
- Where safe road access is available, children are to be collected by parents/carers as the preferred evacuation option. Parents/guardian are to be notified that the site is relatively low flood risk, and that the site can be accessed safely at the parent/guardians best approach to avoid flooded roads (given overland flooding may be present in some locations to the site).
- If directed by the Centre Manager in consultation with Emergency Services, and where parents cannot safely reach the centre, children and staff may be required to shelter in place as a group (with however many personnel are onsite) until peak flood levels recede. Alternatively, if staff are able to determine alternative and safe arrangements for remaining children onsite, in conjunction with emergency services, may be able to utilise nominated evacuation routes to the desired destination:
  - primary safe egress via Moffat Road and Browns Plains Road;
  - avoiding sections of Chambers Flat Road identified as non-trafficable in flood events.
- The Centre Manager (or Chief Warden) shall carry out a final sweep of the building, outdoor areas and car park to ensure all children, staff and visitors have evacuated before themselves leaving the site.

- Staff stationed off-site are to be advised not to attempt to travel to the centre once a Major River or Creek Flood Warning has been issued and flooding has commenced on surrounding roads.

**If early evacuation has not occurred:**

- In the unlikely event that early evacuation has not removed all children and staff from the centre, and floodwaters (from a rare Logan River or Scrubby Creek flood event) encroach upon or surround the site, the remaining staff must:
  - o immediately contact QLD SES on 132 500 (or 000 in a life-threatening emergency);
  - o prepare for shelter-in-place (as an extreme scenario);
  - o follow all instructions issued by Emergency Services and declared disaster officers under the Disaster Management Act 2003, which override this FEMP.
- Remaining children and staff are to be moved to the safest, highest practicable area within the building and kept together under close supervision until rescued (if emergency services deem required), or given an all-clear.

**QLD SES Number: 132 500**

#### 5.4 Procedures After a Flood

**Trigger for Action: When Floodwaters along the Evacuation Route have receded, and Emergency Services have given the all clear to access or leave the site**

- The Centre Manager or nominated delegate shall notify all Managers and staff that the evacuation route (e.g. Moffat Road, Browns Plains Road and relevant sections of Chambers Flat Road) is open to traffic as notified by emergency services.
- The Centre Manager or nominated delegate shall notify all families that the centre is either reopening, or remaining closed pending the degree of remediation works required.
- Regular monitoring of creek and river levels from the noted warning stations (Logan River and Scrubby Creek Stations) as per Section 5 of this report is to be undertaken, until flood warnings have been cancelled.
- Before normal operations resume, the Centre Manager shall arrange for:
  - o a safety inspection of the site, building and outdoor play areas by suitably qualified staff and educators
  - o utilities (electricity, gas, water, wastewater) to be checked and reinstated by licensed professionals, as required.
- The Centre Manager must inspect the site and surrounding access roads for hazards such as:
  - o ponded or contaminated water
  - o erosion or undermining of pavements and play areas
  - o debris (logs, branches, rubbish)
  - o biological hazards (e.g. exposed sewage, deceased animals)
  - o chemical spills (e.g. fuels, oils, cleaning chemicals).
- Particular attention is to be given to:
  - o sandpits, soft-fall and grassed play areas for contamination
  - o outdoor play equipment for structural damage.
- Once the centre is declared safe, the Centre Manager or delegate shall notify all families and service providers that the service is resuming normal operations.
- Following return to normal operations, the Centre Manager shall:
  - o review the effectiveness of the FEMP and document any lessons learnt
  - o update procedures, maps and contact lists as required

- o assess onsite flood gauges or physical flood markers for damage and arrange repair or replacement if necessary.
- Records shall be kept confirming that the FEMP was implemented during the event, including:
  - o timeline of warnings and actions taken
  - o reasons for any non-conformance with procedures
  - o corrective actions proposed and implemented.
- All staff shall be advised of any approved amendments to the FEMP and these changes shall be incorporated into induction and future training.

## 6 Qualifications

Our analysis and overall approach has been specifically catered for the requirements of AELC Development 2 Pty Ltd and may not be applicable beyond this scope. This report should not be read in isolation and for this reason, any other third parties are not authorised to utilise this Report without further input and advice from StormFlood Engineering.

StormFlood Engineering has relied on the information as outlined in Section 2 & 3 of this Report, and therefore any information provided within this Report is limited to the data provided.

