PENRITH
CITY COUNCIL

MAJOR ASSESSMENT REPORT

Application number:	DA19/0886
Proposed development:	Construction of Single Storey Child Care Centre for 96 Children, At-Grade Parking for 30 Vehicles, Remediation Works & On-Site Sewage Management System
Property address:	110 - 112 Mt Vernon Road, MOUNT VERNON NSW 2178
Property description:	Lot 4 DP 865818
Date received:	18 December 2019
Assessing officer	Lauren Van Etten
Zoning:	SEPP WSA - Affected by Obstacle Limitation SEPP WSA - Affected by Wildlife Buffer Zone E4 Environmental Living - LEP 2010
Class of building:	Class 9b
Recommendations:	Approve

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Executive Summary

Council is in receipt of a development application for the construction of a child care centre at 110 - 112 Mt Vernon Road, Mount Vernon. The subject site is zoned E4 Environmental Living under the provisions of Penrith Local Environmental Plan 2010. The proposal is a permissible land use in the E4 zone with consent.

Key issues of concern initially identified for the proposed development included:

- Incompatibility with the established rural area due to setbacks and solid acoustic fences;
- Inadequate landscaped setbacks and inappropriate species given the on-site sewage management (OSSM) area restrictions on planting;
- Non-compliance with Council's OSSM and Greywater Reuse Policy;
- Inadequate information regarding acoustic impacts;
- Insufficient detail regarding the management of stormwater quality and quantity;
- Safety concerns with the revised storwmater plan within the outdoor play area;
- Insufficient detail regarding biodiversity categorisation;
- Insufficient traffic modelling relative to road capacity limits; and
- Strong public opposition to the proposed development with matters raised including amenity impacts, flooding impacts, on-site sewage management detail, noise, construction and traffic impacts and incompatibility with the surrounding locality.

Between March and November 2020, four requests for information were sent, meetings were held and amended plans were considered. The proposal was amended to satisfactorily address the preceding concerns, specifically including the following measures:

- The building front setback increased from 25m to 35m;
- The landscaped front setback increased from 5m to 15m to soften and screen the proposal as viewed from Mt Vernon Road;
- The car park reduced from 32 spaces to 30 spaces to widen side landscape setbacks;
- The side setback and acoustic fence setback increased from 3m to 5m alongside the building and towards the rear;
- The side setback increased from 1m to 3m forward of the building line along the eastern boundary;
- The acoustic fence height reduced from 2.4m to 1.8m forward of the building line with a 3m landscaped side setback;
- Amended acoustic, traffic and contamination reports were submitted;
- An alternative stormwater solution was provided, replacing the absorption pit with a level spreader;
- Updated architectural plans and storwmater plans were submitted reflecting all changes and including a gazebo plan with the OSD underneath;
- A Biodiversity Development Assessment Report was provided;
- An alternative OSSM system was proposed and associated report provided; and
- An amended landscape plan responded to the alternative OSSM system design.

The application was notified and advertised in accordance with Penrith Development Control Plan 2014, publicly exhibited from 17/01/20 to 26/02/20 and re-exhibited from 25/05/20 to 08/06/20. Council received 24 submissions in response, 10 of which were unique.

As the development application is the subject of 10 unique submissions by way of objection, the development application is to be determined by the Penrith Local Planning Panel as per the Local Planning Panels Direction issued by the Minister for Planning under Section 9.1 of the Environmental Planning and Assessment Act 1979.

An assessment under Section 4.15 of the Environmental Planning and Assessment Act 1979 has been undertaken and the application is recommended for approval, subject to recommended conditions.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Site & Surrounds

The subject site is situated on the northern side of Mt Vernon Road in Mount Vernon and is surrounded by E4 Environmental Living zoned properties occupied by detached dwellings. The M4 Motorway is approximately 3km to the east and Elizabeth Drive and Mamre Road are approximately 2km to the south. Approximately 500m to the north-west lies the Western Sydney Employment Area zoned industrial under the SEPP (WSEA) and 600m south-west lies part of the Wianamatta South Creek Catchment that is zoned Environment and Recreation under the Aerotropolis SEPP.

The site is rectangular in shape with a 61.7m frontage and a depth up to 164m. The site is 1.03ha in area, is orientated in a north/south direction and has a cross site slope of up to 2m to the western boundary. There is an access easement adjoining the western boundary of the site which allows access to the lots behind the site.

The surrounding area is predominantly characterised by rural-residential development having residential buildings mostly built on 1 hectare allotments. The existing streetscape is generally defined by pockets of native vegetation, sporadic manicured gardens, 15m+ building setbacks and a combination of older and modern style single and two storey dwelling houses. There are no pedestrian pathways, nor kerb and gutters.

The subject site was previously occupied by a dwelling house, associated structures and several trees (at least 20). Council recently approved a development application (DA17/1331) for a dwelling house, attached secondary dwelling and swimming pool however this consent has been surrendered. From aerial images and Council's records, it appears that vegetation was cleared in accordance with this consent prior to its surrender and further unauthorised clearing was thereafter undertaken in October 2018. Council also approved DA18/0459 for demolition which has been undertaken. The site is now occupied by grassland.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Proposal

The proposed development involves:

- Construction of a single storey child care centre (798m^2), verandah (207.8m^2) and gazebo (128m^2).
- Hours of operation from 7:00am to 6:00pm, Monday to Friday.
- Provision for 96 children with the occupancy rate of each age group as follows:
  - 0-2 years: 16 children;
  - 2-3 years: 20 children; and
  - 3-6 years: 60 children.
- Construction of an at grade car park to accommodate 30 car spaces (including 2 accessible spaces).
- The car park is to be accessed from Mt Vernon Road via a one-way entry and one-way exit driveway (5.4m and 6.4m respectively).
- The width of the driveways is to accommodate splays that enable medium rigid vehicle waste and emergency vehicle movements.
- Provision of a bus space and waste collection space within the car park.
- The centre will provide a minibus which has a capacity for 22 children (plus 1 driver and 1 adult supervisor) and undertake 1 trip in the AM and PM peak periods.
- Remediation works to remove isolated areas of asbestos contamination within the subject site.
- Minor earthworks with the construction of an on-site sewage management system that is to be located within the front setback.
- Fascia signage (3m x 0.5m in height) along the southern facade.
- Associated landscaping to enhance on-site amenity, mitigate stormwater runoff and integrate with the rural landscaped setting.
- An acoustic fence varying in height from 1.8m forward of the building line to 2.4m behind the building line along the side and rear of the outdoor play areas.
- The acoustic fence is to be made of 16mm thick plywood mounted on 9mm thick fibre cement sheet or similar with all gaps sealed.
- Regarding the staff, it is noted that 14 staff are required as per the *Education and Care Services National Regulations,* Part 4.4, Clause 123.
- The additional 5 staff proposed include 1 director/nominated supervisor, 1 administration staffer, 2 educator floaters to cover staff meal breaks and 1 cook.

Education and Care Services National Regulations

It is noted that the proposed 14 staff is based on the requirements of the Regulations, more specifically as detailed in Part 4.4, Clause 123:

(a) for children from birth to 24 months of age—1 educator to 4 children; (therefore 4 staff are required for the 16 children proposed);

(b) for children over 24 months and less than 36 months of age—1 educator to 5 children; (therefore 4 staff are required for 20 children proposed);

(c) for children aged 36 months of age or over (not including children over preschool age)—1 educator to 11 children; (6 staff are required for the 60 children proposed); and

(d) for children over preschool age, 1 educator to 15 children.

Background

A pre-lodgement meeting was held on 27 November 2018. Key issues discussed related to site coverage, acoustics, wastewater management, stormwater drainage and traffic impacts.

It is also noted that an application was previously lodged for a child care centre and then withdrawn (DA19/0343) given issues with rural character compatibility (stemming from 2.4m high boundary fences, an inconsistent front setback and excessive site coverage) along with inadequate information being provided regarding wastewater management, contamination, water sensitive urban design, waste management, parking, access and circulation and public health matters.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Plans that apply

- Local Environmental Plan 2010 (Amendment 4)
- Development Control Plan 2014
- State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017
- State Environmental Planning Policy (Western Sydney Aerotropolis) 2020
- State Environmental Planning Policy No 55—Remediation of Land
- Sydney Regional Environmental Plan No.20 - Hawkesbury Nepean River

Planning Assessment

- ### Section 1.7 - Application of Part 7 of Biodiversity Conservation Act 2016

In accordance with Clause 1.7, this Act has effect subject to the provisions of Part 7 of the Biodiversity Conservation Act 2016 which contains additional requirements with respect to assessments, consents and approvals under this Act.

In accordance with Section 7.2 of the Biodiversity Conservation Act 2016 (BC Act), an activity is likely to significantly affect threatened species if it is carried out in an area of outstanding biodiversity value. The subject site is within an area of outstanding biodiversity value and subsequently the proposal required a biodiversity development assessment report (BDAR) as per Section 7.7 of the BC Act. Council requested this report throughout the assessment process given the nature of the groundcover had not been identified within the supporting documentation, nor had this Act been addressed. Under the Local Land Services Act, Section 60B, which the BC Act references, native vegetation includes groundcover. It is also noted the site was cleared of trees within 2018 without consent.

The BDAR, prepared by Anderson Environment and Planning and dated 26 October 2020, indicates the plant community types within the subject site are indicative (albeit in a degraded state) of PCT849 Cumberland Shale Plains Woodland and PCT850 Cumberland Shale Hills Woodland, the latter associated more closely with the rear of the property untouched by this proposal.

Given the low vegetation integrity score outlined in the BDAR, no credits have been generated. However, the report's assessment of direct impact on the remaining native vegetation, and indirect/prescribed impacts on biodiversity values defined under the Biodiversity Conservation Act 2016 and Regulation 2018, does not fully consider the impacts of the proposed development, particularly relative to the Cumberland Plain Recovery Plan and biodiversity values for connectivity and species movement.

While it is acknowledged that landscape plans will in part cater for species that are tolerant of this development, the required fencing will further contribute limitations to the species that will be able to make use of these resources/move through the site. The suggestion that the development will not increase vehicle strike risk cannot be supported. While no threatened fauna species were identified making use of the resources during the field survey, the BDAR indicates a variety of threatened species that have been identified within range of the site.

Therefore, the clearing of the degraded native vegetation is satisfactory on the condition that mitigation efforts be applied to the unused portion of the site (at the rear of the property), with respect to the full range of current biodiversity values afforded by the site and its potential in relation to the relevant Recovery Plan.

A vegetation management plan to achieve ecological restoration at the rear of the property has therefore been recommended as a consent condition. This is in addition to fauna management requirements.

- ### Section 4.15 - Evaluation

The proposed development has been assessed in accordance with the matters for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979, and having regard to those matters, the following issues have been identified for further consideration.

- ### Section 7.12 - Developer Contributions

The site and proposal are subject to Penrith City Council's City-Wide Section 7.12 Development

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Contributions Plan for Non-Residential Development. Based on the applicable rate under this Development Contributions Plan, the following development contribution applies to the proposal:

1% x $3,346,084.70 (cost of construction works) = $33,461.00

A condition of consent requiring the payment of this development contribution, prior to the issue of a Construction Certificate, has been recommended.

Section 4.15(1)(a)(i) The provisions of any environmental planning instrument

State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017

An assessment against the relevant criteria under State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 has been undertaken and a detailed discussion is provided below.

- **Clause 22 Centre-based child care facility—concurrence of Regulatory Authority required for certain development**
  The proposal complies with regulation 107 (indoor unencumbered space requirements) of the Education and Care Services National Regulations. The proposal also complies with the outdoor space requirements under regulation 108 (outdoor unencumbered space requirements). The proposal provides 344m^2 of indoor unencumbered space (309m^2 is required) and provides 1540m^2 of unencumbered outdoor space (665m^2 is required). Accordingly, in this instance, Clause 22 does not apply to the proposal and concurrence of the Regulatory Authority is not required.

- **Clause 23 Centre-based child care facility—matters for consideration by consent authorities**
  Clause 23 requires that before determining a development application for development for the purpose of a centre-based child care facility, the consent authority must take into consideration any applicable provisions of the Child Care Planning Guideline. An assessment was undertaken against the provisions of the Child Care Planning Guideline dated August 2017, and details are summarised below.

Child Care Planning Guideline (August 2017)		
Section	**Objectives**	**Proposal**

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3.1 Site Selection and Location	• *To ensure that appropriate zone considerations are assessed when selecting a site.* • *To ensure that the site selected for a proposed child care facility is suitable for the use.* • *To ensure that sites for child care facilities are appropriately located.* • *To ensure that sites for child care facilities do not incur risks from environmental, health or safety hazards.*	• The proposed use is a permitted land use in the E4 zone with consent. • The site is considered suitable for the development for the reasons outlined below. • The site is not identified as being affected by flooding, land slip, bushfire or other environmental hazards and is safe and healthy for children. • The site is not located along a major collector road. • The site is located in proximity to Kemps Creek School (4.9km), Bill Anderson Reserve (4km), Plough and Harrow Park (5.8km) and Cecil Hills neighbourhood shops (7km). Bus routes including the 813 route are serviced by a bus stop 300m from the subject site. • While there is no pedestrian connectivity to local community businesses, shops, services or the like given the rural nature of the area, the centre will provide a minibus as part of the proposal. • While the area is rural-residential area, it is noted it is nearby several precincts that have been rezoned via the SEPP Aerotropolis, which will incorporate expansive parklands and blue corridors that the child care centre will be in proximity to in the future. • The site, which has an area of 1.033 hectares is of a sufficient size and width to accommodate the proposed centre-based child care facility. • The application has demonstrated that the site is suitable in respect to environmental impacts, specifically acoustic, privacy and traffic impacts, and does not incur risks from environmental hazards (i.e. contamination will be subject to remediation).
3.2 Local Character, Streetscape and the Public Domain Interface	• T*o ensure that the child care facility is compatible with the local character and surrounding streetscape.* • *To ensure clear delineation between the child care facility and public spaces.* • *To ensure front fences and retaining walls respond to and complement the context and character of the area and do not dominate the public domain.*	• The surrounding area is characterised by rural-residential development and dwellings surrounded by and integrated into a landscape setting, with open style fencing, generous setbacks and limited built forms and hardstand areas. • The proposal provides an appropriate design response within the E4 Environmental Living zone, and contributes to the local area by being designed in character with the locality and existing streetscape. • A combination of materials, finishes and architectural features are proposed that reflect the residential dwellings in the area - i.e. the use of non-reflective materials, earthy tones, timber cladding, timber deck and a stone feature wall as an entry focal point. • While a 798m^2 footprint, excluding the verandah and gazebo, is larger than the neighbouring dwellings, further afield there are dwellings of comparable sizes and there are dwellings that are two storeys. The proposed footprint occupies less than 10% of the site area as a whole. • The proposal provides a 35m front setback, substantially behind the buildings on adjacent properties which are setback 18m and 19m respectively. • The proposed rear setback of 65m is consistent with the surrounding development. It is noted that the acoustic fence along the northern side of the play area is not screened as viewed from properties to the northern rear. A recommended condition will require

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

			landscape screening along the northern side of the acoustic fence to ensure its scale is integrated into the landscaped setting, as the fences are along the eastern and western sides of the play area. • The proposed 15m x 38m landscaped area within the front setback results in appropriate opportunities for landscaping. • Clear delineation between the child care facility and the street is provided through the landscaped verge, along with a clear access path from the parking area to the legible entry. • While the parking area is forward of the proposed building, this location remains predominantly behind the established building line on adjoining properties and is substantially landscaped, to integrate the car park with the surrounding area. • While there are 2 driveways proposed, they facilitate one way movement with one for ingress and one for egress. Given the efficiencies of this dual driveway arrangement and the 43m distance between them, the impact of these driveways on the streetscape character is negligible. • No front boundary fence is proposed, consistent with the open style fencing typical in rural areas, while allowing for surveillance of the street. The existing rural fence along the side boundaries will be retained in keeping with the character of the area. • An acoustic fence which is solid is also proposed within the site. The design was amended, as Council requested, to increase the front and side setback in order to provide greater landscaped areas to integrate the development into the landscape context and soften the necessary solid acoustic walls.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3.3 Building Orientation, Envelope and Design	• *To respond to the streetscape, while optimising solar access and opportunities for shade.* • *To ensure that the scale is compatible with adjoining development and the impact on adjoining buildings is minimised.* • *To ensure that setbacks from the boundary are consistent with the predominant development within the immediate context.* • *To ensure that the built form, articulation and scale of development relates to its context and buildings are well designed to contribute to an area's character.* • *To ensure that child care facilities are designed to be accessible by all potential users;* • *To ensure that buildings are designed to create safe environments for all users.*	• The built form responds to the predominant built form, height and landscaped setbacks in the area to respond to the streetscape quality. • The proposal responds to the site with minimal cut and fill and sensitive design to minimise overshadowing to the neighbouring residential properties. The facility is flush with natural ground level along the southern and eastern sides, as viewed from the streetscape to provide access from the parking area. • Within a portion of the rear of the centre and associated gazebo, the level difference reaches 1.5m although there is no fill proposed but rather a pier and beam construction. Given the built form is one storey, setback from the western boundary by 7m-10m, buffered by proposed landscaping and adjoins a right of way, the visual impacts of this form as viewed from the closest (western) neighbouring property are considered negligible. • The proposed landscaped setbacks within the front portion of the lot provide appropriate separation to the streetscape. • The proposed tree species are likely to result in shade opportunities and 45% of the required rear outdoor play area is covered (33m^2). • The facility is oriented to the north, including the external play area, to maximise solar access and orient the development away from the residential neighbours and towards the extensive rear setback. In addition, the varying ceiling height also improves natural light relative to the depth of the play rooms. • Play areas are located 5m away from common boundaries, buffered by fencing and landscaping. • The side setbacks provide adequate access for building maintenance. These setbacks were widened as requested by Council to 3m-5m to allow room for planting and access for maintenance. • Entry is limited to one secure point which is directly accessible from the parking area and visible from the street frontage. • Subject to the recommendations within the submitted Access Report, the design will be accessible by all potential users. It is noted that a condition of consent is recommended to ensure that the Access Report is updated to reflect the amended plans.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3.4 Landscaping	• To *provide landscape design that contributes to streetscape and amenity.*	• The proposal provides a 15m setback of landscaping along the front boundary. • Four canopy trees are included within the front setback that will reach a mature height of 10m-20m to soften the built form and contribute to the streetscape and 10 acacia implexa trees are also proposed therein, which will reach 3m-8m in height. • Shrubs that are unlikely to grow have been removed, as have inappropriate species within the effluent management area. • It is noted that no species have been proposed which are detrimental to children with allergies. • Water tolerant species are proposed across the site. • In considering the existing streetscape and future desired character, this landscaping is sufficient to screen the proposal and improve the amenity of the site via high quality landscaping that incorporates local vegetation.
3.5 Visual and Acoustic Privacy	• *To protect the privacy and security of children attending the facility.* • *To minimise impacts on privacy of adjoining properties.* • *To minimise the impact of child care facilities on the acoustic privacy of neighbouring residential developments.*	• The proposed development has been designed to minimise direct overlooking of indoor rooms and outdoor play spaces from public areas via appropriate site and building layout and the use of fencing and landscape works as a buffer to side boundaries. • The increased front setback also ensures both the indoor and outdoor play areas are not directly opposite the nieghbouring dwellings. The outdoor play area in particular is distanced further from neighbouring dwellings and their principal private open spaces in the amended layout. • The operational management mechanisms within the submitted Acoustic Report will further manage outdoor play times and the number of children accessing outdoor areas at any one time to minimise acoustic impact to neighbouring properties. • The development proposes acoustic fencing around the perimeter of the play area to minimise acoustic impacts to neighbouring properties as well as other operational management mechanisms as recommended in the Acoustic Report.
3.6 Noise and Air Pollution	• *To adopt design solutions to minimise the impacts of noise on the children.* • *To ensure that outside noise levels of the facility are minimised to acceptable levels.*	• The subject site is not located near major roads, rail lines or other noisy environments. • The future impacts of the airport were considered in the Acoustic Report. • Appropriate design measures have been undertaken including appropriate setbacks, use of landscaping and acoustic fencing to minimise acoustic impacts on neighbouring properties. • The site is not located close to any major roads or industrial areas and is therefore not exposed to major sources of air pollution. • Refer to the Appendix of this report to see further discussion regarding the Acoustic Report that was provided and the noise attenuation measures proposed. Council's Environmental Management Officer reviewed the amended Acoustic Report and found it satisfactory subject to recommended consent conditions.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3.7 Hours of Operation	• *Hours of operation within areas where the predominant land use is residential should be confined to the core hours of 7.00am to 7.00pm weekdays.*	• Proposed operating hours are considered appropriate as they are 7:00am to 6:00pm, Monday to Friday, as per the Acoustic Report.
3.8 Traffic, Parking and Pedestrian Circulation	• *To provide parking that satisfies the needs of users and demand generated by the centre.* • *To provide vehicle access from the street in a safe environment that does not disrupt traffic flows.* • *To provide a safe and connected environment for pedestrians both on and around the site.*	• Under Penrith Development Control Plan 2014, child care centres are required to provide 1 car space per 10 children, plus 1 car space per employee. • The development proposes to employ 19 individuals and provide for 96 children requiring 29 car spaces to be provided on site. The proposal complies with this requirement with 30 parking bays (19 staff and 11 visitor bays) being provided. • A separate pedestrian access path was proposed from the street to the main entry. However, Council's Development Engineer noted that vehicles may be encouraged to park on the verge area which is a safety hazard to motorists and pedestrians and is not supported in rural areas. To discourage cars parking on the verge area within the road reserve, the path that leads from the car park to the front boundary was removed at Council's request. It is noted this is still shown on the stormwater plans and it will be crossed out on the approved plans. • Refer to the Appendix of this report for further detail regarding the traffic reports that were submitted, reviewed and supported by Council's Traffic Engineer. In brief, no adverse traffic generation impacts are expected from the development and the local road network has adequate capacity to cater for the traffic volumes generated by the development.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

State Environmental Planning Policy (Western Sydney Aerotropolis) 2020

Clause 53 - Savings and transitional provisions

The Aerotropolis SEPP commenced on 1 October 2020, after the subject development application was lodged. The SEPP contains savings provisions which means that the SEPP does not strictly apply to the proposed development. More specifically, Clause 53(1) stats that a development application for development on land to which this Policy applies that was lodged and not finally determined before the commencement of this Policy is to be determined as if this Policy had not commenced.

Notwithstanding the above, consideration has been given to the relevant clauses and the proposed development, specifically in relation to the future Western Sydney Airport provisions.

Part 3 Development controls—Airport safeguards

Clause 19 - Aircraft noise

The objectives of this clause are to prevent certain noise sensitive development on land near the airport, to minimise the impact of aircraft noise for other noise sensitive development, and to ensure that land use and development near the airport does not hinder or have other adverse impacts on the ongoing, safe and efficient 24 hours a day operation of the airport.

In addition, sub-clause (2) states that development consent must not be granted to noise sensitive development if the development is to be located on land that is in an ANEF or ANEC contour of 20 or greater. Noise sensitive development, as defined within Clause 19, includes centre-based child care facilities.

While the development is to be located on land that is in an ANEC contour between 20 and 25, it is noted that an Acoustic Report was submitted with the application and it did address the acoustic impact of the future airport insofar as it was identified within 2017 Noise Modelling ANEC Tool supplied by the Department of Infrastructure, Regional Development and Cities. The 2017 ANEC map in Figure 6-2 shows that the project site location (110-112 Mt Vernon Road, Mount Vernon) has an ANEC of ≤20 with the 2030 preferred 05 runway option.

Council's Environmental Management Officer reviewed the proposal and raised no objections, subject to conditions, noting the proposal can comply with internal noise criteria that is required for the development, subject to the implementation of a range of construction and operational management controls, including the provision of acoustic barrier fencing.

Clause 21 - Wildlife hazards

The Aerotropolis SEPP contains a map that relates to wildlife buffer areas. This map is titled the "Wildlife Buffer Zone Map". The map shows that the subject site is within a 13 kilometre 'wildlife buffer zone' of the airport site.

The objective of Clause 21 is to regulate development on land surrounding the airport site where wildlife may present a risk to the operation of the airport. Certain types of development then trigger the requirements for further consideration under Clause 21. The proposed development is not one of the types of uses that warrant additional consideration under the SEPP with regard to wildlife and the operation of the airport.

Clause 24 - Airspace operations

The subject site is also identified as being located within the Obstacle Limitation Surface (OLS) Map area. Clause 24 of the SEPP relates to development that would penetrate the prescribed air space for the airport and be a 'controlled activity'. The proposed development does not penetrate the prescribed air space given the OLS height relative to ground level is 129m, nor is it a controlled activity, therefore not triggering any additional considerations under this clause.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

State Environmental Planning Policy No 55—Remediation of Land

SEPP 55 aims to provide a framework for the assessment, management and remediation of contaminated land throughout the state. Clause 7 of SEPP 55 prevents consent authorities from consenting to a development unless it has considered whether the land is contaminated and is satisfied that the land is suitable (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out.

Council's Environmental Management Officer reviewed the proposal and raised no objection, subject to recommended conditions, noting several key aspects, as outlined below.

Contamination investigation of the site has identified the limited presence of surficial fragments of bonded asbestos that is attributed to the previous demolition of structures. Accordingly, a Detailed Site Investigation (DSI) and Remedial Action Plan (RAP) supported the application. It is noted that the DSI has been reviewed by a SafeWork NSW approved Asbestos Assessor.

The DSI required additional soil sampling to be undertaken to delineate the area(s) of the site impacted by bonded asbestos and to characterise stockpiled material/stockpile footprints. The DSI referred to the RAP for details of the further sampling that is to be undertaken. The DSI concluded that 'it is considered that the site can be remediated and made suitable for the intended proposed residential development, pending … delineation sampling, visual inspection and subsequent remediation and validation works, if required'. The DSI highlighted that the sampling of asbestos undertaken to date was limited to identifying asbestos presence/absence only and further characterisation of the site is required.

The RAP was updated from the original version to extend the scope of works to include further delineation of asbestos contamination and sampling of stockpiles/stockpile footprints. The RAP has been technically reviewed by the SafeWork NSW approved Asbestos Assessor responsible for reviewing the DSI. The RAP proposes remediation by excavation of contaminated soil and material from the site for disposal off site. This remediation strategy is supported. The RAP provides a comprehensive and satisfactory remediation and validation strategy in compliance with applicable legislation, standards and guidelines. It also includes environmental management requirements that will be implemented during further site investigation, remediation and validation works.

It is noted that there are two typographical errors in the RAP. Firstly, the RAP references the original DSI/ESI dated 8 April 2019 rather than the latest version of the DSI dated 17 March 2020. Further, Table 9 of the RAP contains conflicting test pit reference numbers (relating to test pits 6, 7 and 8) in different columns. However, as these issues are related to typographical errors only, it is considered satisfactory that conditions of consent be imposed to ensure compliance with the updated DSI dated 17 March 2020 prepared by Envirotech.

Compliance with the RAP and recommendations of the DSI will facilitate satisfactory investigation, remediation and validation of the site. A number of conditions have been recommended addressing this aspect of the development and requiring that validation of the site be completed to Council's satisfaction prior to the commencement of any works on the site.

Having regard to the above, it is considered that the site is suitable for the proposed development in accordance with Clause 7 of SEPP 55.

Sydney Regional Environmental Plan No.20 - Hawkesbury Nepean River

An assessment has been undertaken of the proposal against relevant criteria within Sydney Regional Environmental Plan No. 20—Hawkesbury-Nepean River (No. 2—1997) and the proposal is compliant with relevant provisions subject to recommended conditions regarding sediment and erosion control measures.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Local Environmental Plan 2010 (Amendment 4)

Provision	Compliance
Clause 1.2 Aims of the plan	Complies - See discussion
Clause 2.3 Permissibility	Complies - See discussion
Clause 2.3 Zone objectives	Complies - See discussion
Clause 4.3 Height of buildings	N/A
Clause 4.4 Floor Space Ratio	N/A
Clause 7.1 Earthworks	Complies - See discussion
Clause 7.4 Sustainable development	Complies - See discussion
Clause 7.6 Salinity	Complies
Clause 7.7 Servicing	Complies

Clause 1.2 Aims of the plan

The site is encumbered by a Section 88B restriction under the *Conveyancing Act 1919* which requires that "all fences shall be of a rural open character". However, under Clause 1.9A (1), for the purpose of enabling development on land in any zone to be carried out in accordance with this Plan or with a consent granted under the Act, any agreement, covenant or other similar instrument that restricts the carrying out of that development does not apply to the extent necessary to serve that purpose. Given the fencing is setback from the side boundaries and screened by extensive landscaping, it is considered the intent of the restriction will still be achieved, however strict compliance is not considered necessary given the provisions of Clause 1.9A(1).

Clause 2.3 Permissibility

The subject site is zoned E4 Environmental Living under the provisions of Penrith Local Environmental Plan 2010. The proposal is defined as a centre-based child care facility which is a permissible land use in the E4 zone with consent.

Clause 2.3 Zone objectives

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

The proposal is considered consistent with the relevant objectives of the E4 zone, as outlined below.

- *To provide for low-impact residential development in areas with special ecological, scientific or aesthetic values.*
- *To ensure that residential development does not have an adverse effect on those values.*

As detailed in the Appendix to this report and as discussed in relation to the SEPP for child care centres, the proposal reflects the materials and form of surrounding dwellings. The proposal has been amended to integrate into the landscaped setting via greater front and side setbacks, greater landscaping opportunities and reduced fence heights. With a landscaped front setback of 15m to the car park and side setbacks of 3m-5m, the amended proposal will maintain the rural character and visual quality of the area. In addition, it is noted there is no tree removal as part of the application and a vegetation management plan will compensate for any lost biodiversity. The proposal is considered low impact in relation to the aesthetic values of the rural-residential area.

- *To minimise conflict between land uses within the zone and land uses within adjoining zones.*

Given compatibility with the rural character, and the likely impacts regarding traffic, noise, wastewater, stormwater and waste detailed elsewhere in this report, the proposed child care centre is considered to minimise conflict between the proposed use and surrounding uses.

- *To ensure land uses are compatible with the available infrastructure, services and facilities and with the environmental capabilities of the land.*

Council's Traffic Engineer and Environmental Management Officer reviewed the proposal and raised no objection. Given the adequate surrounding road capacity anticipated post development, the compliant OSSM system and remediation works proposed, the proposed land use is compatible with the available infrastructure and with the environmental capabilities of the land.

- *To preserve and improve natural resources through appropriate land management practices.*

Subject to recommended conditions requiring a vegetation management plan, the proposal will preserve and improve natural resources on the site.

Clause 7.1 Earthworks
Clause 7.1 stipulates that prior to granting development consent for earthworks, Council must consider matters such as impacts on existing drainage patterns, environmental functions and processes, existing and likely amenity of adjoining properties and future land uses and any new impacts.

The proposed child care centre will generate minor earthworks associated with the build and to facilitate on-site wastewater management. While the facility is to be flush with natural ground level along the southern and eastern sides, as viewed from the streetscape, there is approximately 1.5m in level difference proposed along the north-western corner of the proposed building. While initially fill was proposed, on Council's request this was removed. Rather than stepping the building, a pier and beam construction has been proposed.

Overall, given the minor earthworks proposed, the proposal is consistent with the objectives of this clause as the earthworks are not considered detrimental to environmental functions and processes or neighbouring uses within the area. Standard conditions of consent are recommended with regard to erosion and sediment control measures, the use of fill material and the disposal of excavated material.

Clause 7.4 Sustainable development

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

The proposal satisfies the objectives of this clause in that it incorporates design elements to increase energy efficiency and reduce the consumption of natural resources. The submitted BCA Report and Section J Report detail ways in which the built form of the proposal has considered sustainability in its overall design. More specifically, the proposal includes window sizes and locations that will permit adequate solar penetration as well as natural ventilation. There is also substantial landscaping proposed to mitigate urban heat. In addition, as was requested by Council, lighter finishes were incorporated for both the walls and the roof in order to reduce heat absorption and increase energy efficiency. It is noted, however, that the lighter colour of the walls was not requested and is not considered contextually appropriate. A recommended condition of consent will require a brown tone to the walls to subdue their appearance.

Section 4.15(1)(a)(ii) The provisions of any draft environmental planning instrument

Draft State Environmental Planning Policy (Remediation of Land) 2018

The proposal has been assessed against the applicable provisions of Draft State Environmental Planning Policy (Remediation of Land) 2018 and the associated guideline document, and is considered to be acceptable. Refer also to the discussion under State Environmental Planning Policy No. 55 - Remediation of Land.

Draft State Environmental Planning Policy (Environment) 2017

The intent of the new State Environmental Planning Policy (Environment) 2017 is to combine seven existing State Environmental Planning Policies into a simple, modern and accessible instrument.

The proposal has been assessed against the applicable provisions of Draft State Environmental Planning Policy (Environment) 2017 and is considered to be acceptable. Refer also to the discussion under Sydney Regional Environment Plan No. 20 - Hawkesbury Nepean River (No. 2 - 1997) and the Appendix to this report.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Section 4.15(1)(a)(iii) The provisions of any development control plan

Development Control Plan 2014

Provision	Compliance
C1 Site Planning and Design Principles	Complies - see Appendix - Development Control Plan Compliance
C2 Vegetation Management	Complies
C3 Water Management	Complies - see Appendix - Development Control Plan Compliance
C4 Land Management	Complies
C5 Waste Management	Complies - see Appendix - Development Control Plan Compliance
C6 Landscape Design	Complies - see Appendix - Development Control Plan Compliance
C7 Culture and Heritage	N/A
C8 Public Domain	N/A
C9 Advertising and Signage	Complies - see Appendix - Development Control Plan Compliance
C10 Transport, Access and Parking	Complies - see Appendix - Development Control Plan Compliance
C11 Subdivision	N/A
C12 Noise and Vibration	Complies - see Appendix - Development Control Plan Compliance
C13 Infrastructure and Services	Complies - see Appendix - Development Control Plan Compliance
D1.1. Rural Character	Complies - see Appendix - Development Control Plan Compliance
D1.2. Rural Dwellings and Outbuildings	Does not comply - see Appendix - Development Control Plan Compliance
D1.3. Farm buildings	N/A
D1.4 Agricultural Development	N/A
D1.5. Non-Agricultural Development	Complies - see Appendix - Development Control Plan Compliance
D5.1. Application of Certification System	N/A
D5.2. Child Care Centres	Complies - see Appendix - Development Control Plan Compliance
D5.3. Health Consulting Rooms	N/A
D5.4. Educational Establishments	N/A
D5.5 Parent Friendly Amenities	N/A
D5.6. Places of Public Worship	N/A
D5.7. Vehicle Repair Stations	N/A
D5.8. Cemeteries, Crematoria and Funeral Homes	N/A
D5.9. Extractive Industries	N/A
D5.10 Telecommunication Facilities	N/A

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Section 4.15(1)(a)(iv) The provisions of the regulations

Fire Safety

Under Part 9 of the Environmental Planning and Assessment Regulation 2000, owners of buildings must provide the FRNSW Commissioner with a copy of the Fire Safety Certificate for the building (along with the current Fire Safety Schedule). The Fire Safety Certificate is issued when essential fire safety meausres have been assessed by a qualified person as being capable of performing to the standard defined by the Schedule. A condition of consent is recommended to ensure that this occurs on an annual basis.

Prescribed Conditions

The relevant prescribed conditions of the regulations, such as the requirement for compliance with the BCA, have been imposed as recommended conditions of consent where applicable.

Advertising and Notification

Advertising and neighbour notification was carried in accordance with the requirements of the regulations and Penrith Development Control Plan 2014.

Section 4.15(1)(b)The likely impacts of the development

(i) Natural and Built and Environments

- *Context and Setting*

The siting, form, size and external appearance of the development has been designed to respect the existing rural and environmental qualities of the area and the siting of surrounding residences. The development provides a single storey design, materials that reflect the adjoining built forms and setbacks compatible with the adjoining residential dwellings. Landscaping has been provided along all boundaries which will provide a visual screen and is consistent with the surrounding locality. The proposal generally complies with the Child Care Planning Guideline and the rural land DCP controls.

- *Noise Impacts*

As detailed in the Appendix to this report, the application was accompanied by an Acoustic Impact Assessment prepared by Acoustic Logic. This report concludes that the noise emissions associated with the proposed child care centre to the surrounding nearest residential receivers will comply with the relevant guidelines recommended by the Australian Acoustical Consultants and other regulatory criteria, subject to the implementation of a range of construction and operational management controls, including the provision of acoustic barrier fencing. These recommendations form a recommended condition of consent. The development is not considered likely to have adverse noise impacts on the surrounding locality.

- *Traffic, Access and Parking*

As detailed in the Appendix to this report, the proposed on-site parking provision complies with the rates specifies in Penrith Development Control Plan 2014. The dimensions of the parking bays and circulation aisle will comply with Australian Standards.

The application was accompanied by a Traffic and Parking Impact Assessment and a Traffic Volume Environmental Capacity Report, both prepared by GTK Consulting. These reports found that the volumes of traffic to be generated by the development are unlikely to result in any considerable impacts on the local road network. Council's Traffic Engineer has reviewed the proposal and supporting documentation and raised no objections.

- *Stormwater Impacts*

As detailed further within the Appendix to this report, Council's Development Engineer reviewed the proposal, as amended, and raised no objections in relation to stormwater impacts. An on-site stormwater detention (OSD) tank has been provided to limit stormwater discharge during large storm events and therefore minimise any scouring or erosion on downstream properties. The OSD system will ensure there are no adverse impacts on adjoining properties in relation to stormwater flows.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

- *Biodiversity Impacts*

The proposal does not involve the removal of any trees from the site and biodiversity impacts as a result of the proposal are considered to be negligible. A vegetation management plan to achieve ecological restoration at the rear of the property has been recommended as a consent condition. This is in addition to fauna management requirements and conditioning of the proposed landscape treatments.

- *Wastewater Impacts*

As detailed in the Appendix to this report, Council's Environmental Management Officer is satisfied that wastewater from the development can be satisfactorily managed on the site, subject to recommended consent conditions.

(ii) Social and Economic Impacts

- *Social Impacts*

The development application was referred to Council's Social Planner who raised no objections to the proposal noting that child care centres are an important component of Penrith's local communities, providing facilities for parents and carers that thereby supports employment, economic activity and community participation. The proposed increase in child care places will increase the availability of child care in the local area.

Section 4.15(1)(c)The suitability of the site for the development

The site is considered suitable for the development for the following reasons:

- The site is zoned to permit the proposed use.
- The use is compatible with surrounding and adjoining land uses.
- The grade of the site is suitable for the design proposed.
- The site is able to drain to Council's satisfaction.
- The site can be suitably remediated.
- The site is not located along a major collector road.
- The site is of a sufficient size and width to accommodate the proposed child care centre.
- The site is suitable in respect to environmental impacts, specifically acoustic, privacy and traffic impacts.

Section 4.15(1)(d) Any Submissions

Community Consultation

In accordance with Clause 4.4 of Appendix F4 of Penrith Development Control Plan 2014, the proposed development was extensively notified and advertised in the local newspaper. The proposal was publicly exhibited between 17/01/20 and 26/02/20 and re-exhibited between 25/05/20 and 08/06/20. Council received 24 submissions in response to the proposal, 10 of which were unique. The issues raised are discussed below.

Issue Raised	***Comments***

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Proximity to other child care centres and the need for a child care centre.	The Educational Establishments and Child Care Facilities SEPP and associated Child Care Planning Guideline were gazetted on 1 September 2017. The SEPP has been introduced to facilitate the effective delivery of educational establishments and early education and care facilities across the state. Clause 25(2)(a) of the Educational Establishments and Child Care Facilities SEPP stipulates that a child care facility may be located at any distance from an existing or proposed early education and care facility. The objective of this clause is to identify development standards for particular matters relating to a centre-based child care facility that, if complied with, prevents the consent authority from requiring more onerous standards for those matters. In addition, Clause 26(b) of the SEPP stipulates that any provision of a development control plan that specifies a requirement for demonstrated need or demand for child care services does not apply to development for the purpose of a centre-based child care facility.
Non-compliance with Penrith Development Control Plan 2014, Child Care Centre controls.	In accordance with Clause 26 of the Educational Establishments and Child Care Facilities SEPP, a development control plan that specifies a requirement, standard or control in relation to the design principles set out in Part 2 of the Child Care Planning Guideline, or any of the matters for consideration set out in Part 3 or the regulatory requirements set out in Part 4 of that Guideline (other than those concerning building height, side and rear setbacks or car parking rates), do not apply.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Contamination from previous uses.	A Detailed Site Investigation (DSI) and Remedial Action Plan (RAP) accompanied the application and identified the limited presence of surficial fragments of bonded asbestos. It is noted that the DSI has been reviewed by a SafeWork NSW approved Asbestos Assessor. The DSI required additional soil sampling to be undertaken to delineate the area(s) of the site impacted by bonded asbestos and to characterise stockpiled material/stockpile footprints. The DSI referred to the RAP for details of the further sampling that is to be undertaken. The RAP was updated from the original version to extend the scope of works to further delineate asbestos contamination and sampling of stockpiles/stockpile footprints. The RAP has been technically reviewed by the SafeWork NSW approved Asbestos Assessor responsible for reviewing the DSI. The RAP proposes remediation by excavation of contaminated soil and material from the site for disposal off site. The RAP provides a comprehensive and satisfactory remediation and validation strategy in compliance with applicable legislation, standards and guidelines. The DSI did include an investigation of the historical uses of the site. The DSI and RAP were updated to refer to the NSW EPA Guidelines for Assessing Former Asbestos Contaminated Sites and demonstrated that the investigation and remediation works comply with these guidelines. Council's Environmental Management Officer has reviewed these reports and raised no objection in this regard.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

There will be an increase in noise for adjoining properties.	It is acknowledged that there may be an increase in the noise generated from the site. However, the application was accompanied by an Acoustic Report which demonstrates that the development will comply will relevant noise criteria specified in Australian Standards and guidelines. The report was amended in response to a request from Council's Environmental Management Officer to incorporate cross sections of the acoustic fence, including construction requirements, and to address the total traffic noise to be generated. The Acoustic Report, as amended, was found to be satisfactory. The Acoustic Report also includes operational and design mechanisms to ensure that there is not an adverse noise impact to the surrounding properties through, for example, restricting the number of children outside at any one time and restricting hours for deliveries, cleaning and waste collection, in addition to certain construction requirements for windows and an acoustic fence. These recommendations will be required to be implemented through both construction and the life of the development via a recommended condition of consent. It is noted concerns were raised by submitters in relation to noise impacts given people are spending more time at home in light of the COVID-19 pandemic. That being said, as the relevant acoustic criteria is met by the proposal, it is not considered that the proposal will adversely impact on the aural privacy of adjoining neighbours given the noise attenuation measures previously noted.
Construction noise will adversely affect the neighbour amenity.	It is acknowledged that some disruption may be experienced during the construction phase of the development. However, to minimise potential noise impacts, a recommended condition of consent will limit the hours of demolition and construction works to be undertaken in accordance with the NSW Environment Protection Authority Noise Control Guidelines.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

The development will generate substantial traffic and increase safety risks given the state of the existing road outside the subject site.	In regard to the proposal's impact on the surrounding road network, traffic volume counts on Mt Vernon Road were submitted to determine the current traffic demand and whether the road will remain within its environmental capacity post development (as per the RMS Guide to Traffic Generating Developments). This information was requested by Council's Traffic Engineer. The submitted Traffic Impact Assessment suggests a peak trip generation of 77 and 68 vehicles per hour for the AM and PM peaks respectively. Council's Traffic Engineer has reviewed this information and advised that no adverse traffic generation impacts are expected from the development and that the local road network has adequate capacity to cater for the traffic volumes to be generated by the development. Regarding concerns with the state of the existing road and dips within it, Council's Traffic Engineer noted that there is sufficient sight distance to enable traffic turning into and out of the site to carry out their turning movements without unduly interfering with mainstream traffic flow as per AS 2890.1:2004. A recommended condition of consent will ensure sight distances are maintained between vehicles leaving the car park and pedestrians accessing the road frontage.
The development is out of character and scale with the surrounding residential area.	The proposed development is generally consistent with the requirements of the Educational Establishments and Child Care Facilities SEPP, Penrith Local Environmental Plan 2010 and Penrith Development Control Plan 2014. Originally, the height and presentation of the acoustic fence was a key concern which did not integrate into the landscape. The DCP states that fencing is to be of an open rural nature. Given structures in rural areas are required to be setback at least 5m and that the acoustic fence is solid, it was considered the fence should be treated like any other structure in this regard. On Council's request, the proposal was amended to reduce the height of the acoustic fence to 1.8m forward of the building line and the 2.4m high component setback from between 3m to 5m. Although it is still not an open style fence, it is now contextually appropriate given it is largely setback 5m and surrounded by an adequate landscape buffer. The landscape buffer surrounding the side fences includes shrub style planting that will reach, if not exceed, the height of the fence, coupled with some canopy tree plantings. In addition, although the acoustic fence is fibre cement for acoustic reasons, timber posts will be mounted on the exterior to better blend with the area's earthy tones and typical materials. It is noted that all boundary fencing is to be retained as is, of an open rural style, whereas no fencing along the front boundary is proposed in keeping with the character of the area. The proposal provides a combination of features and materials that reflect rural materials and finishes and

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

		designs, while providing a scale that is compatible with the surrounding rural-residential development given it is single storey in height with comparable and/or greater front, side and rear setbacks and extensive landscaping. The proposal provides a 35m front setback, substantially behind the buildings on adjacent properties which are setback 18m and 19m respectively. The proposed rear setback of 65m is consistent with the surrounding development. The proposed 15m x 38m landscaped area within the front setback results in appropriate opportunities for landscaping. Across the site as a whole, the additional landscaping proposed covers approximately 2,500m^2, which provides an appropriate embellishment relative to the built form and hardstand area of that is proposed. In addition, approximately 5,500m^2 of existing vegetation the rear of the property will be improved via a vegetation management plan required as a recommended consent condition. Collectively, the permeable area that will be retained results in a ratio of landscaped area to built form that is approximately 80:20. The proposed siting, setbacks and design not only retain the rural character, but also maintain the amenity of the area relative to the streetscape and surrounding properties.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

The site does not have capacity to accommodate an on-site sewage management system.	Initially, an on-site sewage management (OSSM) system was proposed within the rear half of the property. The accompanying wastewater report contained inadequate information as the hydraulic load generated by the development required a commercial system rather than the system proposed. After requests from Council's Environmental Management Officer regarding the proposed system, an alternative on-site sewage management system was proposed within the front potion of the property. The amended OSSM system proposes the primary disposal area and part of the reserve area within the front landscaped setback. The remaining reserve area required is proposed within the side setbacks, between the acoustic fencing and the side boundaries. The accompanying amended wastewater report is comprehensive and has been prepared by an appropriately qualified and experienced wastewater consultant. It is noted that reserve area 2 is not located in accordance with Council's On-Site Sewage Management and Greywater Reuse Policy as it will be located 3m uphill/upslope of the western property boundary, whereas a minimum setback distance of 6m is considered appropriate. A recommended consent condition will require the submission to Council of an amended plan prior to issue of a Construction Certificate, showing reserve area 2 to the rear of the internal fence and in accordance with Council's On-Site Sewage Management and Greywater Reuse Policy. This aspect of the development is considered to be suitable for conditioning given there is ample room at the rear of the outdoor play area for a reserve area of 96m^2. Regarding concerns as to the clay soil absorption limitations, the wastewater report identifies that the soil characteristics of the site dictate the need for a combination of both absorption and evapotranspiration methods for effluent disposal and that absorption alone is not suitable. The wastewater report stipulates the detailed construction requirements and specifications that need to be adhered to in constructing the evapotranspiration bed (ETA bed). A recommended consent condition requires the construction of the beds to be supervised by an appropriate person and in accordance with the wastewater report. The sizing and design of the proposed ETA bed fully responds to the characteristics of the site and is in accordance with all applicable guidelines (including NSW Health guidelines), Council policy and Australian Standards that apply to on-site sewage management. The proposed ongoing servicing and monitoring of the system by appropriate persons should ensure its satisfactory ongoing performance. Council's Environmental Management Officer has reviewed the amended wastewater report and proposed OSSM system and considers that it demonstrates that wastewater from the development can be satisfactorily managed on the site, subject to recommended consent conditions.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

The site is affected by overland flows via a natural watercoruse through the middle of the site which will result in stormwater runoff to the neighbouring properties.	Council's Development Engineers reviewed the site and the proposal and noted that there may be a natural depression within the middle of the site due to the slope of the land. However, the subject site is not flood affected by either mainstream flooding or by overland flows. Although the subject site is located outside of a mandatory on-site detention area, an on-site stormwater detention (OSD) tank has been provided to limit stormwater discharge during large storm events and therefore minimise any scouring or erosion on downstream properties. The OSD system will ensure there are no adverse impacts on adjoining properties in relation to stormwater flows. It should be noted that the stormwater plans for the proposal were amended and that the originally proposed absorption pit was removed due to the low permeability of the soil. A level spreader system has been proposed in lieu of the absorption pit. The level spreader area will be fenced off from the children's play area for safety reasons. Council's Development Engineer has reviewed the proposed stormwater design and raised no objections in this regard.
Nature of submissions as 'unique'.	A submission is considered unique when it is not in a pro-forma template and is thus unique in its content. It is acknowledged that Council received 24 submissions in response to the proposal, 10 of which were considered unique.
Proximity to public transport, local services and medical facilities.	Under Clause 23 of the Educational Establishments and Child Care Facilities SEPP, consideration is to be given to any applicable provisions of the associated Child Care Planning Guideline. Given the rural context of the site, it is acknowledged that proximity to public transport and other services is limited. It is also acknowledged that the bus service on Mt Vernon Road is infrequent during the day. However, the local town centres of Erskine Park, Horsley Park and Cecil Hills are within a 15 minute drive of the site. While the subject site is rural in nature, child care centres are permissible within rural areas, subject to integration with the surrounding character and appropriate arrangements to access facilities and services as required. Given the centre will provide a minibus which has capacity for 22 children (plus 1 driver and 1 adult supervisor), access to essential services and facilities is available should the need arise. An emergency evacuation and management plan has also been provided as part of the application and Council's Social Planner reviewed the proposal and raised no objections in this regard. In addition, it is noted that future development associated with the nearby Aerotropolis will mean the proximity to services is likely to change in the future.
Financial impacts on other rural child care centres.	The financial impacts of the proposal on other child care centres is not a matter for consideration under Section 4.15 of the Environmental Planning and Assessment Act 1979.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Referrals

The application was referred to the following stakeholders and their comments have formed part of the assessment:

Referral Body	Comments Received
Building Surveyor	No objections - subject to conditions
Development Engineer	No objections - subject to conditions
Environmental - Environmental management	No objections - subject to conditions
Environmental - Waterways	No objections - subject to conditions
Environmental - Public Health	No objections - subject to conditions
Environmental - Biodiversity	No objections - subject to conditions
Traffic Engineer	No objection subject to conditions
Social Planning	No objections

Section 4.15(1)(e)The public interest

The proposal generally complies with the Child Care SEPP and related Planning Guideline as well as Council's LEP and DCP provisions. In terms of amenity impacts, the proposal will result in negligible overshadowing and overlooking impacts and will contribute to the visual aesthetic and rural character via the setbacks and landscaping proposed. Regarding acoustic amenity, with the noise attenuation measures recommended, the proposal is not considered likely to have adverse impacts on the amenity of the area in terms of noise generation. The proposal provides for sufficient on-site car parking and the surrounding road network can safely sustain the proposed increase in traffic generation. The proposal does not involve the removal of any significant trees and the proposed landscaping and required vegetation management plan will contribute to both remnant biodiversity and the rural character of the area. Subject to remediation works, the proposal will not pose any environmental hazards to the proposed users or adjoining neighbours. Given provision for on-site stormwater detention and wastewater management, the proposal will not place unreasonable demand on public amenities or services. Lastly, the proposal will increase the availability of child care in an area offering high quality open space for children.

For the above reasons, on balance, the proposal is considered to be in the public interest.

Conclusion

In assessing this proposal against the relevant environmental planning policies, primarily being State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017, State Environmental Planning Policy No. 55 - Remediation of Land, Penrith Local Environmental Plan 2010 and Penrith Development Control Plan 2014, the proposal satisfies the aims, objectives and provisions of these policies. The site is suitable for the proposed development, the proposal is in the public interest, and there is unlikely to be negative impacts arising from the proposed development. Therefore, the application is worthy of support, subject to recommended conditions.

Recommendation

That DA19/0886 for construction of a child care centre for 96 children, at-grade parking for 30 vehicles, signage, remediation works and on-site sewage management system at 110-112 Mt Vernon Road, Mount Vernon, be approved subject to the following conditions.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

General

1 A001

The development must be implemented substantially in accordance with the following stamped approved plans and documents, the application form and any supporting information received with the application, except as may be amended in red on the approved plans and documents and by the following conditions.

Drawing Title	Drawing No	Revision	Prepared By	Dated
External Finishes	DA01.1, 18307	A	Project Works Design Pty Ltd	25/03/20
Site Plan	DA01, 18307	C	Project Works Design Pty Ltd	10/12/20
Floor Plan	DA03, 18307	B	Project Works Design Pty Ltd	01/09/20
Elevations & Sections	DA04, 18307	A	Project Works Design Pty Ltd	01/09/20
Roof Plan	DA05, 18307	B	Project Works Design Pty Ltd	01/09/20
Notes and Acoustic Fence Detail	DA07, 18307	A	Project Works Design Pty Ltd	25/03/20
Evacuation Plan	-		-	
Stormwater Concept Plans, *as amended by the architectural plans*	171195, Drawing 101 - 109	G	Australian Consulting Engineers	04/11/20
Landscape Concept Plan	1/5, 2/5 and 4/5	6	Tessa Rose Playspace and Landscape Design	02/12/20

Supporting Documentation:

- Waste Management Plan dated 30/04/19
- Access Report prepared by Lindsay Perry Associates, dated 16 October, 2019, Revision 2
- Geotechnical Investigation Report written by Greywack Geotechnics, COCD0206 - GEO AA, Revision 01 dated March 2019
- Operational Plan of Management
- DA Acoustic Assessment (Revision 6) prepared by Acoustic Logic and dated 08/09/2020
- 'Detailed Site Investigation' prepared by Envirotech and dated 17 March 2020 (REP-19-7579-A1)
- Remedial Action Plan prepared by Envirotech and dated 17 March 2020 (REF-19-7963-A1)
- 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_001) prepared by Roberts Resources and dated 3 September 2020
- Traffic Volume Environmental Capacity report prepared by GTK Consulting, dated October 2020.
- Emergency Management and Evacuation Plan.

2 A012 - Food Act

The proprietor of the food business shall ensure that the requirements of the NSW Food Act 2003, NSW Food Regulation 2010 and the Australian and New Zealand Food Standards Code are met at all times.

3 A019 - Occupation Certificate

The development shall not be used or occupied until an Occupation Certificate has been issued.

A satisfactory inspection from an authorised officer of Council's Environmental Health Department is required prior to the issue of an Occupation Certificate. The occupier is to contact the Environmental Health Department to organise an appointment at least 72 hours prior to the requested inspection time.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

4 A021 - Business Registration

The business is to be registered with Penrith City Council by completing the “Registration of Premises” form. This form is to be returned to Council prior to the issue of an Occupation Certificate and operation of the business.

5 A026 - Advertising sign (not for residential)

A separate development approval for the erection of a sign or advertising structure, other than an advertisement listed as exempt development or otherwise approved by this consent, is to be obtained.

6 A029 - HOURS OF OPERATION AND DELIVERY TIMES

The approved operating hours are from 7am to 6pm, Mondays to Fridays. Delivery and service vehicles generated by the development are limited to:

- Mondays to Fridays, 7am to 6pm,
- Saturdays, 7am to 1pm if inaudible on neighbouring residential premises, otherwise 8am to 1pm, and
- No delivery is permitted on Sundays and Public Holidays.

7 A038 - LIGHTING LOCATIONS

Exterior lighting shall be located and directed in such a manner so as not to create a nuisance to surrounding land uses. The lighting shall be the minimum level of illumination necessary for safe operation. The lighting shall be in accordance with AS 4282 “Control of the obtrusive effects of outdoor lighting” (1997). Only downlights are permitted for the car parking area.

8 A039 - Graffiti

The finishes of all structures and buildings are to be maintained at all times and any graffiti or vandalism immediately removed/repaired.

9 A046 - Obtain Construction Certificate before commencement of works

A **Construction Certificate** shall be obtained prior to commencement of any building works.

10 A Special (BLANK)

The Child Care Centre is to comply with the requirements of the Education and Care Services National Regulation under the Education and Care Services National Law at all times.

11 A Special (BLANK)

The child care centre operator is required to obtain an operating licence from the NSW Department of Education and Communities prior to operation of the child care centre.

12 A Special (BLANK)

The external walls of the building shall be dark brown in order to contrast with the light roof and better blend and integrate with the surrounding area and its earthy tones. Details in this regard shall be shown on the Construction Certificate plans.

13 A Special (BLANK)

Prior to the issue of a Construction Certificate, the Access Report prepared by Lindsay Perry Associates, dated 16/10/19, shall be updated to reflect the stamped approved plans. All recommendations of the updated Access Report shall reflected on the Construction Certificate plans.

14 A Special (BLANK)

Prior to the issue of a Construction Certificate, plans and details shall be submitted to Council, and approved, detailing the proposed fascia signage to ensure the detail integrates with the style, character and function of the building and reflects the area’s rural/landscape character. The proposed wall signs shall be deleted from the plans prior to the issue of a Construction Certificate.

15 A Special (BLANK)

Childproof fencing shall be provided to all outdoor play areas, and to the entrance of the child care centre. Details in this regard shall be shown on the Construction Certificate plans.

16 A Special 1

A maximum of 16 children aged 0-2, 20 children aged 2-3 and 60 children aged 3-6 are to be enrolled to attend the premises at any one time.

17 A Special Condition (BLANK)

Prior to the issue of a Construction Certificate, documentation is to be submitted to Council, and approved, demonstrating compliance with Section 3.1 of Council's WSUD Policy to ensure the development will achieve a 80% non-potable water reuse. An amended MUSIC model and stormwater concept plan demonstrating compliance with Section 3.1 of Council's WSUD Policy shall be submitted in this regard.

Heritage/Archaeological relics

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

18 C003 - Uncovering relics

If any archaeological relics are uncovered during the course of the work, no further work shall be undertaken until further directed by Penrith City Council or the NSW Heritage Office.

The applicant is advised that depending on the possible significance of the relics, an archaeological assessment and an excavation permit under the Heritage Act 1977 may be required before any further work can be recommenced in that area of the site.

Environmental Matters

19 D001 - Implement approved sediment& erosion control measures

Erosion and sediment control measures shall be installed **prior to the commencement of works on site (**including approved site investigation and remediation works and the clearing of site vegetation). The erosion and sediment control measures are to be maintained in accordance with the approved erosion and sediment control plan(s) for the development and the Department of Housing's “Managing Urban Stormwater: Soils and Construction” 2004.

The approved sediment and erosion control measures are to be maintained throughout the construction phase of the development until the development has been completed, including landscaping, driveway and on-site parking works. These measures shall ensure that mud and soil from vehicular movements to and from the site does not occur during the construction of the development.

Dust suppression techniques are to be employed during site remediation and construction works to reduce any potential nuisance to surrounding properties.

20 D010 – Appropriate disposal of excavated or other waste

All excavated material and other construction wastes generated as a result of the development are to be re-used, recycled or disposed of in accordance with the approved waste management plan. Waste materials not specified in the approved waste management plan are to be disposed of at a lawful waste management facility.

All asbestos laden waste must be disposed of at a waste management facility licensed by the NSW Environment Protection Authority to receive asbestos waste.

All receipts and supporting documentation must be retained in order to verify lawful disposal of materials and are to be made available to Penrith City Council on request.

21 D013 - Approved noise level 1

Noise levels from the premises shall not exceed the relevant noise criteria detailed in the acoustic report titled 'DA Acoustic Assessment' (Revision 7) prepared by Acoustic Logic and dated 08/09/2020. The recommendations provided in Section 8.1 of the acoustic report shall be implemented and incorporated into the design and construction of the development (including acoustic fencing), and shall be shown on plans accompanying the Construction Certificate application. The recommendations and management controls provided in Section 8.2 of the acoustic report shall be implemented during the operation of the development.

A certificate is to be obtained from a suitably qualified acoustic consultant certifying that the building and associated acoustic fencing has been constructed to meet the noise criteria in accordance with the approved acoustic report. This certificate is to be submitted to the Principal Certifying Authority and Penrith City Council prior to the issue of an Occupation Certificate and approval of the certificate obtained from Penrith City Council prior to the issue of an Occupation Certificate.

The provisions of the Protection of the Environment Operations Act 1997 apply to the development, in terms of regulating offensive noise.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

22 D014 - Plant and equipment noise

All mechanical plant and equipment is to comply with the noise criteria outlined in the approved acoustic report titled 'DA Acoustic Assessment' (Revision 7) prepared by Acoustic Logic and dated 08/09/2020.

Prior to the issue of a Construction Certificate, further details on the type and location of all mechanical plant and equipment associated with the development it is to be provided to Penrith City Council for consideration and approval. Suitable data and information assessed by a suitably qualified acoustic consultant on the noise impacts associated with this plant and equipment is to be supplied to demonstrate compliance with the established noise criteria.

Prior to the issue of an Occupation Certificate, a Compliance Certificate, prepared by a suitably qualified acoustic consultant, is to be submitted to and approved by Penrith City Council. The certificate is to demonstrate that all plant and equipment has been installed to comply with the established noise criteria.

23 D06A – Approval for bulk earthworks/major filling operations (Use for bulk earthworks/ major filling operations)

No fill material shall be imported to the site until such time as a Validation Certificate (with a copy of any report forming the basis for the validation) for the fill material has been submitted to Council. The Validation Certificate shall:

- state the legal property description of the fill material source site,
- be prepared by an appropriately qualified person (as defined in Penrith Development Control Plan) with consideration of all relevant guidelines (e.g. EPA, ANZECC, NH&MRC), standards, planning instruments and legislation,
- clearly indicate the legal property description of the fill material source site,
- provide details of the volume of fill material to be used in the filling operations,
- provide a classification of the fill material to be imported to the site in accordance with the Environment Protection Authority's "Environmental Guidelines: Assessment, Classification & Management of Non-Liquid Wastes" 1997, and
- (based on the fill classification) determine whether the fill material is suitable for its intended purpose and land use and whether the fill material will or will not pose an unacceptable risk to human health or the environment.

An appropriately qualified person/s (as defined in the Penrith Development Control Plan) shall:

- Supervise the filling works,
- (On completion of filling works) carry out an independent review of all documentation relating to the filling of the site, and shall submit a review findings report to Council and any Principal Certifying Authority,
- Certify by way of a Compliance Certificate or other written documentation that fill materials have been placed on the site in accordance with all conditions of this consent and that the site will not pose an unacceptable risk to human health or the environment. A copy of the Compliance Certificate or other documentation shall be submitted to Council and any Principal Certifying Authority.

The contact details of any appropriately qualified person/s engaged for the works shall be provided with the Notice of Commencement.

If the Principal Certifying Authority or Penrith City Council is not satisfied that suitable fill materials have been used on the site, further site investigations or remediation works may be requested. In these circumstances the works shall be carried out prior to any further approved works.

{Note: Penrith Development Control Plan 2014 defines an appropriately qualified person as "a person who, in the opinion of Council, has a demonstrated experience, or access to experience in hydrology, environmental chemistry, soil science, eco-toxicology, sampling and analytical procedures, risk evaluation and remediation technologies. In addition, the person will be required to have appropriate professional indemnity and public risk insurance."}

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

24 D - Hours of work

Construction works, including site investigation and remediation works, shall be restricted to the following hours in accordance with the NSW Environment Protection Authority Noise Control Guidelines:

- Mondays to Fridays, 7am to 6pm
- Saturdays, 7am to 1pm if inaudible on neighbouring residential premises, otherwise 8am to 1pm
- No construction work is permitted on Sundays and Public Holidays.

In the event that the construction work relates to work inside the building and does not involve external walls or the roof, and does not involve the use of equipment that emits noise, then the works are not restricted to the hours stated above.

The provisions of the Protection of the Environment Operations Act 1997 in regulating offensive noise also apply to all construction works.

25 D Fauna Protection

Prior to works being undertaken, any resident fauna within the development footprint is to be excluded from the site, without harm and in accordance with legislation, policy and guidelines for the safe handling and protection of native wildlife.

26 D Native Vegetation Protection Measures

No clearing of native vegetation within the rear portion of the site is permitted without the prior consent of Penrith City Council. Prior to any works commencing, fencing is to be erected to protect the vegetation at the rear of the property, as indicated in red on the stamped approved plans.

27 D special BLANK

Site investigation, remediation and validation works shall be carried out generally in accordance with the 'Detailed Site Investigation' prepared by Envirotech and dated 17 March 2020 (REP-19-7579-A1), the Remedial Action Plan prepared by Envirotech and dated 17 March 2020 (REF-19-7963-A1), as well as the National Environment Protection (Assessment of Site Contamination) Measure 1999 [NEPM 2013], Penrith Development Control Plan, the ANZECC and NHMRC Guidelines (1992), applicable NSW Environment Protection Authority Guidelines, applicable Australian Standards and State Environmental Planning Policy No. 55 - Remediation of Land.

An appropriately qualified person/s shall:

(a). Supervise the remediation works.
(b). Supply Penrith City Council with a copy of any relevant documentation for further testing carried out during the investigation, remediation and validation works.
(c). After completion of works, certify by way of a Validation Report (including, where required, other written documentation such as asbestos clearance certificates) that remediation works have been carried out in accordance with all conditions of this consent and that the site is suitable for the proposed use. A copy of the Validation Report is to be submitted to the Principal Certifying Authority (PCA) and Penrith City Council if it is not the PCA within 30 days of the said works having been completed and prior to the commencement of building works. **Approval of the Validation Report is to be obtained from Penrith City Council prior to any works commencing on site** (other than works associated with site contamination investigation, remediation and validation).

The contact details of any appropriately qualified person/s engaged for the works shall be provided with the notice of commencement.

{Note: For the purpose of this condition an appropriately qualified person is defined as "a person who, in the opinion of Council, has a demonstrated experience, or access to experience in hydrology, environmental chemistry, soil science, eco-toxicology, sampling and analytical procedures, risk evaluation and remediation technologies. In addition, the person will be required to have appropriate professional indemnity and public risk insurance."}

28 D special BLANK

Should contamination be found during development works (outside the scope of the Council approved Remedial Action Plan), and should remediation be required, Penrith City Council is required to be notified and consulted before the remediation works commence.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

29 D special BLANK

Due to noise requirements, restrictions apply to the maximum number of children allowed in the outdoor play areas at any one time. A maximum of:

- 5 children aged 0-2 years are permitted to play in the western outdoor babies play area at any one time, and
- 30 children aged 2-5 years are permitted to play in the northern outdoor play area at any one time.

30 D Special BLANK

Appropriate signage is to be installed in the car park and entrance of the centre requesting patrons to minimise noise and protect the amenity of the surrounding neighbourhood. **Prior to the issue of an Occupation Certificate,** a suitable signage plan is to be submitted to Council for approval.

The signage plan is to provide details on the location, sizing and wording of the proposed signs. **The signs are to be installed prior to the issue of an Occupation Certificate.**

A public contact number is to be displayed on the child care centre signage and this phone line must be operational during business hours.

31 D Special BLANK

A complaint register is to be maintained and must include complaint details and any actions taken to address those complaints. A copy of the complaint register is to be provided to Council on request.

In the event of ongoing noise complaints relating to the development being received by Penrith City Council, the owner and/or occupier of the development may be required by Council to obtain the services of a suitably qualified acoustic consultant to undertake a noise impact assessment on the development to address the concerns of the community. The noise impact assessment report is to be prepared and provided to Council for approval within 45 days of being requested. Any mitigation works are to be undertaken within thirty (30) days from the date of notice from Council, unless otherwise specified.

32 D Special BLANK

Prior to commencing the keeping of chickens/poultry on site, details of the proposed keeping of chickens/poultry are to be submitted to Penrith City Council for approval. Information that is to be submitted to Council for consideration and approval includes (but is not limited to):

- Proposed maximum number of hens. Roosters are not permitted to be kept on site.
- Proposed accommodation (shelter and outdoor yard area) including proposed location (distances to buildings and boundaries and the like), sizing and construction.
- Plan of Management for the keeping of chickens/poultry (including food storage and feeding method; water provision; cleaning and maintenance schedule; waste collection, storage and disposal including manure, litter and bedding).

The keeping of chickens/poultry must be in accordance with Penrith City Council's *Keeping of Animals Local Orders Policy 2016* and is to be carried out to ensure no odour, noise, fly, vermin or other environmental nuisance to surrounding properties and receivers.

33 D Special BLANK

All contaminated soil is to be lawfully transported and disposed of at a lawful waste facility. Suitable documentation is to be provided to Council demonstrating the lawful transportation and disposal of contaminated soil. No contaminated soil is to be retained on site. This information may be included in the Validation Report.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

34 D Vegetation Management Plan

Prior to the issue of a Construction Certificate, the applicant is to submit to Council for approval a Vegetation Management Plan (VMP) for the property that:

- is prepared by a suitably qualified (minimum 5 years experience) bushland regenerator, with a minimum qualification of Certificate IV in Conservation and Land Management
- is prepared in accordance with the Cumberland Plain Recovery Plan
- is targeted at restoration of the associated plant community type as identified within the BDAR PCT850 Cumberland Shale Hills Woodland (see Figure 5, AEP BDAR)
- extends for an initial period of 5 years, with evaluation and review at the end of that period, with the potential for extension of another term subject to achieving the defined objectives
- prescribes clearly defined objectives that are aimed at the establishment and persistence of the PCT
- is cost effective and sustainable to ensure the ongoing implementation by the owner
- allows for continuation of species movement through the property, as such fencing recommendations must allow for species movement and exclusion of pests
- restores the connectivity values of the property
- incorporates removal of exotic species
- incorporates replacement planting
- includes initial treatment by the bushland regenerator, to be completed prior to the issue of an Occupation Certificate
- 2nd year treatment to be conducted in association with education of site management
- 3rd-5th year treatments either to be undertaken by the bushland regenerator or site management, but subject to the approval of the bushland regenerator of the defined objectives being met, with annual reporting to Council
- the final year treatment to include an evaluation report for submission to Council, with recommendations for either an additional 5 year continuation plan or ongoing maintenance by site management
- the plan will need to take OSSM and APZ requirements into consideration and seek to integrate these requirements potentially by applying core and buffer zones, relative to achieving ecological objectives within the VMP area

Prior to the issue of an Occupation Certificate, the VMP for the property shall be registered against the land title of the property via a suitable positive covenant.

BCA Issues

35 E009 - Annual fire safety-essential fire safety (Class 2-9 buildings)

The owner of a building, to which an essential fire safety measure is applicable, shall provide Penrith City Council with an annual fire safety statement for the building. The annual fire safety statement for a building must:
(a) deal with each essential fire safety measure in the building premises, and
(b) be given:

- within 12 months after the last such statement was given, or
- if no such statement has previously been given, within 12 months after a final fire safety certificate was first issued for the building.

As soon as practicable after the annual fire safety statement is issued, the owner of the building to which the statement relates:

- must also provide a copy of the statement (together with a copy of the current fire safety schedule) to the Commissioner of New South Wales Fire Brigades, and
- prominently display a copy of the statement (together with a copy of the current fire safety schedule) in the building.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

36 E01A - BCA compliance for Class 2-9

All aspects of the building design shall comply with the applicable performance requirements of the Building Code of Australia so as to achieve and maintain acceptable standards of structural sufficiency, safety (including fire safety), health and amenity for the on-going benefit of the community. Compliance with the performance requirements can only be achieved by:

(a) complying with the deemed to satisfy provisions, or

(b) formulating an alternative solution which:

- complies with the performance requirements, or
- is shown to be at least equivalent to the deemed to satisfy provision, or

(c) a combination of (a) and (b).

It is the owner's responsibility to place on display, in a prominent position within the building at all times, a copy of the latest fire safety schedule and fire safety certificate/statement for the building.

Health Matters and OSSM installations

37 F001 - General Fitout

The construction, fit out and finishes of the food premises must comply with Standard 3.2.3 of the Australian and New Zealand Food Standards Code and AS 4674-2004 *Design, Construction and Fitout of Food Premises*.

38 F006 - Water tank & nuisance

The rainwater tank must be maintained so as not to create a nuisance and it must be protected against mosquito infestation.

39 F022 - Commercial kitchen(exhaust system)

Cooking appliances which exceed a total maximum power input of 8kw for electrical, or a total gas input of 29MJ/h for a gas appliance, are required to have a kitchen exhaust system installed in accordance with Clause F4.12 of the Building Code of Australia and Australian Standard 1668, Parts 1 & 2.

Detailed plans together with calculations for the system must be provided as part of the Construction Certificate application.

The exhaust hood must completely cover the equipment to be ventilated and extended at least 200mm beyond the perimeter of the equipment. The exhaust hood must be provided with a condensation gutter around its base. The gutter must be at least 50mm wide by 25mm deep. Where abutting walls are located the hood must be constructed so as to finish flat against the wall surface.

The low edge of a canopy type exhaust hood must be at least 2000mm above floor level.

Prior to the issue of an Occupation Certificate, and operation of the business, the exhaust system shall be certified by an appropriately qualified person to comply with the Building Code of Australia and Australian Standard 1668, Parts 1 & 2. A copy of the certification and supporting documentation must be provided to Council's Environmental Health Department if Council is not the Principal Certifying Authority.

40 F027 - Hand basins

Hand basins must be serviced with hot and cold water through a single outlet, able to be mixed at a temperature of at least 40°C and fitted with a hands free operation. Where sensor taps are installed the basin must not be more than 6 metres from the hot water system. Disposable paper hand towels and soap must be provided and serviced from a dispenser adjacent to each hand basin.

41 F029 - Hand basin within staff toilets

A hand basin located within the toilet cubicle must be serviced with hot and cold water through a single outlet, able to be mixed at a temperature of at least 40°C and fitted with a hands free operation. Where sensor taps are used the basin must not be more than 6 metres from the hot water system. Disposable paper hand towels and soap must be provided and serviced from a dispenser adjacent to each hand basin.

42 F030 - Hot water service

Hot water services must be positioned at least 75mm clear of the adjacent wall surfaces, and mounted at a minimum 150mm above the floor level on a non-corrosive metal stand. The hot water system must be sized to meet the demands of the food business during peak operating and cleaning periods and be able to provide sufficient hot water throughout the working day. Discharge from the hot water system must enter the sewer through a tongue dish in accordance with Sydney Water's requirements.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

43 F031 - Floor & floor waste

The floor of the food premises must be finished in an approved non-absorbent material, evenly laid, or graded and drained to a trapped floor waste. All floor wastes in the food preparation, service and scullery area must be fitted with a sump removable basket and grate, a minimum 200mm in diameter, and finished in all stainless steel.

44 F032 - Floor covering

Approved, recessed coving must be provided at all intersections of the floor with the walls within all food preparation, service, storage and scullery areas. All coving must have a minimum concave radius of 25mm and be installed so as to be integral to the surface finish of both floor and wall in such a manner as to form a continuous, uninterrupted surface.

45 F033 - Walls – food prep area

The walls of the food preparation area must be of solid construction and finished with glazed ceramic tiles or other approved material to a height of 2 metres. The intersection of tiles and render must have a flush finish, or be splayed at a 45 degree angle to eliminate a ledge that would allow dust and grease to accumulate.

46 F034 - Walls – behind cooking appliances

The walls at the rear of cooking appliances must be surfaced with an impervious material, such as stainless steel, which extends from the canopy to the floor. Where a cooking appliance is sealed to the wall, the material must be lapped over the top edge of the appliance to provide a grease and vermin proof seal. Cooking appliances must only be sealed to walls made of a non-combustible material.

47 F035 - Ceilings

The ceiling in the preparation, service and scullery areas must be constructed with a rigid, non-absorbent, smooth faced material free from open joints, cracks and crevices and be painted with a light coloured washable paint. The intersection of the walls and ceiling must be tight jointed, sealed and dust proofed. Drop-in panel style ceilings are not permitted.

48 F036 - Service pipes

Service pipes, electrical conduits and refrigeration condensate pipes shall be enclosed or chased into walls, floors or plinths. Where it can be demonstrated that this is not feasible pipes and conduits fixed on brackets, providing a minimum of 25mm clearance from the adjacent wall and 100mm from the floor or adjacent horizontal surface, can be used. All openings in walls, floors and ceilings, through which service pipes and conduits pass, must be vermin proof.

49 F038 - Window sills

Any window sill within a food preparation area, service or scullery area must be located 450mm above the top of any bench/sink and tiled at a splayed angle of 45 degrees.

50 F039 - Fly screens

Flyscreens or other approved means of excluding flies must be provided to all windows in the kitchen

51 F042 - Sanitising dishwasher/ double bowl sink

All utensils and equipment must undergo a washing, sanitising and rinsing cycle. The sanitising rinse cycle must achieve a water temperature of 80°C for 2 minutes or 75°C for 10 minutes.

If a dishwasher is not being installed a double bowl sink is required for washing and sanitising food equipment. The double bowl sink must be constructed of stainless steel, have a minimum bowl size of 450mm x 300mm x 300mm to enable cleaning of large pots and equipment, be fitted with a draining area at each end, and have a splashback as part of the unit at least 300mm up the wall. Wash sinks must be supplied with water at a temperature of not less than 54°C for washing.

52 F046 - Cleaners sink

The cleaner's sink must be serviced with hot and cold water through taps fitted with hose connectors. Cleaner’s sinks must be located outside of areas where open food is handled.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

53 F047 - Fixtures & fittings

All fixtures, fittings and equipment must be provided with smooth and impervious surfaces, free from cracks and crevices to enable easy cleaning.

All fittings and fixtures must be built into the wall and floor so as to be free from joint, gaps and cavities to enable easy cleaning or alternatively, supported on one of the following:

a. Plinths – plinths must be an integral part of the floor, constructed of solid materials similar to the floor at least 75mm in height and coved at the intersection with the floor. All plinths must have a smooth and impervious finish. All fittings and fixtures must be properly sealed to the plinth so to be free from gaps, cracks and cavities.

b. Wheels or castors – fittings and fixtures can be supported on wheels or castors. The wheels and castors must be capable of supporting and easily moving a full loaded fitting. All wheels and castors must be provided with a restraining device.

c. Legs – fittings and fixtures can be supported on legs but must be constructed of a non-corrosive, smooth metal or moulded plastic. All legs must be free from cracks and crevices. All legs must have a clearance space between the floor and the underside of the fitting of at least 200mm.

NOTE: False bottoms under fittings are not permitted (AS 4674-2004 – Sections 4.2 and 4.3).

54 F048 - Food prep benches

All food preparation benches must be constructed in stainless steel or finished in a smooth and non-absorbent approved material that is free of joints.

55 F053 - Coolrooms – condensation

Condensation from coolrooms and refrigeration motors must discharge to the sewer via a tundish with air gap separation in accordance with Sydney Water requirements.

56 F057 - Waste storage

All garbage must be stored in accordance with the requirements of the Food Safety Standards of the Australian and New Zealand Food Standards Code and the *Protection of the Environment Operations Act 1997* to prevent the harbourage of vermin or generation of odours.

57 F060 - Grease Arrestor

The grease arrestor shall be installed in accordance with Sydney Water's requirements.

Utility Services

58 G002 - Section 73 (not for

A Section 73 Compliance Certificate under the Sydney Water Act 1994 shall be obtained from Sydney Water. The application must be made through an authorised Water Servicing Coordinator. Please refer to "Your Business" section of Sydney Water's website at www.sydneywater.com.au then the "e-developer" icon, or telephone 13 20 92.

The Section 73 Compliance Certificate must be submitted to the Principal Certifying Authority prior to the issue of an Occupation Certificate.

59 G004 - Integral Energy

Prior to the issue of a Construction Certificate, a written clearance is to be obtained from Endeavour Energy stating that electrical services have been made available to the development or that arrangements have been entered into for the provision of services to the development.

In the event that a pad mounted substation is necessary to service the development, Penrith City Council shall be consulted over the proposed location of the substation before the Construction Certificate for the development is issued as the location of the substation may impact on other services and building, driveway or landscape design already approved by Council.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

60 G006 -

Prior to the issue of a Construction Certificate, the Principal Certifying Authority shall be satisfied that telecommunications infrastructure may be installed to service the premises which complies with the following:

- The requirements of the Telecommunications Act 1997;
- For a fibre ready facility, the NBN Co's standard specifications current at the time of installation; and
- For a line that is to connect a lot to telecommunications infrastructure external to the premises, the line shall be located underground.

Unless otherwise stipulated by telecommunications legislation at the time of construction, the development must be provided with all necessary pits and pipes, and conduits to accommodate the future connection of optic fibre technology telecommunications.

Prior to the issue of an Occupation Certificate, written certification from all relevant service providers that the telecommunications infrastructure is installed in accordance with the requirements above and the applicable legislation at the time of construction, must be submitted to the Principal Certifying Authority.

Construction

61 H001 - Stamped plans and erection of site notice

Stamped plans, specifications, a copy of the development consent, the Construction Certificate and any other Certificates to be relied upon shall be available on site at all times during construction.

The following details are to be displayed in a maximum of 2 signs to be erected on the site:

- the name of the Principal Certifying Authority, their address and telephone number,
- the name of the person in charge of the work site and telephone number at which that person may be contacted during work hours,
- that unauthorised entry to the work site is prohibited,
- the designated waste storage area must be covered when the site is unattended, and
- all sediment and erosion control measures shall be fully maintained until completion of the construction phase.

Signage but no more than 2 signs stating the above details are to be erected:

- at the commencement of, and for the full length of the, construction works onsite, and
- in a prominent position on the work site and in a manner that can be easily read by pedestrian traffic.

All construction signage is to be removed when the Occupation Certificate has been issued for the development.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

62 H002 - All forms of construction

Prior to the commencement of construction works:

(a) Toilet facilities at or in the vicinity of the work site shall be provided at the rate of one toilet for every 20 persons or part of 20 persons employed at the site. Each toilet provided must be:

- a standard flushing toilet connected to a public sewer, or
- if that is not practicable, an accredited sewage management facility approved by Council, or
- alternatively, any other sewage management facility approved by Council.

(b) All excavations and backfilling associated with the erection or demolition of a building must be executed safely and in accordance with the appropriate professional standards. All excavations associated with the erection or demolition of a building must be properly guarded and protected to prevent them from being dangerous to life or property.

(c) If an excavation associated with the erection or demolition of a building extends below the level of the base of the footings of a building on an adjoining allotment of land, the person causing the excavation to be made:

- must preserve and protect the building from damage, and
- if necessary, must underpin and support the building in an approved manner, and
- must, at least 7 days before excavating below the level of the base of the footings of a building on an adjoining allotment of land, give notice of intention to do so to the owner of the adjoining allotment of land and furnish particulars of the excavation to the owner of the building being erected or demolished. The owner of the adjoining allotment of land is not liable for any part of the cost of work carried out for the purposes of this condition, whether carried out on the allotment of land being excavated or on the adjoining allotment of land (includes a public road and any other public place).

(d) If the work involved in the erection or demolition of a building is likely to cause pedestrian or vehicular traffic in a public place to be obstructed or rendered inconvenient, or involves the enclosure of a public place, a hoarding or fence must be erected between the work site and the public place:

- if necessary, an awning is to be erected, sufficient to prevent any substance from, or in connection with, the work falling into the public place,
- the work site must be kept lit between sunset and sunrise if it is likely to be hazardous to persons in the public place, and
- any such hoarding, fence or awning is to be removed when the work has been completed.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

63 H036 - Rainwater Tank (Also impose H037, H038, H039, G005 & Q010)
The rainwater tank(s) is to be:

- erected on a self-supporting base in the approved location on the property in accordance with the stamped-approved site plans for the development,
- structurally sound and constructed in accordance with AS/NZS 3500 1.2- 1998: National Plumbing and Drainage - Water Supply - Acceptable Solutions,
- fully enclosed and all openings sealed to prevent access by mosquitoes,
- fitted with a first flush device,
- fitted with a trickle system to top up from mains water,
- provided with an air gap, and
- installed by a licensed plumber in accordance with Sydney Water's "Plumbing requirements Information for rainwater tank suppliers and plumbers April 2003" and the NSW Code of Practice: Plumbing and Drainage.

Additionally, the following are to be provided:

- A back flow prevention device shall be provided at the water meter in accordance with Sydney Water requirements.
- In the event of a power failure, a back up supply of mains water shall be provided to at least one toilet in the dwelling.
- The rainwater tank(s) and associated piping is to be labelled 'Rainwater - Not for Drinking' in accordance with Sydney Water requirements.
- The rainwater tank and pipework is to be painted in colours matching the external finishes of the dwelling and is to be of non-reflective finish.
- The overflow for the rainwater tank is to be connected into the existing stormwater disposal system on the site.

Before a rainwater tank(s) can be used, a certificate or suitable document is to be submitted to the Principal Certifying Authority stating that the rainwater tank has been installed in accordance with:

- the Manufacturer's Specifications, and
- Sydney Water and NSW Health requirements.

This certificate or documentation is to be provided by the licensed plumber who installed the rainwater tank on the property, and is to be submitted prior to the issue of the Occupation Certificate.

64 H037 - Safe supply of water from catchment areas (Also impose H036, H038 & H039)
The catchment area (for the rainwater tank) includes the parts of the roof of the dwelling(s) from which water is collected and includes gutters. To ensure a safe supply of water:

- roof catchment areas must be kept clear of overhanging vegetation,
- gutters must have sufficient fall to downpipes to prevent pooling of water,
- overflow, discharge from bleed off pipes from roof mounted appliances such as airconditioners, hot water services and solar heaters must not discharge into the rainwater catchment area,
- for roofs containing lead based, tar based or asbestos material the tank supply must not be connected to drinking, bathing and gardening tap water outlets,
- appropriate measures must be installed to prevent foreign materials from contaminating the water which enters the rainwater tank.

65 H038 - Connection of rainwater tank supply (Also impose H036, H037 & H039)
The rainwater tank supply must not be connected to drinking and bathing water tap outlets.

66 H039 - Rainwater tank pumps (Also impose H036, H037 & H038)
The rainwater tank pump must not exceed 5dBA above ambient background noise level at the nearest residential property boundary. The provisions of the Protection of the Environment Operations Act 1997 apply to the development, in terms of regulating offensive noise.

Engineering

67 K101 - Works at no cost to Council
All roadworks, stormwater drainage works, signage, linemarking, associated civil works and dedications, required to effect the consented development shall be undertaken by the applicant at no cost to Penrith City Council.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

68 K201 - Infrastructure Bond

An Infrastructure Restoration Bond is to be lodged with Penrith City Council for development involving works around Penrith City Council's Public Infrastructure Assets. The bond is to be lodged with Penrith City Council prior to commencement of any works on site or prior to the issue of any Construction Certificate. The bond and applicable fees are in accordance with Council's adopted Fees and Charges.

An application form together with an information sheet and conditions are available on Council's website.

Contact Penrith City Council's City Works Department on 4732 7777 or visit Penrith City Council's website for more information.

69 K202 - S138 Roads Act – Works and Structures - Minor Works in the public road DRIVEWAYS ROAD OPENINGS

Prior to the issue of any Construction Certificate, a Section 138 Roads Act application, including payment of application and inspection fees together with any applicable bonds, shall be lodged and approved by Penrith City Council (being the Roads Authority for any works required in a public road). These works may include but are not limited to the following:

a) Vehicular crossings (including kerb reinstatement of redundant vehicular crossings)
b) Concrete footpaths and/or cycleways
c) Road opening for utilities and stormwater (including stormwater connection to Penrith City Council roads and other Penrith City Council owned drainage)
d) Road occupancy or road closures
e) The placement of hoardings, structures, containers, waster skips, signs etc. in the road reserve
f) Temporary construction access
g) Temporary ground anchors (for basement construction)

All works shall be carried out in accordance with the Roads Act approval, the development consent, including the stamped approved plans, and Penrith City Council's specifications, guidelines and best engineering practice.

Contact Penrith City Council's City Assets Department on 4732 7777 or visit Penrith City Council's website for more information.

Note:

- Where Penrith City Council is the Certifying Authority for the development, the Roads Act approval for the above works may be issued concurrently with the Construction Certificate.
- Separate approvals may also be required from the Roads and Maritime Service for classified roads.
- All works associated with the Roads Act approval must be completed prior to the issue of any Occupation Certificate as applicable.
- On completion of any awning over the road reserve, a certificate from a practising structural engineer certifying the structural adequacy of the awning is to be submitted to Council before Council will inspect the works and issue its final approval under the Roads Act.

70 K209 - Stormwater Discharge – Minor Development

Stormwater drainage from the site shall be discharged to a level spreader system.

The proposed development and stormwater drainage system shall be designed to ensure no adverse impact on adjoining properties by the diversion, damming or concentration of stormwater flows.

The proposed method of stormwater discharge shall be detailed in the Construction Certificate issued by the Certifying Authority.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

71 K210 - Stormwater Management

The stormwater management system shall be consistent with plan/s lodged for development approval, prepared by Australian Consulting Engineers, reference number 171195, revision G, dated 04.11.2020.

Engineering plans and supporting calculations for the stormwater management systems are to be prepared by a suitably qualified person and shall accompany the application for a Construction Certificate.

Prior to the issue of any Construction Certificate, the Certifying Authority shall ensure that the stormwater management system has been designed in accordance with Penrith City Council's Stormwater Drainage for Building Developments and Water Sensitive Urban Design (WSUD) Policies.

72 K222 - Access, Car Parking and Manoeuvring – General

Prior to the issue of any Construction Certificate or Subdivision Works Certificate, the Certifying Authority shall ensure that vehicular access, circulation, manoeuvring and pedestrian and parking areas associated with the subject development are in accordance with AS 2890.1, AS 2890.2, AS 2890.6 and Penrith Development Control Plan.

73 K224 - Construction Traffic Management Plan

Prior to the commencement of any works on-site (including demolition works) or prior to the issue of any Construction Certificate, a Construction Traffic Management Plan (CTMP) shall be submitted to Council's City Assets Department for endorsement. The CTMP shall be prepared by a suitably qualified consultant with appropriate training and certification from the Roads & Maritime Service (RMS). The CTMP shall include details of any required road closures, work zones, loading zones and the like. Approval of the CTMP may require approval of the Local Traffic Committee. Please contact Council's City Assets Department on 4732 7777 and refer to Council's website for a copy of the Temporary Road Reserve Occupancy Application form.

74 K403 - Major Filling/Earthworks

All earthworks shall be undertaken in accordance with AS 3798 and Penrith City Council's Design Guidelines for Engineering Works for Subdivisions and Developments and Engineering Construction Specification for Civil Works.

The level of testing shall be determined by the Geotechnical Testing Authority/Superintendent in consultation with the Principal Certifying Authority.

75 K405 - Turf to Verge

Upon completion of all works in the road reserve, all verge areas fronting and within the development are to be turfed. The turf shall extend from the back of kerb to the property boundary, with the exception of concrete footpaths, service lids or other infrastructure which is not to be turfed over. Turf laid up to concrete footpaths, service lids or other infrastructure shall finish flush with the edge.

76 K501 - Penrith City Council clearance – Roads Act/ Local Government Act

Prior to the issue of any Occupation Certificate, the Principal Certifying Authority shall ensure that all works associated with a Section 138 Roads Act approval or Section 68 Local Government Act approval have been inspected and signed-off by Penrith City Council.

77 K503 - Works as executed – General and Compliance Documentation

Prior to the issue of an Occupation Certificate, works-as-executed drawings, final operation and maintenance management plans and any other compliance documentation shall be submitted to the Principal Certifying Authority in accordance with Penrith City Council's Engineering Construction Specification for Civil Works, WSUD Technical Guidelines and Stormwater Drainage for Building Developments Policy.

An original set of works-as-executed drawings and copies of the final operation and maintenance management plans and compliance documentation shall also be submitted to Penrith City Council with notification of the issue of the Occupation Certificate where Penrith City Council is not the Principal Certifying Authority.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

78 K504 - Stormwater Compliance

Prior to the issue of any Occupation Certificate, the Principal Certifying Authority shall ensure that the:

a) Stormwater management systems (including on-site detention and water sensitive urban design)

- Have been satisfactorily completed in accordance with the approved Construction Certificate and the requirements of this consent.
- Have met the design intent with regard to any construction variations to the approved design.
- Any remedial works required to be undertaken have been satisfactorily completed.

Details of the approved and constructed system/s shall be provided as part of the works-as-executed drawings.

79 K505 - Restriction as to User and Positive Covenant

Prior to the issue of any Occupation Certificate, a restriction as to user and positive covenant relating to the:

a) Stormwater management systems (including on-site detention and water sensitive urban design)

shall be registered on the title of the property. The restriction as to user and positive covenant shall be in Penrith City Council's standard wording as detailed in Penrith City Council's Stormwater and Drainage for Building Developments Policy.

80 K510 - Entry/ Exit signage

Prior to the issue of any Occupation Certificate, signage which is clearly visible from the public road shall be placed within the development site.

The signage shall indicate that the western vehicular access is to be used for ingress purposes only and appropriately signposted "Entry Only". The eastern vehicular access is to be used for egress purposes only and appropriately signposted "No Entry".

81 K601 - Stormwater management system operation and maintenance

The stormwater management systems shall continue to be operated and maintained in perpetuity for the life of the development in accordance with the final operation and maintenance management plan.

Regular inspection records are required to be maintained and made available to Penrith City Council on request. All necessary improvements are required to be made immediately upon awareness of any deficiencies in the stormwater management systems.

82 K Special (BLANK)

All car parking and manoeuvring must be in accordance with AS 2890.1; AS 2890.2; AS 2890.6 and Council's requirements.

83 K Special (BLANK)

All visitor parking spaces must be designed to accommodate User Class 3 (i.e. minimum 2.6m wide) in accordance with Table 1.1 and Figure 2.2 of AS 2890.1 and staff parking spaces must be a minimum of 2.4m wide.

84 K Special (BLANK)

Appropriate signage and pavement markings are required to reinforce the direction of vehicle circulation and the locations of staff/visitor parking spaces.

85 K Special (BLANK)

The required sight lines around the driveway entrances are not to be compromised by landscaping, fencing or signage and sight distances are to be in accordance with Australian Standard 2890:1: 2004.

86 K Special (BLANK)

All vehicles are to enter and exit the site in a forward direction.

Landscaping

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

87 L001 - General

All landscape works are to be constructed in accordance with the stamped approved Landscape Concept Plan, Sheets 1, 2 and 4 of 5, Revision 6, prepared by Tessa Rose Playspace and Landscape Design and dated 02/12/20 (and as amended by any condition of this consent).

Landscaping shall be maintained:

- in accordance with the approved plans, and
- in a healthy state, and in perpetuity by the existing or future owners and occupiers of the property.

If any of the vegetation comprising that landscaping dies or is removed, it is to be replaced with vegetation of the same species and, to the greatest extent practicable, the same maturity as the vegetation which died or was removed.

88 L002 - Landscape construction

The approved landscaping for the site must be constructed by a suitably qualified and experienced landscape professional.

89 L003 - Report requirement

Upon completion of the landscape works associated with the development and prior to the issue of an Occupation Certificate for the development, an Implementation Report must be submitted to the Principal Certifying Authority attesting to the satisfactory completion of the landscaping works for the development. This report shall be prepared be a suitably qualified and experienced landscape professional.

An Occupation Certificate should not be issued until such time as a satisfactory Implementation Report has been received. If Penrith City Council is not the Principal Certifying Authority, a copy of the satisfactory Implementation Report is to be submitted to Council together with the Occupation Certificate for the development.

90 L005 - Planting of plant

All plant material associated with the construction of approved landscaping is to be planted in accordance with the Tree Planting Specification prescribed in Penrith Development Control Plan 2014.

91 L006 - Aust Standard

All landscape works are to meet industry best practice and the following relevant Australian Standards:

- AS 4419 Soils for Landscaping and Garden Use,
- AS 4454 Composts, Soil Conditioners and Mulches, and
- AS 4373 Pruning of Amenity Trees.

92 L008 - Tree PreservationOrder

No trees are to be removed, ringbarked, cut, topped or lopped or willfully destroyed (other than those within the proposed building footprint or as shown on the approved plans) without the prior consent of Penrith City Council and in accordance with Council's Tree Preservation Order and Policy.

93 L Special (BLANK)

Prior to the issue of a Construction Certificate, an amended landscape plan shall be submitted to and approved by Council providing landscape screening along the northern side of the northern acoustic fence including species that will provide greater screening within the western side setback.

Development Contributions

94 N001 - Section 7.12 Contribution

This condition is imposed in accordance with Penrith City Council's Development Contributions Plan for Non-Residential Development. Based on the current rates detailed in the accompanying schedule attached to this Notice, $33,461.00 is to be paid to Penrith City Council prior to a Construction Certificate being issued for this development (the rates are subject to quarterly reviews). If not paid within the current quarterly period, this contribution will be reviewed at the time of payment in accordance with the adopted Section 7.12 plan.

The projected rates of this contribution amount are listed in Council's Fees and Charges Schedule. Council should be contacted prior to payment to ascertain the rate for the current quarterly period. The Section 7.12 invoice accompanying this consent should accompany the contribution payment. The Section 7.12 Contributions Plan for Non-Residential Development may be inspected at Council's Civic Centre, 601 High Street, Penrith.

Note: The timing of contributions payable may be otherwise affected in accordance with Planning Circular PS20-003 dated 3 July 2020 and the associated NSW Government Ministerial Direction - Infrastructure Contributions.

Payment of Fees

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

95 P001 - Costs
All roadworks, dedications and drainage works are to be carried out at the applicant's cost.

96 P002 - Fees associatedwith Council land (Applies to all works & add K019)
Prior to the commencement of any works on site, all fees associated with Penrith City Council-owned land and infrastructure shall be paid to Council. These fees include Road Opening fees and Infrastructure Restoration fees.

Certification

97 Q006 - Occupation Certicate (Class 2 - 9)
An Occupation Certificate is to be obtained from the Principal Certifying Authority on completion of all works and prior to the occupation of the building.

The Occupation Certificate shall not be issued if any conditions of this consent, but not the conditions relating to the operation of the development, are outstanding.

A copy of the Occupation Certificate and all necessary documentation supporting the issue of the Certificate is to be submitted to Penrith City Council, if Council is not the Principal Certifying Authority.

98 Q01F - Notice of Commencement & Appointment of PCA2 (use for Fast Light only)
Prior to the commencement of any earthworks or construction works on site, the proponent is to:
(a) employ a Principal Certifying Authority to oversee that the said works carried out on the site are in accordance with the development consent and related Construction Certificate issued for the approved development, and with the relevant provisions of the Environmental Planning and Assessment Act and accompanying Regulation, and
(b) submit a Notice of Commencement to Penrith City Council.

The Principal Certifying Authority shall submit to Council an "Appointment of Principal Certifying Authority" in accordance with Section 81A of the Environmental Planning and Assessment Act 1979.

Information to accompany the Notice of Commencement
Two (2) days before any earthworks or construction/demolition works are to commence on site (including the clearing site vegetation), the proponent shall submit a "Notice of Commencement" to Council in accordance with Section 81A of the Environmental Planning and Assessment Act 1979.

Operation of OSSM

99 R101 - Operational Approval prior to use
The on-site sewage management (OSSM) system and ETA bed shall be designed, installed and operated in accordance with:

- Penrith City Council's On-Site Sewage Management and Greywater Reuse Policy,
- the Council approved amended Wastewater Report that is required further to the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020 and that is to address total staff numbers of 19 persons and amended reserve areas for potential future land application,
- the Council approved Hydraulic Engineers Report required to be submitted to and approved by Penrith City Council prior to the installation of the OSSM system/wastewater treatment plant (Econocycle Maxi 35) and any external drainage, and
- the conditions of this consent.

Prior to the issue of the 'Approval to Operate', a Commissioning Certificate for the OSSM system shall be provided to Penrith City Council for approval. This certificate shall certify that the wastewater treatment system and ETA bed (including associated infrastructure) has been installed, and will operate in compliance with, the requirements above.

Prior to the issue of an Occupation Certificate and before the OSSM system can be used, an 'Approval to Operate' for the OSSM system is to be sought from and issued by Penrith City Council.

100 R104 - No alterations without approval
The on-site sewage management (OSSM) system, including all associated infrastructure, including drainage lines, distribution pipes and effluent management areas, shall not be altered without the prior approval of Penrith City Council.

101 R105 - Plumbing Code of Australia
All drainage and sanitary plumbing shall be carried out in accordance with the requirements of the Plumbing and Drainage Act 2011 and the Plumbing Code of Australia.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

102 R109 - No effluent runoff

There shall be no effluent runoff from the subject property to adjoining properties, public places or reserves.

103 R111 - AWTS Servicing

The owner/occupier shall enter into an annual service contract with the manufacturer, distributor or other person authorised (in writing) by Penrith City Council to service the aerated septic tank(s) every three (3) months from the date of commissioning in accordance with:

- the manufacturers specifications and recommendations
- the council approved amended Wastewater Report
- the Council approved Hydraulic Report

i. The three monthly service shall include a check on all mechanical, electrical and functioning parts of the aerated system including:

- the chlorinator, replenishment of the disinfectant, the UV disinfection unit, as appropriate
- all pumps and switches,
- the air blower, fan or air venturi,
- the alarm system,
- the effluent disposal area
- the slime growth on the filter media, and
- the operation of the sludge returns system.

ii. In addition to the above, the following field tests are to be carried out at every service:

- free residual chlorine using DPD colorimetric or photometric method,
- pH from a sample taken from the irrigation chamber,
- dissolved oxygen from a sample taken from the final aeration or stilling chamber (although recommended) is optional.

iii. On the yearly anniversary date of the commissioning of the system, an annual service of the system shall also be carried out which includes a check on the sludge accumulation in the septic tank (primary treatment tank) and the clarifier, where appropriate.

iv. For systems which utilise the sewage treatment principle of activated sludge or contact aeration, a sludge bulking test, known as a SV30 Test, shall also be conducted on an annual basis. This test is to determine whether the accumulated sludge is bulking, indicating that the aeration compartment(s) will require desludging.

v. On completion of each service, a service report sheet is to specify all service items and test results, the amount of chlorine compound provided, parts replaced (if applicable), the date the service was conducted and the technician’s name. A copy of the service report is to be:

- given to the property owner and another to the applicant (if not the same), and
- forwarded to Penrith City Council.

Each service agent shall provide a registered business office which, if unattended during business hours, is provided with a telephone answering device or service. A means of reporting a malfunction or breakdown outside normal business hours shall be available. In the event of a breakdown or malfunction, the service agent shall, within 24 hours of the breakdown or malfunction, ensure that temporary repairs are carried out to the aerated system to ensure continued operation of the system. This may necessitate provision of adequate spare parts and temporary replacement blowers and irrigation pumps where repairs cannot be completed on site.

104 R115 - No structures on EMA

No concreting, driveways, vehicles or any other structure or access way is to be located over any portion of the effluent management area or the reserve areas.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

105 R123 - Hydraulic Report

Prior to the installation of the on-site sewage management (OSSM) system/wastewater treatment plant (Econocycle Maxi 35) and any external sanitary drainage, a Hydraulic Report, prepared by a suitably qualified and experienced Hydraulic Engineer, is to be submitted to Penrith City Council for approval. The Hydraulic Report is to provide hydraulic engineer certified design and details for the OSSM system, including all associated infrastructure and components, in accordance with the Council approved amended wastewater report that is required to be submitted and approved by Council further to the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020.

The Hydraulic Report is to include a site plan showing the location of all infrastructure required and is to be in accordance with the Council approved amended wastewater report that is required to be submitted and approved by Council further to the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020 and that addresses the hydraulic loading for 96 children and 19 staff. The size, specifications and design details and requirements for all aspects of the OSSM system are to be clearly included in the Hydraulic Report, including but not limited to:

- final tank/holding tank details, sizing and specification for ensuring dosing in accordance with the 'On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020
- required pump, including specification details and demonstrating that it is satisfactorily hydraulically sized taking into account the head needed, pressure dosing requirements and flow rate, including pressure loss in the pipes and the desired flow pressure needed from the laterals to evenly distribute effluent throughout the bed
- filter specifications
- matters listed in Table 5 of the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020

The Hydraulic Engineer's Certification is to demonstrate the even distribution of effluent across the ETA bed.

Prior to the issue of an Occupation Certificate, the Hydraulic Engineer is to certify that the OSSM system has been installed in accordance with the Council approved Hydraulic Report. This certification is to be submitted to Council for approval, prior to issue of an Occupation Certificate.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

106 R124 - Operational Wastewater Management Plan

Prior to the issue of an Occupation Certificate, an Operational Wastewater Management Plan (OWMP) for the on-site sewage management (OSSM) system is to be provided to Penrith City Council for consideration and approval. The OWMP shall be prepared by a suitably qualified consultant in consultation with Council, and may need to be amended to include the comments provided by Council. The OWMP is to address:

- All environmental aspects of the operation of the on-site sewage management system
- All systems and controls to be implemented to minimise the potential for any adverse environmental impacts
- A program for ongoing monitoring and review to ensure that the OWMP remains contemporary with relevant environmental standards. Council is to be consulted prior to any amendments of the OWMP. Council may request a review of the OWMP or any proposed amendments.

The OWMP is to include but not be limited to the following:

- System information (including specifications and site plans)
- Monitoring and testing
- Maintenance and servicing program (for the whole system including treatment and disposal system and all associated infrastructure)
- System performance
- System failure contingency
- Odour management
- Landscape and disposal area management
- Health and safety

The OSSM system is to be operated in accordance with the requirements of the Council approved OWMP.

107 R129 - Reserve area with plan

The Council approved reserve areas, once approved by Council in the amended wastewater report (that is required further to the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020 and that is to address total staff numbers of 19 persons and amended reserve areas for potential future land application) are not to be used for any ancillary purpose. The reserve areas are not to be developed In the event that the primary effluent disposal area is to fail, the reserve areas are to be used. Written approval is to be obtained from Penrith City Council prior to any works being undertaken.

108 R 100 Special

Prior to the installation of the on-site sewage management (OSSM) system/wastewater treatment plant (Econocycle Maxi 35) and any external sanitary drainage, an amended wastewater report, further to the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020, is to be submitted to Penrith City Council for approval. The amended report is to be prepared by a suitably qualified and experienced consultant and is to:

- include provision for the proposed staff number of 19
- relocate reserve area 2 to the north of the internal fence that is located to the north of the outdoor play area, and in accordance with *Penrith City Council's On-Site Sewage Management and Greywater Reuse Policy 2014.* Buffer distances are to be provided in accordance with Council's Policy.

Reserve area 2 is not approved in the location shown in the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020. The amended wastewater report is to include an amended Land Application Area and Site Design Plan showing reserve area 2 located to the north of the internal fence that is north of the outdoor play area, and in accordance with *Penrith City Council's On-Site Sewage Management and Greywater Reuse Policy 2014.*

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

109 R Special BLANK

The ETA bed and upslope diversion drains (including to the treatment tanks) are to be constructed in accordance with Sections 4.2 and 4.3, Table 5 and Figure 10 of the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020. The Wastewater Consultant or Hydraulic Engineer is to supervise the construction of the ETA bed.

Prior to the issue of an Occupation Certificate, certification is to be provided to Penrith City Council, certifying that the construction of the ETA bed is in accordance with the above.
This certification is to be provided by the Wastewater Consultant or Hydraulic Engineer.

Note:

- This condition refers to the construction of the ETA bed. The sizing of the ETA bed is to be in accordance with the Council approved amended wastewater report that is required to be submitted to and approved by Council, further to the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020.

- The requirements of this condition regarding certification for the construction of ETA bed also applies to the construction of any future ETA bed/s within the reserve areas, if required in the future.

110 R Special BLANK

All plumbing fixtures used within the child care centre are to have a minimum water efficiency rating of three-stars.

111 R Special BLANK

Prior to the issue of an Occupation Certificate, a Commissioning Certificate, prepared by the Wastewater Consultant or Hydraulic Engineer, is to be submitted to and be approved by Penrith City Council. The Commissioning Certificate is to demonstrate that satisfactory pre-commissioning checks have been completed with the entire system water and pressure tested. The Commissioning Certificate is to certify that the OSSM system is installed and shall operate in compliance with:

- Penrith City Council On-Site Sewage Management and Greywater Reuse Policy,
- the Council approved amended Wastewater Report that is required to be submitted to and approved by Council, further to the 'Site and Soil Assessment for On-Site Wastewater Management Commercial System' (Report Reference: SJDSSE_002) prepared by Roberts Resources and dated 3 September 2020 and that is to address total staff numbers of 19 persons and amended reserve areas for potential future land application,
- the Council approved Hydraulic Engineers Report required to be submitted to and approved by Penrith City Council prior to issue of a Construction Certificate, and
- the conditions of this consent.

112 R Special BLANK

Warning signs are to be erected around and across the ETA bed area in order to keep pedestrian traffic off the bed. A signage plan is to be submitted to Penrith City Council for approval prior to the issue of an Occupation Certificate. This information may be submitted as part of the OWMP that is required to be submitted to and approved by Council prior to the issue of an Occupation Certificate.

113 R Special BLANK

The on-site sewage management (OSSM) system/wastewater treatment plant (Econocycle Maxi 35) is approved for the hydraulic loading associated with 96 children and 19 staff in attendance at the child care centre. Any proposed increase to this load based on population or any additional development on the site, may require a new wastewater report for Council's consideration and approval, and may be subject to separate application and approval requirements.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix - Development Control Plan Compliance

Development Control Plan 2014

Part C - City-wide Controls

C1 Site Planning and Design Principles

The proposed child care centre meets the required front, rear and side boundary setbacks outlined within Part D1 Rural Land Uses. Consistency with the surrounding streetscape has therefore been maintained leading to the ability to maximise visual and acoustic privacy as well as adequate landscaping to assist in softening the built form of the development.

Safety and Security (Principles of Crime Prevention Through Environmental Design CPTED)
The proposal has been assessed as satisfactory with regard to the principles of CPTED and includes safety and security features applicable to the use of the site as a child care centre. The design does not include areas where concealment or crime is likely to occur and includes a visible pedestrian foyer entry from the car park. The entry foyer is centrally located and is provided with a visual connection to the pedestrian pathway. Windows are provided to the street frontages from the staff/administration areas providing opportunity for passive surveillance. Public/private boundaries are adequately reinforced by the provision of landscaping.

Maximising Access and Adaptability
The proposal has been assessed as acceptable having regard to the 7 principles of the section including equitable access, flexibility in use and simple and intuitive use. The development provides for 2 accessible parking spaces within the car park. An Access Report prepared by Lindsay Perry Associates was provided with the application and the recommendations will be required via a recommended condition of consent.

C3 Water Management

Water Quality
Section 3.1 of Council ‘s Water Sensitive Urban Design (WSUD) Policy requires new development over 2500m^2 to have a 80% on-site water reuse. The WSUD Policy does apply to this development given the its size. Therefore, the proposal is requested to demonstrate compliance via water reuse calculations or by demonstrating water efficiency and the submission of a WSUD strategy.

The submitted stormwater plans do not provide any information regarding non-potable water reuse demand and compliance with Section 3.1 of Council's WSUD Policy.

Prior to the issue of a Construction Certificate, the applicant will need to demonstrate the proposal's compliance with Section 3.1 of Council's WSUD Policy and ensure that the development will achieve a 80% non-potable water reuse. An amended MUSIC model and stormwater concept plan demonstrating compliance with Section 3.1 of Council's WSUD Policy will be required via a recommended condition of consent.

Stormwater Management and Drainage
Initially, a stormwater absorption pit was proposed and further details of this pit were requested, including a report detailing the soil's ability to absorb stormwater flows from the proposed on-site stormwater detention (OSD) tank, including expected absorption times and capacity for various storm durations.

The stormwater plans were subsequently amended and the absorption pit removed due to the low permeability of the soil. A level spreader system has been proposed in lieu of the absorption pit.

Although the subject site is located outside of a mandatory on-site detention area, an OSD tank has been provided to limit stormwater discharge during large storm events and therefore minimise any scouring or erosion on downstream properties. The OSD system will ensure there are no adverse impacts on adjoining properties in relation to stormwater flows. The OSD area was re-located from the front setback to the rear area underneath the proposed gazebo. While

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

safety concerns were raised as to whether this OSD area, which is partially protruding, could pose an entrapment issue for children, appropriate fencing will mitigate any safety concerns.

Details were also provided, as requested by Council, regarding emergency overland flows in the event of a blockage or system failure of the stormwater system. The submitted plans demonstrated that the stormwater system will have no adverse impacts on adjoining properties in this regard.

Council's Development Engineer has reviewed the proposed stormwater design and raised no objections in this regard subject to recommended conditions of consent.

C5 Waste Management

On-site waste management is proposed. The plans detail a waste storage room 1.8m x 3m suitable for the storage of 2 x 1,100 litre bins. The submitted Traffic Report details access to the waste storage area, which can also be observed on the plans via the width of the driveways which can accommodate waste truck swept paths. Council's Traffic Engineer reviewed the proposal in this regard and raised no objection.

Further, the collection of waste will be by a private contractor, not Council.

Overall, the proposed waste management arrangements are considered supportable.

C6 Landscape Design

Council requires that landscape design promote best practice environmentally sustainable development (ESD) principles such as the use of low maintenance, drought tolerant native or endemic species and the use of drip irrigation or the like, to reduce water consumption.

Initially, there were many trees and shrubs proposed which would not grow within the effluent areas due to their species type. There was also a lack of trees that represented the Cumberland Plain Woodland (CPW) - i.e. gums. There were also certain trees that were inappropriate given the lack of screening they would provide - i.e. blueberry ash along the side setbacks. In addition, it was requested that the side setbacks be prioritised for landscaping rather than any effluent areas given their importance in screening both the acoustic fences and the proposal at large in its rural context.

The revised landscape design is considered satisfactory. Water tolerant species are now proposed including large trees in the rear play area as well as the front setback. Two canopy trees are now included within the road verge and 9 more trees included within the front setback that will reach a mature height of between 8m and 25m to soften the built form and contribute to the streetscape. It is noted that the taller trees are spread out to ensure surveillance can be maintained from the facility to the street. Within the side setbacks, medium sized trees are proposed that are both appropriate to screen the development from neighbouring properties and that will reach maturity sustainably in effluent reserve areas. No species proposed are considered detrimental to children with allergies.

Council's Landscape Architect reviewed the amended landscape design and raised no objections, subject to recommended conditions of consent. In addition, it is noted that the effluent reserve area along the western side setback is to be removed, as required by a recommended condition of consent. Therefore, there will be greater potential for landscape screening along this side setback. An amended landscape plan will be required via a recommended condition of consent.

C9 Advertising and Signage

The proposal does not include signage details, however it does include a fascia sign location and walls to mount signage along the front property boundary.

The DCP states that only one building identification sign is to be erected on the property. The

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

DCP also states that in rural zones, signage shall not be freestanding in the landscape, but shall relate to walls, fences or buildings. The objectives of these controls are to ensure that the amenity, landscape and character of rural and residential areas are maintained and roadside clutter minimised.

As three signs are proposed, two of which are freestanding, the two signage walls will be crossed and required to be deleted from the approved plans. This will ensure the front setback remains open and landscaped, reflective of the rural character of the area and consistent with the objectives for rural signage.

Further, a recommended condition of consent will require the fascia signage details to be provided to ensure the detail integrates with the style, character and function of the proposed building, and is reflective of the area's landscape and rural character.

C10 Transport, Access and Parking

The proposal is assessed to comply with the general objectives of the Transport, Access and Parking section of the DCP. Specifically, the proposal has provided safe and compliant pedestrian and car parking access.

The DCP specifies that car parking for child care centres is required to be provided at a rate of 1 car space per 10 children, plus 1 car space per employee. The development proposes to employ 19 individuals and provide for 96 children, requiring 29 car spaces be provided on site. The proposal complies with this requirement with 30 parking bays (19 staff and 11 visitor bays) being provided.

In regard to the centre's impact on the surrounding road network, the submitted Traffic Impact Assessment suggests a peak trip generation of 77 and 68 vehicles per hour for the AM and PM peaks respectively. Council's Traffic Engineer requested the applicant conduct traffic volume counts on Mt Vernon Road to determine the current traffic demand and assess whether the road will remain within its environmental capacity post development.

A Traffic Volume Environmental Capacity Report prepared by GTK Consulting, dated October 2020, was subsequently submitted. This report outlines the modelling undertaken and concludes that traffic generation attributed to the proposal will operate within its maximum environmental capacity (as per the RMS Guide to Traffic Generating Developments) post development and the road network can cater for the traffic generated by the development. Council's Traffic Engineer reviewed this report and raised no objections.

In addition, it is noted that the originally proposed path from the car park out to Mt Vernon Road has been deleted from the architectural plans, as Council requested. This will discourage cars parking within the verge area given there is no kerb and gutter. The stormwater plans still show the path and this will be required to be deleted from the approved pans.

C12 Noise and Vibration

The application was accompanied by an Acoustic Impact Assessment prepared by Acoustic Logic. Council's Environmental Management Officer reviewed this assessment and the proposal and raised no objections.

The Acoustic Report recommends operational and design mechanisms to ensure that the child care centre will operate in an acoustically compliant manner and control traffic noise intrusion from Mt Vernon Road, aircraft noise intrusion from flights departing the future Western Sydney Airport and noise emissions from the operation of the facility. These recommendations include acoustic barrier fencing, external glazing, wall, roof and ceiling treatments, restricting the overall capacity and the number of children outside at any one time to 35 and restricting the hours for deliveries, cleaning and operation of mechanical plant equipment.

The Acoustic Report was amended on request from Council, incorporating cross sections of the acoustic fence, including construction requirements, and addressing the total traffic noise to be

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

generated. The Acoustic Report, as amended, was found to be satisfactory.

A recommended condition of consent will ensure that the recommendations provided in Section 8.1 of the Acoustic Report are incorporated into the detailed design and construction of the development (including the acoustic fencing). The recommendations and management controls provided in Section 8.2 of the Acoustic Report shall be implemented during the operation of the development. As such, the development is not considered to likely to have an adverse noise impact on the surrounding locality.

C13 Infrastructure and Services

Initially, an on-site sewage management (OSSM) system was proposed within the rear half of the property. The accompanying wastewater report contained inadequate information as the hydraulic load generated by the development required a commercial system rather than the system proposed. After requests from Council's Environmental Management Officer regarding the proposed system, an alternative on-site sewage management system was proposed within the front potion of the property.

The amended OSSM system proposes the primary disposal area and part of the reserve area within the front landscaped setback. The remaining reserve area required is proposed within the side setbacks, between the acoustic fencing and the side boundaries. The accompanying amended wastewater report is comprehensive and has been prepared by an appropriately qualified and experienced wastewater consultant.

it is noted that reserve area 2 is not located in accordance with Council's On-Site Sewage Management and Greywater Reuse Policy and does not comply with the required setback distances from property boundaries. Reserve area 2 is proposed to be 3m from the property boundary. As the ETA (evapotranspiration) bed will be located uphill/upslope of the western property boundary, a minimum setback distance of 6m is considered appropriate based on the design of the ETA bed. Accordingly, the location of reserve area 2 is not supported. A recommended condition of consent will require the submission to Council of an amended Land Application Plan prior to the issue of a Construction Certificate, showing reserve area 2 to the rear of the internal fence and in accordance with Council's On-Site Sewage Management and Greywater Reuse Policy.

Given that the wastewater load in the submitted wastewater report has been calculated based on 16 staff rather than the proposed 19 staff, the sizing of the ETA bed and reserve areas will need to be reviewed and likely increased. However, the information submitted demonstrates that there is ample room within the broader site, beyond the internal fencing, to accommodate a satisfactory reserve area. As such, this anomaly can be addressed via a recommended consent condition requiring a revised wastewater report to accommodate the 19 staff proposed within the Operational Wastewater Management Plan.

Council's Environmental Management Officer has reviewed the submitted wastewater report and proposed OSSM system and considers that it demonstrates that wastewater from the development can be satisfactorily managed on the site, subject to recommended consent conditions.

D1 Rural Land Uses

D1.1 Rural Character

The objective of this section is to retain and protect each of the elements that make up the rural character of Penrith. The key components that contribute to Penrith's rural character are the rural landscapes, agricultural lands, native vegetation, biodiversity and riparian corridors, areas of mixed rural uses and rural living areas. Of relevance to this site is the rural landscape, rural living areas and biodiversity.

The proposal retains and protects the rural landscape via the landscaped front and side setbacks, the expansive 65m rear setback of groundcover that remains untouched by the proposal and by compensating for native vegetation that is to be lost due to the development footprint on the property. The additional landscaping which covers approximately 2,500m^2 provides an appropriate embellishment relative to the proposed built form and hardstand area of 2,195m^2. This landscaping will enhance the amenity of the streetscape,

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

particularly considering the site's existing conditions. In addition, approximately 5,500m^2 of existing vegetation the rear of the property will be left as is, namely as scattered grassland cover which protects the remnant biodiversity.

Originally, the height and presentation of the acoustic fence (2.4m high and setback 3m from the side boundaries) was a key concern which did not integrate into the landscape as the objectives of the E4 zone and the rural development controls require. The DCP states that fencing is to be of an open rural nature consistent in style with that normally found in rural areas. Given structures in rural areas are required to be setback 5m from side boundaries and that this fence will be solid, it should be treated like any other structure in this regard.

On Council's request, the proposal was amended to reduce the height of the acoustic fence to 1.8m forward of the building line and increase the setback of the 2.4m high component to 5m. Although this is still not an open style fence, it is now contextually appropriate given it is surrounded by an adequate landscape buffer that is wide enough for planting, access and maintenance. The landscape buffer surrounding the side fences includes shrub style planting that will reach, if not exceed, the height of the fence, coupled with some canopy tree planting. In addition, although the fence will be fibre cement for acoustic reasons, timber posts will be mounted on the exterior to better blend with the area's earthy tones and typical materials.

It is noted that all boundary fencing is to be retained as is, and is of an open rural style, whereas no fencing along the front boundary is proposed in keeping with the character of the area.

The proposal also reflects the style of rural dwellings in the area, as discussed further below.

D1.2 Rural Dwellings

While the following controls relate to rural dwellings, Section D1.5.1 of the DCP states that non-agricultural development shall be designed with regard to the rural character of the area and the form and scale of buildings on rural land surrounding the site. Therefore, the rural dwelling controls are considered below for consistency with the objectives for non-agricultural development in rural areas.

1.2.1 Siting and Orientation of Dwellings and Outbuildings
Based on the siting and design of the building, protection of privacy will be maintained, whilst ensuring that maximum solar access is proposed. The site has been previously cleared, however suitable landscaping is proposed to ensure increased amenity on the site and in the surrounds and to integrate the development into the surrounding area.

The proposed building will be single storey, which is reflective of other buildings in the area. The roofline has been designed to provide aesthetic appeal to the building, whilst also remaining consistent with more modern dwellings in the area.

1.2.2. Setbacks and Building Separations
The minimum side setback for dwellings is 5m where the allotment is less than 2 hectares. The proposal, as amended, complies with this requirement given the building ranges from 8m-11m from the side setbacks and the acoustic fence is largely setback 5m, providing an adequate perimeter for landscaping.

1.2.3 Site Coverage
The proposal includes a building with a ground floor footprint of 798m^2. This is above the maximum ground floor control under this section of the DCP which is 600m^2. However, the surrounding area has numerous dwellings that well exceed this requirement. It is also noted a previous approval on this property (DA17/0331) approved a dwelling at 891m^2. Further, the proposal does comply with the requirement to have a maximum overall ground floor dimension of 45m, with a maximum of 18m at any one point, which assists in moderating site coverage. Lastly, as the land area of the site is 1.033 hectares, the proposal covers less than 10% of the site area and will not result in the site being overdeveloped. Therefore, the numeric non-compliance with this development control is acceptable as the proposal is not inconsistent with

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

the objective to ensure that site coverage is appropriate relative to the size of the site and the character of the area.

It should be noted that the ‘ground floor footprint’ is the area measured from the external face of any wall of any dwelling, outbuilding (other than a farm building), dual occupancy dwelling, garage or undercover car parking area, animal house or garden shed. Therefore, the ground floor footprint does not include the proposed verandah and gazebo.

The DCP also states that no more than 3 undercover car parking spaces shall face towards a public road or place. Any additional garages shall be setback behind the building line and screened. While the proposed car park does not comply with this control, it has been substantially setback by 15m and adequately screened with landscape embellishments to ensure that the car park does not detract from the rural landscape as viewed from the streetscape, nor result in an excessive hardstand site coverage.

Overall, the scale of the proposal is greater than that of a rural dwelling. However, the siting and design has had regard to adjoining dwellings and the proposal has been integrated within the landscape setting, noting the site as a whole will remain approximately 80% landscaped.

1.2.4 Height, Scale and Design
The DCP states that the floor level of a dwelling at any point should not be greater than 1m above or below the natural ground level immediately below the floor level of that point. The proposed development provides for a level difference of approximately 1.5m along the proposal's north-western corner, although the proposed development will result in floor levels predominantly 1m above natural ground level along the proposal's western side.

Notwithstanding, the proposed development meets the height requirements of this section of the DCP considering the proposed ceiling level does not exceed 8m above natural ground level and the proposal is substantially setback from the neighbouring property to the west. The proposed level difference is behind the landscape buffer and acoustic fence and therefore will be screened from the neighbouring property and screened from the street by the proposed building.

In this regard, the proposed height, scale and design is considered satisfactory.

1.2.5. Dual Occupancy Dwellings
The DCP states that access to dual occupancies is to be via a common driveway to both dwellings. While an entry and exit driveway is proposed in this instance, it is considered appropriate as it allows for traffic flow efficiencies which will minimise disruption to Mt Vernon Road. Given the proposed landscaping and driveway arrangement, it is considered this outcome is not disruptive to the rural landscape.

1.2.7 Materials and Colours
The materials included in the design of the proposed child care centre generally include earthy tones that are reflective of the existing character of the area, as the DCP requires.

D1.5 Non Agricultural Development

1.5.1 Rural Amenity and Design
For the aforementioned reasons, along with the noise and traffic matters discussed in relation to the Educational Establishments and Child Care Facilities SEPP and associated Child Care Planning Guideline, the proposal is considered consistent with the objectives within this section, being to protect rural character and amenity and avoid unnecessary conflicts between inconsistent land uses.

D5 Other Land Uses

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

D5.2 Child Care Centres

It is noted that the controls within this section are overridden by the Educational Establishments and Child Care Facilities SEPP and associated Child Care Planning Guideline, other than those concerning building height, side and rear setbacks and car parking rates. These matters have been discussed elsewhere in this Appendix under Section C10 Transport, Access and Parking (car parking rates) and under Section D1 Rural Land Uses (building height and side and rear setbacks).

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

CONTEXTUAL SITE PLAN
SCALE 1 : 500

NOTE:
EXISTING DWELLING SETBACK
DIMENSIONS ARE APPROXIMATE ONLY

0 10 20 50
SCALE - 1:1000 @ A1 METRES

AMENDMENTS

Issue	Description	Date	By
A	Mound added to front setback	01.09.20	GM
	Acoustic fence setback increased to 5m		
	Stormwater absorption pit relocated		
	Stormwater flow spreader added		
	Wastewater absorption beds removed		
	Wastewater treatment tanks added		

Development Application

PROJECT WORKS DESIGN

Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

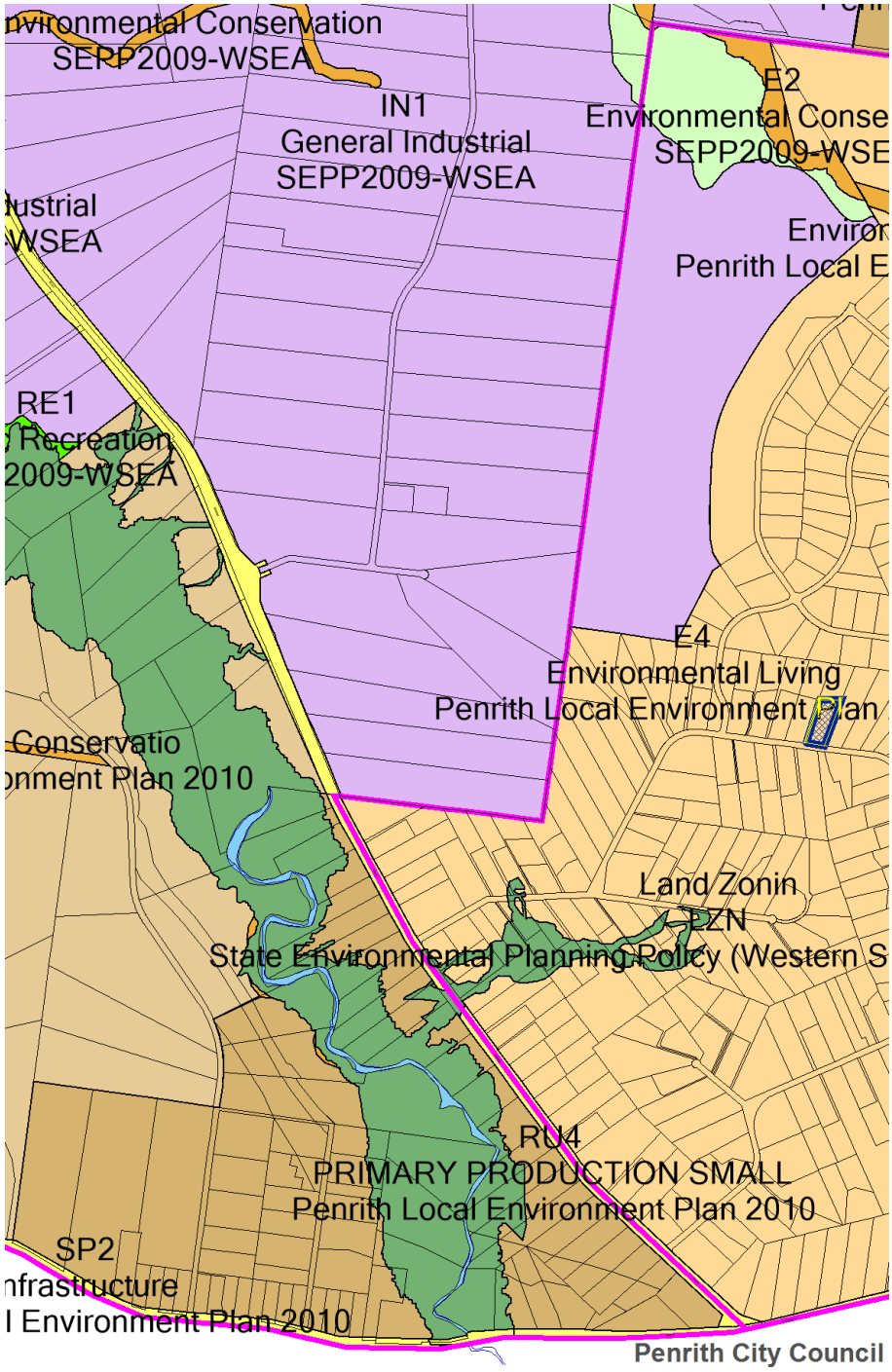
North Point

Title: Contextual Site Plan
Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: 1 : 1000 @A1
Dwg No. DA01.1
Job No. 18307
Issue: A

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

PENRITH CITY COUNCIL

Map	Legend



House Numbers
Road Names
Parcels
Suburbs
waterfeature
railway
LEP Current Zoning Compilation

Map Scale: 1:25,000

About this Document	Disclaimer
This map has been created for the purpose of showing basic locality information. Property boundary line network data is supplied by State Government. Any error should be reported to the GIS Section.	This map is a representation of the information currently held. While every effort has been made to ensure the accuracy of the product, we accept no responsibility for any errors or omissions.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

STREETSCAPE ELEVATION
MOUNT VERNON ROAD

EXTERNAL FINISHES

ABBREVIATION	DESCRIPTION	LOCATION	FINISH
STC.01	STONE CLADDING 'DESERT STORM'	EXTERNAL WALLS	
TBR.01	TIMBER CLADDING 'WEATHERTEX' WEATHERGROOVE 150	EXTERNAL WALLS	
PRP.01	ACRATEX 3 STEP COATING SYSTEM TO POWER PANELS	EXTERNAL WALLS	
R.01 F.01 B.01 G.01 HR.01 PCA.01	COLORBOND METAL 'DUNE'	CORRUGATED ROOF SHEETS GUTTER FASCIA BARGE BOARD HANDRAIL WINDOWS	
DK.01 SCN.01	MODWOOD ECO DECK MODWOOD ECO DECK	VERANDAH, BOARDWALK & GAZEBO SUB-FLOOR SCREEN	
TP.01	TIMBER POST CLADDING 'MERBAU'	VERANDAH, BOARDWALK & GAZEBO	

ARCHITECTURAL DRAWING LIST

DRAWING NO.	NAME	SCALE
DA00	COVER SHEET	NTS
DA01	SITE PLAN	1:200 1:400
DA01	CONTEXTUAL SITE PLAN	1:1000
DA02	SITE ANALYSIS AND MANAGEMENT PLAN	1:400
DA03	FLOOR PLAN	1:100
DA04	ROOF PLAN	1:100
DA05	ELEVATIONS & SECTION	1:100
DA06	COMMERCIAL KITCHEN DETAIL PLAN ELEVATIONS AND SECTIONS	1:50
DA07	NOTES	NTS
DA08	PHOTOMONTAGE - SHEET 1	NTS
DA09	PHOTOMONTAGE - SHEET 2	NTS
DA10	PHOTOMONTAGE - SHEET 3	NTS
DA11	PHOTOMONTAGE - SHEET 4	NTS

AMENDMENTS

Issue	Description	Date	By
A	Finishes Schedule amended	25.03.20	GM
	- Colorbond roof cladding		
	- Wall cladding colour		

Development Application

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

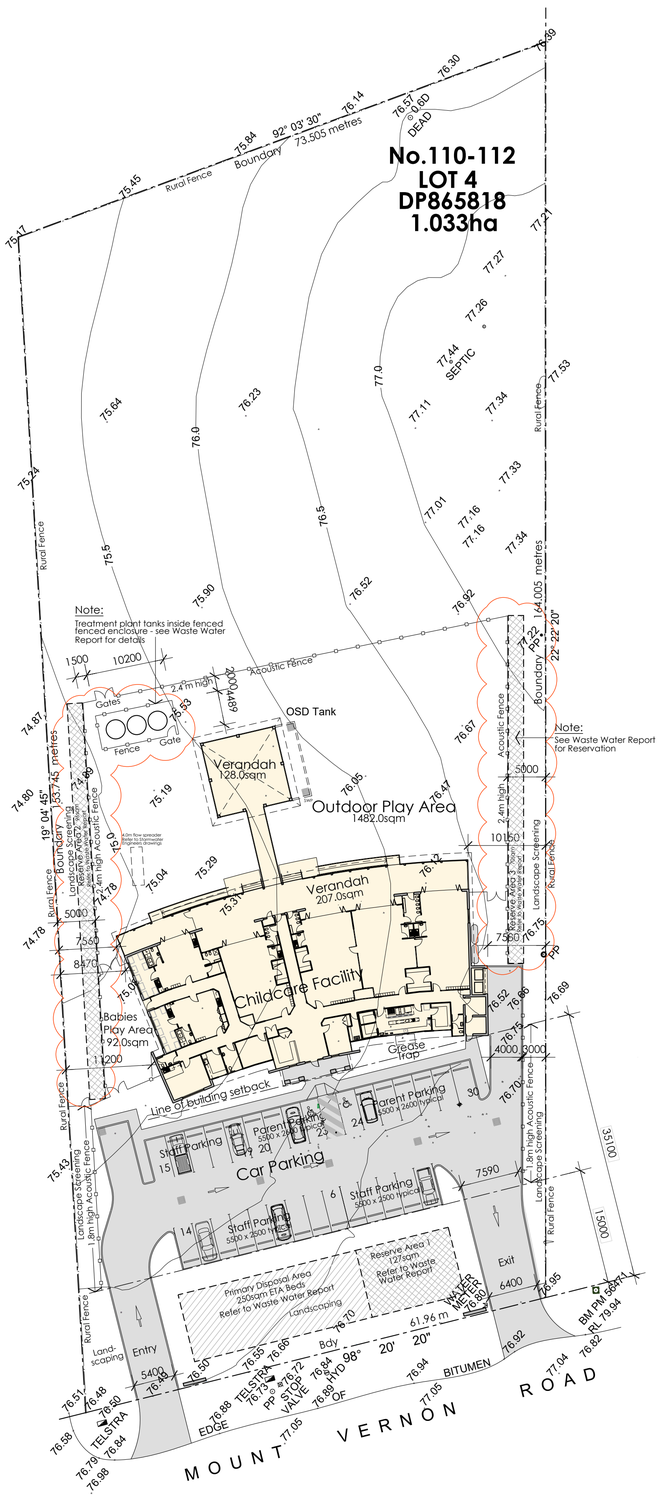
Title: Cover Sheet
Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: NTS
Dwg No. DA00
Job No. 18307
Issue: A

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

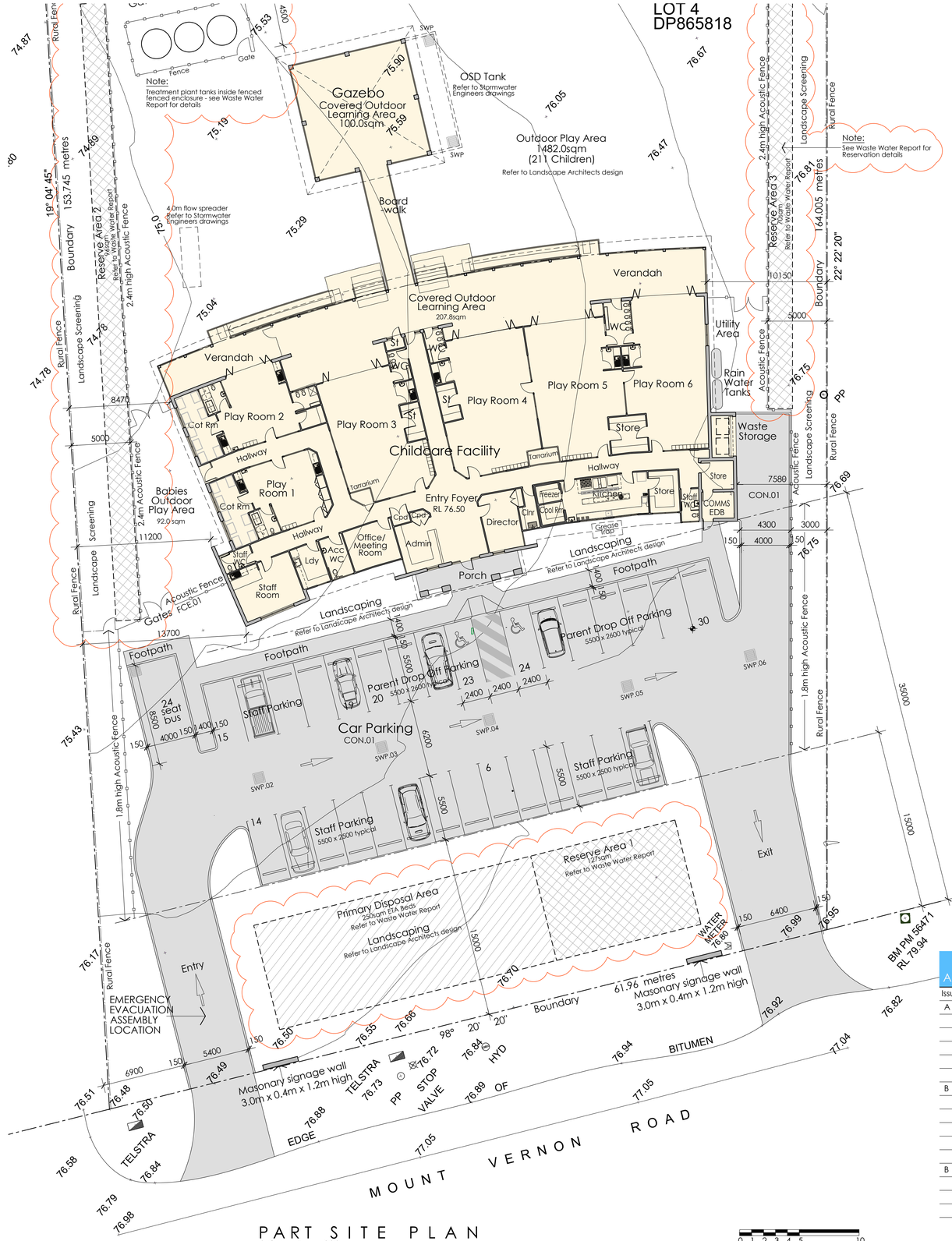
No.110-112
LOT 4
DP865818
1.033ha
Outdoor Play Area
Childcare Facility
Car Parking
Mt Vernon Rd
Mt Vernon Rd
Existing Dwelling
Existing Dwelling
Existing Dwelling

ABBREVIATIONS

Abbr.	Description
B.01	Colorbond Metal Barge Board
BB.01	Stainless steel baby bath
BBS	Electrical Baby Bottle Sanitiser
BAL.01	Select Glazed Balustrade
BG.01	Zincalume Box Gutter
BSN.01	Select Wall Basin
BSN.02	Select Wall Basin
BSN.03	Select Wall Basin
BSN.04	Hands Free Wall Basin
CON.01	Concrete driveway
CPD	Cupboard with benchtop
CRP.01	Cool Room Wall Panel
DK.01	'Modwood' Eco Decking
F.01	Colorbond Metal Fascia
FC.01	Paint Finish to FC Cladding
FCE.01	Decorative Timber Fence
FF.01	Select Vinyl Floor Coverings
FF.02	Select Carpet Floor Coverings
FF.03	Select Floor Tiles
FF.04	Select Floor Tiles
FF.05	Select Vinyl Floor Coverings
FF.06	Select Floor Tiles
FF.07	Select Carpet Floor Coverings
FF.08	Select Vinyl Floor Coverings
FF.09	Select Carpet Floor Coverings
FF.10	Select Vinyl Floor Coverings
FF.11	Select Floor Tiles
FF.12	Select Vinyl Floor Coverings
FF.13	Select Vinyl Floor Coverings
FF.14	Select Vinyl Floor Coverings
FF.15	Select Vinyl Floor Coverings
FF.16	Select Vinyl Floor Coverings
FF.17	Select Vinyl Floor Coverings
FF.18	Select Epoxy Floor Sealer
G.01	Colorbond Metal Gutter
HR.01	Powdercote Aluminium Handrail
LV.01	Powdercote Aluminium Louvres
OHC	Overhead cupboard
PC.01	Colorbond Metal Parapet Capping
PP.01	Laminate Toilet Partitions
PP.02	Laminate Toilet Partitions
PRP.01	Acratex finish to Hebel Power Panel
PWP	Existing power pole
R.01	Colorbond Metal Roof
RC.01	Colorbond metal ridge capping
RS.01	Colorbond roller shutter
SCN.01	'Modwood' Eco Decking Screen
SH.01	Free standing metal shelves
SL.01	Alum Framed Glass Skylight
SLH.01	Slop Hopper
SSS.01	Stainless Steel Sink
SSS.02	Stainless Steel Sink
STC.01	Stone Cladding
TBR.01	'Weathergroove' cladding
TGSI	Tactile Ground Surface Indicator
TP.01	Merbau timber cladding to post
TUB.01	Stainless Steel inset tub
VB.01	Accessible Vanity Basin
VB.02	Vanity Basin
WC.01	Junior Toilet Suite
WC.02	Toilet Suite
WC.03	Accessible Toilet Suite
WM	Washing machine space
WST.01	Stainless Steel Wash Trough



SITE PLAN
SCALE 1:400



PART SITE PLAN
SCALE 1:200

SCALE - 1:200 @ A1 (0 1 2 3 4 5 10 METRES)

SITE STATISTICS

Site Zoning -	E4 - Environmental Living
Total Site Area.	10,330 sqm - 1.033 Ha
Built Upon Area	
Ground Floor Level	798.0 sqm
Verandah	207.8 sqm
Gazebo & Boardwalk	128.7 sqm
Paving and Driveway	1058.0 sqm
Total Built Upon Area	2192.5 sqm
Planning Perameters	
Landscaped Area	8090.0 sqm
Total Site Coverage	1182.0 sqm

Item	Required	Provided
Site Coverage		11.4 %
Gross Floor Area (Previously approved)	600sqm	751.5sqm (891.6sqm)
Floor Space Ratio	N/A	0.0727 : 1
Soft Landscaping		78.3%
Parking		
Parent Car Spaces (Spaces 20-30)	10	11
Staff Car Spaces (Spaces 1-19)	19	19
Total Spaces	29	30

PLAY SPACE AREAS

Indoor Space	Unencumbered Area	No. of Children
Room 1	27.0sqm	8
Room 2	32.2sqm	8
Room 3	65.2sqm	20
Room 4	75.0sqm	20
Room 5	72.0sqm	20
Room 6	72.6sqm	20
Total	344.0sqm	96

Outdoor Space		
Baby Play Area	92.0sqm	Refer
Verandah	207.0 sqm	to
Gazebo and Boardwalk	128.0 sqm	P.O.M.
General Play Area	1482.0sqm	
Total	1909.0sqm	

P.O.M. = Plan of Management

AMENDMENTS

Issue	Description	Date	By
A	Carpark layout amended	25.03.20	GM
	Parking table updated		
	Carpar setback increased to 15m		
	Building setback increased to 35m		
	Boundary dimensions amended		
	Acoustic fence amended		
B	Mound added to front setback	01.09.20	GM
	Acoustic fence setback increased to 5m		
	Stormwater absorption pit relocated		
	Stormwater flow spreader added		
	Wastewater absorption beds removed		
	Wastewater treatment tanks added		
B	Waste water updated to suit revised	10.12.20	GM
	Waste Water Report		

Development Application

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

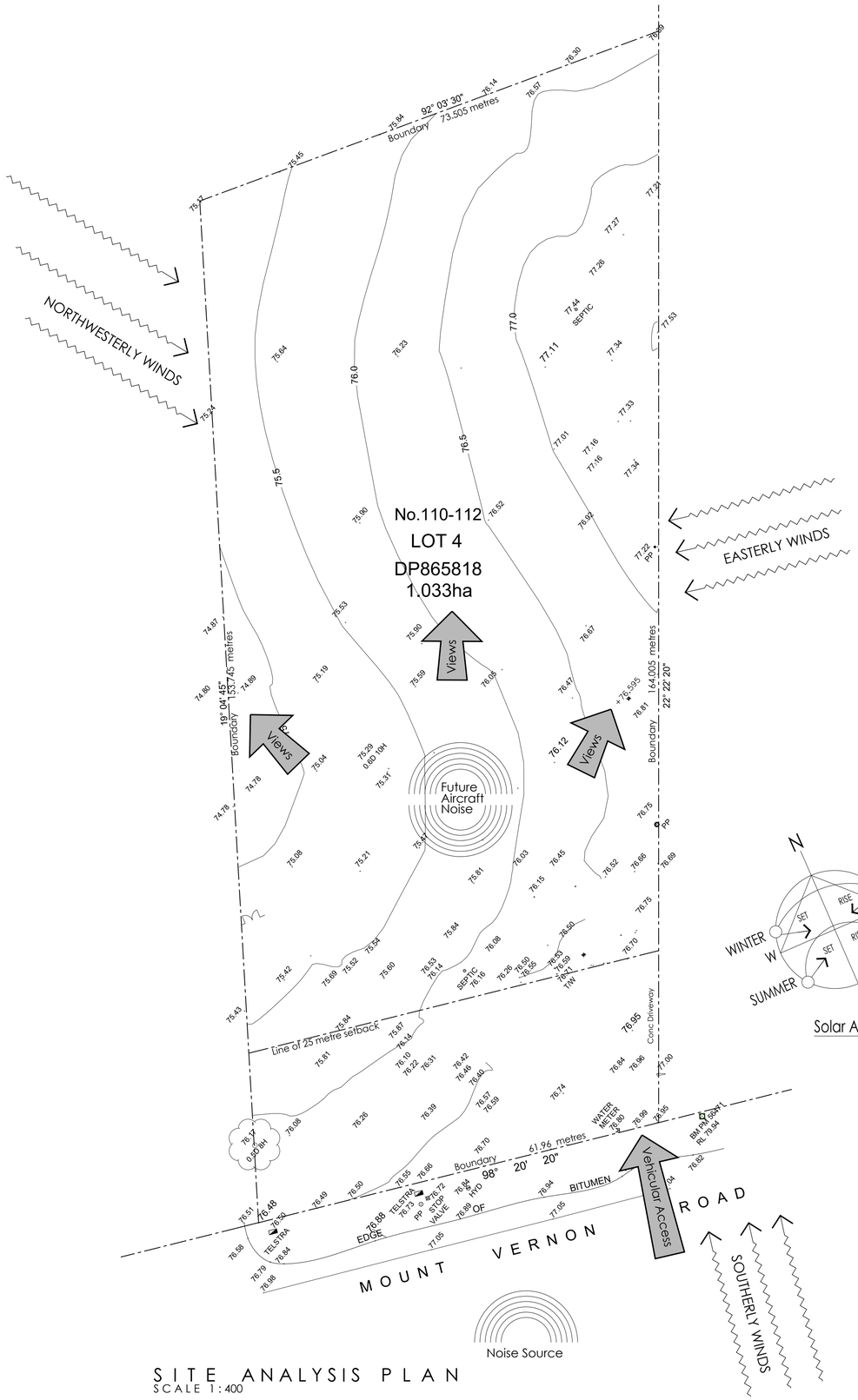
Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

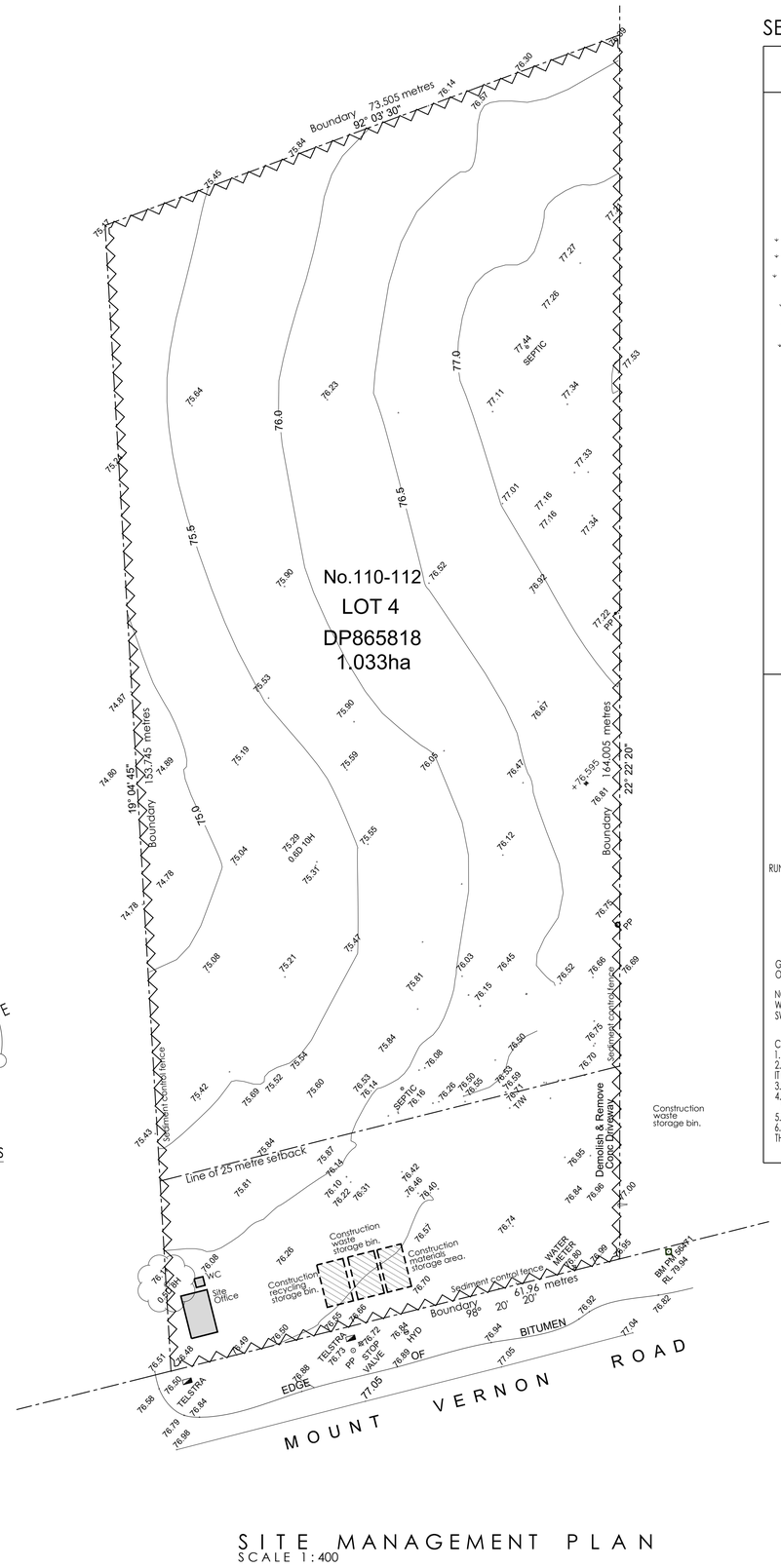
North Point

Title: Proposed Site Plan
Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: 1 : 500 / 1:200 @A1
Dwg No. DA01
Job No. 18307
Issue: C

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



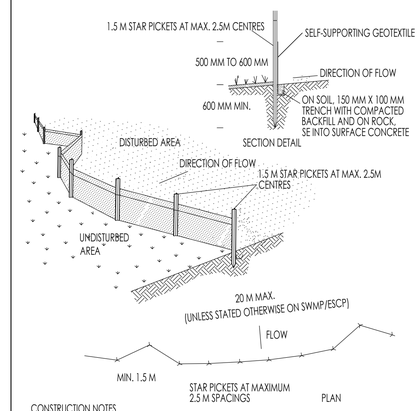
SITE ANALYSIS PLAN
SCALE 1 : 400



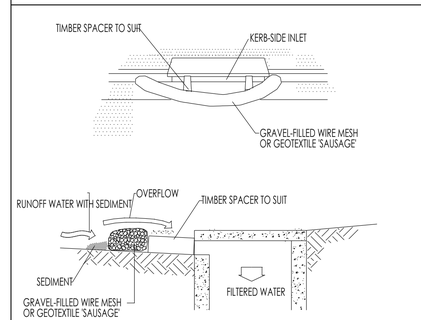
SITE MANAGEMENT PLAN
SCALE 1 : 400

SEDIMENT CONTROL

SEDIMENT CONTROL FENCE



CONSTRUCTION NOTES
1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150-MM DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150-MM OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES
1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25 MM TO 50 MM GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150 MM HIGH X 400 MM WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100-MM SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

0 2 4 6 8 10 20
SCALE - 1:400 @ A1 METRES

Development Application

PROJECT WORKS DESIGN

Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Desian Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

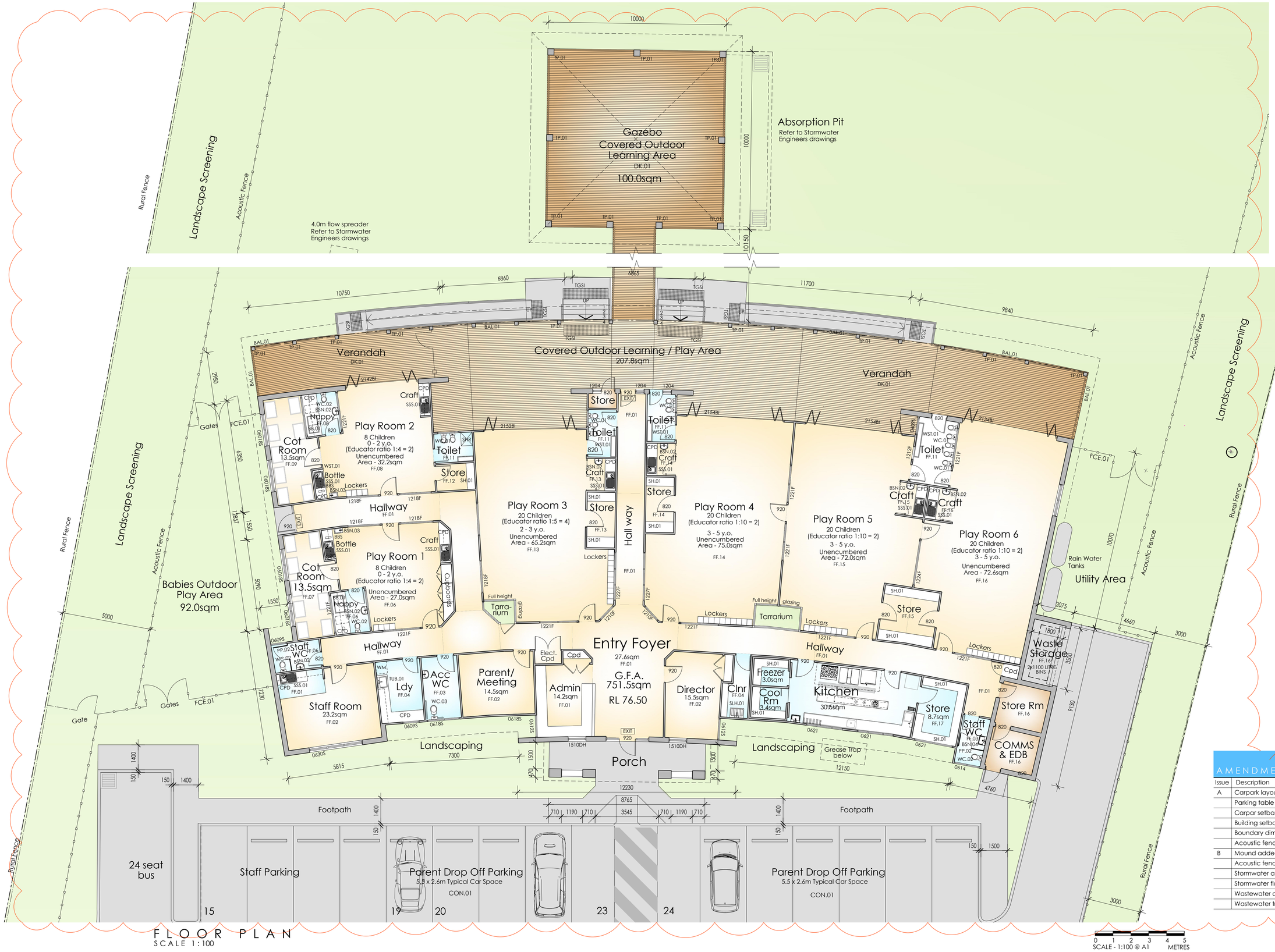
Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: Site Analysis Plan and Site Management Plan
Dwg No. DA02
Drawn: GM
Checked: GM
Date: 20.04.2020
Scale: 1 : 400 @A1
Job No. 18307
Issue: -

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



FLOOR PLAN
SCALE 1:100

SCALE - 1:100 @ A1
0 1 2 3 4 5 METRES

STAFFING REQUIREMENTS

	Ratio	No. of Staff
Room 1	1 per 4 child.	2
Room 2	1 per 4 child.	2
Room 3	1 per 5 child.	4
Room 4	1 per 10 child.	2
Room 5	1 per 10 child.	2
Room 6	1 per 10 child.	2
Floaters		2
Director	1	1
Admin. Staff	1	1
Cook	1	1
Total Staff Required		19

ABBREVIATIONS

Abbr.	Description
B.01	Colorbond Metal Barge Board
BB.01	Stainless steel baby bath
BBS	Electrical Baby Bottle Sanitiser
BAL.01	Select Glazed Balustrade
BG.01	Zincalume Box Gutter
BSN.01	Select Wall Basin
BSN.02	Select Wall Basin
BSN.03	Select Wall Basin
BSN.04	Hands Free Wall Basin
CON.01	Concrete driveway
CPD	Cupboard with benchtop
CRP.01	Cool Room Wall Panel
DK.01	'Modwood' Eco Decking
F.01	Colorbond Metal Fascia
FC.01	Paint Finish to FC Cladding
FCE.01	Decorative Timber Fence
FF.01	Select Vinyl Floor Coverings
FF.02	Select Carpet Floor Coverings
FF.03	Select Floor Tiles
FF.04	Select Floor Tiles
FF.05	Select Vinyl Floor Coverings
FF.06	Select Floor Tiles
FF.07	Select Carpet Floor Coverings
FF.08	Select Vinyl Floor Coverings
FF.09	Select Carpet Floor Coverings
FF.10	Select Vinyl Floor Coverings
FF.11	Select Floor Tiles
FF.12	Select Vinyl Floor Coverings
FF.13	Select Vinyl Floor Coverings
FF.14	Select Vinyl Floor Coverings
FF.15	Select Vinyl Floor Coverings
FF.16	Select Vinyl Floor Coverings
FF.17	Select Vinyl Floor Coverings
FF.18	Select Epoxy Floor Sealer
G.01	Colorbond Metal Gutter
HR.01	Powdercote Aluminium Handrail
LV.01	Powdercote Aluminium Louvres
OHC	Overhead cupboard
PC.01	Colorbond Metal Parapet Capping
PP.01	Laminate Toilet Partitions
PP.02	Laminate Toilet Partitions
PRP.01	Acratex finish to Hebel Power Panel
PWP	Existing power pole
R.01	Colorbond Metal Roof
RC.01	Colorbond metal ridge capping
RS.01	Colorbond roller shutter
SCN.01	'Modwood' Eco Decking Screen
SH.01	Free standing metal shelves
SL.01	Alum Framed Glass Skylight
SLH.01	Slop Hopper
SSS.01	Stainless Steel Sink
SSS.02	Stainless Steel Sink
STC.01	Stone Cladding
TBR.01	'Weathergroove' cladding
TGSI	Tactile Ground Surface Indicator
TP.01	Merbau timber cladding to post
TUB.01	Stainless Steel inset tub
VB.01	Accessible Vanity Basin
VB.02	Vanity Basin
WC.01	Junior Toilet Suite
WC.02	Toilet Suite
WC.03	Accessible Toilet Suite
WM	Washing machine space
WST.01	Stainless Steel Wash Trough

AMENDMENTS

Issue	Description	Date	By
A	Carpark layout amended	25.03.20	GM
	Parking table updated		
	Carpar setback increased to 15m		
	Building setback increased to 35m		
	Boundary dimensions amended		
	Acoustic fence amended		
B	Mound added to front setback	01.09.20	GM
	Acoustic fence setback increased to 5m		
	Stormwater absorption pit relocated		
	Stormwater flow spreader added		
	Wastewater absorption beds removed		
	Wastewater treatment tanks added		

Development Application

PROJECT WORKS DESIGN

Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

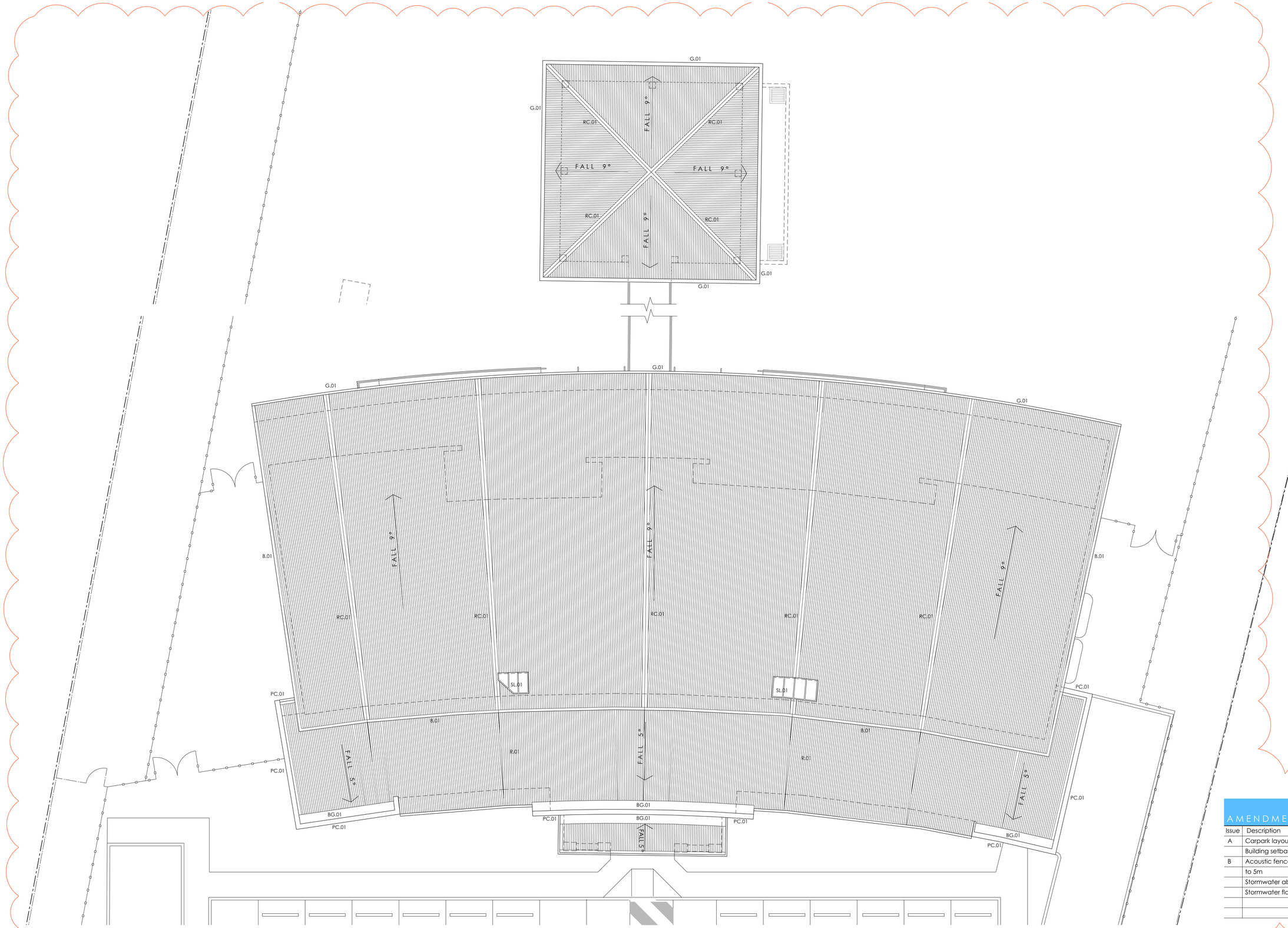
North Point

Title: Proposed Floor Plan

Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: 1:100 @A1

Dwg No. DA03
Job No. 18307
Issue: B

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



ROOF PLAN
SCALE 1:100

ABBREVIATIONS

Abbr.	Description
B.01	Colorbond Metal Barge Board
BB.01	Stainless steel baby bath
BBS	Electrical Baby Bottle Sanitiser
BAL.01	Select Glazed Balustrade
BG.01	Zincalume Box Gutter
BSN.01	Select Wall Basin
BSN.02	Select Wall Basin
BSN.03	Select Wall Basin
BSN.04	Hands Free Wall Basin
CON.01	Concrete driveway
CPD	Cupboard with benchtop
CRP.01	Cool Room Wall Panel
DK.01	'Modwood' Eco Decking
F.01	Colorbond Metal Fascia
FC.01	Paint Finish to FC Cladding
FCE.01	Decorative Timber Fence
FF.01	Select Vinyl Floor Coverings
FF.02	Select Carpet Floor Coverings
FF.03	Select Floor Tiles
FF.04	Select Floor Tiles
FF.05	Select Vinyl Floor Coverings
FF.06	Select Floor Tiles
FF.07	Select Carpet Floor Coverings
FF.08	Select Vinyl Floor Coverings
FF.09	Select Carpet Floor Coverings
FF.10	Select Vinyl Floor Coverings
FF.11	Select Floor Tiles
FF.12	Select Vinyl Floor Coverings
FF.13	Select Vinyl Floor Coverings
FF.14	Select Vinyl Floor Coverings
FF.15	Select Vinyl Floor Coverings
FF.16	Select Vinyl Floor Coverings
FF.17	Select Vinyl Floor Coverings
FF.18	Select Epoxy Floor Sealer
G.01	Colorbond Metal Gutter
HR.01	Powdercote Aluminium Handrail
LV.01	Powdercote Aluminium Louvres
OHC	Overhead cupboard
PC.01	Colorbond Metal Parapet Capping
PP.01	Laminate Toilet Partitions
PP.02	Laminate Toilet Partitions
PRP.01	Acratex finish to Hebel Power Panel
PWP	Existing power pole
R.01	Colorbond Metal Roof
RC.01	Colorbond metal ridge capping
RS.01	Colorbond roller shutter
SCN.01	'Modwood' Eco Decking Screen
SH.01	Free standing metal shelves
SL.01	Alum Framed Glass Skylight
SLH.01	Slop Hopper
SSS.01	Stainless Steel Sink
SSS.02	Stainless Steel Sink
STC.01	Stone Cladding
TBR.01	'Weathergroove' cladding
TGSI	Tactile Ground Surface Indicator
TP.01	Merbau timber cladding to post
TUB.01	Stainless Steel inset tub
VB.01	Accessible Vanity Basin
VB.02	Vanity Basin
WC.01	Junior Toilet Suite
WC.02	Toilet Suite
WC.03	Accessible Toilet Suite
WM	Washing machine space
WST.01	Stainless Steel Wash Trough

AMENDMENTS

Issue	Description	Date	By
A	Carpark layout amended	25.03.20	GM
	Building setback increased to 35m		
B	Acoustic fence setback increased	01.09.20	GM
	to 5m		
	Stormwater absorption pit relocated		
	Stormwater flow spreader added		

0 1 2 3 4 5
SCALE - 1:100 @ A1 METRES

Development Application

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

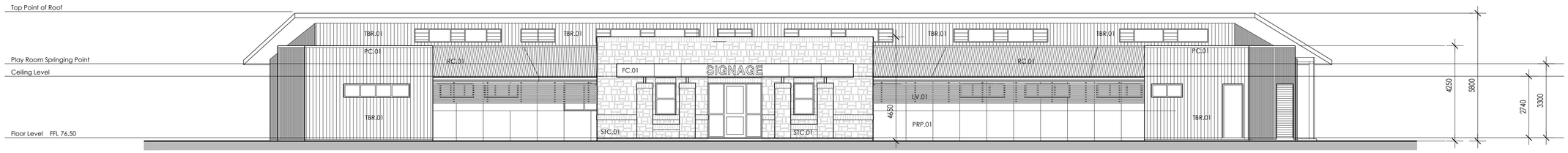
Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

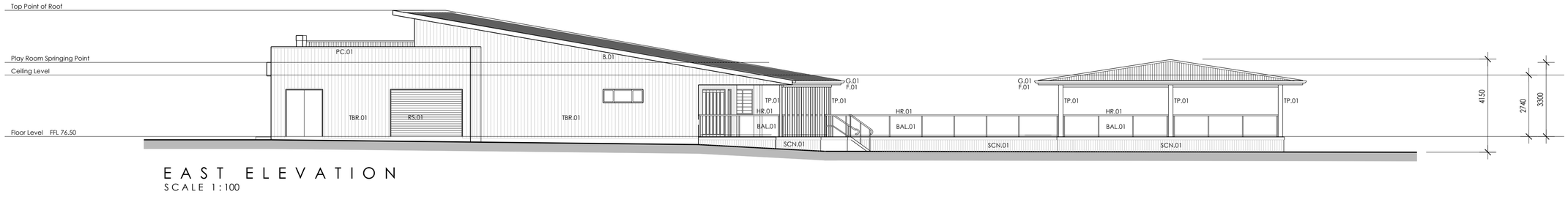
Title: Proposed Roof Plan
Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: 1:100 @A1
Dwg No. DA04
Job No. 18307
Issue: B

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

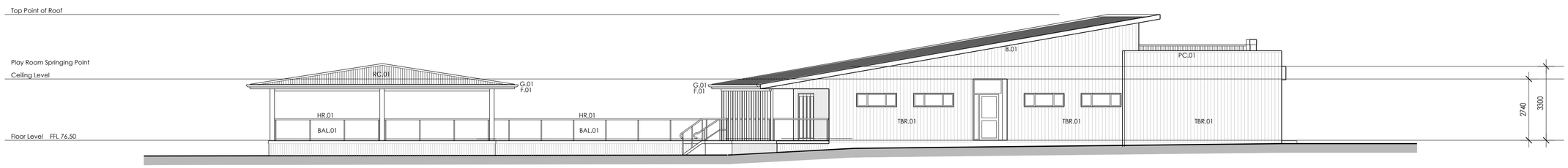


SOUTH ELEVATION
SCALE 1:100

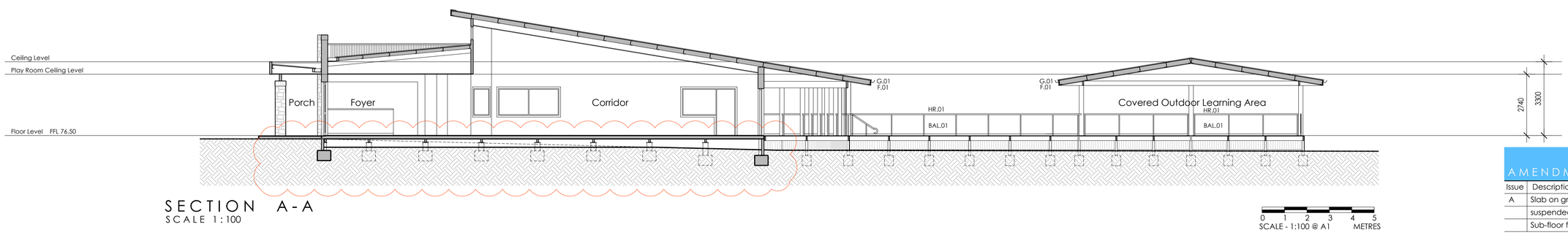
NORTH ELEVATION
SCALE 1:100



EAST ELEVATION
SCALE 1:100



WEST ELEVATION
SCALE 1:100



SECTION A-A
SCALE 1:100

SCALE - 1:100 @ A1 METRES

ABBREVIATIONS

Abbr.	Description
B.01	Colorbond Metal Barge Board
BB.01	Stainless steel baby bath
BBS	Electrical Baby Bottle Sanitiser
BAL.01	Select Glazed Balustrade
BG.01	Zincalume Box Gutter
BSN.01	Select Wall Basin
BSN.02	Select Wall Basin
BSN.03	Select Wall Basin
BSN.04	Hands Free Wall Basin
CON.01	Concrete driveway
CPD	Cupboard with benchtop
CRP.01	Cool Room Wall Panel
DK.01	'Modwood' Eco Decking
F.01	Colorbond Metal Fascia
FC.01	Paint Finish to FC Cladding
FCE.01	Decorative Timber Fence
FF.01	Select Vinyl Floor Coverings
FF.02	Select Carpet Floor Coverings
FF.03	Select Floor Tiles
FF.04	Select Floor Tiles
FF.05	Select Vinyl Floor Coverings
FF.06	Select Floor Tiles
FF.07	Select Carpet Floor Coverings
FF.08	Select Vinyl Floor Coverings
FF.09	Select Carpet Floor Coverings
FF.10	Select Vinyl Floor Coverings
FF.11	Select Floor Tiles
FF.12	Select Vinyl Floor Coverings
FF.13	Select Vinyl Floor Coverings
FF.14	Select Vinyl Floor Coverings
FF.15	Select Vinyl Floor Coverings
FF.16	Select Vinyl Floor Coverings
FF.17	Select Vinyl Floor Coverings
FF.18	Select Epoxy Floor Sealer
G.01	Colorbond Metal Gutter
HR.01	Powdercote Aluminium Handrail
LV.01	Powdercote Aluminium Louvres
OHC	Overhead cupboard
PC.01	Colorbond Metal Parapet Capping
PP.01	Laminate Toilet Partitions
PP.02	Laminate Toilet Partitions
PRP.01	Acratex finish to Hebel Power Panel
PWP	Existing power pole
R.01	Colorbond Metal Roof
RC.01	Colorbond metal ridge capping
RS.01	Colorbond roller shutter
SCN.01	'Modwood' Eco Decking Screen
SH.01	Free standing metal shelves
SL.01	Alum Framed Glass Skylight
SLH.01	Slop Hopper
SSS.01	Stainless Steel Sink
SSS.02	Stainless Steel Sink
STC.01	Stone Cladding
TBR.01	'Weathergroove' cladding
TGSI	Tactile Ground Surface Indicator
TP.01	Merbau timber cladding to post
TUB.01	Stainless Steel inset tub
VB.01	Accessible Vanity Basin
VB.02	Vanity Basin
WC.01	Junior Toilet Suite
WC.02	Toilet Suite
WC.03	Accessible Toilet Suite
WM	Washing machine space
WST.01	Stainless Steel Wash Trough

AMENDMENTS

Issue	Description	Date	By
A	Slab on ground replaced with	01.09.20	GM
	suspended concrete slab -		
	Sub-floor fill removed		

Development Application

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

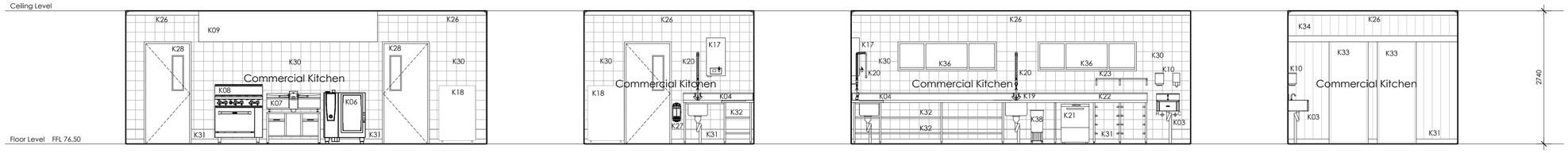
North Point

Title: Proposed Elevations and Section

Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: 1:100 @A1

Dwg No. DA05
Job No. 18307
Issue: A

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

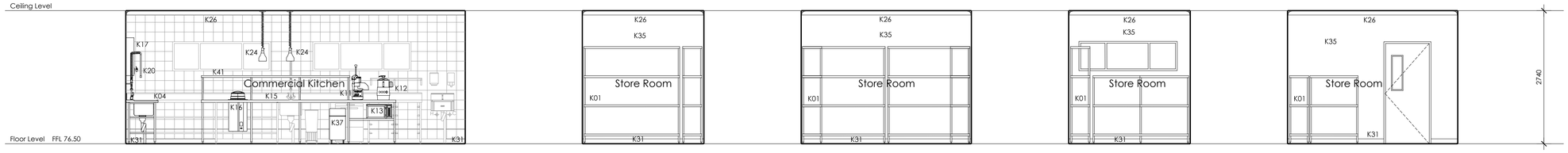


ELEVATION A
SCALE 1:50

ELEVATION B
SCALE 1:50

ELEVATION C
SCALE 1:50

ELEVATION D
SCALE 1:50



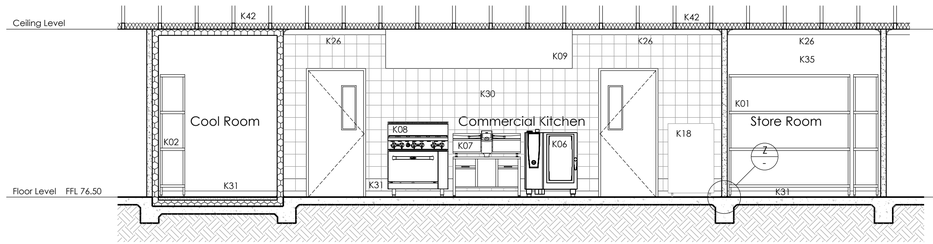
ELEVATION E
SCALE 1:50

ELEVATION E
SCALE 1:50

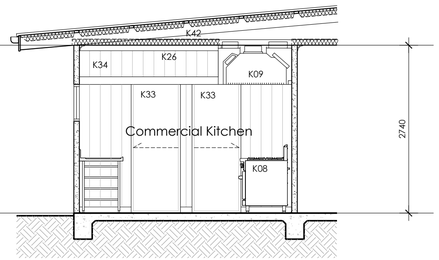
ELEVATION E
SCALE 1:50

ELEVATION E
SCALE 1:50

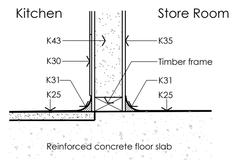
ELEVATION E
SCALE 1:50



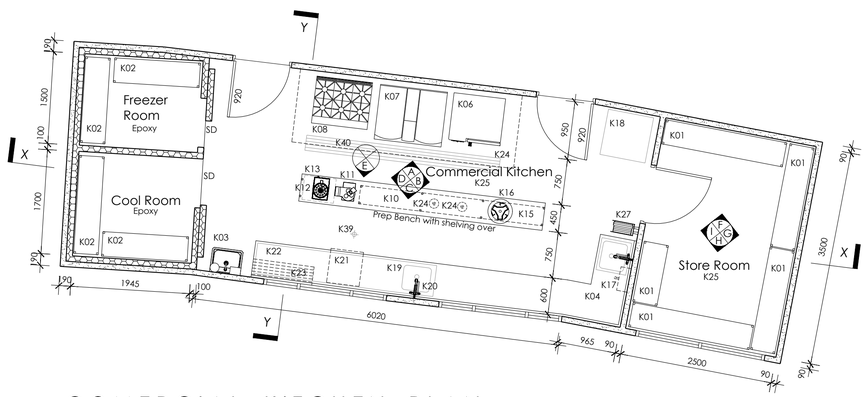
SECTION X-X
SCALE 1:50



SECTION Y-Y
SCALE 1:50



SECTION DETAIL Z
VINYL COVE
SCALE 1:10



COMERCIAL KITCHEN PLAN
SCALE 1:50

KEY LEGEND

ITEM NO.	DESCRIPTION
K01	Dry Store Racking
K02	Cool Room / Freezer Room Storage Racking
K03	Hands Free Wash Basins
K04	S.S. Wet/Dry Prep Bench
K05	S.S. 2 Tier Overshelf
K06	10 Tray Combi Oven
K07	VCC Multi-Function Appliance
K08	6 Burner Cooktop and Oven
K09	Extraction Canopy
K10	Soap dispenser and Paper Towel Dispenser
K11	Blixer
K12	Food Processor
K13	Commercial Microwave
K14	Stick Blender
K15	Island Servery Bench
K16	Plate Warmers
K17	15 Litre Wall Mounted Water Boiling Unit
K18	Heated/Ambient Food Delivery Trolley
K19	S.S. Dishwash inlet Bench w/ Sink
K20	Pre-Rinse Spray Arm Assembly
K21	Under Bench Dishwasher
K22	S.S. Dishwash Outlet Bench
K23	S.S. Wall Mounted Pot Shelves
K24	Drop Down Heat Lamps
K25	Select Vinyl Flooring
K26	90mm Plasterboard Cornice
K27	Hose Reel
K28	Paint finish to solid core door with view panel
K29	3 Drawer - lockable drawer set.
K30	Select Ceramic Wall Tiles
K31	50mm Coved Vinyl Skirting-backfilled with grout
K32	Stainless Steel Shelving
K33	Cool Room and Freezer Sliding Doors
K34	Cool Room and Freezer Wall Panels
K35	Paint finish to plasterboard wall
K36	45° Sill to aluminium framed windows
K37	Ingredients Bin
K38	Waste Bin
K39	Floor Waste
K40	Grated Drain
K41	Serving Shelf
K42	Ceiling Insulation

WALL LEGEND

	K43 - 90mm Timber Stud Wall with Expanding Foam Fill
	K44 - 100mm Aluminum & Foam 'Cool Room' Sandwich Panel Wall

Development Application

0 1 2 3 4 5
SCALE - 1:50 @ A1 METRES

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: Commercial Kitchen Detail Plan Elevations and Sections

Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: 1:50 @A1

Dwg No. DA06
Job No. 18307
Issue: -

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

SECTION J NOTES

Part J1 - Building Fabric

1. Construction Requirements - Installation of Insulation
Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:
(i) abuts or overlaps adjoining insulation other than at supporting members; and
(ii) forms a continuous barrier…and
(iii) does not affect the safe or effective operation of a service or fitting.
Reflective insulation must be installed with:
(i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
(ii) the reflective insulation closely fitted against any penetration, door or window opening; and
(iii) the reflective insulation adequately supported by framing members; and
(iv) each adjoining sheet of roll membrane being overlapped not less than 50 mm or taped together.
Bulk insulation must be installed so that:
(i) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
(ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.

2. Construction Requirements - Roof and Ceiling Insulation
The minimum total R-Value for the roof/ceiling system which forms part of the envelope required by BCA Table J1.3a is R3.2.
The proposed roof/ceiling system achieves an R-Value of R0.47. Therefore to achieve compliance, insulation of at least R2.73 is required to be incorporated into the roof/ceiling system which forms part of the envelope.

3. Construction Requirements - Adjustment for Loss of Ceiling Insulation
Where the required insulation is located at ceiling level and the percentage of ceiling area uninsulated is more than 0.5% as a result of loss of ceiling insulation due to operational or safety reasons and where insulation of more than R1.0 is located at ceiling level, the loss of insulation must be compensated for by increasing the R-Value of the insulation in the remainder of the ceiling in accordance with BCA Table J1.3b.
Note: The percentage of ceiling area uninsulated must not exceed 5% of the total ceiling area forming part of the envelope.

4. Construction Requirements - Thermal Break
Where the ceiling lining is attached directly to the same metal frame as the metal roof, a thermal break of at least R0.2 must be installed between the metal sheet roofing and its supporting metal frame. This applies to areas of roof that form part of the envelope.

5. Construction Requirements - Wall Insulation (External Envelope)
Where external walls form part of the envelope, a total R-value of R2.8 is required to be achieved. The metal stud walls achieve an R-value of R0.22. Therefore, insulation with R-value of at least R2.58 is required to be incorporated into the metal stud wall system where walls form part of the external envelope.
See Appendix for walls forming part of the envelope.

6. Construction Requirements - Wall Insulation (Internal Envelope)
Where internal walls form part of the envelope, a total R-value of R1.8 is required to be achieved.
The stud walls achieve an R-value of R0.33. Therefore, insulation with R-value of at least R1.47 is required to be incorporated into the stud wall system where walls form part of the internal envelope.
See Appendix for walls forming part of the envelope.

7. Construction Requirements - Thermal Breaks
A thermal break with R-Value of not less than R0.2 must be installed between the external cladding and the metal frame of walls that have lightweight external cladding fixed to a metal frame and have a wall lining fixed directly to the same metal frame where walls form part of the envelope.

8. Construction Requirements - Floor Insulation
The total R-value required to be achieved by an on-ground concrete slab with no in-slab heating or cooling in climate zone 6 is: *NIL*

Part J2 - Glazing

9. Construction Requirements - Glazing
Glazing elements forming part of the envelope shall have the following thermal properties in terms of their orientations:

Orientation	Item	Total U Value	SHGC
South	Glazing	Equal or Lower than 5.4	Equal or Higher than 0.31
East	Glazing	Equal or Lower than 8.0	Equal or Lower than 1.0
North	Glazing	Equal or Higher than 3.2	Equal or Lower than 0.54
West	Glazing	Equal or Lower than 6.0	Equal or Lower than 0.99

Refer to Appendix for full calculation of glazing requirements.

10. Construction Requirements - Shading
Shading has been provided as shown on architectural drawings by building elements and shading projections. For further details refer to the glazing calculations in Appendix (see P and H values). No alterations shall be made to shading design dimensions without first checking compliance with this Clause.
Contact Application Solutions for assistance if required.

Part J3 - Building Sealing

11. Construction Requirements - Window and Door Sealing
A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like where forming part of the envelope. The seal may be a foam or rubber compression strip, fibrous seal or the like.
For the bottom edge of an external swing door, a draft protection device must be installed. For exemptions to this clause see body of report.

12. Construction Requirements - Building Entrance Sealing
An entrance to a building leading to a conditioned space must have an airlock, self-closing door, revolving door or the like.

13. Construction Requirements - Exhaust Fan Sealing
A miscellaneous exhaust fan such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.

14. Construction Requirements - Roof, Wall and Floor Sealing
Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, or the like must be constructed to minimise air leakage when forming part of the envelope and must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed by caulking, skirting, architraves, cornices or the like.

Part J5 - Air-conditioning and Ventilation Systems

15. Construction Requirements - Deactivation Capability
An air-conditioning system must be capable of being deactivated when the building or part of the building served is not occupied.

16. Construction Requirements - Air-conditioning Zones
Different air-conditioning zones shall be separately thermostatically controlled and not have their temperature controlled by mixing actively heated air or actively cooled air. Reheating must be limited to not more than a 7.5K rise in temperature for a fixed supply air rate, or for a variable supply air rate, not more than 7.5K rise in temperature at the normal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.

17. Construction Requirements - Economy Cycle
Where the air-conditioning system provides the required mechanical ventilation and exceeds 35 kWr, it shall have an outdoor air economy cycle.

18. Construction Requirements - Air Dampers
Where the air-conditioning unit or system has motorised outside air and return dampers, close the dampers when the air-conditioning unit or system is deactivated.

19. Construction Requirements - Air-conditioning Fans
Fans of any air-conditioning systems serving the building must comply with BCA Specification J5.2a.

20. Construction Requirements - Ductwork Insulation
The ductwork of an air-conditioning system must be insulated and sealed in accordance with BCA Specification J5.2b.

21. Construction Requirements - Energy Efficiency Ratios
Any packaged air-conditioning equipment or refrigerant chillers (as part of an air-conditioning system) must have energy efficiency ratios in compliance with BCA Specification J5.2e.

22. Construction Requirements - Time Switch
A time switch in accordance with BCA Specification J6 must be provided to control all air-conditioning/heating systems of more than 10 kW.

23. Construction Requirements - Ventilation Operation
A mechanical ventilation system (including one which is part of an air-conditioning system) must be capable of being deactivated when the building or part of the building served is not occupied.

24. Construction Requirements - Mechanical Ventilation of Conditioned Space
The mechanical ventilation system shall not provide mechanical ventilation in excess of the minimum quantity required by BCA Part F4 by more than 20% other than in the conditions detailed in the body of the report.

25. Construction Requirements - Ventilation Fans
Any fans of a mechanical ventilation system installed must comply with BCA Specification J5.2a.

26. Construction Requirements -Ventilation Time Switch Control
Any mechanical ventilation system with an air flow rate of more than 1000 L/s must be controlled by a time switch in compliance with BCA Specification J6.
See BCA J5.3(c)(ii) for any appropriate exclusions to this requirement.

27. Construction Requirements - Miscellaneous Exhaust
An exhaust system which has an air flow rate of more than 1000 L/s and is associated with equipment having a variable demand must have the ability for the operator to stop the motor when the system is not in use and must also have a variable speed fan (or similar control system).

Part J6 - Artificial Lighting and Power

28. Construction Requirements - Maximum Interior Illumination Power Load
The total maximum allowed interior illumination power load for the development is 6,446 W.
The aggregate design illumination power load must not exceed this allowed wattage.
Note emergency lighting and signage lighting are exempted from this requirement.
See Appendix for detailed calculation of allowed interior illumination power load.

29. Construction Requirements - Lighting Control
Artificial lighting of a room or space must be individually operated by a switch or other control device.

30. Construction Requirements - Lighting Control (Switching)
Artificial lighting switches must be located in a visible position in the room or space being switched or in an adjacent room or space from where the lighting being switched is visible. Switches must not operate lighting for an area of more than 250 m2.

31. Construction Requirements - Time Switch or Occupant Sensing Device
95% of the lighting in the building must be controlled by a time switch in accordance with BCA Specification J6 or an occupant sensing device such as a security card reader that registers a person entering and leaving the building or a motion detector in accordance with BCA Specification J6.

32. Construction Requirements - Decorative or Display Lighting
Interior decorative and display lighting (such as for foyer mural art display), shall be controlled separately from other lighting by a manual switch for each area (where the operating times of the displays are the same in multiple areas, they may be combined).
Where the decorative/display lighting exceeds 1 kW, it must be controlled by a time switch in accordance with BCA Specification J6.

33. Construction Requirements - Window Display Lighting
Window display lighting must be controlled separately from other display lighting.

34. Construction Requirements - Perimeter Lighting
Artificial lighting around the perimeter of the building must be controlled by a daylight sensor or a time switch in accordance with BCA Specification J6.
When the total perimeter lighting load exceeds 100 W it shall have an average light source efficacy of not less than 60 Lumens/W or be controlled by a motion detector in accordance with BCA Specification J6.

35. Construction Requirements - Decorative Perimeter Lighting
Where external lighting for decorative or signage purposes is installed, it must be controlled by a time switch (separate from other external lighting) in accordance with BCA Specification J6.

36. Construction Requirements - Boiling/Chilled Water Storage Units
The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with BCA Specification J6.

Part J7 - Heated Water Supply and Swimming Pool and Spa Pool Plant

37. Construction Requirements - Hot Water Heater
Any heated water service for food preparation or sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three - Plumbing Code of Australia.

Part J8 - Access for Maintenance and Facilities for Monitoring

38. Construction Requirements - Gas and Electricity Consumption
The building has a floor area of more than 500 m2 and therefore must have the facility to record the consumption of gas and electricity.

1.8m ACOUSTIC FENCE DETAIL
WHERE STORMWATER OVER FLOW IS REQUIRED
SCALE 1:20

2.4m ACOUSTIC FENCE DETAIL
WHERE STORMWATER OVER FLOW IS REQUIRED
SCALE 1:20

AMENDMENTS

Issue	Description	Date	By
A	Acoustic Fence Details Added	25.03.20	GM

Development Application

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: Notes and Acoustic Fence Detail
Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: As Shown
Dwg No. DA07
Job No. 18307
Issue: A

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3D View
Aerial View From Mount Vernon Road
Artistic Impression Only

Development Application

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: 3D View - Sheet 1
Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: N.T.S.
Dwg No. DA08
Job No. 18307
Issue: -

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3D View
Outdoor Play Area
Artistic Impression Only

Development Application

PROJECT WORKS DESIGN

Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chiltaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: 3D View - Sheet 2

Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: N.T.S.

Dwg No. DA10
Job No. 18307
Issue: -

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3D View
From Mount Vernon Road
Artistic Impression Only

Development Application

PROJECT WORKS DESIGN

Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chiltaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: 3D View - Sheet 3

Drawn: GM
Date: 20.04.2020
Checked: GM
Scale: N.T.S.

Dwg No. DA10
Job No. 18307
Issue: -

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

No.110-112
LOT 4
DP865818
1.033ha

tree stumps min 350mmØ - heights between 200-550mm for balancing and 300mm for seating

stepping stones - concrete or sandstone flagging

railway sleepers as pathway

PLANTS TOTAL FOR FULL SITE						
TREES						
symbol	botanical name	common name	height	width	pot size	no
	eucalyptus moluccana	grey box	25m	15m	75L	4
	cupaniopsis anacardioides	tuckeroo	10-12m	8m	75L	10
	acmena smithii	lillypilly	12m	6m	75L	5
SHRUBS						
	indigofera australis	australia indigo	2.5m	2	200mm	68
	acacia implexa	hickory wattle	3-8m	6m	100L	16
	dodonae viscosa ssp cuneata	n/a	3m	1.5m	200mm	63
GRASSES/GROUNDCOVERS						
	dianella caerulea	blue flax lily	1m	1m	150mm	123
	dichondra repens	kidney weed	0.1m	1m	200mm	86
	microlaena stipoides var stipoides	weeping meadow grass	0.6m	0.6m	150mm	239 total site
	lomandra longifolia	spiny headed mat rush	1m	1m	150mm	107 total site
	themeda australis	kangaroo grass	0.3-0.7m	0.6m	200mm	155
CLIMBERS						
	desmodium varians	n/a	climber	climber	200mm	10

PLANTS FOR RESERVE AREAS FOR WASTE TREATMENT						
SHRUBS						
	callistemon 'kings park special'	kings park bottlebrush	3-4.5m	3m	75L	49
	baeckea linifolia	weeping/ swamp baeckea	1-2.5m	2m	200mm	12
	banksia robur	swamp banksia	1-2m	1-2m	200mm	12
	bauera rubioides	river rose	0.5-1.5m	1m	200mm	51
	callistemon viminalis 'little john'	little john bottlebrush	0.5-1m	1m	200mm	15
	leptospermum juniperinum	prickly tea tree	1m	1m	200mm	40
GRASSES/GROUNDCOVERS/SEDGES						
	microlaena stipoides var stipoides	weeping meadow grass	0.6m	0.6m	150mm	239 total site
	lomandra longifolia	spiny headed mat rush	1m	1m	150mm	107 total site
	hibbertia scandens	yellow guinea flower	0.2-0.5m	1-3m	200mm	20
	baloskion tetraphyllum syn restio tetraphyllus	n/a	1m	0.5m	200mm	135

Tessa Rose Playspace and Landscape Design reserves all rights. This drawing is copyright and shall not be reproduced or copied in any form or by any means without the written permission of *Tessa Rose Playspace and Landscape Design*. Any license, expressed or implied to use this document for any purpose is restricted to the terms of the written agreement between *Tessa Rose Playspace and Landscape Design* and the instructing party

TESSA ROSE PLAYSPACE AND LANDSCAPE DESIGN
24 Baxter Road MASCOT NSW 2020
0416 565297
tess@tessaroselandscapes.com.au
www.tessaroselandscapes.com.au

PROJECT:
Proposed Child Care Centre
110-112 Mount Vernon Rd
MOUNT VERNON NSW 2178

Winter Set · Winter Rise · Summer Set · Summer Rise · N

date: 2 December 2020 drawing no.:1/5
scale: 1:200/A1 drawn by: tm

drawing notes
1. Contractor should check site conditions and measurements prior to works
2. No subsitutions for plants and materials may occur without prior approval

revision 6 - FINAL
site plan

Dial Before U Dig - all services to be checked prior to works commencement

This plan is certified as meeting all relevant local government DCP's & legislation and the *Education and Care Services National Regulations 2011*

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

110 - 112 MOUNT VERNON ROAD, MOUNT VERNON
PROPOSED CHILDCARE CENTRE

STORMWATER CONCEPT PLAN

LOCALITY PLAN

N.T.S

DRAWING INDEX	
Drawing No.	DESCRIPTION
ACE171195.SW.DA - 000	COVER SHEET PLAN
ACE171195.SW.DA - 101	STORMWATER CONCEPT PLAN GROUND LEVEL
ACE171195.SW.DA - 102	WSUD TANK DETAILS SHEET 1 OF 3
ACE171195.SW.DA - 103	WSUD TANK DETAILS SHEET 2 OF 3
ACE171195.SW.DA - 104	WSUD TANK DETAILS SHEET 3 OF 3
ACE171195.SW.DA - 105	MISCELLANEOUS DETAILS SHEET

NOT FOR CONSTRUCTION

Issue	Description	Date	Drawn	Design	Checked
G	COUNCIL COMMENTS	04/11/2020	HUV	EHZ	JSF
F	COUNCIL COMMENTS	24/08/2020	HUV	EHZ	JSF
E	COUNCIL COMMENTS	30/03/2020	HUV	EHZ	JSF
D	COUNCIL COMMENTS	10/10/2019	HUV	EHZ	JSF
C	COUNCIL COMMENTS	26/03/2019	HUV	EHZ	JAB

1 0 1cm at full size 10cm 20cm

Architect
Project Work Design Pty
PO Box 5138, Chittaway Bay NSW 2261
M : 0412 637 875
W : pwdesign.com.au

Client
Vladimir Vanovac

Council
Penrith City Council

Scale

Certification By:
Anthony Hasham

AUSTRALIAN CONSULTING ENGINEERS.
AUSTRALIAN CONSULTING ENGINEERS PTY LTD - A.C.N. 084 059 941
LEVEL 4, 470 CHURCH ST, NORTH PARRAMATTA NSW 2150
PH: (02) 9763 1500 FX: (02) 9763 1515
EMAIL: info@aceeng.com.au

Project
110 - 112 MOUNT VERNON ROAD, MOUNT VERNON
PROPOSED CHILDCARE CENTRE
STORMWATER CONCEPT PLAN
DEVELOPMENT APPLICATION

Drawing Title
COVER SHEET PLAN

Scale	A1	Project No.	Dwg. No.	Issue
N.T.S.		171195	000	G

Document Set ID: 9488328
Version: 1, Version Date: 08/01/2021

GENERAL NOTES

1. ALL LINES ARE TO BE Ø90 uPVC 1.0% GRADE UNLESS NOTED OTHERWISE. CHARGED LINES TO BE SEWERGRADE & SEALED.
2. EXISTING SERVICES LOCATIONS SHOWN INDICATIVE ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE & LEVEL ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS.
3. ALL PIPES TO HAVE MIN 150mm COVER IF LOCATED WITHIN PROPERTY.
4. ALL PITS IN DRIVEWAYS TO BE 450x450 CONCRETE AND ALL PITS IN LANDSCAPED AREAS TO BE 450x450 PLASTIC.
5. PITS LESS THAN 600mm DEEP MAY BE BRICK, PRECAST OR CONCRETE.
6. ALL BALCONIES AND ROOFS TO BE DRAINED AND TO HAVE SAFETY OVERFLOWS IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
7. ALL EXTERNAL SLABS TO BE WATERPROOFED.
8. ALL GRATES TO HAVE CHILD PROOF LOCKS.
9. ALL DRAINAGE WORKS TO AVOID TREE ROOTS.
10. ALL DPs TO HAVE LEAF GUARDS.
11. ALL EXISTING LEVELS TO BE CONFIRMED BY BUILDER PRIOR TO CONSTRUCTION.
12. ALL WORK WITHIN COUNCIL RESERVE TO BE INSPECTED BY COUNCIL PRIOR TO CONSTRUCTION.
13. COUNCIL'S ISSUED FOOTWAY DESIGN LEVELS TO BE INCORPORATED INTO THE FINISHED LEVELS ONCE ISSUED BY COUNCIL.
14. ALL WORK SHALL BE IN ACCORDANCE WITH B.C.A. AND A.S.3500.3.
15. REFER TO LANDSCAPE ARCHITECT'S DRAWINGS FOR LANDSCAPING.
16. CARE TO BE TAKEN AROUND EXISTING SEWER. STRUCTURAL ADVICE IS REQUIRED FOR SEWER PROTECTION AGAINST ADDITIONAL LOADING FROM NEW PITS, PIPES, RETAINING WALLS AND OSD BASIN WATER LEVELS.
17. THE OSD BASIN / TANK IS TO BE BUILT TO THE CORRECT LEVELS & SIZE AS PER THIS DESIGN. ANY VARIATIONS ARE TO BE DONE UNDER CONSULTATION FROM OUR OFFICE ONLY. ANY AMENDMENTS WITHOUT OUR APPROVAL WOULD RESULT IN ADDITIONAL FEES FOR REDESIGN AT OC STAGE OR IF A SOLUTION CANNOT BE FOUND, RECONSTRUCTION IS REQUIRED UNDER THE CONTRACTOR'S EXPENSES.