While StormFlood Engineering's Report assesses peak flows from design storms in accordance with best-practice and current industry standards and guidelines, future observed flows may vary from that predicted. For these reasons appropriate freeboards should be adopted.

### 6.1 Limitation to Assessment

This assessment is limited to the information provided by the client, publicly available data and external consultants. It has been deemed that all of provided or obtained information is accurate and complete, and that all assumptions stated within this report are correct.

The outcomes of this report are subject to change upon any design changes within the site, and therefore this report may only be used by our client for the purpose of obtaining a development approval and may not be used without prior written consent by StormFlood.

### 6.2 Document Control

This Plan shall be owned, maintained, and updated by AELC Development 2 Pty Ltd and any future owner of the subject site.

All users should be reminded periodically to provide details of any changes that may materially affect the plan in any way. Details of changes should be recorded, and the documentation updated. This should be completed either through a re-issue of the plan or via an amendments record.

The plan should be reviewed at least every year, or more regularly if required, for example, as a result of lessons identified after an activation event or exercise, following major changes of staff and educators or policy, or following any change to the flood risk or warning process.

Documentation control procedures should be in place to ensure that only the current version of the plan is in circulation.

# Appendices

Appendix A Proposed Site Plan

Appendix B Flood Emergency Evacuation Route Plan

# Appendix A

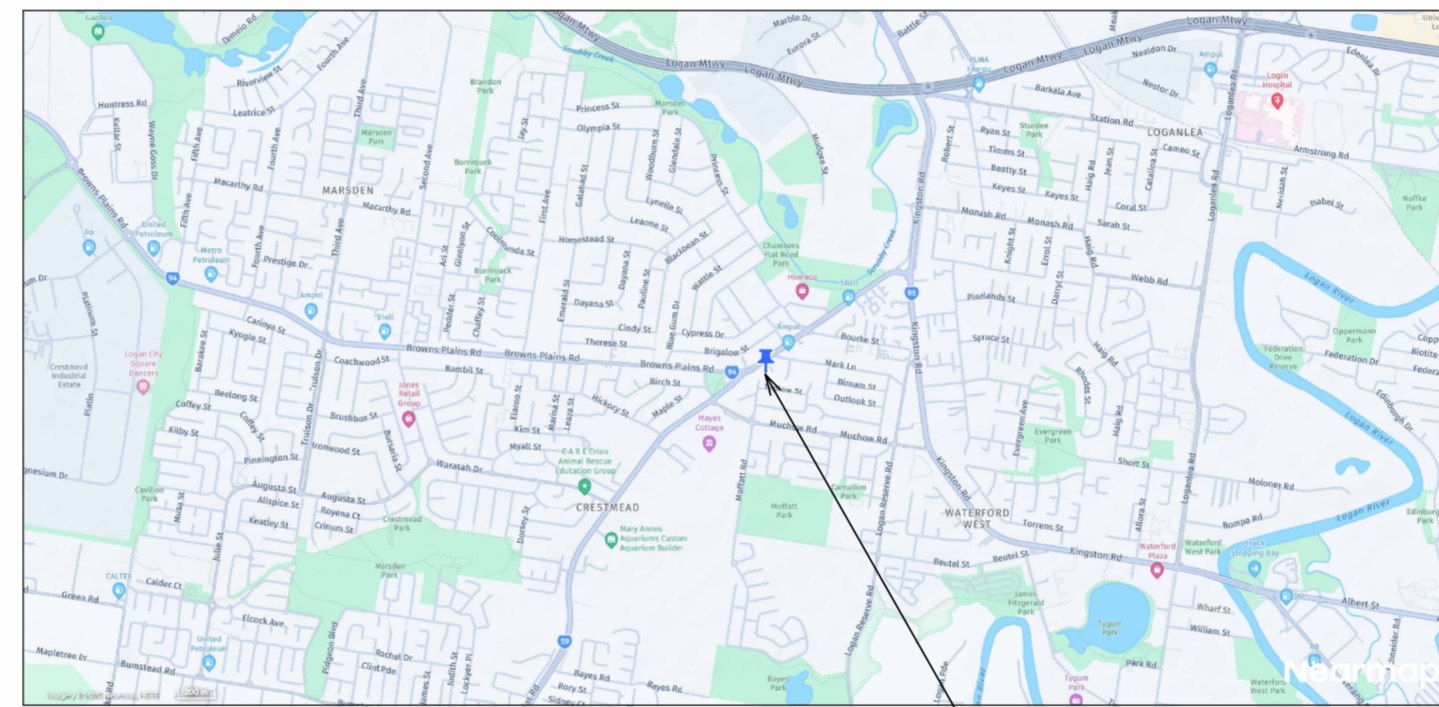
Proposed Site Plan (provided by others)