LEGEND

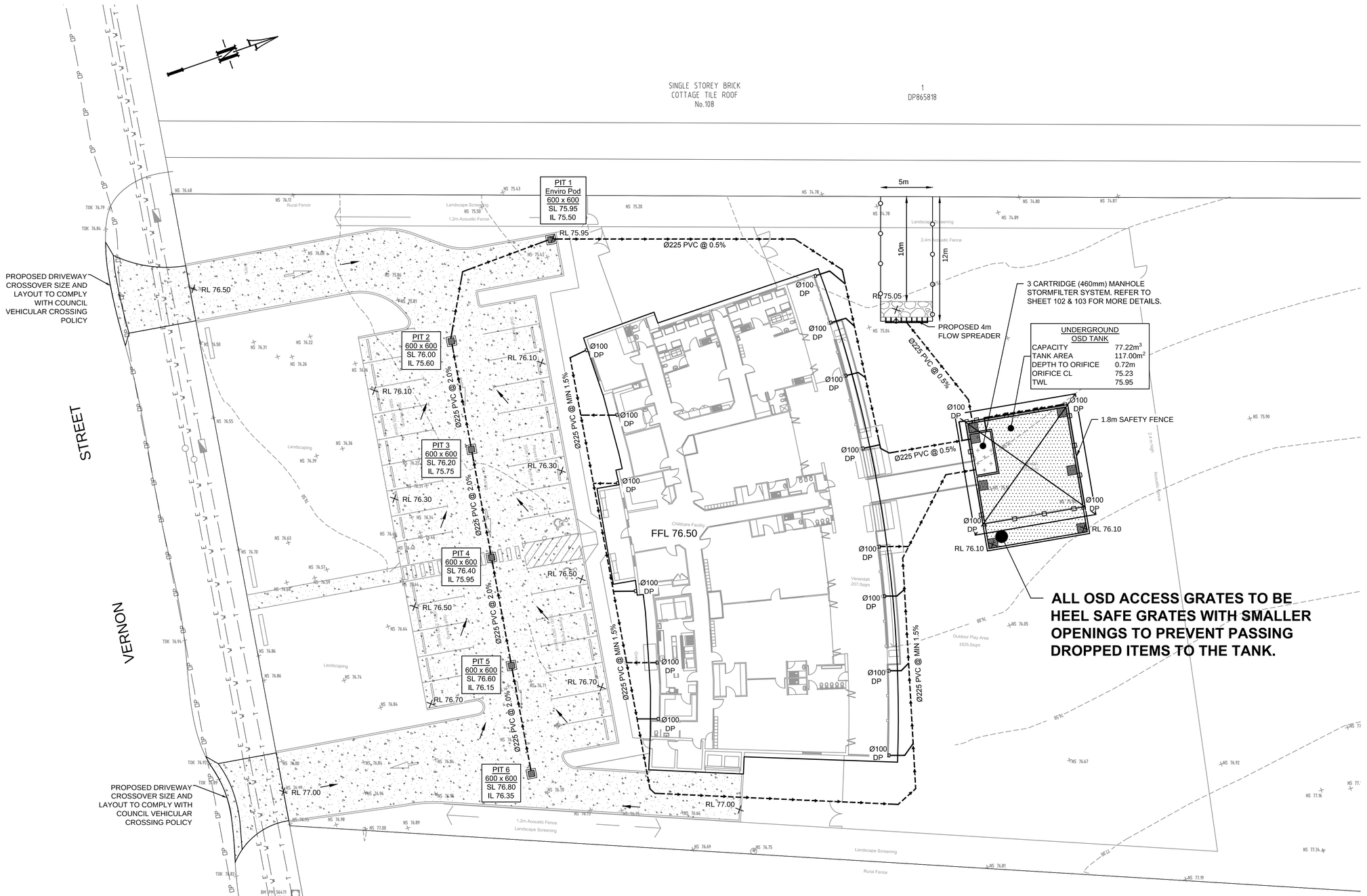
- PROPOSED STORMWATER
- EXISTING OPTIC FIBER MAIN (FROM RECORDS)
- EXISTING WATER (FROM RECORDS)
- EXISTING POWER (FROM RECORDS)
- EXISTING TELSTRA (FROM RECORDS)
- GUTTER DOWNPIPE
- ROOF SLOPE
- Ø300 CLEANING EYE
- SURFACE FLOW ARROWS
- RL 47.00 — DESIGN SURFACE LEVEL
- NS 26.45 — EXISTING SURFACE LEVEL
- PROPOSED OSD STORAGE
- PROPOSED WSUD / BIO-RETENTION AREA / POND
- PROPOSED PERVIOUS PAVING PARKING

PIPES NOTE:

Ø65 PVC @ MIN 1.0%
Ø90 PVC @ MIN 1.0%
Ø100 PVC @ MIN 1.0%
Ø150 PVC @ MIN 1.0%
Ø225 PVC @ MIN 0.5%
Ø300 PVC @ MIN 0.4%
UNLESS NOTED OTHERWISE

TREE NOTE:

ALL TREES TO BE TREATED AS PER THE ARBORIST REPORT (WHERE AVAILABLE).



ALL OSD ACCESS GRATES TO BE HEEL SAFE GRATES WITH SMALLER OPENINGS TO PREVENT PASSING DROPPED ITEMS TO THE TANK.

GROUND FLOOR PLAN
SCALE 1:200

NOT FOR CONSTRUCTION

Issue	Description	Date	Drawn	Design	Checked
G	COUNCIL COMMENTS	04/11/2020	HUV	EHZ	JSF
F	COUNCIL COMMENTS	24/08/2020	HUV	EHZ	JSF
E	COUNCIL COMMENTS	30/03/2020	HUV	EHZ	JSF
D	COUNCIL COMMENTS	10/10/2019	HUV	EHZ	JSF
C	COUNCIL COMMENTS	26/03/2019	HUV	EHZ	JAB

1cm at full size

Architect: Project Work Design Pty
PO Box 5138, Chittaway Bay NSW 2261
M : 0412 637 875
W : pwdesign.com.au

Client: Vladimir Vanovac

Council: Penrith City Council

Scale: 0 3 6 9 m — SCALE 1:200 @ A1

Certification By: Anthony Hasham

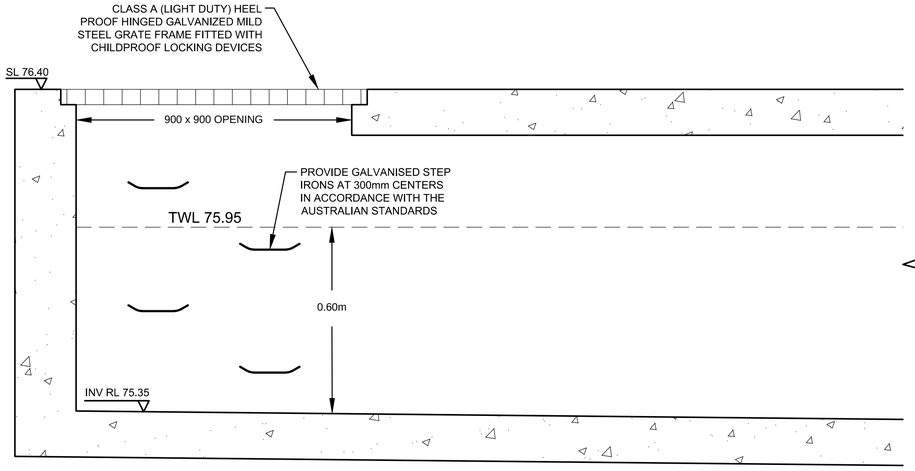
AUSTRALIAN CONSULTING ENGINEERS.
AUSTRALIAN CONSULTING ENGINEERS PTY LTD - A.C.N. 084 059 941
LEVEL 4, 470 CHURCH ST, NORTH PARRAMATTA NSW 2150
PH: (02) 9763 1500 FX: (02) 9763 1515
EMAIL: info@aceeng.com.au

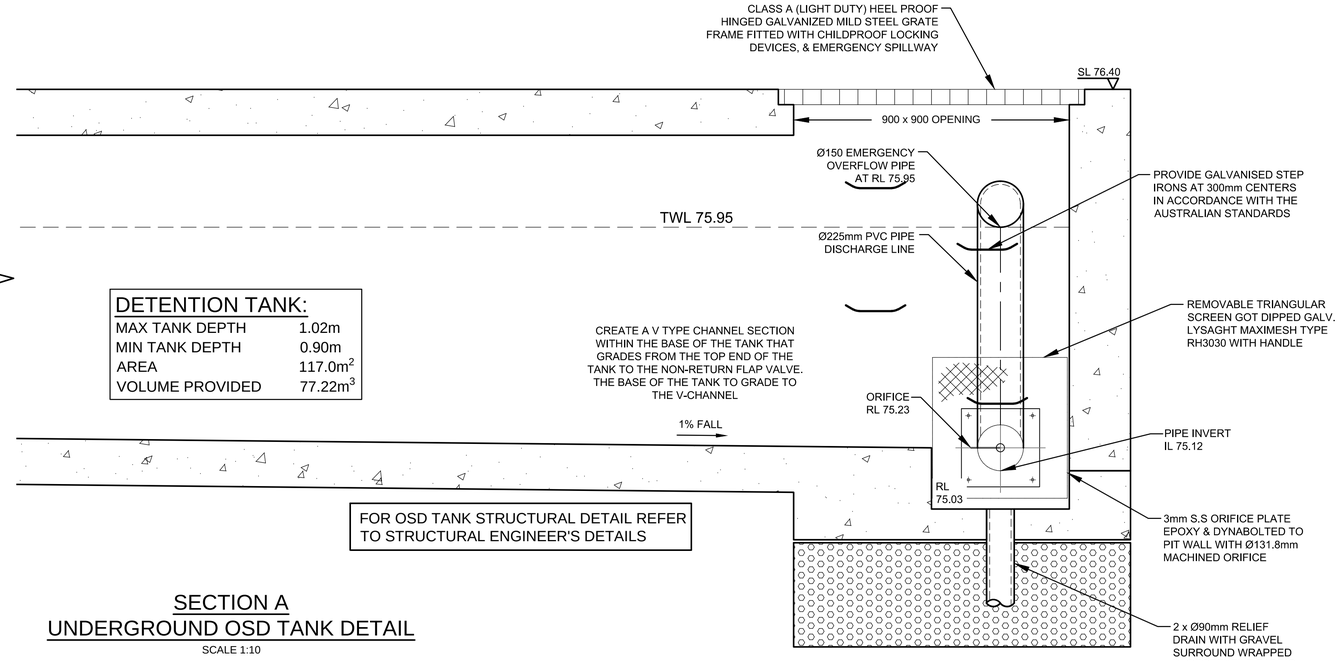
Project: 110 - 112 MOUNT VERNON ROAD, MOUNT VERNON
PROPOSED CHILDCARE CENTRE
STORMWATER CONCEPT PLAN
DEVELOPMENT APPLICATION

Drawing Title: STORMWATER CONCEPT PLAN

Scale	Project No.	Dwg. No.	Issue
1:200 A1	171195	101	G

Document Set ID: 9488328
Version: 1, Version Date: 08/01/2021



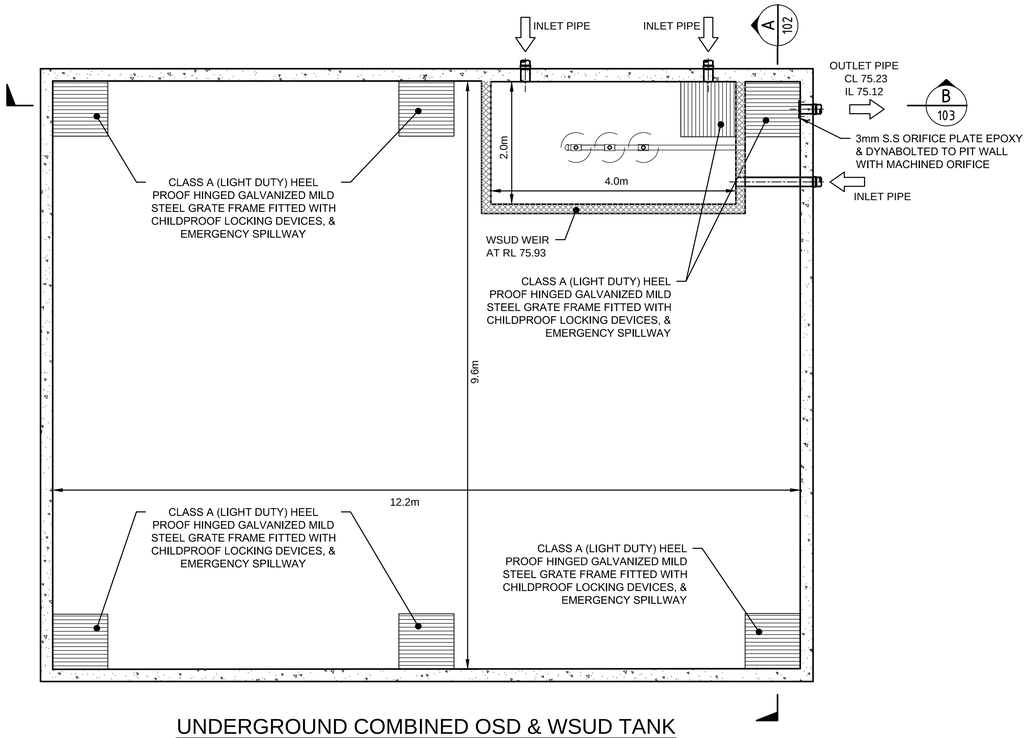


DETENTION TANK:	
MAX TANK DEPTH	1.02m
MIN TANK DEPTH	0.90m
AREA	117.0m^2
VOLUME PROVIDED	77.22m^3

FOR OSD TANK STRUCTURAL DETAIL REFER TO STRUCTURAL ENGINEER'S DETAILS

ALL OSD ACCESS GRATES TO BE HEEL SAFE GRATES WITH SMALLER OPENINGS TO PREVENT PASSING DROPPED ITEMS TO THE TANK.

SECTION A
UNDERGROUND OSD TANK DETAIL
SCALE 1:10



UNDERGROUND COMBINED OSD & WSUD TANK
PLAN VIEW
SCALE 1:50

NOT FOR CONSTRUCTION

Issue	Description	Date	Drawn	Design	Checked
G	COUNCIL COMMENTS	04/11/2020	HUV	EHZ	JSF
F	COUNCIL COMMENTS	24/08/2020	HUV	EHZ	JSF
E	COUNCIL COMMENTS	30/03/2020	HUV	EHZ	JSF
D	COUNCIL COMMENTS	10/10/2019	HUV	EHZ	JSF
C	COUNCIL COMMENTS	26/03/2019	HUV	EHZ	JAB

1cm at full size (0, 10cm, 20cm)

Architect
Project Work Design Pty
PO Box 5138, Chittaway Bay NSW 2261
M : 0412 637 875
W : pwdesign.com.au

Client: Vladimir Vanovac

Council: Penrith City Council

Scale: SCALE 1:10 @ A1 (0, 200, 400, 600mm); SCALE 1:50 @ A1 (0, 1, 2, 3 m)

Certification By: Anthony Hasham

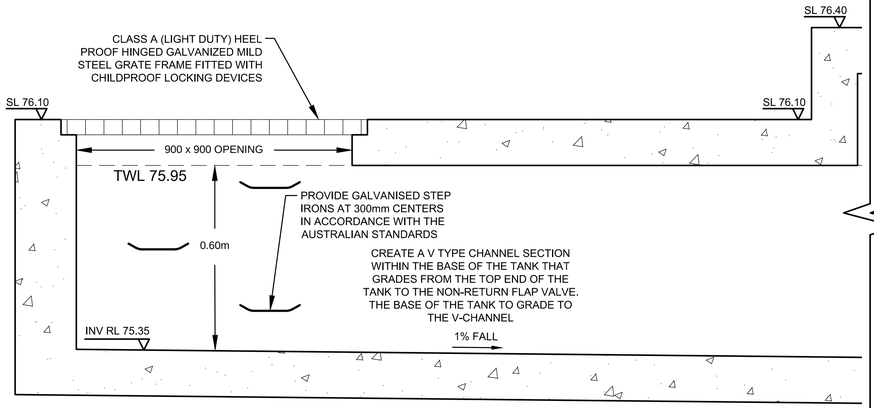
AUSTRALIAN CONSULTING ENGINEERS.
AUSTRALIAN CONSULTING ENGINEERS PTY LTD - A.C.N. 084 059 941
LEVEL 4, 470 CHURCH ST, NORTH PARRAMATTA NSW 2150
PH: (02) 9763 1500 FX: (02) 9763 1515
EMAIL: info@aceeng.com.au

Project: 110 - 112 MOUNT VERNON ROAD, MOUNT VERNON
PROPOSED CHILDCARE CENTRE
STORMWATER CONCEPT PLAN
DEVELOPMENT APPLICATION

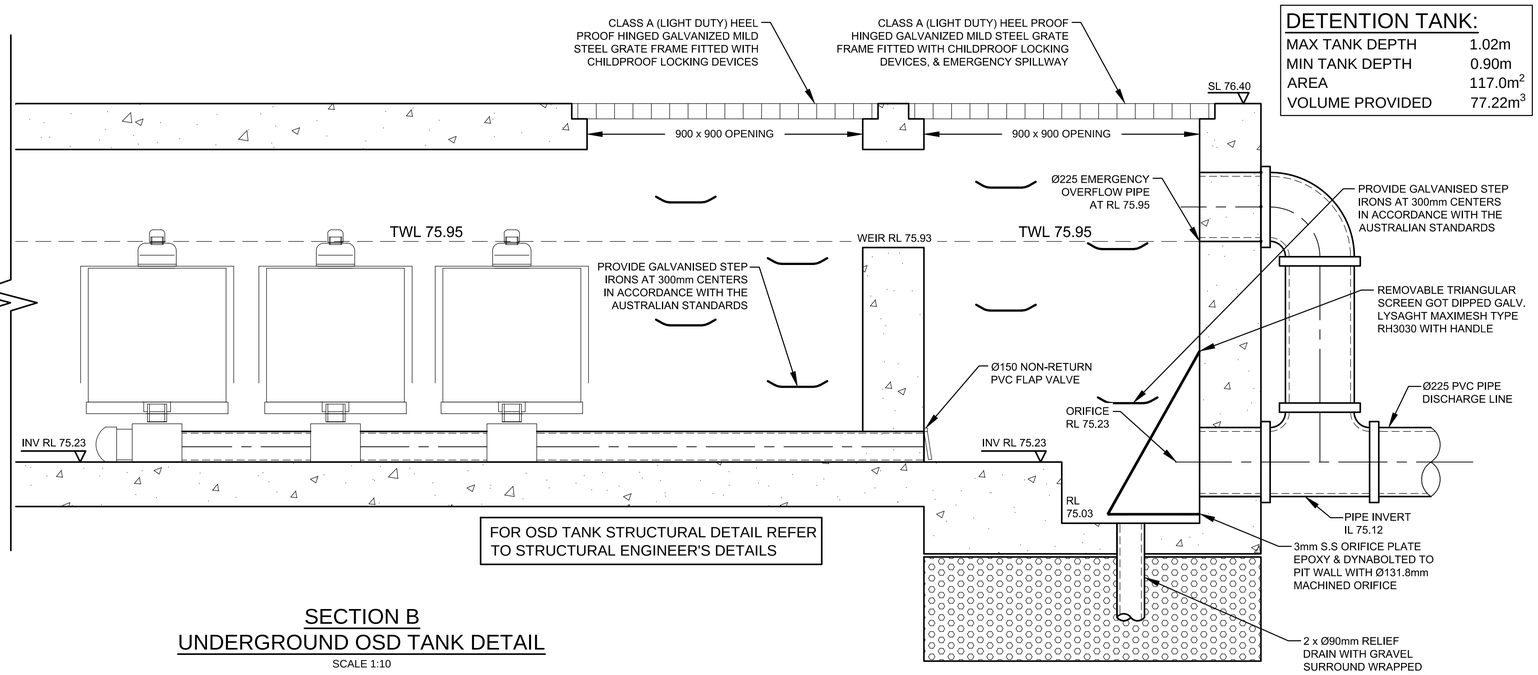
Drawing Title: WSUD TANK DETAILS SHEET 1 OF 3

Scale	Project No.	Dwg. No.	Issue
As Shown (A1)	171195	102	G

Document Set ID: 9484938
Version: 1, Version Date: 08/01/2021



ALL OSD ACCESS GRATES TO BE HEEL SAFE GRATES WITH SMALLER OPENINGS TO PREVENT PASSING DROPPED ITEMS TO THE TANK.



FOR OSD TANK STRUCTURAL DETAIL REFER TO STRUCTURAL ENGINEER'S DETAILS

SECTION B
UNDERGROUND OSD TANK DETAIL
SCALE 1:10

DETENTION TANK:	
MAX TANK DEPTH	1.02m
MIN TANK DEPTH	0.90m
AREA	117.0m^2
VOLUME PROVIDED	77.22m^3

ALL OSD ACCESS GRATES TO BE HEEL SAFE GRATES WITH SMALLER OPENINGS TO PREVENT PASSING DROPPED ITEMS TO THE TANK.

UNDERGROUND OSD TANK STAGED STORAGE CALCULATIONS

DEPTH (mm)	AREA (m²)	CUMULATIVE VOLUME (m³)
0	117.00	0
120	117.00	7.02
200	117.00	16.38
300	117.00	28.08
400	117.00	39.78
500	117.00	51.48
600	117.00	63.18
700	117.00	74.88
720	117.00	77.22

OSD CALCULATIONS:

SITE AREA = 2607 m^2
= 0.2607 ha

PSD = 120 l/s/ha
SSR = 280 m^3/ha

THEREFORE:
PSD = 120 x 0.2607
= 31.28 l/s

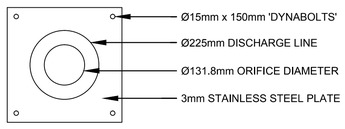
SSR = 280 x 0.2607
= 73.00 m^3

ORIFICE CALCULATIONS:

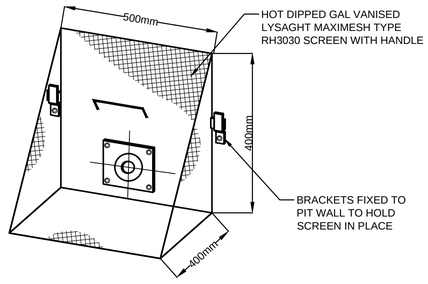
$Q = C \times A \times (2 \times g \times h)^{0.5}$

SO: A = Q / (C x sqrt(2 x g x h))
= 0.03128 / (0.61 x sqrt(2 x 9.81 x 0.72))
= 0.0136 m^2

THEREFORE:
d = sqrt(4 x A / pi)
= sqrt(4 x 0.0106 / 3.14159)
= 131.8 mm



ORIFICE PLATE DETAIL
SCALE 1:10



TRASH SCREEN DETAIL
N.T.S.

NOT FOR CONSTRUCTION

Issue	Description	Date	Drawn	Design	Checked
G	COUNCIL COMMENTS	04/11/2020	HUV	EHZ	JSF
F	COUNCIL COMMENTS	24/08/2020	HUV	EHZ	JSF
E	COUNCIL COMMENTS	30/03/2020	HUV	EHZ	JSF
D	COUNCIL COMMENTS	10/10/2019	HUV	EHZ	JSF
C	COUNCIL COMMENTS	26/03/2019	HUV	EHZ	JAB

0 1cm at full size 10cm 20cm

Architect
Project Work Design Pty
PO Box 5138, Chittaway Bay NSW 2261
M : 0412 637 875
W : pwdesign.com.au

Client
Vladimir Vanovac

Council
Penrith City Council

Scale
0 200 400 600mm
SCALE 1:10 @ A1
0 1 2 3 m
SCALE 1:50 @ A1

Certification By:
Anthony Hasham

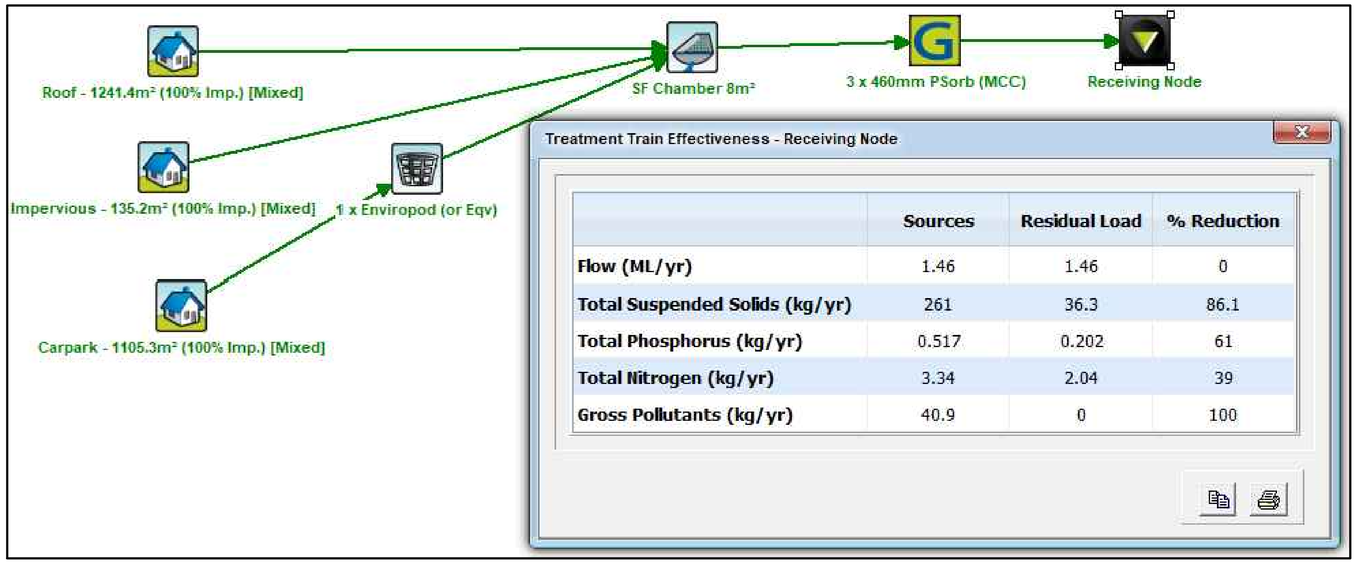
AUSTRALIAN CONSULTING ENGINEERS.
AUSTRALIAN CONSULTING ENGINEERS. PTY LTD - A.C.N. 084 059 941
LEVEL 4, 470 CHURCH ST, NORTH PARRAMATTA NSW 2150
PH: (02) 9763 1500 FX: (02) 9763 1515
EMAIL: info@aceeng.com.au

Project
110 - 112 MOUNT VERNON ROAD, MOUNT VERNON
PROPOSED CHILDCARE CENTRE
STORMWATER CONCEPT PLAN
DEVELOPMENT APPLICATION

Drawing Title
WSUD TANK DETAILS
SHEET 2 OF 3

Scale	Project No.	Dwg. No.	Issue
A1 As Shown	171195	103	G

Document Set ID: 9484523
Version: 1, Version Date: 08/01/2021



	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.46	1.46	0
Total Suspended Solids (kg/yr)	261	36.3	86.1
Total Phosphorus (kg/yr)	0.517	0.202	61
Total Nitrogen (kg/yr)	3.34	2.04	39
Gross Pollutants (kg/yr)	40.9	0	100

WSUD MUSIC RESULTS
N.T.S.

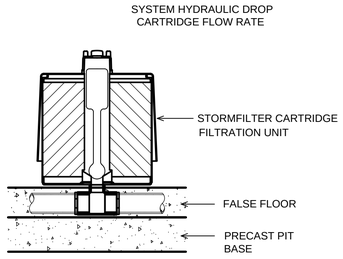
WSUD NOTE:

THE WSUD TANK IS TO BE BUILT TO THE CORRECT LEVELS & SIZE AS PER THIS DESIGN. ANY VARIATIONS ARE TO BE DONE UNDER CONSULTATION FROM OUR OFFICE ONLY. ANY AMENDMENTS WITHOUT OUR APPROVAL WOULD RESULT IN ADDITIONAL FEES FOR REDESIGN AT OC STAGE OR IF A SOLUTION CANNOT BE FOUND, RECONSTRUCTION IS REQUIRED UNDER THE CONTRACTOR'S EXPENSES.

STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION SPECIFIC INTERNAL FLOW CONTROLS. CONVEYANCE CAPACITY IS RATED AT 80L/S.
- ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY STORMWATER360 AUSTRALIA UNLESS OTHERWISE NOTED.

CARTRIDGE HEIGHT	690		460		310	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	930		700		550	
TREATMENT BY MEDIA SURFACE AREA L/S/m2	1.4	0.7	1.4	0.7	1.4	0.7
CARTRIDGE FLOW RATE (L/s)	1.42	0.71	0.95	0.47	0.63	0.32

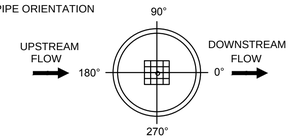


SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	1
WATER QUALITY FLOW RATE (L/S)	-
PEAK FLOW RATE (L/S)	-
RETURN PERIOD OF PEAK FLOW (yrs)	-
# OF CARTRIDGES REQUIRED (8-22)	3
CARTRIDGE HEIGHT (310, 460 or 690mm)	690
MEDIA TYPE (PERLITE, PERLITE/ZEOLITE OR ZPG)	ZPG
PRECAST VAULT WEIGHT	-
PRECAST LID WEIGHT	-

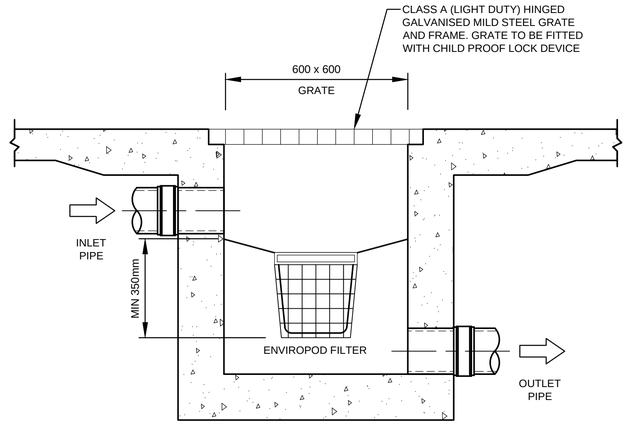
PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE #1	74.58	PVC	225
INLET PIPE #2	74.58	PVC	225
OUTLET PIPE	74.35	PVC	225

PIPE ORIENTATION



LADDER		YES/NO
ANTI-FLOTATION BALLAST	N/A	N/A
	N/A	N/A

STORMFILTER TABLE
N.T.S.



PIT 1
DROP PIPE ENVIROPOD CONFIGURATION SECTION
N.T.S.

GENERAL NOTES

1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT STORMWATER360 FOR OPTIONS.
3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE STANDARD DETAIL DRAWING SHOWS THE MAXIMUM NUMBER OF CARTRIDGES. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH AS3600.
4. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT STORMWATER360 FOR DESIGN OPTIONS.
5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
6. STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTROADS T44 LOAD RATING WITH 0-2m FILL MAXIMUM.
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
8. ANY BACKFILL DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9. STORMFILTER BY STORMWATER360:
   SYDNEY (AU) PHONE: (02) 9525 5833,
   BRISBANE (AU) PHONE: (07) 3272 1872.

NOT FOR CONSTRUCTION

Issue	Description	Date	Drawn	Design	Checked
G	COUNCIL COMMENTS	04/11/2020	HUV	EHZ	JSF
F	COUNCIL COMMENTS	24/08/2020	HUV	EHZ	JSF
E	COUNCIL COMMENTS	30/03/2020	HUV	EHZ	JSF
D	COUNCIL COMMENTS	10/10/2019	HUV	EHZ	JSF
C	COUNCIL COMMENTS	26/03/2019	HUV	EHZ	JAB

1cm at full size

Architect
Project Work Design Pty
PO Box 5138, Chittaway Bay NSW 2261
M : 0412 637 875
W : pwdesign.com.au

Client
Vladimir Vanovac

Council
Penrith City Council

Scale
0 200 400 600mm
SCALE 1:10 @ A1

Certification By:
Anthony Hasham

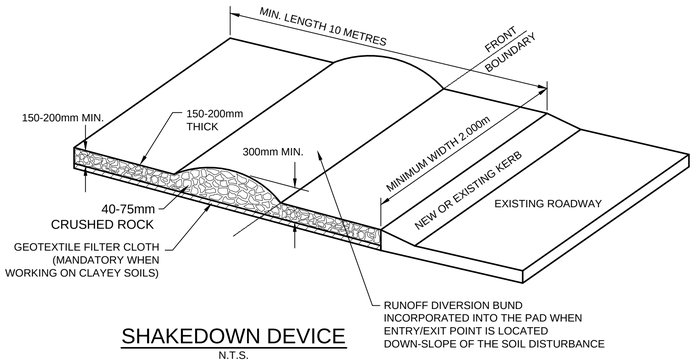
AUSTRALIAN CONSULTING ENGINEERS.
AUSTRALIAN CONSULTING ENGINEERS PTY LTD - A.C.N. 084 059 941
LEVEL 4, 470 CHURCH ST, NORTH PARRAMATTA NSW 2150
PH: (02) 9763 1500 FX: (02) 9763 1515
EMAIL: info@aceeng.com.au

Project
110 - 112 MOUNT VERNON ROAD, MOUNT VERNON
PROPOSED CHILDCARE CENTRE
STORMWATER CONCEPT PLAN
DEVELOPMENT APPLICATION

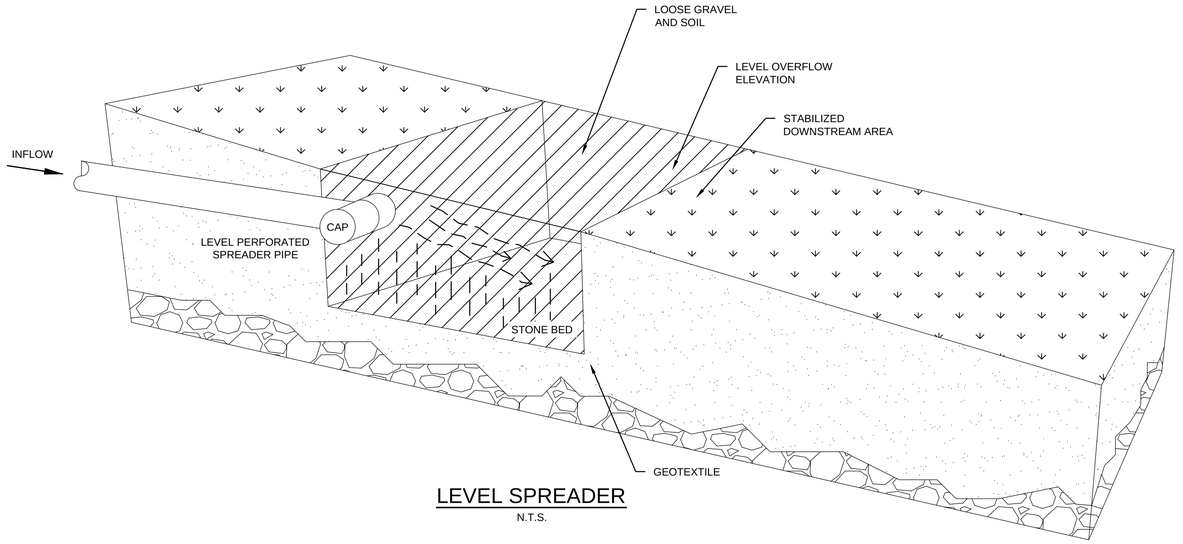
Drawing Title
WSUD TANK DETAILS
SHEET 3 OF 3

Scale	Project No.	Dwg. No.	Issue
As Shown A1	171195	104	G

Document Set ID: 9411928
Version: 1, Version Date: 08/01/2021



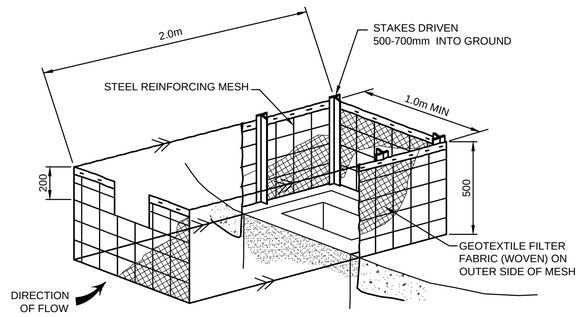
SHAKEDOWN DEVICE
N.T.S.



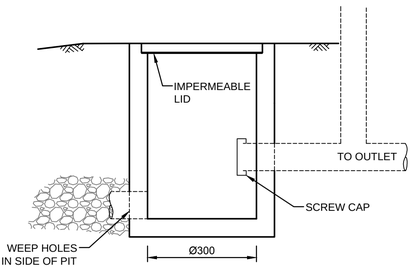
LEVEL SPREADER
N.T.S.

SEDIMENT & EROSION NOTES

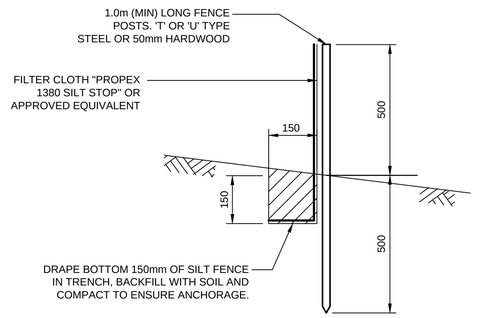
1. IMMEDIATELY FOLLOWING SETTING OUT OF THE WORKS, BUT PRIOR TO COMMENCEMENT OF ANY CLEARING OR EARTHWORKS, THE CONTRACTOR AND SUPERINTENDENT SHALL WALK THE SITE TO NOMINATE THE LOCATIONS AND TYPES OF SEDIMENT AND EROSION CONTROL MEASURES TO BE ADOPTED. THESE MEASURES SHALL BE IMPLEMENTED PRIOR TO ANY CLEARING OR EARTHWORKS AND MAINTAINED UNTIL THE WORKS ARE COMPLETED AND NO LONGER POSE AN EROSION HAZARD, UNLESS OTHERWISE APPROVED BY THE SUPERINTENDENT.
2. IMMEDIATELY FOLLOWING SETTING OUT OF THE WORKS, BUT PRIOR TO COMMENCEMENT OF ANY CLEARING OR EARTHWORKS, THE CONTRACTOR AND SUPERINTENDENT SHALL WALK THE SITE TO IDENTIFY AND MARK TREES WHICH ARE TO BE PRESERVED. NOTWITHSTANDING THE ABOVE,THE CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO MINIMISE DISTURBANCE TO EXISTING VEGETATION AND GROUND COVER OUTSIDE THE MINIMUM AREAS REQUIRED TO COMPLETE THE WORKS AND SHALL BE RESPONSIBLE FOR RECTIFICATION, AT ITS OWN COST, OF ANY DISTURBANCE BEYOND THOSE AREAS.
3. PROVIDE GULLY GRATE INLET SEDIMENT TRAPS AT ALL GULLY PITS.
4. PROVIDE SILT FENCING ALONG PROPERTY LINE AS DIRECTED BY SUPERINTENDENT.
5. ADDITIONAL CONTROL DEVICES TO BE PLACED WHERE DIRECTED BY THE PRINCIPLE.
6. ALTERNATIVE DESIGNS TO BE APPROVED BY SUPERINTENDENT PRIOR TO CONSTRUCTION.
7. WASH DOWN/RUMBLE AREA TO BE CONSTRUCTED WITH PROVISIONS RESTRICTING ALL SILT AND TRAFFICKED DEBRIS FROM ENTERING THE STORMWATER SYSTEM.
8. NO WORK OR STOCKPILING OF MATERIALS TO BE PLACED OUTSIDE OF SITE WORK BOUNDARY.
9. APPROPRIATE EROSION AND SEDIMENT CONTROLS TO BE USED TO PROTECT STOCKPILES AND MAINTAINED THROUGH OUT CONSTRUCTION.
10. IT IS THE CONTRACTORS RESPONSIBILITY TO TAKE DUE CARE OF NATURAL VEGETATION. NO CLEARING IS TO BE UNDERTAKEN WITHOUT PRIOR APPROVAL FROM THE SUPERINTENDENT.
11. TO AVOID DISTURBANCE TO EXISTING TREES, EARTHWORKS WILL BE MODIFIED AS DIRECTED ON-SITE BY THE SUPERINTENDENT.
12. THE LOCATION OF EROSION AND SEDIMENTATION CONTROLS WILL BE DETERMINED ON SITE BY THE SUPERINTENDENT.
13. ACCESS TRACKS THROUGH THE SITE WILL BE LIMITED TO THOSE DETERMINED BY THE SUPERINTENDENT AND THE CONTRACTOR PRIOR TO ANY WORK COMMENCING.
14. ALL SETTING OUT IS THE RESPONSIBILITY OF THE CONTRACTOR PRIOR TO WORKS COMMENCING ON SITE. THE SUPERINTENDENT'S SURVEYOR SHALL PEG ALL ALLOTMENT BOUNDARIES, PROVIDE COORDINATE INFORMATION TO THESE PEGS AND PLACE BENCH MARKS. THE CONTRACTOR SHALL SET OUT THE WORKS FROM AND MAINTAIN THESE PEGS.
15. PLANS ARE MINIMUM REQUIREMENTS AND ARE TO BE USED AS A GUIDE ONLY. EXACT MEASURES USED SHALL BE DETERMINED ON SITE IN CONJUNCTION WITH PROGRAM OF CONTRACTORS WORKS etc.



FIELD INLET SEDIMENT TRAP
N.T.S.



CLEANING EYE DETAIL
N.T.S.



SILT FENCE DETAIL
N.T.S

SILT FENCE NOTES:

1. FILTER CLOTH TO BE FASTENED SECURELY TO POSTS WITH GALVANISED WIRE TIES, STAPLES OR ATTACHMENT BELTS.
2. POSTS SHOULD NOT BE SPACED MORE THAN 3.0m APART.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY 150mm AND FOLDED.
4. FOR EXTRA STRENGTH TO SILT FENCE, WOVEN WIRE (14mm GAUGE, 150mm MESH SPACING) TO BE FASTENED SECURELY BETWEEN FILTER CLOTH AND POSTS BY WIRE TIES OR STAPLES
5. INSPECTIONS SHALL BE PROVIDED ON A REGULAR BASIS, ESPECIALLY AFTER RAINFALL AND EXCESSIVE SILT DEPOSITS REMOVED WHEN "BULGES" DEVELOP IN SILT FENCE
6. SEDIMENT FENCES SHALL BE CONSTRUCTED WITH SEDIMENT TRAPS AND EMERGENCY SPILLWAYS AT SPACINGS NO GREATER THAN 40m ON FLAT TERRAIN DECREASING TO 20m SPACINGS ON STEEP TERRAIN.

NOT FOR CONSTRUCTION

Issue	Description	Date	Drawn	Design	Checked
G	COUNCIL COMMENTS	04/11/2020	HUV	EHZ	JSF
F	COUNCIL COMMENTS	24/08/2020	HUV	EHZ	JSF
E	COUNCIL COMMENTS	30/03/2020	HUV	EHZ	JSF
D	COUNCIL COMMENTS	10/10/2019	HUV	EHZ	JSF
C	COUNCIL COMMENTS	26/03/2019	HUV	EHZ	JAB

1 0 1cm at full size 100m 20cm

Architect
Project Work Design Pty
PO Box 5138, Chittaway Bay NSW 2261
M : 0412 637 875
W : pwdesign.com.au

Client: Vladimir Vanovac

Council: Penrith City Council

Scale:

Certification By:
Anthony Hasham

AUSTRALIAN CONSULTING ENGINEERS.
AUSTRALIAN CONSULTING ENGINEERS. PTY LTD - A.C.N. 084 059 941
LEVEL 4, 470 CHURCH ST, NORTH PARRAMATTA NSW 2150
PH: (02) 9763 1500 FX: (02) 9763 1515
EMAIL: info@aceeng.com.au

Project: 110 - 112 MOUNT VERNON ROAD, MOUNT VERNON
PROPOSED CHILDCARE CENTRE
STORMWATER CONCEPT PLAN
DEVELOPMENT APPLICATION

Drawing Title: MISCELLANEOUS DETAILS SHEET

Scale	Project No.	Dwg. No.	Issue
N.T.S. A1	171195	105	G

Document Set ID: 9488528
Version: 1, Version Date: 08/01/2021

MGA

LOT 1
DP 865818

LOT 4
DP 865818
AREA = 10332.5m²

LOT 137
DP 32140

225ø CLAY PIPE
IL 84.46

100ø PVC PIPE
IL 84.47

153.745
197° 57' 30"

164.005
21° 15' 10"

97° 13' 10"
61.960

GRASS

BITUMEN PATH

ONE STOREY
BRICK
RESIDENCE
TILE ROOF
No. 100

AWN: 88.72
AWN: 88.47
WINDOW
H: 88.43
S: 87.19
TG: 88.70
R: 90.85
TG: 88.60

GL:86.15
D:0.35mø
S:6m
H:9m

GL:87.33
D:0.45mø
S:6m
H:14m

WINDOW
H: 88.60
S: 87.92
GARAGE
TG: 88.05
R: 89.74
TG: 89.03

ONE STOREY
BRICK
RESIDENCE
TILE ROOF
No. 114

AWN: 89.51
TG: 89.96
TG: 89.97
R: 91.05
R: 91.45
R: 92.63
TG: 89.97
TG: 89.97
TG: 89.98

GL:87.05
D:0.5mø
S:7m
H:10m

EP POLE

BENCH MARK GIN
IN POWER POLE
RL 87.50m
(AHD)

STEEL MESH FENCE

EDGE OF BITUMEN

EDGE OF BITUMEN

MOUNT VERNON ROAD

0 5 10 Meters

SCALE: 1:200 (A1)
SCALE: 1:400 (A3)

A1

NOTES:

0.5m AND 1m CONTOURS SHOWN.

THIS PLAN IS PREPARED FOR DETAIL AND LEVEL PURPOSES ONLY AND THE BOUNDARIES OF THE LAND HAVE NOT BEEN FIXED BY SURVEY. THE INFORMATION SHOWN ON THIS PLAN MUST NOT BE USED FOR CONSTRUCTION SETOUT.

THIS IS NOT A "SURVEY" AS DEFINED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT 2002.

THIS SURVEY IS LIMITED TO THOSE PARTS OF THE SUBJECT BUILDING AND OTHER IMPROVEMENTS THAT WERE VISIBLE AND ACCESSIBLE AT THE TIME OF SURVEY.

ANY STRUCTURES RELATED TO PHYSICAL FEATURES SUCH AS BUILDINGS, POOLS, DRIVEWAYS, TREES, WALLS AND STAIRS MUST BE CONFIRMED PRIOR TO FINAL DESIGN.

ONLY VISIBLE SERVICES HAVE BEEN LOCATED AND NO DBYD INFORMATION HAS BEEN INVESTIGATED, ALL SERVICES MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

THE TITLE DIMENSIONS SHOWN ARE TAKEN DIRECTLY FROM INFORMATION PROVIDED BY LAND AND PROPERTY INFORMATION PLANS AND ARE SHOWN ON THE ORIENTATION SPECIFIED ON THIS PLAN. THESE DIMENSIONS ARE SUBJECT TO CHANGE ON COMPLETION OF A FINAL SURVEY.

NEIGHBOURING HOUSES, ROOF POSITIONS, RIDGE POSITIONS AND WINDOW DETAILS ARE APPROXIMATE ONLY.

ORIGIN OF RL'S: SSM 13865 - RL 71.361 (AHD)

PINNACLE
LAND SURVEYORS

PINNACLE LAND SURVEYORS PTY LTD

MAIL: PO Box 112
Baulkham Hills NSW 2153

ADDRESS: Suite 104, Level 1
447 Victoria Street,
Wetherill Park NSW 2164

PHONE: (02) 9686 2548

FAX: (02) 9844 5445

EMAIL: office@pinnaclesurveyors.com.au

DIAL BEFORE YOU DIG www.1100.com.au

VISIT US AT:
www.pinnaclesurveyors.com.au

ABN 59607099534

© Pinnacle Land Surveyors Pty Ltd

PROJECT : DETAIL AND LEVEL SURVEY AT No. 110-112 MOUNT VERNON ROAD, MOUNT VERNON

SHEET 1 OF 2

DRAWING No. : 1383Det.dwg

CLIENT : Vladimir Vanovac

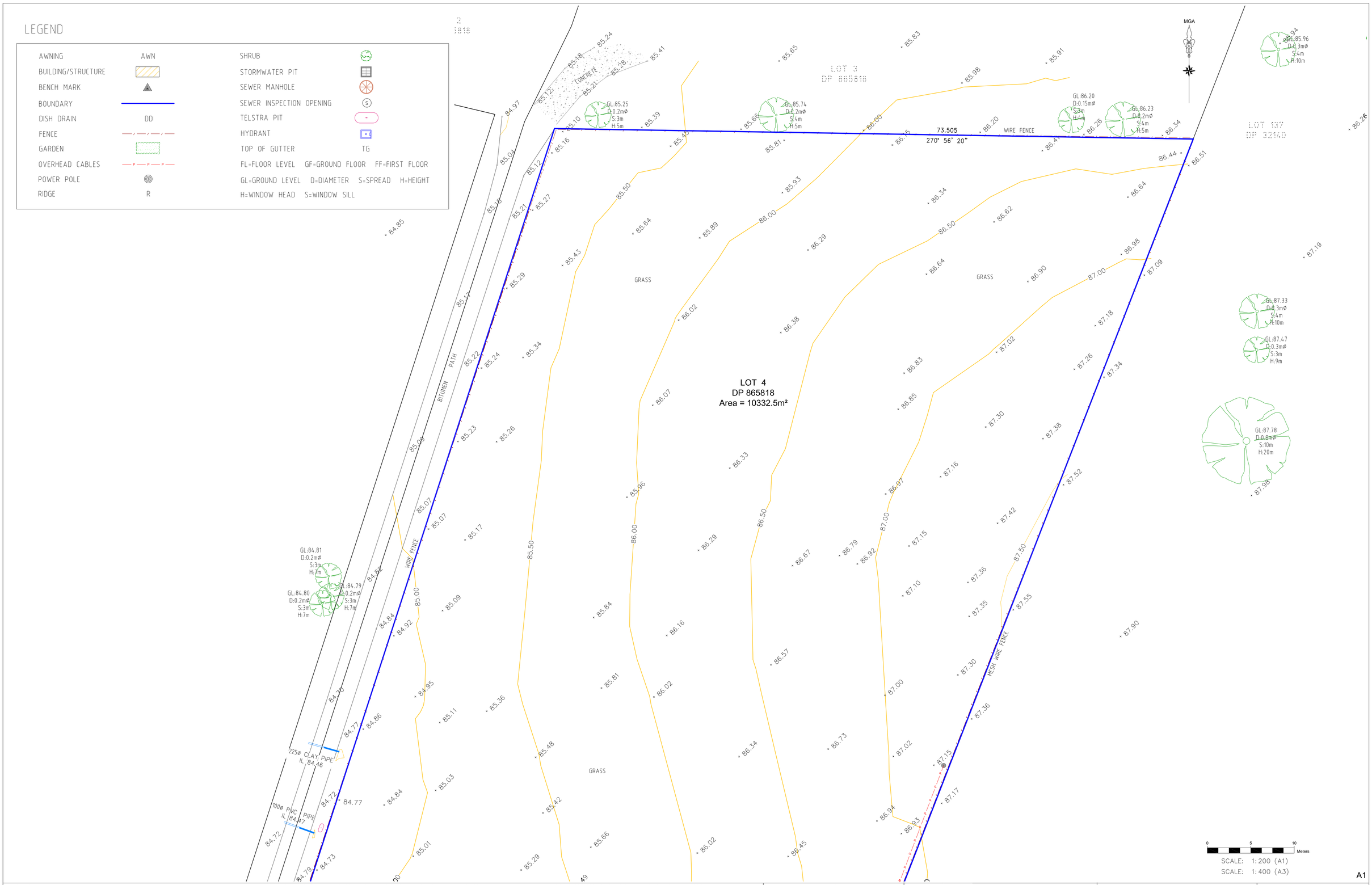
JOB REF : 1383Det

DATE : 29 March 2019

Document Set ID: 8968599
Version: 1, Version Date: 18/02/2020

LEGEND

AWNING	AWN	SHRUB	
BUILDING/STRUCTURE		STORMWATER PIT	
BENCH MARK		SEWER MANHOLE	
BOUNDARY		SEWER INSPECTION OPENING	S
DISH DRAIN	DD	TELSTRA PIT	-
FENCE	—/—/—/—	HYDRANT	
GARDEN		TOP OF GUTTER	TG
OVERHEAD CABLES	—P—P—P—	FL=FLOOR LEVEL GF=GROUND FLOOR FF=FIRST FLOOR	
POWER POLE		GL=GROUND LEVEL D=DIAMETER S=SPREAD H=HEIGHT	
RIDGE	R	H=WINDOW HEAD S=WINDOW SILL	



NOTES:

0.5m AND 1m CONTOURS SHOWN.

THIS PLAN IS PREPARED FOR DETAIL AND LEVEL PURPOSES ONLY AND THE BOUNDARIES OF THE LAND HAVE NOT BEEN FIXED BY SURVEY. THE INFORMATION SHOWN ON THIS PLAN MUST NOT BE USED FOR CONSTRUCTION SETOUT.

THIS IS NOT A "SURVEY" AS DEFINED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT 2002.

THIS SURVEY IS LIMITED TO THOSE PARTS OF THE SUBJECT BUILDING AND OTHER IMPROVEMENTS THAT WERE VISIBLE AND ACCESSIBLE AT THE TIME OF SURVEY.

ANY STRUCTURES RELATED TO PHYSICAL FEATURES SUCH AS BUILDINGS, POOLS, DRIVEWAYS, TREES, WALLS AND STAIRS MUST BE CONFIRMED PRIOR TO FINAL DESIGN.

ONLY VISIBLE SERVICES HAVE BEEN LOCATED AND NO DBYD INFORMATION HAS BEEN INVESTIGATED, ALL SERVICES MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

THE TITLE DIMENSIONS SHOWN ARE TAKEN DIRECTLY FROM INFORMATION PROVIDED BY LAND AND PROPERTY INFORMATION PLANS AND ARE SHOWN ON THE ORIENTATION SPECIFIED ON THIS PLAN. THESE DIMENSIONS ARE SUBJECT TO CHANGE ON COMPLETION OF A FINAL SURVEY.

NEIGHBOURING HOUSES, ROOF POSITIONS, RIDGE POSITIONS AND WINDOW DETAILS ARE APPROXIMATE ONLY.

ORIGIN OF RL'S: SSM 13865 - RL 71.361 (AHD)

PINNACLE LAND SURVEYORS

PINNACLE LAND SURVEYORS PTY LTD

MAIL: PO Box 112 Baulkham Hills NSW 2153
ADDRESS: Suite 104, Level 1 447 Victoria Street, Wetherill Park NSW 2164
PHONE: (02) 9686 2548
FAX: (02) 9844 5445
EMAIL: office@pinnaclesurveyors.com.au

DIAL BEFORE YOU DIG www.1100.com.au

VISIT US AT: www.pinnaclesurveyors.com.au

ABN 59607099534

© Pinnacle Land Surveyors Pty Ltd

PROJECT : DETAIL AND LEVEL SURVEY AT No. 110-112 MOUNT VERNON ROAD, MOUNT VERNON

CLIENT : Vladimir Vanovac

SHEET 2 OF 2

DRAWING No. : 1383Det.dwg

JOB REF : 1383Det

DATE : 29 March 2019

Document Set ID: 8965599
Version: 1, Version Date: 18/02/2019

Site and Soil Assessment

for

On-Site Wastewater Management

Commercial System

Lot 4 DP865818

110-112 Mount Vernon Road, Mount Vernon NSW 2178

Penrith City Council

3rd September 2020

Roberts Resources – September 2020

Report Reference: SJDSSE_0002

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

This Wastewater Management Report has been prepared by Roberts Resources for the owners of Number 110-112 Mount Vernon Road, Mount Vernon NSW 2178 (Lot 4 – DP865818) for purpose and to the scope stated in this report. The services undertaken by Roberts Resources in connection with preparing this report are limited to those specifically detailed in the report.

Should third parties choose to rely on this report they do so at their own risk. Roberts Resources excludes implied warranties and conditions, to the extent legally permissible.

The opinions, conclusions and any recommendations in this report are based on conditions and information reviewed at the date of preparation of the report. Roberts Resources has no responsibility or obligation to update this report to account for events or changes occurring after the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on the information available to and the assumptions made by Roberts Resources, which are described in various sections throughout this report. Roberts Resources disclaims liability arising from any of those assumptions being incorrect.

Roberts Resources has prepared this report based on the information referenced in this report. Roberts Resources has not independently verified or checked that information. Roberts Resources does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Nothing in this report constitutes legal advice and any commentary relating to legislation is for providing context as appropriate to the contents and objectives of the report. Any reader of this report should refer directly to relevant legislation or seek independent legal advice with respect to legal rights, liabilities or implications of any matter relating to the content of this report. This report is not an all-encompassing report dealing with the building and or property from every aspect.

This report is not a Certificate of Compliance with the requirements of any Act, Regulation, Ordinance or by-law.

This report has been developed based on agreed requirements as understood by Roberts Resources at the time of the investigation. It only applies to a specific task on the nominated lands. This task and accompanying report are a ‘Wastewater Management Study ‘only.

This report is based on a single site inspection. The entire property was not assessed and the assessment is limited to those areas and sections of the property requested as well as reasonably accessible and visible to the inspector at the time of the inspection. The inspection did not include earthworks or excavation, mechanical, soil pit sampling, removing or moving objects including but not limited to, vegetation, infrastructure, debris or refuse. The inspector did not dig, gouge, force or perform any other invasive procedures to the area or any part of the property grounds other than hand auger soil testing.

This report is COPYRIGHT, all rights reserved. This report may only be used for the purposes of its intention as a ‘Wastewater Management Study’ for the intended clients. Unauthorised use of this document in any form whatsoever is prohibited. The sole purpose of this report and the associated services performed by Roberts Resources is to prepare a Wastewater Management Study in accordance with the relevant Australian Standards and Guidelines relevant to Wastewater Management Studies.

Table of Contents

1.0 Introduction 1

2.0 Site Assessment 2

2.1 Consultant Details 2

2.2 Site Details 2

2.3 Land Application Area – Site Information 4

3.0 Soil Assessment 6

3.1 Method 6

3.2 Soil Classification 7

4.0 System Design and Specifications 7

4.1 Treatment Plant 7

4.2 Land Application Area Disposal Method Design 9

4.3 Wastewater Management System Location 13

5.0 Setback Requirements 16

6.0 Comments and Conclusions 16

7.0 References 17

Table index

Table 1 Soil Classification Log 7

Table 2 Soil Chemistry Tests and Limitations 7

Table 3 Soil Classification Summary – Land Application Area 7

Table 4 Design Sizing Calculation – ETA Bed 10

Table 5 System Type and Disposal Method Specifications 11

Table 6 Recommended Setback Distances 16

Figure index

Figure 1 Site Location 2

Figure 2 Proposed Infrastructure Location on Property 3

Figure 3 Hydro Mapping Surrounding Property 5

Figure 4 Proposed building location and site layout relative to Drill Hole locations 6

Figure 5 MAXI 35 9

Figure 6 Evapotranspiration Absorption Bed Design 12

Figure 7 Example of ETA Bed using Central Manifold System 13

Figure 8 Land Application Area Location 13

Figure 9 Land Application Area and Site Design 14

Figure 10 Diversion Drain Design 16

Picture index

Photograph 1 Existing Property Condition 3

Photograph 2 Auger Hole 1 7

Photograph 3 Example of wide ETA Bed 10

Appendix

Appendix 1 ALS Soil Testing Results 16

Appendix 2 LAA suitable plant species list 17

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.0 Introduction

Roberts Resources Pty Ltd in accordance with AS/NZS 1547:2012 (On-site domestic wastewater management), Penrith City Council 'On-Site Sewage Management and Greywater Reuse' 2014 and the Environment and Health Protection Guidelines 'On-site Sewage Management for Single Households' 1998 as well as other relevant documentation where cited; was commissioned to undertake a Site and Soil Assessment (referred to as 'Wastewater Management Study') in the Penrith City Council Local Government Area.

This Wastewater Management Study has been completed to investigate whether on-site effluent treatment and disposal can be sustainably accommodated and managed within Lot 4 (110-112), DP865818; Mount Vernon Road, Mount Vernon, NSW 2178 for the proposed wastewater producing building and infrastructure for Development Application 19/0886.

Development Application and proposed building on this site is for a Childcare Facility.

The site is currently undeveloped and zero infrastructure exists on-site.

All work associated with this report was undertaken by Roberts Resources Principal; D. Roberts.

Site assessment was conducted on the 3rd of September 2020.

It must be noted that although all standards listed in the AS/NZS 1547:2012 has been adhered too, it is impossible to ascertain the exact soil profiles/classifications and relationship to bedrock across the entire site without conducting a more thorough exploration project.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

2.0 Site Assessment

2.1 Consultant Details

Company:	**Roberts Resources – Independent Geoscience Consultants**
Disciplines:	**Geomorphology – Geology – Soil Science – Hydrogeology**
Service Areas:	**Civil – Environmental – Exploration – Agricultural**
Address:	**'Somerton' Duke Street, Mittagong, NSW 2575**
PH:	[redacted]
Site Assessor:	**Dave Roberts**
Email:	[redacted]
Field Work Date:	**3rd September 2020**
Assessment Ref:	**SJDSSE_0002**

2.2 Site Details

Owner:	Vladimir Vanovac and Mark Toma
Email:	N/A
Phone:	N/A
Address:	110-112 Mount Vernon Road, Mount Vernon, NSW 2178
Postal Address:	N/A
Lot / DP:	4 / 865818
Report Commissioned By:	Owners

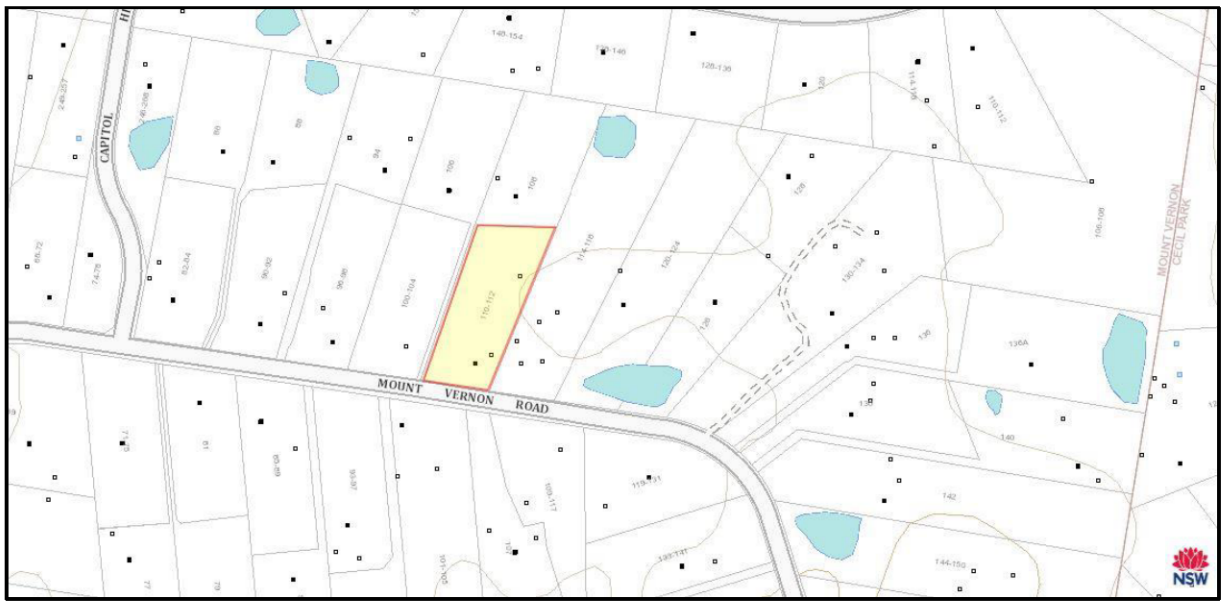


Figure 1: Site Location – 110-112 Mount Vernon Road, Mount Vernon (Sixt Maps Image)

GPS (if known):	
Allotment Size:	1.033ha
Local Government Authority:	Penrith City Council
Topographic Map:	Penrith 1:25,000

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Photograph 1: Existing Property Condition - zero infrastructure

Proposed Development: Childcare Facility - New On-site Wastewater Management System.

Figure 2: Proposed Infrastructure Location on Property

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Existing Wastewater Type:	None
Water Supply:	Town (Reticulated)
Current Bedrooms:	N/A
Potential Bedrooms:	N/A
Proposed Pool:	No
Sydney Catchment Area:	No
Neighboring System Types:	Septic Tank / AWTS – Irrigation surface and subsurface, absorption bed type

2.3 Land Application Area - Site Information

Assessment Criteria:

Penrith City Council Development Control Plan – 'On-Site Sewage Management and Greywater Reuse' 2014

AS/NZS 1547:2012 On-site Domestic wastewater management

NSW Government Health: Sewage Management Facility Vessel Accreditation Guideline February 2016

NSW Health Department: Septic Tank and Collection Well Accreditation Guideline – Part 4, December 2001

Australian Standard – AS/NZS 1546. 1:2008

Environment and Health Protection Guidelines 'On-site Sewage Management for Single Households' 1998

Design Wastewater Loading:

- Maximum Children per day = 96 @ 23 litres per child per day. Total per day maximum for children = 2,208 litres
- Maximum Staff per day = 16 @ 40 litres per staff member. Total per day maximum for staff = 640 litres.

Total per day wastewater loading = 2,848 litres

5% fluctuation contingency capacity of total = 142 litres

Grand Total = 2,990 litres per day maximum flow

Climate:	N/A
Height Above Sea Level:	95 meters
Evaporation > Rainfall:	Yes (source BOM, as at December 2011)
Flood Potential:	Flood studies have not been consulted for this assessment. On-site inspection has concluded the following; Proposed treatment system location is above 1:100-year flood level. Proposed Land Application Area (LAA) is above 1:20-year flood level. Both areas are considered a low limitation.
Frost Potential:	This locality is not known to endure long and sustained frosts and as such is considered a low limitation.
Exposure:	East to West. Low limitation
Slope:	~1-2 across LAA. Minor Limitation
LAA Landform:	LAA on open flat ground (Linear divergent / planar). Minor Limitation
Run on:	Low potential. Minor Limitation

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Run off & Seepage:	Low potential if designed properly. Minor Limitation
Springs or Seeps:	None observed. Minor Limitation
Erosion/Movement:	None observed. Minor Limitation
Drainage:	Well drained. Minor Limitation
Evidence of Fill:	None. Minor Limitation
Outcrop/Surface Rock:	None observed.
Domestic Groundwater:	No Domestic Water Bore on property. Minor Limitation
Watercourses/body's	LAA > 40 meters from drainage depression / dam. LAA > 100 meters from permanent/intermittent water stream/river. LAA > 150 meters from named river.

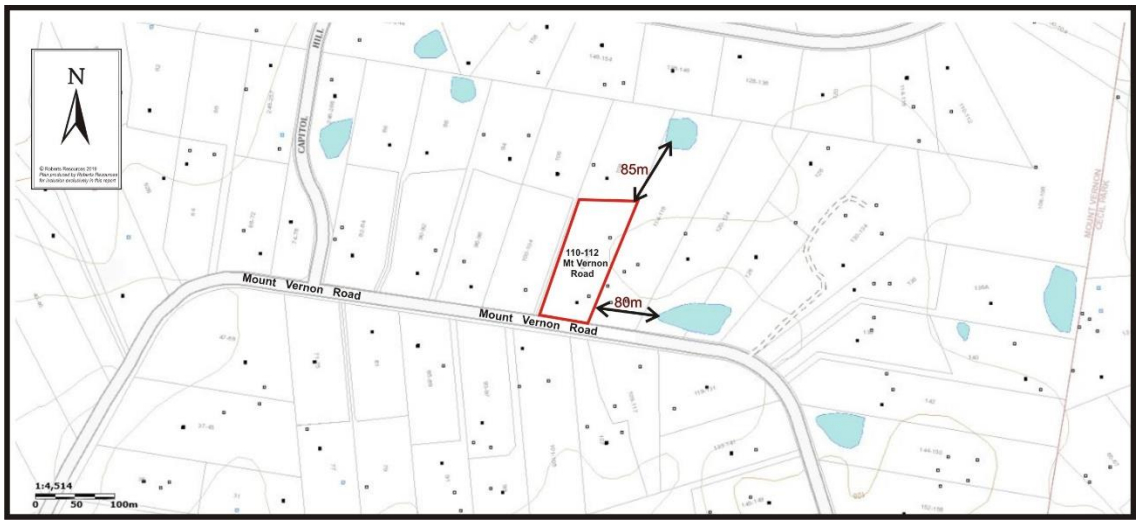


Figure 3: Hydro mapping surrounding property

Vegetation:	LAA present vegetation cover – Managed Lawn. Low Limitation
Property Use:	Rural-Residential. Low Limitation
Previous Property Use:	Rural. Low Limitation
Soil Compaction:	No cracks or compaction observed. Low Limitation
Salinity:	Not observed.
LAA Availability:	Extremely low due to intended property use. Very High Limitation.
Geology:	Sedimentary (Wianamatta Group)
Soil Landscape:	Blacktown
Geological/Geotech Hazards:	Unknown in this area.
Environmental Areas:	None known. Low Limitation
Ground Water:	Not intersected. Low Limitation
Mains Sewer Potential:	No known plans.
System Access:	Excellent. Low Limitation

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3.0 Soil Assessment

3.1 Method

Auger holes were drilled across the site and Land Application Area. Soil type and profile is believed to be continuous across the property.

Representative soil samples were taken and sent to an approved NATA laboratory for testing. Test results are listed in Appendix 1.

A soil classification summary log for the drill holes is presented in Table 1. Table 2 outlines any limitations to the site soils for wastewater disoposal by chemical analysis. An overall soil classification summary relating to the soil horizon/s to be utilized in the LAA, Table 3.

With the exception of the Modified Emerson Aggregate Test, there are no limitations for treated effluent application to the site. The Modified Emerson Aggregate presents a moderate limitation. This limitation is addressed in Section 4.2 'Land Application Area Disposal Method Design' with the recommended design modifications allowing for this moderate limitation.

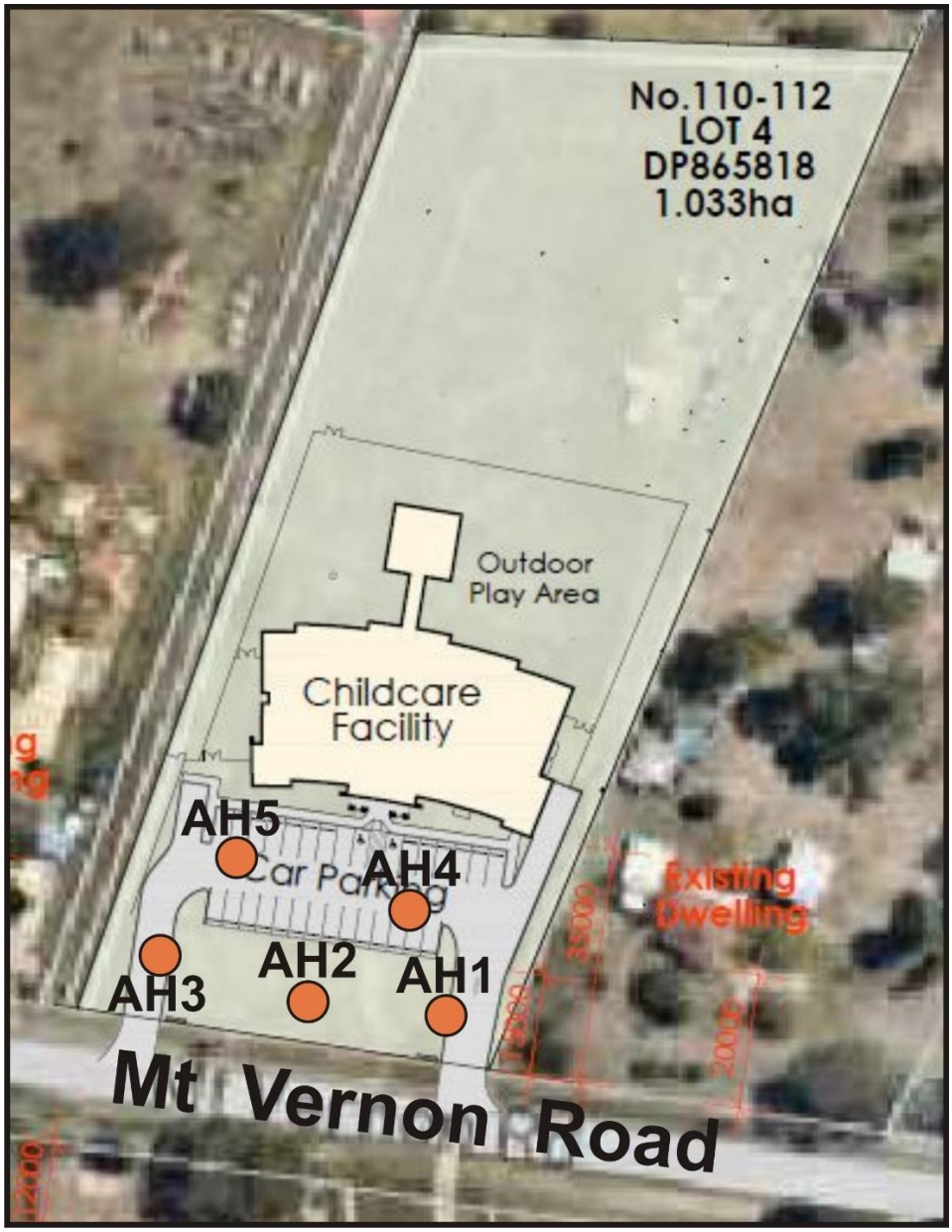


Figure 4: Proposed building and site layout relative to Drill Hole locations

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3.2 Soil Classification

Table 1: Soil Classification Log

Layer	Horizon	Test Type	Depth to (mm)	Texture	Moisture	Colour	% Frags	Structure	Consistency	Mottling	Sample Taken	Emerson	PH	EC	Category	Photo	Comment
1	A11	AH	260	SL	D	DB	15	S	2	No	Yes	NR	6.0	N/A	2	Yes	
2	A12	AH	330	LS	M	DB	15	S	2	No	Yes	NR	6.0	N/A	2	Yes	
3	B11	AH	490	SCL	M	B	15	S-M	2	No	Yes	NR	6.0	N/A	4	Yes	Common Floaters
4	B12	AH	1129	LC	M-VM	B-LB-O	20	S	3	At Base	Yes	NR	5.5	N/A	5	Yes	Common Floaters

Photograph 2: Auger Hole 1

Table 2: Soil Chemistry Tests and Limitations

Test	Limitiation
pH (1:5)	Minor
Electrical Conductivity	Minor
Emerson Aggregate Test	Moderate
Exchangeble Cations	Minor
Psorption Index & Psorption Capacity	Minor

Table 3: Soil Classification Summary – Land Application Area

Horizon/s Most Impacted - Utilised in LAA	B11 / B12
Soil Category Adopted	5
Indicative Drainage	Strong / Moderate
Structure	Strong / Moderate
Texture	Light Clay
Indicative Permeability P(m/d) as Ksat	0.12 - 0.5
Recommended DLR (mm/d) (AS/NZS 1547:2012)	12

4.0 System Design and Specifications

4.1 Treatment Plant

The required minimum standard the treatment plant is to be capable of processing is a minimum of 2990 litres of effluent per day, treated to 'secondary' class or higher.

The treatment plant will require a 'multi-tank' treatment system. Essential to this design is surge capability incorporated into Tank 1. This is required due to the intended operating times and subsequent hydraulic loading expected from the Childcare Facility. This being; a surge in wastewater production between the hours of approximately 7am to 7pm (Childcare Facility operating hours). Tank 1 should be baffled or meshed to act as first stage separation. Tank 1 will also require an alarm and flashing light to indicate high water level has been reached or a blockage has occurred. Childcare Facilities are at risk from non-disposable or inappropriate items flushed down toilets occasionally and it is essential that these are picked up in the first tank rather than making their way into the main treatment tank and causing breakdowns.

A second tank should be part of the treatment process to cause further separation of solids and liquids. This could be baffled and/or grated/meshed. Initial stage aeration can also be introduced.

The next tank or series of tanks should fully treat the wastewater to 'secondary class' and will ideally incorporate a series of aeration chambers, clarification chamber, chlorine chamber and pump well to output/distribution pipe.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

The final tank requires a timed dose/pump capability ensuring treated effluent is distributed to the Land Application Area in 'timed' increments across a 24-hour period. The more common demand dosing found in domestic treatment plant applications is not suitable for this site and the buildings daily uses. It is essential the treated effluent is pumped to and introduced into the disposal area in timed increments across a 24-hour daily period to ensure the Land Application Area does not get overloaded.

Immediately after the treated wastewater exits the treatment plant a 100-150-micron filter should be installed and as this is a commercial sized system a daily flow meter to record and track daily flow amounts. There should also be a valve or outlet so treated effluent samples can be easily obtained for testing as required.

The treatment plant will take the effluent produced by the Childcare Facility during its operating hours. Hold the effluent, treat it to secondary class and then distribute the effluent across that day and night ready for the next surge of effluent to begin again the next day when the Facility opens. Even though the Facility is expected to operate Monday to Friday, the system is capable of operating 7 days per week 365 days per year.

All works associated with system manufacture and installation must be completed by a suitably licensed and certified person and comply with all relevant statutory regulations and standards.

Roberts Resources recommends the treatment plant to be an ECONOCYCLE MAXI 35; studies have shown this treatment plant is suited to the site and treatment requirements. Mesh/grates, alarms and flashing light require fitting to Tank 1.

It is critical that a flow meter is fitted to the main treated effluent distribution line in order to gain 'hard data' on the daily flows occurring at the Childcare Facility. This way if for any reason the daily loadings are different to the nominated design loadings proactive design changes can be undertaken to ensure the continued sustainability of the On-Site Wastewater Management System.

Treatment Plant summary specifications are listed below.

Model:	**Econocycle Maxi 35**
Capability:	**2500 – 7000 litres per day**
Treatment Class:	**Secondary**
Configuration:	**3 Tank System**
Tank 1:	**Septic, 7000 litres total (1500 litres min sludge allowance) and (5500 litres min capacity)**
Tank 2:	**Chamber 1: Septic-Baffled (4000 litres)** **Chamber 2: Aeration Section 1 (3000 litres, 80 l/p/m air supply, 1600mm diffusers, 120sqm growth media)**
Tank 3:	**Chamber 1: Aeration Section 2 (3000 litres, 80 l/p/m air supply, 1600mm diffusers, 120sqm growth media)** **Chamber 2: Aeration Section 3 1 (3000 litres, 80 l/p/m air supply, 1600mm diffusers, 120sqm growth media, 0.42sqm / 500 litres capacity clarifier, twin bath chlorination, pump well – irrigation pump, timer)**
Effluent Quality:	**BOD (<20 mg/l)** **SS (<30 mg/l)** **Free Chlorine (>0.2 & <2.0 mg/l)** **Coliforms (<30 cfu/100ml)**

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

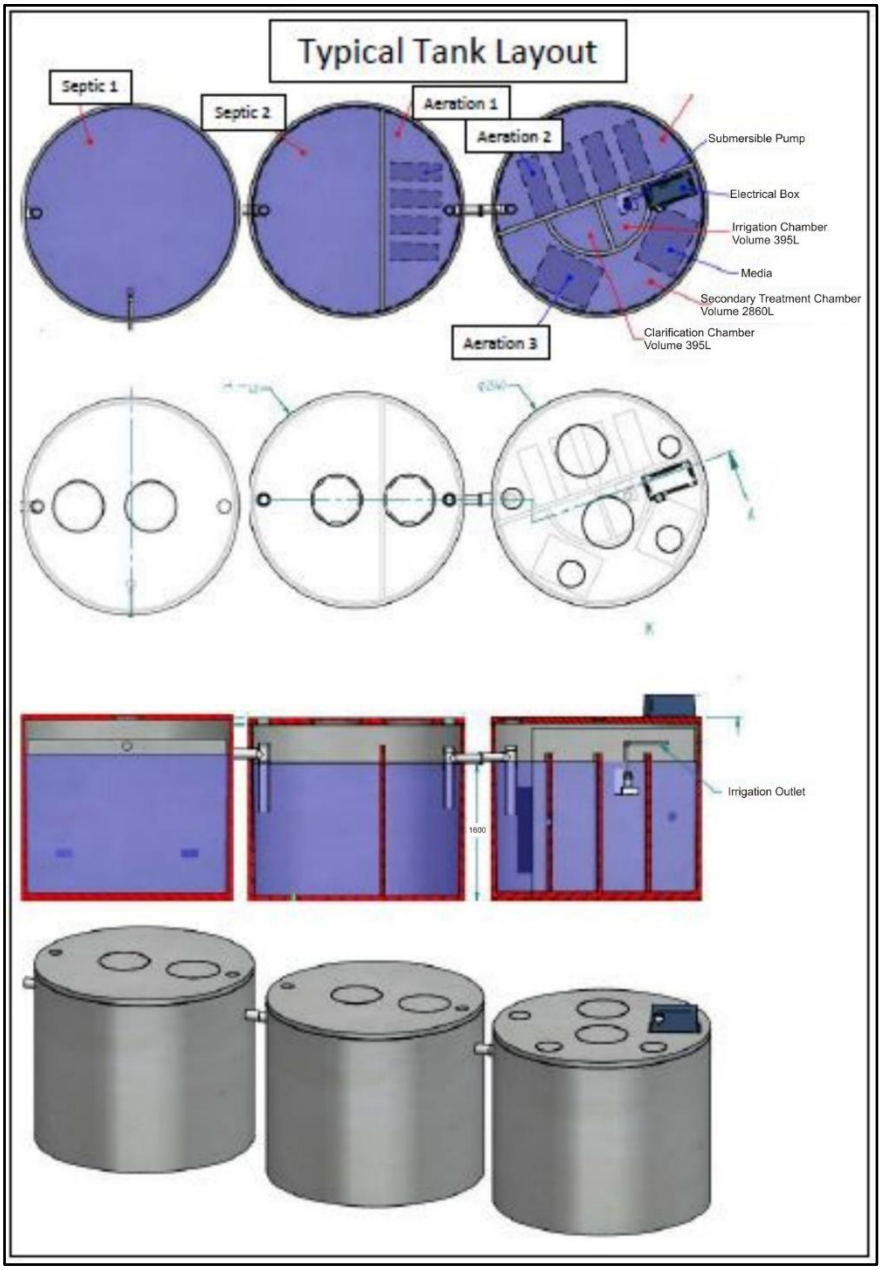


Figure 5: MAXI 35 (Diagramme courtesy of Econocycle Pty Ltd)

4.2 Land Application Area Disposal Method Design

The serviceable life of the Land Application Area (LAA) will be compromised if the prescribed daily calculated design flow of 2990 litres is exceeded.

Any changes to the proposed Building Envelope, Land Application Areas, Design Sizing Calculations, proposed buildings, prior to or post building and installation will require a re-assessment of this site. Adjustments or changes to the wastewater management system must be reviewed and approved by Roberts Resources.

Due to planned infrastructure, property use and future property plans available land for wastewater disposal is extremely limited. There is not enough available land for surface or subsurface irrigation. Wisconsin Mounds or Amended Soil Mounds are suitable however, again the site layout, development requirements and lack of available space inhibit this as a suitable disposal method.

Soil characteristics when considered alongside intended property use, site layout and characteristics dictate that conventional absorption methods are not suitable and for efficient and for effective wastewater disposal a combination of absorption and evapotranspiration methods are necessary.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

The LAA is best suited to Subsurface Absorption and Evapotranspiration methods. This is best delivered via ETA Bed (Evapotranspiration Absorption Bed) Distribution.

Site and soil characteristics require all top soil and growth medium associated with the ETA Bed and vegetation to be imported. Zero existing soils from the site are suitable for constructing any part of the ETA Bed. All soils / layering materials used in the build must be imported and of appropriate industry quality.

Due to the moderate limitation imposed by the Emerson Aggregate test results the ETA Bed base will require excavation deeper than the usually prescribed 500mm from ground surface. The ETA Bed base will need to be excavated to a total depth of 800mm from ground surface. 400mm of high-quality Sandy Clay Loam is to be imported and used to build the bed base back up from 800mm depth to 400mm depth from surface ensuring a total of 400mm thick Sandy Clay Loam layer is created. This layer will require even compaction to an industry standard compaction rate for this soil type to ensure zero subsidence of this layer occurs over time. The regular ETA Bed design and layering can then be installed on top of this 400mm Sandy Clay Loam layer.

Penrith City Council DCP requires a 100% reserve area available relative to the primary Land Application Area. The prescribed primary Land Application Area is 250m². An additional 293m² of usable reserve area is available for ETA Bed disposal type. This is split across 3 zones.

Design Sizing Calculations are provided and tabulated in Table 4. The ETA Bed specifications are detailed in Table 5 and Figure 6.

Table 4: Design Sizing Calculation – Evapotranspiration Absorption Bed (ETA Bed)

	ETA - Bed
DLR (mm/day)	12
Design wastewater loading	Town (Reticulated)
Design Flow (lt/day)	2990
Disposal Area - Bed width required (metres)	10.5
Disposal Area - Bed length required (metres)	23.9
Total Area Required (m²)	250
Reserve Area Required (m²)	250
Reserve Area Available (m²)	293 (Split across 3 separate areas)
Reserve Area 1 Available (m²)	127
Reserve Area 2 Available (m²)	96
Reserve Area 3 Available (m²)	70

Photograph 3: Example of wide ETA Bed with multiple distribution pipes

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table 5: System Type and Disposal Method Specifications

Treatment Plant	3 Tank System
Treatment Class	Secondary
Tank Size (minimum)	Each Tank 7000 litres
Minimum Daily Flow Capability (lt/d)	2990
DLR (mm)	12
Timed Dose Rate	124.5 (litres per hour)
Disposal Method	Evapotranspiration (ETA) Absorption Bed
Disposal Area Required (m²)	250
ETA Bed Configuration - Length & Width	23.9 metres long X 10.5 metres wide
Manifold	Can be located at end of Bed or through the centre distibuting to pipes either side
Dosing Pipe - From Tank	100mm
Distribution Pipe in beds	100mm slotted (can use smaller to achieve required pressure through system if required)
Distribution Pipe distance from bed edges	1000mm
Distribution Pipes separation distance within bed	1000mm
Bed Base	Entire area of Bed area to be excavated out to a depth of 800mm from ground surface. Bed then built up with Sandy Clay Loam to 400mm from surface. This 400mm layer must be compacted to industry standard compaction rates that guarantee zero subsidence will occur. This layer is not to be over compacted which will destroy permeability rates and must act as a natural occuring soil horizon of this soil type. Explicit direction from a Geotechncial Engineer must be sought for this Layers installation. First Layer (Layer 1) detailed below then starts immediately on top of this 400mm thick Sandy Clay Loam layer
1st layer from base - Fine Sand Layer	50mm thick layer of fine sand (0.1mm) immediately on top on bed base
2nd layer from base - Aggregate	150 mm thick layer of 40mm Blue Stone immediately on top of 1st layer (can use 20mm if 40mm not available)
3rd layer from base - Aggregate	50mm thick layer of 10mm Blue Stone immediately on top of 2nd layer
4th layer from base - Fine Sand Layer	150mm thick layer of fine sand (0.1mm) immediately on top of 3rd layer
Aggregate and Sand Quality	Ensure aggregate is of even size. No smaller or larger aggregates, fines or dust is to be incorporated - sieve and wash aggregate first to ensure only the specified aggregate size is installed. All sand is to be of uniform size. Zero dust, particles, forign materials or smaller or larger sand grains to be included.
5th layer from base - Imported top-soil	100mm thick layer of premium top soil (fine sandy loam to loam) immediately on top of 4th layer. Subsidence potential must be calculated. This may mean the initial thickness of this layer maight be 150-200mm thick with subsidence expected to occur over time. Geotechncial consultation may be required to calculate subsidence.
Distribution Pipe Base Depth	Centre of 2nd layer
Geotextile Cloth Required	No
Depth of bed from natural surface (bed base depth)	400mm
Total Bed Thickness	500mm
Height above natural surface	100 - 150mm minimum raised above (allow for settling)
Batter	1 to 3
Gypsum Required	At maximum application rate for clay on bed base (800mm depth from ground surface)
Air Flow Vents Required	Yes (must be insect proof)
Inspection Ports Required	Yes (must be insect proof)
System Flush	Flush return line must be incorporated
Field Flush Vale	Required
Non-Return Valves / pressure reducing valves	Required
Air/Vacume Release Valves	Not essential but preferable to have at least one
Filter Required	Yes; must be 100-150 micron positioned immediately after final tank outlet
Filter Flush Valve	Required
Sample Port Required	Yes; must be positioned after final treatment tank and before ETA Bed Manifold
Grass Required	By time of certification (or compatable vegetation - Detailed in Appendix 2)
Upslope Diversion Drains Required	Yes
Hydraulic Capacity	Pump must be sized correctly to deliver required head and flow rate throughout entire bed. Successful testing must be undertaken prior to signoff. This means the system must be run with clean water for a period equivalent to the 'timed dose'. The installer or certifier must document and photograph the process. The entire system must work as required meaning all distribution pipes are delivering the required flow evenly across all dispribution pipes at the prescribed dosage for the timed-dose period.
Additional Comments 1	During installation; if any changes in ground conditions are encountered that are different to recorded in this report. Contact Roberts Resources for discussion and further planning prior to finalising the installation
Additional Comments 2	Do not operate machines in trench/bed. This will compact the soil and inhibit efficient trench/bed wokings. Do not construct beds during rain or immediately after rains.
Additional Comments 3	All infrastructure and materials used in the system must comply with all relevant standards and guidelines I.E. they must be effluent quality specific
Additional Comments 4	Test workings of system throughout installation. Make sure pipes are loading and distributing evenly before adding layers 3, 4 and 5.
Additional Comments 5	Water NSW notes that drilling holes within PVC pipe makes them non-compliant with the AS/NZS 3500 as it impacts the structural integrety of the pipe
Additional Comments 6	Ensure the ETA Bed is not positioned under any canopy of existing or planned trees and roots can not encroach into the Bed area
Additional Comments 7	Fully document all stages of build and infrastructure installation with notes and photographs. This is required for documentation and certification procedure
Additional Comments 8	AWTS must not allow any suspended soilids or organic material into main distribution line leading to ETA Bed infrastructure
Additional Comments 9	entire system to be serviced every 3 months minimum
Additional Comments 10	Ensure grass coverage across the bed area to encourage evapotranspiration. Seeding of topsoil (top dressing) recommended yearly followed by oversowing

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

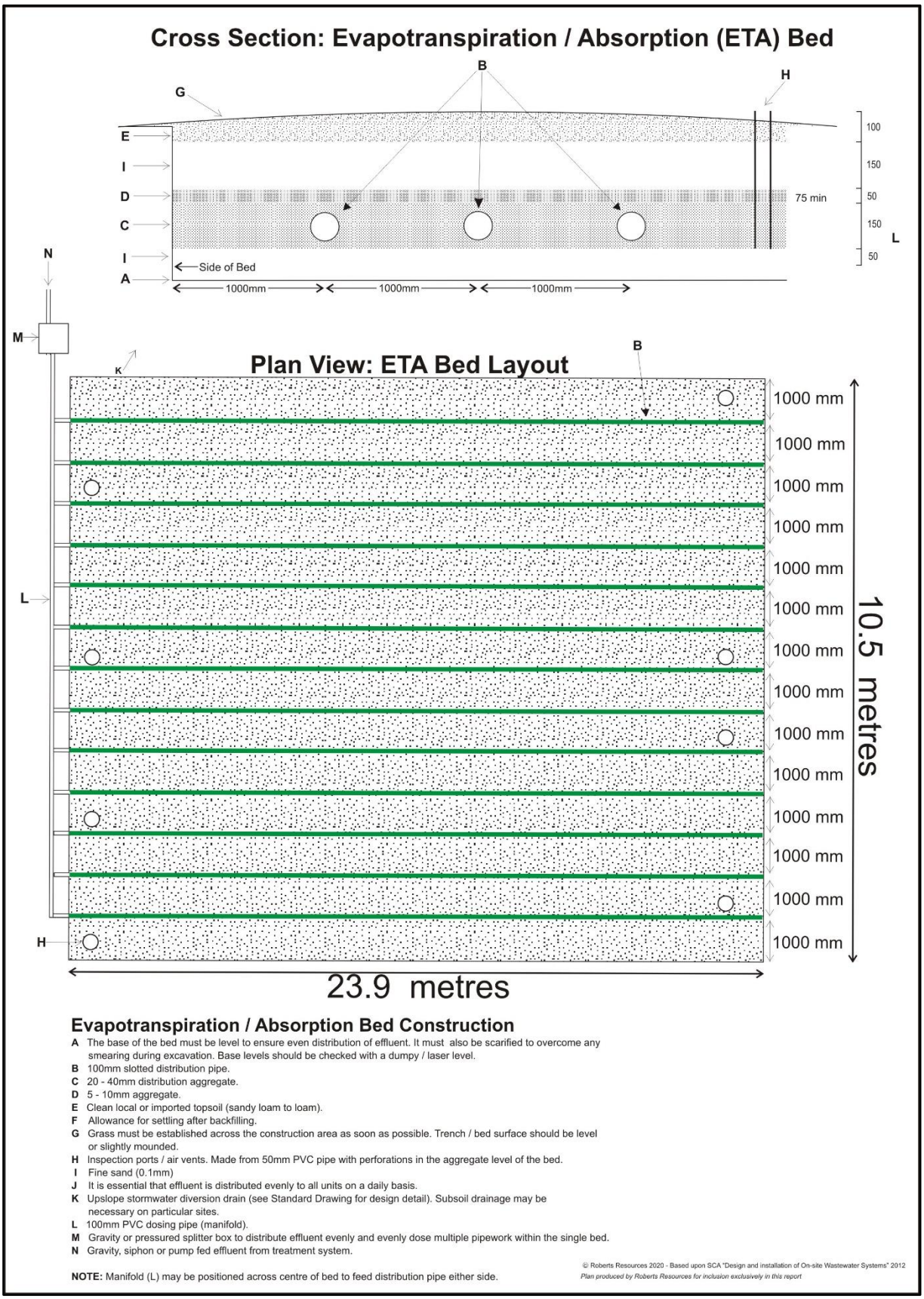


Figure 6: Evapotranspiration Absorption Bed Design

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

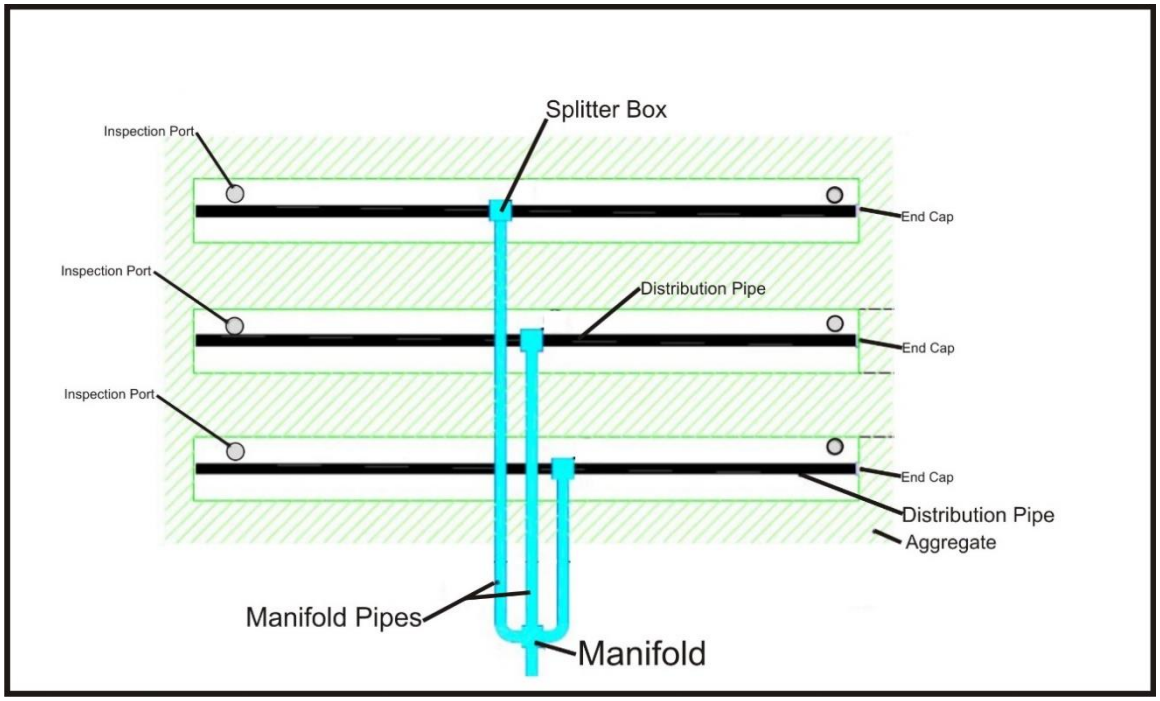


Figure 7: Example of ETA Bed using a Central Manifold System

4.3 Wastewater Management System Location

The location of the nominated Land Application Area (LAA) that will accommodate the ETA Bed and internal infrastructure is shown in Figure 8.

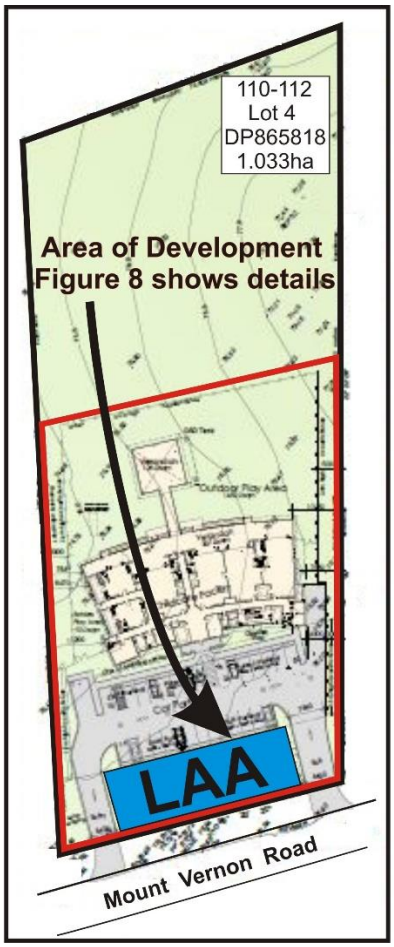


Figure 8: LAA Location

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

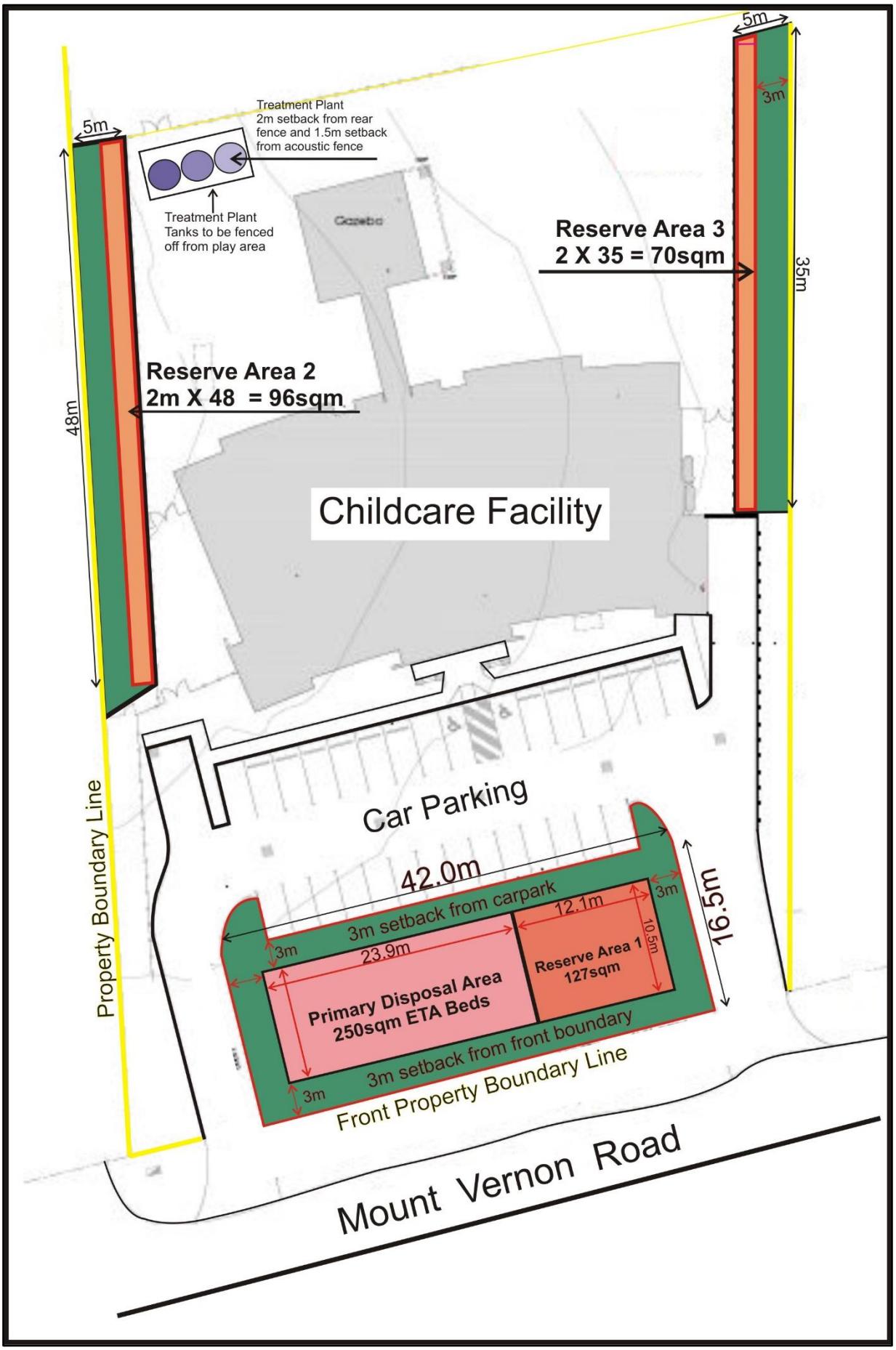


Figure 9: Land Application Area and Site Design

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

It is proposed in the design calculations that the ETA Bed be designed at a 10.5-meter width with appropriate batter grades along the outer regions. At this configuration outlined in Table 3 the minimum disposal area length when adopting the ETA Bed disposal method is 23.9 meters' bed length.

The 23.9-meter-long, 10.5-meter-wide ETA Bed will give a total of 250m² disposal area.

293m² of Reserve Area split across 3 zones is available and can be configured with standard or raised ETA Beds. 293m² represents greater than 100% land available than the Primary disposal area that will be utilised.

Reserve Area 1 is 127m² and is located immediately adjacent to the Primary disposal area that will hold the ETA Bed. At 127m² this is approximately 50% of the Primary ETA Bed area size. If additional room is ever required utilising Reserve Area 1 first will be easily fitted out with the additional ETA infrastructure.

Reserve Area 2 is 96m² and Reserve Area 3 70m². Both areas are set 3m inside from the eastern and western boundaries and inside the 5-metre-wide land to be vegetated behind the Acoustic Fence. Both reserve areas are 2 metres wide and run for the full length of the vegetated area. If ever required, the ETA Beds that can be installed in this location would be 2 meters wide and 48 metres long in Reserve Area 2 and 30 metres long in Reserve Area 3. As required in the Primary disposal ETA Bed area vegetation used in this location (once ETA Beds are installed) would be required from the Specific List of species nominated in Appendix 2 for ETA Bed plantings and the chosen species must not have root systems that can destroy the disposal infrastructure.

Reserve Areas 2 and 3 have the acoustic fence running north-south on the play area of the facility. The fence is approximately 2.1 metres high. The vegetation to be planted inside the Reserve Areas will not be blocked or shaded and growth of plants unaffected by the fence. Both reserve areas will receive full northern sun throughout the day. Reserve Area 3 will also receive the full eastern morning sun and Reserve Area 2 will receive the full afternoon western sun.

ETA Bed surface to be mounded (150mm minimum) above the adjacent land surface to shed rainwater away from area. Suitable mounding should also consider any potential short and long-term subsidence affects.

The site requires an adequately sized retention mound/diversion drain on all upslope areas surrounding the ETA Bed area and Tank infrastructure. This may not be required as the existing land surface is extremely level and it is understood that post landscaping levels will also be flat. With this in mind the mounded ETA Bed surface will suffice for minimizing any surface flow encroachment. A diversion drain on the up slope side of the treatment plant must be large enough to stop all potential ingress of rainwater surface flow into the Tank areas. It is recommended that the diversion drain be adequately 'keyed' into the subsoil to reduce the risk of percolation of water under the mound itself and tracking/flowing at the interface of soil horizons or soil/bedrock.

The Land Application Area / ETA Bed area is not to be used for any other means and should remain separate from the rest of the property. For example; it should never be driven over and used as a vehicle access path. Warning signs are required around and across the ETA Bed area in order to keep pedestrian traffic off this space.

Discussion with the installer as to the intended usual use of the area will help establish appropriate distribution pipe depths.

The Land Application Area must at all times remain open to the natural climate, ensuring the required amount of sun and wind is captured. Building on top of or immediately adjacent to this area will lessen the positive effects the sun and wind has on the plants and area itself.

Land Application Area is to be planted with compatible grasses of suitable vegetation by time of certification.

Figure 10 shows the basic design for the Diversion Drain.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

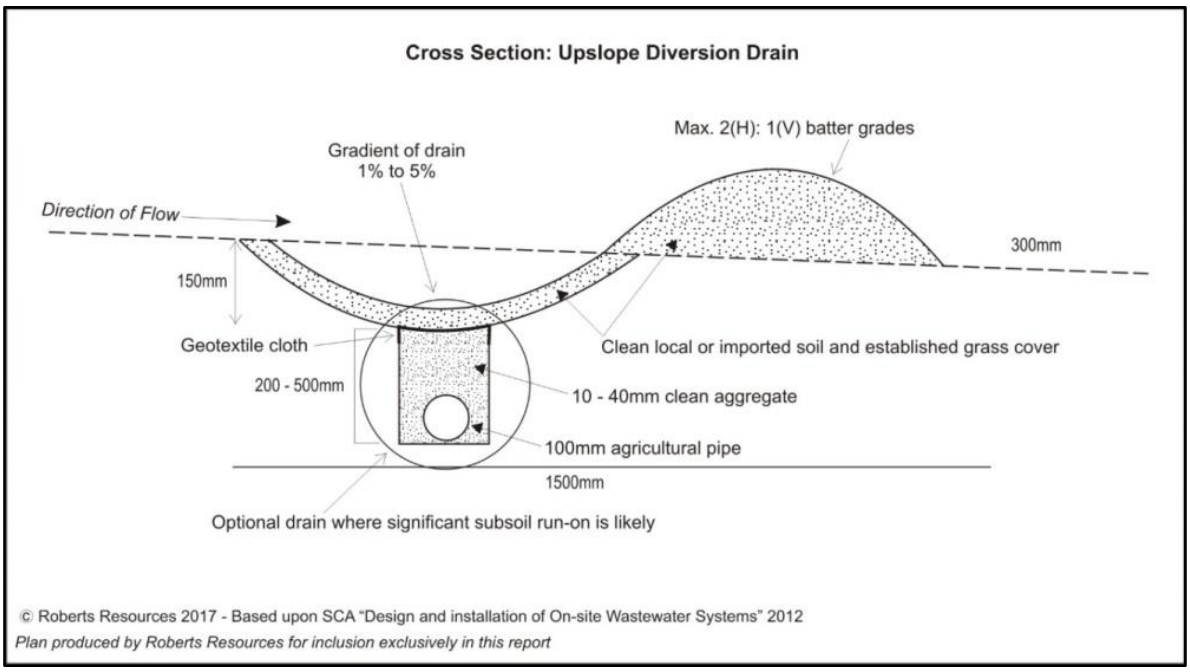


Figure 10: Diversion Drain Design

5.0 Setback Requirements

All regulations and set back requirements can be met on this site. There is no need to encroach into any on-site wastewater infrastructure positioning to either the AS/NZS 1547:2012 or other relevant guidelines or standards.

Table 6: Recommended Setback Distances

SITE FEATURE	SETBACK DISTANCES (m) AS/NZS 1547:2012 Table R1	Comment
Property Boundary	1.5 – 50	-
Buildings / Houses	2.0 - >6.0	-
Surface Water	15 – 100	-
Bore / Well	15 – 50	-
Recreational Areas	3.0 – 15	-
In-ground Water Tank	4.0 – 15	-
Retaining Wall	3.0 or 45° angle from toe of wall	-
Embankments, escarpments, cuttings	3.0 or 45° angle from tow of wall	-
Groundwater	0.6 – 1.5	-
Hardpan or bedrock	0.5 - ≥1.5	-

NOTE: The local government authority may upon considering the public health and environmental risks reduce or increase the distances in the above table.

6.0 Comments and Conclusions

This Wastewater Management Report concludes that it is possible to treat wastewater produced by the proposed Childcare Facility with on-site disposal to the guidelines, parameters and recommendations stipulated within this report. This can be undertaken in a sustainable and environmentally compliant process.

This site is suitable for an on-site wastewater treatment through Commercial Scale AWTS Treatment Plant system utilizing ETA Bed disposal method as detailed in this report.

The ETA Bed must be kept within the nominated Land Application Area.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Design calculations have shown 250m² disposal area is required. Penrith DCP stipulates the same amount of reserve area as the primary disposal area must be available. This site has 293m² reserve area available for future application purposes if required.

Disposal method designs should remain within the stipulated design guidelines in this report.

System installer to provide home owner with complete instruction manual that demonstrates best practice when owning an AWTS / ETA Bed System. This will aid the home owner to ensure the system operates efficiently, cleanly and reduces risk of overloading and contamination.

A flow meter must be fitted to the treatment plant and flow rates recorded in the servicing schedule and presented to council along with the quarterly servicing records.

This is a commercial sized system and it is expected the system manufacturer and installer provided the system owner with a maintenance schedule for reference and compliance. This should also be help on the Local Council database for this property.

The recommendations included in this report assume that at least three-star plumbing fixtures are used throughout the updated dwelling.

Regular servicing and maintenance of the system must be adhered too.

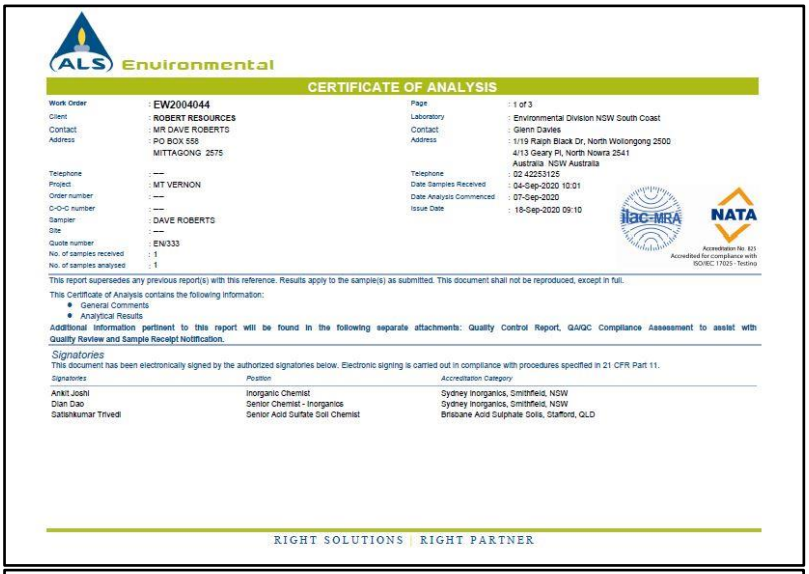
It is advised to check the condition of the Treatment Plant and LAA at least monthly for the first 12 months' post installation. It is essential to identify any negative issues prior to them becoming an environmental hazard.

7.0 References

- Australian/New Zealand Standard – On-site domestic wastewater management (AS/NZS 1547:2012)
- NSW Government (Sydney Catchment Authority) Designing and Installing On-site Wastewater Systems "A Sydney Catchment Authority Current Recommended Practice" 2012.
- Penrith City Council Development Control Plan – 'On-Site Sewage Management and Greywater Reuse' 2014
- NSW Government Health: Sewage Management Facility Vessel Accreditation Guideline February 2016
- NSW Health Department: Septic Tank and Collection Well Accreditation Guideline – Part 4, December 2001
- Australian Standard – AS/NZS 1546. 1:2008
- Environment and Health Protection Guidelines 'On-site Sewage Management for Single Households' 1998

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix 1



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EW2004044	Page	: 1 of 3
Client	: ROBERT RESOURCES	Laboratory	: Environmental Division NSW South Coast
Contact	: MR DAVE ROBERTS	Contact	: Glenn Davies
Address	: PO BOX 558 MITTAGONG 2575	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	: ---	Telephone	: 02 42253125
Project	: MT VERNON	Date Samples Received	: 04-Sep-2020 10:01
Order number	: ---	Date Analysis Commenced	: 07-Sep-2020
C-O-C number	: ---	Issue Date	: 18-Sep-2020 09:10
Sampler	: DAVE ROBERTS		
Site	: ---		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825 Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

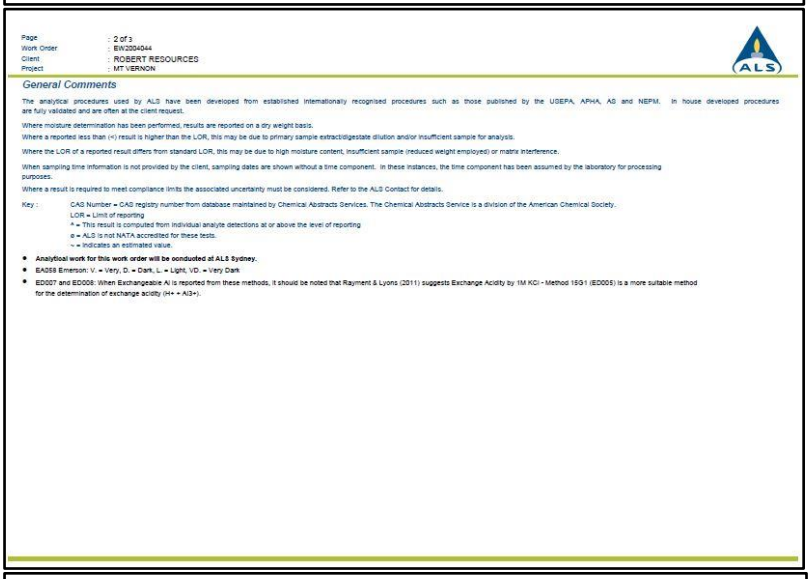
Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dlan Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

RIGHT SOLUTIONS | RIGHT PARTNER



Page : 2 of 3
Work Order : EW2004044
Client : ROBERT RESOURCES
Project : MT VERNON

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

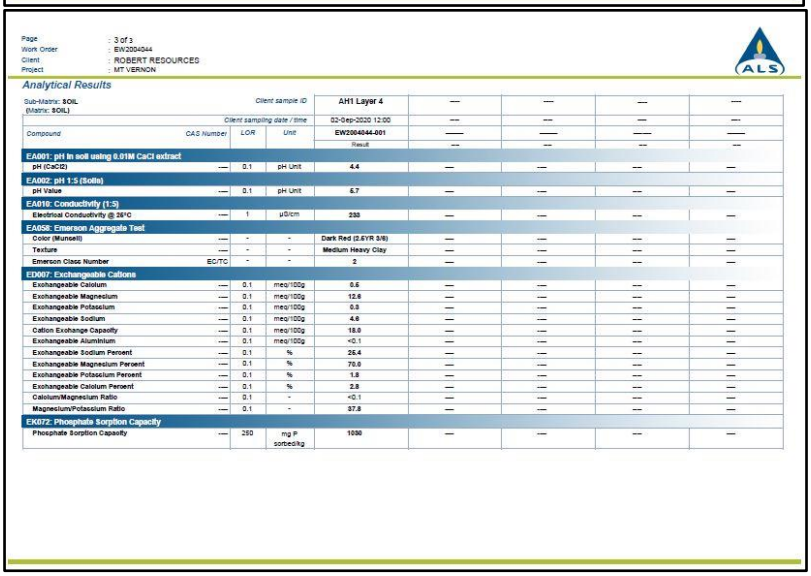
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
a = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EA058 Emerson: V. = Very, D. = Dark, L. = Light, VD. = Very Dark
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).



Page : 3 of 3
Work Order : EW2004044
Client : ROBERT RESOURCES
Project : MT VERNON

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	AH1 Layer 4	---	---	---	---
				Client sampling date / time	02-Sep-2020 12:00	---	---	---	---
Compound	CAS Number	LOR	Unit	EW2004044-001	-----	-----	-----	-----	
				Result	---	---	---	---	
EA001: pH in soil using 0.01M CaCl extract									
pH (CaCl2)	---	0.1	pH Unit		4.4	---	---	---	---
EA002: pH 1:5 (Soils)									
pH Value	---	0.1	pH Unit		6.7	---	---	---	---
EA010: Conductivity (1:5)									
Electrical Conductivity @ 25°C	---	1	µS/cm		233	---	---	---	---
EA058: Emerson Aggregate Test									
Color (Munsell)	---	-	-		Dark Red (2.5YR 3/6)	---	---	---	---
Texture	---	-	-		Medium Heavy Clay	---	---	---	---
Emerson Class Number	EC/TC	-	-		2	---	---	---	---
ED007: Exchangeable Cations									
Exchangeable Calcium	---	0.1	meq/100g		6.6	---	---	---	---
Exchangeable Magnesium	---	0.1	meq/100g		12.6	---	---	---	---
Exchangeable Potassium	---	0.1	meq/100g		0.8	---	---	---	---
Exchangeable Sodium	---	0.1	meq/100g		4.6	---	---	---	---
Cation Exchange Capacity	---	0.1	meq/100g		18.8	---	---	---	---
Exchangeable Aluminium	---	0.1	meq/100g		<0.1	---	---	---	---
Exchangeable Sodium Percent	---	0.1	%		25.4	---	---	---	---
Exchangeable Magnesium Percent	---	0.1	%		70.8	---	---	---	---
Exchangeable Potassium Percent	---	0.1	%		1.8	---	---	---	---
Exchangeable Calcium Percent	---	0.1	%		2.8	---	---	---	---
Calcium/Magnesium Ratio	---	0.1	-		<0.1	---	---	---	---
Magnesium/Potassium Ratio	---	0.1	-		57.5	---	---	---	---
EK072: Phosphate Sorption Capacity									
Phosphate Sorption Capacity	---	250	mg P sorbed/kg		1030	---	---	---	---

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: EW2004044	Page	: 1 of 3
Client	: ROBERT RESOURCES	Laboratory	: Environmental Division NSW South Coast
Contact	: MR DAVE ROBERTS	Contact	: Glenn Davies
Address	: PO BOX 558 MITTAGONG 2575	Address	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
Telephone	: ---	Telephone	: 02 42253125
Project	: MT VERNON	Date Samples Received	: 04-Sep-2020
Order number	: ---	Date Analysis Commenced	: 07-Sep-2020
C-O-C number	: ---	Issue Date	: 18-Sep-2020
Sampler	: DAVE ROBERTS		
Site	: ---		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825 Accredited for com pliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Satishkumar Trivedi	Senior Acid Sulfate Soil Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

RIGHT SOLUTIONS | RIGHT PARTNER

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL

						Laboratory Duplicate (DUP) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA001: pH in soil using 0.01M CaCl extract (QC Lot: 3249216)									
EB2031005-021	Anonymous	EA001: pH (CaCl2)	---	0.1	pH Unit	7.6	7.6	0.00	0% - 20%
EA002: pH 1:5 (Soils) (QC Lot: 3243058)									
EW2004044-001	AH1 Layer 4	EA002: pH Value	---	0.1	pH Unit	5.7	5.7	0.00	0% - 20%
EA010: Conductivity (1:5) (QC Lot: 3243057)									
EW2004044-001	AH1 Layer 4	EA010: Electrical Conductivity @ 25°C	---	1	µS/cm	233	221	5.33	0% - 20%
ED007: Exchangeable Cations (QC Lot: 3246732)									
EB2030762-060	Anonymous	ED007: Calcium/Magnesium Ratio	---	0.1	-	4.7	4.6	3.82	0% - 20%
		ED007: Magnesium/Potassium Ratio	---	0.1	-	12.6	12.5	0.859	0% - 20%
		ED007: Exchangeable Calcium Percent	---	0.1	%	79.7	79.3	0.570	0% - 20%
		ED007: Exchangeable Magnesium Percent	---	0.1	%	16.9	17.3	2.09	0% - 20%
		ED007: Exchangeable Potassium Percent	---	0.1	%	1.3	1.4	0.00	0% - 50%
		ED007: Exchangeable Sodium Percent	---	0.1	%	2.0	2.0	0.00	0% - 20%
		ED007: Exchangeable Calcium	---	0.1	meq/100g	8.0	7.7	3.05	0% - 20%
		ED007: Exchangeable Magnesium	---	0.1	meq/100g	1.7	1.7	0.00	0% - 50%
		ED007: Exchangeable Potassium	---	0.1	meq/100g	0.1	0.1	0.00	No Limit
		ED007: Exchangeable Sodium	---	0.1	meq/100g	0.2	0.2	0.00	No Limit
		ED007: Cation Exchange Capacity	---	0.1	meq/100g	10.0	9.7	2.48	0% - 20%
		ED007: Exchangeable Aluminium	---	0.1	meq/100g	<0.1	<0.1	0.00	No Limit
EK072: Phosphate Sorption Capacity (QC Lot: 3242251)									
EB2022761-006	Anonymous	EK072: Phosphate Sorption Capacity	---	250	mg P sorbed/kg	552	709	24.9	No Limit
EB2023170-009	Anonymous	EK072: Phosphate Sorption Capacity	---	250	mg P sorbed/kg	2000	1990	0.652	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (1:5) (QCLot: 3243057)								
EA010: Electrical Conductivity @ 25°C	---	1	µS/cm	<1	1412 µS/cm	99.3	92.0	108
ED007: Exchangeable Cations (QCLot: 3246732)								
ED007: Exchangeable Calcium	---	0.1	meq/100g	<0.1	1 meq/100g	89.0	76.8	120
ED007: Exchangeable Magnesium	---	0.1	meq/100g	<0.1	1.67 meq/100g	96.2	74.9	116
ED007: Exchangeable Potassium	---	0.1	meq/100g	<0.1	0.51 meq/100g	116	80.0	120
ED007: Exchangeable Sodium	---	0.1	meq/100g	<0.1	0.87 meq/100g	102	80.0	120
ED007: Cation Exchange Capacity	---	0.1	meq/100g	<0.1	---	---	---	---
ED007: Exchangeable Aluminium	---	0.1	meq/100g	<0.1	---	---	---	---
ED007: Exchangeable Calcium Percent	---	0.1	%	<0.1	---	---	---	---
ED007: Exchangeable Magnesium Percent	---	0.1	%	<0.1	---	---	---	---
ED007: Exchangeable Potassium Percent	---	0.1	%	<0.1	---	---	---	---
ED007: Exchangeable Sodium Percent	---	0.1	%	<0.1	---	---	---	---
ED007: Calcium/Magnesium Ratio	---	0.1	-	<0.1	---	---	---	---
ED007: Magnesium/Potassium Ratio	---	0.1	-	<0.1	---	---	---	---

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix 2

Botanical Name	Approximate Height	Common Name of Variety
Grasses		
Carex spp.		
Lomandra longifolia		
Microlaena stipoides		
Oplismenus imbecillis		
Pennisetum alopecuroides	40 - 80cm	Available as lawn turf
Poa lab		
Stipa spp.		
Ground cover / climbers		
Hibbertia scandens		Snake Vine
Hibbertia stellaris		
Isotoma fluviatalis	Prostrate	
Kennedia rubicunda	Climber	Dusky coral pea
Scaevola albida		
Scaevola ramosissima		
Veronica plebeia		
Viola hederacea		Native Violet
Sedges/grasses/small plants		
Anigozanthus flavidus	2m	Kangaroo Paw
Baumea acuta		
Baumea articulata	Sedge	
Baumea juncea	Sedge	
Baumea nuda	Sedge	
Baumea rubiginosa	Sedge	
Baumea teretifolia	Sedge	
Blandfordia grandiflora	30-90cm	Christmas Bell
Blandfordia nobilis	30-90cm	Christmas Bell
Brachyscome diversifolia	Clump	Native Daisy
Carex appressa	Sedge	
Cotula coronopifolia	10-20cm	Waterbutton
Crinum pedunculatum	<2m	Swamp Lilly
Cyperus polystachyos	Sedge	
Dianella caerulea	Low Plant	Blue Flax Lilly
Epacris microphylla	50cm - 1m	
Ferns		
Gahnia spp.	Tall grass	
Juncus spp.	0.5m Rush	
Lobelia trigonocaulis	5-10cm	
Lomandra spp.	Grass	
Patersonia fragilis		Native Iris
Patersonia glabrata		Native Iris
Patersonia occidentalis		Native Iris
Ranunculus graniticola	5cm	
Restio australis	Reed	
Restio tetraphylius	1m	
Sowerbaea juncea	Sedge	Rush Lily
Tetratheca juncea	<30cm	
Xyris operculata	<1m	Tall Yellow Eye

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Shrubs		
Agonis flexuosa nana		
Baekea linifolia	1-2.5m	
Baekea utilis	1-2.5m	
Baekea virgata	<4m	
Banksia aemula	1-7m	
Banksia robur	0.5-2m	
Bauera ruboides	0.5-1.5m	
Callistemon	2-3m	Burgundy
Callistemon	2-4m	Eureka
Callistemon	3-4m	Harkness
Callistemon	3-4.5m	Kings Park Special
Callistemon	2-3m	Mauve Mkist
Callistemon	1-2.5m	Red Clusters
Callistemon	2-3m	Reeves Pink
Callistemon citrinus	50-80cm	Austraflora Firebrand
Callistemon citrinus	2-4m	Splendens
Callistemon citrinus	60cm - 1m	White Ice
Callistemon linearis	1-3m	
Callistemon macropunctatus	2-4m	
Callistemon pachyphylius	2-3m	
Callistemon pallidus	1.5-4m	
Callistemon paludosus	3-7m	
Callistemon pinifolius	1-3m	
Callistemon rigidus	1.5-2.5m	
Callistemon salignus	3-10m	
Callistemon shiresii	4-8m	
Callistemon sieberi	1.5-2m	
Callistemon sieberi	50-80cm	Austraflora Little Cobber
Callistemon subulatus	1-2m	
Callistemon viminalis	1-2m	Captain Cook
Callistemon viminalis	5-10m	Dawson River
Callistemon viminalis	3-5m	Hannah Ray
Callistemon viminalis	50cm-1m	Little John
Callistemon viminalis	1.5-2m	Rose Opal
Callistemon viminalis	2-3m	Western Glory
Goodenia ovata	1-1.5m	
Hibiscus diversifolius	1-2m	Swamp hibiscus
Kunzea capitata	1-2m	
Leptospermum flavescens	<2m	Tea-tree
Leptospermum juniperinum	1m	Tea-tree
Leptospermum lanigerum	1-2m	Woolly tea-tree
Leptospermum squarrosum	<2m	Tea-tree
Melaleuca alternifolia	4-7m	
Melaleuca decussata	1-2m	Cross-leaved honey myrtle
Melaleuca lanceolata	4-6m	
Melaleuca squamea	1-2m	
Melaleuca thymifolia		

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

envirotech
Environmental and Engineering
Consultancy Services

PO Box 3086 East Blaxland NSW 2774
P: 1300 888 324 F: 02 8834 0760
W: www.envirotech.com.au
E: info@envirotech.com.au

DETAILED SITE INVESTIGATION

110-112 MOUNT VERNON ROAD, MOUNT VERNON NSW

PREPARED FOR: Graham Mann

REFERENCE: REP-19-7579-A1

DATE: 17th March 20202

Wastewater Management / Effluent Reuse | Contamination Investigations | Urban Salinity Investigations | Bushfire Hazard Assessments | Geotechnical Engineering Slope Stability | Sediment & Erosion Control | Structural Engineering (Design & Certification) |Flora & Fauna | Environmental Impact Assessment / Managment

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

CONTROLLED DOCUMENT
DISTRIBUTION & REVISION REGISTER

DISTRIBUTION LIST		
Copy No.	Custodian	Location
1 Original	Daniel Mathew	Envirotech Pty. Ltd (Filed)
2 Soft Copy (PDF, emailed)	Graham Mann	gmann@pwdesign.com.au

Note: This register identifies the current custodians of controlled copies of the subject document.

DOCUMENT HISTORY		
Document No.	Revision No.	Issue Date
REF-19-7579	A	08.04.2019
REF-19-7579	A1	17.03.2020

AUTHOR	TECHNICAL REVIEWER
Charbel Bahi Graduate Civil Engineer B.Eng. (Civil)	Con Kariotoglou Team Leader - Environmental and HAZMAT BSc, Cert IV WHS, AFMIML, MEIANZ, MALGA, AMAIOH SafeWork NSW Approved Asbestos Assessor, License No. LAA001006

COPYRIGHT © 2020 ENVIROTECH PTY. LTD.

The report is protected by copyright law and may only be reproduced, in electronic or hard copy format, if it copied and distributed in full without the prior written permission of EnviroTech Pty. Ltd.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

EXECUTIVE SUMMARY

EnviroTech Pty. Ltd. was engaged by Mr. Graham Mann of PW Design Pty Ltd to conduct a Detailed Site Investigation at 110-112 Mount Vernon Road, Mount Vernon NSW 2178 (hereafter referred to as the site). The investigation is part of a development application for a proposed childcare centre.

The total area of the site is approximately 10,250 m^2. A site inspection was carried out on Tuesday 26th March 2019 which involved a visual assessment of the entire the site and surrounding areas as well as the acquisition of representative soil samples. Details of the findings are presented within the body of this report, as well as an assessment of significance with regards to the findings of the investigation.

The site has remained unchanged between the period of the initial report, dated 8th April 2019, to the date of this revised report, dated 17th March 2020, in accordance to aerial imagery via www.maps.au.nearmap.com with the exception of minor truck movements on site to store wooden crates on site within the north eastern portion of the site. It appears that these crates hold construction material in anticipation for the future proposed site development. No other environmental issues on site between this period warrants further investigation.

This report was completed in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites, NSW EPA, September 2000*.

Based on the data and evidence collected during the site inspection and site history review, the findings of the Detailed Site Investigation are as follows:

- On Tuesday 26th March 2019, a site inspection was conducted by Envirotech consultant Jack Hinchliffe;
- At the time of inspection, the site consisted of a fenced off unoccupied and empty property. The majority of the site was comprised of disused market gardens;
- At the north-eastern and southern portions of site were the footprint remains of sheds and a residential house that were previously demolished. Stockpiles were present at the southern portion of site;
- The following area of concern were identified:
    - Previous historical site use as a market garden has the potential for OC/OP Pesticides to be impacting soils onsite;
    - Previously existing residential building and sheds originally constructed in an era to have comprised potentially hazardous building materials and incorrectly demolished;
    - Potentially unvalidated stockpiles onsite comprised of unknown building materials;
    - The underlying soils onsite have the potential to be comprised of unknown fill material.
- The site was first developed before 1955;
- The site is not listed by the EPA;
- Based on the available information, a targeted and stratified sampling plan was considered most appropriate to provide sufficient characterisation data. A total of twenty-one (21) test pits were nominated across the area of investigation (Figure 3);

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

- Samples were analysed for Heavy Metals, Phenols, TRH, BTEX, PAH, Hydrocarbons, OC/OP Pesticides & Asbestos by ALS Environmental Division;
- Soil chemical concentrations were below the thresholds of the adopted human health and ecological assessment criteria for residential land use as specified under the NEPM (2013);

All soil samples collected and tested (26th March 2019) were reported by the laboratory to have concentrations below the adopted site assessment criteria for HIL A, land use as per the NEPM, 2013, except for the following samples:

- **TP6/ASB1 (0-0.5m): Chrysotile Asbestos & Amosite Asbestos presence**
  - BONDED (Three pieces of asbestos cement sheeting approx. 50 x 40 x 5mm)
- **TP7/ASB2 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
  - BONDED (Three pieces of asbestos cement sheeting approx. 60 x 50 x 5mm)
- **TP8/ASB3 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
  - BONDED (One piece of asbestos cement sheeting approx. 80 x 30 x 5mm)
- **TP19/ASB6 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
  - BONDED (Two larger pieces of asbestos cement sheeting approx. 80 x 40 x 5mm and one smaller piece of asbestos cement sheeting approx. 5 x 4 x 3mm)

As soil samples indicate the *presence of BONDED Asbestos*, within four (4) sampling locations, it is recommended that a suitably trained and qualified professional is engaged to prepare the following:

- Additional **Delineation Sampling** at and around the potentially asbestos hotspot areas of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 to further characterise these potential areas of concern and to determine the lateral and vertical extent of the asbestos contamination according regulatory guidelines and site criteria.
- A **Visual Inspection** is to be undertaken of these areas by a SafeWork NSW Licensed Approved Asbestos Assessor to ensure no visible asbestos containing materials (ACM) are identified on surface soils and provide an Asbestos Clearance Certificate for the potential areas.

Also, to further characterise the site, the additional sampling is required:

- Additional **Stockpile Sampling** to further characterise the stockpiled soils within the southern portion of the site. If the stockpiles have been removed, then the stockpile footprint areas will be sampled to further characterise underlying soils.

Details of the required additional works will be recommended within in the amended Envirotech RAP (REP: 19-7963-A1).

Subject to the above, it is considered that the site can be remediated and made suitable for the intended proposed residential development, pending on the following Delineation Sampling, Visual Inspection and subsequent Remedial and Validation Works, if required.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

TABLE OF CONTENTS

EXECUTIVE SUMMARY **3**

1. INTRODUCTION **7**

1.1 Background 7
1.2 Objectives 7
1.3 Scope of Works 7
1.4 Legislative Requirements 8
1.5 Context of report 9

2. SITE IDENTIFICATION **10**

3. AREA OF INVESTIGATION **11**

4. SITE DESCRIPTION **12**

4.1 Site Inspection 12
4.2 Surrounding Land Use 12
4.3 Topography 12
4.4 Geology and Soils 12
4.5 Surface Water Hydrology 12
4.6 Hydrogeology 12
4.7 Acid Sulphate Soils 13

5. CONCEPTUAL SITE MODEL (CSM) **14**

5.1 Areas of Concern 14
5.2 Human Receptors and Sensitive Environments 15
5.3 Potential for Migration and Exposure of Contaminants 15

6. SITE RECORDS **16**

6.1 List of NSW Contaminated Sites - Notified to the EPA 16
6.2 List of NSW Contaminated Sites - Record of Notices 16
6.3 National Waste Management Site Database 16
6.4 List of Current EPA Licensed Activities 16
6.5 Delicensed Activities still regulated by the EPA 16
6.6 Former Licensed Activities under the POEO Act 1997 now surrendered 16
6.7 Historical Business Directories Premise Match 16
6.8 Historical Business Directories Road Match 16
6.9 Section 10.7 Certificate 17

7. SITE HISTORY **18**

7.1 Aerial Photographs 18
7.2 Information Gaps 19

8. SOIL SAMPLING AND ANALYSIS **20**

8.1 Data Quality Objectives 20
8.2 Define the Problem 20
8.3 Identify the Decision 20
8.4 Identify Inputs to the Decision 20
8.5 Define the Study Boundaries 21
8.6 Develop a Decision Rule 21
8.7 Specify Limits of Decision Errors 22
8.8 Optimize Design for Obtaining Data 22
8.9 Soil Sample Methodology 23
8.10 Laboratory Analysis 23

9. SITE ASSESSMENT CRITERIA **27**

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

10. QUALITY ASSURANCE / QUALITY CONTROL 29

11. RESULTS 31

11.2 Soil Laboratory Results 31

12. DISCUSSION 39

12.1 Soil Laboratory Results 39
12.2 Potential Risks to Onsite Receptors 39
12.3 Potential for Migration of Contaminants 40
12.4 Conceptual Site Model 40
12.5 Recommendations 41

13. CONCLUSIONS 42

14. LIMITATIONS STATEMENT 44

15. REFERENCES AND LEGISLATION 45

APPENDIX A: LOTSEARCH 46

APPENDIX B: LABORATORY CERTIFICATES 47

APPENDIX C: LOTSEARCH 48

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

1. INTRODUCTION

1.1 Background

EnviroTech Pty. Ltd. was engaged by Graham Mann to conduct a Detailed Site Investigation at 110-112 Mount Vernon Road, Mount Vernon NSW 2178 (hereafter referred to as the site). The investigation is part of a development application for a proposed childcare centre.

The total area of the site is approximately 10,250 m^2. A site inspection was carried out on Tuesday 26th March 2019 which involved a visual assessment of the entire the site and surrounding areas as well as the acquisition of representative soil samples. Details of the findings are presented within the body of this report, as well as an assessment of significance with regards to the findings of the investigation.

The site has remained unchanged between the period of the initial report, dated 8th April 2019, to the date of this revised report, dated 17th March 2020, in accordance to aerial imagery via www.maps.au.nearmap.com with the exception of minor truck movements on site to store wooden crates on site within the north eastern portion of the site. It appears that these crates hold construction material in anticipation for the future proposed site development. No other environmental issues on site between this period warrants further investigation.

This report was completed in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites, NSW EPA, September 2000*.

1.2 Objectives

The objectives of this DSI were to:

1. Identify past and present potentially contaminating activities;
2. Identify potential contaminants of concern;
3. Provide a preliminary assessment of the condition of the site and potential for contamination; and
4. Assess the need for further investigation.

1.3 Scope of Works

The scope of works included the following:

1. Acquisition and review of available data comprising;

    - Cadastre & Topography
    - Aerial Imagery
    - EPA Contaminated Land
    - EPA Records of Notice
    - National Waste
    - Groundwater Bores
    - Geology & Soils
    - Planning Zones

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

2. A review of past and current site uses;
3. A review of past and current adjacent site uses;
4. A site inspection;
5. *Supplementary* soil sampling and analysis; and
6. Reporting in accordance with the associated legislations and guidelines.

1.4 Legislative Requirements

The legislative framework for the report is based on guidelines that have been set out by the NSW Environmental Protection Agency (EPA) formerly the Office of Environment and Heritage (OEH) in the form of the following Acts/Regulations:

- *Protection of the Environment Operations Act* (1997);
- *Protection of the Environment Operations Regulation* (2008);
- *Contaminated Land Management Act* (1998).

In addition, the following guidelines and technical documents have been reviewed and applied where applicable:

- *Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme (3rd Edition, 2017).*
- *State Environmental Planning Policy No.55 (SEPP55) – Remediation of Land (2018)*
- *NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (2011).*
- *NSW EPA Sampling Design Guidelines (1995).*
- *NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014).*
- *NSW EPA Guidelines for Assessing Former Orchards and Market Gardens (2005)*
- *Guidelines on the Investigation Levels for Soil and Groundwater, National Environmental Protection Measure 1999, 2013 Amendment (NEPC, 2013).*
- *Australian Standard AS 4482.1 Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.*
- *Australian Standard AS 4482.2 Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances.*
- *CRC CARE Technical Report No. 39: Risk-based remediation and management guidance for benzo(a)pyrene (2017).*
- *Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 (NSW DECCW, 2009).*
- *Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC, 2007).*
- *Guidelines for the Assessment, Remediation & Management of Asbestos - Contaminated Sites (WA DOH, 2009).*
- *"Technical Report on Synthetic Mineral Fibres' in Technical Report on Synthetic Mineral Fibres and Guidance Note on the Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres" (National Occupational Health and Safety Commission, 1990);*

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

1.5 Context of report

This report is to be read in its entirety and should not be review in individual section to provide any level of information independently. Each section of the report relates to the rest of the document and as such is to be read in conjunction, including its appendices and attachments.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

2. SITE IDENTIFICATION

The study site is 110-112 Mount Vernon Road, Mount Vernon NSW 2178 (Lot 4 DP865818) (Figure 1). It can be identified as a trapezoidal allotment north of Mount Vernon Road. Figure 2 shows an aerial photograph of the site and the surrounding land.

Table 1: Site Identification.

Street Address	110-112 Mount Vernon Road, Mount Vernon
Lot and DP Number	Lot 4 DP865818
Approx. Site Area	10,250 m^2
Local Government Area	Penrith City Council
Zoning	E4 – Environmental Living
LGA Legislation	Penrith Local Environmental Plan 2010

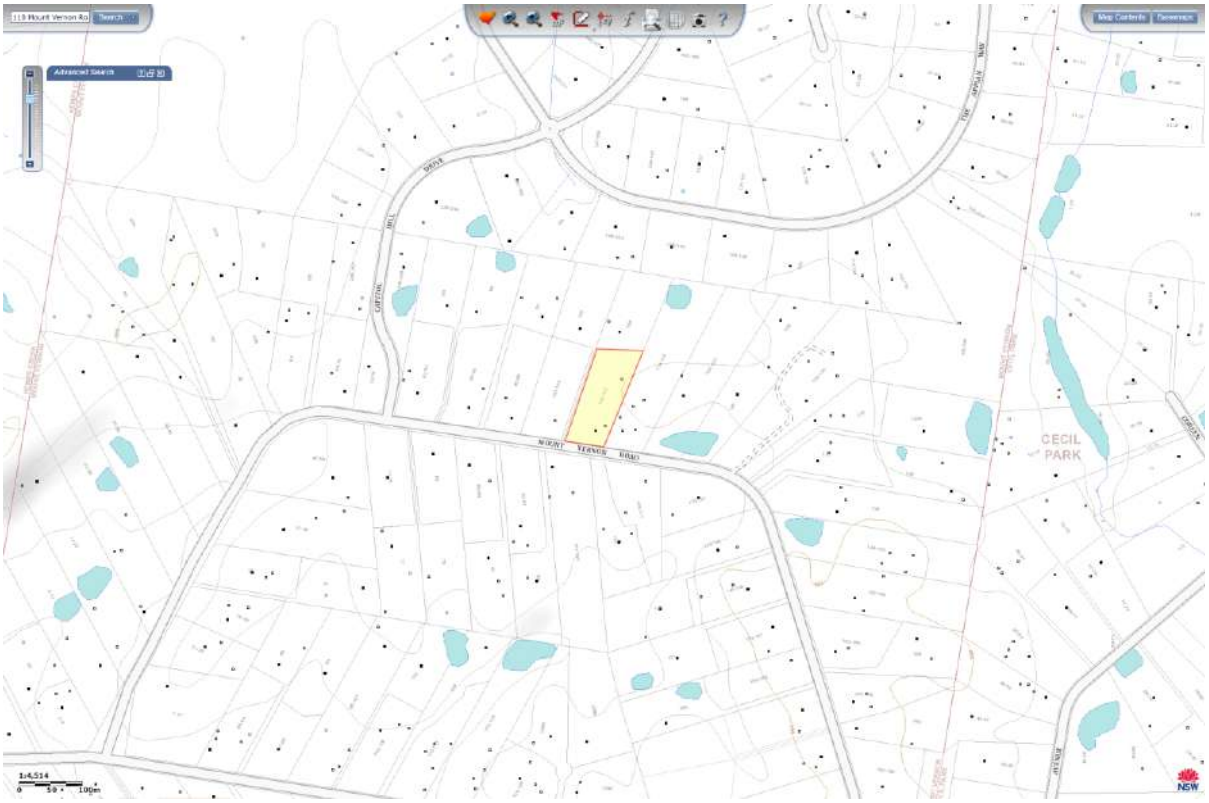


Figure 1: Site location map (NSW Spatial Information Exchange).

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

3. AREA OF INVESTIGATION

The investigation is part of a development application for a proposed childcare centre. The entire site was accessible and was investigated, including the proposed development area within the southern half of the site.

Figure 2: Aerial photograph of the site and surrounding land (NSW Spatial Information Exchange).

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

4. SITE DESCRIPTION

4.1 Site Inspection

On Tuesday 26th March 2019, a site inspection was conducted by Envirotech consultant Jack Hinchliffe. Field work was carried out in accordance with the methodology described in AS 4482.1 – 2005 and the NEPM (2013). At the time of inspection, the site consisted of a fenced off unoccupied and empty property. The majority of the site was comprised of disused market gardens. At the north-eastern and southern portions of site were the footprint remains of sheds and a residential house that were previously demolished. Stockpiles were present at the southern portion of site.

4.2 Surrounding Land Use

The site is located within a rural residential setting and bordered by:

- Rural residential allotments surrounding the site in all directions and
- Current Market Gardens surrounding the site to the east, west and south.

4.3 Topography

Gently undulating rises on Wianamatta Shale with local relief 10–30 m and slopes generally >5% but occasionally up to 10%. Crests and ridges are broad (200–600 m) and rounded with convex upper slopes grading into concave lower slopes. Outcrops of shale do not occur naturally on the surface. They may occur, however, where soils have been removed.

4.4 Geology and Soils

The department of environment soil map shows the site is within a Blacktown Soil Landscape characterised by gently undulating rises on Wianamatta Group shales. Local relief to 30 m, slopes usually >5%. Broad rounded crests and ridges with gently inclined slopes. Cleared Eucalypt woodland and tall open-forest (dry schlerophyll forest). Soils generally consist of friable brownish black loam transitioning to moderately to light grey plastic mottled clay.

4.5 Surface Water Hydrology

No groundwater or distinct overland flow paths were noted during the investigation. Stormwater is expected to infiltrate into soils or sheet south into the stormwater drainage system at Mount Vernon Road.

4.6 Hydrogeology

A search of the State Department of Primary Industries Groundwater map showed no groundwater works within 500m of the site.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

4.7 Acid Sulphate Soils

The NSW Planning Portal shows the site within the boundary of being within Class 5 Acid Sulfate Soils Risk. Therefore, acid sulfate soils are not typically found in Class 5 areas and areas classified as Class 5 are located within 500 metres on adjacent class 1, 2, 3 or 4 land.

According to Atlas of Australian Acid Sulfate Soils, Appendix E, Lotsearch (page 144), the site is within an Extremely Low (1-5%) area of probability for the occurrence of acid sulfate soils, therefore a preliminary hydrology study in accordance with the ASSMAC Assessment Guidelines 1998 was not undertaken as part of this investigation. Also, as the proposed development will not alter the water table level of the zone during earthworks & construction, further assessment or action was not required.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

5. CONCEPTUAL SITE MODEL (CSM)

5.1 Areas of Concern

- Previous historical site use as a market garden has the potential for OC/OP Pesticides to be impacting soils onsite
- Previously existing residential building and sheds originally constructed in an era to have comprised potentially hazardous building materials and incorrectly demolished
- Potentially unvalidated stockpiles onsite comprised of unknown building materials and
- The underlying soils onsite have the potential to be comprised of unknown fill material.

Table 2 identifies the main Areas of Environmental Concern (AECs), and their associated Contaminants of Concern (COCs), using the information gathered through this assessment and qualitative judgement based on consultant experience.

Table 2: Areas of Environmental Concern *(*Derived from AS 4482.1-2005 and consultant experience).*

AEC	Potentially Contaminating Activity	Contaminants of Concern	Likelihood of Contamination**
Historical market garden site usage	Potential Pesticides impacting soils.	• OC/OP Pesticides	Possible.
Previously existing residential buildings and sheds	Originally constructed in an era to contain hazardous building materials and incorrectly demolished.	• Asbestos and • Heavy Metals.	Possible.
Stockpiles of soil and building material onsite.	Stockpiles containing unknown materials.	• Asbestos • Heavy Metals • Hydrocarbons and • OC/OP Pesticides.	Possible.
Underlying soils potentially comprised of fill material.	Potentially contaminated fill material.	• Asbestos • Heavy Metals • Hydrocarbons and • OC/OP Pesticides.	Possible.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

5.2 Human Receptors and Sensitive Environments

On-site Human Receptors & Sensitive Environments:

- Construction workers during the excavation / construction process
- Future occupants of the site including Childcare staff and children
- Native vegetation within the site.

Off-site Human Receptors & Sensitive Environments:

- Surrounding rural residential properties
- Ropes Creek 1km northeast of the site
- Adjacent neighbouring dam 80m east of the site

5.3 Potential for Migration and Exposure of Contaminants

Site history information and onsite inspection observations indicated that due to the unsealed and open space condition of the site there may be a potential for contaminants to provide exposure risks to humans and native vegetation within the site.

Exposure routes of contaminants could potentially be through direct dermal contact with exposed underlying soils (Heavy Metals, TPH and PAHs) or airborne dust (Asbestos) and vapour (Phenols and VOCs). These exposure risks will potentially be most likely, and potentially at its highest risk during any earthworks or construction phases within the site.

There is also a potential for these contaminates to be present within stockpiled soils and underlying soils and have the ability to migrate vertically (dispersed up into the atmosphere, or infiltrate down into the groundwater), uptake by vegetation and/or migrate horizontally (through stormwater runoff pathways) from the proposed development, that will likely collect into the Mount Vernon stormwater system.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

6. SITE RECORDS

A search of 110-112 Mount Vernon Road, Mount Vernon NSW 2178 on the following records was undertaken by Jack Hinchliffe. A full list of recorded sites within a 1 km radius is provided within (Appendix A).

6.1 List of NSW Contaminated Sites - Notified to the EPA

- No records in buffer.

6.2 List of NSW Contaminated Sites - Record of Notices

- No records in buffer.

6.3 National Waste Management Site Database

- No records in buffer.

6.4 List of Current EPA Licensed Activities

- No records in buffer.

6.5 Delicensed Activities still regulated by the EPA

- No records in buffer.

6.6 Former Licensed Activities under the POEO Act 1997 now surrendered

- Licence # 4653. Luhrman Environment Management PTY LTD – Location: Waterways Through NSW – Other Activities / Non-Scheduled Activity - Application of Herbicides – Distance: 79m.
- Licence # 4838. Robert Orchard LTD – Location: Various Waterways Throughout NSW – Sydney 2000 – Other Activities / Non-Scheduled Activity - Application of Herbicides – Distance: 79m;
- Licence # 5150. Fairfield City Council – Location: Waterways of Fairfield City Council, Fairfield NSW 2165 – Other Activities / Non-Scheduled Activity - Application of Herbicides – Distance: 79m; and
- Licence # 6630. Sydney Weed and Pest Management Pty Ltd – Location: Waterways throughout NSW, Pest Management Pty Ltd – Other Activities / Non-Scheduled Activity - Application of Herbicides – Distance: 79m.

6.7 Historical Business Directories Premise Match

- No records in buffer.

6.8 Historical Business Directories Road Match

- No records in buffer.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

6.9 Section 10.7 Certificate

- A search of the section 10.7 certificate has not been undertaken. A review of the certificate with regards to Matters arising under the Contaminated Land Management Act 1997 and the Contaminated Land Management Amendment Act 2008 should be undertaken concurrently with the review of this report.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

7. SITE HISTORY

7.1 Aerial Photographs

A review of aerial photographs provided by Lotsearch (Appendix A) was undertaken. The results of which are summarized in Table 3.

Table 3: Findings of the historical photograph review.

Year	Description
1955	• Low resolution black and white photo; • Site appears to be an empty land. • No residential building in any direction of site. • Surrounding area is all empty land.
1961	• Low resolution black and white photo; • Shed present at north-eastern portion of site. • A dam is present along the western boundary of site. • Roads now bisect the site to access areas surrounding the site. • six dams look to surround the property in the north, north-west, and east direction.
1965	• Low resolution black and white photo; • A market garden along the western boundary and along the northern boundary. • Buildings to the south-west and west of site have been constructed.
1970	• Low resolution black and white photo; • Majority of site is now comprised of market gardens. • Residential buildings surround the east, south and west of site. • A few outbuildings have been constructed on site at the north-eastern area of site.
1982	• Moderate resolution colour photo; • Building at the front of property has been constructed. • More residential dwellings have been constructed around the site. • Sheds at north-eastern portion of site have been demolished and replaced by a new development. • Site appears to be no longer utilised as a market garden. • Site appears to be connected to property north of site.
1991	• Moderate resolution colour photo; • Commercial planting equipment looks to be installed to the property in the west direction. • Land to the north is still unoccupied • No major changes to the site.
2004	• High resolution colour photo;

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

	• Empty land in the north has been used with the construction of residential buildings. • Commercial equipment in the west has been removed and subdivided with a residential building being constructed on it. • Property directly behind the site in the north has been reconstructed. • Site has been separated from northern property.
2009	• High resolution colour photo; • Site is once again utilised as a market garden at northern half of site. • Property to the south west landscape has been altered.

7.2 Information Gaps

A site history has been established using the various sources as outlined above. However, the following information gaps have been identified:

1. Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published;
2. Inferences have been drawn based on 'point in time' aerial photographs;
3. No information pertaining to the site pre-1955 was available; and

Regarding the information available, it is considered that the quality of the information is consistent the industry standard and that the information is of high integrity with respect to the historical use of the site overall.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

8. SOIL SAMPLING AND ANALYSIS

8.1 Data Quality Objectives

Data quality objectives were established for the site characterisation works, following the decision-making procedures outlined in NEPC (2013):

1. Define the problem
2. Identify the decision
3. Identify inputs to the decision
4. Define the study boundaries
5. Develop a decision rule
6. Specify limits on decision errors and
7. Optimise the design for obtaining data.

8.2 Define the Problem

The underlying soils onsite have the potential to be impacted by previous historical land use as a market garden and the potential incorrect demolition of a previously existing residential building and sheds originally constructed in an era to have comprised potentially hazardous building materials. As well as the current potentially unvalidated stockpiles onsite comprised of unknown building materials and underlying soils onsite being comprised of unknown and potentially contaminated fill material.

8.3 Identify the Decision

Based on the decision-making process for assessing urban redevelopment sites, the following decisions must be made:

1. Are there any unacceptable health risks to future onsite receptors?
2. Are there any unacceptable ecological risks posed by the site?
3. Are there any aesthetic issues at the site?
4. Is there any evidence of, or potential for, migration of contaminants from the site?
5. Is a site management strategy required?

8.4 Identify Inputs to the Decision

The following inputs were used to allow the assessment of the decisions:

1. Historical information
2. Observations made during site investigations
3. Soil analytical data from samples collected on site
4. Adopted site assessment criteria and
5. Data quality indicators.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

8.5 Define the Study Boundaries

The study site is 110-112 Mount Vernon Road, Mount Vernon NSW 2178 (Lot 4 DP865818) (Figure 1). It can be identified as an irregularly shaped rectangular allotment.

8.6 Develop a Decision Rule

Soil analytical data were assessed against National Environmental Protection Measure (NEPM) criteria as identified in Section 8. Statistical analysis of the data will be undertaken if necessary. The following statistical criteria shall be adopted:

1. The upper 95% confidence limit on the average concentration for each analyte (calculated for samples collected from consistent soil horizons, stratigraphy or material types) must be below the adopted criterion;
2. No single analyte shall exceed 250% of the adopted criterion; and
3. The standard deviation of the results must be below 50 % of the criterion.

The acceptable limits for laboratory QA/QC parameters are shown in the table below and are based upon the laboratory reported acceptable limits and those stated within the NEPM 2013 Schedule B3 Guideline & AS 4482.1-2005.

Type of QC Sample	Control Limit
FIELD	
Rinsate Blanks	Analytes <LOR
Intra-Laboratory Duplicates	RPD's < 30 - 50%
Inter-Laboratory Duplicates	RPD's < 30 - 50%
Trip Blanks	Volatiles <LOR
Trip Spike Recovery	>70%
LABORATORY	
Method Blanks	< Laboratory LOR
Matrix Spike	Recovery targets: • Metals: 70% to 130% • Organics: 60% to 140%
Laboratory Duplicate	RPD's <30%
Laboratory Control Samples	Recovery targets: 70% to 130%
Surrogate Spike	Recovery targets: 60% to 140%

The following conditions should be adopted:

- If the control limits are exceeded, then an assessment of the significance of the results should be carried out;
- If major non-conformances from the laboratory or field data are identified, then further sampling and laboratory analysis may be required to provide an adequate sample set for data reliance;

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

- If the results of the DQI assessment indicate that the data set is reliable, then the data set will be deemed to be acceptable for the purposes of the validation works; and
- If the measured concentrations of soil, groundwater and soil vapour samples analysed meet their respective validation criteria, then no additional remediation is required.

8.7 Specify Limits of Decision Errors

The usual null hypothesis for remediation of contamination is that the land has unacceptable risk from residual contamination, and this hypothesis is able to be accepted at a 95% confidence level, giving a 5% risk of a Type I error (site is deemed suitable when it is not).

An assessment of the likelihood of a decision error will be made based on:

- The acceptable limits for inter/intra laboratory duplicate sample comparisons as specified in Step 5 of the DQOs; and
- The acceptable limits for laboratory QA/QC parameters are based upon the laboratory reported acceptable limits and those stated within the NEPM 2013 Schedule B3 Guideline & AS 4482.1-2005.

If the concentration of a particular contaminant of concern exceeds its remediation/validation criteria, then a further assessment is required to address the significance of the result. Statistical analysis (arithmetic mean) based on 95% UCL may be used to assess the significance of the data provided the following conditions are met:

- the 95%ucl of the arithmetic mean must be less than the criterion;
- the standard deviation of the data set is less than 50% of the relevant threshold level; and
- no individual sample result should be greater than 250% of the relevant threshold level.

8.8 Optimize Design for Obtaining Data

Based on the available information, a targeted sampling plan was considered most appropriate to provide sufficient characterisation data. An initial total of twenty-one (21) test pits were nominated across the area of investigation (Figure 3) analysed for Asbestos, Heavy Metals, Hydrocarbons and OC/OP Pesticides.

The optimum design for obtaining data in order to achieve the Data Quality Objectives is as follows:

- Only NATA-accredited environmental testing laboratories will be commissioned to analyse soil samples and will implement a quality control plan conforming to the NEPM (Assessment of Site Contamination) Measure Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils;
- Assessment of the Data Quality Indicators to determine if the field procedures and laboratory analytical results are reliable; and
- Field sampling works will be carried out by an experienced and qualified Environmental Scientist in accordance with Envirotech protocols, based on National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 Schedules B1, B2, B4, B6 & B9 and other NSW EPA endorsed guidelines.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

8.9 Soil Sample Methodology

Soil samples were collected on Tuesday 26th March 2018 via test pitting. Samples were collected from approximately 0 - 500 mm depth using a simple mattock. No Groundwater was encountered in soil profile samples. Asbestos grab samples were taken by carefully removing soil within test pits. The depth of sampling across the site was limited to the top 500mm of soils, to ensure adequate coverage of the average depths of fill material across the entire site.

During the collection of soil samples, any features such as seepage, discoloration, staining, odours, or other physical indicators of contamination were noted. All site work was undertaken by Jack Hinchliffe, Environmental Scientist of Envirotech. Soil Samples were transferred directly from the test pits into laboratory supplied 250 mL sample jars sealed with Teflon lids. Asbestos samples were collected in asbestos sample bags and zip locked. The samples were stored in a chilled esky and transferred to ALS Environmental Division under stringent chain of custody (COC) procedures.

The decontamination of non-dedicated sampling equipment was achieved by washing with phosphate-free detergent and tap water, followed by a final rinse with distilled water. Decontamination was conducted after the collection of samples at each sample location. A clean pair of disposable gloves was used when handling each sample. The hand augers were decontaminated between sampling locations by physically removing soil material between boreholes, washing the augers with Decon 90 and rinsing them with water.

8.10 Laboratory Analysis

The laboratory used for the analysis of all samples was ALS Environmental located at 277-289 Woodpark Road, Smithfield NSW Australia. The laboratory is NATA accredited for the selected analyses. The completed analysis schedule is summarised in Table 4 below providing a diverse range of analytes:

Table 4: Analytical Schedule.

Sample ID	Location	Analytes
TP1-21	Top 500mm of potential fill material around the area of investigation (Figure 3).	• Heavy Metals • Hydrocarbons • OC/OPs
ASB1-6	Top 500mm within the footprints of demolished house and sheds onsite (Figure 3).	• Asbestos

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

Figure 3: Site sampling plan showing location of the twenty-one (21) test pits (yellow) with the concurrent asbestos sampling (blue). (enhanced image Appendix B).

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

Table 5: Sampling locations collected 26.03.2019

Borehole Number	Soil Description	Sample Depth (m)	Latitude	Longitude
TP1	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.8611493949	150.812207381
TP2	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861606426	150.811976711
TP3	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861552972	150.811845283
TP4	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861479472	150.811618636
TP5	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861611994	150.811546217
TP6	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861677699	150.812039743
TP7	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.96180688	150.811992805
TP8	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861913789	150.811945866
TP9	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861937175	150.811834554
TP10	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.861811335	150.811687033
TP11	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.8618613	150.811476479

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

TP12	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862084174	150.811888198
TP13	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862129833	150.811573039
TP14	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862078606	150.811398695
TP15	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862230059	150.811267267
TP16	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862316922	150.811585109
TP17	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862521829	150.811637412
TP18	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862634304	150.811547558
TP19	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862624282	150.811328958
TP20	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.862496215	150.811189483
TP21	FILL: LOAM; mid brown to dark brown loam to clay loam with inclusions of rock, gravels and vegetation matter followed by: NATURAL; LIGHT CLAY; mottled brown at depth (500mm)	0.5	-33.86273453	150.81156231

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

9. SITE ASSESSMENT CRITERIA

Concentrations of contaminants in soil samples were compared against the National Environmental Protection Council (2013) site assessment criteria presented below and summarised in Table 5:

1. *Health Investigation Levels (HIL) for Soil Contaminants – NEPM HIL A; Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.*
2. *Soil Health Screening Levels (HSL) for Vapour Intrusion – Residential A & B;*
3. *NEPM 2013 Management Limits for TRH Fractions F1-F4 in Soil - Residential, Parkland and Public Open Space (Fine Grained Soils).*
4. *Health Screening Levels for Asbestos Contamination in Soil – Commercial/Industrial, Guidelines for the Assessment, Remediation and Management Asbestos-Contaminated sites in Western Australia*
5. *CCME: Soil Quality Guidelines for the Protection of Environmental and Human Health Agricultural, Residential/Parkland, Commercial and Industrial*
6. *Assessment levels for Soil, Sediment and Water – Department of Environment and Conservation 2010*
7. *Interim Ecological Soil Screening Level – United States Environmental Protection Agency 2005*

Table 5: Adopted Human Health Based Soil Criteria and Hydrocarbon Management Limits (all units in mg/kg)

	Limit of Reporting	Health Screening Levels	Environmental Screening Levels	Management Limits
METALS AND INORGANICS				
Arsenic	5.0	100	100	-
Cadmium	1.0	20	-	-
Chromium	2.0	100	-	-
Copper	5.0	6,000	-	-
Nickel	2.0	400	-	-
Lead	5.0	300	-	-
Zinc	5.0	7,400	-	-
Mercury	0.1	40	-	-
PAH				
BaP (TEQ)	0.5	3	0.7	-
Total PAH	0.5	300		-
BTEX				
Benzene	0.2	0.6	65	-
Toluene	0.5	390	105	-
Total Xylenes	0.5	95	45	-
Naphthalene	1	4	170	-

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

PHENOLS				
Phenol	0.5	3,000	-	-
Pentachlorophenol	2.0	100	-	-
Cresols	0.5	400	-	-
TRH				
F1 C6 – C10	10	230	180	800
F2 > C10 – C16	50	180	120	1,000
F3 > C16 – C34	100	-	1300	3,500
F4 > C34 – C40	50	-	5600	10,000
ASBESTOS				
Bonded ACM	0.01%		0.01%	
Friable ACM	0.001%		0.001%	
Visible ACM			No visible ACM	
OC AND OP PESTICIDES				
DDT+DDE+DDD	0.05	240	-	
Aldrin and dieldrin	0.05	6	-	
Chlordane	0.05	50	-	
Endosulfan	0.05	270	-	
Endrin	0.05	10	-	
Heptachlor	0.05	6	-	
HCB	0.05	10	-	
Methoxychlor	0.05	300	-	
Mirex	0.05	10	-	
Toxaphene	0.05	20	-	

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

10. QUALITY ASSURANCE / QUALITY CONTROL

10.1 Site Procedures

The following field quality assurance and quality control measures were implemented:

1. All sample jars and sample bags were clearly labelled prior to site visit;
2. All soil samples were collected by hand (after shallow excavation using a clean mattock);
3. Disposable gloves were worn throughout the process and changed between the collection of each soil sample;
4. All sampled jars and bags were immediately placed in an ice-block chilled esky;
5. All samples were clearly labelled and sealed for couriering;
6. The ALS Environmental chain-of-custody form was completed and emailed to the lab as well as a hard copy placed with the samples;
7. All samples were kept in the office of Envirotech Pty Ltd until collected by courier; and
8. Ice-blocks were interchanged prior to couriering.

10.2 Laboratory

The following is an extract from the quote for service provided by ALS Environmental Division.

"ALS has a comprehensive QA/QC program. Our QA/QC procedures are designed to provide reliable and defensible analytical results. Our analytical services are based on internal QCS3 schedule, which includes Laboratory Control Samples (LCS), Method Blanks (MB), Matrix Spikes (MS), Laboratory Duplicates (Dups) and Surrogates (for target organics) where applicable, at frequencies at or above that detailed in the 1999 NEPM guidelines.

The basis of the QCS3 Schedule is the 'analytical lot' (process analytical batch) of samples. Generally, the laboratory processes samples of similar matrices in groups called 'Lots'. 'Lots' are made up of 20 samples that may consist of several discrete batches and may be independent of project and / or client. The selection of samples for QC purposes will be biased towards the larger batches within the process lot" ...

The following summarizes the frequency that QC samples are processed:

1. 5% Method Blanks (MB) –1 analyzed within each process lot of 20 samples.
2. 10% Laboratory Duplicates (Dups) –2 analyzed within each process lot of 20 samples.
3. 5% Laboratory Control Samples (LCS) –1 analyzed within each process lot of 20 samples.
4. 5% Matrix Spikes (MS) – 1 analyzed within each process lot of 20 samples (except for dioxins).
5. Surrogate Spikes on all 'target' organics analyses.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

10.3 QA/QC Results

10.3.1 Site

1. All soil samples arrived at ALS Environmental within specified holding times;
2. All soil samples arrived at ALS Environmental within specified temperature requirements;
3. No potential OHS incidents were recorded on site;
4. No quality assurance incidents (such as cross contamination or similar) were recorded.
5. The RPDs for all analytes (for the sampling set 26th March 2019) were within their respective control limits. Therefore, the data set is considered to be adequately precise.

10.3.2 Lab

ALS Environmental Division provided a Quality Control Report and Interpretive Quality Control Report (Appendix C) Those Quality Control Reports contain the following information:

1. A Laboratory Duplicate (DUP) Report - referring to a randomly selected intra-laboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. For all matrices, no Duplicate outliers occurred.
2. A Method Blank (MB) Report - referring to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. For all matrices, no Method Blank outliers occurred.
3. Laboratory Control Spike (LCS) Report - referring to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. For all matrices, no Laboratory Control outliers occurred.
4. A Matrix Spike (MS) Report – referring to an intra-laboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. For all matrices, no Matrix Spike outliers occurred.
5. An Analysis Holding Time Compliance Report - No Analysis Holding Time outliers exist.
6. A Frequency of Quality Control Samples Report - No Quality Control Frequency Outliers exist.

10.4 QA/QC Conclusions

The field sampling and handling procedures across the site produced QA/QC results which indicate that the soil data collected is of acceptable quality and suitable for use in site characterisation.

The NATA certified laboratory reports indicate that the laboratory was generally achieving levels of performance within its recommended control limits during the period when the samples from this program were analyzed.

On this basis of the results and the laboratory QA/QC program, the soil data is of an acceptable quality upon which to draw conclusions regarding the environmental condition of the site.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

11. RESULTS

11.2 Soil Laboratory Results

Detailed laboratory reports and chain of custody documentation are provided in Appendix C. Laboratory results are summarized in Tables 6 and 7 and discussed in the following sections in relation to the adopted assessment criteria. The results were as follows:

1. Heavy Metals: All samples were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria.
2. TRH: All samples were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria.
3. BTEX: All samples were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria.
4. PAH: All samples were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria.
5. OC/OP Pesticides: All samples were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria.
6. Phenols: All samples were reported by the laboratory to have concentrations **BELOW** the adopted site assessment criteria.
7. Asbestos: Asbestos was **PRESENT** in four (4) of the six (6) samples in the form of ACM:
    - **TP6/ASB1 (0-0.5m): Chrysotile Asbestos & Amosite Asbestos presence**
        i. BONDED (Three pieces of asbestos cement sheeting approx. 50 x 40 x 5mm)
    - **TP7/ASB2 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
        i. BONDED (Three pieces of asbestos cement sheeting approx. 60 x 50 x 5mm)
    - **TP8/ASB3 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
        i. BONDED (One piece of asbestos cement sheeting approx. 80 x 30 x 5mm)
    - **TP19/ASB6 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
        i. BONDED (Two larger pieces of asbestos cement sheeting approx. 80 x 40 x 5mm and one smaller piece of asbestos cement sheeting approx. 5 x 4 x 3mm)

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

Table 6: Schedule of Laboratory Testing

TABLE A
SCHEDULE OF LABORATORY TESTING

Analyte / Analyte Group / Sample	Depth (m)	TYPE	SAMPLING DATE	DUPLICATE	MET-8	TPH & BTEX	PAH	OCP	PCB	PHENOLS	ASBESTOS
TP1	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP2	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP3	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP4	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP5	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP6	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	✔
TP7	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	✔
TP8	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	✔
TP9	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP10	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP11	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP12	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP13	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP14	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP15	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP16	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP17	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	✔
TP18	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	✔
TP19	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	✔
TP20	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	
TP21	0 - 0.5	F	26.03.2019		✔	✔	✔	✔	✔	✔	

Notes
MET-8: arsenic, cadmium, chromium, copper, lead, mercury,
OCP : Organochlorine Pesticides
PCB : Polychlorinated Biphenyls
PAH: Polycyclic Aromatic Hydrocarbons
TPH: Total Petroleum Hydrcarbons
BTEX: Benzene, Toluene, Ethyl Benzene, Xylene
F,T,N: Fill, Topsoil, Natural

**Please note: No duplicate, split, rinsate, trip blank or field blank samples were collected during the initial site inspection on 26th March 2019. No explanation can be provided as all staff members associated with the works during the initial site inspection are no longer with the company. However due to non-exceedances of all samples against their site assessment criteria, it is presumed that RPDs for the majority of analysts would had been within their respective control limits.*

***Please note: No rinsate samples was collected during the site inspection on 26th March 2019, as all samples were presumed to be collected by hand using nitrite disposable gloves and placed directly into the sampling containers. New gloves were presumed to be used between each sampling depth and sampling location.*

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

Table 7: Summary of Test Results – Sub Tables B-E

TABLE B

HEAVY METALS TEST RESULTS FOR HILs & ESLs

Analyte / Sample Location	Date Sampled	Depth (m)	HEAVY METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM (VI)	COPPER	MERCURY	NICKEL	LEAD [g]	ZINC
TP1	26.03.2019	0 - 0.5	6	< 1	23	20	< 0.1	12	22	91
TP2	26.03.2019	0 - 0.5	< 5	< 1	18	27	< 0.1	8	14	46
TP3	26.03.2019	0 - 0.5	9	< 1	24	24	< 0.1	8	18	48
TP4	26.03.2019	0 - 0.5	7	< 1	21	22	< 0.1	12	19	64
TP5	26.03.2019	0 - 0.5	5	< 1	19	29	< 0.1	13	20	138
TP6	26.03.2019	0 - 0.5	< 5	< 1	18	33	< 0.1	16	19	124
TP7	26.03.2019	0 - 0.5	10	< 1	26	19	< 0.1	12	20	44
TP8	26.03.2019	0 - 0.5	8	< 1	17	17	< 0.1	12	16	136
TP9	26.03.2019	0 - 0.5	6	< 1	16	29	< 0.1	13	12	86
TP10	26.03.2019	0 - 0.5	8	< 1	19	16	< 0.1	11	28	145
TP11	26.03.2019	0 - 0.5	< 5	< 1	15	16	< 0.1	10	36	109
TP12	26.03.2019	0 - 0.5	6	< 1	15	17	< 0.1	10	35	96
TP13	26.03.2019	0 - 0.5	8	< 1	30	22	< 0.1	10	22	51
TP14	26.03.2019	0 - 0.5	8	< 1	18	19	< 0.1	10	15	45
TP15	26.03.2019	0 - 0.5	6	< 1	18	18	< 0.1	10	18	54
TP16	26.03.2019	0 - 0.5	19	< 1	21	47	0.1	13	61	449
TP17	26.03.2019	0 - 0.5	< 5	< 1	9	32	< 0.1	16	13	61
TP18	26.03.2019	0 - 0.5	6	< 1	18	12	< 0.1	6	14	28
TP19	26.03.2019	0 - 0.5	6	< 1	20	15	< 0.1	8	18	58
TP20	26.03.2019	0 - 0.5	6	< 1	21	15	< 0.1	12	20	45
TP21	26.03.2019	0 - 0.5	19	< 1	30	62	0.3	9	87	289
Practical Quantitation Limits (PQL)			5	1	2	5	0.1	2	5	5
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)										
Health Investigation Levels (HIL) - Table 1A (1)										
HIL A [a]			100	20	100	6000	40[e] / 10[f]	400	300	7400
HIL B [b]			500	150	500	30,000	120[e] / 30[f]	1200	1200	60,000
HIL C [c]			300	90	300	17,000	80[e] / 13[f]	1200	600	30,000
HIL D [d]			3000	900	3600	240,000	730[e] / 180[f]	6000	1500	400,000
Ecological Investigation Levels (EIL) - Table 1B (5)										
Areas of ecological significance			40[h]							
Urban residential and public open space [i]			100[h]							
Commercial and industrial			160[h]							

Notes

a: Residential with garden/accessible soil (home grown poduce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.

b: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high rise buildings and apartments.

c: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate

d: Commercial/industrial, includes premises such as shops, offices, factories and industrial sites

e: Elemental mercury: HIL does not address elemental mercury. A site-specific assessment should be considered if elemental mercury is present, or suspected to be present,

f: Methyl mercury: assessment of methyl mercury should only occur where there is evidence of its potential source. It may be associated with inorganic mercury and anaerobic microorganism activity in aquatic environments. In addition the reliability and quality of sampling/analysis should be

g: Lead: HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate.

h: Aged values are applicable to arsenic contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.

i: Urban residential / public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

TABLE C1
TOTAL RECOVERABLE HYDROCARBONS (TRH), BTEX AND NAPHTHALENE TEST RESULTS FOR HSLs IN CLAY

Analyte / Sample Location	Date Sampled	Depth (m)	TRH (mg/kg) F1 [a]	TRH (mg/kg) F2 [b]	BTEX (mg/kg) BENZENE	BTEX (mg/kg) TOLUENE	BTEX (mg/kg) ETHYL BENZENE	BTEX (mg/kg) TOTAL XYLENES	PAH (mg/kg) NAPHTHALENE
TP1	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP2	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP3	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP4	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP5	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP6	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP7	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP8	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP9	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP10	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP11	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP12	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP13	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP14	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP15	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP16	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP17	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP18	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP19	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP20	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
TP21	26.03.2019	0 - 0.5	<10	<50	<0.2	<0.5	<0.5	<0.5	<1
Practical Quantitation Limits (PQL)			10	50	0.2	0.5	0.5	0.5	1
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)									
Health Screening Levels (HSL) - Table 1A (3)									
HSL A & HSL B: Low-high density residential									
Source depth - 0m to <1m			50	280	0.7	480	NL	110	5
Source depth - 1m to <2m			90	NL	1	NL	NL	310	NL
Source depth - 2m to <4m			150	NL	2	NL	NL	NL	NL
Source depth - 4m +			290	NL	3	NL	NL	NL	NL
HSL C: recreational / open space									
Source depth - 0m to <1m			NL	NL	NL	NL	NL	NL	NL
Source depth - 1m to <2m			NL	NL	NL	NL	NL	NL	NL
Source depth - 2m to <4m			NL	NL	NL	NL	NL	NL	NL
Source depth - 4m +			NL	NL	NL	NL	NL	NL	NL
HSL D: Commercial / Industrial									
Source depth - 0m to <1m			310	NL	4	NL	NL	NL	NL
Source depth - 1m to <2m			480	NL	6	NL	NL	NL	NL
Source depth - 2m to <4m			NL	NL	9	NL	NL	NL	NL
Source depth - 4m +			NL	NL	20	NL	NL	NL	NL

Notes a: To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.
b: To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.
NL: Not Limiting

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

TABLE C2
TOTAL RECOVERABLE HYDROCARBONS (TRH), BTEX AND BENZO(a)PYRENE TEST RESULTS
ESLs FOR COARSE GRAINED SOIL TEXTURE

Analyte			TRH (mg/kg)				BTEX (mg/kg)				PAH (mg/kg)
			F1 (C_6-C_{10}) [a]	F2 (>C_{10}-C_{16}) [b]	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{40})	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	BENZO(a)PYRENE
Sample Location	Date Sampled	Depth (m)									
TP1	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP2	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP3	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP4	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP5	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP6	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP7	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP8	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP9	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP10	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP11	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP12	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP13	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP14	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP15	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP16	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP17	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP18	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP19	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP20	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
TP21	26.03.2019	0 - 0.5	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<0.5
Practical Quantitation Limits (PQL)			10	50	100	100	0.2	0.5	0.5	0.5	0.5
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)											
Ecological Screening Levels (ESL) - Table 1B											
Areas of ecological significance			125*	25*	-	-	10	10	1.5	10	0.7
Urban residential and public open space			180*	120*	300	2800	50	85	70	105	0.7
Commercial and industrial			215*	170*	1700	3300	75	135	165	180	0.7

Notes
a: To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.
b: To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.
*: ESLs are of low reliability except where indicated by * which indicates that the ESL is of
"-": "-" indicates that insufficient data was available to derive a value.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

TABLE C3
TOTAL RECOVERABLE HYDROCARBONS (TRH) TEST RESULTS
MANAGEMENT LIMITS FOR COARSE GRAINED SOIL TEXTURE

Analyte / Sample Location	Date Sampled	Depth (m)	TRH (mg/kg) F1 (C_6-C_{10}) [a]	F2 (>C_{10}-C_{16}) [a]	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{40})
TP1	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP2	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP3	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP4	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP5	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP6	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP7	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP8	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP9	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP10	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP11	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP12	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP13	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP14	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP15	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP16	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP17	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP18	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP19	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP20	26.03.2019	0 - 0.5	<10	<50	<100	<100
TP21	26.03.2019	0 - 0.5	<10	<50	<100	<100
Practical Quantitation Limits (PQL)			10	50	100	100
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)						
Management Limits - Table 1B (7)						
Residential parkland and public open space			700	1000	2500	10,000
Commercial and industrial			700	1000	3500	10,000

Notes
a: Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.
b: Management limits are applied after consideration of relevant ESLs and

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

TABLE D

POLYCYCLIC AROMATIC HYDROCARBONS (PAH), ORGANOCHLORINE PESTICIDES (OCP), POLYCHLORINATED BIPHENYLS (PCB), PHENOLS TEST RESULTS FOR HILs, EILs & ESLs

Analyte / Sample Location	Date Sampled	Depth (m)	PAH (mg/kg)				Organochlorine Pesticides (mg/kg)									Phenols (mg/kg)	
			Carcinogenic PAHs (as BaP TEQ) [e]	TOTAL PAHs [f]	BENZO(a)PYRENE	NAPHTHALENE	DDT + DDE + DDD	ALDRIN & DIELDRIN	CHLORDANE	ENDOSULFAN	ENDRIN	HEPTACHLOR	HCB	METHOXYCHLOR	PCB [j]	PHENOL	PENTACHLOROPHENOL
TP1	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP2	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP3	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP4	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP5	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP6	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP7	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP8	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP9	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP10	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP11	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP12	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP13	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP14	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP15	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP16	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP17	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP18	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP19	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP20	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
TP21	26.03.2019	0 - 0.5	0.6	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.1	<0.5	<2
Practical Quantitation Limits (PQL)			0.5	0.5	0.5	0.5	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.1	0.5	2
NATIONAL ENVIRONMENT PROTECTION MEASURE (2013)																	
Health Investigation Levels (HIL) - Table 1A (1)																	
HIL A [a]			3	300			240	6	50	270	10	6	10	300	1	3000	100
HIL B [b]			4	400			600	10	90	400	20	10	15	500	1	45,000	130
HIL C [c]			3	300			400	10	70	340	20	10	10	400	1	40,000	120
HIL D [d]			40	4000			3600	45	530	2000	100	50	80	2500	7	240,000	660
Ecological Investigation Levels (EIL) - Table 1B																	
Areas of ecological significance						10 [g]	3 [g, k]										
Urban residential and public open space [h]						170 [g]	180 [g, k]										
Commercial and industrial						370 [g]	640 [g, k]										
Ecological Screening Levels (ESL) - Table 1B (6)																	
Areas of ecological significance					0.7 [i]												
Urban residential and public open space					0.7 [i]												
Commercial and industrial					0.7 [i]												

Notes

a: Residential with garden/accessible soil (home grown poduce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary

b: Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high rise buildings and apartments.

c: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site-specific assessment may be more appropriate.

d: Commercial/industrial, includes premises such as shops, offices, factories and industrial sites

e: Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008 (refer Schedule B7). The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products.

PAH species	TEF	PAH species	TEF
Benzo(a)anthracen	0.1	Benzo(g,h,i)perylene	0.01
Benzo(a)pyrene	1	Chrysene	0.01
Benzo(b+j)fluoranthe	0.1	Dibenz(a,h)anthracene	1
Benzo(k)fluoranthe	0.1	Indeno(1,2,3-c,d)pyrene	0.1

Where the B(a)P occurs in bitumen fragments it is relatively immobile and does not represent a significant health risk.

f: Total PAHs: HIL is based on the sum of the 16 PAHs most commonly reported for contaminated sites (WHO 1998). The application of the total PAH HIL should consider the presence of carcinogenic PAHs and naphthalene (the most volatile PAH). Carcinogenic PAHs reported in the total PAHs should meet the B(a)P TEQ HIL. Naphthalene reported in the total PAHs should meet the relevant HSL.

g: Insufficient data was available to calculate aged values for DDT and naphthalene, consequently the values for fresh contamination should be used.

h: Urban residential / public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.

i: For coarse and fine grained texture soils.

j: PCBs: HIL relates to non-dioxin-like PCBs only. Where a PCB source is known, or suspected, to be present at a site, a site-specific assessment of exposure to all PCBs (including dioxin-like PCBs) should be undertaken.

k: For DDT only.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

TABLE E
ASBESTOS TEST RESULTS

Analyte / Sample Location	Date Sampled	Depth (m)	Field Observations*	Laboratory Results Asbestos Type Present / Absent	Laboratory Results Asbestos %w/w
ASB1	26.03.2019	0 - 0.5	Fibre-cement fragment observed	**Chrysotile Asbestos + Amosite Asbestos present**	NT
ASB2	26.03.2019	0 - 0.5	Fibre-cement fragment observed	**Chrysotile Asbestos + Amosite Asbestos + Crocidolite Asbestos present**	NT
ASB3	26.03.2019	0 - 0.5	Fibre-cement fragment observed	**Chrysotile Asbestos + Amosite Asbestos + Crocidolite Asbestos present**	NT
ASB4	26.03.2019	0 - 0.5	No fibre-cement observed	No Asbestos detected	NT
ASB5	26.03.2019	0 - 0.5	No fibre-cement observed	No Asbestos detected	NT
ASB6	26.03.2019	0 - 0.5	Fibre-cement fragment observed	**Chrysotile Asbestos + Amosite Asbestos + Crocidolite Asbestos present**	NT
WA Guidelines for the Assessment, Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009					
National Environment Protection (Assessment of Site Contamination) Measure 2013 Schedule B1					
%w/w asbestos for FA and AF					0.001%
%w/w asbestos for ACM - Residential use, childcare centres, preschools etc.					0.01%
%w/w asbestos for ACM - Residential, minimal soil access (fully sealed surfaces)					0.04%
%w/w asbestos for ACM - Parks, public open spaces, playing fields etc.					0.02%
%w/w asbestos for ACM - Commercial / Industrial					0.05%

Note:
ACM = Asbestos Containing Materials >7mm x 7mm (visible by eye)
FA = Friable and Fibrous Asbestos Materials >7mm x 7mm (visible by eye)
AF = Asbestos Fines <7mm x 7mm ACM including free fibres (visible by microscope only)
* Field Observations: All fibro- cement fragments observed are assumed to contain Asbestos until otherwise tested and recorded as such.
NT = Not Tested

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

12. DISCUSSION

12.1 Soil Laboratory Results

All soil samples collected and tested (26th March 2019) were reported by the laboratory to have concentrations below the adopted site assessment criteria for HIL A, land use as per the NEPM, 2013, except for the following samples:

- **TP6/ASB1 (0-0.5m): Chrysotile Asbestos & Amosite Asbestos presence**
  - BONDED (Three pieces of asbestos cement sheeting approx. 50 x 40 x 5mm)
- **TP7/ASB2 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
  - BONDED (Three pieces of asbestos cement sheeting approx. 60 x 50 x 5mm)
- **TP8/ASB3 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
  - BONDED (One piece of asbestos cement sheeting approx. 80 x 30 x 5mm)
- **TP19/ASB6 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
  - BONDED (Two larger pieces of asbestos cement sheeting approx. 80 x 40 x 5mm and one smaller piece of asbestos cement sheeting approx. 5 x 4 x 3mm)

The asbestos detected are in the form of **BONDED ACM** materials – fragments of asbestos cement sheeting identified in the soil sample sampled between 0-500mm. It is anticipated that the source of the ACM was associated with the demolition of previous building structures within the vicinity of where the samples were collected. Also as indicated, the samples ASB1, ASB2, ASB3 and ASB6 were collected between 0-500mm depth, however from previous site inspections and experience the likelihood depth of the ACM is within the topsoil layers 0-100mm, as no indication of previous or historical backfilling of the site within these areas was noted from historical aerial photographs (Lotsearch or Nearmaps).

Please note that the asbestos samples were only tested for absence/presence, however a %w/w analysis is required to characterise the site as per regulatory guidelines and site assessment criteria, therefore it is recommended that additional sampling of these potential hotspot areas are required to justify the suitability of the site for the proposed development and land use.

Additionally, the stockpiled material within the southern portion of the site requires further characterisation to determine their suitability status. If the stockpiles have been removed then sampling of the stockpile footprint areas will be undertaken.

12.2 Potential Risks to Onsite Receptors

Human exposure to the potential contaminants identified is currently considered *Low* as:

- The site is privately owned
- The site is not publicly accessible
- The soils throughout site are currently exposed as grassland
- Asbestos Containing Materials are in the form of BONDED fragments pieces

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

- The majority of surface soils containing ACM fragment contaminants are confined to isolated areas within the site, and not widespread.

Human exposure to the potential contaminants identified would increase to Moderate-*High* following the commencement of any further earthworks and development exposing underlying soils and disturbance of overlying fragments of ACM.

12.3 Potential for Migration of Contaminants

The potential for migration is currently considered *Low* as the ACM contaminants are located within top-soils however may migrate downgradient due to further and continued heavy episodes of rainfall.

Migration potential for the ACM contaminants identified would increase to *Moderate-High* following the disruption of the top-soils and underlying soils and subsequent dust formation and stormwater runoff as a result of any potential excavations and construction.

Migration potential for the possible contaminants identified within the stockpile areas would increase to *Moderate-High* following the excavation of the stockpiles and subsequent dust formation, into adjacent site locations, as a result of excavation practices.

12.4 Conceptual Site Model

The refined Conceptual Site Model (CSM) is presented in the table below:

Potential Source	Potential Receptor	Potential Exposure Pathway	Complete Linkage	Risk	Justification
Asbestos in soils within TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 sampling location vicinity	Site users, maintenance workers, general public & surrounding residents	Inhalation	No, as long as the overlying soils is adequately maintained, and no excavation works that would expose underlying contaminated soils.	Low	Potential impacted soils with asbestos is currently from 0-500mm BGL.
Stockpiles of material (or footprint areas) within southern portion of the site	Site users, maintenance workers, general public & surrounding residents	Inhalation, dermal contact, ingestion	No, as long as the stockpiled soils and materials are adequately maintained, and no excavation works that would expose underlying contaminated soils.	Low	Potential impacted soils

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

12.5 Recommendations

As soil samples indicate the *presence of BONDED Asbestos*, within four (4) sampling locations, it is recommended that a suitably trained and qualified professional is engaged to prepare the following:

- Additional **Delineation Sampling** at and around the potentially asbestos hotspot areas of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 to further characterise these potential areas of concern and to determine the lateral and vertical extent of the asbestos contamination according regulatory guidelines and site criteria.
- A **Visual Inspection** is to be undertaken of these areas by a SafeWork NSW Licensed Approved Asbestos Assessor to ensure no visible asbestos containing materials (ACM) are identified on surface soils and provide an Asbestos Clearance Certificate for the potential areas.

Also, to further characterise the site, the additional sampling is required:

- Additional **Stockpile Sampling** to further characterise the stockpiled soils within the southern portion of the site. If the stockpiles have been removed, then the stockpile footprint areas will be sampled to further characterise underlying soils.

Subject to the above, it is considered that the site can be remediated and made suitable for the intended proposed residential development, pending on the following Delineation Sampling, Visual Inspection and subsequent Remedial and Validation Works, if required.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

13. CONCLUSIONS

Based on the data and evidence collected during the site inspection and site history review, the findings of the Detailed Site Investigation are as follows:

- On Tuesday 26th March 2019, a site inspection was conducted by Envirotech consultant Jack Hinchliffe;
- At the time of inspection, the site consisted of a fenced off unoccupied and empty property. The majority of the site was comprised of disused market gardens;
- At the north-eastern and southern portions of site were the footprint remains of sheds and a residential house that were previously demolished. Stockpiles were present at the southern portion of site;
- The following area of concern were identified:
    - Previous historical site use as a market garden has the potential for OC/OP Pesticides to be impacting soils onsite;
    - Previously existing residential building and sheds originally constructed in an era to have comprised potentially hazardous building materials and incorrectly demolished;
    - Potentially unvalidated stockpiles onsite comprised of unknown building materials;
    - The underlying soils onsite have the potential to be comprised of unknown fill material.
- The site was first developed before 1955;
- The site is not listed by the EPA;
- Based on the available information, a targeted and stratified sampling plan was considered most appropriate to provide sufficient characterisation data. A total of twenty-one (21) test pits were nominated across the area of investigation (Figure 3);
- Samples were analysed for Heavy Metals, Phenols, TRH, BTEX, PAH, Hydrocarbons, OC/OP Pesticides & Asbestos by ALS Environmental Division;
- Soil chemical concentrations were below the thresholds of the adopted human health and ecological assessment criteria for residential land use as specified under the NEPM (2013);

All soil samples collected and tested (26th March 2019) were reported by the laboratory to have concentrations below the adopted site assessment criteria for HIL A, land use as per the NEPM, 2013, except for the following samples:

- **TP6/ASB1 (0-0.5m): Chrysotile Asbestos & Amosite Asbestos presence**
    - BONDED (Three pieces of asbestos cement sheeting approx. 50 x 40 x 5mm)
- **TP7/ASB2 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
    - BONDED (Three pieces of asbestos cement sheeting approx. 60 x 50 x 5mm)
- **TP8/ASB3 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
    - BONDED (One piece of asbestos cement sheeting approx. 80 x 30 x 5mm)
- **TP19/ASB6 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
    - BONDED (Two larger pieces of asbestos cement sheeting approx. 80 x 40 x 5mm and one smaller piece of asbestos cement sheeting approx. 5 x 4 x 3mm)

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

As soil samples indicate the *presence of BONDED Asbestos*, within four (4) sampling locations, it is recommended that a suitably trained and qualified professional is engaged to prepare the following:

- Additional **Delineation Sampling** at and around the potentially asbestos hotspot areas of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 to further characterise these potential areas of concern and to determine the lateral and vertical extent of the asbestos contamination according regulatory guidelines and site criteria.
- A **Visual Inspection** is to be undertaken of these areas by a SafeWork NSW Licensed Approved Asbestos Assessor to ensure no visible asbestos containing materials (ACM) are identified on surface soils and provide an Asbestos Clearance Certificate for the potential areas.

Also, to further characterise the site, the additional sampling is required:

- Additional **Stockpile Sampling** to further characterise the stockpiled soils within the southern portion of the site. If the stockpiles have been removed, then the stockpile footprint areas will be sampled to further characterise underlying soils.

Details of the required additional works will be recommended within in the amended Envirotech RAP (REP: 19-7963-A1).

Subject to the above, it is considered that the site can be remediated and made suitable for the intended proposed residential development, pending on the following Delineation Sampling, Visual Inspection and subsequent Remedial and Validation Works, if required.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9429795
Version: 1, Version Date: 03/05/2020

14. LIMITATIONS STATEMENT

EnviroTech Pty. Ltd. Pty. Ltd. has undertaken the following report in accordance with the scope of works set out between EnviroTech Pty. Ltd. and the client. EnviroTech Pty. Ltd. derived the data in this report primarily from the site and soil assessment conducted on the date of site inspection. The impacts of future events may require future investigation of the site and subsequent data analysis, together with a re-evaluation of the conclusions and recommendations of this report.

In preparing this report, EnviroTech Pty. Ltd has relied upon, and assumed accurate, certain site information provided by the client and other persons. Except as otherwise stated in the report, we have not attempted to verify the accuracy or completeness of any such information. EnviroTech Pty. Ltd. accepts no liability or responsibility whatsoever for or in respect to any use or reliance upon this report by any third party.

The information contained within this report have been prepared exclusively for the client. Envirotech have prepared the report to address the risk associated with scale of the works. The report has been prepared with a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia. No other warranty, expressed or implied, is made or intended. This report is to be read in its entirety including attachments and appendices and should not read in individual sections.

A third party should not rely upon the information prior to making an assessment that the scope of work conducted meets their specific needs. Envirotech cannot be held liable for third party reliance on this document.

Envirotech's professional opinions are based upon its professional judgment, experience, training and results from analytical data. In some cases, further testing and analysis may be required, thus producing different results and/or opinions. Envirotech Pty Ltd has limited its investigation to the scope agreed upon with its client.

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

15. REFERENCES AND LEGISLATION

- Protection of the Environment Operations Act (1997);
- Protection of the Environment Operations Regulation (2008);
- Contaminated Land Management Act (1998).
- Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme (3rd Edition, 2017).
- State Environmental Planning Policy No.55 (SEPP55) – Remediation of Land (2018)
- NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (2011).
- NSW EPA Sampling Design Guidelines (1995).
- NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014).
- NSW EPA Guidelines for Assessing Former Orchards and Market Gardens (2005)
- Guidelines on the Investigation Levels for Soil and Groundwater, National Environmental Protection Measure 1999, 2013 Amendment (NEPC, 2013).
- Australian Standard AS 4482.1 Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.
- Australian Standard AS 4482.2 Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances.
- CRC CARE Technical Report No. 39: Risk-based remediation and management guidance for benzo(a)pyrene (2017).
- Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 (NSW DECCW, 2009).
- Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC, 2007).
- Guidelines for the Assessment, Remediation & Management of Asbestos - Contaminated Sites (WA DOH, 2009).
- NSW Spatial Information Exchange (http://maps.six.nsw.gov.au/)
- Sutherland Shire Maps (https://www.sutherlandshire.nsw.gov.au/Development/Shire-Maps).

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

APPENDIX A: LOT SEARCH

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 27 Mar 2019 13:23:13

Reference: LS005574 EP

Address: 110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Disclaimer:
The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features.
You should obtain independent advice before you make any decision based on the information within the report.
The detailed terms applicable to use of this report are set out at the end of this report.

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Table of Contents

Location Confidences 2
Dataset Listings 3
Site Location Aerial 5
Contaminated Land & Waste Management Facilities 6
PFAS Investigation Programs 8
EPA Other Sites with Contamination Issues 9
EPA Current Licensed Activities 10
EPA Delicensed & Former Licensed Activities 11
UPSS Sensitive Zones 13
Historical Business Activities 14
Historical Aerial Imagery & Maps 21
Topographic Features 33
Elevation Contours 37
Hydrogeology & Groundwater 38
Geology 42
Naturally Occurring Asbestos Potential 44
Soils 45
Acid Sulfate Soils 49
Dryland Salinity 52
Mining Subsidence Districts 54
State Environmental Planning 55
Environmental Planning Instruments 56
Heritage 58
Natural Hazards 59
Ecological Constraints 61
Terms & Conditions 70

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
General area or suburb match	Georeferenced with the confidence of the general/approximate area
Road match	Georeferenced to the road or rail
Road intersection	Georeferenced to the road intersection
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site
Network of features	Georeferenced to a network of features

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Finance, Services & Innovation	27/03/2019	27/03/2019	Daily	-	-	-	-
Topographic Data	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	14/03/2019	20/02/2019	Monthly	1000	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority	11/03/2019	11/03/2019	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	04/03/2019	11/10/2017	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	05/02/2019	07/03/2017	Quarterly	1000	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	04/03/2019	04/03/2019	Monthly	2000	0	0	0
Defence PFAS Investigation & Management Program	Department of Defence	14/03/2019	14/03/2019	Monthly	2000	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	11/03/2019	16/11/2018	Monthly	2000	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	13/12/2018	13/12/2018	Annually	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	26/03/2019	26/03/2019	Monthly	1000	0	0	0
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	26/03/2019	26/03/2019	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	26/03/2019	26/03/2019	Monthly	1000	0	4	4
UPSS Environmentally Sensitive Zones	Environment Protection Authority	14/04/2015	12/01/2010	As required	1000	0	0	1
UBD Business to Business Directory 1991 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business to Business Directory 1991 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business to Business Directory 1986 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business to Business Directory 1986 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	0	0
Points of Interest	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	0	0	2

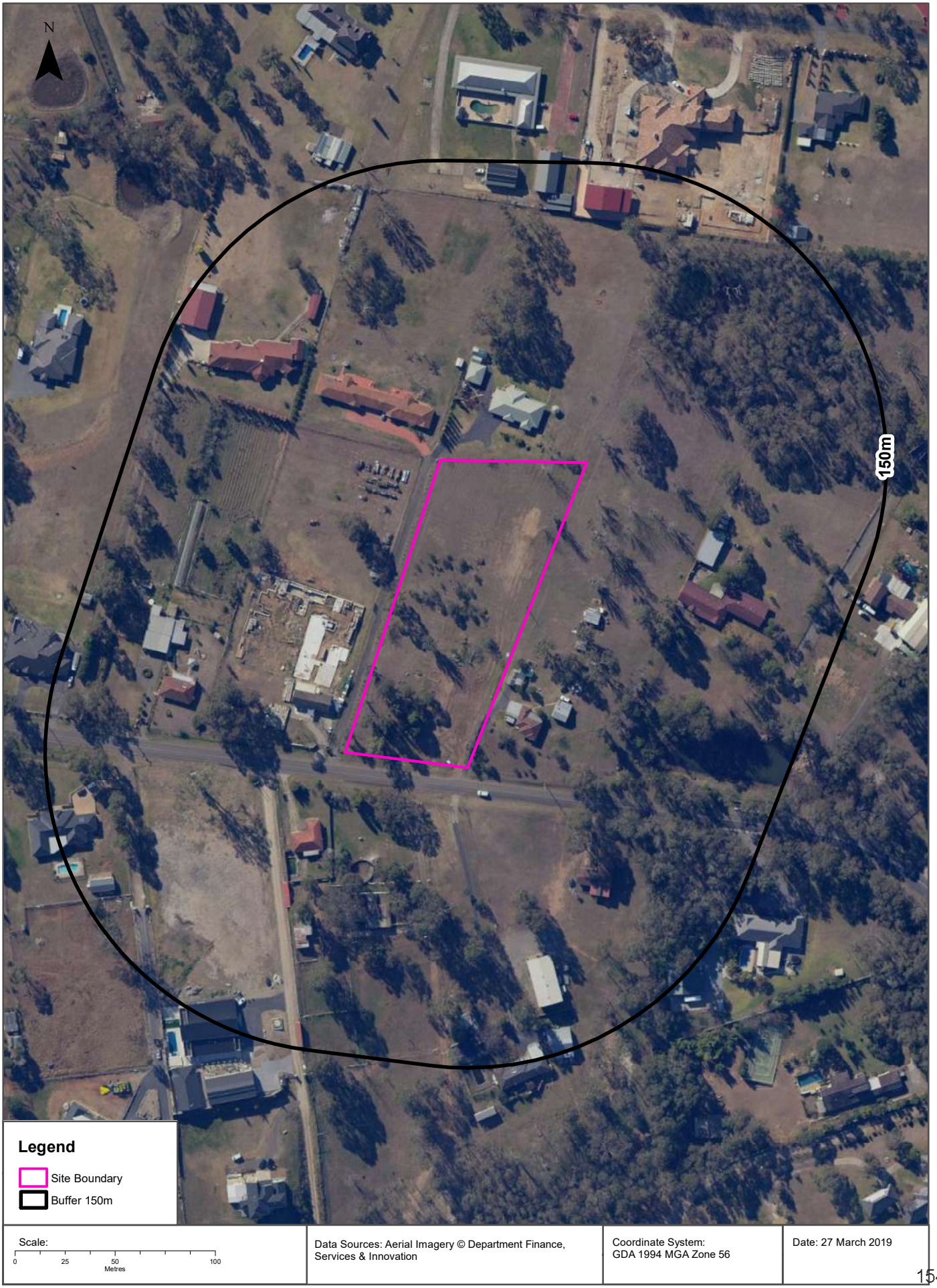
Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Tanks (Areas)	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	0	0	0
Tanks (Points)	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	0	0	0
Major Easements	NSW Department of Finance, Services & Innovation	11/01/2019	11/01/2019	Quarterly	1000	0	0	5
State Forest	NSW Department of Finance, Services & Innovation	18/01/2018	18/01/2018	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	16/01/2019	14/11/2018	Annually	1000	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1
Botany Groundwater Management Zones	NSW Department of Primary Industries	15/03/2018	01/10/2005	As required	1000	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000	0	0	8
Geological Units 1:100,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	1	-	2
Geological Structures 1:100,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	0	-	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Soil Landscapes	NSW Office of Environment & Heritage	12/08/2014		None planned	1000	1	-	3
Atlas of Australian Soils	CSIRO	19/05/2017	17/02/2011	As required	1000	1	1	2
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning and Environment	19/03/2019	09/11/2018	Weekly	500	0		
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	1
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	1	1	2
Dryland Salinity Potential of Western Sydney	NSW Office of Environment & Heritage	12/05/2017	01/01/2002	None planned	1000	1	1	3
Mining Subsidence Districts	NSW Department of Finance, Services & Innovation	13/07/2017	01/07/2017	As required	1000	0	0	0
SEPP State Significant Precincts	NSW Department of Planning and Environment	19/03/2019	04/07/2104	Weekly	1000	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning and Environment	19/03/2019	08/02/2019	Weekly	1000	1	1	3
Commonwealth Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	31/07/2018	Unknown	1000	0	0	0
National Heritage List	Australian Government Department of the Environment and Energy - Heritage Branch	16/01/2019	28/09/2018	Unknown	1000	0	0	0
State Heritage Register - Curtilages	NSW Office of Environment & Heritage	16/01/2019	09/11/2018	Quarterly	1000	0	0	0
Environmental Planning Instrument Heritage	NSW Department of Planning and Environment	19/03/2019	18/01/2019	Weekly	1000	0	0	0
Bush Fire Prone Land	NSW Rural Fire Service	26/02/2019	01/11/2018	Quarterly	1000	0	0	2
Remnant Vegetation of the Cumberland Plain	NSW Office of Environment & Heritage	07/10/2014	04/08/2011	Unknown	1000	2	2	6
Ramsar Wetlands of Australia	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	2
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	0	0	2
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	27/03/2019	27/03/2019	Weekly	10000	-	-	-

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Aerial Imagery 2018

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Contaminated Land & Waste Management Facilities

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist (m)	Direction
N/A	No records in buffer								

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Contaminated Land & Waste Management Facilities

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority
Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Geoscience Australia
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

PFAS Investigation Sites

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Id	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Defence PFAS Investigation & Management Program

Sites being investigated or managed by the Department of Defence for PFAS contamination within the dataset buffer:

Property ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation & Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

EPA Other Sites with Contamination Issues

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

EPA Activities

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Licensed Activities under the POEO Act 1997

Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

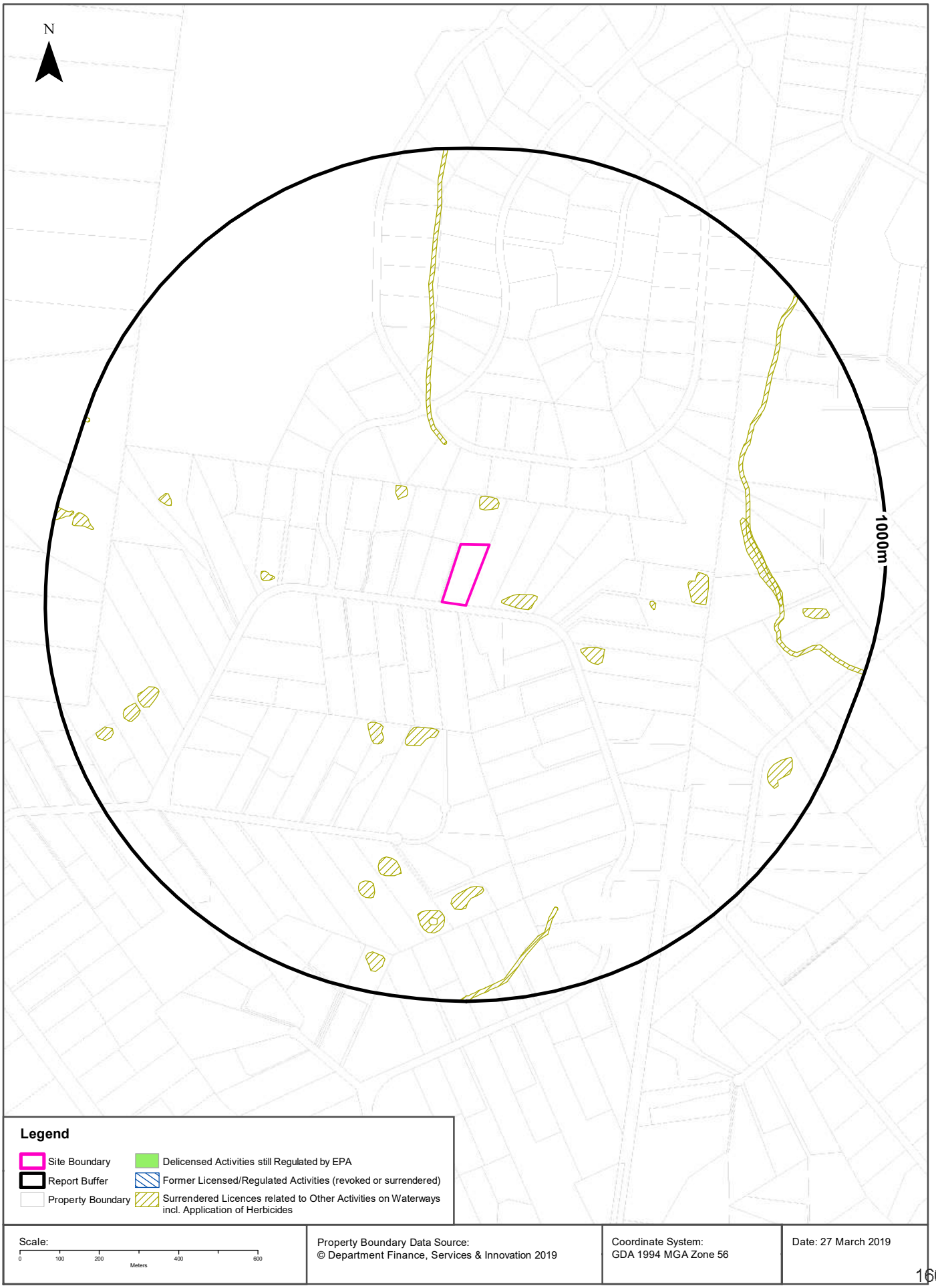
EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

POEO Licence Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Delicensed & Former Licensed EPA Activities

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

EPA Activities

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

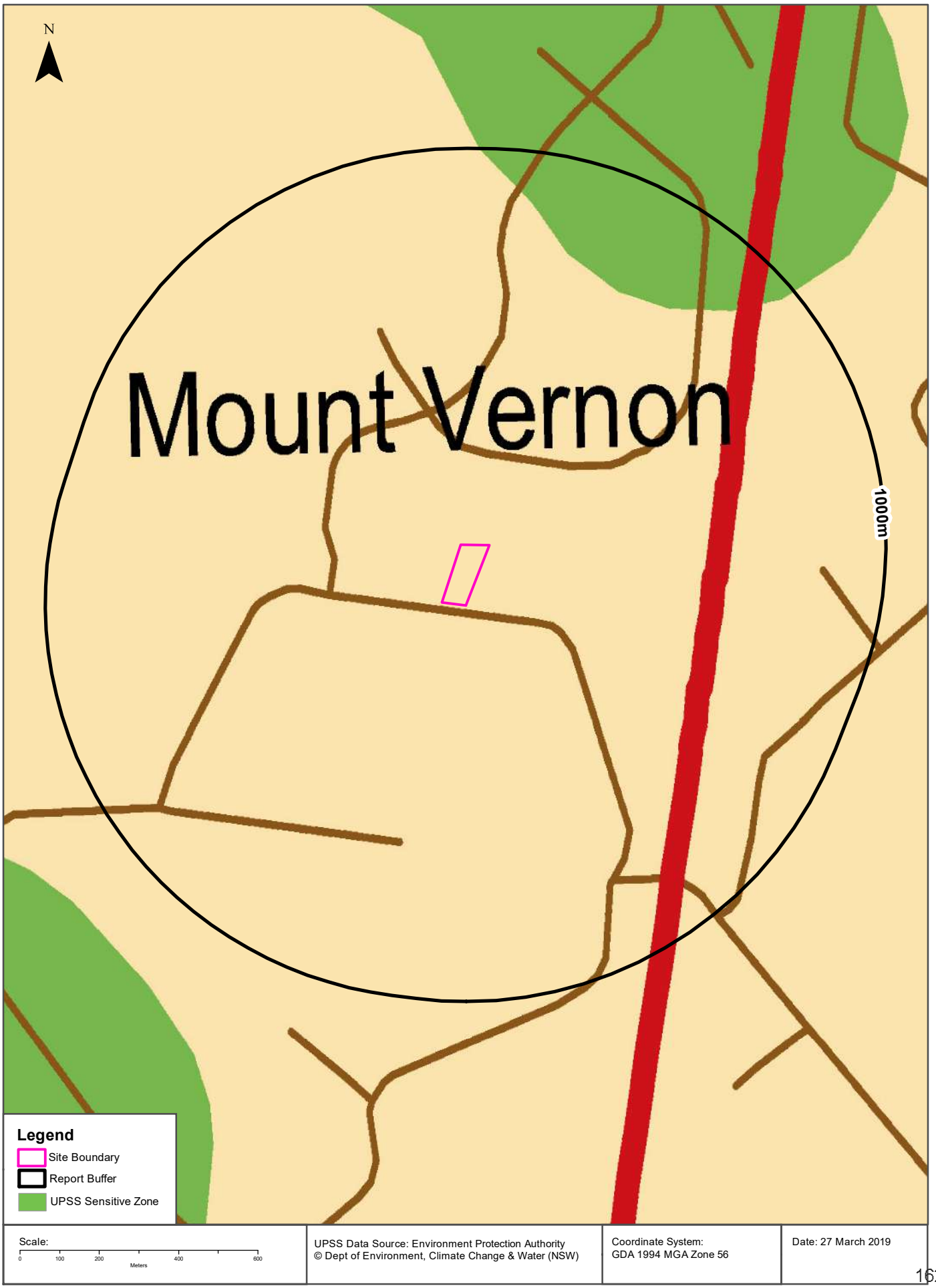
Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	79m	-
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	79m	-
5150	FAIRFIELD CITY COUNCIL	WATERWAYS OF FAIRFIELD CITY COUNCIL - FAIRFIELD NSW 2165	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	79m	-
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	79m	-

Former Licensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

UPSS Sensitive Zones

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Business Directories

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

1991 Business to Business Directory Records Premise or Road Intersection Matches

Records from the 1991 UBD Business to Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1991 Business to Business Directory Records Road or Area Matches

Records from the 1991 UBD Business to Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Business Directories

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

1986 Business to Business Directory Records Premise or Road Intersection Matches

Records from the 1986 UBD Business to Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1986 Business to Business Directory Records Road or Area Matches

Records from the 1986 UBD Business to Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Business Directories

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

1982 Business Directory Records
Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1982 Business Directory Records
Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Business Directories

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

1970 Business Directory Records
Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1970 Business Directory Records
Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Business Directories

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

1961 Business Directory Records
Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1961 Business Directory Records
Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Business Directories

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

1950 Business Directory Records
Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

1950 Business Directory Records
Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Business Directories

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches (1948-1993)

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
	No records in buffer						

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Dry Cleaners, Motor Garages & Service Stations Road or Area Matches (1948-1993)

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

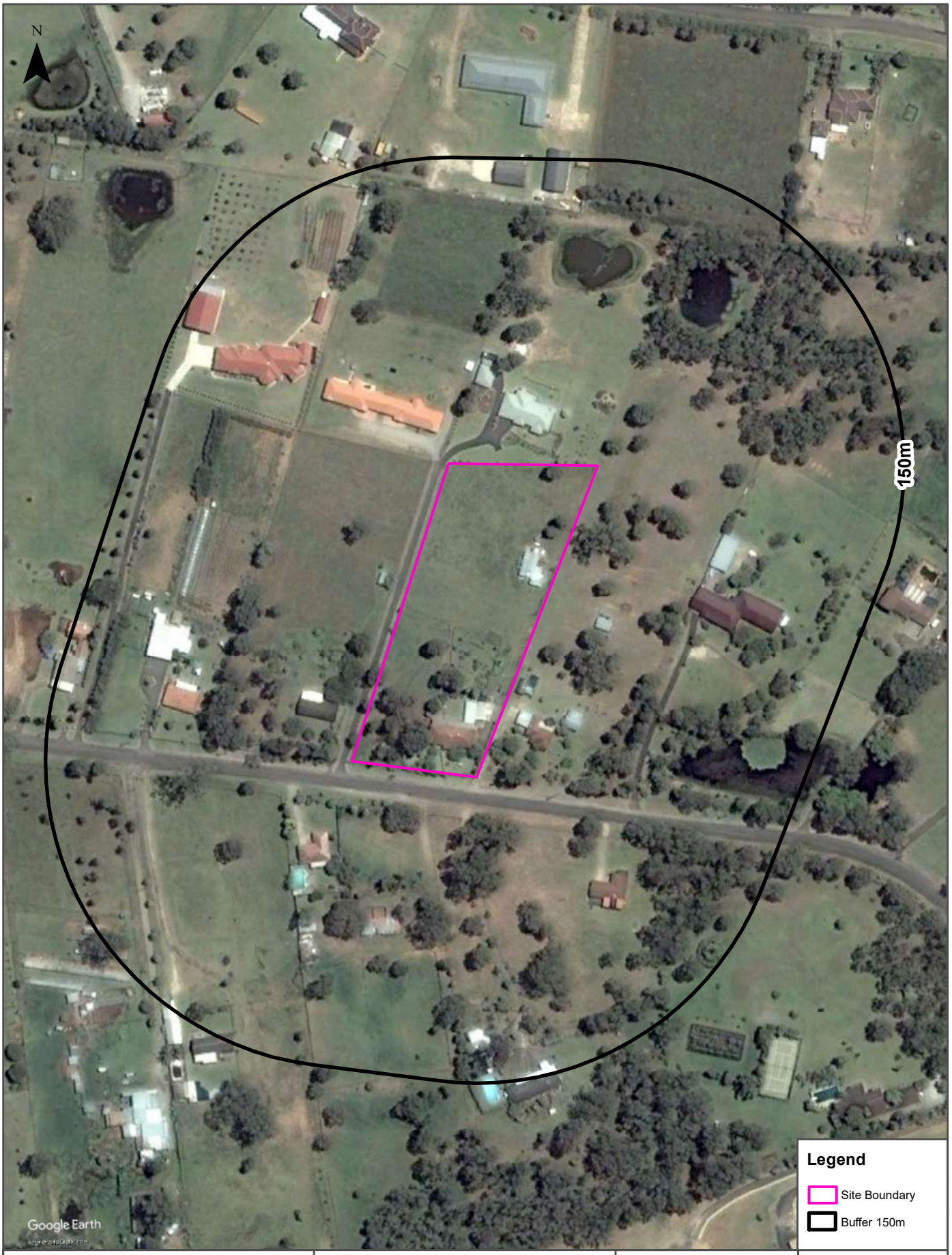
Aerial Imagery 2009

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Aerial Imagery 2004

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Data Source Aerial Imagery: © 2019 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.