# proposed childcare centre, 92 chambers flat road, waterford west, queensland



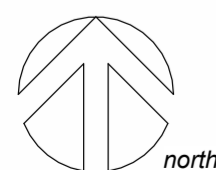
site data / analysis

|  |   |
|--|---|
| <p><b>proposal</b><br/>- 121 place childcare centre</p> <p><b>r.p.d.</b><br/>lot 3, 92 chambers flat road, waterford west</p> <p><b>local authority</b> Logan City Council</p> <p><b>site area</b> 4132 sqm<br/><b>site cover</b> 1370.5 sqm (33.1 %)<br/><b>gross floor area</b> - 1052.1 sqm</p> <p><b>building area</b><br/>floor area - 1052.1 sqm<br/>veranda area - 234.9 sqm<br/>safety zone area - 14.3 sqm<br/>playstores - 30.1 sqm<br/>refuse - 10.0 sqm<br/>service court - 29.1 sqm</p> <p><b>impervious area</b><br/>total impervious area - 2632.7 sqm (63.7 %)</p> <p><b>landscaped open space</b><br/>landscaped open space area - 1476 sqm (35.7%)</p> <p><b>childcare centre</b><br/>no. of children - 121<br/>no. of activity rooms - 7</p> <p><b>staff</b><br/>- 18 contact</p> <p><b>playscape</b><br/>required - 847.0 sq.m.<br/>provided - 1324.6 sq.m.</p> <p><b>development statement</b><br/>built environment<br/>the development will comply with the requirements of the Logan City Council, the NCC 2022 Vol 1 and the National Quality Framework and standards.</p> <p>car parking<br/>all car parking and access shall accord with AS2890.1</p> | <p><b>car parking</b><br/>car bays provided - 32 bays inc. disabled bay<br/>refer to traffic report</p> <p><b>operating hours</b><br/>monday - friday 6:30am - 6:30pm tbc</p> <p><b>index to sheets</b></p> <ol style="list-style-type: none"> <li>01. face sheet/ site data</li> <li>02. existing site plan</li> <li>03. site context plan</li> <li>04. overall site plan</li> <li>05. part site plan</li> <li>06. site snapshot plan</li> <li>07. 3D views</li> <li>08. floor plan</li> <li>09. elevations</li> <li>10. site sections</li> <li>11. roof plan</li> <li>12. fence details</li> <li>13. refuse &amp; playstore details</li> <li>14. impervious &amp; open space plan</li> <li>15. shadow diagrams</li> </ol> <p><b>area calculations</b><br/>all area calculations are based on design and are subject to final design development. final figures shall accord with minimums or maximums allowed by council and shall not vary by more than 5% of that stated</p> <p>garbage collection<br/>garbage is to be collected on site, bins to be stored in screened service area</p> |
|--|---|