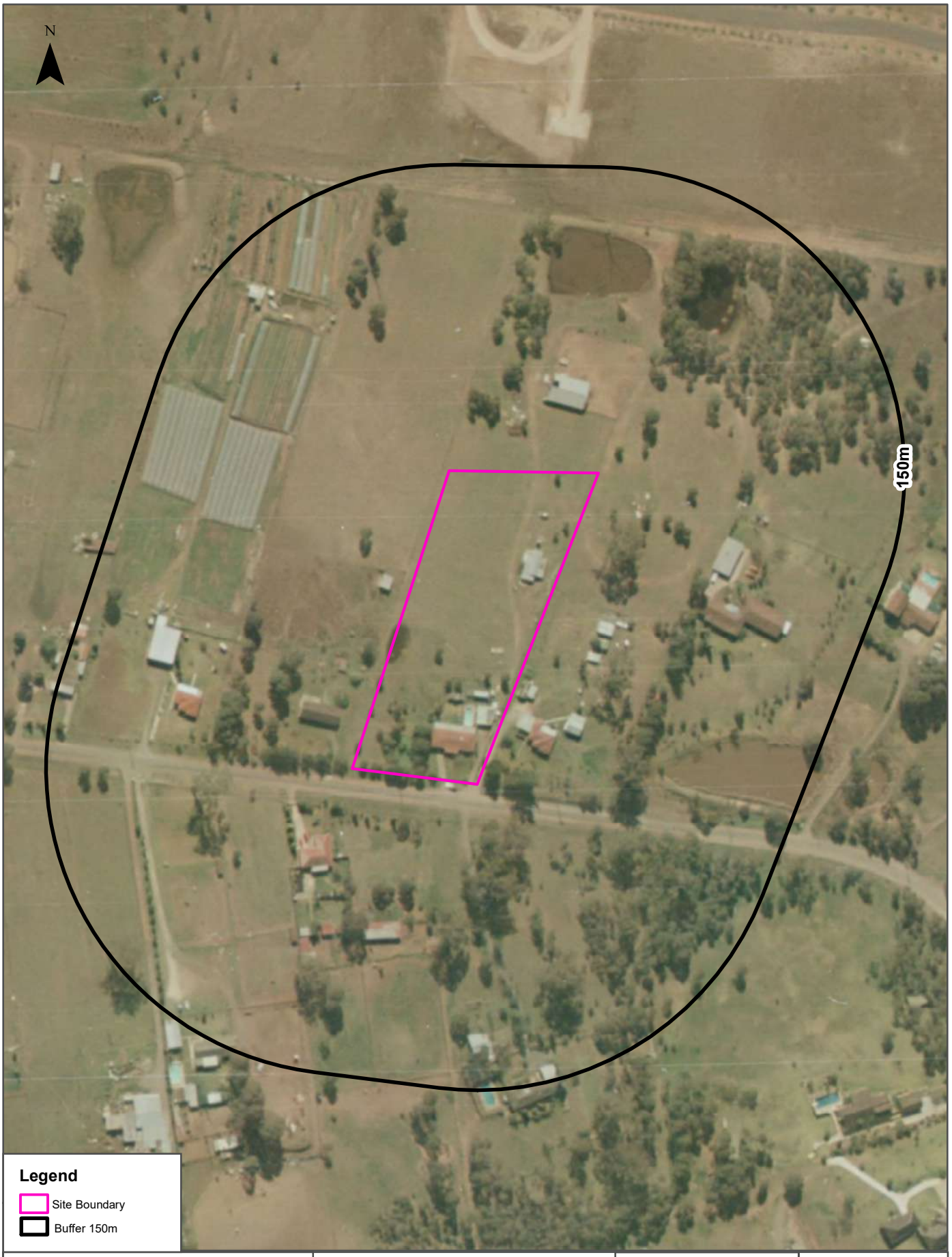
Coordinate System: GDA 1994 MGA Zone 56

Date: 26 March 2019

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Aerial Imagery 1991

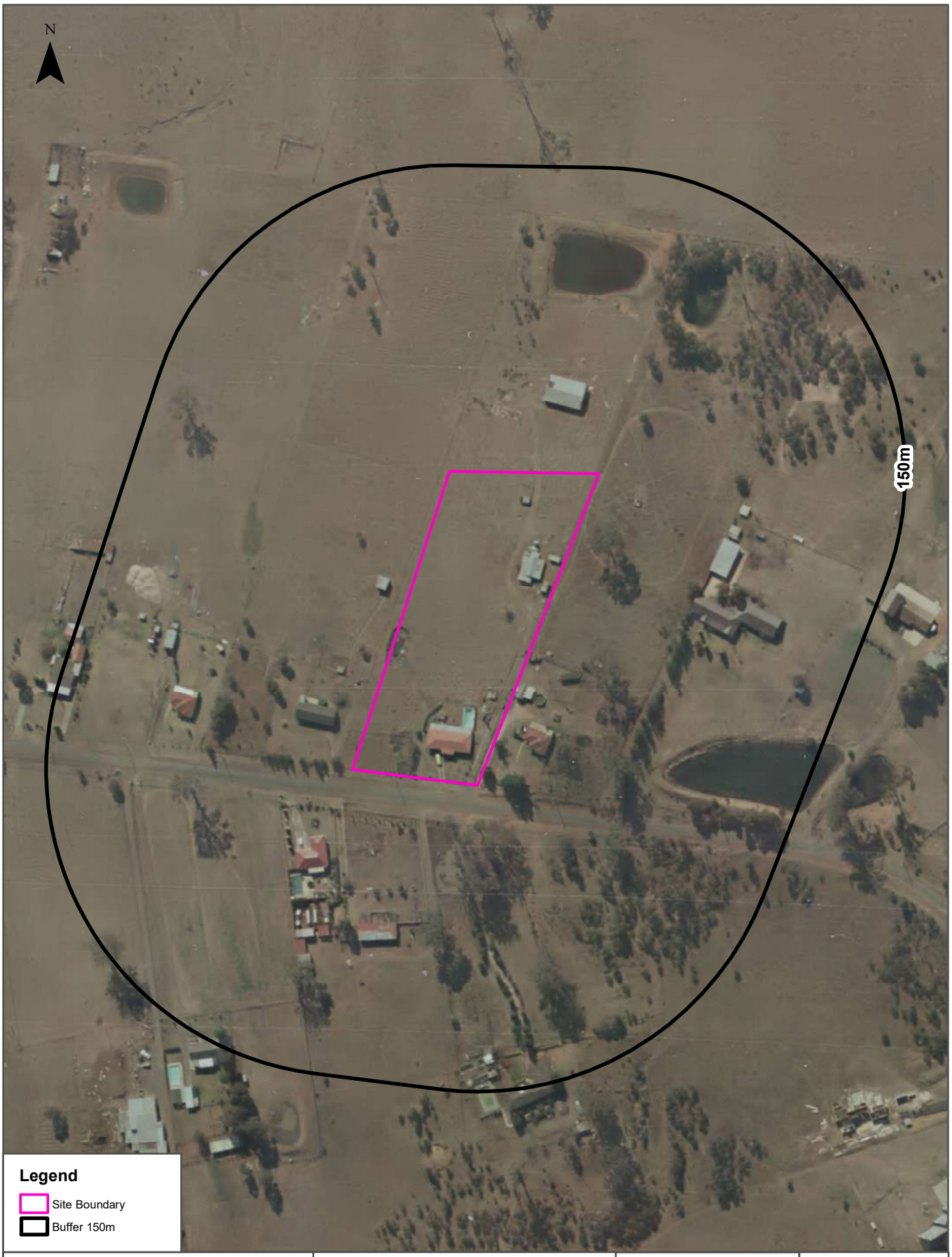
110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Aerial Imagery 1982

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Aerial Imagery 1970

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Data Sources: Aerial Imagery © Department of Finance, Services & Innovation

Coordinate System: GDA 1994 MGA Zone 56

Date: 27 March 2019

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Aerial Imagery 1965

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

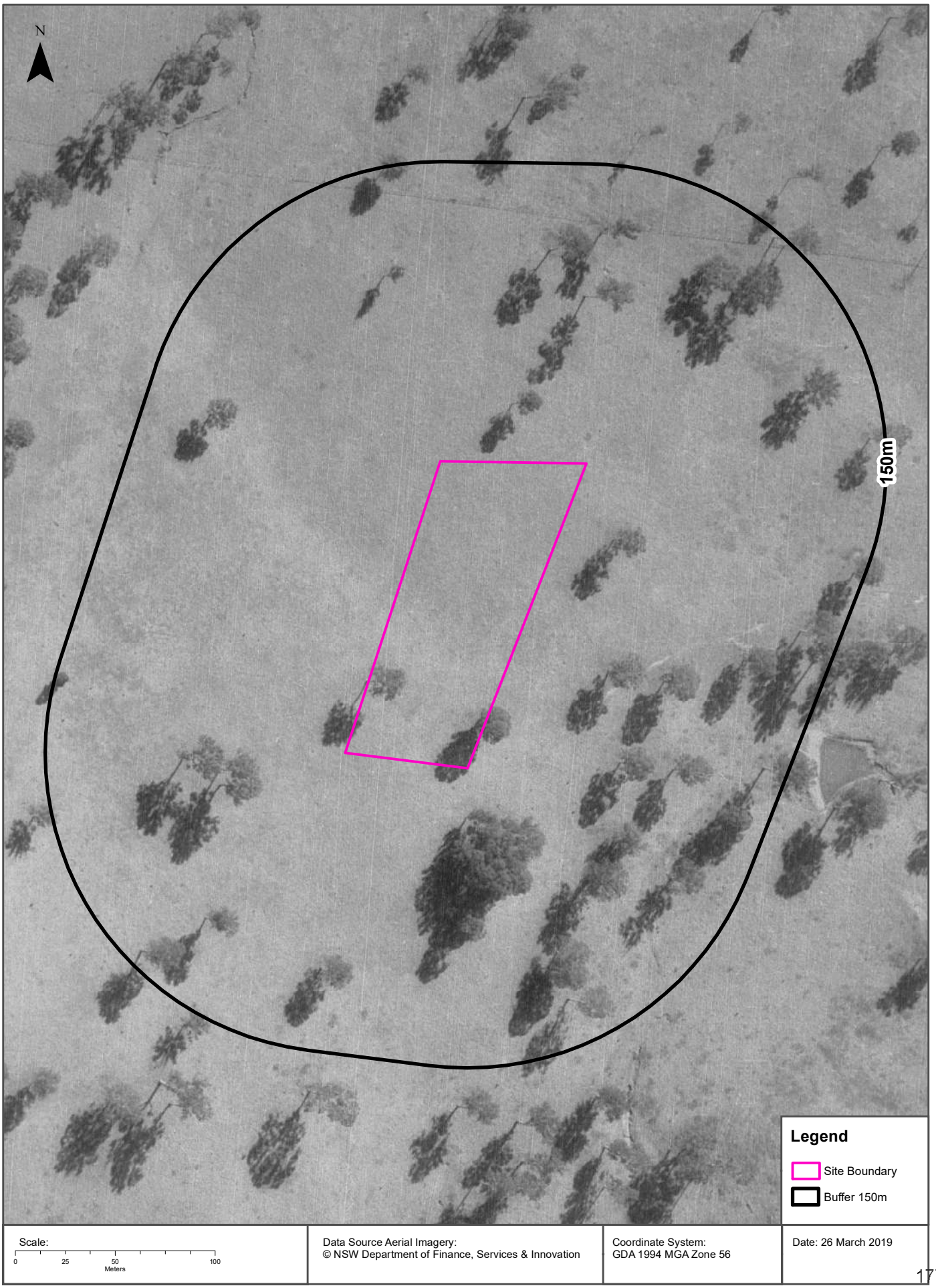
Aerial Imagery 1961

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Aerial Imagery 1955

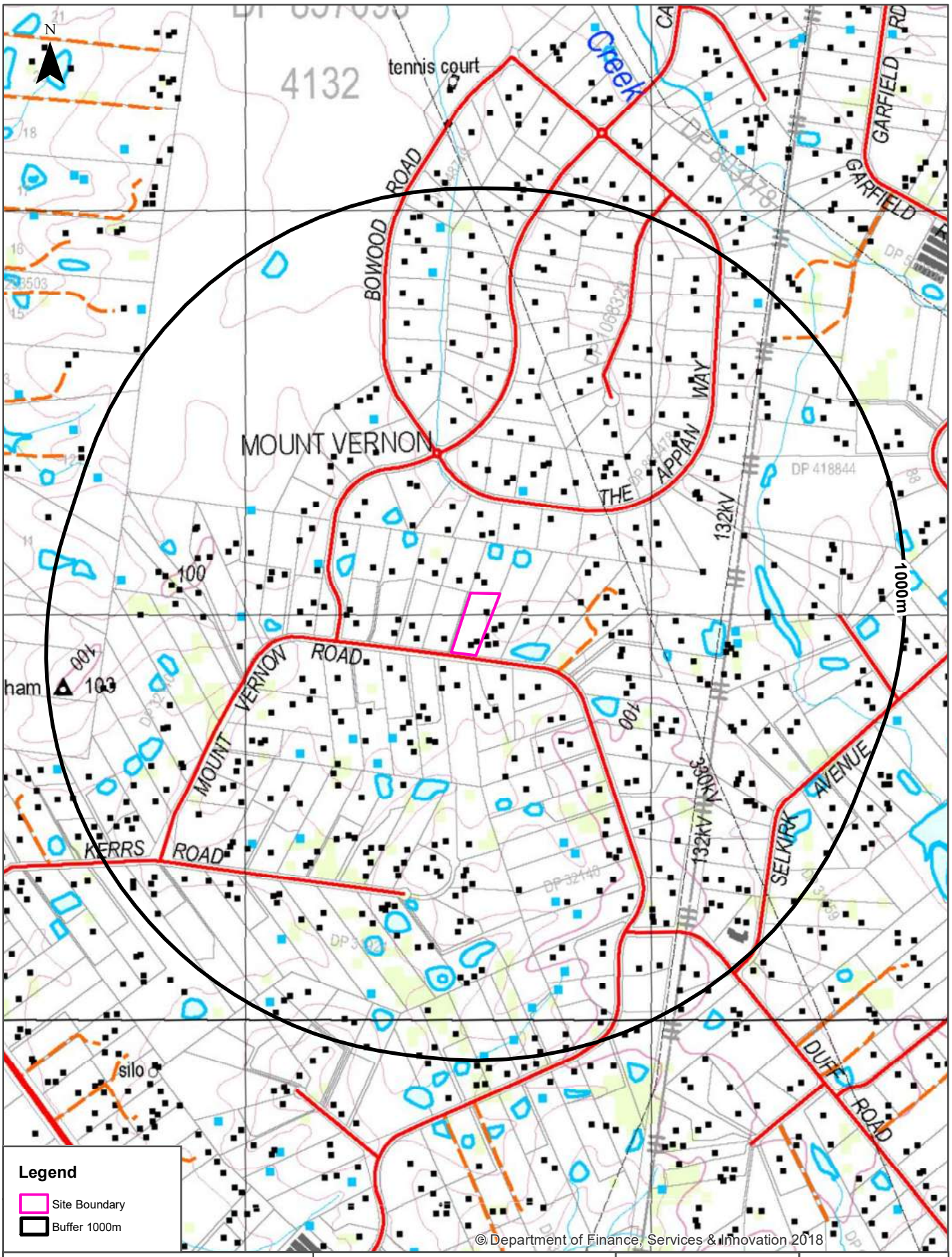
110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Topographic Map 2015

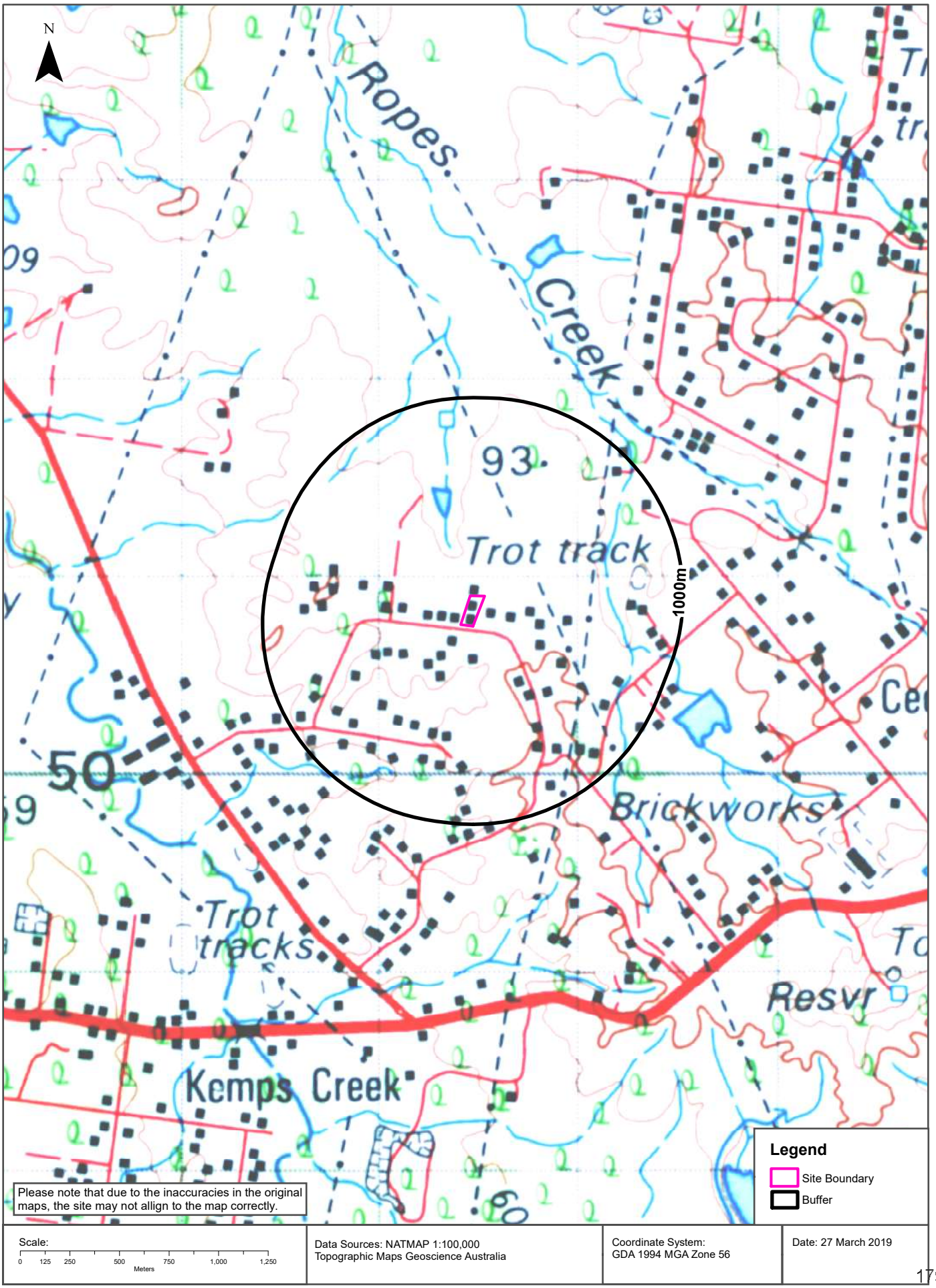
110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9129595
Version: 1, Version Date: 08/05/2020

Historical Map 1975

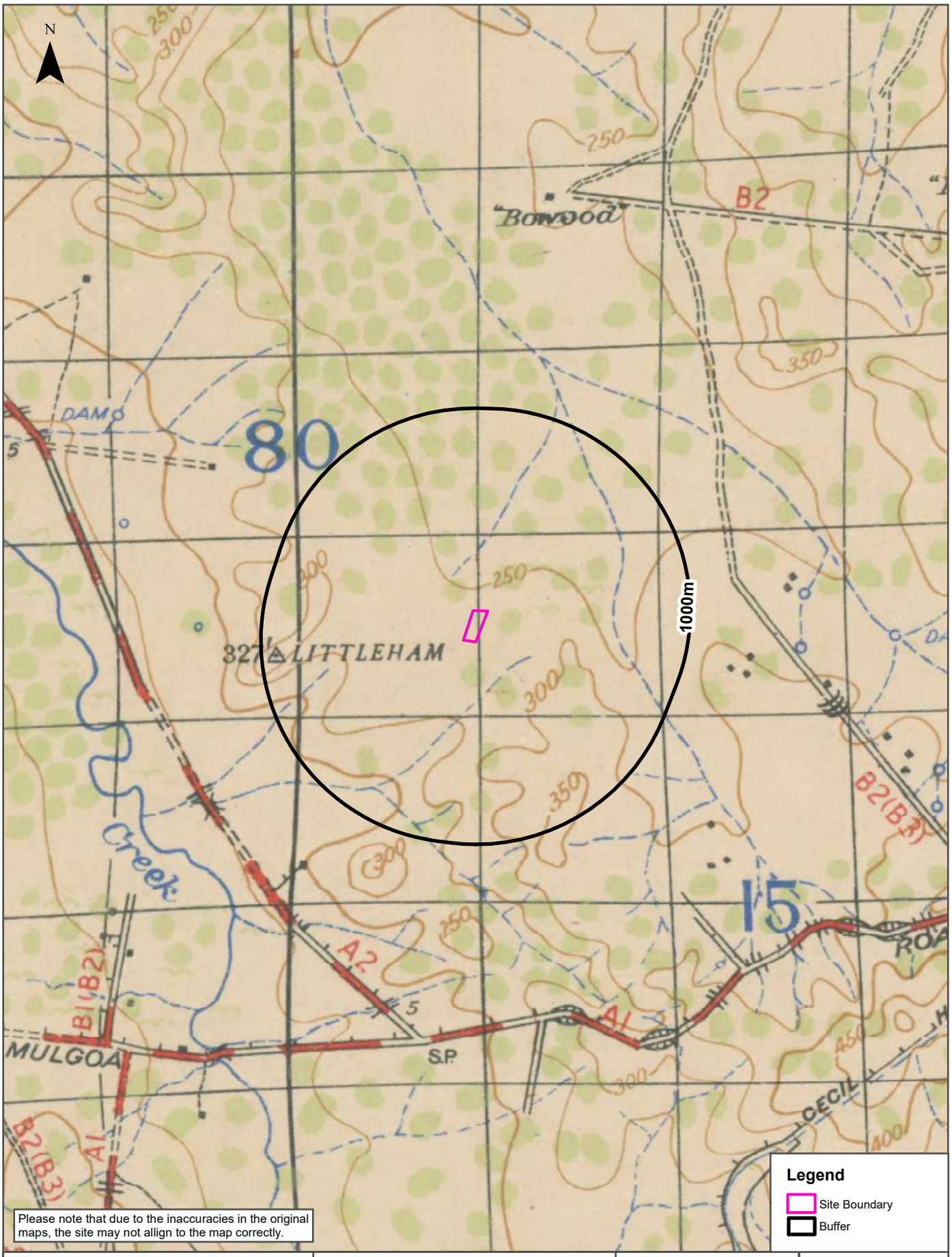
110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Historical Map c.1942

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Scale: 0 125 250 500 750 1,000 1,250 Meters

Data Sources: Australia 1:63360, Produced by Australian Section Imperial General Staff

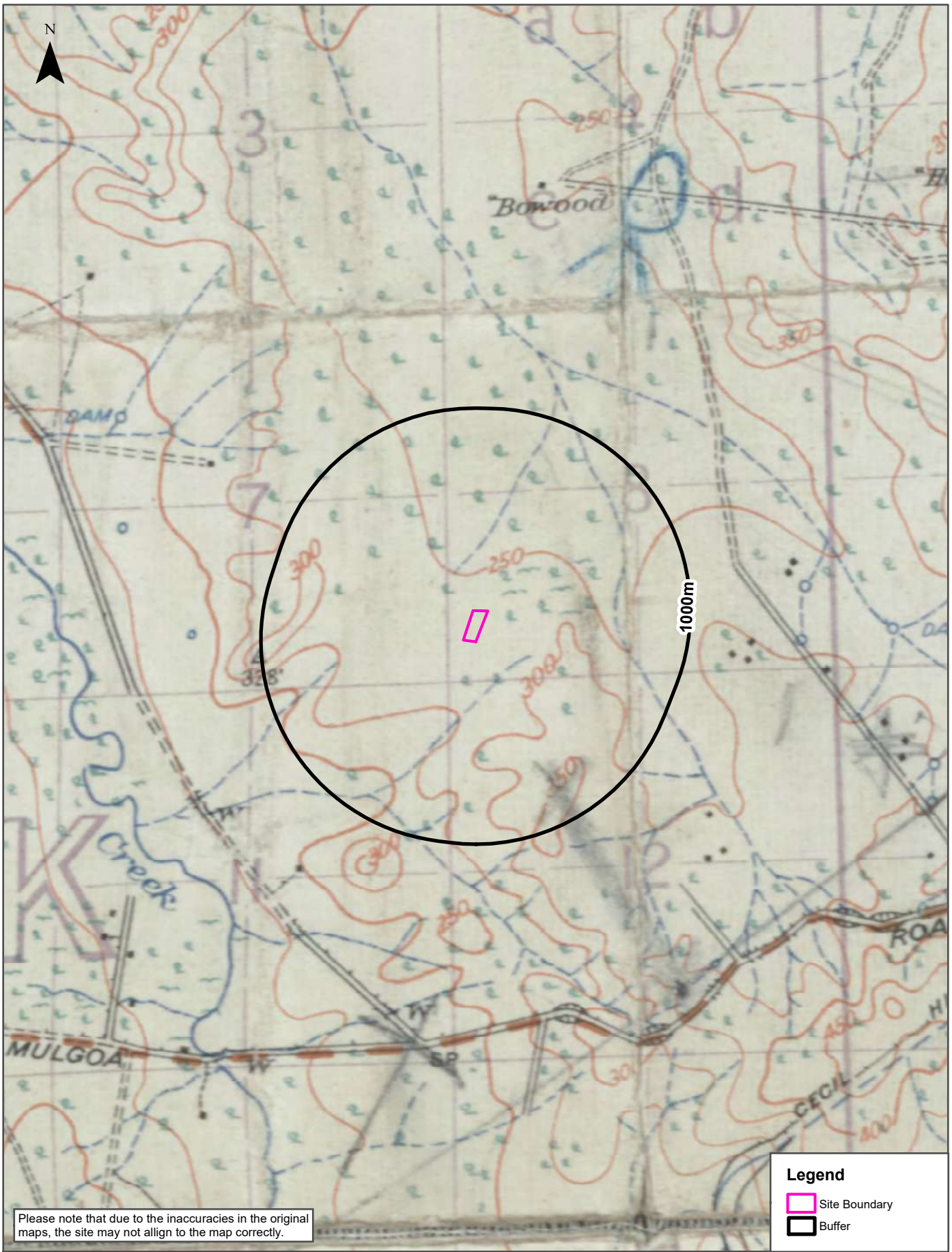
Coordinate System: GDA 1994 MGA Zone 56

Date: 27 March 2019

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Historical Map c.1929

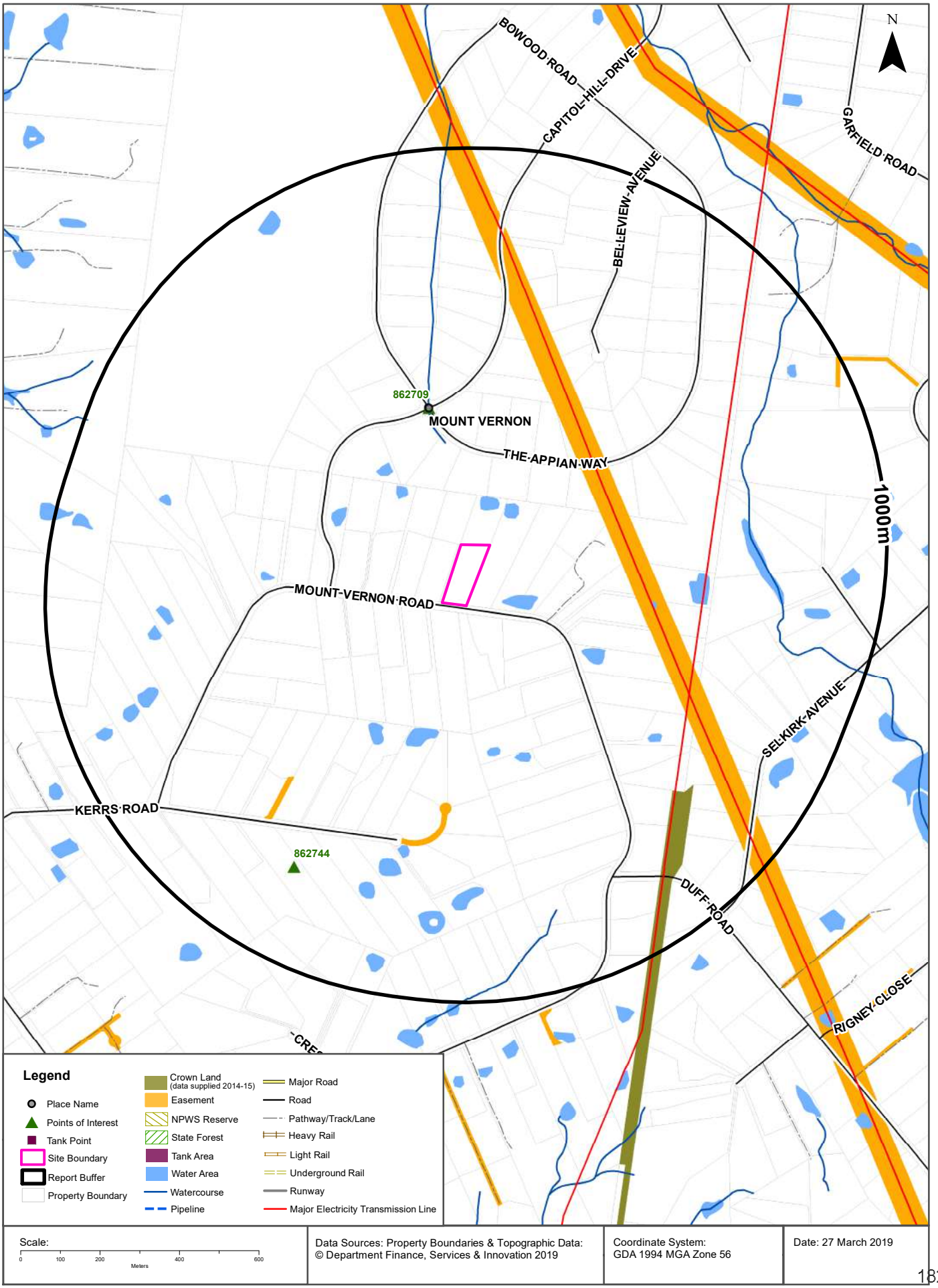
110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Topographic Features

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Topographic Features

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
862709	Suburb	MOUNT VERNON	353m	North
862744	Child Care Centre	DO RE MI PRE-SCHOOL	764m	South West

Topographic Data Source: © Land and Property Information (2015)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Topographic Features

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks (Points)

What are the Tank Points located within the dataset buffer?
Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks Data Source: © Land and Property Information (2015)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Major Easements

What Major Easements exist within the dataset buffer?
Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
120116055	Primary	Undefined		289m	North East
120110120	Primary	Undefined		501m	South
120110603	Primary	Undefined		577m	South West
120111578	Primary	Undefined		672m	North
120121083	Primary	Undefined		959m	North East

Easements Data Source: © Land and Property Information (2015)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Topographic Features

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

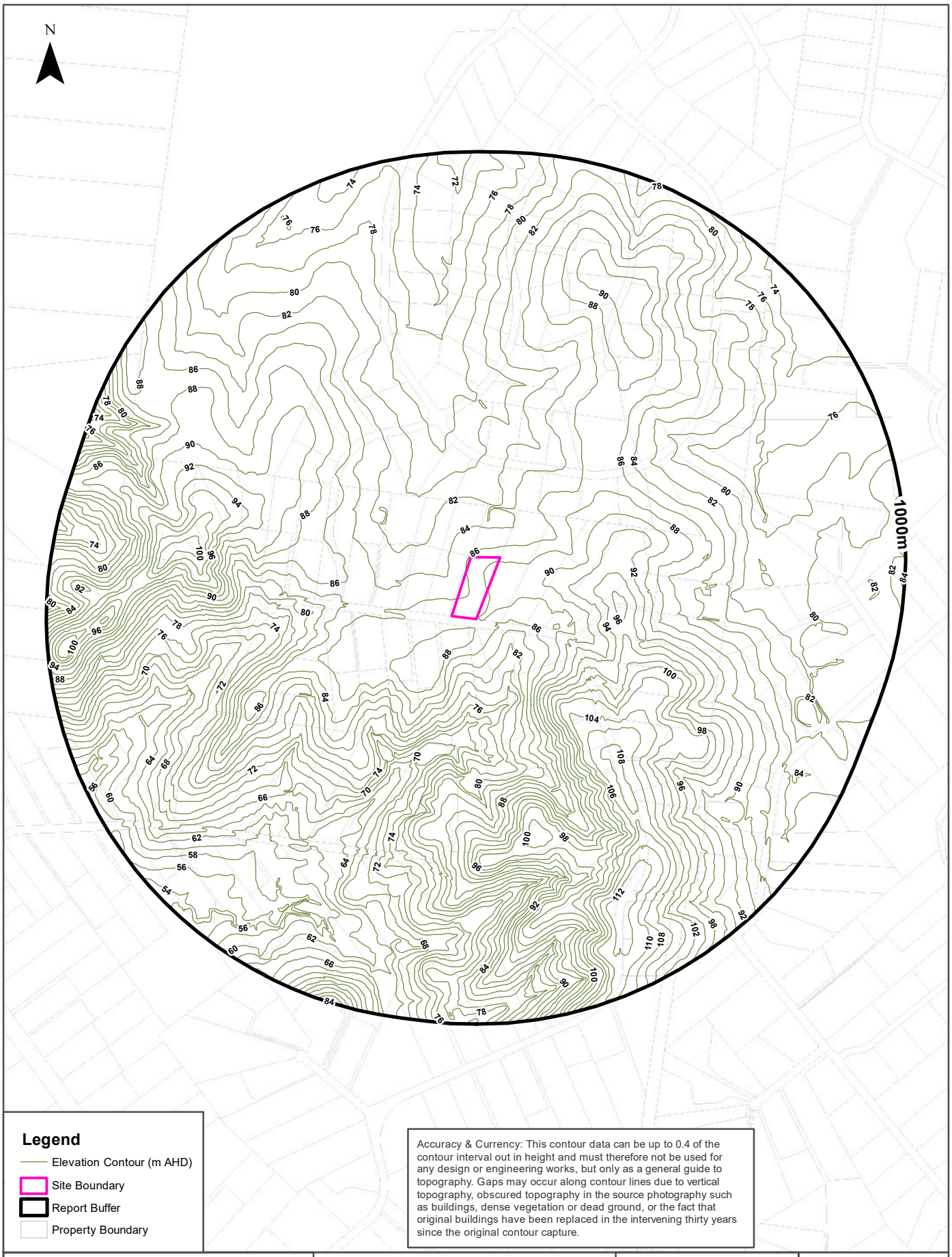
Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

NPWS Data Source: © NSW Department of Finance, Services & Innovation (2018)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Elevation Contours (m AHD)

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Hydrogeology & Groundwater

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Hydrogeology

Description of aquifers on-site:

Description
Porous, extensive aquifers of low to moderate productivity

Description of aquifers within the dataset buffer:

Description
Porous, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Botany Groundwater Management Zones

Groundwater management zones relating to the Botany Sand Beds aquifer within the dataset buffer:

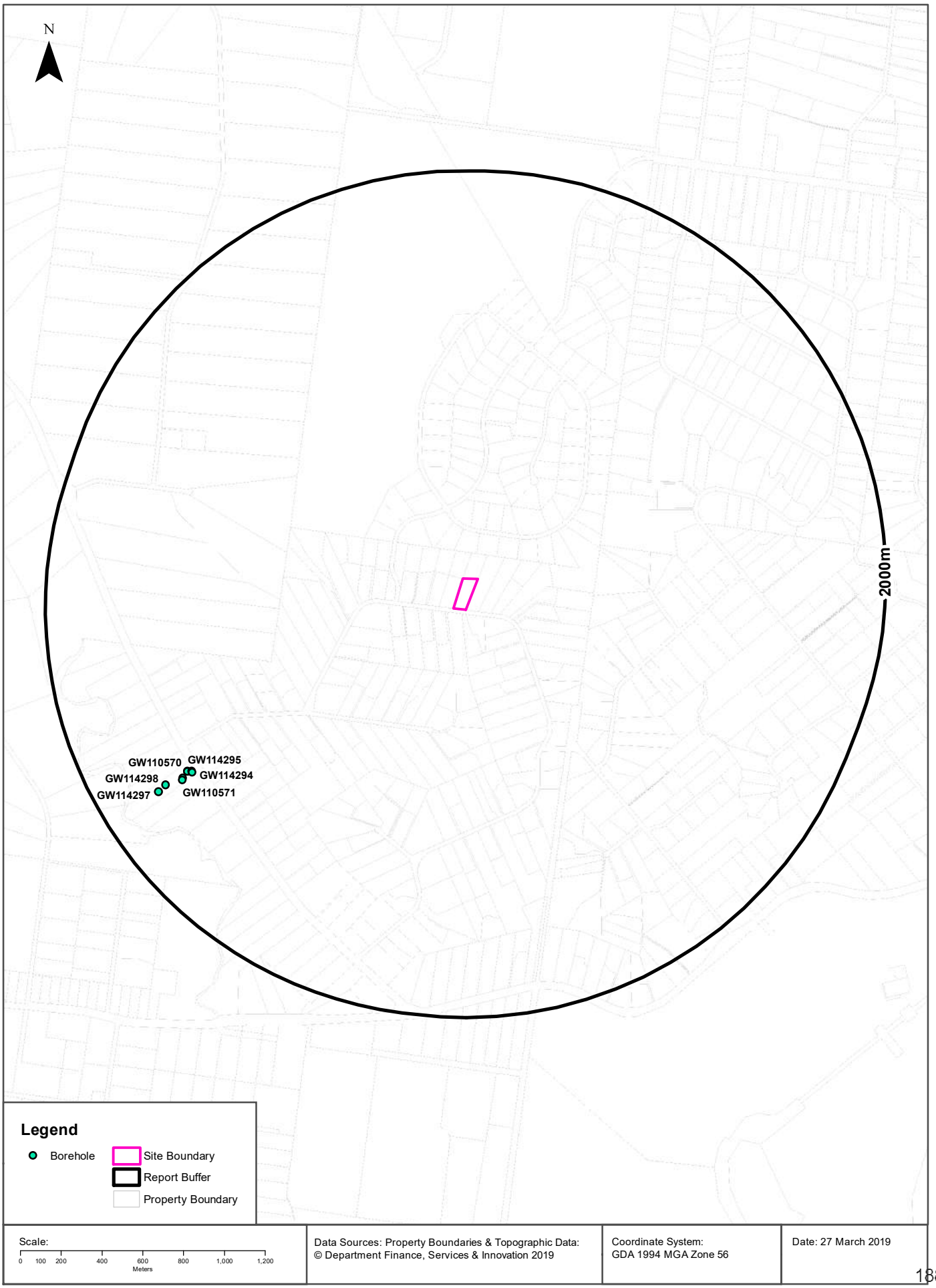
Management Zone No.	Restriction	Distance	Direction
N/A	No records in buffer		

Botany Groundwater Management Zones Data Source : NSW Department of Primary Industries

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Groundwater Boreholes

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Hydrogeology & Groundwater

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW114294	10BL604605	Bore	Private	Monitoring Bore	Monitoring Bore		28/04/2011	6.00	6.00					1511m	South West
GW110569	10BL603558	Bore	Private	Monitoring Bore	Monitoring Bore		25/08/2009	6.00	12.00		4.40			1511m	South West
GW114295	10BL604605	Bore	Private	Monitoring Bore	Monitoring Bore		28/04/2011	6.00	6.00					1529m	South West
GW110570	10BL603558	Bore	Private	Monitoring Bore	Monitoring Bore		25/08/2009	12.00	6.00		4.40			1530m	South West
GW114296	10BL604605	Bore	Private	Monitoring Bore	Monitoring Bore		28/04/2011	6.00	6.00					1565m	South West
GW110571	10BL603558	Bore	Private	Monitoring Bore	Monitoring Bore		25/08/2009	12.00	6.00		4.40			1573m	South West
GW114298	10BL604605	Bore	Private	Monitoring Bore	Monitoring Bore		28/04/2011	7.00	7.00					1654m	South West
GW114297	10BL604605	Bore	Private	Monitoring Bore	Monitoring Bore		28/04/2011	8.00	8.00					1702m	South West

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Hydrogeology & Groundwater

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Driller's Logs

Drill log data relevant to the boreholes within the dataset buffer:

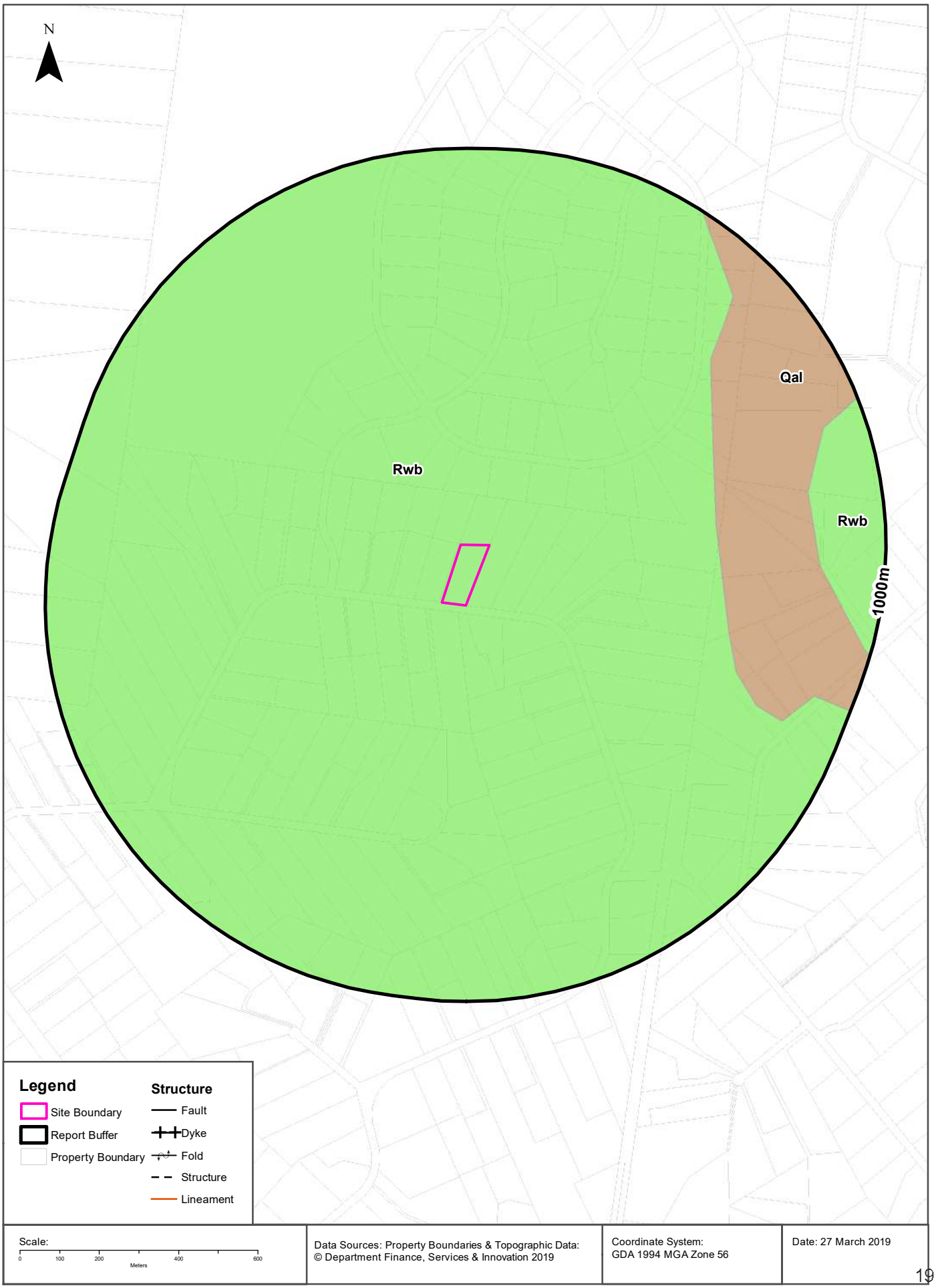
Groundwater No	Drillers Log	Distance	Direction
GW110569	0.00m-1.00m FILL, SILTY CLAY BROWN 1.00m-6.00m CLAY SILTY, BROWN	1511m	South West
GW110570	0.00m-1.00m FILL,SILTY CLAY,BROWN 1.00m-6.00m CLAY SILTY,BROWN	1530m	South West
GW110571	0.00m-1.00m FILL,SILTY CLAY,BROWN 1.00m-6.00m CLAY SILTY,BROWN	1573m	South West

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Geology 1:100,000

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Geology

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Rwb7	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Qal	Fine-grained sand, silt and clay				Quaternary		Penrith	1:100,000
Rwb	Shale, carbonaceous claystone,claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff	Bringelly Shale	Wianamatta Group (undifferentiated)		Middle Triassic		Penrith	1:100,000

Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:100,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Dataset
No features				1:100,000

Geological Data Source : NSW Department of Industry, Resources & Energy
© State of New South Wales through the NSW Department of Industry, Resources & Energy

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Naturally Occurring Asbestos Potential

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

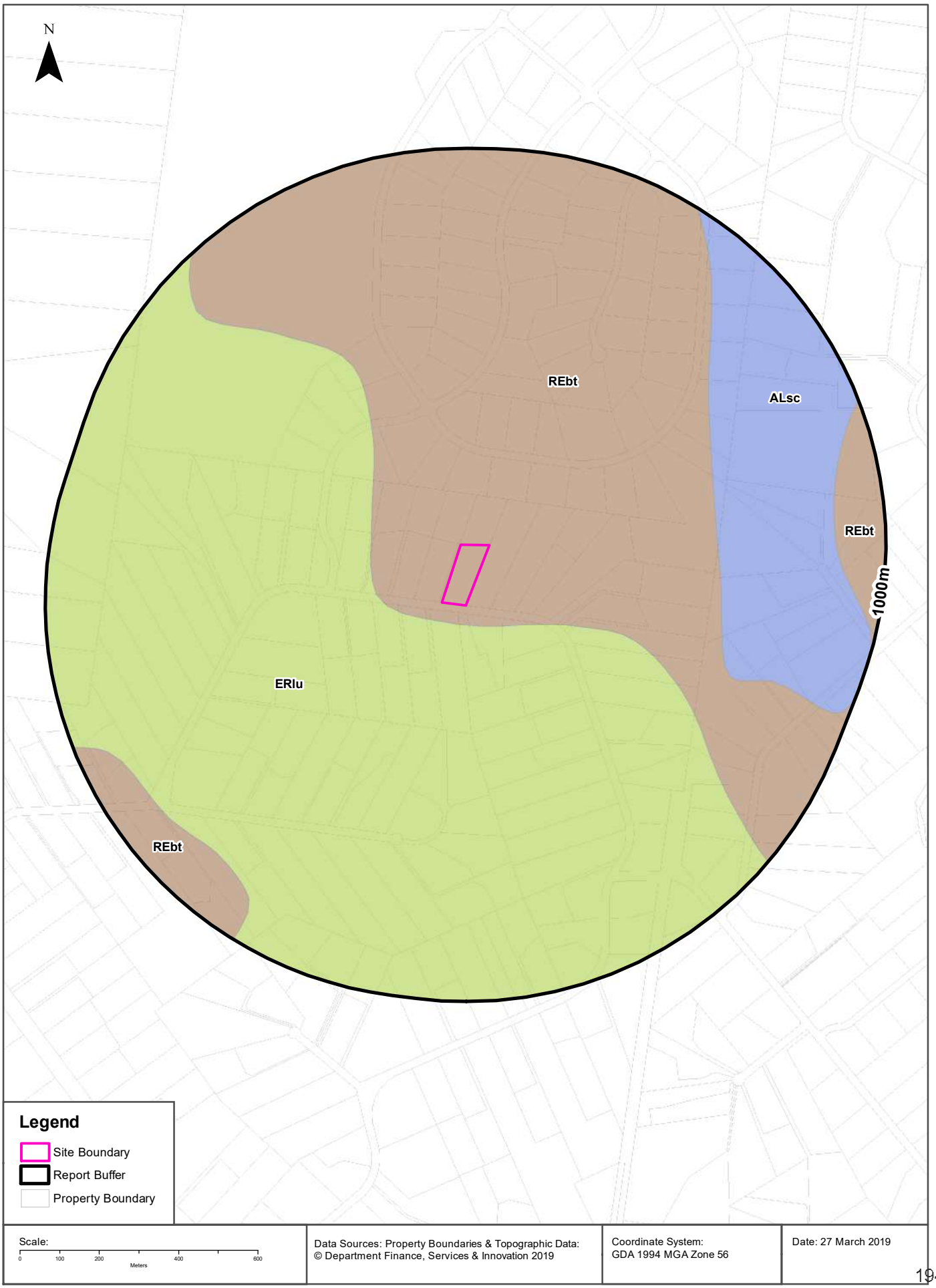
Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Mining Subsidence District Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Soil Landscapes

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Soils

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Soil Landscapes

What are the onsite Soil Landscapes?

Soil Code	Name	Group	Process	Map Sheet	Scale
REbt	BLACKTOWN		RESIDUAL	Penrith	1:100,000

What are the Soil Landscapes within the dataset buffer?

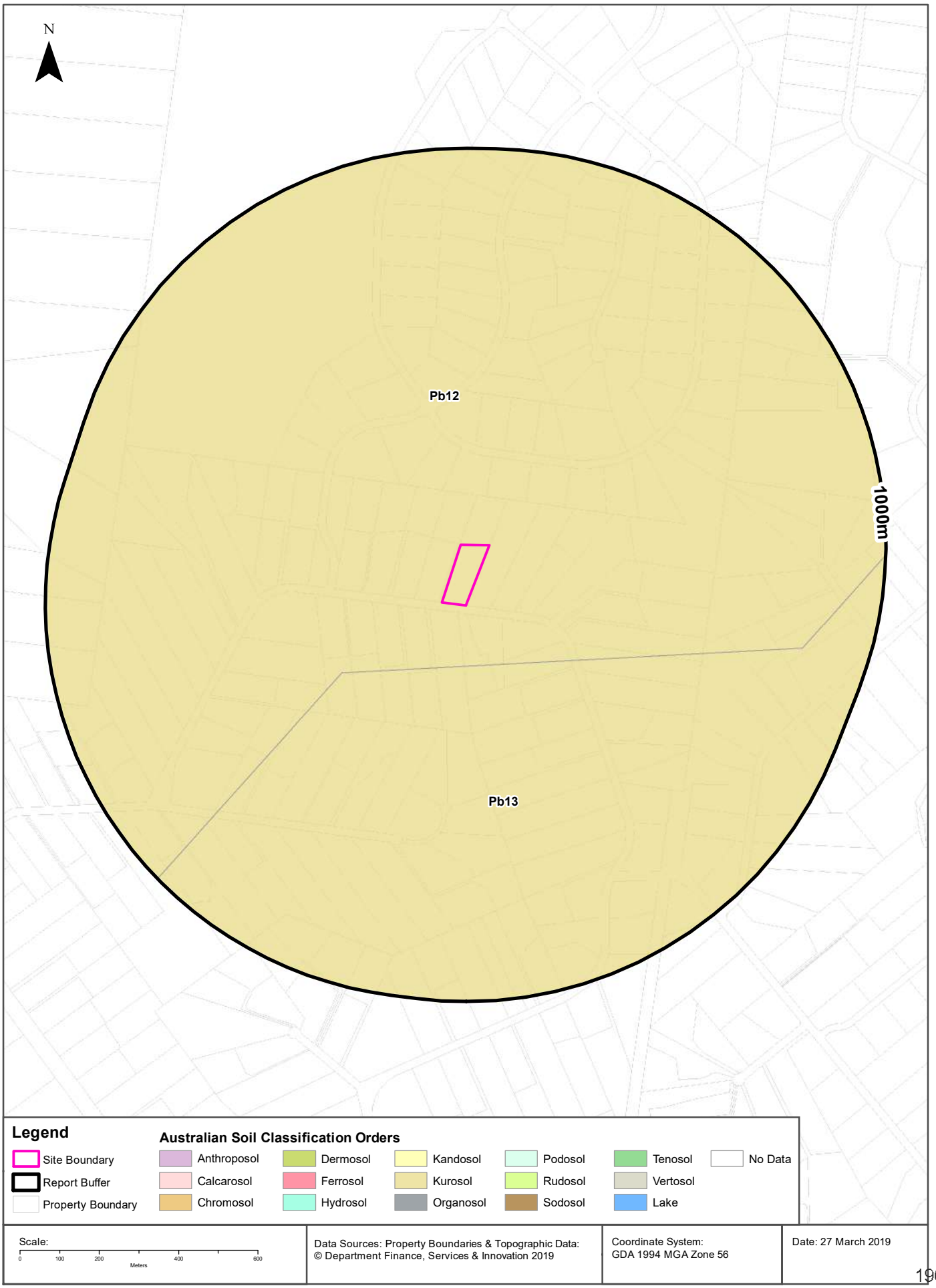
Soil Code	Name	Group	Process	Map Sheet	Scale
ALsc	SOUTH CREEK		ALLUVIAL	Penrith	1:100,000
ERlu	LUDDENHAM		EROSIONAL	Penrith	1:100,000
REbt	BLACKTOWN		RESIDUAL	Penrith	1:100,000

Soils Landscapes Data Source : NSW Office of Environment and Heritage
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Atlas of Australian Soils

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Soils

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance
Pb12	Kurosol	Gently rolling to rounded hilly country with some steep slopes and broad valleys: chief soils are hard acidic red soils (Dr2.21) with hard neutral and acidic yellow mottled soils (Dy3.42 and Dy3.41) on lower slopes and in valleys. Associated are small areas of various soils including (Gn3.54) on some ridges, (Dr3.31) on some slopes; (Dr2.23) in saddles and some mid-slope positions, and some low- lying swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Small areas of other soils such as (Db1.2) are likely throughout.	0m
Pb13	Kurosol	Ridge and valley country of gently undulating ridge tops and steep side slopes often with slumping, also rounded hilly to steep hilly areas and relatively narrow valleys: chief soils are hard acidic red soils (Dr2.21) with hard acidic yellow mottled soils (Dy3.41); in places some ironstone gravels occur in both these soils. Associated are hard neutral and alkaline red soils (Dr2.22 and Dr2.23) in saddles and some mid-slope positions; (Dy3.42 and Dy3.43) soils, usually in depressions; and small areas of undescribed soils in wet soaks and valley areas. Small areas of other soils are likely throughout.	154m

Atlas of Australian Soils Data Source: CSIRO
Creative Commons 4.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/4.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Acid Sulfate Soils

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI Name
N/A		

If the on-site Soil Class is 5, what other soil classes exist within 500m?

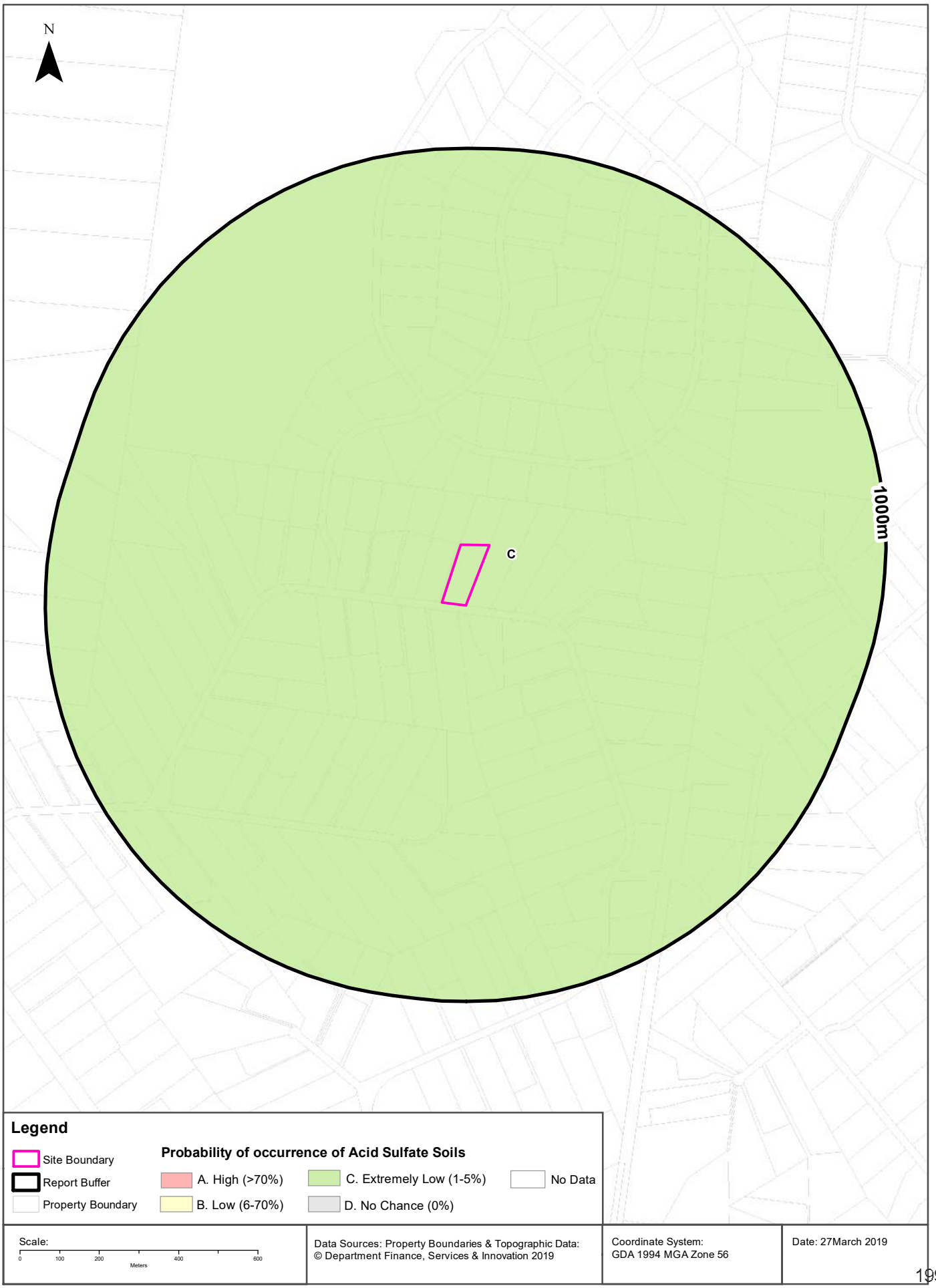
Soil Class	Description	EPI Name	Distance	Direction
N/A				

Acid Sulfate Data Source Accessed 23/10/2018: NSW Crown Copyright - Planning and Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Atlas of Australian Acid Sulfate Soils

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Acid Sulfate Soils

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

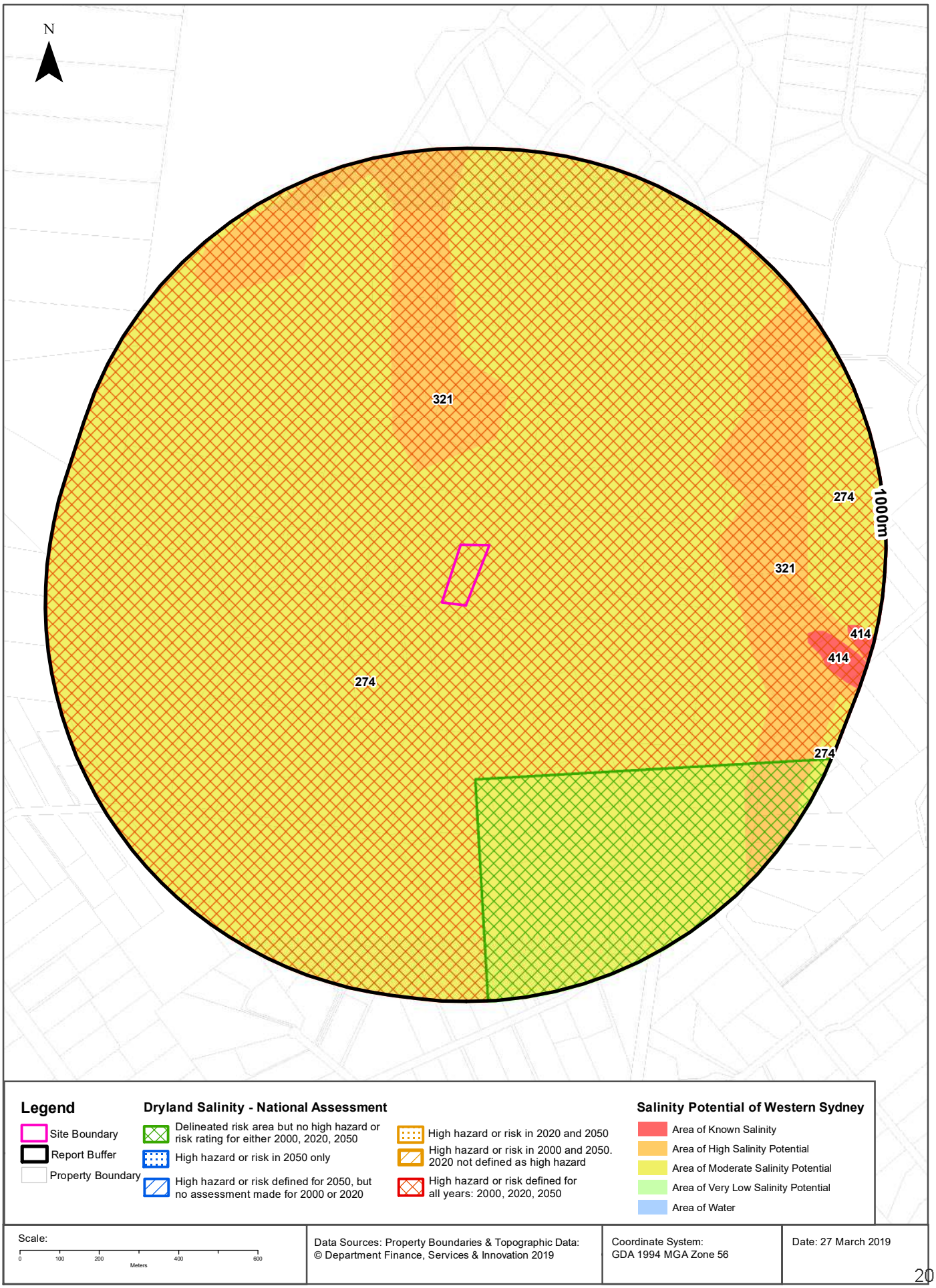
Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Dryland Salinity

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Dryland Salinity

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

Yes

Is there Dryland Salinity - National Assessment data within the dataset buffer?

Yes

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
High hazard or risk	High hazard or risk	High hazard or risk	0m	Onsite
Delineated risk area but no high hazard or risk rating	Delineated risk area but no high hazard or risk rating	Delineated risk area but no high hazard or risk rating	439m	South East

Dryland Salinity Data Source : National Land and Water Resources Audit
The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.
In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

Feature Id	Classification	Description	Distance	Direction
274	MODERATE	Area of Moderate Salinity Potential	0m	Onsite
321	HIGH	Area of High Salinity Potential	213m	North
414	SALT	Area of Known Salinity	833m	East

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Mining Subsidence Districts

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

State Environmental Planning Policy

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

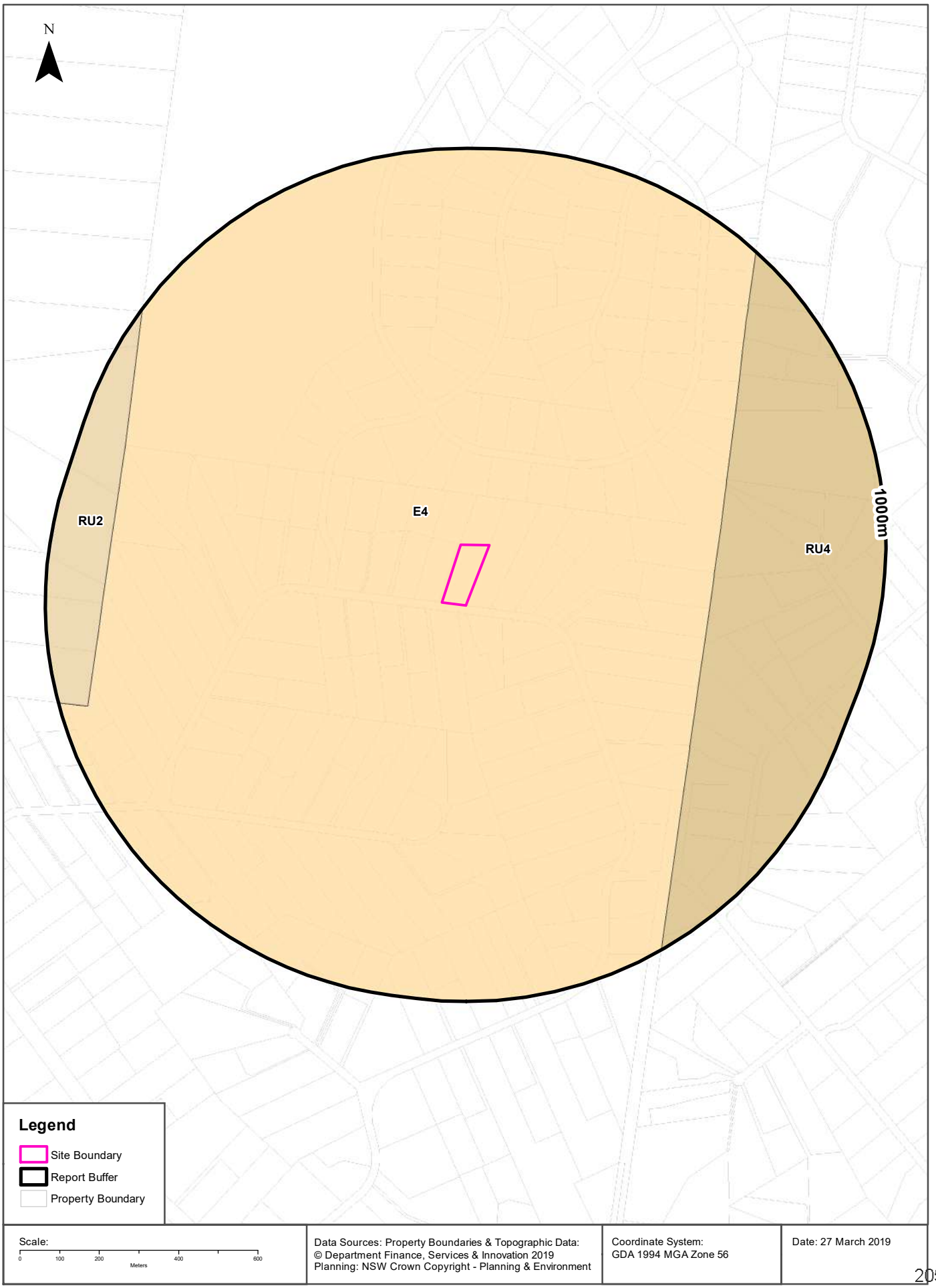
Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No Records in Buffer							

State Environment Planning Policy Data Source: NSW Crown Copyright - Planning & Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

EPI Planning Zones

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Environmental Planning Instrument

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
E4	Environmental Living		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	22/06/2018		0m	Onsite
RU4	Primary Production Small Lots		Fairfield Local Environmental Plan 2013	17/05/2013	31/05/2013	26/10/2018		571m	South East
RU2	Rural Landscape		Penrith Local Environmental Plan 2010	22/09/2010	22/09/2010	22/06/2018		848m	North West

Environmental Planning Instrument Data Source: NSW Crown Copyright - Planning & Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Heritage

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
Creative Commons 3.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/3.0/au/deed.en

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
Creative Commons 3.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/3.0/au/deed.en

State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

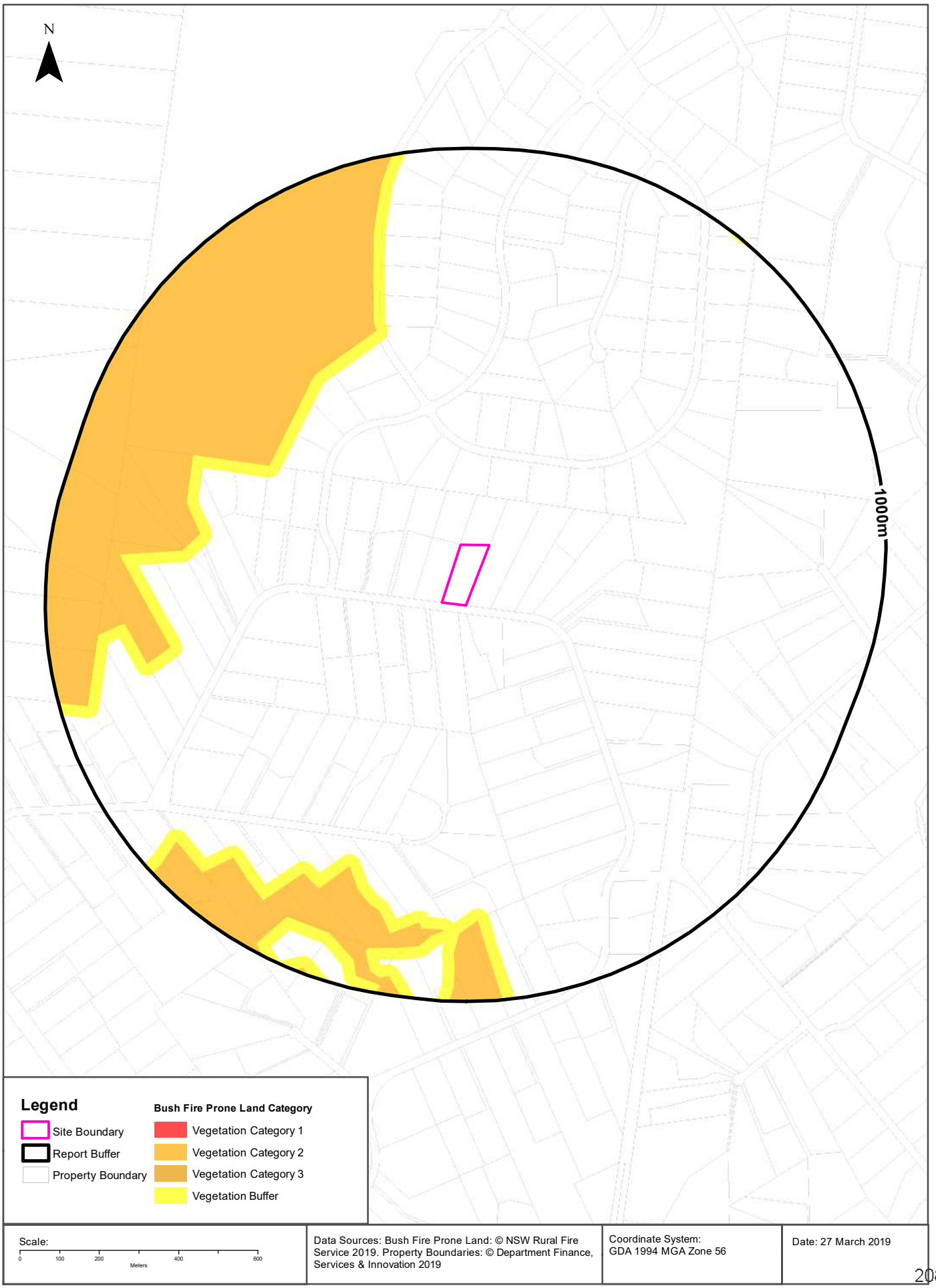
Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
N/A	No records in buffer								

Heritage Data Source: NSW Crown Copyright - Planning & Environment
Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Natural Hazards - Bush Fire Prone Land

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Natural Hazards

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

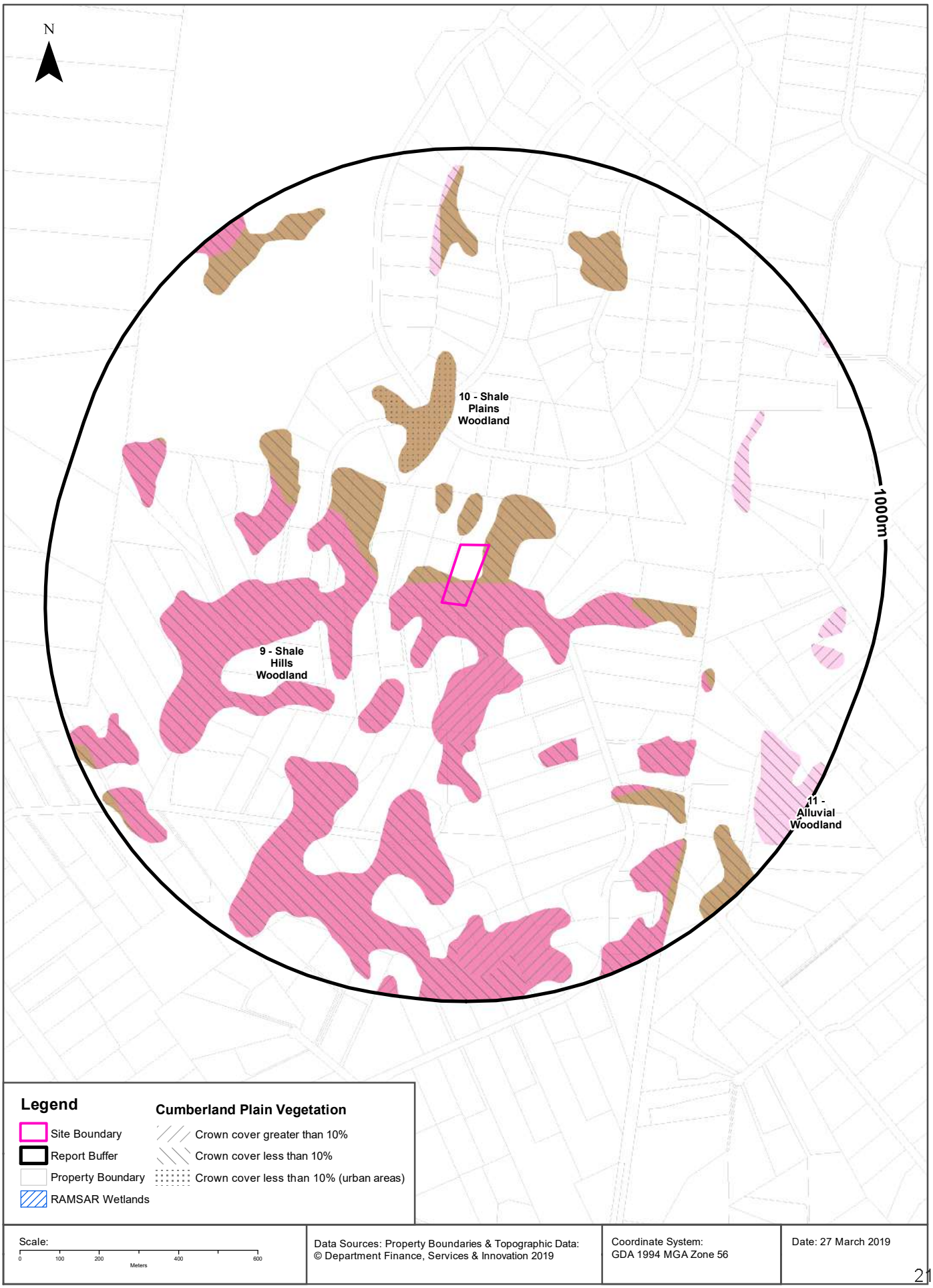
Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	491m	South West
Vegetation Category 2	521m	West

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Ecological Constraints - Remnant Vegetation of the Cumberland Plain

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Ecological Constraints

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Remnant Vegetation of the Cumberland Plain

What remnant vegetation of the Cumberland Plain exists within the dataset buffer?

Description	Crown Cover	Distance	Direction
10 - Shale Plains Woodland	Crown cover less than 10%	0m	Onsite
9 - Shale Hills Woodland	Crown cover less than 10%	0m	Onsite
9 - Shale Hills Woodland	Crown cover greater than 10%	135m	South
10 - Shale Plains Woodland	Crown cover less than 10% (urban areas)	222m	North
11 - Alluvial Woodland	Crown cover less than 10%	625m	East
11 - Alluvial Woodland	Crown cover greater than 10%	850m	East

Remnant Vegetation of the Cumberland Plain : NSW Office of Environment and Heritage
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

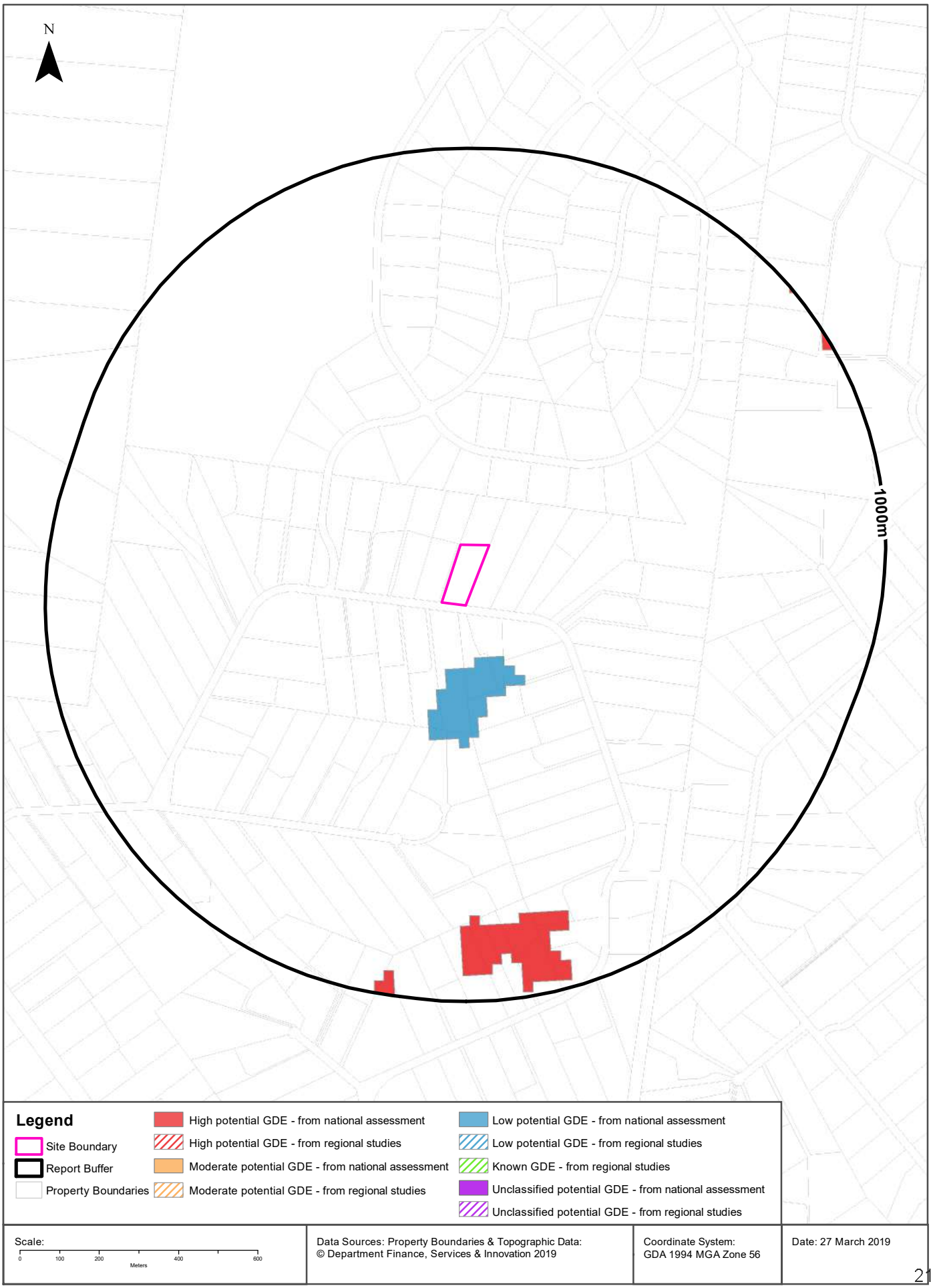
Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Environment

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Ecological Constraints

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Groundwater Dependent Ecosystems Atlas

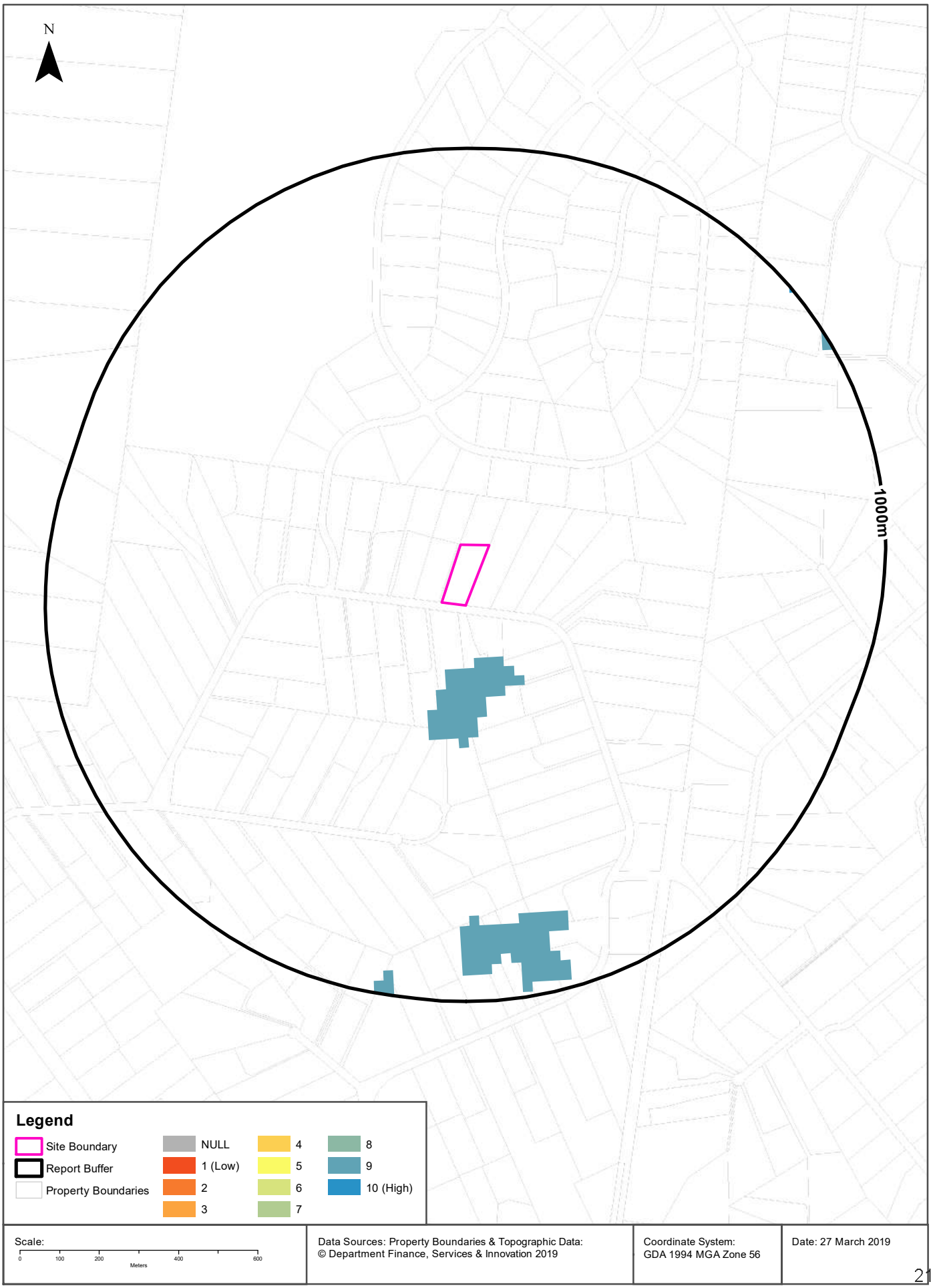
Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	Low potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	133m
Terrestrial	High potential GDE - from national assessment	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	782m

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

110-112 Mount Vernon Road, Mount Vernon, NSW 2178



Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Ecological Constraints

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	9	Undulating to low hilly country, mainly on shale.	Vegetation	Consolidated sedimentary	133m
Terrestrial	10	Undulating to low hilly country, mainly on shale.	Vegetation	Unconsolidated sedimentary	988m

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Ecological Constraints

110-112 Mount Vernon Road, Mount Vernon, NSW 2178

NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardea ibis	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Falco subniger	Black Falcon	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Lophochroa leadbeateri	Major Mitchell's Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Merops ornatus	Rainbow Bee-eater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Plegadis falcinellus	Glossy Ibis	Not Listed	Not Sensitive	Not Listed	CAMBA

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Gastropoda	Meridolum corneovirens	Cumberland Plain Land Snail	Endangered	Not Sensitive	Not Listed	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bentwing-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Mormopterus norfolkensis	Eastern Freetail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Acacia pubescens	Downy Wattle	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Argyrotegium nitidulum	Shining Cudweed	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Vulnerable	Category 3	Not Listed	
Plantae	Flora	Cynanchum elegans	White-flowered Wax Plant	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Dillwynia tenuifolia		Endangered Population, Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Dillwynia tenuifolia		Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Isotoma fluviatilis subsp. fluviatilis		Not Listed	Not Sensitive	Extinct	
Plantae	Flora	Macadamia integrifolia	Macadamia Nut	Not Listed	Not Sensitive	Vulnerable	
Plantae	Flora	Marsdenia viridiflora subsp. viridiflora	Native Pear	Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	Persoonia nutans	Nodding Geebung	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pimelea spicata	Spiked Rice-flower	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Pterostylis saxicola	Sydney Plains Greenhood	Endangered	Category 2	Endangered	
Plantae	Flora	Pultenaea parviflora		Endangered	Not Sensitive	Vulnerable	

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Pultenaea pedunculata	Matted Bush-pea	Endangered	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.
NSW BioNet: © State of NSW and Office of Environment and Heritage
Data obtained 27/03/2019

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

USE OF REPORT - APPLICABLE TERMS

The following terms apply to any person (End User) who is given the Report by the person who purchased the Report from Lotsearch Pty Ltd (ABN: 89 600 168 018) (Lotsearch) or who otherwise has access to the Report (Terms). The contract terms that apply between Lotsearch and the purchaser of the Report are specified in the order form pursuant to which the Report was ordered and the terms set out below are of no effect as between Lotsearch and the purchaser of the Report.

1. End User acknowledges and agrees that:
   (a) the Report is compiled from or using content (**Third Party Content**) which is comprised of:
      (i) content provided to Lotsearch by third party content suppliers with whom Lotsearch has contractual arrangements or content which is freely available or methodologies licensed to Lotsearch by third parties with whom Lotsearch has contractual arrangements (**Third Party Content Suppliers**); and
      (ii) content which is derived from content described in paragraph (i);
   (b) Neither Lotsearch nor Third Party Content Suppliers takes any responsibility for or give any warranty in relation to the accuracy or completeness of any Third Party Content included in the Report including any contaminated land assessment or other assessment included as part of a Report;
   (c) the Third Party Content Suppliers do not constitute an exhaustive set of all repositories or sources of information available in relation to the property which is the subject of the Report (**Property**) and accordingly neither Lotsearch nor Third Party Content Suppliers gives any warranty in relation to the accuracy or completeness of the Third Party Content incorporated into the report including any contaminated land assessment or other assessment included as part of a Report;
   (d) Reports are generated at a point in time (as specified by the date/time stamp appearing on the Report) and accordingly the Report is based on the information available at that point in time and Lotsearch is not obliged to undertake any additional reporting to take into consideration any information that may become available between the point in time specified by the date/time stamp and the date on which the Report was provided by Lotsearch to the purchaser of the Report;
   (e) Reports must be used or reproduced in their entirety and End User must not reproduce or make available to other persons only parts of the Report;
   (f) Lotsearch has not undertaken any physical inspection of the property;
   (g) neither Lotsearch nor Third Party Content Suppliers warrants that all land uses or features whether past or current are identified in the Report;
   (h) the Report does not include any information relating to the actual state or condition of the Property;
   (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
   (j) the Report should not be relied upon for determining saleability or value or making any other decisions in relation to the Property and in particular should not be taken to be a rating or assessment of the desirability or market value of the property or its features; and
   (k) the End User should undertake its own inspections of the Land or Property to satisfy itself that there are no defects or failures
2. The End User may not make the Report or any copies or extracts of the report or any part of it available to any other person. If End User wishes to provide the Report to any other person or make extracts or copies of the Report, it must contact the purchaser of the Report before doing so to ensure the proposed use is consistent with the contract terms between Lotsearch and the purchaser.
3. Neither Lotsearch (nor any of its officers, employees or agents) nor any of its Third Party Content Suppliers will have any liability to End User or any person to whom End User provides the Report and End User must not represent that Lotsearch or any of its Third Party Content Suppliers accepts liability to any such person or make any other representation to any such person on behalf of Lotsearch or any Third Party Content Supplier.
4. The End User hereby to the maximum extent permitted by law:
   (a) acknowledges that the Lotsearch (nor any of its officers, employees or agents), nor any of its Third Party Content Supplier have any liability to it under or in connection with the

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Report or these Terms;

(b) waives any right it may have to claim against Third Party Content Supplier in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms; and

(c) releases each Third Party Content Supplier from any claim it may have otherwise had in connection with the Report, or the negotiation of, entry into, performance of, or termination of these Terms.

5. The End User acknowledges that any Third Party Supplier shall be entitled to plead the benefits conferred on it under clause 4, despite not being a party to these terms.
6. End User must not remove any copyright notices, trade marks, digital rights management information, other embedded information, disclaimers or limitations from the Report or authorise any person to do so.
7. End User acknowledges and agrees that Lotsearch and Third Party Content Suppliers retain ownership of all copyright, patent, design right (registered or unregistered), trade marks (registered or unregistered), database right or other data right, moral right or know how or any other intellectual property right in any Report or any other item, information or data included in or provided as part of a Report.
8. To the extent permitted by law and subject to paragraph 9, all implied terms, representations and warranties whether statutory or otherwise relating to the subject matter of these Terms other than as expressly set out in these Terms are excluded.
9. Subject to paragraph 6, Lotsearch excludes liability to End User for loss or damage of any kind, however caused, due to Lotsearch's negligence, breach of contract, breach of any law, in equity, under indemnities or otherwise, arising out of all acts, omissions and events whenever occurring.
10. Lotsearch acknowledges that if, under applicable State, Territory or Commonwealth law, End User is a consumer certain rights may be conferred on End User which cannot be excluded, restricted or modified. If so, and if that law applies to Lotsearch, then, Lotsearch's liability is limited to the greater of an amount equal to the cost of resupplying the Report and the maximum extent permitted under applicable laws.
11. Subject to paragraph 9, neither Lotsearch nor the End User is liable to the other for:

    (a) any indirect, incidental, consequential, special or exemplary damages arising out of or in relation to the Report or these Terms; or

    (b) any loss of profit, loss of revenue, loss of interest, loss of data, loss of goodwill or loss of business opportunities, business interruption arising directly or indirectly out of or in relation to the Report or these Terms,

    irrespective of how that liability arises including in contract or tort, liability under indemnity or for any other common law, equitable or statutory cause of action or otherwise.
12. These Terms are subject to New South Wales law.

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

APPENDIX B: SAMPLING PLAN

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

LEGEND:
Site Boundary
Other Fences
Landform Element
Watercourses, Dams
Overland Flow Path
Surface Spray Sprinkler
Irrigation Pipework
Soil Borehole
Photo Location
Building Area
Land App. Area
Paved Area

envirotech
Environmental and Engineering Consultancy Services

A: Unit 1, 23 Rowood Road, Prospect NSW 2148
P: PO Box 3086, EAST BLAXLAND NSW 2774
E: info@envirotech.com.au
F: (02) 8834 0760
T: 1300 888 324 | (02) 9896 1568

Wastewater | Contamination | Geotechnical
Stormwater | Ecology | Occupational Hygiene
Bushfire | Acoustic & Noise

TITLE: 110-112 Mount Vernon Road Sampling Map		SHEET SIZE: A4	SCALE: NTS
CLIENT: Graham Mann	PROJECT: 110-112 Mount Vernon Road, Mount Vernon NSW (Penrith LGA)	SHEET: 1/1	DATE: 26/03/2019
		PROJECT REF / DRAWING NUMBER: DWG-19-7579-A	

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

APPENDIX C: ALS REPORTS

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9429795
Version: 1, Version Date: 13/05/2020

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1909468**	Page	: 1 of 29
Client	: **ENVIROTECH PTY. LTD.**	Laboratory	: Environmental Division Sydney
Contact	: SIMON DOBERER	Contact	: Customer Services ES
Address	: Level1/1/23 Rowood Rd, Prospect 2148	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Mount Vermon Road, Mount Vermon	Date Samples Received	: 27-Mar-2019 14:35
Order number	: 757919	Date Analysis Commenced	: 29-Mar-2019
C-O-C number	: ----	Issue Date	: 04-Apr-2019 11:07
Sampler	: Jack Hinchliffe		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 27		
No. of samples analysed	: 27		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP1	TP2	TP3	TP4	TP5
			Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit	ES1909468-001	ES1909468-002	ES1909468-003	ES1909468-004	ES1909468-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	20.8	15.6	19.9	22.9	13.4
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	<5	9	7	5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	23	18	24	21	19
Copper	7440-50-8	5	mg/kg	20	27	24	22	29
Lead	7439-92-1	5	mg/kg	22	14	18	19	20
Nickel	7440-02-0	2	mg/kg	12	8	8	12	13
Zinc	7440-66-6	5	mg/kg	91	46	48	64	138
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP1	TP2	TP3	TP4	TP5
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-001	ES1909468-002	ES1909468-003	ES1909468-004	ES1909468-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP1	TP2	TP3	TP4	TP5
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-001	ES1909468-002	ES1909468-003	ES1909468-004	ES1909468-005
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP1	TP2	TP3	TP4	TP5
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-001	ES1909468-002	ES1909468-003	ES1909468-004	ES1909468-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**80.0**	**74.2**	**80.6**	**73.3**	**71.4**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**81.2**	**75.5**	**100**	**104**	**95.7**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**77.0**	**68.4**	**75.3**	**77.7**	**74.9**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**95.9**	**89.4**	**95.1**	**90.8**	**89.0**
2-Chlorophenol-D4	93951-73-6	0.5	%		**100**	**102**	**97.6**	**95.0**	**103**
2.4.6-Tribromophenol	118-79-6	0.5	%		**102**	**96.9**	**92.3**	**90.7**	**97.8**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**102**	**94.5**	**93.5**	**94.6**	**103**
Anthracene-d10	1719-06-8	0.5	%		**101**	**104**	**105**	**104**	**104**
4-Terphenyl-d14	1718-51-0	0.5	%		**106**	**109**	**111**	**109**	**108**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**119**	**114**	**115**	**123**	**124**
Toluene-D8	2037-26-5	0.2	%		**89.4**	**86.0**	**85.8**	**88.1**	**89.9**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP1	TP2	TP3	TP4	TP5
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-001	ES1909468-002	ES1909468-003	ES1909468-004	ES1909468-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**82.3**	**80.5**	**74.5**	**82.4**	**78.4**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP6	TP7	TP8	TP9	TP10
			Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit	ES1909468-006	ES1909468-007	ES1909468-008	ES1909468-009	ES1909468-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	19.6	16.9	19.0	17.6	24.0
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	10	8	6	8
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	18	26	17	16	19
Copper	7440-50-8	5	mg/kg	33	19	17	29	16
Lead	7439-92-1	5	mg/kg	19	20	16	12	28
Nickel	7440-02-0	2	mg/kg	16	12	12	13	11
Zinc	7440-66-6	5	mg/kg	124	44	136	86	145
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP6	TP7	TP8	TP9	TP10
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-006	ES1909468-007	ES1909468-008	ES1909468-009	ES1909468-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP6	TP7	TP8	TP9	TP10
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-006	ES1909468-007	ES1909468-008	ES1909468-009	ES1909468-010
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP6	TP7	TP8	TP9	TP10
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-006	ES1909468-007	ES1909468-008	ES1909468-009	ES1909468-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**76.1**	**77.2**	**81.4**	**79.0**	**74.0**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**99.3**	**107**	**108**	**95.8**	**87.2**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**84.9**	**74.6**	**77.7**	**81.0**	**75.4**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**92.6**	**92.9**	**88.0**	**90.1**	**89.9**
2-Chlorophenol-D4	93951-73-6	0.5	%		**96.7**	**95.9**	**92.7**	**93.2**	**91.1**
2.4.6-Tribromophenol	118-79-6	0.5	%		**85.0**	**103**	**97.4**	**100**	**100**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**102**	**102**	**96.0**	**102**	**102**
Anthracene-d10	1719-06-8	0.5	%		**104**	**103**	**108**	**104**	**103**
4-Terphenyl-d14	1718-51-0	0.5	%		**108**	**107**	**101**	**109**	**108**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**120**	**133**	**129**	**124**	**113**
Toluene-D8	2037-26-5	0.2	%		**86.0**	**91.0**	**95.0**	**88.3**	**81.1**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP6	TP7	TP8	TP9	TP10
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-006	ES1909468-007	ES1909468-008	ES1909468-009	ES1909468-010
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**79.1**	**87.9**	**89.0**	**80.2**	**79.8**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP11	TP12	TP13	TP14	TP15
			Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit	ES1909468-011	ES1909468-012	ES1909468-013	ES1909468-014	ES1909468-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	28.9	24.0	18.7	18.3	19.2
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	6	8	8	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	15	15	30	18	18
Copper	7440-50-8	5	mg/kg	16	17	22	19	18
Lead	7439-92-1	5	mg/kg	36	35	22	15	18
Nickel	7440-02-0	2	mg/kg	10	10	10	10	10
Zinc	7440-66-6	5	mg/kg	109	96	51	45	54
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11	TP12	TP13	TP14	TP15
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-011	ES1909468-012	ES1909468-013	ES1909468-014	ES1909468-015
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11	TP12	TP13	TP14	TP15
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-011	ES1909468-012	ES1909468-013	ES1909468-014	ES1909468-015
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11	TP12	TP13	TP14	TP15
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-011	ES1909468-012	ES1909468-013	ES1909468-014	ES1909468-015
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**74.8**	**77.9**	**71.4**	**78.6**	**72.4**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**87.9**	**85.6**	**88.3**	**96.8**	**82.5**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**66.2**	**77.7**	**92.2**	**77.3**	**66.0**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**89.2**	**90.0**	**86.0**	**91.0**	**86.6**
2-Chlorophenol-D4	93951-73-6	0.5	%		**92.3**	**93.3**	**98.5**	**93.7**	**88.8**
2.4.6-Tribromophenol	118-79-6	0.5	%		**96.8**	**98.4**	**95.0**	**99.5**	**92.4**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**101**	**95.2**	**95.6**	**96.2**	**92.5**
Anthracene-d10	1719-06-8	0.5	%		**101**	**104**	**105**	**107**	**104**
4-Terphenyl-d14	1718-51-0	0.5	%		**106**	**110**	**111**	**98.6**	**110**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**118**	**123**	**113**	**124**	**121**
Toluene-D8	2037-26-5	0.2	%		**85.0**	**95.5**	**81.3**	**81.8**	**86.1**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP11	TP12	TP13	TP14	TP15
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-011	ES1909468-012	ES1909468-013	ES1909468-014	ES1909468-015
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**83.4**	**89.0**	**79.8**	**75.3**	**79.1**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP16	TP17	TP18	TP19	TP20
			Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit	ES1909468-016	ES1909468-017	ES1909468-018	ES1909468-019	ES1909468-020
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	19.6	11.6	15.8	13.8	17.2
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	19	<5	6	6	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	21	9	18	20	21
Copper	7440-50-8	5	mg/kg	47	32	12	15	15
Lead	7439-92-1	5	mg/kg	61	13	14	18	20
Nickel	7440-02-0	2	mg/kg	13	16	6	8	12
Zinc	7440-66-6	5	mg/kg	449	61	28	58	45
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP16	TP17	TP18	TP19	TP20
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-016	ES1909468-017	ES1909468-018	ES1909468-019	ES1909468-020
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP16	TP17	TP18	TP19	TP20
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-016	ES1909468-017	ES1909468-018	ES1909468-019	ES1909468-020
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP16	TP17	TP18	TP19	TP20
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-016	ES1909468-017	ES1909468-018	ES1909468-019	ES1909468-020
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	<50	<50	<50	<50
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**75.0**	**76.0**	**75.8**	**73.0**	**74.9**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**90.9**	**109**	**87.4**	**91.1**	**89.0**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**89.9**	**90.1**	**80.3**	**86.2**	**90.2**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**83.2**	**84.1**	**86.1**	**82.0**	**91.4**
2-Chlorophenol-D4	93951-73-6	0.5	%		**87.4**	**93.2**	**90.3**	**86.0**	**96.0**
2.4.6-Tribromophenol	118-79-6	0.5	%		**83.2**	**96.1**	**96.0**	**88.2**	**90.7**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**94.1**	**96.1**	**95.9**	**102**	**94.1**
Anthracene-d10	1719-06-8	0.5	%		**103**	**106**	**107**	**103**	**107**
4-Terphenyl-d14	1718-51-0	0.5	%		**108**	**104**	**102**	**109**	**105**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**122**	**119**	**122**	**121**	**117**
Toluene-D8	2037-26-5	0.2	%		**80.1**	**90.2**	**84.8**	**79.8**	**77.4**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP16	TP17	TP18	TP19	TP20
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-016	ES1909468-017	ES1909468-018	ES1909468-019	ES1909468-020
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**75.5**	**82.9**	**78.9**	**75.8**	**75.4**

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP21	ASB1	ASB2	ASB3	ASB4
			Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit	ES1909468-021	ES1909468-022	ES1909468-023	ES1909468-024	ES1909468-025
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	20.2	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	Yes	Yes	Yes	No
Asbestos (Trace)	1332-21-4	5	Fibres	----	No	No	No	No
Asbestos Type	1332-21-4	-	--	----	Ch + Am	Ch + Am + Cr	Ch + Am + Cr	-
Sample weight (dry)	----	0.01	g	----	210	421	314	313
APPROVED IDENTIFIER:	----	-	--	----	C.OWLER	C.OWLER	C.OWLER	C.OWLER
Synthetic Mineral Fibre	----	0.1	g/kg	----	No	No	No	No
Organic Fibre	----	0.1	g/kg	----	No	No	No	No
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	19	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	30	----	----	----	----
Copper	7440-50-8	5	mg/kg	62	----	----	----	----
Lead	7439-92-1	5	mg/kg	87	----	----	----	----
Nickel	7440-02-0	2	mg/kg	9	----	----	----	----
Zinc	7440-66-6	5	mg/kg	289	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.3	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP21	ASB1	ASB2	ASB3	ASB4
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-021	ES1909468-022	ES1909468-023	ES1909468-024	ES1909468-025
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)A: Phenolic Compounds									

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP21	ASB1	ASB2	ASB3	ASB4
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-021	ES1909468-022	ES1909468-023	ES1909468-024	ES1909468-025
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
Phenol	108-95-2	0.5	mg/kg		<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg		<2	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP21	ASB1	ASB2	ASB3	ASB4
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-021	ES1909468-022	ES1909468-023	ES1909468-024	ES1909468-025
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**73.3**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**87.6**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**63.4**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**90.1**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**104**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**77.1**	----	----	----	----

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP21	ASB1	ASB2	ASB3	ASB4
				Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00	26-Mar-2019 00:00
Compound	CAS Number	LOR	Unit		ES1909468-021	ES1909468-022	ES1909468-023	ES1909468-024	ES1909468-025
					Result	Result	Result	Result	Result
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		102	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		101	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		109	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		94.6	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		101	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		110	----	----	----	----

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	ASB5	ASB6	----	----	----
			Client sampling date / time	26-Mar-2019 00:00	26-Mar-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1909468-026	ES1909468-027	--------	--------	--------
				Result	Result	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	**No**	**Yes**	----	----	----
Asbestos (Trace)	1332-21-4	5	Fibres	**No**	**No**	----	----	----
Asbestos Type	1332-21-4	-	--	**-**	**Ch + Am + Cr**	----	----	----
Sample weight (dry)	----	0.01	g	**304**	**298**	----	----	----
APPROVED IDENTIFIER:	----	-	--	**C.OWLER**	**C.OWLER**	----	----	----
Synthetic Mineral Fibre	----	0.1	g/kg	**No**	**No**	----	----	----
Organic Fibre	----	0.1	g/kg	**No**	**No**	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	ASB1 - 26-Mar-2019 00:00	Mid brown soil plus three pieces of asbestos cement sheeting approx 50 x 40 x 5mm.
EA200: Description	ASB2 - 26-Mar-2019 00:00	Mid brown soil plus three pieces of asbestos cement sheeting approx 60 x 50 x 5mm.
EA200: Description	ASB3 - 26-Mar-2019 00:00	Mid brown soil plus one piece of asbestos cement sheeting approx 80 x 30 x 5mm.
EA200: Description	ASB4 - 26-Mar-2019 00:00	Mid brown soil.
EA200: Description	ASB5 - 26-Mar-2019 00:00	Mid brown soil.
EA200: Description	ASB6 - 26-Mar-2019 00:00	Mid brown soil plus two larger pieces of asbestos cement sheeting approx 80 x 40 x 5mm and one smaller piece of asbestos cement sheeting approx 5 x 4 x 3mm.

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

2/4/19

253

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Envirotech PTY LTD	TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: Prospect		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes / No / N/A
PROJECT: Mount Vernon Road, MOUNT VERNON	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Cooling Method: Ice / Ice Pack / Frozen Ice Pack / None / Other
ORDER NUMBER: 757919		OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Simon Doberer	CONTACT PH: 029896 1568		Cliffs comment: 14-1
SAMPLER: Jack Hinchliffe	SAMPLER MOBILE:	RELINQUISHED BY: Simon Doberer	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 27/03/2019	DATE/TIME: 27/3/19 1435
Email Reports to (will default to PM if no other addresses are listed): simon@envirotech.com.au			
Email Invoice to (will default to PM if no other addresses are listed): accurateaccounts@bigpond.com			

RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	S-19	Asbestos (presence/non)						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	TP1	26-03-19	S		1	✓							
2	TP2	26-03-19	S		1	✓							
3	TP3	26-03-19	S		1	✓							
4	TP4	26-03-19	S		1	✓							
5	TP5	26-03-19	S		1	✓							
6	TP6	26-03-19	S		1	✓							
7	TP7	26-03-19	S		1	✓							
8	TP8	26-03-19	S		1	✓							
9	TP9	26-03-19	S		1	✓							
10	TP10	26-03-19	S		1	✓							
11	TP11	26-03-19	S		1	✓							
12	TP12	26-03-19	S		1	✓							
				TOTAL	40	20	20						

Subcon / Forward Lab / Split WO
Lab / Analysis: Asbestos → Newcastle
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

Environmental Division
Sydney
Work Order Reference
ES1909468

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Document Set ID: 9419595
Version: 1, Version Date: 08/05/2020

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 45 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Envirotech PTY LTD	**TURNAROUND REQUIREMENTS :** ☐ Standard TAT **(List due date):** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact: Yes No N/A; Freezer Ice Bricks present Upon Receipt: Yes No N/A; Random Sample Temperature on Receipt: °C; Cooler Comment: 14.1
OFFICE: Prospect		
PROJECT: Mount Vernon Road, MOUNT VERNON	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7; OF: 1 2 3 4 5 6 7
ORDER NUMBER: 757919		
PROJECT MANAGER: Simon Doberer	**CONTACT PH:** 029896 1568	
SAMPLER: Jack Hinchliffe	**SAMPLER MOBILE:**	**RELINQUISHED BY:** *Simon Doberer*
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**	DATE/TIME: 27/03/2019
Email Reports to (will default to PM if no other addresses are listed): simon@envirotech.com.au		**RECEIVED BY:** Sophie A DATE/TIME: 27/3/19 1435
Email Invoice to (will default to PM if no other addresses are listed): accurateaccounts@bigpond.com		**RELINQUISHED BY:** DATE/TIME:
		RECEIVED BY: DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	S-19	Asbestos (present/non)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	TP13	26-03-19	S		1	✓								
14	TP14	26-03-19	S		1	✓								
15	TP15	26-03-19	S		1	✓								
16	TP16	26-03-19	S		1	✓								
17	TP17	26-03-19	S		1	✓								
18	TP18	26-03-19	S		1	✓								
19	TP19	26-03-19	S		1	✓								
20	TP20	26-03-19	S		1	✓								
21	TP21	26-03-19	S		1	✓								
22	ASB1	26-03-19	S		1		✓							
23	ASB2	26-03-19	S		1		✓							
24	ASB3	26-03-19	S		1		✓							
				TOTAL	27	21	6							

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Document Set ID: 9419595
Version: 1, Version Date: 08/05/2020

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 24 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: Envirotech PTY LTD	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☐ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)** Custody Seal Intact: Yes / No / N/A
OFFICE: Prospect		☐ Non Standard or urgent TAT (List due date):	Cooling Present: Yes / No / N/A
PROJECT: Mount Vernon Road, MOUNT VERNON	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: 14.1 °C
ORDER NUMBER: 757919		OF: 1 2 3 4 5 6 7	Other comment:
PROJECT MANAGER: Simon Doberer	**CONTACT PH:** 029896 1568		

SAMPLER: Jack Hinchliffe	**SAMPLER MOBILE:**	**RELINQUISHED BY:**	**RECEIVED BY:**	**RELINQUISHED BY:** / **RECEIVED BY:**
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**	*Simon Doberer*		
Email Reports to (will default to PM if no other addresses are listed): simon@envirotech.com.au		DATE/TIME:	DATE/TIME: 27/3/19 1435	DATE/TIME: / DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): accurateaccounts@bigpond.com		27/03/2019		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	S-19	Asbestos (presen/non)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
25	ASB4	26-03-19	S		1		✓							
26	ASB5	26-03-19	S		1		✓							
27	ASB6	26-03-19	S		1		✓							
				TOTAL	27	21	6							

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Document Set ID: 9419595
Version: 1, Version Date: 08/05/2020

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1909468**	Page	: 1 of 9
Client	: **ENVIROTECH PTY. LTD.**	Laboratory	: Environmental Division Sydney
Contact	: SIMON DOBERER	Telephone	: +61-2-8784 8555
Project	: Mount Vermon Road, Mount Vermon	Date Samples Received	: 27-Mar-2019
Site	: ----	Issue Date	: 04-Apr-2019
Sampler	: Jack Hinchliffe	No. of samples received	: 27
Order number	: 757919	No. of samples analysed	: 27

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**----**	----	----	**29-Mar-2019**	09-Apr-2019	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag: Separate bag received (EA200)							
ASB1, ASB2, ASB3, ASB4, ASB5, ASB6	**26-Mar-2019**	**----**	----	----	**29-Mar-2019**	22-Sep-2019	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	22-Sep-2019	✓	**29-Mar-2019**	22-Sep-2019	✓

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	23-Apr-2019	✓	**30-Mar-2019**	23-Apr-2019	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**30-Mar-2019**	08-May-2019	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**30-Mar-2019**	08-May-2019	✓

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**30-Mar-2019**	08-May-2019	✓
EP075(SIM)A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075(SIM))							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**30-Mar-2019**	08-May-2019	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**30-Mar-2019**	08-May-2019	✓

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**29-Mar-2019**	09-Apr-2019	✓
Soil Glass Jar - Unpreserved (EP071)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**30-Mar-2019**	08-May-2019	✓

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**29-Mar-2019**	09-Apr-2019	✓
Soil Glass Jar - Unpreserved (EP071)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**30-Mar-2019**	08-May-2019	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21	**26-Mar-2019**	**29-Mar-2019**	09-Apr-2019	✓	**29-Mar-2019**	09-Apr-2019	✓

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	4	35	11.43	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	4	35	11.43	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	4	35	11.43	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	30	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Document Set ID: 9129795
Version: 1, Version Date: 18/05/2020

QUALITY CONTROL REPORT

Work Order	: **ES1909468**	Page	: 1 of 21
Client	: **ENVIROTECH PTY. LTD.**	Laboratory	: Environmental Division Sydney
Contact	: SIMON DOBERER	Contact	: Customer Services ES
Address	: Level1/1/23 Rowood Rd, Prospect 2148	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Mount Vermon Road, Mount Vermon	Date Samples Received	: 27-Mar-2019
Order number	: 757919	Date Analysis Commenced	: 29-Mar-2019
C-O-C number	: ----	Issue Date	: 04-Apr-2019
Sampler	: Jack Hinchliffe		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 27		
No. of samples analysed	: 27		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 2266195)									
ES1909320-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	30	29	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	19	18	7.04	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	6	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	17	16	6.58	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	10	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	29	27	7.77	No Limit
ES1909320-011	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	38	38	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	23	23	0.00	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	7	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	21	21	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	10	10	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	26	25	0.00	No Limit
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 2266198)									
ES1909468-006	TP6	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	18	20	13.9	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	16	17	6.83	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	33	39	17.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	19	21	9.69	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	124	130	4.69	0% - 20%
ES1909468-016	TP16	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	21	22	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	13	13	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 2266198) - continued									
ES1909468-016	TP16	EG005T: Arsenic	7440-38-2	5	mg/kg	19	16	17.1	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	47	58	21.2	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	61	59	4.16	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	449	425	5.37	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 2266105)									
ES1909468-003	TP3	EA055: Moisture Content	----	0.1	%	19.9	19.7	1.30	0% - 50%
ES1909468-014	TP14	EA055: Moisture Content	----	0.1	%	18.3	18.9	3.25	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 2266106)									
ES1909470-002	Anonymous	EA055: Moisture Content	----	0.1	%	17.3	16.6	3.69	0% - 50%
ES1909470-013	Anonymous	EA055: Moisture Content	----	0.1	%	11.2	11.0	2.43	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2266196)									
ES1909320-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1909320-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2266197)									
ES1909468-006	TP6	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1909468-016	TP16	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.2	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 2265515)									
ES1909468-001	TP1	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1909468-011	TP11	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 2265517)									
ES1909470-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1909470-010	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2265514)									
ES1909468-001	TP1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2265514) - continued									
ES1909468-001	TP1	EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1909468-011	TP11	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2265520)									
ES1909470-001	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 2265520) - continued									
ES1909470-001	Anonymous	EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1909470-010	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2265514)									
ES1909468-001	TP1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2265514) - continued									
ES1909468-001	TP1	EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1909468-011	TP11	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2265520)									
ES1909470-001	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 2265520) - continued									
ES1909470-001	Anonymous	EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1909470-010	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 2265513)									
ES1909468-001	TP1	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)A: Phenolic Compounds (QC Lot: 2265513) - continued									
ES1909468-011	TP11	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 2265519)									
ES1909470-001	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
ES1909470-010	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2265513)									
ES1909468-001	TP1	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2265513) - continued									
ES1909468-001	TP1	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1909468-011	TP11	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2265519)									
ES1909470-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2265519) - continued									
ES1909470-001	Anonymous	EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1909470-010	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2265348)									

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2265348) - continued									
ES1909468-001	TP1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1909468-011	TP11	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2265387)									
ES1909534-005	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2265512)									
ES1909468-001	TP1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1909468-011	TP11	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2265518)									
ES1909470-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1909470-010	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2265348)									
ES1909468-001	TP1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1909468-011	TP11	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2265387)									
ES1909534-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2265512)									
ES1909468-001	TP1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1909468-011	TP11	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2265518)									
ES1909470-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1909470-010	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 2265348)									
ES1909468-001	TP1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 2265348) - continued									
ES1909468-001	TP1	EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1909468-011	TP11	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 2265387)									
ES1909534-005	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2266195)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	101	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	95.7	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	106	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	108	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	103	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	111	80	122
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2266198)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	106	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	104	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	94.6	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	102	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	82.1	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	106	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	107	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2266196)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	81.2	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2266197)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	80.8	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2265515)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	117	62	126
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2265517)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	98.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 2265514)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.4	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.4	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	92.3	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	101	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	101	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	106	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	107	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	93.5	63	117

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 2265514) - continued								
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.6	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.0	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	98.9	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	93.1	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.1	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	88.4	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	86.0	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.2	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	84.1	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	74.8	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	105	54	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 2265520)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	101	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	93.2	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	83.0	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.7	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	108	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	78.3	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	104	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	97.4	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	92.0	63	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	95.6	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	101	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	101	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.2	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.8	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.7	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.0	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	85.6	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.9	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	96.7	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	108	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	103	54	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2265514)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	74.5	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	76.3	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	76.8	67	119

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2265514) - continued								
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	84.7	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	91.9	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	77.2	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	99.1	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.7	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	99.5	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	80.5	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	83.6	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.6	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	80.2	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.6	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	64.0	41	123
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2265520)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	95.4	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.9	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	91.7	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	67	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.7	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	85.0	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	82.3	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	80.8	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.5	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	82.2	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	105	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	102	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	102	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	91.1	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	102	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	92.0	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	79.1	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	88.4	41	123
EP075(SIM)A: Phenolic Compounds (QCLot: 2265513)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	90.2	71	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	89.9	72	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	92.8	71	123

Document Set ID: 9429795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 2265513) - continued								
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	95.0	67	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	84.8	54	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	92.4	68	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	92.6	66	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	90.7	70	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	90.2	70	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	83.0	54	114
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	83.3	60	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	47.2	10	57
EP075(SIM)A: Phenolic Compounds (QCLot: 2265519)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	97.9	71	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	95.8	72	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	91.7	71	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	94.3	67	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	84.4	54	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	92.5	68	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	95.3	66	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	96.2	70	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	92.4	70	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	79.5	54	114
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	82.2	60	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	37.3	10	57
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2265513)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	92.4	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	92.7	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	92.1	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	95.1	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	96.9	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	98.1	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	95.5	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	96.0	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	94.8	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	95.6	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	93.2	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	96.0	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	97.6	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	90.7	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	90.5	62	118

Document Set ID: 9129798
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2265513) - continued								
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	93.4	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2265519)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	92.3	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	99.2	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	92.6	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	96.4	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	97.8	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	98.0	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	93.1	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	96.6	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	99.9	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	98.8	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	95.0	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	94.6	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	96.6	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	83.8	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	84.2	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	86.7	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265348)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	118	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265387)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	95.1	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265512)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	90.1	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	94.5	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	93.7	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265518)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	87.1	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	106	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	95.6	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265348)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	116	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265387)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	98.0	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265512)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	91.2	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	95.3	74	138

Document Set ID: 9429595
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265512) - continued								
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	85.3	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265518)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	105	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	104	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	74.0	63	131
EP080: BTEXN (QCLot: 2265348)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	113	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	89.7	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	86.7	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	99.4	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	92.4	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	114	63	119
EP080: BTEXN (QCLot: 2265387)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	103	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	105	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	104	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	104	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	102	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	106	63	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2266195)							
ES1909320-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	92.1	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	97.5	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	90.7	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	101	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	74.7	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	91.6	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	94.7	70	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2266198)							

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2266198) - continued							
ES1909468-006	TP6	EG005T: Arsenic	7440-38-2	50 mg/kg	98.3	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	101	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	101	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	99.4	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	78.0	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	95.0	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	96.1	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2266196)							
ES1909320-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	94.3	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2266197)							
ES1909468-006	TP6	EG035T: Mercury	7439-97-6	5 mg/kg	99.5	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2265515)							
ES1909468-001	TP1	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	96.0	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 2265517)							
ES1909470-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	96.0	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 2265514)							
ES1909468-001	TP1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	121	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	87.0	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	124	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	88.8	70	130
		EP068: Endrin	72-20-8	2 mg/kg	127	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	103	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 2265520)							
ES1909470-001	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	111	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	113	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	117	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	76.6	70	130
		EP068: Endrin	72-20-8	2 mg/kg	94.7	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	95.0	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2265514)							
ES1909468-001	TP1	EP068: Diazinon	333-41-5	0.5 mg/kg	78.6	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	81.6	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	76.4	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	91.7	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	93.2	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2265520)							

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 2265520) - continued							
ES1909470-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	87.8	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	81.6	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	104	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	101	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	76.9	70	130
EP075(SIM)A: Phenolic Compounds (QCLot: 2265513)							
ES1909468-001	TP1	EP075(SIM): Phenol	108-95-2	10 mg/kg	95.0	70	130
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	93.5	70	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	96.5	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	95.0	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	57.3	20	130
EP075(SIM)A: Phenolic Compounds (QCLot: 2265519)							
ES1909470-001	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	92.0	70	130
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	99.0	70	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	81.1	60	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	92.5	70	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	62.0	20	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2265513)							
ES1909468-001	TP1	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	96.8	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.0	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2265519)							
ES1909470-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	96.6	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265348)							
ES1909468-001	TP1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	99.6	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265387)							
ES1909534-005	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265512)							
ES1909468-001	TP1	EP071: C10 - C14 Fraction	----	523 mg/kg	99.4	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	117	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	131	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2265518)							
ES1909470-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	102	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	112	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	119	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265348)							

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265348) - continued							
ES1909468-001	TP1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	103	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265387)							
ES1909534-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	113	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265512)							
ES1909468-001	TP1	EP071: >C10 - C16 Fraction	----	860 mg/kg	102	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	128	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	118	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2265518)							
ES1909470-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	106	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	125	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	120	52	132
EP080: BTEXN (QCLot: 2265348)							
ES1909468-001	TP1	EP080: Benzene	71-43-2	2.5 mg/kg	101	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	87.7	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	91.6	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	95.7	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	94.7	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	99.3	70	130
EP080: BTEXN (QCLot: 2265387)							
ES1909534-005	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	110	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	111	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	112	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	110	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	109	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	115	70	130

Document Set ID: 9129795
Version: 1, Version Date: 08/05/2020

envirotech
Environmental and Engineering
Consultancy Services

PO Box 3086 East Blaxland NSW 2774
P: 1300 888 324 **F:** 02 8834 0760
W: www.envirotech.com.au
E: info@envirotech.com.au

REMEDIAL ACTION PLAN

110-112 MOUNT VERNON ROAD, MOUNT VERNON NSW

PREPARED FOR: Project Works Design

OUR REFERENCE: REP-19-7963-A1

ISSUE DATE: 17th March 2020

Wastewater Management / Effluent Reuse | Contamination Investigations | Urban Salinity Investigations | Bushfire Hazard Assessments | Geotechnical Engineering Slope Stability | Sediment & Erosion Control | Structural Engineering (Design & Certification) |Flora & Fauna | Environmental Impact Assessment / Managment

Document Set ID: 9129585
Version: 1, Version Date: 18/05/2020

CONTROLLED DOCUMENT
DISTRIBUTION & REVISION REGISTER

DISTRIBUTION LIST		
Copy No.	Custodian	Location
1 Original	Daniel Mathew	Envirotech Pty. Ltd (Filed)
2 Soft Copy (PDF, emailed)	Graham Mann	gmann@pwdesign.com.au

Note: This register identifies the current custodians of controlled copies of the subject document.

DOCUMENT HISTORY		
Document No.	Revision No.	Issue Date
REP-19-7963	A	20/05/2019
REP-19-7963	A1	17.03.2020

AUTHOR	TECHNICAL REVIEWER
Charbel Bahi Graduate Civil Engineer B.Eng. (Civil)	Con Kariotoglou Team Leader - Environmental and HAZMAT BSc, Cert IV WHS, AFMIML, MEIANZ, MALGA, AMAIOH SafeWork NSW Approved Asbestos Assessor, License No. LAA001006

COPYRIGHT © 2020 ENVIROTECH PTY. LTD.

The report is protected by copyright law and may only be reproduced, in electronic of hard copy format, if it copied and distributed in full without the prior written permission of EnviroTech Pty. Ltd.

TABLE OF CONTENTS

1. INTRODUCTION 5

1.2 Objectives 5
1.3 Scope of Work 5
1.4 Legislative Requirements 6

2. SITE IDENTIFICATION 7

3. SITE DESCRIPTION 9

3.1 Site Inspection 9
3.2 Surrounding land use 9
3.3 Topography 9
3.4 Geology and Soils 9
3.5 Surface Water Hydrology 9
3.6 Hydrogeology 9
3.7 Acid Sulfate Soils 10
3.8 Soil Sample Methodology 10
3.9 Conceptual Site Model 12
3.10 Human Receptors and Sensitive Environments 12
3.11 Potential for Migration and Exposure of Contaminants 13

4. SUMMARY OF PREVIOUS INVESTIGATIONS 14

4.1 Data Gaps 17

5. DATA QUALITY OBJECTIVES 18

5.1 Step 1 – State the Problem 18
5.2 Objectives 18
5.3 Step 2 – Identify the Decisions 18
5.4 Step 3 – Identify Inputs to the Decisions 18
5.5 Previous Reports 18
5.6 Contaminants of Concern 19
5.7 Step 4 – Define the Study Boundaries 19
5.8 Step 5 – Develop a Decision Rule 19
5.9 Step 6 – Specify Limits on Decision Errors 20
5.10 Optimise the Design for Obtaining Data 21

6. VALIDATION CRITERIA 22

6.1 General 22
6.2 Soils 22
6.2.1 Health Investigation Levels (HILs) 22
6.2.2 Health Screening Levels (HSLs) 23
6.2.3 Ecological Investigation Levels (EILs) 23
6.2.4 Ecological Screening Levels (ESLs) 24
6.2.5 Petroleum Hydrocarbon Management Limits 24
6.2.6 Asbestos in Soils 24
6.2.7 Groundwater Investigation Levels (GILs) 26
6.2.8 Protection of Aquatic Ecosystems 27
6.2.9 Recreational Water Use and Aesthetics 27
6.2.10 Export of Waste 27
6.2.11 Duty to Report 28

7. SAMPLING AND ANALYSIS PLAN 29

7.1 General Methodology 29
7.2 Additional Soil Sampling Assessment 29
7.3 Sampling Methodology 33
7.4 Soil Laboratory Analysis 34

envirotech Environmental Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

8. QUALITY CONTROL / ASSURANCE PLAN 35

8.1 Field QA/QC 35
8.2 Data Quality Indicators 35
8.3 Completeness 35
8.4 Comparability 37
8.5 Representativeness 37
8.6 Precision 38
8.7 Accuracy 38

9. REMEDIATION OPTIONS 39

9.1 Overview 39
9.2 Typical Remedial Options Available 40

10. SELECTION OF PREFERRED REMEDIATION STRATEGY 41

10.1 Evaluation of Remediation Options 41
10.2 Preferred Remediation Option 42

11. IMPLEMENTATION OF SELECTED REMEDIAL STRATEGY 43

11.1 Roles and Responsibilities 43
7.2 Remediation Process – Excavation Offsite 43
7.3 Occupational Health and Safety (OHS) 44
7.4 Waste Classification 45
7.5 Validation Goals/Implementation 45

12. ENVIRONMENTAL MANAGEMENT PLAN 46

12.1 Introduction 46
12.2 Site Fencing 46
12.3 Erosion Sediment Control Plan 46
12.4 Noise Control Plan 46
12.5 Dust Control Plan 47
12.6 Stormwater Control and Groundwater Management Plan 47
12.7 Odour Control Plan 47
12.8 Health and Safety 47
12.9 Onsite Stockpiles 48

13. UNEXPECTED FINDS PROTOCOL 49

13.1 Management 49
13.2 Training 49
13.3 Procedure 49

14. CONCLUSION 51

15. REFERENCES 52

16. LIMITATIONS 53

APPENDIX A: DEVELOPMENT PLANS 54

1. INTRODUCTION

1.1 GENERAL

EnviroTech Pty. Ltd. was engaged by Mr. Graham Mann of PW Design Pty Ltd to prepare this Remediation Action Plan (RAP) for the remediation of contaminated soils at 110-112 Mount Vernon Road, Mount Vernon NSW 2178 (hereafter referred to as the site). The investigation will accompany a development application to evaluate, on the basis of the available information, the likely suitability of the site for the proposal from a contamination perspective.

The remediation strategy described in this RAP has primarily been established based on the findings of a Detailed Site Investigation conducted at the site by Envirotech dated 8th April 2019 (REP-19-7579-A1).

This RAP outlines procedures for the remediation of the site to a condition suitable for the proposed development. The RAP also provides guidance on how the remedial strategy is to be implemented during construction and relevant occupational and environmental controls to be adopted. The principal objective of this plan was to outline the management techniques and safeguards that should be implemented to ensure the remediation and development are completed in an acceptable manner, preventing any adverse exposure on site contractors and the surrounding environment.

1.2 Objectives

The objectives of the investigation were to:

- Set remediation goals that ensure the remediated site will be suitable for the proposed use and will pose no unacceptable risk to the human health or the environment
- Document the procedures and plans to be implemented to reduce the risk of significant harm to acceptable levels
- Establish the environmental safeguards required in completing the remediation in an environmentally acceptable manner and,
- Identify necessary approvals and licenses required by regulatory authorities if required.

1.3 Scope of Work

The Scope of Works included the following:

- A review of previous investigations and summary of the site's contamination status for the entire investigative site
- Delineate areas of potential concern to determine the lateral and vertical extent of possible ACM contamination within nominated areas TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6
- Additional stockpile sampling and/or stockpile footprint areas within the southern portion of the site to further characterise soil material
- Details of the preferred remediation strategy, and an outline of the methodology for the implementation of the selected strategy within the site

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120758
Version: 1, Version Date: 08/05/2020

- A brief outline of environmental pollution control, community health and safety, and occupational health and safety measures that should be implemented during remedial works; and
- An outline of regulatory approvals and licenses which may be required to adopt the preferred remedial strategy.

1.4 Legislative Requirements

The legislative framework for the report is based on guidelines that have been set out by the NSW Environmental Protection Agency (EPA) formerly the Office of Environment and Heritage (OEH) in the form of the following Acts/Regulations:

- *Protection of the Environment Operations Act* (1997);
- *Protection of the Environment Operations Regulation* (2008);
- *Contaminated Land Management Act* (1998).

In addition, the following guidelines and technical documents have been reviewed and applied where applicable:

- *Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme (3rd Edition, 2017).*
- *State Environmental Planning Policy No.55 (SEPP55) – Remediation of Land (2018)*
- *NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (2011).*
- *NSW EPA Sampling Design Guidelines (1995).*
- *NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014).*
- *NSW EPA Guidelines for Assessing Former Orchards and Market Gardens (2005)*
- *Guidelines on the Investigation Levels for Soil and Groundwater, National Environmental Protection Measure 1999, 2013 Amendment (NEPC, 2013).*
- *Australian Standard AS 4482.1 Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.*
- *Australian Standard AS 4482.2 Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances.*
- *CRC CARE Technical Report No. 39: Risk-based remediation and management guidance for benzo(a)pyrene (2017).*
- *Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 (NSW DECCW, 2009).*
- *Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC, 2007).*
- *Guidelines for the Assessment, Remediation & Management of Asbestos - Contaminated Sites (WA DOH, 2009).*
- *"Technical Report on Synthetic Mineral Fibres' in Technical Report on Synthetic Mineral Fibres and Guidance Note on the Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres" (National Occupational Health and Safety Commission, 1990).*

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

2. SITE IDENTIFICATION

The study site is 110-112 Mount Vernon Road, Mount Vernon NSW 2178 (Lot 4 DP865818) (Figure 1). It can be identified as a trapezoidal allotment north of Mount Vernon Road. Figure 2 shows an aerial photograph of the site and the surrounding land.

Table 1: Site Identification.

Street Address	110-112 Mount Vernon Road, Mount Vernon
Lot and DP Number	Lot 4 DP865818
Approx. Site Area	10,250 m^2
Local Government Area	Penrith City Council
Zoning	E4 – Environmental Living
LGA Legislation	Penrith Local Environmental Plan 2010

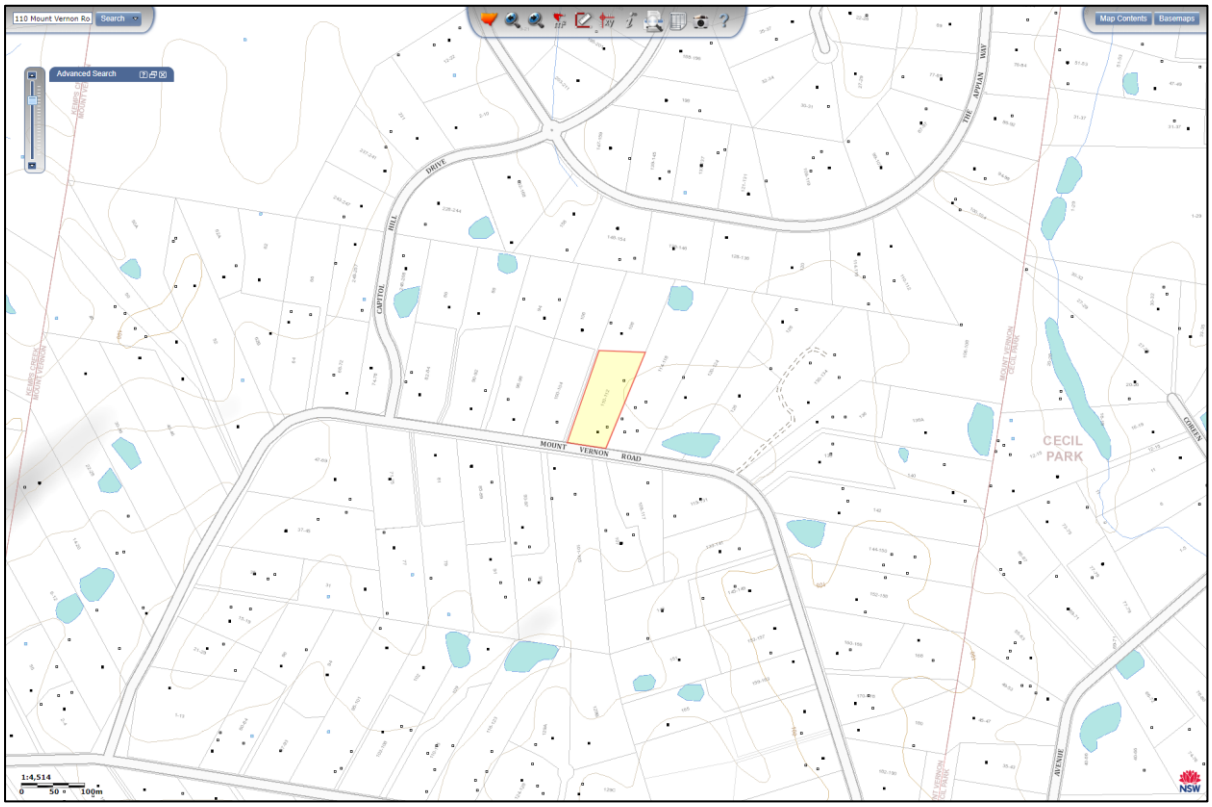


Figure 1: Site location map (NSW Spatial Information Exchange).

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

The investigation is part of a development application for a proposed childcare centre. The entire site was accessible and was investigated, including the proposed development area within the southern half of the site.

Figure 2: Aerial photograph of the site and surrounding land (NSW Spatial Information Exchange).

envirotech
Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

3. SITE DESCRIPTION

3.1 Site Inspection

On Tuesday 26th March 2019, a site inspection was conducted by Envirotech consultant Jack Hinchliffe. Field work was carried out in accordance with the methodology described in AS 4482.1 – 2005 and the NEPM (2013). At the time of inspection, the site consisted of a fenced off unoccupied and empty property. The majority of the site was comprised of disused market gardens. At the north-eastern and southern portions of site were the footprint remains of sheds and a residential house that were previously demolished. Stockpiles were present at the southern portion of site.

3.2 Surrounding land use

The site is located within a rural residential setting and bordered by:

- Rural residential allotments surrounding the site in all directions and
- Current Market Gardens surrounding the site to the east, west and south.

3.3 Topography

Gently undulating rises on Wianamatta Shale with local relief 10–30 m and slopes generally >5% but occasionally up to 10%. Crests and ridges are broad (200–600 m) and rounded with convex upper slopes grading into concave lower slopes. Outcrops of shale do not occur naturally on the surface. They may occur, however, where soils have been removed.

3.4 Geology and Soils

The department of environment soil map shows the site is within a Blacktown Soil Landscape characterised by gently undulating rises on Wianamatta Group shales. Local relief to 30 m, slopes usually >5%. Broad rounded crests and ridges with gently inclined slopes. Cleared Eucalypt woodland and tall open-forest (dry schlerophyll forest). Soils generally consist of friable brownish black loam transitioning to moderately to light grey plastic mottled clay.

3.5 Surface Water Hydrology

No groundwater or distinct overland flow paths were noted during the investigation. Stormwater is expected to infiltrate into soils or sheet south into the stormwater drainage system at Mount Vernon Road.

3.6 Hydrogeology

A search of the State Department of Primary Industries Groundwater map showed no groundwater works within 500m of the site.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

3.7 Acid Sulfate Soils

The NSW Planning Portal shows the site within the boundary of being within Class 5 Acid Sulfate Soils Risk. Therefore, acid sulfate soils are not typically found in Class 5 areas and areas classified as Class 5 are located within 500 metres on adjacent class 1, 2, 3 or 4 land.

According to Atlas of Australian Acid Sulfate Soils, Appendix E, Lotsearch (page 144), the site is within an Extremely Low (1-5%) area of probability for the occurrence of acid sulfate soils, therefore a preliminary hydrology study in accordance with the ASSMAC Assessment Guidelines 1998 was not undertaken as part of this investigation. Also, as the proposed development will not alter the water table level of the zone during earthworks & construction, further assessment or action was not required.

3.8 Soil Sample Methodology

Soil samples were collected on Tuesday 26th March 2018 via test pitting. Samples were collected from approximately 0 - 500 mm depth using a simple mattock. No Groundwater was encountered in soil profile samples. Asbestos grab samples were taken by carefully removing soil within test pits. The depth of sampling across the site was limited to the top 500mm of soils, to ensure adequate coverage of the average depths of fill material across the entire site.

During the collection of soil samples, any features such as seepage, discoloration, staining, odours, or other physical indicators of contamination were noted. All site work was undertaken by Jack Hinchliffe, Environmental Scientist of Envirotech. Soil Samples were transferred directly from the test pits into laboratory supplied 250 mL sample jars sealed with Teflon lids. Asbestos samples were collected in asbestos sample bags and zip locked. The samples were stored in a chilled esky and transferred to ALS Environmental Division under stringent chain of custody (COC) procedures.

The decontamination of non-dedicated sampling equipment was achieved by washing with phosphate-free detergent and tap water, followed by a final rinse with distilled water. Decontamination was conducted after the collection of samples at each sample location. A clean pair of disposable gloves was used when handling each sample. The hand augers were decontaminated between sampling locations by physically removing soil material between boreholes, washing the augers with Decon 90 and rinsing them with water.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

Figure 3: Site sampling plan showing location of the twenty-one (21) test pits (yellow) with the concurrent asbestos sampling (blue). (enhanced image Appendix B).

envirotech
Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

3.9 Conceptual Site Model

The main areas of potential concern within the vicinity of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 locations include the following:

- The topsoils and underlying soils within the vicinity of of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 has the potential to be comprised of unknown fill material containing Asbestos.

Additionally, the stockpiled soils and/or stockpile footprint areas within the southern portion of the site has the potential to be of comprised of contaminated materials

Table 2 identifies the main Potential Areas of Environmental Concern (AECs), and their associated Contaminants of Concern (COCs), using the information gathered through this assessment and qualitative judgement based on consultant experience.

Table 2: Potential Areas of Environmental Concern (PAEC)

PAEC	Potentially Contaminating Activity	Contaminant of Concern	Likelihood of Contamination
Vicinity of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6	Potentially contaminated ACM fill material.	Asbestos	Possible.
Stockpiles of material (or footprint areas) within southern portion of the site	Potentially containing fill material from an unknown source	Heavy Metals, TRH, BTEX, PAH, Phenols, PCB, OC/OP Pesticides, Asbestos	Possible

3.10 Human Receptors and Sensitive Environments

On-site Human Receptors & Sensitive Environments:

- Construction workers during the excavation / construction process
- Future occupants of the site including Childcare staff and children
- Native vegetation within the site.

Off-site Human Receptors & Sensitive Environments:

- Surrounding rural residential properties
- Ropes Creek 1km northeast of the site
- Adjacent neighbouring dam 80m east of the site

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120758
Version: 1, Version Date: 08/05/2020

3.11 Potential for Migration and Exposure of Contaminants

Site history information and onsite inspection observations indicated that due to the unsealed and open space condition of the site there may be a potential for contaminants to provide exposure risks to humans and native vegetation within the site.

Exposure routes of contaminants could potentially be through direct dermal contact with exposed underlying soils (Heavy Metals, TPH and PAHs) or airborne dust (Asbestos) and vapour (Phenols and VOCs). These exposure risks will potentially be most likely, and potentially at its highest risk during any earthworks or construction phases within the site.

There is also a potential for these contaminates to be present within stockpiled soils and underlying soils and have the ability to migrate vertically (dispersed up into the atmosphere, or infiltrate down into the groundwater), uptake by vegetation and/or migrate horizontally (through stormwater runoff pathways) from the proposed development, that will likely collect into the Mount Vernon stormwater system.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

4. SUMMARY OF PREVIOUS INVESTIGATIONS

The following report was prepared specifically for the proposed works and are the principal documents used in the preparation of this RAP:

- Envirotech Pty Ltd Detailed Site Investigation, 110-112 Mount Vernon Road, Mount Vernon, Reference: REP-19-7579-A1 dated 17th March 2020.

Based on the available information, a targeted sampling plan was considered most appropriate to provide sufficient characterisation data. A total of twenty-one (21) test pits were nominated across the area of investigation (Figure 3).

The samples were measured against the Health Investigation Levels (HIL) for Soil Contaminants – *HIL A; Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.*

The findings of the Detailed Site Investigation are as follows:

- On Tuesday 26th March 2019, a site inspection was conducted by Envirotech consultant Jack Hinchliffe;
- At the time of inspection, the site consisted of a fenced off unoccupied and empty property. The majority of the site was comprised of disused market gardens;
- At the north-eastern and southern portions of site were the footprint remains of sheds and a residential house that were previously demolished. Stockpiles were present at the southern portion of site;
- The following area of concern were identified:
    - Previous historical site use as a market garden has the potential for OC/OP Pesticides to be impacting soils onsite;
    - Previously existing residential building and sheds originally constructed in an era to have comprised potentially hazardous building materials and incorrectly demolished;
    - Potentially unvalidated stockpiles onsite comprised of unknown building materials;
    - The underlying soils onsite have the potential to be comprised of unknown fill material.
- The site was first developed before 1955;
- The site is not listed by the EPA;
- Based on the available information, a targeted and stratified sampling plan was considered most appropriate to provide sufficient characterisation data. A total of twenty-one (21) test pits were nominated across the area of investigation (Figure 3);
- Samples were analysed for Heavy Metals, Phenols, TRH, BTEX, PAH, Hydrocarbons, OC/OP Pesticides & Asbestos by ALS Environmental Division;
- Soil chemical concentrations were below the thresholds of the adopted human health and ecological assessment criteria for residential land use as specified under the NEPM (2013);

All soil samples collected and tested (26th March 2019) were reported by the laboratory to have concentrations below the adopted site assessment criteria for HIL A, land use as per the NEPM, 2013, except for the following samples:

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 4120538
Version: 1, Version Date: 08/05/2020

- **TP6/ASB1 (0-0.5m): Chrysotile Asbestos & Amosite Asbestos presence**
    - BONDED (Three pieces of asbestos cement sheeting approx. 50 x 40 x 5mm)
- **TP7/ASB2 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
    - BONDED (Three pieces of asbestos cement sheeting approx. 60 x 50 x 5mm)
- **TP8/ASB3 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
    - BONDED (One piece of asbestos cement sheeting approx. 80 x 30 x 5mm)
- **TP19/ASB6 (0-0.5m): Chrysotile Asbestos, Amosite Asbestos & Crocidolite Asbestos presence**
    - BONDED (Two larger pieces of asbestos cement sheeting approx. 80 x 40 x 5mm and one smaller piece of asbestos cement sheeting approx. 5 x 4 x 3mm)

As soil samples indicate the *presence of BONDED Asbestos*, within four (4) sampling locations, it is recommended that a suitably trained and qualified professional is engaged to prepare the following:

- Additional **Delineation Sampling** at and around the potentially asbestos hotspot areas of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 to further characterise these potential areas of concern and to determine the lateral and vertical extent of the asbestos contamination according regulatory guidelines and site criteria.
- A **Visual Inspection** is to be undertaken of these areas by a SafeWork NSW Licensed Approved Asbestos Assessor to ensure no visible asbestos containing materials (ACM) are identified on surface soils and provide an Asbestos Clearance Certificate for the potential areas.

Also, to further characterise the site, the additional sampling is required:

- Additional **Stockpile Sampling** to further characterise the stockpiled soils within the southern portion of the site. If the stockpiles have been removed, then the stockpile footprint areas will be sampled to further characterise underlying soils.

Details of the required additional works will be recommended within in the amended Envirotech RAP (REP: 19-7963-A1).

Subject to the above, it is considered that the site can be remediated and made suitable for the intended proposed residential development, pending on the following Delineation Sampling, Visual Inspection and subsequent Remedial and Validation Works, if required.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

Figure 4: Site aerial photograph indicating, site sampling plan showing location of the potential contaminated Hotspot locations (yellow outline), within the site, and additional stockpile investigations required within the southern portion of the site (orange outline).

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

4.1 Data Gaps

The following data gaps were identified which require further assessments:

- Soils sampled within the TP6/ASB1, TP7/ASB2, TP8, ASB3 and TP19/ASB6 sampling areas (26th March 2019) were only tested for Asbestos absence/presence – to further characterise and assess the concentration and distribution of asbestos within these four (4) vicinities, in accordance with WA DOH 2009 and NEPM 2013, further soil assessments are warranted within these areas.
- Delineation sampling within these four locations will determine the lateral and vertical extent of remediation and validations works required, if any, to confirm the suitability of the site for the proposed development and land use.
- Additionally sampling of the stockpile areas and/or the stockpile footprint areas (if the stockpiles have been already removed) to further characterise and assess the suitability of the site for the proposed development and land use.

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

5. DATA QUALITY OBJECTIVES

5.1 Step 1 – State the Problem

The Envirotech (2020) Detailed Site Investigation report indicated that soil samples (TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6) reported the presence of fragments of BONDED ACM identified within the specific areas within the site as a result of historical demolition of building structures which may of contained hazardous construction materials (Asbestos).

5.2 Objectives

The objectives are to:

- Characterisation of soils around the vicinity of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6
- To determine the lateral and vertical extent of asbestos impacted soils within the TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 locations
- To determine if Asbestos is a contaminate of concern within the TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 vicinities
- Characterisation of stockpiled soils and/or stockpile footprint areas (if stockpiles have been already removed).

5.3 Step 2 – Identify the Decisions

Based on the results of the additional assessments, are there any other areas that require further management when assessed under the adopted site criteria?

5.4 Step 3 – Identify Inputs to the Decisions

The following information is required for input into the decisions identified in Step 2;

- Findings and conclusions from previous assessments carried out on site
- Laboratory analytical results from soil analysis previously carried out
- Field observations made on site during additional assessment or characterisation
- Collection and laboratory analysis of soil samples from locations specified in this RAP
- Laboratory analysis in accordance with USEPA/APHA methods and
- Comparison and interpretation of laboratory results against the adopted soil investigation and screening levels as specified in this RAP.

5.5 Previous Reports

The findings from the following Detailed Site Investigation previously prepared for the site was referenced to assist in the preparation of this RAP:

- Envirotech Pty Ltd, Detailed Site Investigation, 110-112 Mount Vernon Road, Mount Vernon: REP-19-7579-A1, dated 17th March 2020.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

5.6 Contaminants of Concern

The contaminants of concern identified in soils during previous investigations are listed in the table below:

Table 3: Summary of Areas and Contaminants of Concern

Areas of Environmental Concern	Contaminating Activities	Contaminants of Concern
Vicinity of TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6	Fragments of ACM within surface soils	Asbestos
Stockpiles of soil within the southern portion of the site	Stockpiles containing unknown fill material	Heavy Metals Hydrocarbons OC/OP Pesticides Asbestos

5.7 Step 4 – Define the Study Boundaries

The spatial and temporal aspects of the additional assessment areas that the data must represent to support the decisions identified in Step 2 are as follows:

- The lateral extent of the additional ACM assessment is limited one (1) metre around the vicinity of each the TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 locations
- The vertical extent of the ACM study boundary is the surface top-soils 0-100mm within the vicinity of the TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 locations
- The lateral extent of the stockpile assessment is limited to the perimeter boundaries of each of the stockpiles and/or the stockpile footprint areas
- The vertical extent of the stockpile study boundary is the height of each of the stockpiles, or 0-100mm of the stockpile footprint area (if stockpiles have been removed).

5.8 Step 5 – Develop a Decision Rule

The acceptable limits for laboratory QA/QC parameters are shown in the table below and are based upon the laboratory reported acceptable limits and those stated within the NEPM 2013 Guidelines.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120538
Version: 1, Version Date: 08/05/2020

Table 4: Acceptable Limits for QC Samples

Type of QC Sample	Control Limit
FIELD	
Rinsate Blanks	Analytes <LOR
Intra-Laboratory Duplicates	RPD's <± 30-50%
Inter-Laboratory Duplicates	RPD's <± 30-50%
Trip Blanks	Volatiles <LOR
Trip Spike Recovery	>70%
LABORATORY	
Method Blanks	< Laboratory LOR
Matrix Spike	Recovery targets: • Metals: 70% to 130% • Organics: <30%
Laboratory Duplicate	GRPDs <30%
Laboratory Control Samples	Laboratory specified
Surrogate Spike	Laboratory specified

The following conditions should be adopted:

- If the control limits are exceeded, then an assessment of the significance of the results should be carried out
- If the results of the DQI assessment indicate that the data set is reliable, then the data set will be deemed to be acceptable for the purposes of the investigation and
- If the measured concentrations of additional soil and groundwater samples analysed meet their respective regulatory criteria, then no additional assessment is required.

5.9 Step 6 – Specify Limits on Decision Errors

There are two types of decision errors:

- **Sampling errors**, which occur when the samples collected are not representative of the conditions within the assessment/validation area; and
- **Measurement errors**, which occur during sample collection, handling, preparation, analysis and data reduction.

These errors may lead to following (null hypothesis):

- Deciding that the site is not suitable for the proposed development when it actually is (Type I error);
- Deciding that the site is suitable for the proposed development when it is actually not (Type II error);

- Deciding that the risks to human health from the additional soil and groundwater concentrations are high and require further management or remediation, when the risks are actually low (Type I error); and
- Deciding that the risks to human health from the additional soil and groundwater concentrations are low and requires no further management, when the risks are actually high (Type II error).

A 5% significance level has been selected for Type I errors on the basis that 95% of the data set will satisfy the DQIs. Therefore, the acceptable limit of the decision errors is based on a 5% probability of the hypothesis being incorrect.

An assessment will be made as to the likelihood of a decision error being made based on:

- The acceptable limits for inter/intra laboratory duplicate sample comparisons as specified in Step 5 of the DQOs; and
- The acceptable limits for laboratory QA/QC parameters are based upon the laboratory reported acceptable limits and those stated within the NEPM Guidelines.

If the concentration of a particular contaminant of concern exceeds its assessment criteria, then a further assessment is required to address the significance of the result.

Statistical analysis based on 95% UCL may be used to assess the significance of the data provided the following conditions are met:

- the arithmetic mean of the data set must be less than its respective threshold level; that is, it is acceptable for individual results to exceed its respective threshold level, but the cumulative mean of the data set of soil sample results must not exceed the threshold level
- the standard deviation of the data set is less than 50% of the relevant threshold level and
- no individual sample result should be greater than 250% of the relevant threshold level.

5.10 Optimise the Design for Obtaining Data

The optimum design for obtaining data in order to achieve the Data Quality Objectives is as follows:

- Review of previous reports prepared by Envirotech
- Adhering to the specifications of this RAP, and other requirements that the Council may have
- NATA-accredited environmental testing laboratories will be commissioned to analyse soil samples and will implement a quality control plan conforming to the NEPM (Assessment of Site Contamination) Measure Guidelines; and
- An assessment of the Data Quality Indicators to determine if the field procedures and laboratory analytical results are reliable.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

6. VALIDATION CRITERIA

6.1 General

The selection of appropriate human health, ecological and groundwater site validation criteria were based on the following guiding documents:

- "National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)", NEPC (2013);
- "Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000" (ANZECC);
- "Australian Water Quality Guidelines 2000" (AWQG);
- "Australian Drinking Water Guidelines 2011" (ADWG); and
- "Guidelines for Managing Risk to Recreational Waters 2008 (GMRRW).

It is acknowledged that the guideline values adopted are generally intended for application as investigation and screening levels and are based on a conservative approach. However, the guidelines do not necessarily preclude their use in determining the suitability of a site for its proposed land use in the absence of remediation guideline values. Therefore, should the validation samples be at concentrations below their respective adopted criterion, they are considered to render the site suitable for the proposed use.

It should be noted that should validation samples fail their respective validation criteria, a justifiable decision should be made to determine whether a quantitative risk assessment would be warranted, based on the likelihood that it would result in a beneficial outcome in avoiding further unnecessary remediation costs.

Full details of the validation criteria for each contaminant of concern in soils, groundwater and soil vapour are presented in below.

6.2 Soils

6.2.1 Health Investigation Levels (HILs)

The NEPM presents Tier 1 Health Investigation Levels (HILs) for a broad range of chemicals such as metals, inorganics, PAHs, phenols, pesticides and other organics. The HILs are applicable to generic land uses such as residential, commercial/industrial or public open space and all soil types, generally within the first 3 metres of soil below ground level. The HILs have been applied to assess human health risks via all relevant pathways of exposure.

Based on the proposed development, soil investigation results within the building footprint/site will be assessed against the following criteria:

- ***HIL 'A' -*** *Residential use with gardens/accessible soils, including children's day-care centres, preschools and primary schools*
- ***HIL 'B' –*** *Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments*

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

- ***HIL 'C' –*** *Public open space such as parks, playgrounds, playing fields, secondary schools and footpaths*
- ***HIL 'D' –*** *Commercial/industrial, including premises such as shops, offices, factories and industrial sites.*

6.2.2 Health Screening Levels (HSLs)

The NEPM presents Tier 1 Health Screening Levels (HSLs) for the following petroleum compounds and fractions:

- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX);
- Naphthalene; and
- TPH C_6-C_{10} and TPH >C_{10}-C_{16} fractions

The HSLs are applicable to generic land uses such as residential, commercial/industrial or recreational/public open space and different soil types between the ground surface and soils >4 metres below ground level. The HILs have been applied to assess human health risks via the inhalation and direct contact pathways of exposure.

Point 1 of Table 1A (4), which indicates that HSL D can be used in lieu of HSL B for buildings that comprise car parks or commercial properties on the ground floor.

6.2.3 Ecological Investigation Levels (EILs)

The NEPM presents Ecological Investigation Levels (Interim EILs) for As, Cu, CrIII, Ni, Pb, Zn, DDT and naphthalene.

The EILs are applicable to generic land uses such as areas of ecological significance, urban residential areas and public open space, and commercial/industrial land uses. The EILs have been applied to assess risks to terrestrial ecosystems, generally, within the top 2 metres of soil at the final surface/ground level.

Site specific EILs for Copper, Zinc, Nickel and Chromium III can be derived by adding the Ambient Background Concentration (ABC) to the Added Contaminant Limits (ACL), as per the following formula:

$$EIL = ABC + ACL$$

The ABC of a contaminant is the soil concentration in a specified locality that is the sum of the naturally occurring background level and the contaminant levels that have been introduced from diffuse or non-point sources by generating anthropogenic activity not attributed to industrial, commercial, or agricultural activities.

The ACL is the added concentration (above the ABC) of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required. ACLs are based on the soil characteristics of pH, CEC and clay content. Different soils types / profiles will have different contaminant EILs rather than a single generic EIL for each contaminant. ACLs apply chromium

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

III (CrIII), copper (Cu), nickel (Ni) and zinc (Zn) for site-specific EIL determination. The soil properties to be measured for site-specific derivation of ACLs for CrIII, Cu, Ni and Zn are summarised below:

- pH - Cu
- CEC - Cu, Ni, Zn
- % clay - CrIII

Note – the lowest concentration of copper that is derived from the pH or the CEC calculation is to be used for the ACL.

Insufficient data was available to derive ACLs for As, Pb, DDT and naphthalene. As a result, the derived EILs are generic to all soils and are presented as total soil contaminant concentrations in Tables 1(B)4 and 1(B)5.

6.2.4 Ecological Screening Levels (ESLs)

Table 1B (6) of the NEPM presents Ecological Screening Levels (ESLs) for TPH C_6-C_{40} fractions, BTEX and benzo(a)pyrene.

The ESLs are applicable to generic land uses such as areas of ecological significance, urban residential areas and public open space, and commercial/industrial land uses. The ESLs have been applied to assess risks to terrestrial ecosystems, generally, within the top 2 metres of coarse or fine soil at the final surface/ground level.

6.2.5 Petroleum Hydrocarbon Management Limits

Table 1B (7) of the NEPM presents petroleum hydrocarbon management limits for application to TPH fractions C_6-C_{10}, $>C_{10}$-C_{16}, $>C_{16}$-C_{34} and $>C_{34}$-C_{40}. The management limits are applicable for coarse or fine soils in residential, parkland, public open space or commercial/industrial land uses following consideration of relevant ESLs and HSLs.

6.2.6 Asbestos in Soils

Health screening for asbestos in soil, which are based on scenario-specific likely exposure levels, are adopted from the WA DoH guidelines and are referred in Table 5 in Schedule B1.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

Table 5: Health screening levels for asbestos contamination in soil

	Health Screening Level (w/w)			
Form of asbestos	Residential A[1]	Residential B[2]	Recreational C[3]	Commercial/ Industrial D[4]
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF[5] (friable asbestos)	0.001%			
All forms of asbestos	No visible asbestos for surface soil			

- *Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.*
- *Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.*
- *Recreational C includes public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and unpaved footpaths.*
- *Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.*
- *The screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures (refer Section 4.10). This screening level is not applicable to free fibres.*

Based on the proposed development, soil assessment/validation results within the site will be assessed against the HS for "Residential A" for bonded asbestos and 0.001%w/w for asbestos as AF/FA.

Asbestos and dust monitoring may be necessary during DSI, remediation and site development, and should meet the Guidelines (0.01fibre/mL) and NEPM ambient air criteria (PM10 of 50 mg/m3 over 24 hours), respectively.

Any admissible exposure to airborne asbestos should be kept as low as achievable and in any case below the specified exposure standards. These standards are determined by the *National Commission for Occupational Exposures*. Below is a summary of the threshold limits for airborne concentrations measured as a time-weighted average (TWA) fibre concentration.

Table 6: Exposure Standards – TWA Fibre Concentration Limits

Asbestos Species	Concentration (fibres/mL)
Chrysotile	0.1
Crocidolite	0.1
Amosite	0.1
Other forms	0.1
Other mixtures of species	0.1

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120758
Version: 1, Version Date: 08/05/2020

Air monitoring must be conducted by an Occupational Hygienist or SafeWork NSW Approved Asbestos Assessor, in accordance with the following guidelines: *Guidance Note on Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC: 3003(2005)].*

Note: Air sampling results should not be used to conclude that there has been no asbestos fibre release from soils or materials, or to justify use of less stringent site management measures, because the sampling methodology is not sufficiently accurate or representative for these purposes.

6.2.7 Groundwater Investigation Levels (GILs)

Groundwater investigation and screening levels were established by identifying the potential beneficial uses of groundwater down-gradient from the site based on the Six Environmental Values presented in the table below.

Table 7: Potential Beneficial Uses of Groundwater

Environmental Value	Applicability
Freshwater aquatic ecosystem	×
Marine aquatic ecosystem	✓
Agricultural use - irrigation	×
Agricultural use – stock watering	×
Recreational use	✓
Raw drinking water	✓

The applicable Environmental Values were selected on the basis of the following down-gradient receptors:

- *Recreational users and aesthetics at Botany Bay, located approximately 4.0 km to the south;*
- *The marine water aquatic ecosystem at Botany Bay;*
- *The nominated site is located within the Botany Groundwater Management Zone 2 area, therefore according to the Botany Sands Groundwater Source Fact Sheet for Residents, dated February 2018, all groundwater usage for domestic purposes is banned within this area.*

For each relevant Environmental Value identified above, the groundwater investigation and screening levels adopted are discussed in the following sub-sections.

If the screening or investigation levels are exceeded, then further consideration will be given to processes such natural attenuation, advection, adsorption and contaminant flux to assess potential risks to down-gradient aquatic ecosystems or drinking water sources.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

6.2.8 Protection of Aquatic Ecosystems

Table 1C of the NEPM presents Groundwater Investigation Levels (GILs) for the protection of fresh water and marine water in slightly to moderately disturbed ecosystems. However, where the closest sensitive receptor is high value or highly disturbed, Section 3.1 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) provides a range of water quality guidelines values based upon three levels of ecosystem conditions as shown in the table below.

Table 8: Aquatic Ecosystem Values

Ecosystem Value	Protection Level	Brief Definition	Applicability
High value ecosystems (HVE)	99%	Effectively unmodified, with ecological integrity regarded as intact.	×
Slightly to moderately disturbed ecosystems (SMDE)	95%	Small impacts to aquatic biological diversity within moderately cleared catchments with reasonably intact riparian vegetation.	✓
Highly disturbed ecosystems (HDE)	90%	Measurably degraded ecosystems typically associated with shipping ports or urban catchments.	×

Based on observations made during the site walkover, the aquatic ecosystem value of the Botany Bay area was considered to be highly disturbed and that the NEPM GILs are applicable.

However, where contaminants are potentially bio-accumulative, trigger values for the protection of 99% of species were used. Low reliability trigger values presented in Table 3.4.1 of the ANZECC 2000 guidelines were also adopted in the absence of high or moderate reliability trigger values.

6.2.9 Recreational Water Use and Aesthetics

The GMRRW guidelines (as referenced in NEPM) recommend adopting a multiplication factor of 10 to 20 to the ADWG for the assessment of recreational water quality. This is based on the rationale that the ADWG guideline values are based on a daily consumption of 2L, which is considered to be very conservative for application to recreational water exposure. On this basis, a multiplication factor of '10' (i.e. recreational consumption of 200mL per day) will be applied to the ADWG health guidelines to establish screening criteria.

6.2.10 Export of Waste

To assess the waste classification of materials to be disposed of off-site, the NSW EPA refers to the NSW DECC (2009) "*Waste Classification Guidelines, Part 1: Classifying Waste".*

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

6.2.11 Duty to Report

In accordance with Section 2.3.4 of the EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*, notification is required when:

- friable asbestos is present in or on soil on the land, AND
- the level of asbestos (% weight for weight) in an individual soil sample is equal to or above the health screening level of friable asbestos in soil (0.001%) specified in Section 4.8, Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013); AND
- a person has been, or foreseeably will be, exposed to elevated levels of asbestos fibres by breathing them into their lungs.

In accordance with Section 2.3.5 of the EPA (2015) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, notification is required when:

- the contaminant has entered or will foreseeably enter groundwater or surface water; and
- the concentration of the contaminant in the groundwater or surface water is, or will foreseeably be, above the groundwater investigation level for that contaminant as specified in Section 6, Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013); and
- the concentration of the contaminant in the groundwater or surface water will foreseeably continue to remain above the specified concentration.

Furthermore, the guideline specifies situations not intended to be captured by the duty to report such as:

- sites without off-site contamination where
  - on-site contamination is not likely to migrate to a neighbouring property, and
  - any on-site contamination has been assessed and the site found to be suitable for the proposed use in accordance with the requirements under the Environmental Planning and Assessment Act 1979
- sites with contaminants that are at levels above the triggers but are equal to, or below, the ambient background concentration.
- sites with non-friable asbestos materials (fibro) in or on soils, or naturally occurring asbestos.

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

7. SAMPLING AND ANALYSIS PLAN

7.1 General Methodology

In order to meet the Data Quality Objectives, the additional soil assessment will comprise fieldwork and sample collection carried out in general accordance with industry accepted standard practice.

The sampling strategy is based on our current level of understanding of the site conditions and to address Auditor comments. However, the fieldwork and the sampling and analysis program may be subject to change based on the observations made during field work, such as soil profiles beneath the site and visual extent of contamination.

The drilling method adopted should ensure that no pathways of contamination are created between various strata encountered. Where a confined layer is encountered, a bentonite seal should be used to prevent potential cross-contamination between the overlying and underlying strata.

7.2 Additional Soil Sampling Assessment

Sampling Density and Sampling Location Rationale

The following table presents the minimum number of samples to be collected at each area to be targeted during the validation and additional soil assessment sampling.

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

Table 9: Soil Sampling Density

Area	Remediation Works	Analysis	Samples Number
Hotspot TP6/ASB1	To collect surface soil 0-100mm samples, and deeper samples 300-400mm at the TP4/ASB1 location. To collect surface soil 0-100mm samples, and deeper 300-400mm samples, 1000mm around the centre TP4/ASB1 location at four locations to delineate lateral extent of potential asbestos contamination.	Asbestos %w/w	Two (2) base location samples at the TP4/ASB1 vicinity. Four (4) delineation sampling locations 1000mm around the TP4/ASB1 vicinity at two (2) depths.
Hotspot TP7/ASB2	To collect surface soil 0-100mm samples, and deeper samples 300-400mm at the TP6/ASB2 location. To collect surface soil 0-100mm samples, and deeper 300-400mm samples, 1000mm around the centre TP6/ASB2 location at four locations to delineate lateral extent of potential asbestos contamination.	Asbestos %w/w	Two (2) base location samples at the TP6/ASB2 vicinity. Four (4) delineation sampling locations 1000mm around the TP6/ASB2 vicinity at two (2) depths.
Hotspot TP8/ASB3	To collect surface soil 0-100mm samples, and deeper samples 300-400mm at the TP7/ASB3 location. To collect surface soil 0-100mm samples, and deeper 300-400mm samples, 1000mm around the centre TP7/ASB3 location at four locations to delineate lateral extent of potential asbestos contamination.	Asbestos %w/w	Two (2) base location samples at the TP7/ASB3 vicinity. Four (4) delineation sampling locations 1000mm around the TP7/ASB3 vicinity at two (2) depths.
Hotspot TP19/ASB6	To collect surface soil 0-100mm samples, and deeper samples 300-400mm at the TP19/ASB6 location. To collect surface soil 0-100mm samples, and deeper 300-400mm samples, 1000mm around the centre TP19/ASB6 location at four locations to delineate lateral extent of potential asbestos contamination.	Asbestos %w/w	Two (2) base location samples at the TP19/ASB6 vicinity. Four (4) delineation sampling locations 1000mm around the TP19/ASB6 vicinity at two (2) depths.
Stockpiles	A minimum of three (3) samples per each stockpile within the southern portion of the site At various depths within the stockpile	Heavy Metals, Hydrocarbons, OC/OP Pesticides, Asbestos	Number of stockpile sampling is dependent of the size of the stockpile and sample numbers in accordance to the Table 10 below.

Notes: Refer to Figure 3 below.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

Table 10: Minimum number of Samples for stockpiles 200m3 or less (minimum of 3 then 1:25)

Soil Volume, m^3	No. of Samples
25 or <25	3
50	3
75	3
100	4
125	5
150	6
175	7
200	8
>200	1:25

Source: EPA Victoria Soil Sampling

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

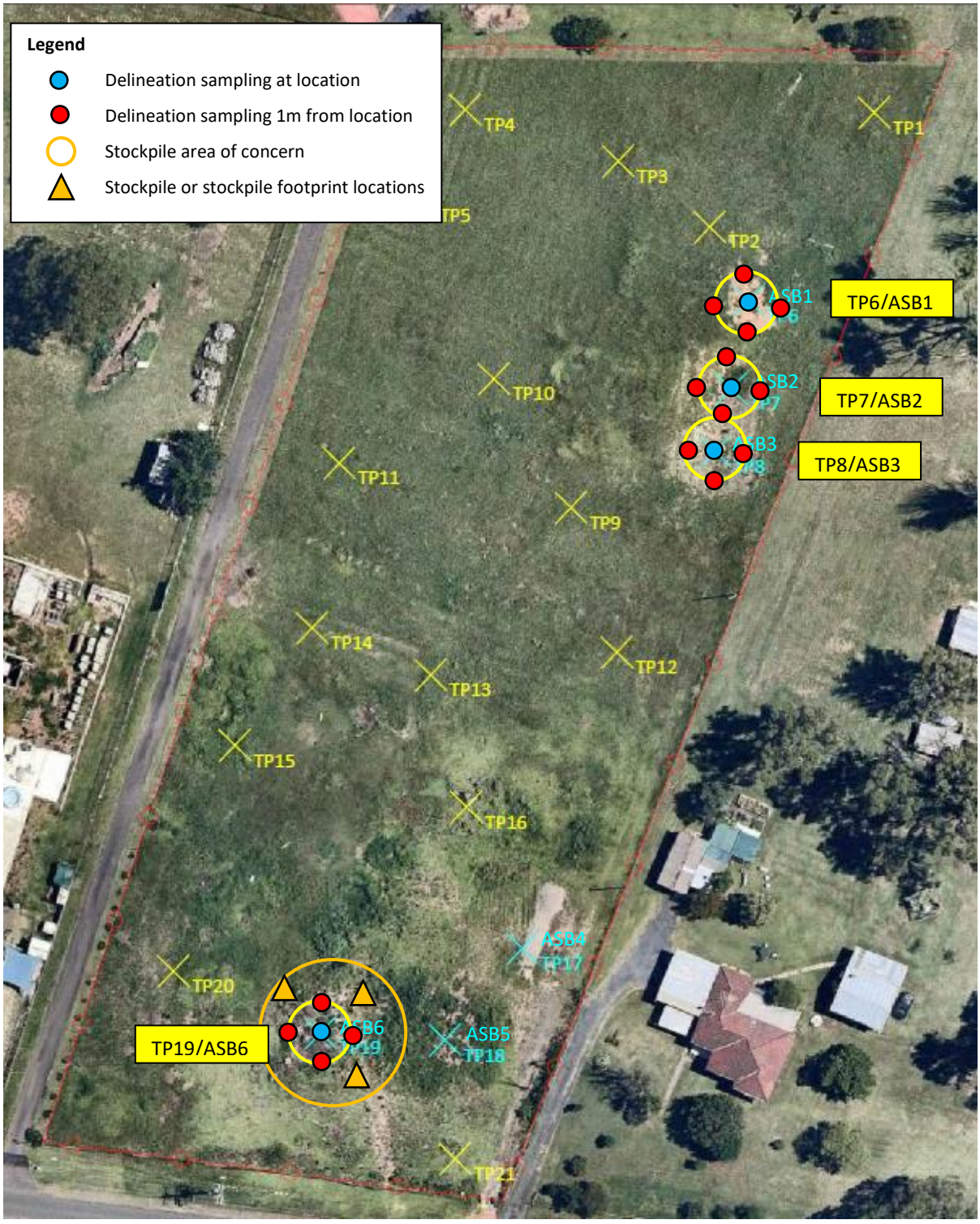


Figure 5: site aerial photograph indicating, proposed delineation site sampling plan showing location of the delineation sampling at and around each of the potential Hotspot locations.

envirotech Environmental Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

The number of delineation sampling locations to properly characterise the potential hotspots include:

- Potential Hotspots TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 at 0-100mm and 300-400mm depths BGL to determine the vertical extent of potential asbestos contamination (**blue**); and
- 1000mm (north, south east and west) around the centre of the potential hotspots TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6 at 0-100mm and 300-400mm depths BGL to determine the lateral and vertical extent of potential asbestos contamination (**red**).

Sampling for QA/QC purposes as follows:

- Field quality sampling regime sufficient with at least 1 duplicate / triplicate per 20 primary samples per sampling event and per sampling date.
- Rinsate collected / analyses for contaminants of concern (COC) at one per batch per sampling date.

7.3 Sampling Methodology

Delineation soil sampling will be carried out in general accordance with Envirotech Fieldwork Protocols. In summary:

- Soil samples will be collected using a hand auger. Soil samples will be collected from the near surface 100mm fill layer and 300mm depth BGL. Additional samples will be collected where there is visual evidence of contamination; and
- Sampling will occur at the exact location where previous sampling occurred and again at four (4) locations 500mm away from the centre location at two depths. Additional samples will be collected where there is visual evidence of contamination.

Sampling of asbestos will be undertaken as follows:

- A minimum 10L sample from each sample location will be recovered
- Each sample (minimum of 10 L) will be screened through a 7mm sieve and the material retained on the sieve examined for any bonded ACM and / or suspect material and forwarded to the laboratory for analysis if any suspected ACM is encountered
- If visible FA material is present or suspected, the soil should be wetted to minimise the release of fibres
- Identified bonded ACM and FA should be weighed for each sample and
- One wetted 500ml sample from each sampling location will be submitted to a NATA accredited laboratory for analysis for AF. Soil asbestos analysis should comply with Australian Standard Method for the Qualitative Identification of asbestos in bulk samples (AS4964–2004).

Sampling of stockpiles will be undertaken as follows:

- Stockpile sampling will be collected at a rate of 1:25m^3
- Samples will be collected at various depths within the stockpile
- If the stockpiles have been already removed from site then samples will be collected from the stockpile footprint areas, minimum of 3 samples collected

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 4120538
Version: 1, Version Date: 08/05/2020

- During the collection of soil samples, any features such as seepage, discoloration, staining, odours, or other physical indicators of contamination were noted.
- Soil Samples were transferred directly from the test pits into laboratory supplied 250 mL sample jars sealed with Teflon lids
- Asbestos samples were collected in asbestos sample bags and zip locked.
- The samples were stored in a chilled esky and transferred to ALS Environmental Division under stringent chain of custody (COC) procedures.

7.4 Soil Laboratory Analysis

Delineation Soil samples will be analysed in a NATA-accredited laboratory under Chain of Custody conditions for a selection of the following:

- Asbestos %w/w

Stockpile / stockpile footprint samples will be analysed in a NATA-accredited laboratory under Chain of Custody conditions for a selection of the following:

- Heavy Metals, TRH, BTEX, PAH, Phenols, PC, OC/OP Pesticides and Asbestos %w/w

Field QA/QC samples will also be collected and analysed for the above analytes in accordance with the QA/QC Plan below.

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

8. QUALITY CONTROL / ASSURANCE PLAN

8.1 Field QA/QC

The following procedures should be adopted to minimise cross-contamination between sampling locations and to adopt appropriate measures in the transport and storage of samples:

- Any non-dedicated equipment will be decontaminated in between sampling locations, including hand trowel, where used
- QA/QC samples will be collected in accordance with the sampling frequencies specified in Section 5.2
- All glass bottles should be individually bubble wrapped for protection and insulated containers/coolers should be used for sample shipment
- Soil and groundwater sample containers other than asbestos bags will be placed immediately into a chilled cooler box and dispatched to their respective analytical laboratories on the same day. If this is not possible, samples will be temporarily held overnight in the Envirotech office refrigerator at a temperature of no greater than 4ºC and dispatched the following day
- All samples will be dispatched to a NATA-accredited laboratory (or to an EPA approved laboratory for soil vapour samples) under Chain of Custody conditions
- A Chain of Custody form (CoC) will be fully completed for all samples collected and included with the samples for transport and laboratory submission. The CoC will include the laboratory analysis requirements and
- Samples must be delivered to each respective laboratory within relevant holding times.

8.2 Data Quality Indicators

The five Data Quality Indicators (DQIs) comprising completeness; comparability; representativeness; precision and accuracy provide an assessment of the reliability of field procedures and laboratory analytical results in accordance with the NEPM 2013 Schedule B2 Site Characterisation Appendix C. These are addressed in the following sub-sections.

8.3 Completeness

Data Completeness is a measure of the amount of useable data (expressed as %) from a data collection activity. The completeness is equal to the percentage of valid quality assurance and quality control results.

Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

The assessment should address the following:

Table 11: Data Completeness

Field	Laboratory
• All critical locations are sampled • All samples collected from critical grids and depths • Consistency in the use of standard operating procedures, equipment, sampler • Completion and correctness of field documentation.	• All critical samples and analytes are analysed in accordance with the RAP; • Appropriateness of laboratory methods and PQLs.

The minimum target frequency for each type of QA/QC sample should be carried out in accordance with the following tables:

Table 12: QA/QC Sample Frequency

Field QA/QC Sample	Frequency (Soil)	Frequency (Groundwater)
Intra-Laboratory Duplicate	1 in 20 samples	1 in 10 samples
Inter-Laboratory Duplicate	1 in 20 samples	1 in 10 samples
Field Blanks	1 per day	1 per day
Trip Blank	1 per day	1 per day

Where any of the above objectives are not achieved for particular samples, steps will be taken to rectify the non-conformance, if possible. Alternatively, data qualifiers detailing the nature of the quality problem will be documented in the report and attached to relevant data in the result summary tables.

The target for overall completeness for each data set is a minimum of 95%. A data completeness of less than 95% may be accepted where it can be justified that the non-conformance does not have a significant effect on the outcome of the results.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

8.4 Comparability

Data Comparability is the confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event.

The qualitative assessment should address the following:

Table 13: Data Comparability

Field	Laboratory
• Consistency in the use of standard operating procedures, equipment, sampler • Consistency in the method of sample collection for each media • Quantification of influence by climatic conditions.	• Consistency of analytical methods and limits of reporting (LOR) for each analyte • Whether laboratory limits of reporting are set at < 20% of the adopted site criteria value for each analyte • Consistent use of one primary and one secondary laboratory

8.5 Representativeness

Data Representativeness is the confidence (expressed qualitatively) that data are representative of each media present on the site.

The qualitative assessment should address the following:

Table 14: Data Representativeness

Field	Laboratory
• Samples are collected in accordance with the SAQP • Receipt of samples within holding times • Receipt of intact samples • Receipt of adequately preserved samples.	• All samples are extracted and analysed within their respective holding times.

Document Set ID: 9120538
Version: 1, Version Date: 08/05/2020

8.6 Precision

Data Precision is a quantitative measure of the variability (or reproducibility) of data.

Intra-laboratory or Inter-laboratory Duplicate Samples (B) results are compared with Primary Sample (A) results using Relative Percentage Differences (RPDs) according to the following formula:

$$\%RPD = \left|\frac{A - B}{A + B}\right| \times 200$$

Duplicate sampling rates for this assessment (**for each separate sample batch**) are to be tested for all the same analytes as the primary sample:

Table 15: Data Precision

Type of QC Sample	Control Limit
Field Intra-Laboratory Duplicate (Blind)	RPD < +/- 30-50%
Field Inter-Laboratory Duplicate (Split)	RPD < +/- 30-50%

Where the laboratory has reported results for a particular analyte below the limit of reporting for either the primary sample or a duplicate sample, the RPD is reported as 'Not Calculable' or NC. A discussion should be made as to which sample should be adopted and compared against the relevant assessment criteria. However, no discussion is required where both the primary sample and the duplicate sample for a particular analyte are below the limit of reporting.

8.7 Accuracy

Data Accuracy is a quantitative measure of the closeness of reported data to the true value. Laboratory measured recovery of analytes in lab control samples with known concentrations. Laboratory QA/QC testing is to include:

Table 16: Data Accuracy

Laboratory QA/QC Sample	Frequency
Method Blank	1 per 20 samples
Matrix Spike	1 per 20 samples
Laboratory Duplicate	Laboratory defined
Laboratory Control	Laboratory defined
Surrogate Spike	All organic samples

9. REMEDIATION OPTIONS

9.1 Overview

With regard to site remediation, the Environment Protection Authority (EPA) endorses the Policy of the 1992 Australian and New Zealand Environment and Conservation Council (ANZECC) and National Health and Medical Research Council (NHMRC) Guidelines for the Assessment and Management of Contaminated Sites. Furthermore, the threshold concentrations presented in the NSW DECC Third Edition 2017 Guidelines for the NSW Site Auditor Scheme and the National Environment Protection (Assessment of Site Contamination) Measure 2013 (NEPM) are considered as appropriate soil and groundwater clean-up criteria.

For groundwater, the ANZECC 2000 Guidelines for Fresh and Marine Water Quality have been generally accepted by the NSW EPA as appropriate investigation levels along with criteria outlined in the National Environment Protection (Assessment of Site Contamination) Measure 2013. The NSW EPA Service Station Guidelines also provide reference guidelines. In addition, the NSW EPA 2009 Waste Classification Guidelines have been used as the basis of technical review for the waste disposal options most applicable to the site.

A risk management approach has provided the basic principle of the remediation technologies/methods selected for the Site. This approach is consistent with the strategy outlined in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC, 1992) and the National Environment Protection (Assessment of Site Contamination) Measure 2013, which are endorsed by NSW EPA.

A contaminated site, as defined by the NEPM 2013 and the ANZECC 1992, is a site at which hazardous substances occur at concentrations above background levels, and where assessment indicates it poses, or is likely to pose, an immediate or long-term hazard to human health or the environment.

Wherever human health is at risk, either on or off-site, or the off-site environment is at risk, a contaminated site should be remediated to the extent necessary in order to minimise such risks in both the short and long terms.

Environmental and Human Health Risk is based on exposure to potential hazards and is defined as:

Risk = Hazard x Exposure

The elimination of the risk can be achieved by the removal of the hazard and/or the exposure pathway. Remediation is defined as any measure that removes the risk to an acceptable level by negating the hazard or exposure pathway. Therefore, remediation can involve removal of the hazard (i.e. no risk remains) or alternatively, management of the risk by removal of the exposure pathway even if the hazard remains. Exposure pathways to contaminated material can be managed by undertaking a physical action (e.g. erection of a fence, installation of cap, etc.) and/or a management plan, which prevents exposure to contaminants (e.g. use of planning controls, management of site activities etc.).

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120538
Version: 1, Version Date: 08/05/2020

9.2 Typical Remedial Options Available

Several remedial options were reviewed. The suitability of the remedial options was examined with respect to the requirements of the proposed development, whilst taking into account the provisions of a number of relevant guideline documents, including:

- ANZECC/NHMRC document Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Lands 1992 (ANZECC 1992).
- Department of Environment and Conservation (now DECCW), Contaminated Site: Guidelines for the NSW Site Auditor Scheme (3rd Edition) 2017.
- ANZECC, Guidelines for the Assessment of On-site Containment of Contaminated Soil' (ANZECC 1999).
- NSW EPA Best Practice Note: Landfarming (NSW EPA, 2014).

Typical remedial options that may achieve the remedial objectives are identified as:

- Removal of contaminated material to landfill
- Encapsulation of the contaminated soils by a physical barrier system or
- On-site treatment and re-use of contaminated material.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

10. SELECTION OF PREFERRED REMEDIATION STRATEGY

10.1 Evaluation of Remediation Options

A summary of the hierarchical policy for site remediation options (Guidelines for the NSW Site Auditors Scheme NSW DEC 2017) is as follows:

1. On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level
2. Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site
3. Removal of contaminated soil to an approved site or facility, followed where necessary by replacement with clean fill
4. Bioremediation which uses naturally occurring micro-organisms, such as bacteria and fungi, to eliminate, attenuate or transform polluting or contaminating substances in soils and
5. Consolidation and isolation of the soil on site by containment within a properly designed barrier.

An evaluation of remedial options was considered as follows:

- **Do nothing** – Whereby no remediation is undertaken, and impacted soil remains on site. Given the sensitive nature of the proposed development, including residential and commercial uses, this option is not considered suitable.

- **On-site containment** – Given that this option will result in the site recorded on the Register of Contaminated Sites under section 21(A) of the Environmental Protection Act 1997, it is the least preferred option in the hierarchy of remediation options as outlined above.

- **On-site treatment and re-use of contaminated land** – This strategy is feasible for some contaminants such as bacterial contamination. Bacterially contaminated soil is excavated and then spread thin over plastic exposed to the sun for seven days. This can be carried out by the caretaker/owner of the site. This is an advantageous strategy as the soil, once exposed to the sun, is reusable onsite.

- **Excavation to offsite** – This remedial strategy involves the complete removal of impacted soil from the site for disposal at an appropriately licensed waste management facility. The advantage of this strategy is that it removes the contaminants and their associated problems from the site. The disadvantage is that it is typically more costly than on-site containment and off-site transport of contaminated soil increases the risk of exposure within the surrounding community.

- **Bioremediation** – This remedial strategy involves 'landfarming' wherein engineered bioremediation systems which generally use tilling or ploughing of impacted soils to reduce contaminant levels biologically. Another well-practiced system of bioremediation uses forced air that actively aerates the contaminated mass to encourage bioremediation.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 4120538
Version: 1, Version Date: 08/05/2020

10.2 Preferred Remediation Option

Based on an assessment of the options and considering the proposed land-uses and development, the remediation option which should be adopted for the site is **excavation of contaminated soil offsite**.

Excavation Offsite

The excavation to offsite is considered to be the most appropriate remedial strategy for the majority of the development area. The sensitive nature of the potential inhabitants for the proposed are key to this remediation recommendation. Off-site disposal of contaminated soil is considered a suitable option for managing human health and environmental impacts from the contaminated materials. Off-site disposal harnesses the excavation of soil, classification of spoil, and disposal to a facility which can legally receive it.

The EPA permits disposal of contaminated material subject to an approved landfill. The DECC Waste Classification Guidelines (2009) document sets out the methodology for assessing and classifying wastes to be disposed to landfill. Essentially, wastes are classified into General Solid (Non-putrescible), General Solid (Putrescible), General Solid – Special Waste Asbestos, General Solid – Restricted Waste and Hazardous Waste.

The selection of an appropriate landfill will normally depend largely upon the results of classification of the wastes. It is sometimes necessary for heavily contaminated soils to be pretreated prior to disposal, to reduce the concentrations or minimise the mobility of the contaminants. Special criteria are sometimes applicable to certain categories of waste. Contaminants covered by Chemical Control Orders have restrictions placed on their handling and disposal.

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

11. IMPLEMENTATION OF SELECTED REMEDIAL STRATEGY

11.1 Roles and Responsibilities

Principal and Principals Representative

- The Principal's representative, Impact Group Pty Ltd, is responsible for the environmental performance of the proposed remediation works, including implementation of acceptable environmental controls.

Principal Contractor and Site Manager

- The Principal Contractor (referred to herein as the Contractor) is anticipated to be the party responsible for the day-to-day implementation of this RAP and shall fulfil the responsibilities of the Principal Contractor as defined by SafeWork NSW.
- If hazardous materials (Asbestos) are identified, SafeWork NSW licensed contractors are to be commissioned to safely remove them from site and dispose of them at a suitably licensed waste disposal facility (tickets retained for proof).
- Furthermore, Principle Representative, Principal Contractor and Site Manager will be responsible for implementing the Remedial Environmental Monitoring Plan (REMP) including:
    - Notification of adjoining residents and local planning authority (involved in remedial works) prior to commencement of remedial works
    - Define hours of operation (complying with council requirements)
    - Define roles and responsibilities for relevant parties to provide contact details
    - Traffic control measures
    - Handling of contaminated material
    - Odour control measures
    - Stockpiling of excavated soils on site and
    - Complaints and how they will be handled.

7.2 Remediation Process – Excavation Offsite

ACM Hotspots

If asbestos contamination is identified above the adopted site criteria within the potential hotspot areas TP6/ASB1, TP7/ASB2, TP8/ASB3 and TP19/ASB6, then the following remediation processes apply:

- Licensed contractors are to be commissioned to safely remove contaminated soils and dispose of them at a suitably licensed waste disposal facility (tickets retained for proof)
- According to the NSW EPA Sampling Guidelines for a site with a size of 10,250m^2, the diameter of the Hotspot that can be detected with 95% confidence is approximately 25.7m diameter.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

For each identified contaminated Hotspot(s)

- excavate the area 25.7m diameter around the hotspot x 1.0m depth *(0.5m below the sampling location)*. Estimated volume (using πr^2) = **471m^3 per hotspot area**
- excavated soil surfaces should be visibly clean residual soil material
- unless tested and proven otherwise, the contaminated material from the Hotspot locations will be disposed of offsite at a licensed facility as **Special Waste (Asbestos)**.
- if the material is transported interstate it must be tracked and monitored using an NSW EPA approved tracking waste system.

Note: additional excavations/chasing out of contaminants may be required should further visible contaminants are identified within each of the hotspot areas.

Stockpile Hotspots

If contamination is identified above the adopted site criteria within stockpile areas within the southern portion of the site, then the following remediation processes apply:

- Licensed contractors are to be commissioned to safely remove contaminated soils and dispose of them at a suitably licensed waste disposal facility (tickets retained for proof)
- According to the NSW EPA Sampling Guidelines for a site with a size of 10,250m^2, the diameter of the Hotspot that can be detected with 95% confidence is approximately 25.7m diameter.

For each identified contaminated Hotspot(s)

- excavate the area 25.7m diameter around the stockpile area x 0.1m depth. Estimated volume (using πr^2) = **471m^3 per hotspot area**
- excavated soil surfaces should be visibly clean residual soil material
- Any soil to be removed from the site shall be classified in accordance with the NSW EPA (2014) "*Waste Classification Guidelines, Part 1: Classifying Waste"* before it can be disposed of off-site.
- if the material is transported interstate it must be tracked and monitored using an NSW EPA approved tracking waste system.

Note: additional excavations/chasing out of contaminants may be required should further visible contaminants are identified within each of the hotspot areas.

7.3 Occupational Health and Safety (OHS)

- All transport of waste and disposal of materials must be conducted in accordance with the requirements of the POEO Act
- Removal of waste materials from the site shall only be carried out by suitably licensed contractors holding consent and/ or approvals to dispose of the waste materials per the assigned waste classification; and
- Asbestos containing soils are to be safely disposed at a facility licensed to receive such waste with receipts retained for proof of safe and appropriate disposal.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120758
Version: 1, Version Date: 08/05/2020

7.4 Waste Classification

- TP6/ASB1, TP7/ASB2, TP8/ASB3 & TP19/ASB6 – Special (Asbestos) Waste.
- Stockpile material should be characterised before disposal to appropriately licensed landfill facility. Excavated soils that require temporary stockpiling should be placed on a heavy-duty plastic sheet or a sealed surface such as concrete and covered with an impermeable plastic sheet to prevent rain infiltration and dust-dispersion.
- Any soil to be removed from the site shall be classified in accordance with the NSW EPA (2014) "*Waste Classification Guidelines, Part 1: Classifying Waste"* before it can be disposed of off-site.

7.5 Validation Goals/Implementation

If contamination is identified after the delineation sampling around each of the potential ACM hotspot areas and Stockpile areas, then following applies:

- The validation goals are to have no contaminated soils remaining in the area of concern
- A validation certificate must be provided by a suitably qualified occupational hygienist, environmental scientist or equivalent person for each Stage of the proposed residential development
- Validation will involve a validation soil sampling and laboratory analysis regime as per follows:
    - Validation sampling for the contaminates of concern around each wall one validation sample per each wall face (or one sample every 5m of excavated wall) of the excavated hotspot pit(s), additional discretionary samples if necessary
    - Validation sampling for the contaminants of concern a minimum of three (3) validation samples from the base/floor of the excavated hotspot pit(s), additional discretionary samples if necessary
    - Each validation sample retrieved will be analysed for the contaminate of concern

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

12. ENVIRONMENTAL MANAGEMENT PLAN

12.1 Introduction

A major component of the remedial works shall involve the installation and maintenance of an Environmental Management Plan (EMP). The EMP will provide details of the environmental protection and pollution control measures to be implemented during the operational phase of the remedial works. The pollution control measures have the objective of removing/minimizing any adverse impact on the surrounding environment.

In the following sections, outlines have been presented of the various pollution control measures that would be implemented during most elements of the remedial works. These form the basis of the Environmental Management Plan that should be read in conjunction with this document.

12.2 Site Fencing

Reasonable measures need to be taken to ensure the site boundary remains secure during all remedial site works. Secure temporary fencing is required to be in place for the duration of site works with gates secured and locked outside of site operating hours to prevent unauthorized access.

12.3 Erosion Sediment Control Plan

An erosion and sediment control plan will be prepared for the site. Erosion and run-off control measures will be implemented during all elements of remedial works. Typically, these measures will be designed to prevent the transport of pollutants (including sediments) out of the remediation area (including the designated stockpile areas) via surface run-off. Such measures typically include:

- Minimizing disturbed areas
- Sediment control fencing
- Stabilized site access points
- Strict excavation times tables and
- Prompt rehabilitation of disturbed areas.

12.4 Noise Control Plan

The Principal Contractor and Site Manager will be responsible for keeping noise levels to a minimum and not exceed limits outlined in AS 2436-1981. Noise levels must comply with Council and NSW EPA requirements. It is expected that equipment and machinery used onsite will not generate noise levels above this requirement.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

12.5 Dust Control Plan

Dust generation should be kept to an absolute minimum. Dust control measures will be implemented to ensure that dust generated from the site is controlled within acceptable levels. These control measures will be developed considering the site conditions in each remediation area, and are likely to include (but not necessarily be limited) to the following:

- All vehicles leaving the site will be hosed down to remove any potentially contaminated dust
- A water cart or equivalent will be utilized on-site to keep vehicle paths and areas of site work damp to minimise dust generation
- Access to water sprays shall be available to water down excavation / loading areas and
- Plastic sheeting shall be available to cover excavation faces and stockpiles.

12.6 Stormwater Control and Groundwater Management Plan

A stormwater control plan will be prepared for the site. Stormwater and run-off control measures will be implemented during all elements of remedial works. Minimisation of stormwater runoff will prevent contaminated media moving through the water column, into uncontaminated portions of the site, neighbouring properties or into council stormwater systems and are likely to include (but not necessarily be limited) to the following:

- Covering stormwater drains on Mount Vernon Road with filter drain socks or silt traps or hay bales (or similar); and
- Diverting run-off around stockpiles so that surface water collects in a low point on site and does not drain into neighbouring properties or Brocks Ln.

Any groundwater encountered during excavation works will be transferred to and stored onsite in trenches and sumps. No discharge of groundwater will occur without approval of appropriate regulatory bodies.

12.7 Odour Control Plan

All potential odours generated during remedial action is taking place must be monitored and comply with local Council and NSW EPA requirements. Due to the type of contamination present onsite, odours is not expected to be an issue onsite but may still be encountered.

12.8 Health and Safety

A Work Health and Safety (WHS) plan is an essential part of all remediation projects, to ensure the health and safety of all personnel working on or visiting the site. All remediation work would be undertaken in accordance with the provisions set out by the Work Health and Safety Act (2011) and associated Regulations 2011, and any other regulations or directions set out by regulatory authorities.

- Prior to commencing any remediation works, a specific WHS Plan would be prepared by the Remediation Contractor covering the following minimum aspects:

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

- Method statements
- Identification of the remediation area and exclusion zones
- Induction of personnel
- Personal protective equipment (PPE)
- Hazard identification / locations
- Identification of contaminants of concern and their physical and toxicological properties
- Description of exposure pathways and personal protection requirements
- Location of all underground/aboveground services
- Details of specific work practice procedures to be followed within the designated contaminated areas
- Monitoring protocols to identify a potentially hazardous practice
- Emergency information and
- Incident reporting.