locality plan

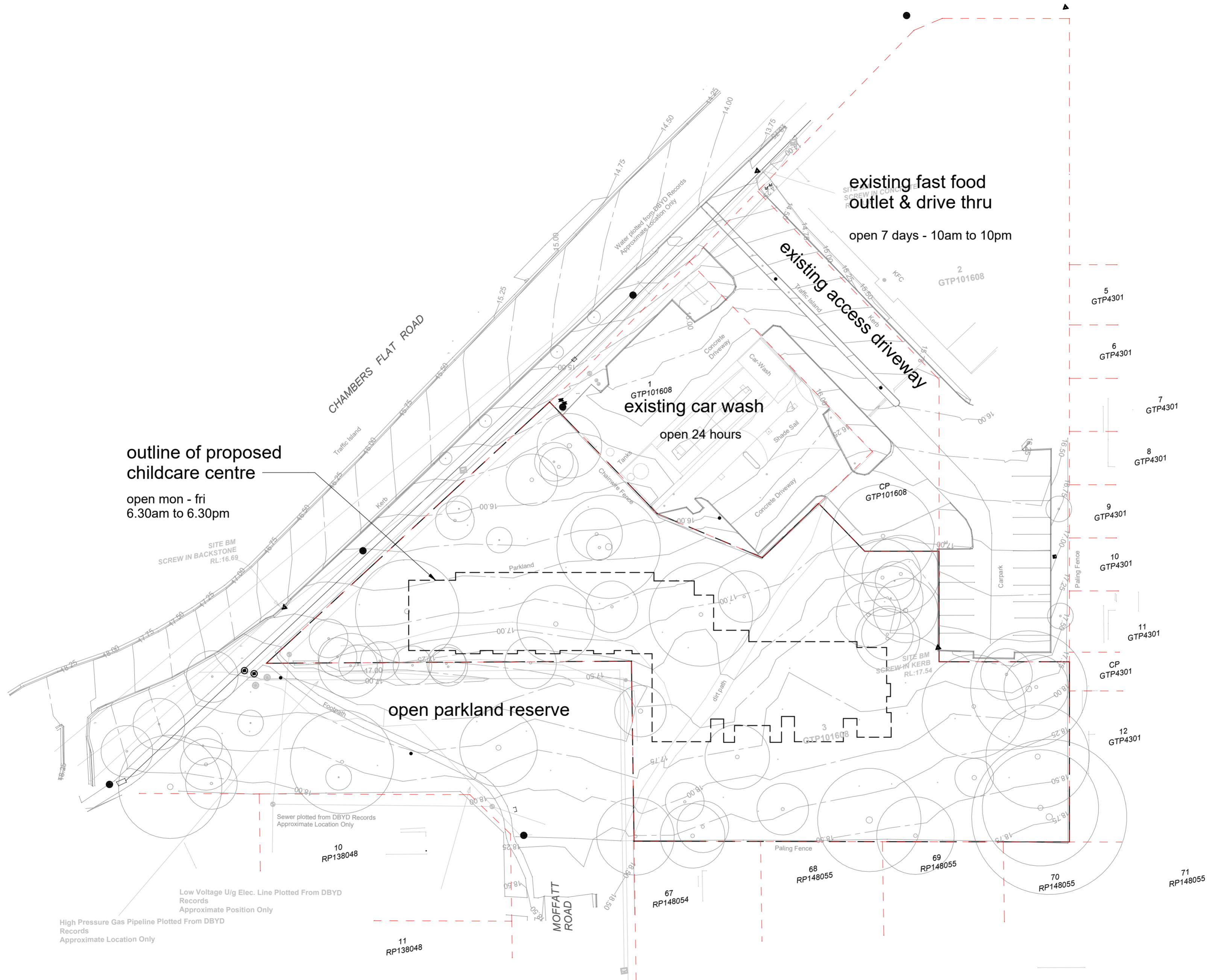
site location



face sheet/ site data



note: this proposal is subject to site survey and development approval(s) from the relevant authority.  
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these drawings are for sketch/DA only and not to be used for construction



outline of proposed  
childcare centre  
open mon - fri  
6.30am to 6.30pm

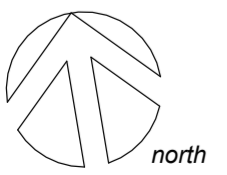
existing fast food  
outlet & drive thru  
open 7 days - 10am to 10pm

existing car wash  
open 24 hours

open parkland reserve

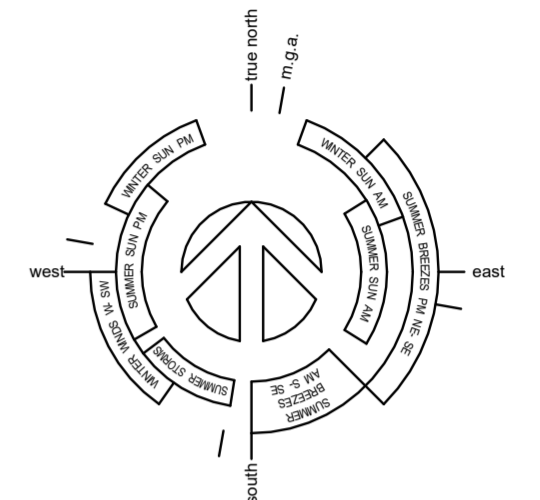
existing site plan

proposed early learning college, lot 3, 92 chambers flat road, waterford west



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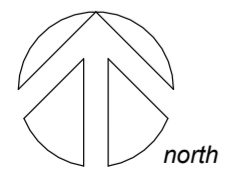
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solar aspect

site context legend

- A** proposed childcare centre
- B** existing dwellings
- C** oasis carwash
- D** KFC fast food restaurant & drive-thru
- E** service station
- F** existing multi-residential townhouses
- G** existing childcare centre
- H** bus stop location
- indicates locations outdoor living areas
- indicates areas of landscaped open space & dense landscaped setback buffers to boundaries

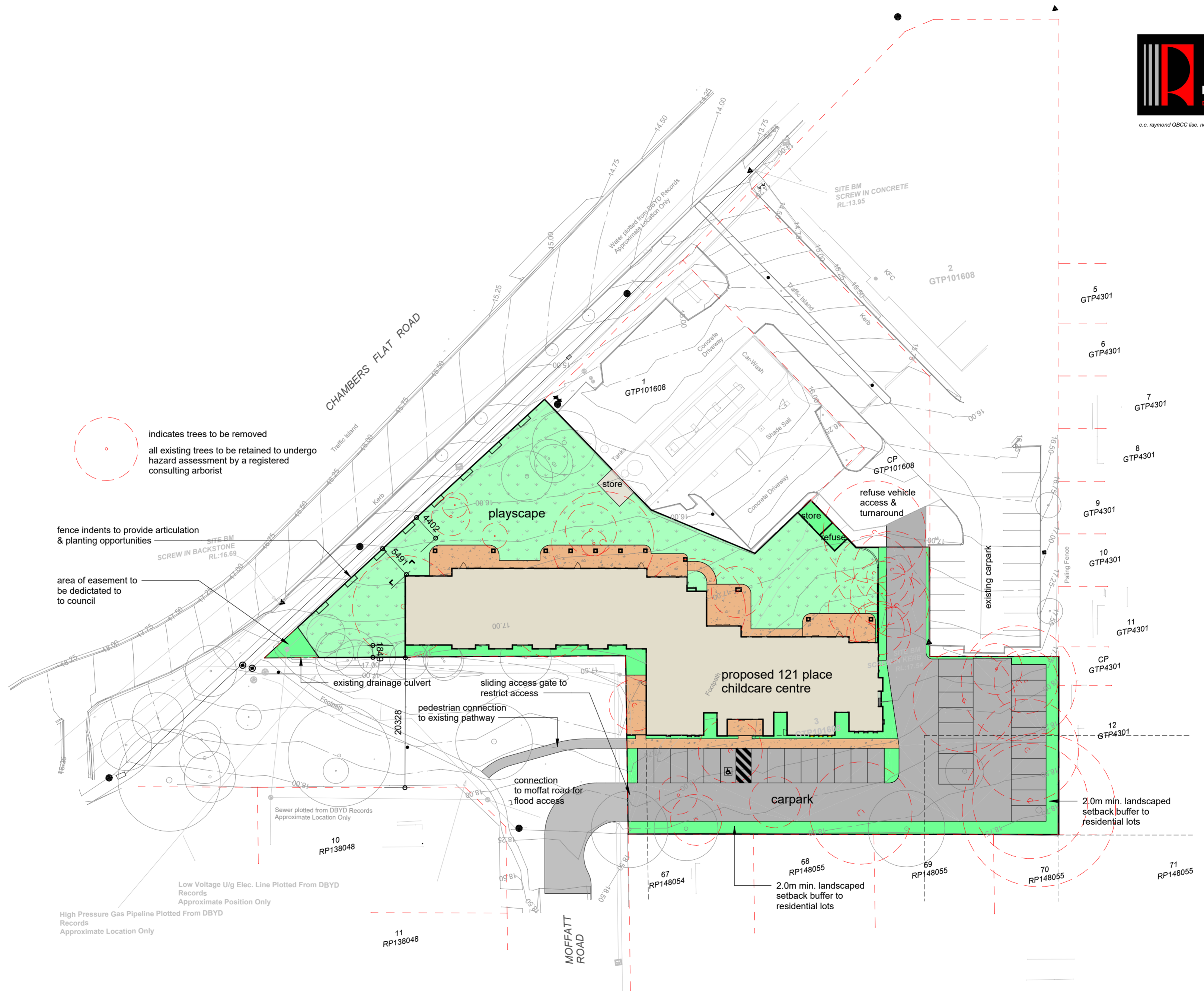


site context plan

0 m  
not to scale

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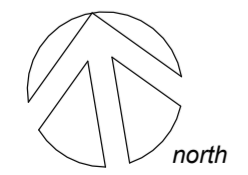
proposed early learning college, lot 3, 92 chambers flat road, waterford west



indicates trees to be removed  
 all existing trees to be retained to undergo hazard assessment by a registered consulting arborist

fence indents to provide articulation & planting opportunities  
 area of easement to be dedicated to council