12.9 Onsite Stockpiles

Stockpiles should be managed to minimise the risk of dust generation, erosion and leaching. The measures required to achieve this will depend on the materials in the stockpile and the length of time the stockpile is to remain on site, but should include:

- Restrict the height of stockpiles to reduce dust generation
- Construct erosion, sediment and runoff control measures
- Cover stockpiles of contaminated soils to be left on site no more than 24 hour and
- Keep temporary stockpiles moist, by using water spray where required.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

13. UNEXPECTED FINDS PROTOCOL

13.1 Management

Where earthworks are required there is potential to expose unexpected forms of contamination within the surface and subsurface. In such instances, action is required to mitigate potential contaminated soil/material encountered during excavation or construction activities. If potentially contaminated material is encountered the Unexpected Finds Protocol is to be followed. Works in the vicinity will be stopped or modified and will not recommence until the material has been analysed and management measures developed.

13.2 Training

Personnel involved in earthworks on site are to be inducted on the identification of potential unexpected finds and asbestos awareness. The induction can be undertaken at the time of general site induction and refreshed periodically at toolbox meetings. Induction to provide awareness of all types of possible unexpected finds is not practicable. In general, a precautionary approach can be employed and the unexpected finds procedure outlined in the following sections should be implemented.

13.3 Procedure

Personnel involved in earthworks on site are to be inducted on the identification of potential unexpected finds and asbestos awareness. The induction can be undertaken at the time of general site induction and refreshed periodically at toolbox meetings. Induction to provide awareness of all types of possible unexpected finds is not practicable. In general, a precautionary approach can be employed and the unexpected finds procedure outlined in the following sections should be implemented.

Should an unexpected actual or suspected contamination be encountered during the development works, the following procedure applies:

1. Stop work in the potentially hazardous area as soon as it is safe to do so and move to the upwind side of the area, or away from the area.

2. Assess the potential immediate risk to human health posed by the unexpected find and assess if evacuation or emergency services need to be contacted.

3. Delineate an exclusion zone around the affected area using fencing and/or appropriate barriers and signage. Additional control measures may be required for odours and/or volatile compounds: odours suppression and no smoking signage.

4. Contact the appointed environmental consultant for advice and request a site visit to undertake an assessment of the unexpected find. The Site Supervisor should be informed of the find once a preliminary assessment is made.

5. The environmental consultant will assess the unexpected find and provide advice regarding:

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

a) Preliminary assessment of the contamination and need for immediate management controls;

b) What further assessment and/or remediation works are required and how such works are to be undertaken in accordance with contaminated site regulations and guidelines;

c) Preparation of an addendum to the remediation action plan (if necessary) or provide clean up advice;

d) Remediation works required (where applicable);

e) Validation works required following remediation works (if applicable).

6. Works are not to recommence in the affected area until appropriate advice has been obtained from the environmental consultant and the environmental consultant has provided relevant information to the Site Supervisor, particularly for considering change to the Site Safety Plan.

7. If it is deemed safe to do so by the Site Supervisor, works may resume in the affected area.

Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

14. CONCLUSION

The Site can be made suitable for the intended land-use through remedial action as part of the redevelopment works in accordance with State Environmental Planning Policy No.55 Managing Land Contamination: Planning Guidelines SEPP 55.

In conclusion, the RAP:

- Has been developed in a manner consistent with current industry practice;
- Has selected a preferred remediation strategy based on the site-specific issues and currently available technologies that will allow the site to be made suitable for the intended land use;
- Has presented an outline of the Environmental Management Plan (EMP) and associated contingency plans to ensure the environment is appropriately protected during the proposed works;
- Has presented an information and consultation program to ensure the stakeholders are informed of the works as they proceed; and,
- Has outlined the means of validation of the completed works and ongoing management.

envirotech Environmental and Engineering Consultancy Services
Document Set ID: 9120535
Version: 1, Version Date: 08/05/2020

15. REFERENCES

- Protection of the Environment Operations Act (1997);
- Protection of the Environment Operations Regulation (2008);
- Contaminated Land Management Act (1998).
- Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme (3rd Edition, 2017).
- State Environmental Planning Policy No.55 (SEPP55) – Remediation of Land (2018)
- NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (2011).
- NSW EPA Sampling Design Guidelines (1995).
- NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014).
- NSW EPA Guidelines for Assessing Former Orchards and Market Gardens (2005)
- Guidelines on the Investigation Levels for Soil and Groundwater, National Environmental Protection Measure 1999, 2013 Amendment (NEPC, 2013).
- Australian Standard AS 4482.1 Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.
- Australian Standard AS 4482.2 Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances.
- CRC CARE Technical Report No. 39: Risk-based remediation and management guidance for benzo(a)pyrene (2017).
- Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 (NSW DECCW, 2009).
- Guidelines for the Assessment and Management of Groundwater Contamination (NSW DEC, 2007).
- Guidelines for the Assessment, Remediation & Management of Asbestos - Contaminated Sites (WA DOH, 2009).
- "Technical Report on Synthetic Mineral Fibres' in Technical Report on Synthetic Mineral Fibres and Guidance Note on the Membrane Filter Method for the Estimation of Airborne Synthetic Mineral Fibres" (National Occupational Health and Safety Commission, 1990);

envirotech Environmental and Engineering Consultancy Services

Document Set ID: 9120538
Version: 1, Version Date: 08/05/2020

16. LIMITATIONS

The information contained within this report have been prepared exclusively for the client. Envirotech has carried out the investigation with a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia. No other warranty, expressed or implied, is made or intended. This report is to be read in its entirety including attachments and appendixes and should not read in individual sections.

A third party should not rely upon the information prior to making an assessment that the scope of work conducted meets their specific needs. Envirotech cannot be held liable for third party reliance on this document.

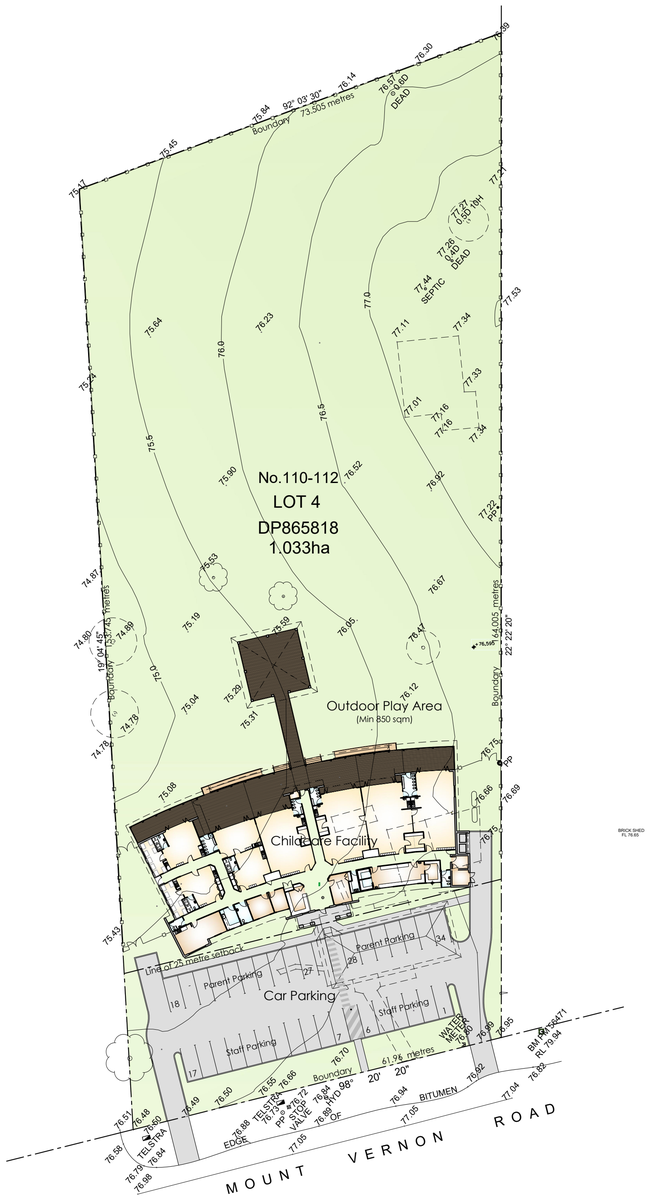
The sub-surface environment can vary greatly across an individual site. The conclusions presented in this report are based on limited investigation of conditions at specific sampling locations chosen to be as representative as possible under the given circumstances. However, it is possible that this investigation may not have encountered all areas of contamination at the site due to the limited sampling and testing program undertaken.

Envirotech's professional opinions are based upon its professional judgment, experience, training and results from analytical data. In some cases further testing and analysis may be required, thus producing different results and/or opinions. Envirotech has limited its investigation to the scope agreed upon with its client.

envirotech
Environmental and Engineering Consultancy Services
Document Set ID: 8120535
Version: 1, Version Date: 08/05/2020

APPENDIX A: DEVELOPMENT PLANS

Document Set ID: 9120535
Version: 1, Version Date: 09/05/2020



SITE PLAN
SCALE 1:500

PART SITE PLAN
SCALE 1:200

0 1 2 3 4 5 10
SCALE - 1:200 @ A1 METRES

Concept Design Plans

PROJECT WORKS DESIGN

Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Design Pty Limited.

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

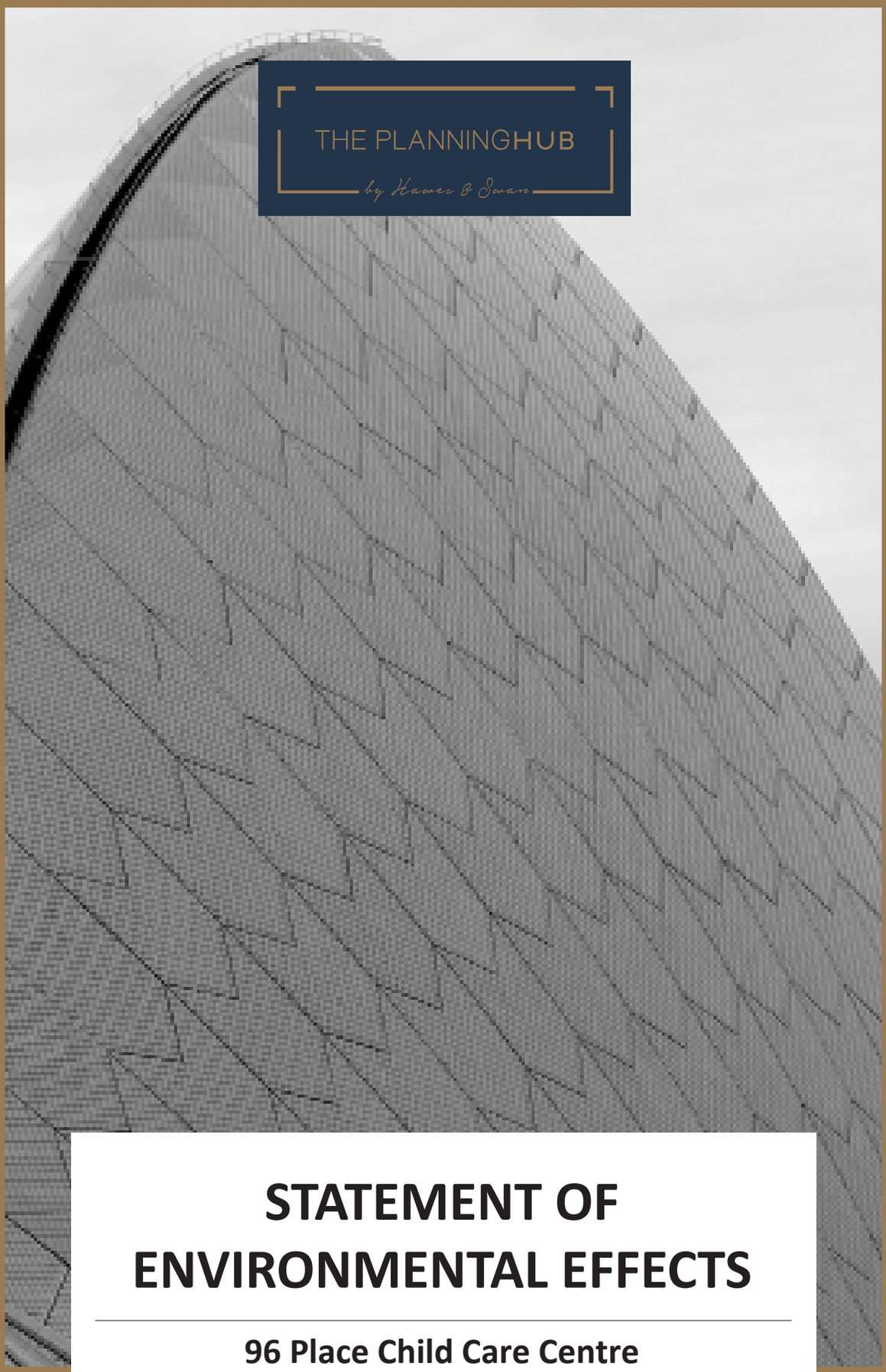
Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: Proposed Site Plan
Drawn: GM
Date: 01.11.18
Checked: GM
Scale: 1 : 500 / 1:200 @A1
Dwg No. SK01
Job No. 18307
Issue: B

Document Set ID: 9449588
Version: 1, Version Date: 08/05/2020



THE PLANNINGHUB

by Hawes & Swan

STATEMENT OF ENVIRONMENTAL EFFECTS

96 Place Child Care Centre
110-112 Mount Vernon Road,
Mount Vernon

Document Set ID: 9063595
Version: 1, Version Date: 18/02/2019

CONTACT INFORMATION

THE PLANNINGHUB by Hawes & Swan
ABN 27 605 344 045
Suite 4, Level 4,
35 Buckingham Street,
Surry Hills New South Wales 2010

www.theplanninghub.com.au

Author(s):

Matthew Jessup
Town Planner

Approved by:

Mairead Hawes
Director

DOCUMENT INFORMATION

Prepared For:	Vladimir Vanovac
Project Name:	110-112 Mount Vernon Road, Mount Vernon
Job Reference:	19/380 V1
Date Approved:	16 December 2019

© The Planning Hub by Hawes & Swan. Reproduction of this document or any part thereof is not permitted without prior written permission of The Planning Hub by Hawes & Swan. The Planning Hub by Hawes & Swan operate under a quality management system. This report has been prepared and reviewed in accordance with that system. If the report is not signed, it is a preliminary draft.

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

Table of Contents

1.0	Introduction	6
1.1	Project Context	6
2.0	Background Withdrawn Development Application	6
3.0	Site Analysis	13
3.1	Location and Context	13
3.2	Site Description	14
3.3	Existing Site Conditions	14
4.0	Proposed Development	15
4.1	Access and Car Parking	15
4.2	Geotechnical Works	16
4.3	Infrastructure & Services	16
4.4	Landscaping	16
4.5	Built Form and Design	17
4.6	Safety and Security	17
5.0	Assessment of Environmental Impacts	20
5.1	Statutory Planning Framework and Compliance	20
5.2	Noise Impacts	25
5.3	Social and Economic Impacts	26
5.4	Site Suitability	26
5.5	Public Interest	26
6.0	Conclusion	27

Document Set ID: 9463595
Version: 1, Version Date: 18/12/2019

Appendices

A *Architectural Drawings*
Project Works Design

B *Childcare Planning Guideline – Compliance Table*
The Planning Hub

C *Penrith Local Environmental Plan 2010 – Compliance Table*
The Planning Hub

D *Penrith Development Control Plan 2014 – Compliance Table*
The Planning Hub

E *Survey Plan*
Pinnacle Land Surveyors

F *Acoustic Report*
Acoustic Logic

G *Traffic and Parking Report*
GTK Consulting

H *Geotech Report*
Greywacke Geotechnics

I *Stormwater Concept Plan & Water Sensitive Urban Design Documents*
Australian Consulting Engineers

J *Access Report*
Lindsay Perry Access

K *Landscape Plan*
Tessa Rose Playscape and Landscape Design

L *BCA Compliance Assessment*
BCA Vision

M *Section J Report*
Applications Solutions

N *On-site Wastewater Assessment Report*
Envirotech

O *Operational Wastewater Management Plan*
Envirocycle

P *Phase two (2) Contamination Report*
Envirotech

Q *Remediation Action Plan*
Envirotech

R *Waste Management Plan*
Mark Toma

S *Operational Plan of Management*
Dale Eadie

T *Emergency Management and Evacuation Policy*

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

Dale Eadie

U *Structural Engineers Report*
ODG Consulting

V *Pram Specifications*
Redsbaby

Document Set ID: 9463595
Version: 1, Version Date: 18/12/2019

1.0 Introduction

This Statement of Environmental Effects (SEE) accompanies a Development Application (DA) submitted to Penrith Council by Vladimir Vanovac c/o The Planning Hub. This DA proposes a 96-place childcare centre at 110-112 Mount Vernon Road, Mount Vernon.

This SEE provides a detailed description of the site and the proposal and provides an assessment of the proposal against the relevant heads of consideration set out in Section 4.15 of the *Environmental Planning and Assessment Act, 1979 (EP&A Act)*. That assessment has found that the proposal:

- Meets the current objectives of the LEP and DCP where applicable;
- Will not result in significant negative impacts on surrounding land uses and environment;
- Is responsive to site context and presents a positive visual relationship with surrounding uses; and
- Is strongly in the public interest.

The SEE forms part of a suite of documents that are submitted in support of the application attached as **Appendices A-V**.

1.1 Project Context

The site is located to the north of Mount Vernon Road and is located in the local government area of Penrith Council. The land is described as No's. 110-112 Mount Vernon Road, Mount Vernon. The site is rectangular in shape, covering an area of approximately 10,330m^2.

This application proposes a 96-place childcare centre for children aged between 0-5 years of age. The proposed development will aim to contribute to the community of the Mount Vernon locality, by providing a child care service that caters to the increasing demand in the local area.

The key aims of this project can be summarised as follows:

- The provision of a well designed child care centre that provides a service to meet the needs of young families within the Mount Vernon locality; and

- The design of the child care centre will be compatible with the existing residential context, ensuring that the built form of the centre will be compatible with the streetscape.

2.0 Background Withdrawn Development Application

A Pre-DA meeting was held with Council on the 20th of November 2018 between Council and the proponent. The matters discussed at the meeting were documented in the formal response from Council received on the 27th of November 2018. Council's advice has been taken into consideration in the formulation of this Development Application.

Document Set ID: 9463695
Version: 1, Version Date: 18/12/2019

On 23 May 2019, the Development Application - **DA19/0343** was lodged for the Construction of a Single Storey Child Care Centre to Accommodate 118 Children Including at Grade car Parking to Accommodate 34 Car Parking Spaces, Associated Signage and On-Site Waste Management. On August 9 2019, the Planning Hub received notification that the application would not be supported in its current form based on the information provided at the time of lodgment. Consequently, the DA was withdrawn on 15 August 2019. This application systematically addresses Council's concerns, and the proposed development has been amended to satisfy each of Council's requests set out in the advice letter dated August 9 2019.

The requirements of the Advice Letter have been addressed in table 1 below:

Table 1: Response to Advice Letter	
RFI Requirement	**Response**
Character of Local Area and Site Suitability: 2.4m High Acoustic Barrier Fence	In response, the updated Landscape Plans (Refer to **Appendix K**) include landscaping around the perimeter of the property to soften and screen the development from the neighbouring properties. In total, the updated landscape plans provide an additional 83 trees. Moreover, a rural fence is now included in the design that is consistent with Council's request and the rural character of the area and demonstrated in the Architectural Plans (Refer to **Appendix A**). Given, the substantial increase in landscaped area located in the 'outer area' between the two fences, the acoustic barrier fence will not be viewable from adjoining properties or Mount Vernon Road. Therefore, the proposed development is compatible with the character of the site's rural context and maintains the amenity of the neighbouring properties in accordance with Council's request.
Character of Local Area and Site Suitability: Hardstand Area	Several measures have been included within the updated Architectural Plans and Landscape Plans in response to Council's request in relation to compatibility with the existing streetscape. These measures are: • Pervious pavement for carparking in the row nearest to Mount Vernon road helps to soften the hard stand area is consistent with the rural character of the area; • The reduction in the number of parking spaces allows for increased landscaping to further soften and screen the development, which

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

Table 1: Response to Advice Letter	
RFI Requirement	**Response**
	assists in maintaining the rural character of the area; and • Increased landscaping in the front setback has been provided to further soften and screen the hardstand area.
Character of Local Area and Site Suitability: Site Coverage	The updated architectural plans (**Appendix A**) have responded to Council's issues relating the site coverage of the proposed development. In response to this request, the Gross Floor Area has been reduced from 890.5m^2 to 751.5m^2. Of note, as detailed in the Pre-DA Meeting minutes for the proposed development a previous approval on the site approved a building with a footprint of 891.6m^2. Council have advised that a building footprint of 891.6m^2 or less is deemed acceptable for the development. Therefore, the substantial reduction in site coverage is deemed reasonable.
Character of Local Area and Site Suitability: Parking	Given the reduction in GFA, the parking requirements have been reduced in accordance with the DCP to 10 and 19 spaces for visitors and staff respectively. The hard stand area contains 13 spaces for parents and 19 for staff. Therefore, the hardstand area in the front setback supports the number of car parking spaces required for the proposed development in accordance with Council's request.
Land Contamination	This has been noted. The Statement of Environmental Effects has been updated to include remediation works as part of the proposed works associated with the development proposal.
No. of Children and Staff and Parking for Staff	An updated Plan of Management (refer to **Appendix S**) has been provided. Of note, the number of children has been reduced from 118 to 96. In accordance with Council's request, the number of children and staff has been broken down into: • Number of children based on age; • Number of children based on age present within the outdoor play areas at any one time; • Number of educators per child; and

Document Set ID: 9468595
Version: 1, Version Date: 18/12/2019

Table 1: Response to Advice Letter	
RFI Requirement	**Response**
	• Staff numbers broken down by role including director/supervisor, admin staff, educators, educator floaters and cooks, present on site. Given that the number of children on site has reduced, the plan of management has been updated to reflect the required number on staff on site. This will be 19 staff at any one time. The updated architectural plans (refer to **Appendix A**) now include 19 parking spaces which is consistent with the plan of management.
Wastewater	The 'On-site Wastewater Management Assessment Report (**Appendix N**) has been updated to include the required details relating to operational wastewater management. The On-Site Wastewater Management Assessment Report (**Appendix N**) has been updated to detail that there will be maximum 19 staff on site at any-one time. Accordingly, the hydraulic load and disposal requirements have also been updated. This information is consistent across each of the Appendices, in accordance with Council's request. The proposed setback and location of the accredited aerated wastewater treatment systems (AWTS) tanks and absorption beds are now provided in the On-Site Wastewater Assessment Report (refer to page 17 of **Appendix N**). The proposed setbacks from the child outdoor play are, are a minimum of 7.22m from the absorption beds and 18.05m from the AWTS tank. The On-Site Wastewater Management Assessment Report (**Appendix N**) has been amended to include detailed information which demonstrates that the proposed AWTS can suitably handle the commercial volumes of waste.

Document Set ID: 9963595
Version: 1, Version Date: 18/12/2019

Table 1: Response to Advice Letter	
RFI Requirement	**Response**
	The application has been updated to include an Operational Wastewater Management Plan (OWMP) Refer to **Appendix O**. The OWMP has been prepared by Envirocycle and details all environmental aspects of the operation of the on-site sewage management system.
Water Sensitive Urban Design (WSUD)	MUSIC Modeling - The application is now accompanied by a MUSIC Model). The application also includes a MUSIC Link Report which is provided in the Stormwater Concept Plans (Refer to **Appendix I**). The Stormwater Concept Plan (refer to **Appendix I**) shave been updated to include information relating to the capacity and operation of WSUD tanks, which are also detailed within the architectural plans (refer to **Appendix A**). The application has been updated to include detail on ongoing storm water management. The Operations & Maintenance Plans are provided as part of the Stormwater Concept Plan and Documents in **Appendix I.** Furthermore, the application includes details relating to water sensitive urban design within the Stormwater Concept Plan and related documents provided in **Appendix I**.
Public Health	A food safety program has been provided within the Operational Plan of Management (refer to **Appendix S**) to respond Council's relating to public health. The food safety program details: • potential food safety hazards; • where in the food handling operation the hazards can be controlled and the means of control; • controls and corrective action if a hazard is found not to be under control; and • record keeping that demonstrates action taken or compliance with the program.

Document Set ID: 9963595
Version: 1, Version Date: 18/12/2019

Table 1: Response to Advice Letter	
RFI Requirement	**Response**
	Moreover, the Architectural Plans (refer to **Appendix A**), have been updated and now include a kitchen floor plan and sectional elevation drawings which detail fittings, equipment, materials and finishes. The updated Architectural Plans (refer to **Appendix A**) clearly label Hands Free Wash Basin in the Staff WC. Note: These are labelled BSN.04. The updated Architectural Plans (refer to **Appendix A**) clearly label the location of Bottle Wash area and electric baby bottle wash sanitizers. Note: These are labelled 'BBS'. The updated Stormwater Plans include details relating to hydraulic plans (refer to **page 5** of **Appendix I**).
Biodiversity	The Landscape Plans (refer to **Appendix K**), have been updated to include a significant amount of additional trees and landscaping to ensure the best bio-diversity outcome possible. The original landscape plan provided 19 trees and 49 shrubs. The current proposal now includes 112 trees and 154 shrubs. Given the substantial increase in landscaped area and total number of trees and shrubs, the revised landscaping plans are deemed reasonable to meet Council's biodiversity request.
Waste Management	Swept Path Models: Swept path models have been included in the Traffic and Parking Report (refer to **Appendix G**). **Figures 5 and 6** of the report detail swept path plans for access to the bin collection area. The Vehicle Access Traffic and Car parking assessment also details that Services vehicles, including waste collection trucks, will enter and exit the site outside of the AM and PM peak periods. Plan of Operations Regarding waste collection are within the Architectural Plans (refer to **Appendix**

Document Set ID: 9463595
Version: 1, Version Date: 18/12/2019

Table 1: Response to Advice Letter	
RFI Requirement	**Response**
	A) and the Traffic and Parking Report (refer to Appendix G). The architectural plans (Appendix A) detail that the waste storage room is 1.8m x 3.5m and large enough to store 2 x 1100 litre bins. The traffic and car parking assessment report details access to waste collection. A structural engineers report has been prepared by ODG Consulting (Refer to Appendix U). This report details that the carparking slab and driveway can support the gross weight of service vehicles using the subject site. The Waste Management Plan (Refer to Appendix R) has been updated to reflect the amendments made to the proposed development. The updated Waste Management Plan details that the proposed development will be serviced by a Waste Disposal Contractor will collect and empty bins once a week. Should the waste requirements increase, the contractor will collect the bins twice a week.
Parking, Access and Circulation	The architectural plans (refer to Appendix A) have now been updated to detail staff allocation and visitor allocation. Furthermore, the dimensions (5.5m x 2.5m) are detailed on the plans. A swept path of the minibus ingress and egress is provided in the Traffic and Parking Report (refer to Appendix G). The inclusion of swept paths illustrates that the minibus can ingress and egress the subject site safely, thus ensuring the safety of the children. The two accessible parking bays have been relocated to the centre of the parking lot and are located close to the main entrance with direct and easy access to the proposed child care centre. This is detailed in the Access Report (refer to Appendix J).

Document Set ID: 9963595
Version: 1, Version Date: 18/12/2019

Table 1: Response to Advice Letter	
RFI Requirement	**Response**
	Standard pram dimensions, have been prepared and are detailed in **Appendix V**. The maximum width of a single pram is 61cm. The proposed footpath is a minimum of 1.4m. Therefore, two standard single prams will be easily to pass each other side by side.
Emergency and Evacuation Procedures	The updated Architectural Plans (refer to **Appendix A**) clearly label an Emergency Evacuation Assembly Location. This is located within the south west corner of the site.

3.0 Site Analysis

3.1 Location and Context

The site is located in Mount Vernon within the Penrith LGA and is located approximately 56km from the Sydney CBD. The area is predominantly rural and residential land uses with the immediate context being predominantly for large lot residential purposes. The site is subject to the provisions of the Penrith Local Environmental Plan (PLEP) 2010.

The site is located nearby to the Westlink M7 Motorway, which provides ease of access for residents to surrounding suburbs and regions, including the Sydney CBD. The site's locational context is demonstrated in **Figures 1 & 2** below.

Document Set ID: 9463595
Version: 1, Version Date: 18/12/2019

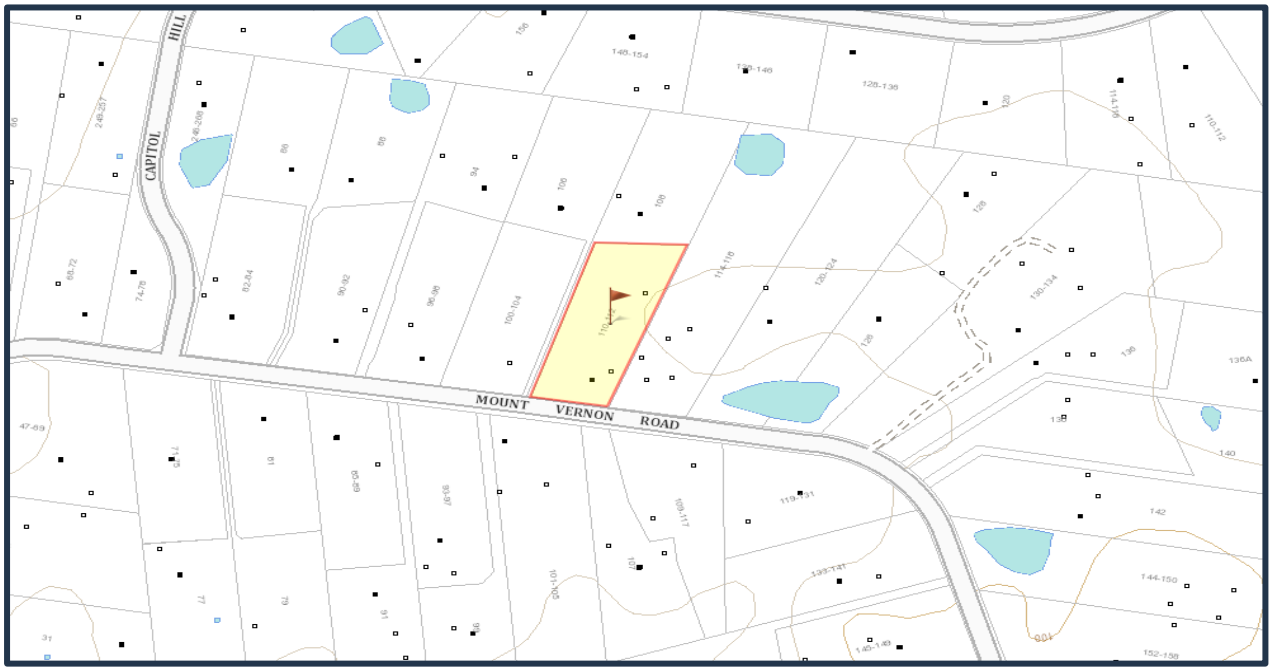


Figure 1: **Locality Plan demonstrating the site outlined in red (Source – Sixmaps).**

Figure 2: **Location Plan demonstrating the site area outlined in red (Source: Nearmap).**

3.2 Site Description

The site is commonly known as 110-112 Mount Vernon Road, Mount Vernon and is legally described as Lot 4, DP 865818. The site has a total area of 10,330m^2 and has a frontage of 61.7m to Mount Vernon Road. The site is currently vacant with access provided from Mount Vernon Road to the south.

3.3 Existing Site Conditions

Document Set ID: 9963595
Version: 1, Version Date: 18/12/2019

Specific details on analysis is provided as follows:

Landform	The subject site has a gentle slope from the south west corner of the site to the north east.
Existing Structures	Land currently has no existing structures.
Access	Vehicular access is provided via Mount Vernon Road.
Vegetation	The site has previously been cleared and only some vegetation remains in the form of ground cover.

4.0 Proposed Development

This proposal seeks consent for the construction of a single storey child care centre at 110-112 Mount Vernon Road, Mount Vernon. Specifically, the development will comprise of:

- Construction of a single storey 96 place child care centre;
- Construction of at grade car park to accommodate 32 car spaces (including 2 disabled spaces). The car park is to be accessed from Mount Vernon Road via a one-way entry and one-way exit driveway facilitating safe and efficient vehicular movements;
- The composition of the children in the centre will consist of:
    - Aged 0-2 = 16;
    - Aged 2-3 = 20; and
    - Aged 3-5 = 60.
    - Total = 96.
- The hours of operation for the centre will be 6:00am – 6:00pm Monday to Friday;
- The development proposes a total of 1,316m^2 of unencumbered outdoor play space that will incorporate a number of play areas and features that will create an active an effective outdoor learning space.
- Remediation works to remove isolated areas of asbestos contamination within the subject site. The Remediation Action Plan (RAP) in **Appendix Q** for an assessment of the required remediation works.

The Architectural Plans provided in **Appendix A** show indicative locations for future signage. These areas are indicative only and approval for the signage will be sought under separate applications.

4.1 Access and Car Parking

Document Set ID: 9963595
Version: 1, Version Date: 18/12/2019

Access

Access to the site will be provided via Mount Vernon Road, via a one-way entry and one way exit driveway facilitating safe and efficient vehicular movements. A Traffic Report prepared by GTK Consulting has been submitted with this application and is included as **Appendix G** which provides further details on the proposed access and vehicle circulation onsite.

Car parking

A total of 32 car parking spaces are proposed within the at grade car park located at the front of the proposed centre. As part of these spaces, two disabled parking spaces are proposed, along with an additional space for a mini bus. Based on the number on the number of children (96) and staff required (19), a total of 29 spaces are required. Therefore, the proposed development provides a surplus of 3 car spaces to service the development.

4.2 Geotechnical Works

A Geotech report has been prepared by Greywacke Geotechnics and can be found as part of **Appendix H**. Minor earthworks are proposed as part of this development, with the construction of an on-site detention system that is to be located at the rear of the site, away from any activities.

4.3 Infrastructure & Services

The site is capable of being serviced by appropriate public utility infrastructure, with appropriate provisions of public utility infrastructure to be made, ensuring that essential utilities are made available to service the site.

The development will be reliant on an On-Site Wastewater Management system, which has been detailed within the On-Site wastewater Management Assessment Report by Envirotech (**Appendix N**). To suitably treat the on-site wastewater, pressure does absorption beds have been proposed towards the rear of the site. These beds are setback a suitable distance of 7.22m from the maximum extent of the outdoor play space, which is bounded by a 2.4m high timber fence which is appropriately screened and will not be visible from neighbouring properties.

4.4 Landscaping

Appropriate landscaping is proposed throughout the development site. A Landscape plan has been provided, that details the landscape concept, prepared by Tessa Rose Playscape and Landscape Design and is included as **Appendix K**. Of note, the Landscape Plans include:

Document Set ID: 9468595
Version: 1, Version Date: 18/12/2019

- Perimeter landscaping that will help to soften and screen the proposed development from adjoining sites and the street;
- 112 trees and 154 shrubs which assists in maintain on-site amenity in out-door play areas, and in mitigating storm water runoff in accordance with Council's requirements; and
- The planting of native species to assist in softening the development, whilst enhancing the neighbourhood and providing shading in the open space and play areas; and
- The provision of landscaping in proximity to the On Site Storm Water Detention Area to improve the visual amenity of the development.

4.5 Built Form and Design

Key Principles integrated into the design are:

- Provision of a built form that is legible, articulated and of high-quality design;
- Opportunities for play spaces that provides high quality amenity for children, whilst ensuring that the amenity for neighbouring residents is maintained;
- Convenient access between the indoor and outdoor spaces;
- The provision of a rural style fence that is compatible with the rural character of the area;
- The creation of welcoming spaces; and
- Minimal overshadowing/privacy impacts on adjoining residents.

The design of the proposed childcare centre has been based on the National Quality Framework (NQF), including the National Quality Standard (NQS). These requirements have been met and are detailed within the plans prepared by Project Works Design (**Appendix A**).

The palette of materials used has been selected to reflect the surrounding streetscape, whilst softening the built form of the child care centre.

Potential noise from the proposed development has been considered and the development has been oriented to address this issue. Equipment and plant are distanced from neighbouring properties, minimising their exposure to these elements. Any noise attenuating measures including the 2.4m Acoustic Barrier, have been appropriately screened by the provision of landscaping and the addition of a rural style fence which is demonstrated in the Architectural Drawings (**Appendix A**).

4.6 Safety and Security

The following section outlines Crime Prevention through Environmental Design (CPTED) principles and uses these to assess the Architectural Drawings for the proposed development. This assessment has been undertaken in accordance with the NSW Government's CPTED principles (outlined below), and the requirements of the Penrith DCP 2010. The following section also outlines recommended mitigation measures to be considered in the final design.

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

There are a number of criteria to be considered when assessing CPTED as part of a development application. As stated by the NSW Government, CPTED aims to influence the design and management of buildings and places by:

- Increasing the perception of risk to criminals by increasing the possibility of detection, challenge and Capture.
- Increasing the effort required to commit crime by increasing the time, energy or resources which need to be expended.
- Reducing the potential rewards of crime by minimising, removing or concealing 'crime benefits'.
- Removing conditions that create confusion about required norms of behaviour.

To that end, the four key principles to minimise the opportunity for Crime are outlined in **Table 2** below:

Table 2: CPTED Key Principles

No.	PRINCIPLE	DEFINITION
1	**Natural Surveillance**	Involves maximising opportunities for passers-by or residents to observe what happens in an area (the 'safety in numbers' concept). This highlights the importance of building layout, orientation and location; the strategic use of design; landscaping and lighting. Natural surveillance is a by-product of well-planned, well-designed and well-used space. Higher risk locations can also benefit from organised surveillance, which involves the introduction of formal measures such as on-site security guards or CCTV.
2	**Access Control**	Control of who enters an area so that unauthorised people are excluded, for instance, via physical barriers such as fences, grills etc.
3	**Territorial Reinforcement /Ownership**	People are more likely to protect territory they feel they own and have a certain respect for the territory of others. This can be expressed through installation of fences, paving, signs, good maintenance and landscaping. Territoriality relates to the way in which a community has ownership over a space.
4	**Space Management**	Ensures that space is appropriately utilised and cared for. Space management strategies include: activity coordination (i.e. having a specific plan for the way different types of activities are carried out in space), site cleanliness, rapid repair of vandalism and graffiti, the replacement of burned out lighting and the removal or refurbishment of decayed physical elements.

Document Set ID: 9963595
Version: 1, Version Date: 18/12/2019

Car Parking Areas

Car parking areas are typically common spaces for offences against property or persons. Relevant CPTED considerations for car parks include: access control, providing visibility, ensuring safe access for cars and pedestrians, and discouraging loitering. The following points provide a description of the sites proposed car parking area:

- Adequate open space surrounding the car parking space and within the spaces to ensure that cars and pedestrians have safe access to the site, with clear visibility between pedestrian pathways and parking spaces;
- Clear demarcation of pedestrian walkways throughout the car park and adjacent to the proposed building;
- To avoid conflicts with vehicles will be provided through line marking and signage; and
- Safe parking signage throughout car park.

Entry and Exit Points

Entry and exit points are a key consideration for CPTED assessments because of the interface they provide with the surrounding area. Relevant CPTED considerations for entry and exit points include: access control, providing visibility, ensuring safe access for cars and pedestrians, and discouraging loitering. The subject DA proposes the following measures:

- Adequate lighting at all entry and entry points will be provided in accordance with the relevant Australian Standards;
- All entry/exit points are aesthetic and inviting and the landscaping, building position and activities are all orientated to maximise natural surveillance on entry/exist.

Internal Layouts

Key internal layout considerations in regard to CPTED include interfaces between public and private space; and the existence of ‘dead space’, ‘areas of entrapment’ and ‘areas of concealment’. The subject DA proposes the following measures:

- The design of new internal spaces does not create 'areas of entrapment or concealment;
- All entries have good sight lines, are well lit and are in areas with ample room for access;
- Clear definition between public and private access areas are created using signage and secure doors; and
- Hallways provide for clear separation and space between rooms.

Document Set ID: 9468595
Version: 1, Version Date: 18/12/2019

External Areas

Key external layout considerations in regard to CPTED include visibility, activation and prevention of vandalism and graffiti. The subject DA proposes the following measures:

- All external areas of the building are proposed to be well lit, particularly at night.
- No opportunities for concealment are provided by external building design or landscaping based on the design of the proposal.

As identified above, the proposed development has been designed with regard to the principles of Crime Prevention Through Environmental Design. Landscaped areas within the development site will be maintained to a good standard. Clear delineation between public and private areas is proposed. Lighting that complies with AS1158 will be used.

The proposed development is therefore considered compliant with the requirements of CPTED.

5.0 Assessment of Environmental Impacts

5.1 Statutory Planning Framework and Compliance

An assessment of the proposal has been made against the relevant planning instruments applicable to the land and the proposal. These are:

- State Environmental Planning Policy No.55 – Remediation of Land;
- State Environmental Planning Policy No. 64 – Advertising and Signage;
- State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017;
- Sydney Regional Environmental Plan No.20 – Hawkesbury-Nepean River;
- Penrith Local Environmental Plan 2010; and
- Penrith Development Control Plan 2014.

5.1.1 State Environmental Planning Policy No.55 – Remediation of Land

SEPP 55 requires Council to consider whether the subject land of any development application is contaminated. If the land requires remediation to ensure that it is made suitable for a proposed use or zoning, Council must be satisfied that the land can and will be remediated before the land is used for that purpose.

A Phase 2 Detailed Site Investigation has been prepared by Envirotech which is provided in **Appendix P**. The investigation details that Asbestos was detected in four samples taken from the site and recommends that a suitably trained professional is engaged to prepare a Remedial Action Plan to determine the

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

remediation of the asbestos contamination within the contaminated areas and appropriate remedial action. Subject to the above, it is considered that the site can be remediated for the proposed works.

A Remediation Action Plan (RAP) has been prepared by Envirotech (**Appendix Q**) detailing suitable measures to address contamination on site. As part of this development, the recommendations of the RAP will be incorporated to ensure that any impacts from contamination are rectified prior to the operation of the proposed child care centre.

5.1.2 State Environmental Planning Policy No.64 – Advertising and Signage

State Environmental Planning Policy No. 64 applies to the entire state to ensure that signage is compatible with the desired amenity and character of an area, whilst ensuring that signs provide effective communication in suitable locations.

The Architectural Plans provided in **Appendix A** show indicative locations for future signage. These areas are indicative only and approval for the signage will be sought under separate applications.

Under SEPP 64, business identification signs are defined as:

"means a sign:

(a) that indicates:

(i) the name of the person or business, and
(ii) the nature of the business carried on by the person at the premises or place at which the sign is displayed, and

(b) that may include the address of the premises or place and a logo or other symbol that identifies the business, but that does not contain any advertising relating to a person who does not carry on business at the premises or place."

The specifications for the building identification signs are not proposed as part of this development application, with details of the signs being provided closer to the occupation of the site as a child care centre.

An Assessment of SEPP No. 64 Advertising and Signage is provided below:

Table 3: SEPP 64 – Schedule 1 – Assessment Criteria

Schedule Clause	Assessment Criteria	Comment
Character of the Area	Is the proposal compatible with the existing or desired future character of the area or locality in which it is proposed to be located?	Proposed signage will be compatible with the future character of the area.

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

	Is the proposal consistent with a particular theme for outdoor advertising in the area or locality?	The specifications of the proposed sign will be detailed as part of a future application.
Special Areas	Does the proposal detract from the amenity or visual quality of any environmentally sensitive areas, heritage areas, natural or other conservation areas, open space areas, waterways, rural landscapes or residential areas?	The proposed indicative signage will enhance the overall amenity of the area, through its design and materials incorporated. The sign will not impact on surrounding landscapes and residential areas.
Views and Vistas	Does the proposal obscure or compromise important views? Does the proposal dominate the skyline and reduce the quality of vistas? Does the proposal respect the viewing rights of other advertisers?	No important views will be impacted by signage. The indicative signage will not dominate the skyline or reduce the quality of vistas. The indicative signage will respect the viewing rights of other advertisers within the vicinity of the site.
Streetscape, Setting or Landscape	Is the scale, proportion and form of the proposal appropriate for the streetscape, setting or landscape? Does the proposal contribute to the visual interest of the streetscape, setting or landscape? Does the proposal reduce clutter by rationalising and simplifying existing advertising? Does the proposal screen unsightliness? Does the proposal protrude above buildings, structures or tree canopies in the area or locality? Does the proposal require ongoing vegetation management?	The scale of the indicative sign will complement the surrounding setting and streetscape, through the siting and materials incorporated. The future signs will contribute to the visual interest of the streetscape, whilst not being designed to conflict with the surrounding character of the area. No existing advertising exists on site. The future signage will complement its setting, not screening any unsightliness. The future signage will not protrude above buildings and will not adversely impact on surrounding buildings. Ongoing vegetation management will not be required for future signage.
Site and Building	Is the proposal compatible with the scale, proportion and other	The proposed signage is compatible with other existing building advertising signs

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

	characteristics of the site or building, or both, on which the proposed signage is to be located? Does the proposal respect important features of the site or building, or both? Does the proposal show innovation and imagination in its relationship to the site or building, or both?	in the area, whilst also being compatible with the DCP size restrictions for signage. The future signage will compliment the building through its design and materials used. The proposal will complement the site and will be designed in an innovative manner that acts as a feature for the proposed child care centre.
Associated Devices and Logos with Advertisements and advertising structures	Have any safety devices, platforms, lighting devices or logos been designed as an integral part of the signage or structure on which it is to be displayed?	The future signage will be designed as an integrated product.
Illumination	Would illumination result in unacceptable glare?	No illumination is proposed as part of the indicative signage. If illumination is proposed under future applications, it will comply with the relevant controls and standards.
Safety	Would the proposal reduce the safety for any public road? Would the proposal reduce the safety for pedestrians or bicyclists? Would the proposal reduce the safety for pedestrians, particularly children, by obscuring sightlines from public areas?	The indicative signage will not impact on safety of motorists travelling on adjoining public roads. The indicative signage will not result in safety concerns for pedestrians or bicyclists. No adverse safety impacts will be generated for pedestrians from public areas.

5.1.3 State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017

The SEPP Educational Establishments and Child Care Facilities was implemented on the 1st of September 2017. The SEPP has been introduced to facilitate the effective delivery of educational establishments and early education and care facilities across the State of NSW.

Document Set ID: 9963695
Version: 1, Version Date: 18/12/2019

Clause 23 of the SEPP details that "before determining a development application for development for the purpose of a centre-based child care facility, the consent authority must take into consideration any applicable provisions of the Child Care Planning Guideline, in relation to the proposed development."

An assessment of the proposal against the relevant controls and considerations of the guideline applying to the proposed development is provided in **Appendix B**.

5.1.4 Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River

The proposed development is consistent with the aim of the SEPP that is to protect the environment of the Hawkesbury-Nepean River system, as well as all of its planning controls. Given the distance between this proposed child care centre and the Hawkesbury-Nepean River system and the implementation of soil erosion and sediment controls measures in accordance with the requirements of Council's Engineering Specifications, no issues will be encountered as part of this DA.

5.1.5 Penrith Local Environmental Plan (LEP) 2010

Permissibility

The site is situated within the Penrith Local Government Authority (LGA) and is subject to the provisions of the Penrith LEP 2010.

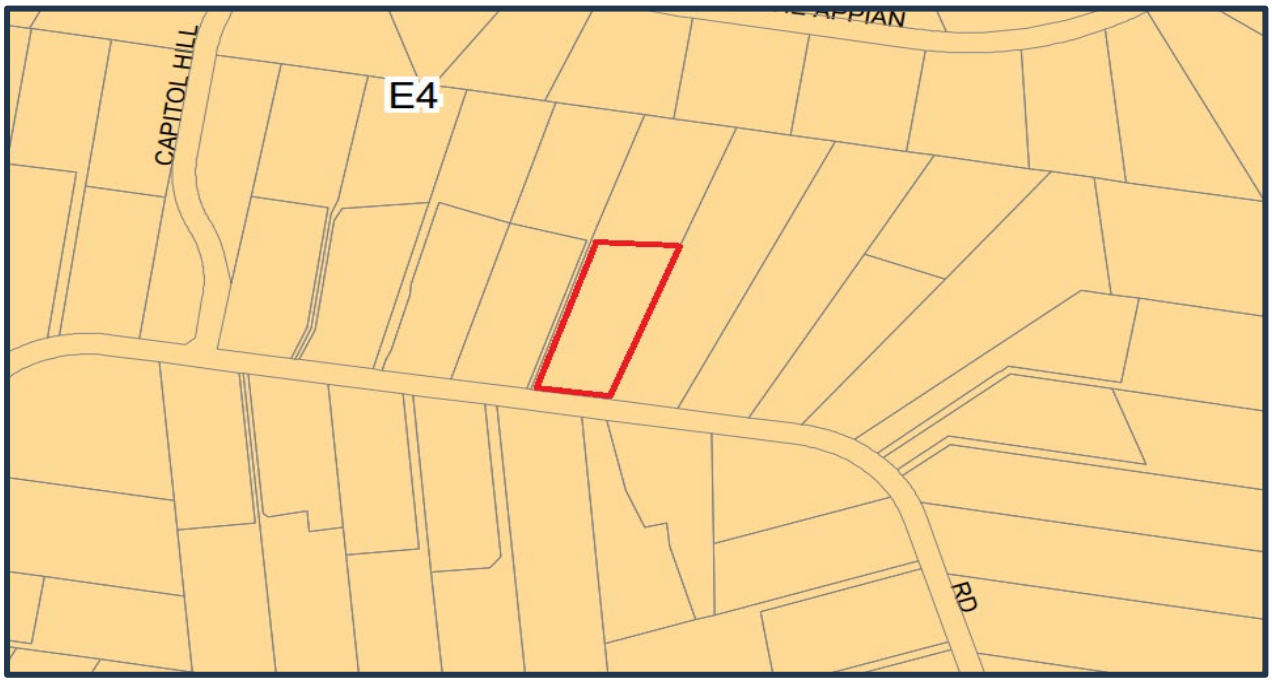


Figure 3:Land Zoning Map demonstrating the subject site as outlined in red (Source – PLEP).

The site is zoned E4 – Environmental living, under the provisions of the Penrith LEP. Centre-based child care facilities are permissible within the E4 zone.

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

Zone Objectives:

- *To provide for low-impact residential development in areas with special ecological, scientific or aesthetic values;*
- *To ensure that residential development does not have an adverse effect on those values;*
- *To minimise conflict between land uses within the zone and land uses within adjoining zones;*
- *To ensure land uses are compatible with the available infrastructure, services and facilities and with the environmental capabilities of the land; and*
- *To preserve and improve natural resources through appropriate land management practices.*

Comment:

The proposal is consistent with the relevant objectives of the E4 zone in that the proposed development will provide a land use that is compatible with the site's characteristics and capabilities and will provide a service for the existing and future community.

Relevant Clauses

A full assessment against the relevant clauses of the Penrith LEP 2010 is provided in **Appendix C.**

5.1.6 Penrith Development Control Plan (DCP) 2014

The Penrith DCP (PDCP 2014) provides detailed provisions to supplement the Penrith LEP 2010. Part 5 of the Penrith DCP 2014 provides the specific controls for Child Care Centres within the Penrith LGA.

The proposal is consistent with the relevant controls of the Penrith DCP 2014, through the overall design of the child care centre, ensuring that minimal adverse impacts on neighbouring dwellings will result from this development. The built form of the child care centre is designed to complement the streetscape and will furthermore provide the community with a child care facility that responds to an increasing demand in the area.

An assessment of the proposal against the relevant development controls applying to the proposed development and site is provided in **Appendix D**.

5.2 Noise Impacts

An Acoustic Assessment has been prepared by Acoustic Logic (**Appendix F**), which details the potential noise impacts of the proposed development on surrounding land uses. Following the result of noise monitoring undertaken on site, the Acoustic Assessment provides a series of recommendations to ensure any adverse noise impacts on the adjoining properties are minimized.

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

The recommendations provided in the report have been included in the design and management of the development.

5.3 Social and Economic Impacts

The construction of the proposed development will bring with it a number of important environmental benefits for the local and wider community as outlined below.

- The development will provide a child care centre within an area where demands outstrips supply;
- Promote enhanced neighbourhood safety and security through casual surveillance generated by the presence of a permanent new development and activity within the site;
- Provide short-term economic benefits through construction expenditure and employment; and
- Positively complements the envisaged streetscape, character, amenity of the area.

5.4 Site Suitability

Having regard to the characteristics of the site and its location in Mount Vernon, the proposed development is considered appropriate in that:

- The zoning of the site permits the proposed uses;
- The size and dimensions of the land are appropriate for accommodating the proposal;
- It will deliver a child care centre that positively responds to the streetscape and is compatible in size and siting with surrounding existing developments;
- The site is considered suitable for that development as it satisfies the need for an additional child care facility in the area; and
- It is consistent with the site-specific objectives and provisions of the Penrith Development Control Plan 2014 and Penrith Local Environmental Plan 2010.

5.5 Public Interest

The proposal will facilitate the development of the site by providing a new high-quality child care centre which achieves good design. It is in the public interest to reinforce the importance of this location for an additional child care centre. Generally, the proposal provides the following public benefits:

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

- The development has been designed that enhances and responds sensitively to its setting, creating a space that reflects the desired scale and significance of the immediate precinct;

- The proposed development provides a built form that presents as high-quality design that fits within the envisaged character of the area and responds to the site attributes and development controls applicable;

- The development is located on close proximity to range of planned services and amenities and;

- There are no significant adverse impacts on surrounding properties in terms of sunlight access, views, visual and acoustic privacy.

6.0 Conclusion

This proposal seeks approval for a proposed 96-place child care centre on land at 110-112 Mount Vernon Road, Mount Vernon.

The proposal is generally consistent with the relevant environmental planning instruments, including the Penrith Local Environmental Plan 2010 and the Penrith Development Control Plan 2014.

The proposed development has significant planning merit in the following respects:

- The scale, massing and height of the building is appropriate for the site and will complement the surrounding context; and

- There are no significant adverse impacts on the surrounding properties in terms of sunlight access, views, visual and acoustic privacy.

Having regard to the above, and in light of the relevant heads of consideration listed under Section 4.15 of the *Environmental Planning and Assessment Act, 1979* the proposal is reasonable and appropriate and warrants favourable consideration.

Document Set ID: 9068595
Version: 1, Version Date: 18/12/2019

A PUBLICATION BY
THE PLANNING HUB

PH (02) 9690 0279

SUITE 4, LEVEL 4,
35 BUCKINGHAM STREET,
SURRY HILLS, NSW 2010

INFO@THEPLANNINGHUB.COM.AU
WWW.THEPLANNINGHUB.COM.AU

Document Set ID: 9063695
Version: 1, Version Date: 18/12/2019

DIRECTORS
MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

110-112 Mount Vernon Road, Mount Vernon

DA Acoustic Assessment

SYDNEY
A: 9 Sarah St
MASCOT 2020
T: (02) 8339 8000

SYDNEY MELBOURNE BRISBANE CANBERRA
LONDON DUBAI SINGAPORE GREECE

ABN: 11 068 954 343

The information in this document is the property of Acoustic Logic Consultancy Pty Ltd ABN 11 068 954 343 and shall be returned on demand. It is issued on the condition that, except with our written permission, it must not be reproduced, copied or communicated to any other party nor be used for any purpose other than that stated in particular enquiry, order or contract with which it is issued.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

DOCUMENT CONTROL REGISTER

Project Number	20190184.1
Project Name	110-112 Mount Vernon Road, Mount Vernon
Document Title	DA Acoustic Assessment
Document Reference	20190184.1/0809A/R7/SN
Issue Type	Email
Attention To	Vladimir Vanovac

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	26/02/2019	20190184.1/2602A/R0/SN	SN		GW
1	26/02/2019	20190184.1/2602A/R1/SN	SN		GW
2	6/05/2019	20190184.1/0605A/R2/SN	SN		GW
3	10/10/2019	20190184.1/0605A/R3/SN	SN		GW
4	1/04/2020	20190184.1/0104A/R4/SN	SN		GW
5	8/04/2020	20190184.1/0804A/R5/SN	SN		GW
6	5/05/2020	20190184.1/0505A/R6/SN	SN		GW
7	8/09/2020	20190184.1/0809A/R7/SN	SN		GW

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

TABLE OF CONTENTS

1 INTRODUCTION 5
2 SITE DESCRIPTION 6
3 PROPOSED OPERATION OF THE CHILD CARE FACILITY 8
4 ENVIRONMENTAL NOISE DESCRIPTORS 9
5 RATING BACKGROUND NOISE MONITORING 10
5.1 BACKGROUND NOISE MONITORING 10
5.2 MEASUREMENT LOCATION 10
5.3 MEASUREMENT EQUIPMENT 10
5.4 MEASURED NOISE LEVELS 10
6 EXTERNAL NOISE INTRUSION ASSESSMENT 11
6.1 NOISE INTRUSION CRITERIA 11
6.1.1 Penrith City Council '*Development Control Plan 2014'* 11
6.1.2 NSW Department of Environment and Heritage, Environmental Protection Authority document – *'NSW Road Noise Policy 2011'* (RNP) 12
6.1.3 NSW Department of Planning & Environment document – *'State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017'* 12
6.1.4 Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013'* 13
6.1.5 Australian Standard AS: 2021:2015 – *"Acoustics – Aircraft Noise Intrusion Building Siting and Construction"* 13
6.1.6 Australian/New Zealand Standard AS/NZS: 2107:2016 – *"Acoustics – Recommended design sound levels and reverberation time for building interiors"* 14
6.1.7 Summarised Internal Noise Criteria 14
6.2 TRAFFIC NOISE MEASUREMENTS 14
6.2.1 Measurement Equipment 14
6.2.2 Measurement Location 14
6.2.3 Measurement Period 15
6.2.4 Measured Traffic Noise Measurements 15
6.3 PREDICTED AIRCRAFT NOISE LEVEL 15
6.3.1 Requirements by Council 15
6.4 ANALYSIS / RECOMMENDATIONS 17
6.4.1 Internal Noise Levels 17
6.4.2 External Noise Levels within Outdoor Play Areas 17
6.4.2.1 Traffic Noise – Outdoor Play Areas 17
7 NOISE EMISSION ASSESSMENT 18
7.1 NOISE EMISSION CRITERIA 18
7.1.1 Penrith City Council – '*Development Control Plan 2014'* 18
7.1.2 NSW Department of Planning & Environment document – *'State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017'* 18
7.1.3 Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013'* 19
7.1.4 NSW Environmental Protection Authority (EPA) document – *'NSW EPA Noise Policy for Industry (NPfI) 2017'* 20
7.1.4.1 Intrusiveness Criterion 20
7.1.4.2 Amenity Criterion 21
7.1.5 Summary of Noise Emission Criteria 21
7.2 NOISE EMISSION ANALYSIS 22
7.2.1 Outdoor Play Noise Emissions 22
7.2.2 Indoor Play / Teaching Sound Pressure Level (SPL) 22

7.2.3 Predicted Noise Levels 23
7.3 MECHANICAL PLANT NOISE EMISSIONS 25
7.4 NOISE GENERATED BY ADDITIONAL TRAFFIC ON PUBLIC ROADS 25
7.5 DRIVEWAY AND ONGRADE CARPARK NOISE EMISSIONS 26
8 RECOMMENDED TREATMENTS – BUILDING AND MANAGEMENT 28
8.1 BUILDING CONSTRUCTION 28
8.1.1 External Glazing 28
8.1.2 External Wall Construction 28
8.1.3 External Roof and Ceiling Construction 28
8.1.4 Acoustic Barrier 29
8.2 MANAGEMENT CONTROLS 31
9 CONSTRUCTION NOISE AND VIBRATION IMPACTS 32
9.1 SENSITIVE RECEIVERS 32
9.2 NOISE MANAGEMENT LEVEL 32
9.2.1 NSW EPA Interim Construction Noise Guideline 32
9.2.1.1 At Residential Receivers 33
9.2.2 Summarised Noise Management Levels 33
9.3 CONSTRUCTION NOISE EMISSION ASSESSMENT 33
10 CONSTRUCTION VIBRATION CRITERIA 34
10.1.1 DIN 4150 34
10.1.2 Assessing Amenity 35
10.1.3 Summarised Recommended Vibration Limits 35
11 CONCLUSION 36
APPENDIX A – UNATTENDED NOISE MONITORING DATA 37

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1 INTRODUCTION

Acoustic Logic Consultancy (ALC) have been engaged to conduct an acoustic assessment of potential noise impacts associated with the proposed new child care centre to be constructed at 110-112 Mount Vernon Road, Mount Vernon.

This document addresses noise impacts associated with the following:

- External noise intrusions into the project site:
  - Traffic noise impacts from the Mount Vernon Road; and
  - Noise impacts from aircraft fly overs from Western Sydney *"Badgerys Creek"* Airport.
- The impact of potential noise generation by the site:
  - Noise emissions from the indoor and outdoor playing areas;
  - Noise emissions from the operation of the on-grade carpark and driveway; and
  - Noise emissions from mechanical plant in principle.

ALC have utilised the following documents and regulations in the assessment of noise emanating from and into the development:

- Penrith City Council – '*Development Control Plan 2014'*;
- NSW Department of Planning & Environment document – '*State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017';*
- NSW Department of Planning & Environment document – '*Child Care Planning Guideline, August 2017';*
- Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013';*
- Australian Standard AS2021-2015 *"Aircraft Noise Intrusion – Building siting and Construction";*
- NSW Environmental Protection Authority (EPA) document – *'NSW EPA Noise Policy for Industry (NPfI) 2017'*;
- Australian/New Zealand Standard AS/NZS: 2107:2016 – *"Acoustics – Recommended design sound levels and reverberation time for building interiors"; and*
- NSW Environmental Protection Authority (EPA) document – *'NSW Road Noise Policy 2011'* (RNP).

This assessment has been conducted using the Project Works Design architectural drawings, see below for details.

Table 1-1 – Architectural Drawing Information

Prepared By	Drawing Number	Drawing Title	Date	Revision
Project Works Design	DA01	Proposed Site Plan	20.04.2020	B
	DA02	Site Analysis and Management Plan	31.10.19	-
	DA03	Proposed Floor Plan	25.03.20	A
	DA04	Proposed Roof Plan		
	DA06	Proposed Elevations & Section	31.10.19	-

2 SITE DESCRIPTION

The proposed development consists of on grade car parking along the southern boundary of the development (used for drop off and pick up) with ground floor management areas/offices, internal and external education spaces.

Onsite acoustic investigations have been carried out by this office in relation to the surrounding receivers and the existing acoustic environment, the findings of our investigations have been summarised below:

- North of the project site is an existing single storey residential dwelling. The existing single storey dwelling has windows which face along the northern boundary (towards the site).
- South of the project site is an existing single storey residential dwelling. The existing single storey dwelling has windows which face along the southern boundary (towards the site), across Mount Vernon Road, which carriers a low volume of traffic movements.
- East of the site is an existing single storey residential dwelling. The existing dwelling has windows which face along the eastern boundary (towards the site).
- West of the site is existing single storey residential dwellings. The existing dwelling has windows which face along the western boundary (towards the site).

The nearest noise receivers around the project site include:

- Receiver 1: Residential receiver located at 108 Mount Vernon Road, Mount Vernon to the North. Residential receiver is single storey.
- Receiver 2: Residential receiver located at 106 Mount Vernon Road, Mount Vernon to the North-West. Residential receiver is single storey.
- Receiver 3: Residential receiver located at 100 Mount Vernon Road, Mount Vernon to the West. Residential receiver is single storey.
- Receiver 4: Residential receiver located at 122 Mount Vernon Road, Mount Vernon to the North-East. Residential receiver is single storey.
- Receiver 5: Residential receiver located at 114 Mount Vernon Road, Mount Vernon to the East. Residential receiver is single storey.
- Receiver 6: Residential receiver located at 105 Mount Vernon Road, Mount Vernon to the South, across Mount Vernon Road. Residential receiver is single storey.

A site map has been provided below, Figure 2-1 is a site map, measurement locations and surrounding receivers.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

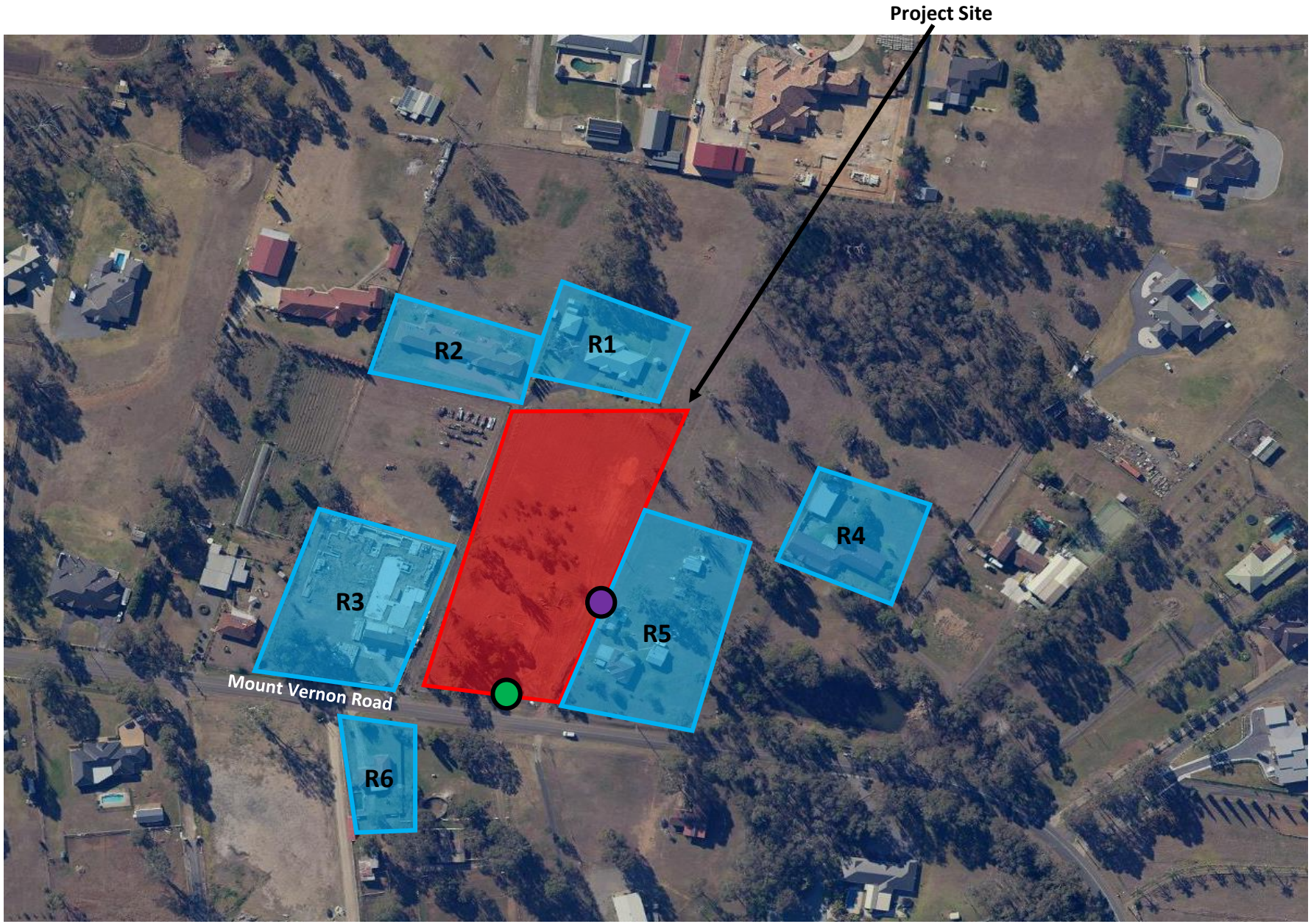


Figure 2-1: Site Survey and Monitoring Positions
Sourced from SixMaps NSW

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3 PROPOSED OPERATION OF THE CHILD CARE FACILITY

Acoustic Logic has been advised that the Child Care Centre will operate based on the following parameters:

- Operation of the facility is 7:00am - 6:00pm Monday to Friday;
- Drop off and pick up to take place within the on-grade car park;
- Development proposal is for a facility capable of holding 96 children at any one time, with the following breakdown:
    - 16 x 0-2-year-old;
    - 20 x 2-3-year-old; and
    - 60 x 3-5-year-old
- No amplified speaker system for music or the like is proposed to be utilised in any of the outdoor spaces.
- No centre events except for typical childcare centre operation are to be undertaken.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

4 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15-minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

5 RATING BACKGROUND NOISE MONITORING

5.1 BACKGROUND NOISE MONITORING

Details regarding the unattended noise monitoring carried out around the site are discussed below.

5.2 MEASUREMENT LOCATION

One unattended background noise monitor was installed along the eastern facade of the proposed project site located at 110-112 Mount Vernon Road, as indicated in Figure 1 above.

5.3 MEASUREMENT EQUIPMENT

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix A.

Weather affected data was excluded from the assessment in accordance with the NSW EPA *Noise Policy for Industry (NPfI) 2017*.

5.4 MEASURED NOISE LEVELS

The results of the unattended noise measurements have been summarised below.

Table 5-1 – Measured Rating Background Noise Level (RBL)

Date	Measured Rating Background Noise Level (RBL) dB(A)$L_{90(Period)}$
	7:00am-6:00pm
Friday, 1st March 2019	-
Saturday, 2nd March 2019	36
Sunday, 3rd March 2019	35
Monday, 4th March 2019	34
Tuesday, 5th March 2019	35
Wednesday, 6th March 2019	40
Resultant Median	**35**

6 EXTERNAL NOISE INTRUSION ASSESSMENT

Based on site surveys, the main source of external noise intrusion into the proposed facility are the following:

- Traffic movements along Mount Vernon Road; and
- Noise impacts from aircraft fly overs from the Western Sydney *"Badgerys Creek"* Airport.

External noise assessment has been assessed in accordance with the following documents:

- Penrith City Council – '*Development Control Plan 2014'*;
- NSW Environmental Protection Authority (EPA) document – *'NSW Road Noise Policy 2011'* (RNP);
- NSW Department of Planning & Environment document – '*State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017';*
- NSW Department of Planning & Environment document – '*Child Care Planning Guideline, August 2017';*
- Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013';*
- Australian Standard AS2021-2015 *"Aircraft Noise Intrusion – Building siting and Construction";*
- Australian/New Zealand Standard AS/NZS: 2107:2016 – *"Acoustics – Recommended design sound levels and reverberation time for building interiors"; and*
- NSW Environmental Protection Authority (EPA) document – *'NSW EPA Noise Policy for Industry (NPfI) 2017'*.

6.1 NOISE INTRUSION CRITERIA

6.1.1 Penrith City Council '*Development Control Plan 2014'*

The Penrith DCP states that for childcare centres; outside playing areas shall be designed and located to minimise noise impact on any noise sensitive adjacent properties.

Sections 12.1 and 12.4 of the Penrith DCP address noise impacts associated with industrial development, each noting the importance of maintaining residential amenity.

Section 12.1 deals with noise from traffic associated with a site and refers to the guidelines of relevant state government authorities. In this case, this will be the EPA Road Noise Policy (discussed below).

Section 12.4 refers to the EPA Industrial Noise Policy (now the Noise Policy for Industry) in the assessment of plant and equipment noise generated by the site.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

6.1.2 NSW Department of Environment and Heritage, Environmental Protection Authority document – *'NSW Road Noise Policy 2011'* (RNP)

The NSW EPA RNP states that child care centres being affected by development or existing roads should be designed to the requirements of Table 4 on page 12 of the RNP. The design criteria of 4 from the RNP is summarised below.

Table 6-1 – NSW EPA RNP Design Criteria

Existing sensitive land use	Assessment Criteria – dB(A)		Additional considerations
	Day (7am-10pm)	Night (10pm-7am)	
Childcare facilities	Sleeping rooms $L_{Aeq, (1hour)}$ 35 (Internal)	-	Multi-purpose spaces, e.g. shared indoor play/sleeping rooms should meet the lower of the respective criteria. Measurements for sleeping rooms should be taken during designated sleeping times for the facility, or if these are not known, during the highest hourly traffic noise level during the opening hours of the facility.
	Indoor play areas $L_{Aeq, (1hour)}$ 40 (Internal)		
	Outdoor play areas $L_{Aeq, (1hour)}$ 55 (External)		

6.1.3 NSW Department of Planning & Environment document – *'State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017'*

Section 3.6 Noise and air pollution

C26

An acoustic report should identify appropriate noise levels for sleeping areas and other non-play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations:

- *on industrial zoned land*
- *where the ANEF contour is between 20 and 25, consistent with AS 2021 – 2000*
- *along a railway or mass transit corridor, as defined by State Environmental Planning Policy (Infrastructure) 2007*
- *on a major or busy road*
- *other land that is impacted by substantial external noise.*

Principle 6 – Amenity

- *Good design positively influences internal and external amenity for children, staff and neighbours. Achieving good amenity contributes to positive learning environments and the well-being of students and staff.*

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

- *Good amenity combines appropriate and efficient indoor and outdoor learning spaces, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage, service areas and ease of access for all age groups and degrees of mobility.*
- *Well-designed child care facilities provide comfortable, diverse and attractive spaces to learn, play and socialise.*

6.1.4 Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013'*

The $L_{eq(1hour)}$ intrusive noise level from road, rail traffic or industry at any location within the indoor play or sleeping areas of the Centre during the hours when the centre is operating shall not exceed 40 dB(A).

Aircraft noise should have a L_{ASmax} noise level from aircraft at any location within the indoor play or sleeping areas of the centre during the hours when the Centre is operating shall not exceed 50 dB(A) in accordance with Australian Standard AS2021.

The noise level $L_{Aeq(1hour)}$ from road, rail or industry at any location within the outdoor play or activity area during the hours when the Centre is operating shall not exceed 55 dB(A).

6.1.5 Australian Standard AS: 2021:2015 – *"Acoustics – Aircraft Noise Intrusion Building Siting and Construction"*

AS2021 states that a full evaluation of internal noise levels should be carried out for locations with an aircraft noise exposure close to or exceeding ANEF 20. This full evaluation requires an examination of likely levels of internal noise from aircraft flyovers.

Critically, AS2021 does not have specific noise intrusion criteria for child care centres.

In the absence of any criteria ALC have recommended the most suitable internal performance requirement from which is listed. These levels will be used to assess aircraft noise intrusion into the specific areas of the development.

Table 6-2 – Aircraft Noise Levels inside Buildings

Activity	Indoor Design Sound Level from Aircraft Flyover, dB(A)$L_{Max(Slow)}$
Sleeping areas	50 dB(A)
Teaching Areas	55 dB(A)
Bathrooms, toilets, laundries	60 dB(A)
Offices	55 dB(A)
Staff Room	65 dB(A)

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

6.1.6 Australian/New Zealand Standard AS/NZS: 2107:2016 – *"Acoustics – Recommended design sound levels and reverberation time for building interiors"*

AS2107-2016: Recommended design sound levels and reverberation times for building interiors specifies allowable internal noise levels for internal spaces within different types of buildings. Table 1, in Section 5 of AS2107-2016, gives the following internal noise.

Table 6-3 – Recommended Design Sound Level

Space /Activity Type	Design Sound Level
Bathrooms	<55dB(A)$L_{eq(When\ in\ Use)}$
Offices	40-45dB(A)$L_{eq(When\ in\ Use)}$
Staff Room	40-45dB(A)$L_{eq(When\ in\ Use)}$

*Assumed based on similar use.

6.1.7 Summarised Internal Noise Criteria

Table 4 – Summarised Internal Noise Criteria

Space	Aircraft Flyover, dB(A)$L_{Max(Slow)}$	Traffic Noise dB(A)$L_{eq,\ 1\ hour}$
Sleeping areas	50 dB(A)	35 dB(A)
Teaching Areas	55 dB(A)	40 dB(A)
Bathrooms, toilets, laundries	60 dB(A)	55 dB(A)
Offices	55 dB(A)	45 dB(A)
Staff Room	65 dB(A)	45 dB(A)

6.2 TRAFFIC NOISE MEASUREMENTS

This section of the report details noise measurements conducted around the project site to establish traffic and surrounding environmental noise levels impacting on the development.

6.2.1 Measurement Equipment

Attended noise measurements were conducted using a Norsonic 140 Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonic Sound Calibrator type 1251. No significant drift was noted.

6.2.2 Measurement Location

Attended traffic noise measurements were conducted along Mount Vernon Road located along the southern boundary of the 110-112 Mount Vernon Road project site. Attended noise measurements were undertaken at a distance of 3m from the kerb. See figure 1 for a detailed measurement location.

6.2.3 Measurement Period

Attended noise measurements were undertaken on Friday, 1st March 2019.

6.2.4 Measured Traffic Noise Measurements

Results from the attended traffic noise measurements have been summarised below for each location.

Table 6-5 – Attended Traffic Noise Measurements

Location	Date and Time of Measurement	Measured Noise Level dB(A)$L_{eq(1\text{-}hour)}$
Mount Vernon Road (See Figure 1) 3m from kerb 180° view of the road	Friday, 1st March 2019 (3:00pm – 4:00pm	63

6.3 PREDICTED AIRCRAFT NOISE LEVEL

Aircraft noise levels at the site were determined using the procedures outlined in AS 2021:2015. The standard gives aircraft noise levels for aircraft landing and taking off for locations near airports. The location of the runways was obtained from the Western Sydney airport, 2017 ANEC contour maps, Prefer 05 direction as detailed in the Australian Government, Department of Infrastructure, Regional Development and Cities Online Noise Modelling Tool. (Refer to Figure 6-2 below)

Based on the distance from the site to the runway, the flight path and the site elevation, AS 2021 predicts that the loudest typical aircraft movement will be from a 747-400 Short Range aircraft taking-off from Western Sydney Airport. The noise level at the site as indicated by the standard is 62dB(A)$L_{max(Slow)}$. This noise level will be used to predict the resultant internal noise levels.

6.3.1 Requirements by Council

It is noted that the Penrith Council Development Control Plan 2014, C.12 Noise and Vibration, Section 12.3 “Aircraft Noise” details an ANEF Contour map (Figure 6-1). This contour map has been superseded by the 2017 Noise Modelling ANEC Tool supplied by the Australia Government, Department of Infrastructure, Regional Development and Cities.

The current 2017 ANEC map in (Figure 6-2) shows that the project site location (110-112 Mt Vernon Road, Mount Vernon) has an ANEC of ≤20 with the 2030 prefer 05 runway option. Therefore; the current 2017 ANEC map has been used in this assessment.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

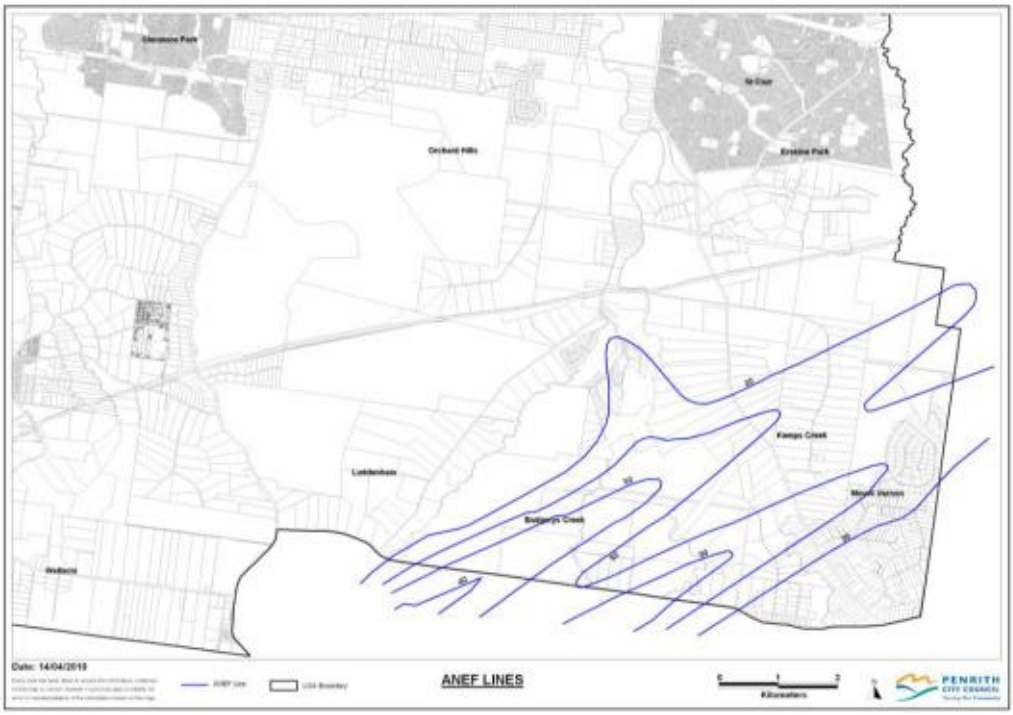


Figure 6-1 - Penrith Council DCP 2014 ANEF Map Dated: 14/04/2010

Figure 6-2 – Site Location Map 2 (Current ANEC Map & Project Site Location)

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

6.4 ANALYSIS / RECOMMENDATIONS

Internal noise levels from external traffic/aircraft movements into the proposed development has been assessed using the external measured or predicted noise levels which have been detailed above and the noise criteria listed in section 6.1 of this report.

6.4.1 Internal Noise Levels

Calculations were performed taking into account the orientation of windows, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way, the likely interior noise levels can be predicted.

The building shell acoustic treatment required to ensure compliance with the assessment criteria are detailed in Section 8.

6.4.2 External Noise Levels within Outdoor Play Areas

6.4.2.1 Traffic Noise – Outdoor Play Areas

Northern Outdoor Play Area and Western Outdoor Babies Play Area

Based on detailed distance and barrier calculations we can confirm that the external noise levels from traffic movements around the site will be compliant with the NSW EPA Road Noise Policy for noise levels in external play areas (i.e. $L_{Aeq, (1hour)}$ 55).

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

7 NOISE EMISSION ASSESSMENT

7.1 NOISE EMISSION CRITERIA

Based on the acoustic review conducted by this office, the primary sources of noise generated by the site will be as follows:

- Noise associated with the outdoor play spaces;
- Noise-associated with the indoor learning spaces;
- Noise associated with the operation of the driveway/on-grade carpark; and
- Noise from the mechanical plant in principle.

This noise emission assessment has been assessed in accordance with the following documents:

- Penrith City Council – '*Development Control Plan 2014'*;
- NSW Department of Planning & Environment document – '*State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017';*
- Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013';*
- NSW Environmental Protection Authority (EPA) document – *'NSW EPA Noise Policy for Industry (NPfI) 2017'*; and
- NSW Environmental Protection Authority (EPA) document – *'NSW Road Noise Policy 2011'* (RNP).

7.1.1 Penrith City Council – '*Development Control Plan 2014*'

Penrith City Council Development Control Plan (DCP) 2014 does not contain any applicable criteria.

7.1.2 NSW Department of Planning & Environment document – *'State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017'*

Section 3.5 Visual and Acoustic Privacy

Considerations

C24

A suitably qualified acoustic professional should prepare an acoustic report which will cover the following matters:

- *identify an appropriate noise level for a child care facility located in residential and other zones*
- *determine an appropriate background noise level for outdoor play areas during times they are proposed to be in use*
- *determine the appropriate height of any acoustic fence to enable the noise criteria to be met.*

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

7.1.3 Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013'*

Residential Receptors

Outdoor Play Area

For most centres as the duration of time that children are allowed to play outside is reduced than the overall noise impacts reduce. Therefore, it is reasonable to allow a higher level of noise impact for shorter duration of outdoor play. AAAC members regard that a total time limit of approximately 2 hours outdoor play per day (e.g. 1 hour in the morning and 1 hour in the afternoon) should allow an additional emergence above the background of 5dB. ***We note that as per the plan of management, outdoor play is proposed to occur more than 2 hours.***

More than 2 hours per day – *The L_{eq},15minute noise level emitted from the outdoor play area shall not exceed the background noise level by more than 5 dB at the assessment location.*

The assessment location is defined as the most affected point on or within any residential receiver property boundary. Examples of this location may be:

- *1.5m above ground level;*
- *On a balcony at 1.5 above floor level;*
- *Outside a window on the ground on higher floors.*

Indoor Play Area, Mechanical Plant, Pick-up and Drop Off

The $L_{eq,15minute}$ noise level emitted from the cumulative noise impact of children playing indoors, mechanical plant and traffic on the site shall not exceed the background noise level by more than 5 dB(A) at the assessment location.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

7.1.4 NSW Environmental Protection Authority (EPA) document – *'NSW EPA Noise Policy for Industry (NPfI) 2017'*

The NSW EPA NPfI, has two criteria which need to be satisfied namely Intrusiveness and Amenity. These are described below:

- *Intrusiveness Criteria* - This guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5 dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

- *Amenity Criteria* - This guideline is intended to limit the absolute noise level from all "industrial" noise sources such as mechanical plant to a level that is consistent with the general environment.

The EPA's NPfI sets out acceptable noise levels for various localities. Table 2.2 on page 11 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Noise levels are to be assessed at the property boundary.

7.1.4.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor do not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Section 5. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

Table 7-1 - Intrusiveness Noise Emission Goals

Location	Period/Time	Intrusiveness Noise Emission Goal dB(A) $L_{eq(15min)}$
Residential Receivers	Day (7:00am-6:00pm)	40

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

7.1.4.2 Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The NSW EPA NPfI sets out acceptable noise levels for various localities. Table 2.2 on page 11 of the policy indicates 4 categories to distinguish different areas. They are rural, suburban, urban and urban/industrial interface. This site is categorised by rural receivers.

For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays.

Table 7-2 – Project Amenity Noise Emission Goals

Location	Period/Time	Project Amenity Noise Emission Goals dB(A)$L_{eq(15mins)}$
Nearby Residences – Rural Receiver	Day (7:00am-6:00pm)	48

7.1.5 Summary of Noise Emission Criteria

The following table presents the noise emission objectives for the proposed child care centre.

Table 7-3 – Summarised Noise Emission Criteria (Residential Criteria)

Receiver Location	Noise Source	Time of Day	Noise Emission Criteria
Residential Receivers	Operational Noise	Day (7:00am-6:00pm)	BG+5dB(A) = 35dB(A)L_{90} + 5dB(A) = **40dB(A)$L_{eq(7am-6pm)}$** (AAAC Criteria)

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

7.2 NOISE EMISSION ANALYSIS

7.2.1 Outdoor Play Noise Emissions

Typical sound power levels generated by children playing have been detailed in the AAAC Child Care Guideline 2013 which is presented below:

Table 1 – Effective Sound Power Levels for groups of 10 children playing

10 Children aged 0 to 2 years	77 to 80 dB(A)
10 Children aged 2 to 3 years	83 to 87 dB(A)
10 Children aged 3 to 6 years	84 to 90 dB(A)

The outdoor play noise has been predicted based on the following information provided to this office below:

- The operation of the external play areas will use a staggered system.

0-2yrs age group

A maximum of 5 children are to play in the Western outdoor babies play area at any one time.

2-5yrs age group

A maximum of 30 children are to play in the Northern outdoor play area at any one time.

- Recommended acoustic treatments in Section 8 of this report are implemented.
- Noise from each outdoor area is calculated assuming the children evenly distributed throughout the space.

7.2.2 Indoor Play / Teaching Sound Pressure Level (SPL)

Noise levels generated from indoor activities (i.e. lessons) are 75dB(A)L_{eq} Sound Pressure Level based on our measurement results of similar sites.

Noise from indoor spaces is significantly less than from outdoor spaces given activities which are typically undertaken inside are passive learning activities which would have a lower overall noise level. For completeness, the cumulative impact of both indoor and outdoor noise will be assessed in section 7.3.

The indoor play noise has been predicted based on assumptions below:

- Recommended acoustic treatments in Section 8 of this report are implemented.
- A cumulative result for outdoor and indoor has been presented in 7.3 of this report.

7.2.3 Predicted Noise Levels

Predicted noise levels which are presented below.

For the purpose of this assessment ALC have undertaken analysis of multiple scenarios with different aged children utilising the outdoor areas and other remaining children located inside indoor classrooms. The scenario which is presented below is the worst case (i.e. nosiest). This scenario includes the following:

- 30 x 2-5yrs old children playing within the Northern Outdoor Play Area;
- 5 x 0-2yrs old children playing within the Western Babies Outdoor Play Area; and
- Remaining children inside classrooms with external doors/windows closed.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table 7-4 – Predicted Noise Level to Receivers

Assessment Location	Predicted Worst Case Noise Level	Children Activity	Criteria- Day	Compliance
Receiver 1: 108 Mount Vernon Road, Mount Vernon (Figure 2-1)	≤35	• 30 x 2-5yrs old children playing within the Northern Outdoor Play Area; • 5 x 0-2yrs old children playing within the Western Babies Outdoor Play Area; and • Remaining children inside classrooms with external doors/ windows closed.	**40dB(A)$L_{eq(Period)}$** (AAAC Criteria) BG+5dB(A) = 35dB(A)L_{90} + 5dB(A)	Refer to Section 8 for recommendations
Receiver 2: 106 Mount Vernon Road, Mount Vernon (Figure 2-1)	≤35			
Receiver 3: 100 Mount Vernon Road, Mount Vernon (Figure 2-1)	40			
Receiver 4: 122 Mount Vernon Road, Mount Vernon (Figure 2-1)	≤35			
Receiver 5:114 Mount Vernon Road, Mount Vernon (Figure 2-1)	39			
Receiver 6: 105 Mount Vernon Road, Mount Vernon (Figure 2-1)	≤35			

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

7.3 MECHANICAL PLANT NOISE EMISSIONS

At this stage, no mechanical plant has been selected.

It is therefore recommended that prior to the issue of the Construction Certificate an acoustic review of the proposed equipment selections is to be reviewed to ensure all acoustic treatments for mechanical plant are documented.

As a minimum the mechanical plant are to be designed and installed to comply with the requirements summarised of section 7.1 of this report.

7.4 NOISE GENERATED BY ADDITIONAL TRAFFIC ON PUBLIC ROADS

The NSW EPA '*Road Noise Policy*' provides a target noise abatement levels for existing roads not subject to redevelopment, in which should be adopted in the assessment of additional noise associated with traffic increase. The noise abatement levels are set out in table 8 of the policy and are provided below.

Table 7-5 – NSW EPA *Road Noise Policy – Target noise abatement levels (Table 8, page 30)*

Existing road category	Target noise level – dB(A)	
	Day (7 a.m.-10 p.m.)	Night (10 p.m.- 7 a.m.)
Freeway/arterial/sub-arterial road (Mount Vernon Road)	$L_{Aeq,\ (15\ hour)}$ 60 (External)	$L_{Aeq,\ (9\ hour)}$ 55 (External)

Traffic associated with the childcare centre is proposed to access the site via Mount Vernon Road which is defined as a sub-arterial road. The measured existing traffic noise levels already exceed the criteria above, however; the NSW EPA "Road Noise Policy" specifies the following below:

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use development, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

7.4.1 Predicted Additional Traffic Noise Levels

The following additional traffic volumes have been provided by the traffic engineer that the "96" children centre would generate 77 peak trips between 7am and 9am. The centre will provide a minibus which has capacity of 22 children and undertake 1 trip during the AM period, this would reduce the peak hour vehicle trips to approximately 59 peak trips in the AM period. However, given that 77 peak trips between 7am and 9am is a 'worst-case' scenario, assessment has been undertaken based on this.

Table 7-6 – Additional Traffic Volume Data

Roadway	Predicted Traffic Volume Increase during Peak Hour
Mount Vernon Road	38-39 vehicle/ hour

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

CORTN program has been used to predict the additional traffic noise generated by the project site. Detailed prediction results have been presented as below.

Table 7-7 – Predicted Traffic Noise Increase on Neighbouring Streets

Roadway	Predicted Traffic Noise Increase dB(A)	Criteria dB(A)	Comply?
Mount Vernon Road	1.2	≤ 2	Yes

7.5 DRIVEWAY AND ONGRADE CARPARK NOISE EMISSIONS

A noise emission assessment of the on-grade carpark and driveway has been completed during the following times;

- A worst 1-hour period when children are being dropped off (7am to 9am); and
- The following noise data provided by the AAAC Childcare Guideline:

Table 3 – Sound Power Levels for Traffic (30 second L_{eq})

Car	85 to 90 dB(A)
Delivery Van	85 to 95 dB(A)

The traffic noise from the proposed car park has been predicted based on the assumption as below.

- Traffic engineer explained that the "96" children centre would generate 77 peak trips between 7am and 9am. The centre will provide a minibus which has capacity of 22 children and undertake 1 trip during the AM period, this would reduce the peak hour vehicle trips to approximately 59 peak trips in the AM period. However, given that 77 peak trips between 7am and 9am is a 'worst-case' scenario, assessment has been undertaken based on this.
- Vehicles drive in/out at 10km/hour speed with typical Sound Power Level 87dB(A).
- Garbage/Delivery Trucks drive in/out at 10km/hour speed with typical Sound Power Level 99dB(A).
- Recommendations in Section 8 are implemented.

The predicted noise levels at the nearby receivers are presented in the table below. It is noted that if noise emissions from the carpark/driveway are compliant to the nearest receivers being receiver 3,5 and 6, then noise emissions to the remaining receivers will also be satisfactory.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table 7-8 - Predicted Noise Levels from Car Park/Driveway – Parents Drop Off

Noise at Affected Receivers (External Boundary)	Predicted Noise Level (dB(A)$L_{eq, 15min}$)	Time of Day	Criteria (dB(A)$L_{eq, 15min}$)	Compliance
Receiver 3: 100 Mount Vernon Road, Mount Vernon (Figure 2-1)	40	Day (7am-6pm)	40dB(A)	Yes
Receiver 5:114 Mount Vernon Road, Mount Vernon (Figure 2-1)	41			Yes*
Receiver 6: 105 Mount Vernon Road, Mount Vernon (Figure 2-1)	39			Yes

*Section 4.2 of the Noise Policy for Industry states that predicted noise levels that result in residual noise impacts that are less than 2dB(A) is considered negligible and that *'The exceedances would not be discernible by the average listener and therefore would not warrant receiver-based treatments or controls'.*

Table 7-9 - Predicted Noise Levels from Car Park/Driveway – Garbage/Delivery Truck

Noise at Affected Receivers (External Boundary)	Predicted Noise Level (dB(A)$L_{eq, 15min}$)	Time of Day	Criteria (dB(A)$L_{eq, 15min}$)	Compliance
Receiver 3: 100 Mount Vernon Road, Mount Vernon (Figure 2-1)	35	Day (7am-6pm)	40dB(A)	Yes
Receiver 5:114 Mount Vernon Road, Mount Vernon (Figure 2-1)	36			Yes
Receiver 6: 105 Mount Vernon Road, Mount Vernon (Figure 2-1)	≤30			Yes

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

8 RECOMMENDED TREATMENTS – BUILDING AND MANAGEMENT

The following building and management controls are required in order to control:

- Traffic noise intrusion from Mount Vernon Road;
- Aircraft noise intrusion from flights departing Western Sydney Airport; and
- Noise emission from the operation of the facility.

8.1 BUILDING CONSTRUCTION

8.1.1 External Glazing

The following table presents the recommended glazing.

Table 8-1 – Recommended Glazing Construction

Space	Glazing Construction	R_w Rating	Acoustic Seals
All	6.38mm Laminated	31	Yes. All Windows and Doors

Note: The following constructions are recommended to comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-lon type acoustic seals. (**Mohair Seals are unacceptable**).

8.1.2 External Wall Construction

The following table presents the recommended external wall construction.

Table 8-2 – External Wall Construction

Space	External Lining	Stud System	Internal Lining
All	Blockwork, Masonry Brick or Concrete	64mm Steel Stud with 75mm thick 11kg/m^3 glasswool insulation	1x13mm Standard Plasterboard
	9mm Thick Fibre-Cement Sheeting	92mm Steel Stud with 75mm thick 11kg/m^3 glasswool insulation	1x13mm Standard Plasterboard

8.1.3 External Roof and Ceiling Construction

The following table presents the recommended external roof and ceiling construction.

Table 8-3 – External Roof and Ceiling Construction

Space	External Lining	Truss System	Internal Lining
All	Sheet Metal	Minimum 250mm airgap with 11kg/m^3 glasswool insulation	1x13mm Standard Plasterboard

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

8.1.4 Acoustic Barrier

The acoustic barrier proposed below is based on information provided to this office, that land between the yellow line (marked up below) and Mount Vernon Road is non-construction land. A solid fence constructed from 16mm thick plywood, 9mm thick fibre cement sheet or similar with all gaps sealed must be installed. See Figure 8-1 below for a mark-up of the boundary fence and Figures 8-2 and 8-3 for section details provided to this office.

1.8m High Solid Fence

2.4m High Solid Fence

Figure 8-1: Boundary Fence Mark-up

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

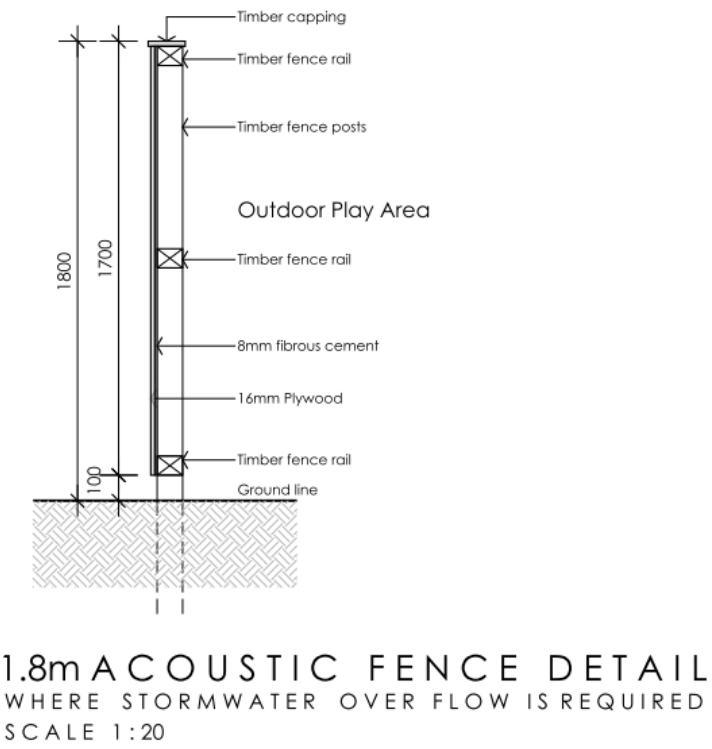


Figure 8-2: 1.8m High Acoustic Fence Detail (Provided to this office from Project Works Design)

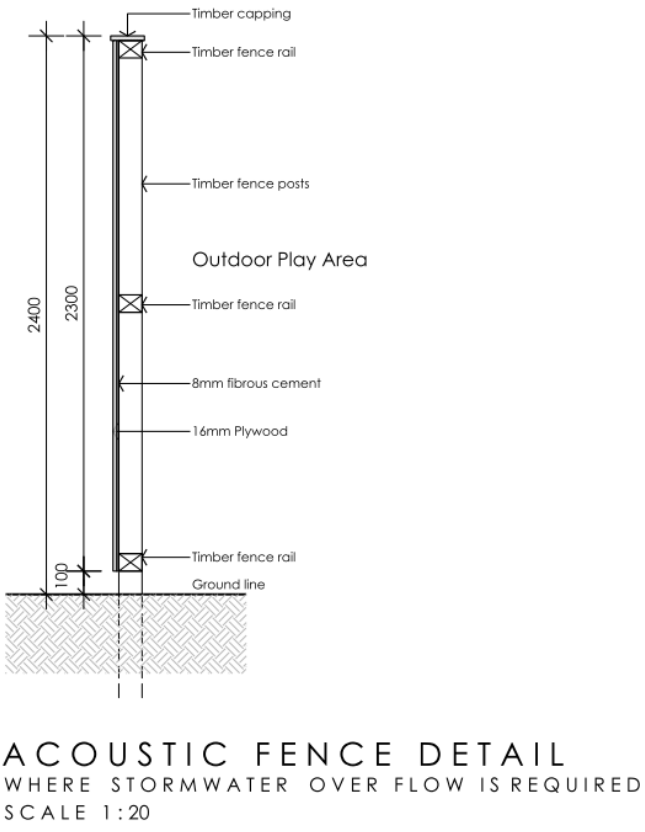


Figure 8-3: 2.4m High Acoustic Fence Detail (Provided to this office from Project Works Design)

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Acoustic analysis indicates that the noise reduction will be increased by 4 dB(A) at 1kHz if the fence height is increased from 1.8m to 2.4m.

8.2 MANAGEMENT CONTROLS

- No more than 96 children inside the Child Care Centre at any one time.
- External and Internal play regulated as follows:
  - Maximum of 5 x 0-2yrs old within the Western Babies Outdoor Play area at any time.
  - Maximum of 30 x 2-5yrs old within the Northern Outdoor Play area at any time.
  - All remaining children will be undertaking indoor activities when not outside.
- All windows and external doors must be closed except for ingress and egress.
- Child Care Centre to operate only Monday to Friday 7:00am to 6:00pm.
- Carpark must not be used prior to 7:00am.
- All cleaning activities are permitted to operate after centres hours however must be completed prior to 10pm. All facades are to be closed during cleaning activities.
- All deliveries are to be between 10:00am and 2:00pm, Monday to Friday.
- No garbage collection before 7:00am or after 6:00pm.
- No centre events except for typical childcare centre operation are to be undertaken.
- Additional general management controls as follow:
  - Signs reminding staff and visitors to minimise noise at all times shall be installed at ingress/egress points from the child care centre (including car park).
  - All staff are to be given appropriate training in relation to the acoustic impacts and requirements in terms of operation of the facility.
  - Management is to ensure children are supervised at all times to minimise noise generated by the children whenever practical and possible.
  - Install a contact phone number at the front of the centre so that any complaints regarding centre operation can be made.
  - No music systems are to be used outside at any time.
  - Mechanical Plant only to operate between 7:00am and 6:00pm.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

9 CONSTRUCTION NOISE AND VIBRATION IMPACTS

9.1 SENSITIVE RECEIVERS

The nearest sensitive receivers in the vicinity of the project site are as follows below:

- Receiver 1: Residential receiver located at 108 Mount Vernon Road, Mount Vernon to the North. Residential receiver is single storey.
- Receiver 2: Residential receiver located at 106 Mount Vernon Road, Mount Vernon to the North-West. Residential receiver is single storey.
- Receiver 3: Residential receiver located at 100 Mount Vernon Road, Mount Vernon to the West. Residential receiver is single storey.
- Receiver 4: Residential receiver located at 122 Mount Vernon Road, Mount Vernon to the North-East. Residential receiver is single storey.
- Receiver 5: Residential receiver located at 114 Mount Vernon Road, Mount Vernon to the East. Residential receiver is single storey.
- Receiver 6: Residential receiver located at 105 Mount Vernon Road, Mount Vernon to the South, across Mount Vernon Road. Residential receiver is single storey.