Low Voltage U/g Elec. Line Plotted From DBYD Records Approximate Position Only  
 High Pressure Gas Pipeline Plotted From DBYD Records Approximate Location Only

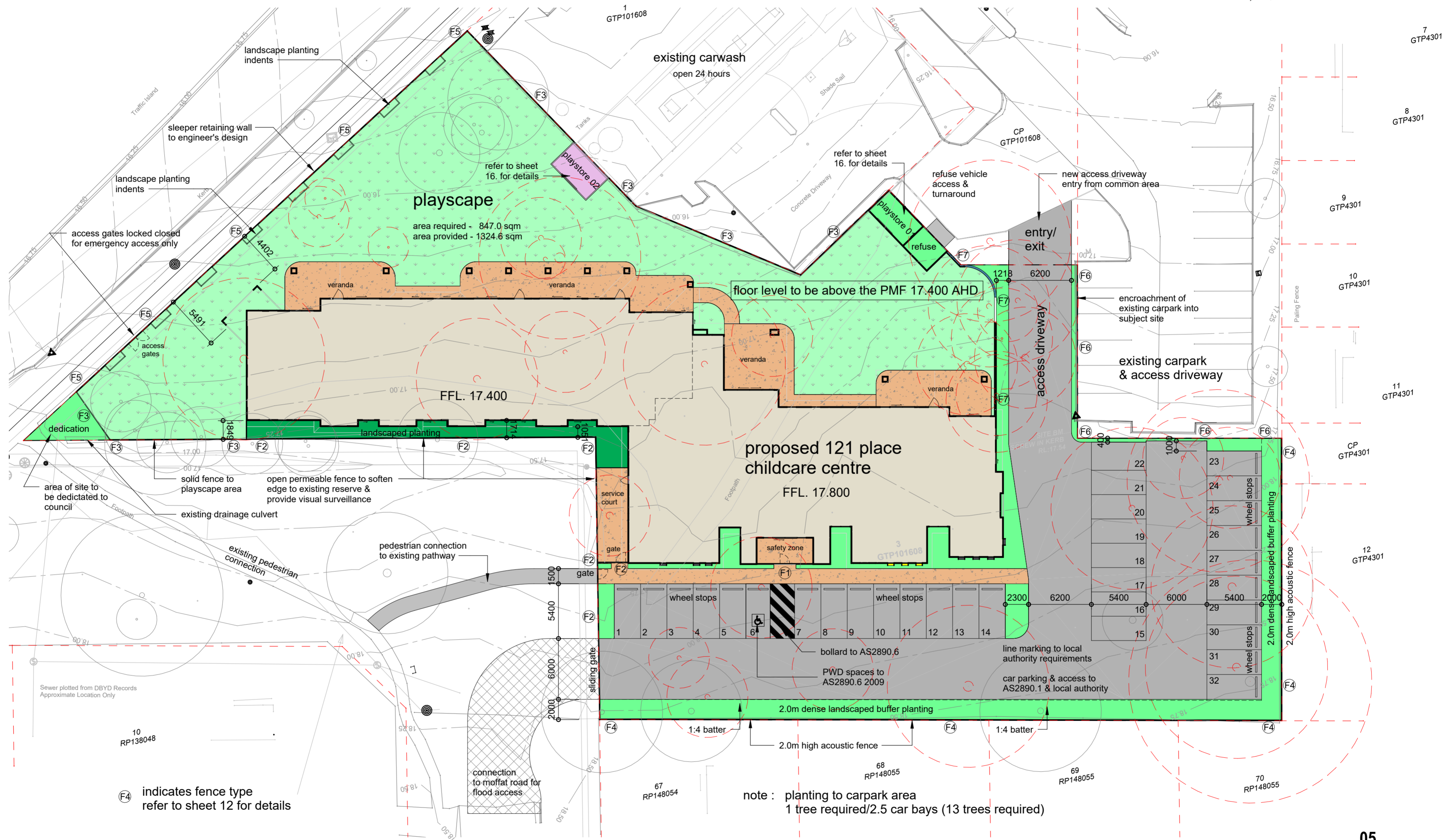


overall site plan

0 12.5m 1:250 (A2)

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proposed early learning college, lot 3, 92 chambers flat road, waterford west



F4 indicates fence type refer to sheet 12 for details

note : planting to carpark area  
1 tree required/2.5 car bays (13 trees required)



part site plan

0 1:250 (A2) 12.5m

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proposed early learning college, lot 3, 92 chambers flat road, waterford west



view 1



view 2



view 3



view 4



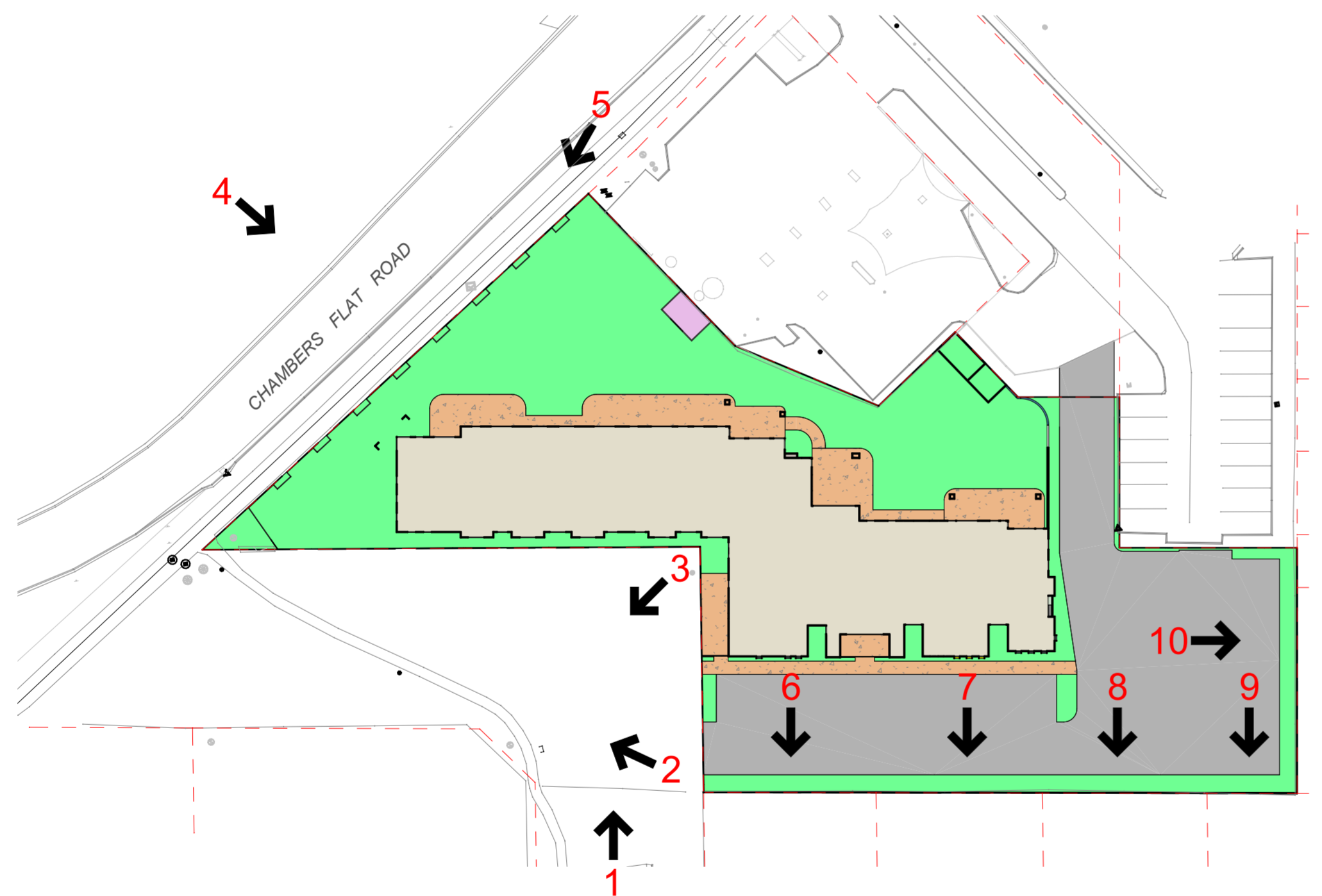
view 8



view 5



view 9



site snapshot key plan



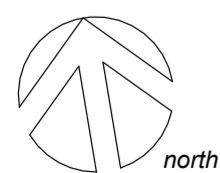
view 6



view 10



view 7



site snapshot plan

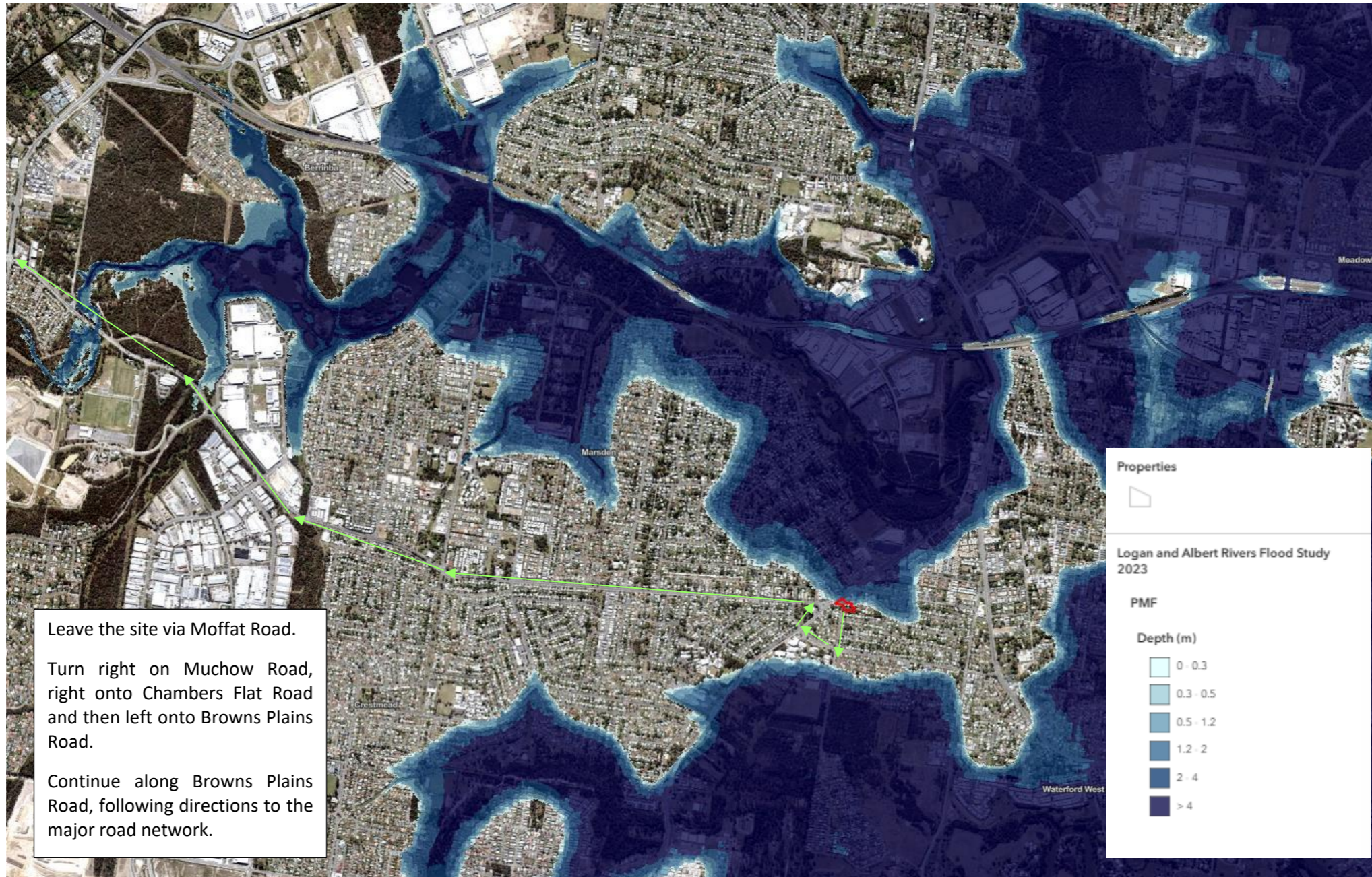
0 1:500 (A2) 25m

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proposed early learning college, lot 3, 92 chambers flat road, waterford west

# Appendix B

## Flood Emergency Evacuation Route Plan



Appendix B – Flood Evacuation Plan