9.2 NOISE MANAGEMENT LEVEL

Establishment of criteria for construction noise requirements will be in accordance with the NSW Environmental Protection Authority 'Interim Construction Noise Guideline'.

9.2.1 NSW EPA Interim Construction Noise Guideline

Given the scale of the proposed works, the "quantitative" assessment procedure, as outlined in the Interim Construction Noise Guideline (ICNG) will be used (as opposed to the simpler "qualitative" assessment method outlined in the guidelines). The quantitative assessment method requires:

- Determination of noise generation management levels (based on background noise levels on site).
- Prediction of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission management levels is not possible.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

9.2.1.1 At Residential Receivers

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected" level*. Where construction noise is predicted to exceed the "noise affected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise affected level". For residential properties, the "noise affected" level occurs when construction noise exceeds ambient levels by more than 10dB(A)$L_{eq(15min)}$.

- "*Highly noise affected level"*. Where noise emissions are such that nearby properties are "highly noise affected", noise controls such as respite periods should be considered. For residential properties, the "highly noise affected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

Table 9-1 – Construction Noise Management Levels to Residential Receivers

Location	"Noise Affected" Level - dB(A)$L_{eq(15min)}$	"Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$
Residential Receivers	BG 35+10 = 45	75

9.2.2 Summarised Noise Management Levels

The summarised noise management levels for the proposed construction activities are presented in the table below.

Table 9-2 – Summarised Noise Management Levels

Location	Management Level dB(A)$L_{eq\ (15\ min)}$
Residential Receivers	"Noise Affected" Level - 45 "Highly Noise Affected" Level - 75

9.3 CONSTRUCTION NOISE EMISSION ASSESSMENT

Detailed construction methodology are not available at this stage, acoustic analysis will be carried out at CC stage based on requirements above to work out noise mitigation solutions.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

10 CONSTRUCTION VIBRATION CRITERIA

Vibration criteria for the nearest receivers will be based on the following documents:

- DIN 4150-3 (1999-02); and
- EPA "Assessing Vibration: A technical guideline"

10.1.1 DIN 4150

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in the table below.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 10-1 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

	TYPE OF STRUCTURE	PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

10.1.2 Assessing Amenity

Table 2.2 of EPA "Assessing Vibration: A technical guideline" specified the following vibration goal for human comfort:

Table 10-2 – Preferred and Maximum Weighted RMS Values for Vibration Acceleration (m/s^2) 1-80 Hz

Location	Assessment Period	Preferred Values Z-axis	Preferred Values X & Y-axis	Maximum Values Z-axis	Maximum Values X & Y-axis
Continuous Vibration					
Residences	Day time	0.010	0.0071	0.020	0.014
Impulsive Vibration					
Residence	Day time	0.3	0.21	0.6	0.42

Acceptable values for intermittent vibration shall comply with the requirements in Table 2.4 of EPA "Assessing Vibration: A technical guideline" detailed as below.

Table 10-3 - Acceptable Vibration Dose Values for Intermittent Vibration ($m/s^{1.75}$)

Location	Day time preferred value	Day time maximum value
Residences	0.20	0.40

10.1.3 Summarised Recommended Vibration Limits

The summarised vibration criteria are presented in the table below.

Table 10-4 – Recommended Vibration Limit

Vibration Receiver	Recommended Vibration Limits PPV (mm/s)
Residential Buildings	5

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

11 CONCLUSION

Environmental noise assessment for the proposed childcare centre to be located within 110-112 Mount Vernon Road, Mount Vernon has been carried out. Provided acoustic treatments in Section 8 of this report are adopted, the noise intrusion and noise emissions will satisfy the requirements of;

- Penrith City Council – '*Development Control Plan 2014'*;
- NSW Department of Planning & Environment document – '*State Environmental Planning Policy (Education Establishments and Child Care Centre Facilities) 2017';*
- NSW Department of Planning & Environment document – '*Child Care Planning Guideline, August 2017';*
- Association of Australian Acoustical Consultants (AAAC) document – *'Technical Guideline Child Care Centre Noise Assessment 2013';*
- Australian Standard AS2021-2015 *"Aircraft Noise Intrusion – Building siting and Construction";*
- NSW Environmental Protection Authority (EPA) document – *'NSW EPA Noise Policy for Industry (NPfI) 2017'*;
- Australian/New Zealand Standard AS/NZS: 2107:2016 – *"Acoustics – Recommended design sound levels and reverberation time for building interiors"; and*
- NSW Environmental Protection Authority (EPA) document – *'NSW Road Noise Policy 2011'* (RNP).

Based on the information provided above, we believe in our professional opinion that the proposal is capable of maintaining the acoustic amenity of the occupants and surrounding receivers, provided that the recommendation in section 8 of this report are adopted.

Construction noise emission management levels have been setup based on the requirements of the NSW Interim Construction Noise Guideline and detailed noise controls are to be determined at CC Stage.

Construction vibration limits have been setup based on the requirements of DIN 4150, EPA document Assessing Vibration: A technical guideline. Detailed vibration safeguard system will be determined at CC Stage.

We trust this information is satisfactory. Please contact us should you have any further queries.

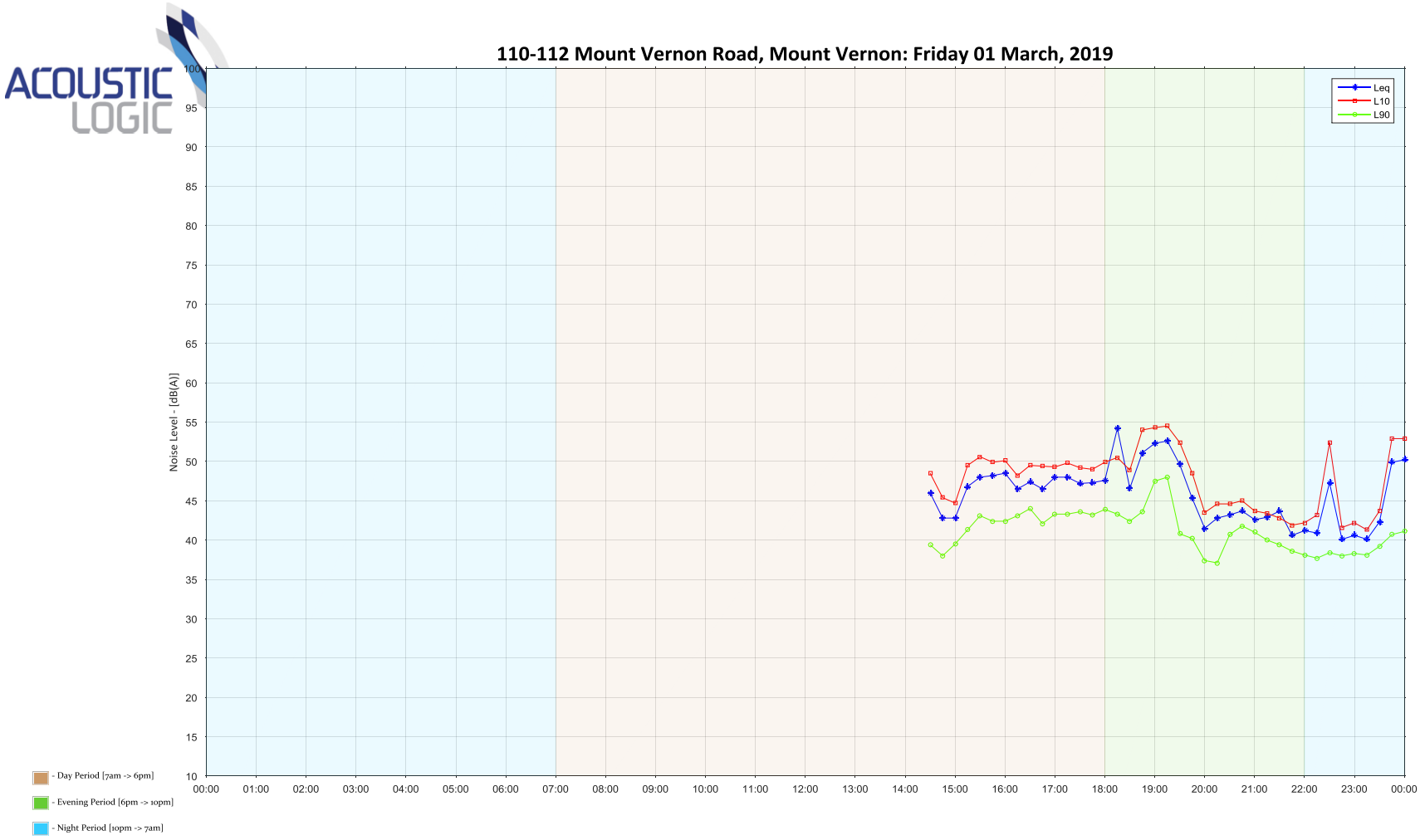
Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Shane Nichols

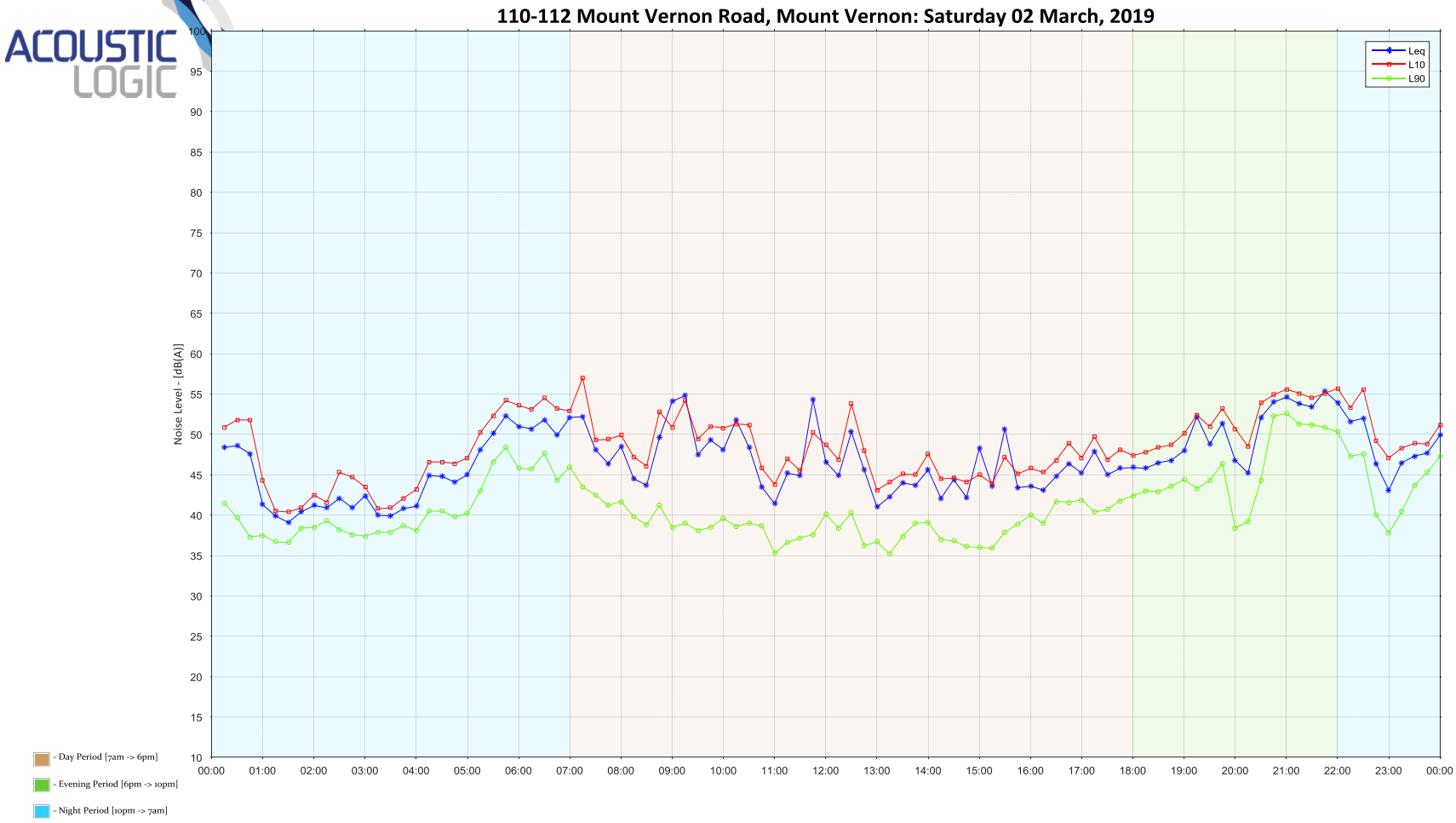
Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

APPENDIX A – UNATTENDED NOISE MONITORING DATA

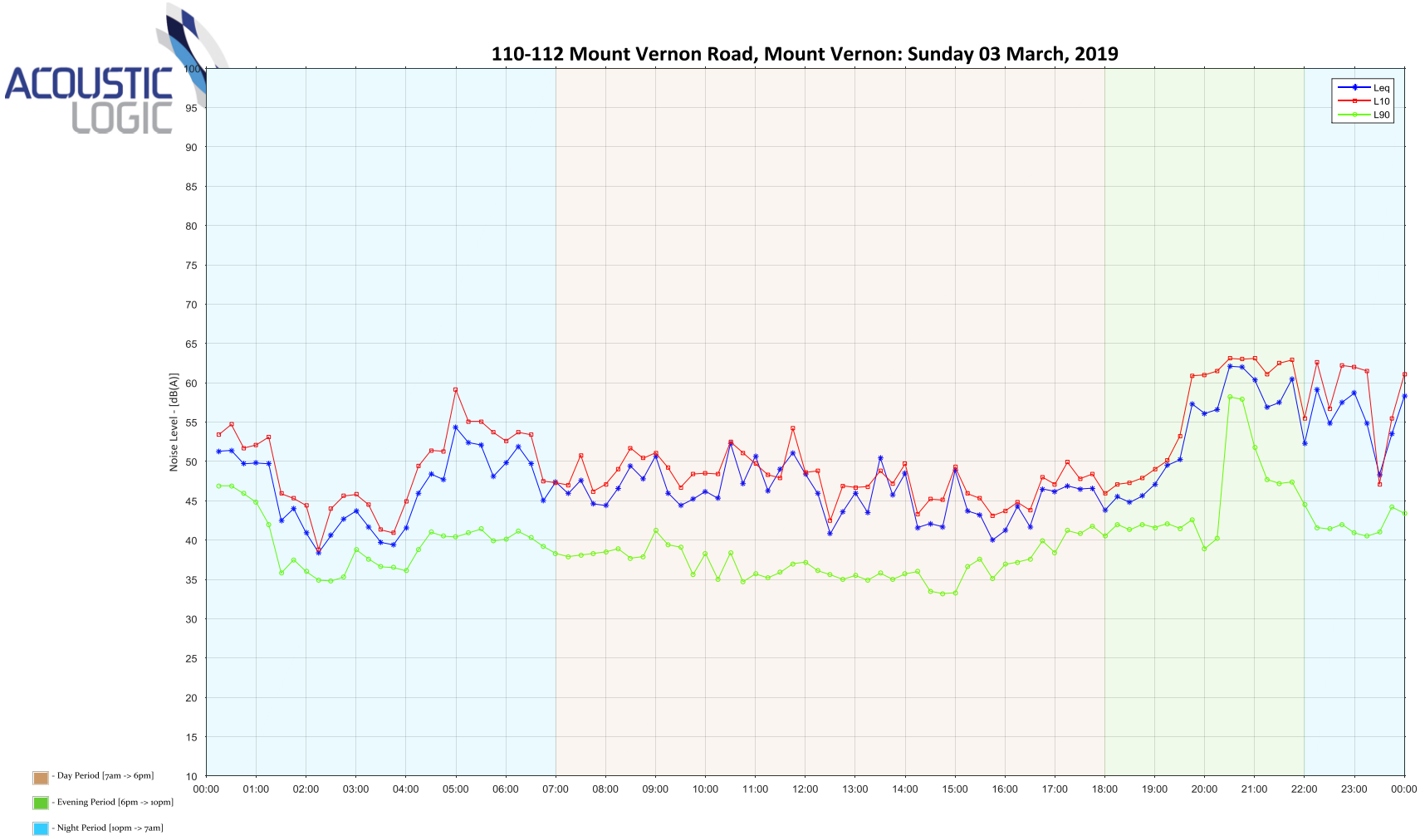
Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



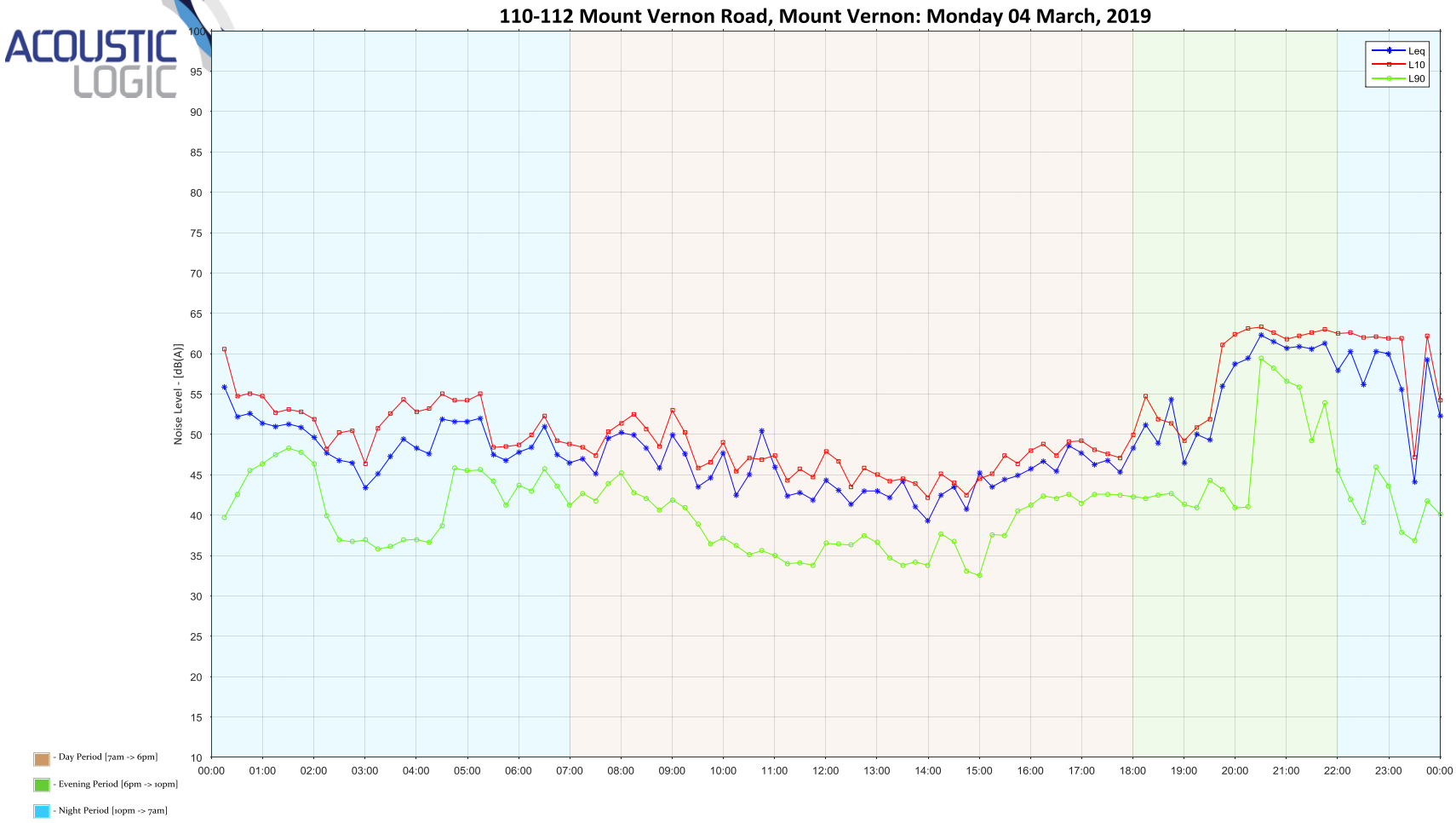
Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



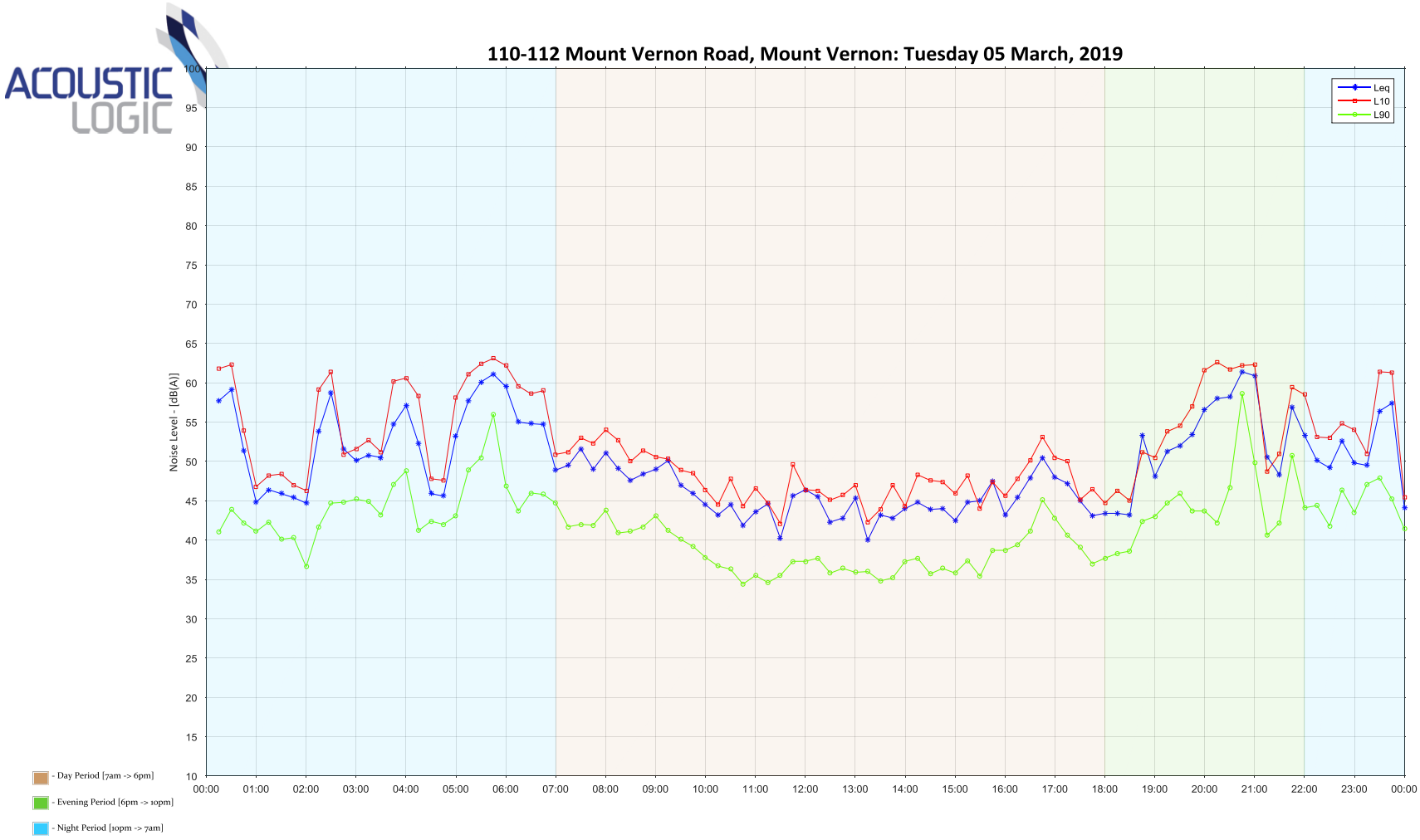
Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



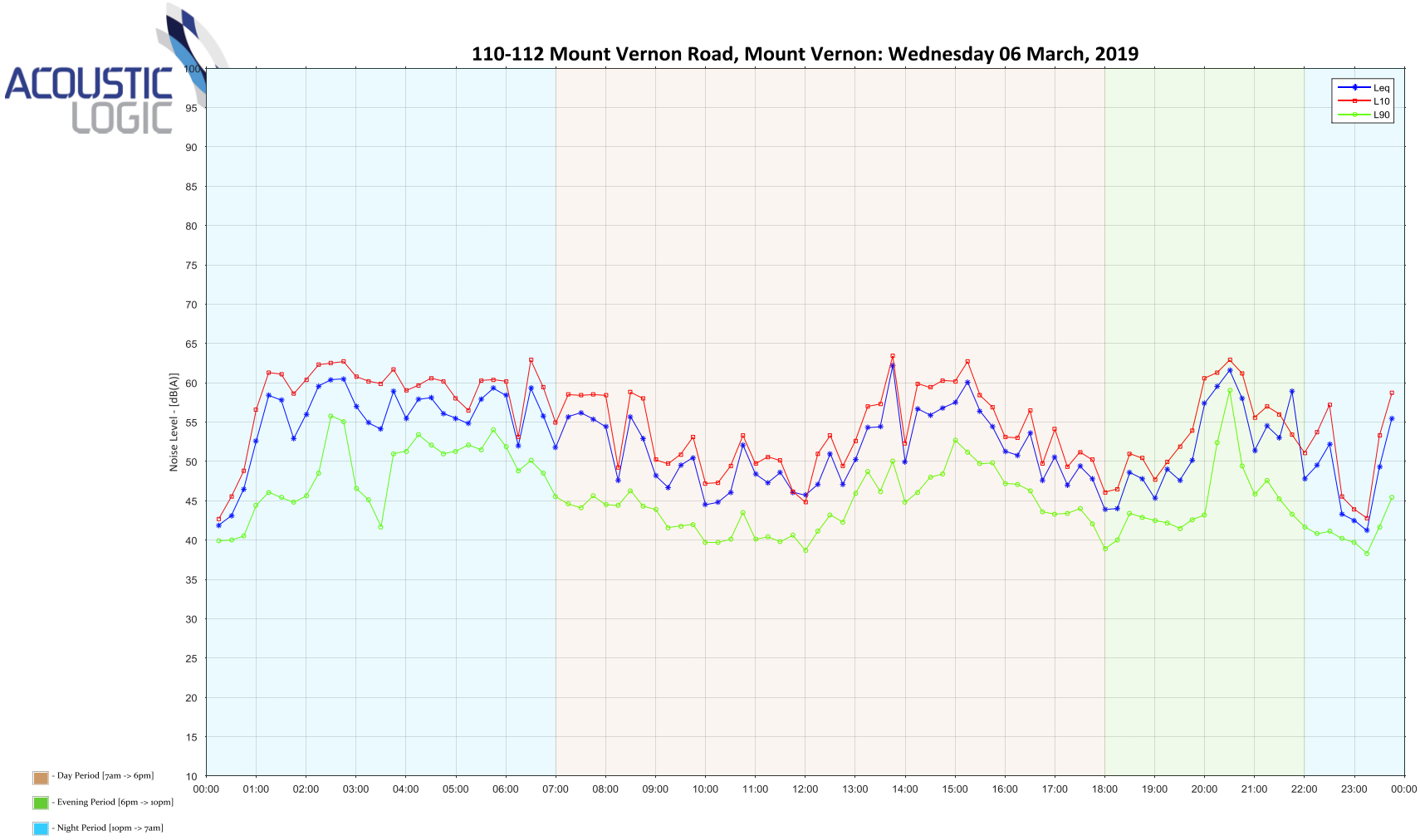
Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

gtk consulting
traffic management
and car parking solutions

Assessment
Traffic Volume Environmental Capacity
Proposed Child Care Centre
110-112 Mount Vernon Road, Mount Vernon

October 2020

gtk consulting pty ltd
1701 River Road
Lower Portland NSW 2756

ABN 70 122 395 993

m 0417 274 729
e gtkconsulting@bigpond.com

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table of Contents

1 INTRODUCTION 3
2 EXISTING TRAFFIC VOLUMES 4
3 IMPACT ON ENVIRONMENTAL CAPACITY 5
4 CONCLUSION 7

Copyright:
The concepts and information contained in this document are the property of gtk consulting pty ltd. Use of information or copying of this document in whole or part without the written permission of gtk consulting pty ltd constitutes an infringement of copyright.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

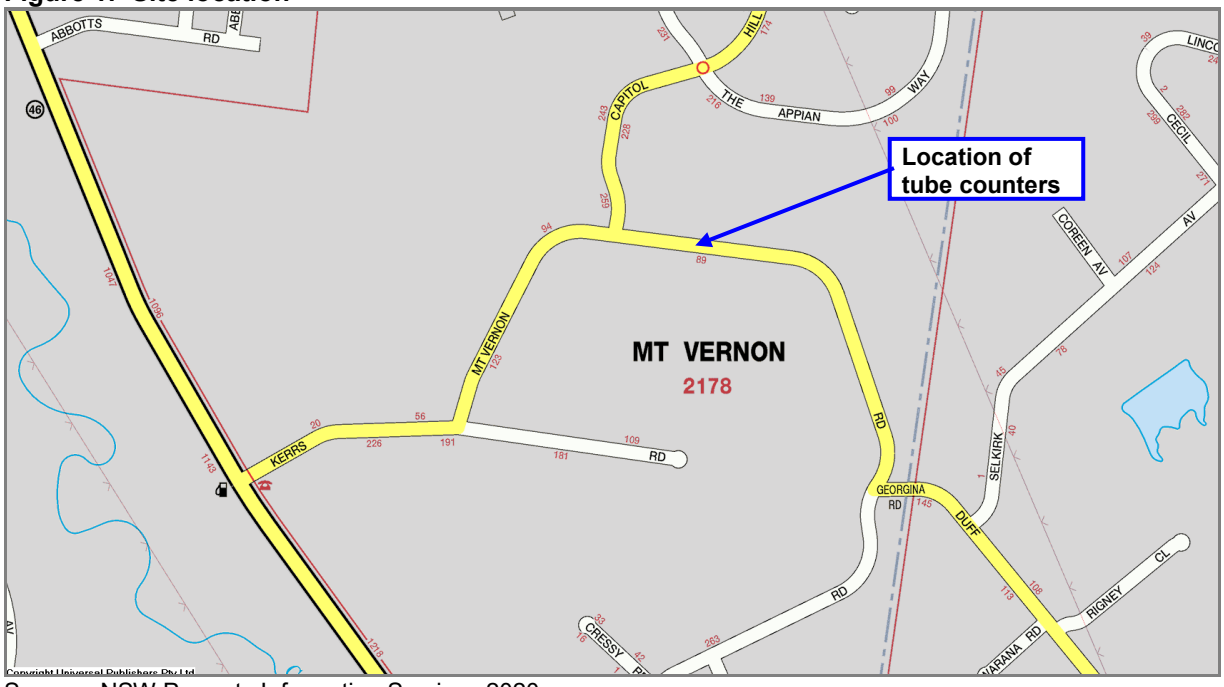
1 INTRODUCTION

Penrith City Council's Traffic Engineer requested in his email dated 14 October 2020 that:

> "*I'm simply requesting mid-block traffic counts (e.g. via tubes) be conducted fronting the development to determine the current peak time volumes. This should be summed with the trip generation resulting from the proposed centre to predict future traffic demand on Mt Vernon Rd and assess whether the roadway will remain within its environmental capacity post-development. These values should be justified with reference to relevant best practice e.g. RTA Guide to Traffic Generating Developments and/or Austroads.*"

On 16 October 2020, gtk consulting engaged Austraffic Pty Ltd to undertake speed, volume and classification surveys using tube counters on Mount Vernon Road, Mount Vernon outside the subject site, i.e. 110-112 Mount Vernon Road.

Figure 1: Site location



Source: NSW Property Information Services 2020

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

2 EXISTING TRAFFIC VOLUMES

In October 2020, traffic volume surveys were undertaken on Mount Vernon Road by an independent, experienced traffic survey company, Austraffic Pty Ltd. The surveys were conducted between midnight Wednesday 21 October and midnight Tuesday 27 October, 2020 outside 110-112 Mount Vernon Road.

The surveys (full survey data provided via email to Council's Mr Isaac Mann) revealed the following peak hour volumes (7 day average) on Mount Vernon Road:

- 114 in the AM peak (8.00am-9.00am) and 128 in the PM peak (3.00pm-4.00pm).

The RMS publication *Guide to Traffic Generating Developments 2002* provides the peak activity time for long day care centres as 7.00am to 9.00am and 4.00pm to 6.00pm. The maximum peak hour traffic volume for the existing traffic on Mount Vernon Road is:

- 114 in the AM (8.00am-9.00am) and 104 in the PM peak (4.00pm-5.00pm).

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3 IMPACT ON ENVIRONMENTAL CAPACITY

Mount Vernon Road is a local road under the Penrith City Council Road Hierarchy Plan. RMS has published guidelines which provide advice for the assessment of environmental capacity for streets with direct access to residential properties (RMS *Guide to Traffic Generating Development* 2002). These guidelines were developed following considerable research and have taken into account residents' attitudes to traffic in their streets. The guidelines are summarised in **Table 1**:

Table 1: RMS recommended environmental capacity performance standards for residential streets, i.e. local and collector roads

Road Class	Road Type	Maximum Speed (km/h)	Maximum Peak Hour Volume (veh/h)
Local	Access way	25	100
Local	Street	40	200 environmental goal 300 environmental maximum
Collector	Street	50	300 environmental goal 500 environmental maximum

Source: RMS *Guide to Traffic Generating Development* 2002

Two sets of performance standards have been recommended for the maximum peak hour volume in **Table 1**. For example, the recommended desirable number of vehicles per hour (vph) for a local street is 200 vph and the maximum is 300 vph. However, it is acknowledged that some streets carry volumes greater than the recommended maximum due to their location and connectivity within the road network.

The maximum peak hour vehicle trips (phvt) for the proposed child care centre are:

Child care centre	96 children x 0.8	=	**77 phvt** in the AM peak
	96 children x 0.7	=	**68 phvt** in the PM peak

The centre will provide a minibus which has a capacity of 22 children (plus 1 driver and 1 adult supervisor) and undertake 1 trip in the AM and PM peak periods, thereby reducing the peak hour vehicle trips to approximately **59** in the AM peak and **52** in the PM peak period.

Existing and post development traffic on Mount Vernon Road, at the peak traffic generating times of the proposed child care centre, is compared to the environmental capacity goal in **Table 2**:

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table 2: Environmental capacity Mount Vernon Road compared with existing and post development volumes

Location	Existing Volumes		Post Development		Environmental Capacity
	8.00am - 9.00am	4.00pm - 5.00pm	8.00am - 9.00am	4.00pm - 5.00pm	
Mount Vernon Rd	114	104	173	156	200

Source: gtk consulting 2015

During times of peak traffic generation of the proposed child care centre, Mount Vernon Road will operate within the recommended desirable environmental capacity goal.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

4 CONCLUSION

The proposal to establish a child care centre for 96 children at 110-112 Mount Vernon Road, Mount Vernon has been assessed to determine the impact of the additional traffic generated by the development on the environmental capacity and concludes that:

- During times of peak traffic generation of the proposed child care centre, Mount Vernon Road will operate within the desirable environmental capacity goal.
- The traffic generated by the proposed development is moderate and will not present any unsatisfactory traffic safety or capacity issues on the existing or future road network.

This additional assessment, requested by Council's Traffic Engineer, concludes that the combined traffic generated by the proposed child care centre and the existing traffic volume on Mount Vernon Road, Mount Vernon is within the desirable environmental capacity goal set by the RMS in it publication *Guide to Traffic Generating Developments 2002*.

Garry Kennedy

Director

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

gtk consulting
traffic management
and car parking solutions

Traffic and Car Parking Assessment
Proposed Child Care Centre
110-112 Mount Vernon Road, Mount Vernon

April 2020

gtk consulting pty ltd
1701 River Road
Lower Portland NSW 2756

ABN 70 122 395 993

m 0417 274 729
e gtkconsulting@bigpond.com

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

Table of Contents

1 INTRODUCTION 3
2 THE SITE, SURROUNDING LAND USE AND ADJACENT STREETS 5
3 THE PROPOSAL 7
4 TRAFFIC GENERATION 9
5 PARKING 10
6 ACCESS AND INTERNAL CIRCULATION 11
6.1 SITE ACCESS 11
6.2 INTERNAL CIRCULATION 12
6.3 SERVICES VEHICLES 12
7 CONCLUSION 16

Copyright:
The concepts and information contained in this document are the property of gtk consulting pty ltd. Use of information or copying of this document in whole or part without the written permission of gtk consulting pty ltd constitutes an infringement of copyright.

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

1 INTRODUCTION

gtk consulting has been engaged by Mr Vladimir Vanovac to undertake a traffic and car parking assessment for a proposal to construct a child care centre at 110-112 Mount Vernon Road, Mount Vernon (**Figures 1** & **2**).

The proposed child care centre is required to meet both existing and future needs of the developing Mount Vernon community and surrounding suburbs.

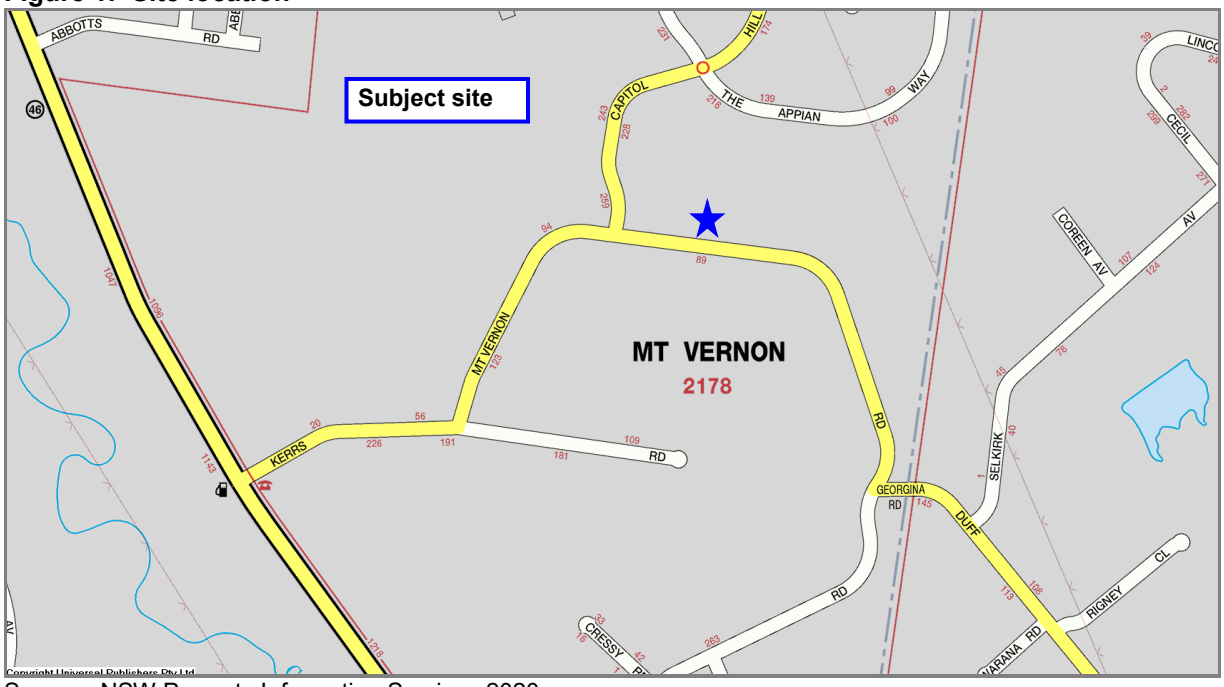
This report provides:

- A description of the site and the proposal.
- A description of the road network serving the site and the prevailing traffic conditions.
- An assessment of the potential traffic implications of the development.
- An assessment of car parking requirements for the proposed child care centre.
- An assessment of vehicle access to and from the site.

This assessment was undertaken by Garry Kennedy, Director gtk consulting pty ltd. Garry has extensive (46 years) experience in Traffic Engineering, Road Safety and Car Parking. Garry chaired a Local Traffic Committee for seventeen years at a major metropolitan Council. In 2006 Garry established gtk consulting and since that time has undertaken many traffic and car parking assessments and studies for Local and State Government Agencies and private developers. Garry provides expert evidence in the NSW Land and Environment Court, Local Magistrates Court and District Court. Garry's court experience covers a wide range of traffic activities, such as, the suitability of development proposals, traffic accident liabilities, heavy vehicle prosecutions, parking offences and many other offences under the Local Government Act and the Roads Act.

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

Figure 1: Site location



Source: NSW Property Information Services 2020

Figure 2: Aerial view of site

Source: Google Maps 2020

422

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

2 THE SITE, SURROUNDING LAND USE AND ADJACENT STREETS

The site of the proposed child care centre is located on the northern side of Mount Vernon Road approximately 400 metres east of Capitol Hill Drive. The property is currently vacant and has an area of 1.033 hectares. Its legal description is Lot 4 in DP 865818 (**Photo 1**). The surrounding land use is rural residential and the site and adjacent lots are zoned *E4 Environmental Living*.

Photo 1: Subject site

Source: gtk consulting 2019

Mount Vernon Road is 7.0 metres wide between the edges of bitumen and there is double white line-marking in front of the site and for the majority of the length of Mount Vernon Road. There is no kerb and gutter on Mount Vernon Road (**Photos 2** & **3**) and the speed zone is 60km/h.

Photo 2: Mount Vernon Rd looking west

Source: gtk consulting 2019

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

Photo 3: Mount Vernon Rd looking east

Source: gtk consulting 2019

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

3 THE PROPOSAL

The proposal is to establish a child care centre which will operate 7.00am – 6.00pm weekdays and accommodate 96 children from the local and surrounding communities. Nineteen (19) staff will be engaged within the child care centre.

Thirty (30) car parking spaces are proposed within a car parking area to be constructed between the road boundary and child care centre building comprising:

- 19 staff spaces;
- 11 parent/carer/visitor spaces, including 2 spaces for persons with a disability; and,
- 1 mini bus space.

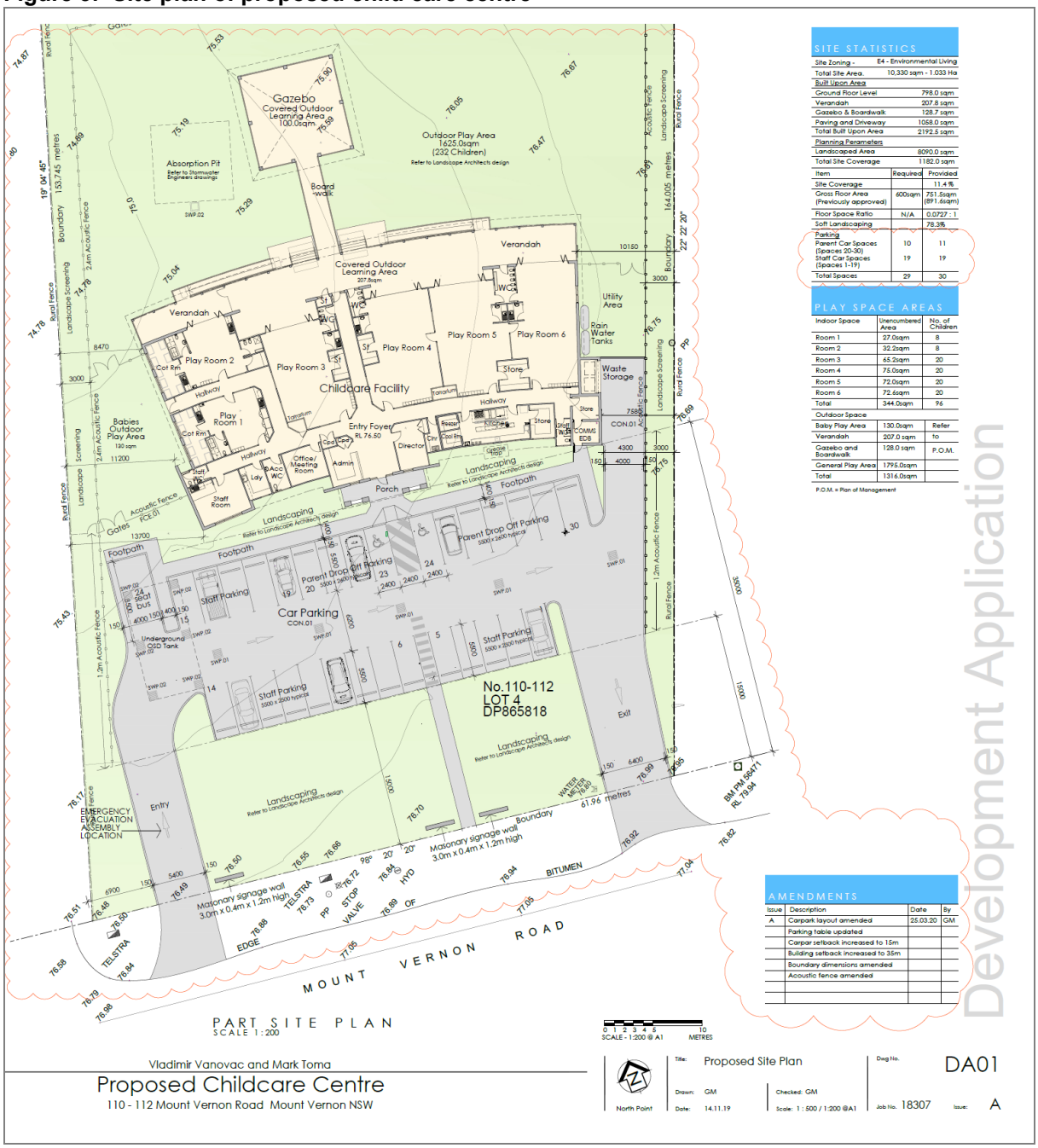
A one-way traffic circulation will be adopted with ingress to the car parking area via a new 5.4 metre wide entry driveway on the western side of the property and new exit driveway 6.4 metres wide on the eastern side.

A 24 seat minibus will be provided to pick-up and return children to their place of residence. The use of a minibus will reduce the volume of traffic to and from the site and demand for car parking.

A site plan for the proposal is provided in **Figure 3**.

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

Figure 3: Site plan of proposed child care centre



Source: Project Works Design Pty Limited 2020

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

4 TRAFFIC GENERATION

Roads and Maritime Services (RMS) provides average traffic generation rates for a range of different land uses in their publication *Guide to Traffic Generating Developments*. The rates are based on extensive surveys undertaken throughout the Sydney Metropolitan Area. RMS guidelines suggest that the maximum peak hour vehicle trips generated by child care centres (long day care) are:

- 0.8 per child in the AM peak between 7.00am and 9.00am; and,
- 0.7 per child in the AM peak between 4.00pm and 6.00pm.

The maximum peak hour vehicle trips (phvt) for the proposed development are:

Child care centre	96 children x 0.8	=	**77 phvt** in the AM peak
	96 children x 0.7	=	**68 phvt** in the PM peak

The centre will provide a minibus which has a capacity of 22 children (plus 1 driver and 1 adult supervisor) and undertake 1 trip in the AM and PM peak periods, thereby reducing the peak hour vehicle trips to approximately **59** in the AM peak and **52** in the PM peak period.

The volume of traffic generated by the proposed child care centre, therefore:

- Is moderate and will have minor impact on existing and future traffic flows, and intersection capacities.
- Will not present any unsatisfactory traffic safety or capacity issues on the road network.

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

5 PARKING

Penrith City Council's Development Control Plan 2014 – Table C10.2 Car Parking Rates, provides a schedule of car parking requirements for various land use activities within the Penrith LGA. The car parking rates for the child care centre are set out in **Table 1** and these are used to calculate the parking requirements for the proposal.

Table 1: Car parking requirements proposed child care centre

Parking Type	DCP Car Parking Rates	Number Proposed	Spaces Required
Children	1 space per 10 children	96 children	**10 parking spaces**
Staff	1 space per staff	19 staff	**19 parking spaces**
		TOTAL	**29 parking spaces**

Source: Penrith City Council DCP 2014

The proposal provides 30 spaces comprising:

- 10 spaces, including 2 spaces for persons with a disability, for parents/carers/visitors;
- 19 spaces for staff; and,
- 1 space spare.

In accordance with AS 2890.1:2004 the car parking area for the proposed child care centre is a Class 3 facility. The aisle width is 6.2 metres and staff car parking spaces are 2.5 metres wide and minimum 5.5 metres long. Parent/carer/visitor spaces are 2.6 metres wide and minimum 5.5 metres long. The spaces for persons with a disability are 2.4 metres wide (adjacent to a 2.4 metre wide 'shared area') and 5.5 metres long.

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

6 ACCESS AND INTERNAL CIRCULATION

6.1 SITE ACCESS

The minimum requirement in assessing the safety of the driveways on Mount Vernon Road is the need to provide sufficient sight distance for drivers to observe a possible conflict with other vehicles and allow for sufficient time to take evasive action should it be required.

An accepted approach to calculating the provision of safe and efficient access to and from the development is to ensure that there is sufficient sight distance to enable non-priority traffic (i.e. traffic turning into and out of the site) to carry out their turning movements without unduly interfering with mainstream traffic flow.

AS 2890.1:2004 *Parking Facilities – Off-street car parking* sets out the sight distance requirements for access driveways.

The speed zone on Mount Vernon is 60 km/h and sight distance from the location of the access driveways is set out in **Table 2**:

Table 2: Sight distance requirements

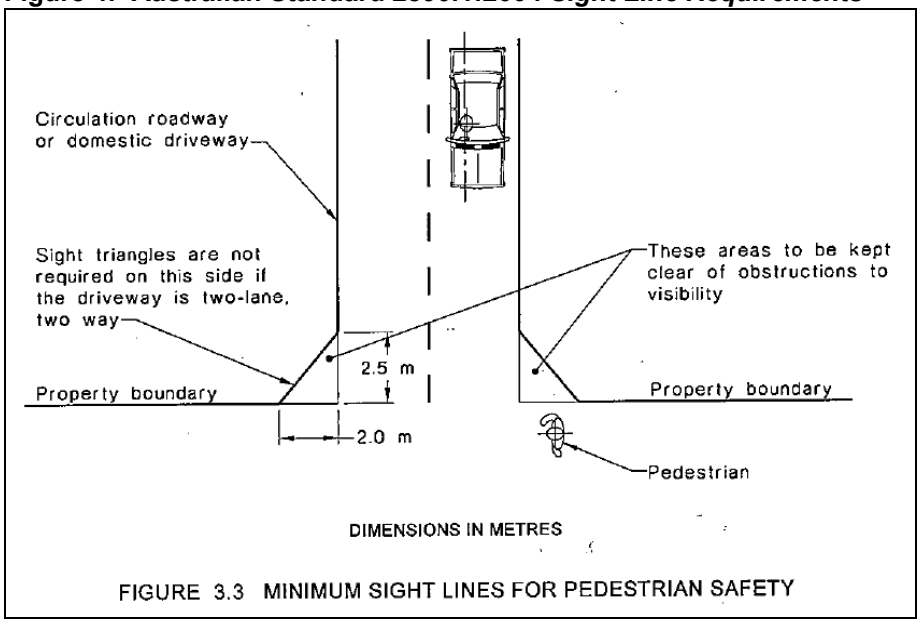
Source	Sight Distance Required	Sight Distance Available
AS 2890.1:2004 (5 sec gap@ 50km/h)	83 metres (east)	190 metres
	83 metres (west)	>200 metres

The sight distance from the proposed ingress and egress driveways on Mount Vernon Road, therefore, exceeds the requirements of AS 2890.1:2004.

In addition to sight distance requirements for vehicles entering and exiting the site, AS 2890.1: 2004 requires the provision of adequate visibility between vehicles leaving a car park and pedestrians on the road frontage footpath. Landscaping on either side of the exit driveway will be low shrubs and ground covers and, as shown in **Figure 3** (**Section 3**), there are clear sightlines at the road boundary of the exit driveway. **Figure 4** below reproduces Figure 3.3 of the Standard and details the sight lines required for a vehicle exiting a driveway, i.e. a point 2.5 metres within the property to a distance of 2.0 metres either side of the exit driveway.

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

Figure 4: Australian Standard 2890.1:2004 *Sight Line Requirements*



The landscaping on either side of the exit driveway will be low shrubs and ground covers, therefore, complying with the sight line requirements of AS 2890.1:2004.

6.2 INTERNAL CIRCULATION

In accordance with Table 3.1 of AS 2890.1:2004 the car parking for the proposed child care centre is a Class 3 facility. The proposed entrance driveway for the car parking area is 5.4 metres wide, the exit driveway 6.4 metres wide and the traffic aisle between car parking spaces is 6.2 metres, all of which comply with Table 3.2 of the Standard for a car parking facility between 25 and 100 spaces.

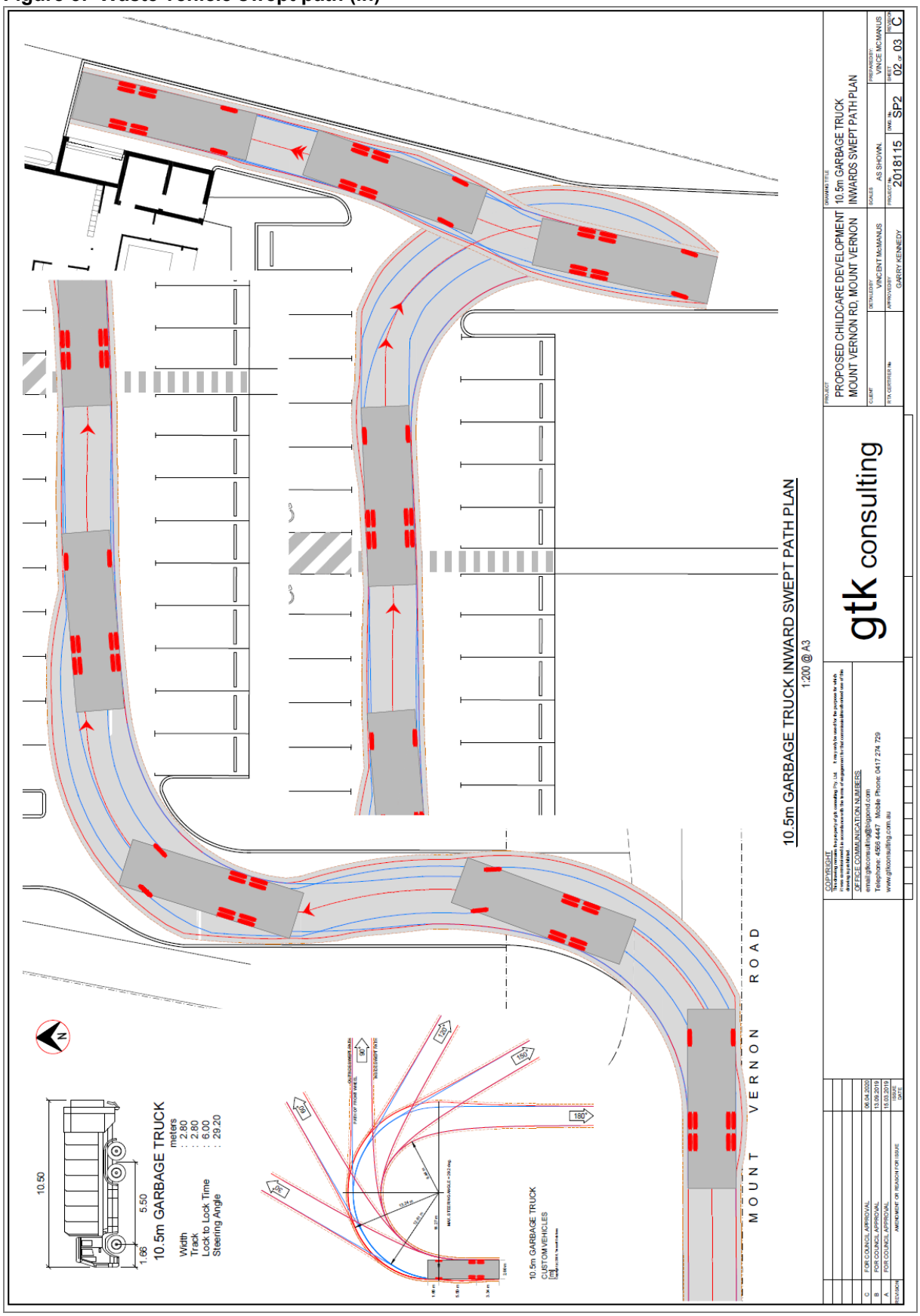
6.3 SERVICES VEHICLES

Waste collection will be undertaken by Council's standard 10.5 metre heavy rigid vehicle (MRV). These vehicles will enter the site outside of the AM and PM peak periods. There is no on-street car parking in this location. Swept path plans for access to the bin collection area is provided in **Figures 5** and **6**.

A minibus will set down and pick up children from the bay on the eastern side of the car park. A swept path plan showing access to and from the minibus bay is provided in **Figure 7**.

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

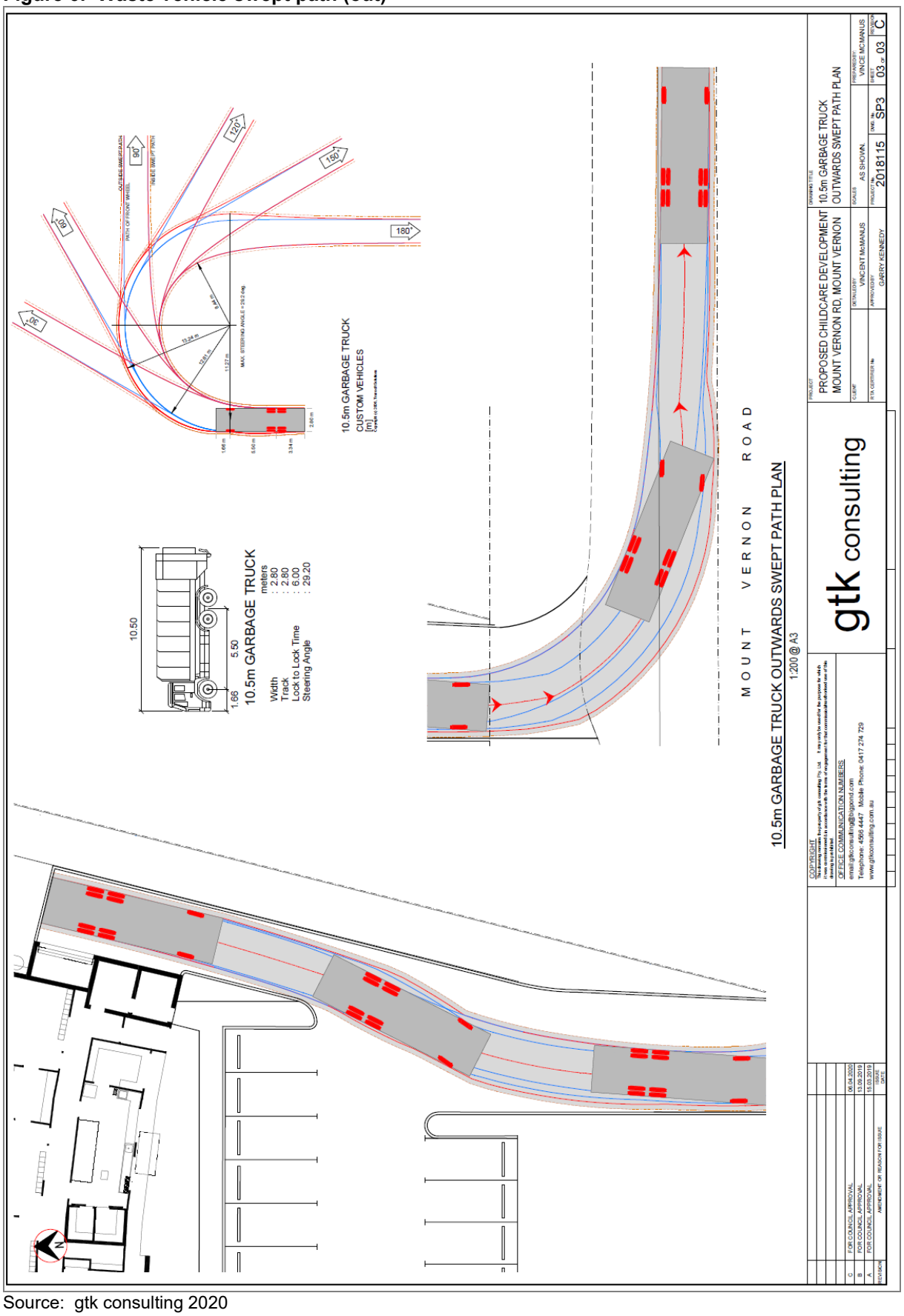
Figure 5: Waste vehicle swept path (in)



Source: gtk consulting 2020

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

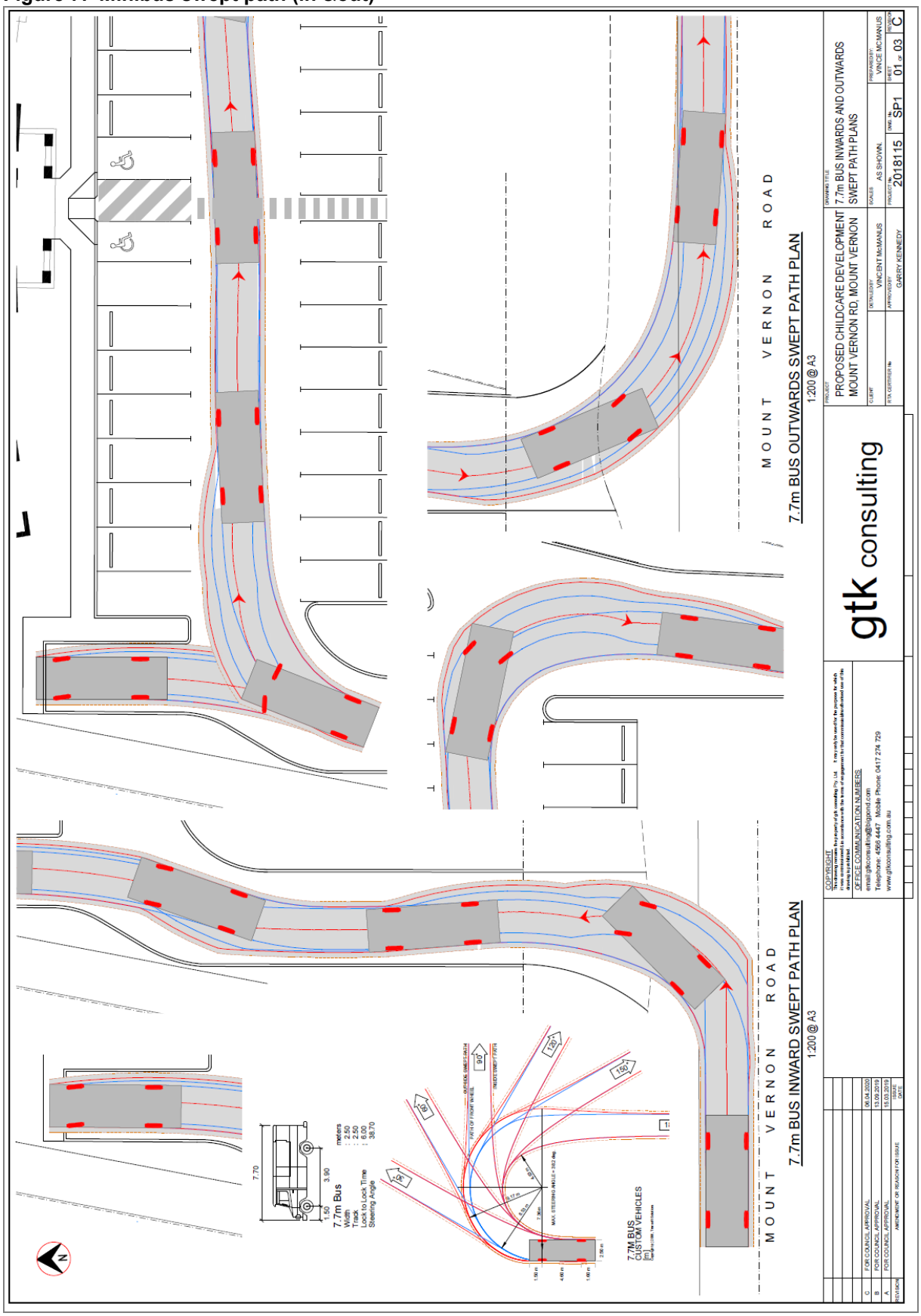
Figure 6: Waste vehicle swept path (out)



Source: gtk consulting 2020

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

Figure 7: Minibus swept path (in &out)



Source: gtk consulting 2020

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

7 CONCLUSION

The proposal to establish a child care centre for 96 children at 110-112 Mount Vernon Road, Mount Vernon has been assessed to determine the suitability of the proposal in relation to Council's DCP, Australian Standards, RMS guidelines and the likely traffic impacts on the surrounding road network.

Assessment of the proposal indicates that:

- The provision of 30 car parking spaces (including 2 spaces for persons with a disability) exceeds the requirements of Council's DCP.
- The car parking layout complies with AS 2890.1:2004 *Off-Street Car Parking* and AS 2890.6:2009 *Off-Street Parking for People with a Disability*.
- Driver sight distance from the proposed egress driveway onto Mount Vernon Road exceeds the requirements of AS 2890.1:2004.
- Pedestrian sightlines from the proposed egress driveway comply with the sight line requirements of AS 2890.1:2004.
- Council's standard waste vehicle will access the site out of the AM and PM peak periods.
- The operation of a minibus for pick-up and return of children to their place of residence will reduce traffic volumes and car parking demand.
- The traffic generated by the proposed development is moderate and will not present any unsatisfactory traffic safety or capacity issues on the existing or future road network.

This assessment concludes that the traffic impact, road safety and car parking elements of the proposed child care centre at 110-112 Mount Vernon Road, Mount Vernon comply with the relevant standards and guidelines for such developments and is worthy of approval.

Garry Kennedy

Director

Document Set ID: 9429796
Version: 1, Version Date: 08/05/2020

AEP
ECOLOGY | BIOBANKING | OFFSETS | BUSHFIRE

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

FOR

PROPOSED CHILDCARE CENTRE

AT

110 – 112 MOUNT VERNON ROAD, MOUNT VERNON, NSW

Prepared for: **Key Business Accountants**

26 October 2020

BOAMS Ref: 22090
AEP Ref: 2091.01

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

EXECUTIVE SUMMARY

Anderson Environment & Planning (AEP) was commissioned by Key Business Accountants (the proponent) to undertake a Biodiversity Development Assessment Report (BDAR) over land that is associated with a proposed Childcare Centre development at 110-112 Mount Vernon Road, located within Lot 4 DP 865818.

This report has been prepared to meet the requirements of the *Biodiversity Assessment Method 2017* (BAM) established under Section 6.7 of the *Biodiversity Conservation Act 2016* (NSW). This assessment utilises methods detailed within the BAM Order 2017, to identify biodiversity values inherent within the site, including known and potentially occurring threatened species and ecological communities, and quantifies impacts of the proposal upon these values.

The Subject Site, encompassing the entirety of the lot, is approx. 1.03ha consisting of exotic grassland. The land on which the development is proposed is zoned E4 – Environmental Living.

The site primarily contains a mix of exotic grasses and herbs, with native vegetation limited to sporadic ground cover. It is assumed that the vegetation may have once formed part of Cumberland Shale Hill Woodland Ecological Endangered Community (EEC) (CSHW). The observed grasslands on site are dominated by exotics and lack the structure, composition and diagnostic species of the CSHW.

No threatened fauna or flora was identified by desktop research on records held by the NSW BioNet Atlas, no threatened species were observed during survey work.

BAM data collected during field surveys generated a very low Vegetation Integrity score (1.7) due to the highly disturbed nature of the site, therefore an assessment of habitat suitability for threatened species is not required under Section 3.1.1.3 of the BAM. As such, no biodiversity credits are required to address potential impacts to biodiversity values.

No serious and irreversible impacts (SAIIs) are considered likely to occur as a result of the proposal.

Avoid and minimise has been considered. Given the small size of the Subject Site, and highly disturbed nature of the vegetation present, it is considered that the proposed development can suitably avoid impacts to biodiversity values.

Assessment of the proposal under other relevant environmental policy instruments including the of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* were undertaken. No impact on Matters of National Environmental Significance is expected as a result of the proposal. Therefore, referral under the *Environment Protection and Biodiversity Conservation Act* is not likely to be necessary for this development. Assessment under SEPP (Koala Habitat) 2020 found no core koala habitat on the Subject Site.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table of Contents

1.0 Stage 1 – Biodiversity Assessment 1

1.1 Introduction 1

1.1.1 Assessment Scope 1

1.1.2 The Proposal 1

1.1.3 Site Particulars 2

1.1.4 Information Sources 5

1.2 Landscape Features 6

1.2.1 Regional Landscapes 6

1.2.2 Site Context Components 6

1.2.2.1 Method 6

1.2.2.2 Landscape Native Vegetation Cover 6

1.2.3 Regional Mapping 7

1.2.4 Field Survey Results 9

1.2.4.1 Plant Community Types (PCTs) 9

1.2.4.2 Habitat Features 10

1.2.5 Vegetation Integrity Assessment 10

1.2.5.1 Patch Size 10

1.2.5.2 Vegetation Zones 10

1.2.5.3 Survey Effort 13

1.2.5.4 Vegetation Integrity Score 13

1.3 Threatened Species 15

1.3.1 Ecosystem Credit Species 15

1.3.2 Species Credit Species 16

1.3.2.1 Threatened Species Survey Effort 16

1.3.2.2 Species Presence 17

2.0 Stage 2 – Impact Assessment (Biodiversity Values) 18

2.1 Avoid and Minimise Impacts 18

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

2.1.1 Project Design, Construction & Operation 18
2.3 Impact Summary 26
2.3.1 Serious and Irreversible Impacts (SAIIs) 26
2.3.2 Impacts requiring offset 26
2.3.2.1 Ecosystem Credits 26
2.3.2.2 Species Credits 26
2.3.3 Areas not requiring assessment 26
3.0 Conclusion 28
4.0 References 29

Tables

Table 1 – Regional Vegetation Mapping Results 7
Table 2 – Vegetation Zones 10
Table 3 – Predicted threatened species (Ecosystem credits) 15
Table 4 – Field Survey Effort – Subject Site 16
Table 5 – Impact avoidance and minimisation 19
Table 6 – Prescribed impact avoidance and minimisation 22

Figures

Figure 1 – Site Map 3
Figure 2 – Location Map 4
Figure 3 – Regional Vegetation Mapping 8
Figure 4 – Plant Community Types 12
Figure 5 – Survey Effort 14

Plates

Plate 1 – Vegetation Zone 1 - PCT 850 (Plot 1) 11

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendices

Appendix A – Development Plan

Appendix B – Expected Fauna Species List

Appendix C – BAM Plot Field Data & Flora Species List

Appendix D – BAM Plot Field Sheets

Appendix E – Vegetation Integrity Score Table

Appendix F – Biodiversity Credit Report

Appendix G – Site Photographs

Appendix H – Other Legislation

Appendix I – Important Area Mapping

Appendix J – CVs

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Study Certification and Licensing

This report was written by Tim Mouton BEnvSc MEnvSc (BAAS: 19083), and reviewed and certified by Ian Benson BEng (Civil) & GradDipSc (Ecology) (BAAS: 18147) of Anderson Environment & Planning.

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101313;
- Animal Research Authority (Trim File No: 14/600(2)) issued by NSW Department of Industry; and
- Animal Research Establishment Accreditation Number 53724.

Certification:

As the principal author, I, Tim Mouton, make the following certification:

- This report has been written to comply with the requirements of the BAM 2017 and obligations outlined within the BAM Assessor Code of Conduct and includes, in the opinion of the writer, a true and accurate account of the species recorded, or considered likely to occur within the Survey Area, and inferences of such for biodiversity credit calculations;
- BAM Assessment methodology, as well as Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, unless specified departures from industry standard guidelines are justified for scientific and/or animal ethics reasons;
- All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the *Animal Research Act 1995*, *National Parks and Wildlife Act 1974* and the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.

Principal Author and Certifier:

[redacted]

Tim Mouton
Senior Ecologist
Anderson Environment & Planning
BAAS no. **19083**
Calculator Ref: 00022090/BAAS18147/20/00022091
26 October 2020

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Glossary of Terms

APZ	Asset Protection Zone
BAM	*Biodiversity Assessment Method Order* (2017) that determines: • Methodology applicable to quantifying biodiversity values inherent within a development site; • Avoid and mitigation efforts required to be employed as part of any development proposal; and • Number and class of credits required to offset residual impacts of the proposal upon the biodiversity values therein.
BC Act	The NSW *Biodiversity Conservation Act 2016.*
Biodiversity Credit Report	Specifies the number and type of biodiversity credits required to offset the impacts of a development.
BAM Calculator (BAM-C)	The online tool used to interpret site survey data and regional location information to quantify ecosystem and species credits required / generated at a development / stewardship site.
Biodiversity credits	Ecosystem or Species Credits required to offset the loss of biodiversity values on a development site.
Biodiversity offsets	Specific measures that are put in place to compensate for impacts on biodiversity values.
Biodiversity values	The composition, structure and function of ecosystems, and threatened species, populations and ecological communities, and their habitats.
CEEC	Critically Endangered Ecological Community.
Council	City of Penrith
Development Lands	Land upon which the development is proposed, and within which impacts upon biodiversity are required to be offset.
DoEE	The Commonwealth Department of the Environment and Energy.
DPI	The NSW Department of Primary Industries.
DPIE	The NSW Department of Planning, Industry and Environment.
Ecosystem credit	The class of biodiversity credits created or required for the impact on EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur within a vegetation type.
EEC	Endangered Ecological Community (under BC Act).
EPBC Act	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
OEH	The former NSW Office of Environment and Heritage.
PFC	Percentage Foliage Cover

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Subject Site	The development footprint as shown in **Figure 1**.
Species credit	Class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area based on habitat surrogates.
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.0 Stage 1 – Biodiversity Assessment

1.1 Introduction

A Childcare Centre is proposed on land currently identified as 3110-112 Mount Vernon Road, located within Lot 4 DP 865818 (the Subject Site). Anderson Environment & Planning (AEP) have undertaken the necessary investigations to inform the production of a Biodiversity Development Assessment Report (BDAR) addressing the development proposal.

This BDAR undertaken adheres to the approach outlined in the Biodiversity Assessment Methodology (OEH 2017a) (the BAM), and the Biodiversity Assessment Method (BAM) Calculator User Guide (OEH 2017b).

1.1.1 Assessment Scope

The BDAR presented herewith aims to quantify impacts of the proposal upon biodiversity values based upon the methods described within the *Biodiversity Assessment Method Order 2017* (BAM), including threatened entities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act).

This report includes:

- **Stage 1 – Biodiversity Assessment** – including the mapping of remnant vegetation communities including any Endangered Ecological Communities (EECs) within the site, the location of previously identified threatened species and their habitats, and potential contemporary occurrence of threatened species identified within the BAM Calculator; and

- **Stage 2 – Impact Assessment** – identification of impact avoidance and mitigation measures, and the quantifying of offset requirements in the form of biodiversity credits based upon residual impacts of the proposal.

1.1.2 The Proposal

The Subject Site occurs within the City of Penrith LGA. The proponent is seeking development consent to undertake a proposed Childcare Centre and associated civil works at the Subject Site. The land subject to the development is zoned E4 – Environmental Living. The proposed development and associated works are proposed to cover the majority of the 1.03ha lot, including access and parking, structures, landscaping, and wastewater treatment adsorption beds.

.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

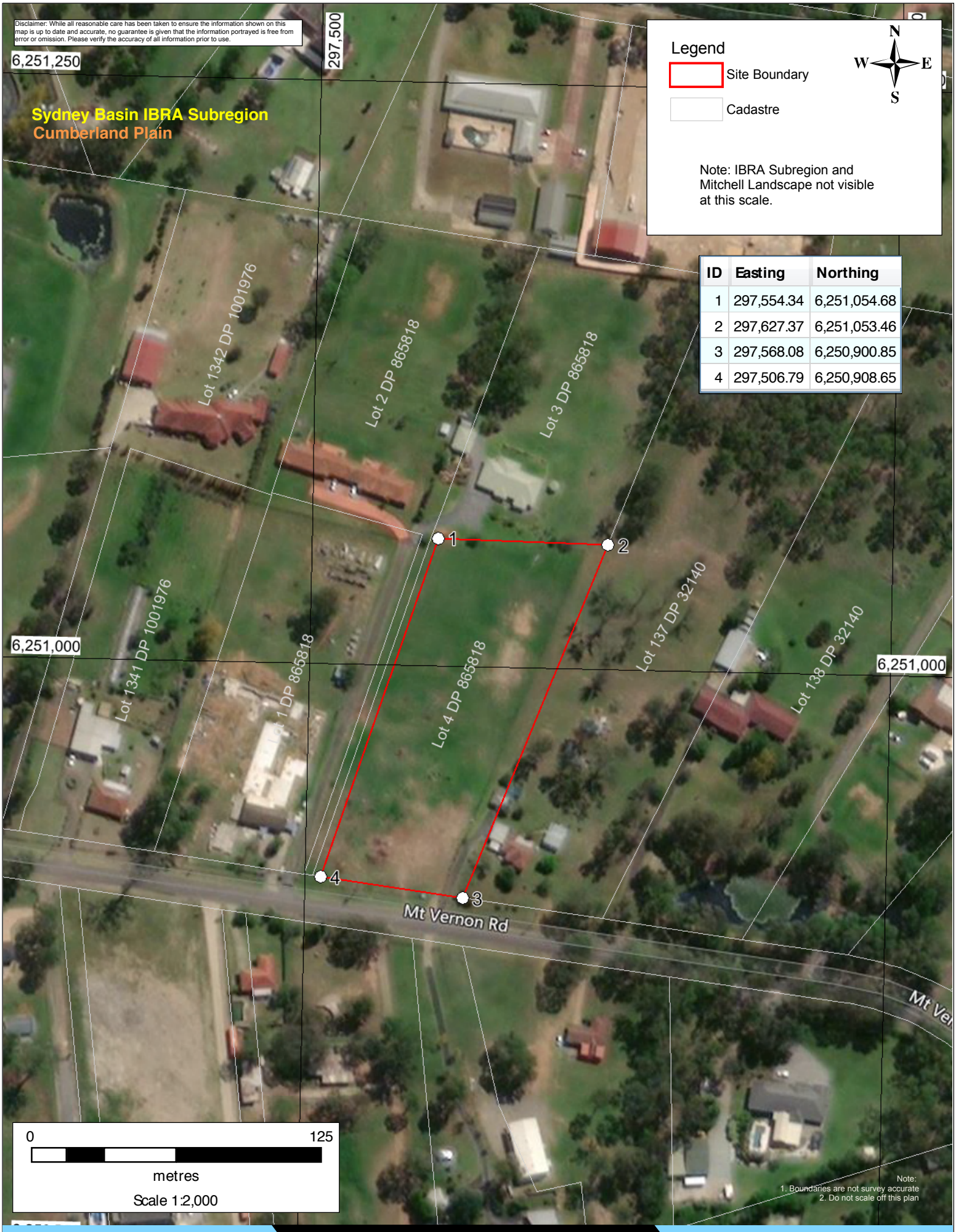
1.1.3 Site Particulars

- **Location** – 110-112 Mount Vernon Road, Mount Vernon, NSW.
- **Local Government Area (LGA)** – City of Penrith LGA.
- **Title** – The proposed development is situated within Lot 1 DP 865818.
- **Subject Site** – The Subject site encompasses the entirety of the lot, approx. 1.03ha.
- **Zoning** – Development is proposed within land zoned E4 – Environmental Living.
- **Current Land Use** – The site is entirely cleared, consisting of exotic grassland.
- **Surrounding Land Use –** The site is surrounded on all sides by low density residential and semi-rural lots, containing dwellings and occasional scattered paddock trees. Kemps Creek is located approximately 2km to the west. The surrounding land is zoned E4 – Environmental Living.

Figure 1 depicts the extent of the site and defines the Subject Site.

Figure 2 depicts the location of the site within the landscape.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



AEP

Title: FIgure 1 - Site Location

Location: 110-112 Mount Vernon Road, Mount Vernon, NSW

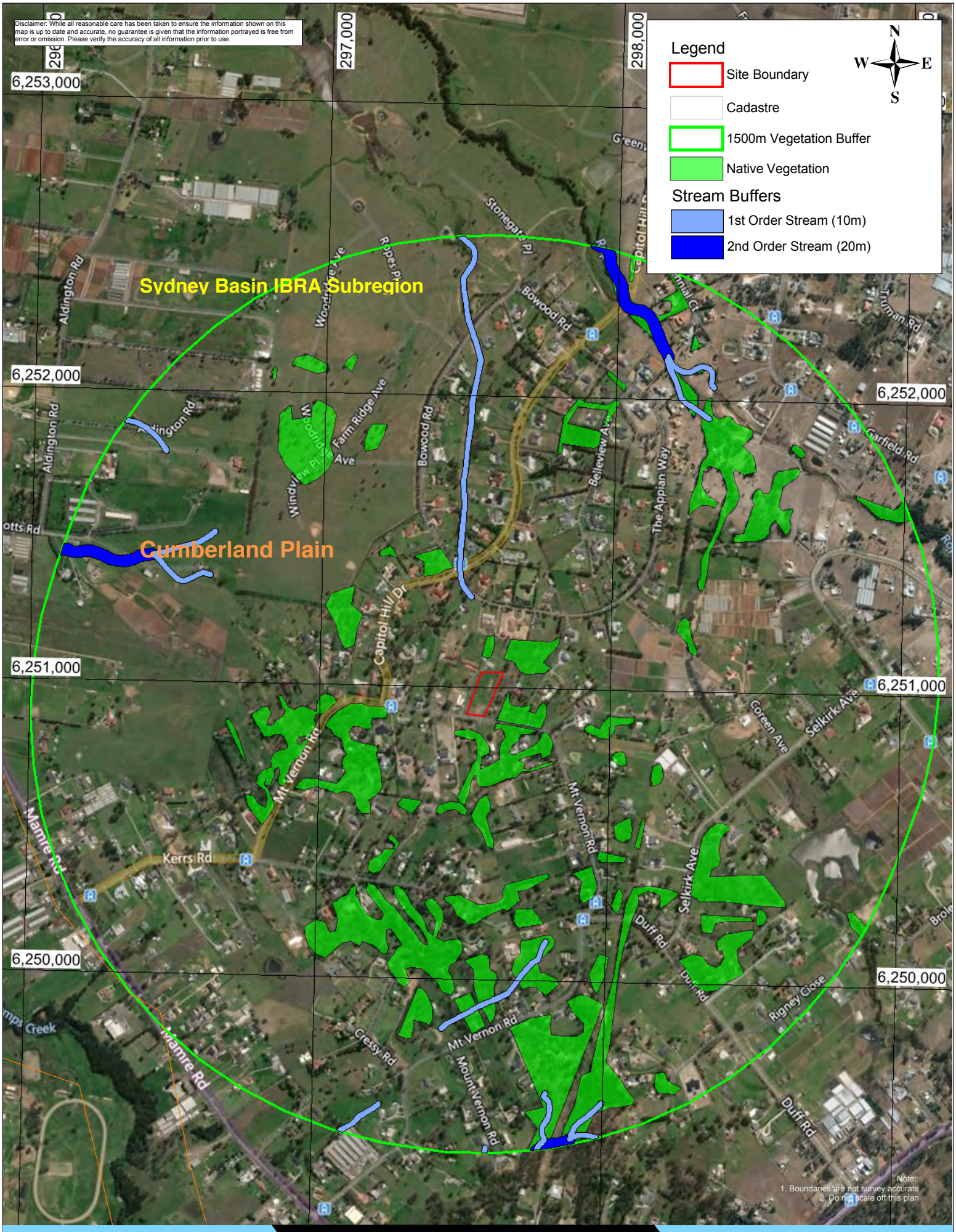
Client: Key Business Accountants

Date: 30 Sept 2020

BOAMS: 22090

AEP Ref: 2091.01

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



AEP

Title: FIgure 2 - Location Map

Location: 110-112 Mount Vernon Road, Mount Vernon, NSW

Client: Key Business Accountants

Date: 30 Sept 2020

BOAMS: 22090

AEP Ref: 2091.01

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.1.4 Information Sources

Information and spatial data provided within this BDAR has been compiled from various sources including:

- State survey guidelines (DEC 2004, DECC 2009, OEH 2020);
- PlantNET NSW (http://plantnet.rbgsyd.nsw.gov.au/);
- *Remnant Vegetation of the western Cumberland subregion, 2013 Update;*
- Aerial Photograph Interpretation (API) of the site and surrounding locality (Bing 2020; NSW Department of Finance, Services and Innovation 2020);
- OEH Threatened Biodiversity Profiles (https://www.environment.nsw.gov.au/threatenedSpeciesApp/);
- Search and review of flora and fauna sighting records in the OEH BioNet Atlas within 10km of the site;
- Protected Matters Search within a 5km radius of the site held by the Commonwealth Department of the Environment and Energy, summarising Matters of National Environmental Significance that may occur in, or may relate to the study area;
- BAM Important Area Mapping for Regent Honeyeater and Swift Parrot; (https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/biodiversity-offsets-and-agreement-management-system)
- Collective knowledge gained from previous ecological survey and assessment in the Cumberland region over the past 20 years; and
- Anecdotal records.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.2 Landscape Features

1.2.1 Regional Landscapes

The Subject Site was identified as occurring within the following landscape areas:

- *IBRA Bioregion* – Sydney Basin
- *IBRA Subregion* – Cumberland
- *NSW Landscape* –Cumberland Plain

Delineation of *NSW Landscape* areas are shown in both the Site and Location Maps (**Figure 1** and **Figure 2**).

1.2.2 Site Context Components

1.2.2.1 Method

Site layout allowed for the landscape values to be determined based upon a site-based method, rather than that of a linear method.

1.2.2.2 Landscape Native Vegetation Cover

The 1500m buffer placed around the site is approximately 774ha in size. Of this, approx. 76.9ha comprises native vegetation as per Section 4.3.2 of the BAM. This equates to approximately **10%** native vegetation cover and was entered as such within the Calculator.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.2.3 Regional Mapping

Regional vegetation mapping executed under the *Remnant Vegetation of the western Cumberland subregion, 2013 Update* was utilised to identify vegetation communities occurring on site.

Communities mapped within the Subject Site are provided in **Table 1** and displayed in **Figure 3.**

Table 1 – Regional Vegetation Mapping Results

Vegetation Community	Area (ha) – Subject Site
Shale Plains Woodland	0.2
Shale Hills Woodland	0.35
Not Mapped (Cleared or built areas)	0.48
Total	**1.03**

Regional vegetation models and community profiles developed under the *Remnant Vegetation of the western Cumberland subregion, 2013 Update* assessment informed our survey design and Plant Community Type determination, as well as assessment for Endangered Ecological Community (EEC) designations.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

AEP

Title: FIgure 3 - Regional Vegetation Mapping

Location: 110-112 Mount Vernon Road, Mount Vernon, NSW

Client: Key Business Accountants

Date: 30 Sept 2020

BOAMS: 22090

AEP Ref: 2091.01

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.2.4 Field Survey Results

Flora survey was undertaken by AEP in 2020 to produce a flora species list for the Subject Site, to search specifically for threatened flora species known from the wider area, and to gather data necessary to both derive vegetation community type(s) and to meet relevant survey guidelines. Such works included:

- Identification of all vascular plant species encountered during fieldwork. Subject Site coverage was both systematic to ensure all key points of the site were checked, and therein the Random Meander Technique (Cropper, 1993) was utilised to maximise species encountered.
- One (1) BAM plot was undertaken within the Subject Site. A summary of the plot data is provided in **Appendix A**.
- A full list of all flora species recorded within the Subject Site and surrounds is included as **Appendix B.**
- Targeted searches for threatened species were undertaken on 31 March 2020 using the random meander technique. Targeted flora survey tracks are shown in **Figure 4**. Given the small size of the site and vegetation present consisting of open grassland, it is considered that the site was adequately covered using this technique.

1.2.4.1 Plant Community Types (PCTs)

Regional vegetation mapping identified the Subject Site contains two Plant Community Types (PCTs), PCT 849 – Cumberland shale plains woodland and PCT 850 – Cumberland shale hills woodland. Field survey carried out by AEP identified the vegetation present to be predominantly exotic grassland, however for the purpose of this assessment it is assumed this vegetation constitutes a highly degraded form of Cumberland Plain Woodland.

Diagnostic species found on site include *Microlaena stipoides* (Weeping Grass), *Themeda australis* (Kangaroo Grass), *Carex inversa* (Knob Sedge), and *Cyperus gracilis* (Slender Flat-sedge), however these species were only present at very low densities.

Given the uniformity of vegetation on site, similarities between PCT 849 and 850, and lack of diagnostic species present, it is assumed one PCT is present. Under regional mapping PCT 850 covers the larger portion of the site, and therefore has been selected as the representative PCT for this assessment. PCT 850 forms part of the Critically Endangered Ecological Community Cumberland Plain Woodland.

<u>Non-remnant / Cleared Areas</u>

Within the Subject Site approx. 0.48ha is managed, mown or cleared with no native canopy or shrub layer.

Vegetation community mapping for the site is shown in **Figure 4**. Additional site photographs are included in **Appendix G**.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.2.4.2 Habitat Features

No habitat features were identified on site.

1.2.5 Vegetation Integrity Assessment

1.2.5.1 Patch Size

The vegetation that exists within the Subject Site is predominantly exotic grassland and does not form part of any 'patch' of native vegetation within the Subject Site or surrounds. As such the patch size class is <5ha and entered into the BAM-C as '1'.

1.2.5.2 Vegetation Zones

One (1) native vegetation zone has been identified, as mapped in **Figure 4.**

Table 2 – Vegetation Zones

Zone	Vegetation Community	TEC	Area (ha)
1	PCT 850 – Cumberland shale hills woodland	CEEC	0.55
Total – Remnant Vegetation			**0.55**
Non-remnant / cleared areas / dams		N/A	0.48
Total			**1.03**

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Plate 1 – Vegetation Zone 1 - PCT 850 (Plot 1)

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

AEP

Title: FIgure 4 - Plant Community Types

Location: 110-112 Mount Vernon Road, Mount Vernon, NSW

Client: Key Business Accountants

Date: 30 Sept 2020

BOAMS: 22090

AEP Ref: 2091.01

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.2.5.3 Survey Effort

One (1) vegetation plot was undertaken within the Subject Site in March 2020 (AEP).

Plot survey was undertaken as per the requirements within Table 4 of the BAM. Given the small size and disturbed nature of the site the plot was placed in the best representation of native vegetation within the site.

Field data are provided in **Appendix C** and AEP field sheets are provided in **Appendix D**. See **Figure 5** for the location of the plot.

1.2.5.4 Vegetation Integrity Score

Plot data was used to determine the composition, structure and function condition score for the zone, which informed the vegetation integrity score within the BAM-C. Plot data has been tabulated and includes corresponding scores along with the overall vegetation integrity score (**Appendix D**).

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

AEP

Title: FIgure 5 - Survey Effort

Location: 110-112 Mount Vernon Road, Mount Vernon, NSW

Client: Key Business Accountants

Date: 30 Sept 2020

BOAMS: 22090

AEP Ref: 2091.01

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.3 Threatened Species

Under the BAM, threatened species are classified into two types: 'Ecosystem Credit' and 'Species Credit' type species, as detailed within the BioNet Atlas Threatened Species Profile Database (OEH).

Field surveys were undertaken on the site in March 2020. A summary of survey effort within the Subject Site is described in Section 1.3.2.2 and species listed are presented in **Appendix B** and **Appendix C**.

1.3.1 Ecosystem Credit Species

Ecosystem Credit species are associated with PCTs and other habitat surrogates that are used to predict their occurrence on a particular site.

The 'biodiversity risk weighting' for a species is based on the 'sensitivity to loss' and 'sensitivity to potential gain' score using criteria listed in Appendix 7 of the BAM, and are used in credit calculations to assess impacts of the proposal on a threatened species. The sensitivity to gain class is listed within the BAM calculator for Ecosystem Credit species.

Those Ecosystem Credit species predicted to occur within the site are provided in **Table 3**.

Table 3 – Predicted threatened species (Ecosystem credits)

Scientific Name	Common Name	Sensitivity to Gain Class	Recorded within 10km (NSW BioNet Wildlife Atlas 2020) Y/N	Recorded within site or nearby surrounds Y/N
Anthochaera phrygia	Regent Honeyeater	Very High	Y	N
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Moderate	Y	N
Chthonicola sagittata	Speckled Warbler	Moderate	Y	N
Climacteris picumnus victoriae	Brown Treecreeper	Moderate	N	N
Dasyurus maculatus	Spotted-tailed Quoll	High	N	N
Glossopsitta pusilla	Little Lorikeet	High	Y	N
Haliaeetus leucogaster	White-bellied Sea-Eagle	Moderate	Y	N
Lathamus discolour	Swift Parrot	Moderate	Y	N
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Moderate	N	N

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Scientific Name	Common Name	Sensitivity to Gain Class	Recorded within 10km (NSW BioNet Wildlife Atlas 2020) Y/N	Recorded within site or nearby surrounds Y/N
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	High	Y	N
*Miniopterus australis^*	Little Bent-winged Bat	High	N	N
*Miniopterus orianae oceanensis^*	Large Bent-winged Bat	High	Y	N
Petroica boodang	Scarlet Robin	Moderate	N	N
Petroica phoenicea	Flame Robin	Moderate	Y	N
Phascolarctos cinereus	Koala	High	Y	N
Pteropus poliocephalus	Grey-headed Flying-fox	High	Y	N
Stagonopleura guttata	Diamond Firetail	Moderate	N	N

^ Habitat surrogates relating to Ecosystem Credits relevant for foraging habitat only

1.3.2 Species Credit Species

In addition to the above, the Calculator identifies Species Credit species that have the potential to occur within the development site. Due to the highly disturbed nature of the site and dominance by exotic species, which is expressed in the low VI score (1.7), the habitat suitability for threatened species to occur on site is considered extremely low. Therefore, an assessment of habitat suitability for Species Credit species is not required under Section 3.1.1.3 of the BAM. As such, habitat for predicted Species Credit species has been checked as degraded in the Calculator in accordance with 6.4.1.17 of the BAM, and no candidate species requiring targeted survey were generated.

1.3.2.1 Threatened Species Survey Effort

The overall survey effort within the Subject Site is detailed in **Tables 4**, and was conducted using relevant guidelines, in particular OEH survey guidelines for plants (2016), along with applicable EPBC guidelines (2010; 2011). Survey effort is shown in **Figure 5**.

Table 4 – Field Survey Effort – Subject Site

Date	Time	Activity	No. of Persons on Site
31/03/2020	10:00 – 14:30	Site reconnaissance, BAM plot, general observations.	1

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

1.3.2.2 Species Presence

As mentioned in Section 1.3.2, no Species Credit species were identified as requiring targeted surveys to determine presence due to the habitat on site being degraded.

As mentioned above in 1.3.2, poor conditions on site generated a very low VI score (1.7), and no candidate species were generated within the BAM-C as requiring targeted searches. As such targeted flora transects were not undertaken to meet BAM guidelines. The traverses undertaken did not exceed 20m, and averaged at approximately 14m apart for the whole site, and approximately 12m within the development footprint. Therefore, the survey effort is considered adequate for the purposes of this assessment.

In addition, no threatened species were recorded within the Subject Site (this survey, previous surveys, Atlas records, anecdotal records) which would require impact offsetting.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

2.0 Stage 2 – Impact Assessment (Biodiversity Values)

Section 8 of the BAM provides a list of measures that need to be taken into consideration during project planning and design, to minimise impacts upon native vegetation, habitat and other prescribed biodiversity values. Applicable measures taken as part of this project to minimise impacts are provided below.

The avoid and minimise strategy for the development (in accordance with Section 8 of the BAM), is discussed in greater detail in **Table 5** below.

The prescribed impact risk assessment and mitigation measures (in accordance with Section 9 of the BAM) are included in **Table 6** below.

2.1 Avoid and Minimise Impacts

2.1.1 Project Design, Construction & Operation

The following measures are provided to help mitigate impacts of the construction and ongoing operation of the proposed development on the biodiversity values identified within the Subject Site and surrounds. Given that the Subject Site is highly disturbed and lacking any native vegetation structure, avoidance measures are limited as the biodiversity value of the site and immediate surrounds is negligible.

- Fencing around the Subject Site is to be erected during the construction phase to limit incursions of fauna and delineate the boundary of clearing works;
- Where possible native landscaping is to occur in conjunction with the proposed development;
- Implement hygiene protocols for machinery to prevent the spread of weeds outside the development site; and
- Best practice erosion and sedimentation (ERSED) and dust suppression control methods are to be adopted, enforced and maintained throughout any vegetation clearing works. Such are to be in accordance with "Soils and Construction – Managing Urban Stormwater" published by Landcom.

No further site-specific avoidance measures (as listed within Section 8.1 and 9.3 of the BAM) are proposed for the project.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table 5 – Impact avoidance and minimisation

Locating a Project to Avoid and Minimise Impacts on Native Vegetation and Habitat	
Objectives/Requirements	**Evidence of compliance**
Project location decisions should be informed by knowledge of biodiversity values. The assessment requirements set out in Stage 1 of the BAM may be used to provide an initial desktop assessment of biodiversity values for early consideration in planning the route or location of a project.	Zoning of the Subject Site is E4 – Environmental Living. A childcare centre is a permitted use in this zone. The Subject Site is already highly modified in a disturbed state, with negligible biodiversity value.
Final selection of project location may be an iterative process. Location decisions may need to be revisited when all field surveys have been completed.	As discussed above, the Subject Site is highly modified, which is expressed in the field data collected and resulting low Vegetation Integrity score for the site (1.7). Therefore, the location of the proposed childcare centre is considered to be environmentally optimal in the context of the broader locality.
Direct impacts on clearing of native vegetation and habitat can be avoided and minimised by: *(a) locating the project in areas where there are no biodiversity values* *(b) locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score)* *(c) locating the project in areas that avoid habitat for species that have a high biodiversity risk weighting or native vegetation that is a critically endangered ecological community (CEEC) or an endangered ecological community (EEC)* *(d) locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained.*	a) As reflected in the VI score, the site contains negligible biodiversity values. b) No threatened species or potential habitat was identified on site. c) As above. d) The site does not contain any connectivity value.
In selecting a project location, the following should be addressed, as they apply to the project:	a) The site contains negligible biodiversity value, as reflected in the low VI score, therefore analysis of alternatives to minimise impacts is not applicable. b) As above c) As mentioned above the site contains negligible biodiversity value, which is reflected in the low VI score. Therefore in the context of the locality, impacts to biodiversity have been avoided, and selection of location is

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

(a) an analysis of alternative modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology *(b) an analysis of alternative routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route* *(c) an analysis of alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location* *(d) an analysis of alternative sites within a property on which the project is proposed that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site.*	deemed suitable to address avoid and minimise principals. No alternatives site were investigated as the site is owned by the proponent, therefore no other sites were considered. d) The site contains negligible biodiversity value, as reflected in the low VI score, therefore analysis of alternatives within the site was not considered necessary.
Justifications for project location decisions should identify any other site constraints that the proponent has considered in determining the location and design of the project, e.g. bushfire protection requirements including clearing for asset protection zones, flood planning levels, servicing constraints.	No other constraints were identified for the site.
Actions taken to avoid and minimise impacts through locating the project, or selecting the land to be biodiversity certified must be documented and justified in the BDAR or BCAR.	As above.
Designing a Project to Avoid and Minimise Impacts on Native Vegetation and Habitat	
Project design, including the location of temporary and permanent ancillary construction and maintenance facilities, should avoid and minimise clearing of native vegetation and habitat by: *(a) reducing the clearing footprint of the project* *(b) locating ancillary facilities in areas where there are no biodiversity values* *(c) locating ancillary facilities in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower vegetation integrity score)* *(d) locating ancillary facilities in areas that avoid habitat for species and vegetation in high threat status categories (e.g. an EEC or CEEC)* *(e) providing structures to enable species and genetic material to move across barriers or hostile gaps*	a) – d) The site contains negligible biodiversity value, as reflected in the low VI score, therefore the site was deemed appropriate for development. e) – f) As mentioned above the site is already disconnected from larger areas of continuous vegetation as a result of surrounding development. Therefore, there is little value in providing structures or undertaking ecological restoration on site. Native landscaping will be undertaken, which will improve the vegetation structure currently present on site.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

(f) making provision for the demarcation, ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on the development site.	
Efforts to avoid and minimise impacts through design must be documented and justified in the BDAR or BCAR.	As above.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Table 6 – Prescribed impact avoidance and minimisation

Avoiding and Minimising Prescribed Biodiversity Impacts during Project Planning	
Objectives/Requirements	**Evidence of compliance**
Some types of projects may have impacts on biodiversity values in addition to, or instead of, impacts from clearing vegetation and/or loss of habitat. For many of these impacts, the biodiversity values may be difficult to quantify, replace or offset, making avoiding and minimising impacts critical.	No biodiversity values in addition to those noted in the BDAR as being subject to direct, indirect or prescribed impacts were identified for the Subject DA Footprint. Direct, indirect and prescribed impacts are considered in **Section 2.2** of the BDAR.
The BC Regulation (clause 6.1) identifies actions that are prescribed as impacts to be assessed under the biodiversity offsets scheme: *(a) impacts of development on the habitat of threatened species or ecological communities associated with:* *(i) karst, caves, crevices, cliffs and other geological features of significance, or* *(ii) rocks, or* *(iii) human made structures, or* *(iv) non-native vegetation* *(b) impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range* *(c) impacts of development on movement of threatened species that maintains their life cycle* *(d) impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining)* *(e) impacts of wind turbine strikes on protected animals* *(f) impacts of vehicle strikes on threatened species or on animals that are part of a TEC.*	a) The Subject DA: (i) Does not contain karsts, caves, crevices, cliffs, rocks and other features of geological significance supporting threatened species and ecological communities; (ii) Does not contain rocks supporting habitat for threatened species and ecological communities; (iii) Does not contain human made structures containing habitat for threatened species and ecological communities; (iv) Does not contain non-native vegetation supporting threatened species and ecological communities. b) It is considered that the vegetation within the Subject Site would not provide meaningful connectivity in the locality. c) As above d) No hydrological considerations are relevant to the site or immediate surrounds. e) Wind turbines are not a feature of the development proposed. f) It is not predicted that the development will increase traffic such that the risk of vehicle strike is increased in the locality.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Locating a Project to Avoid and Minimise Prescribed Biodiversity Impacts	
Objectives/Requirements	**Evidence of compliance**
Prescribed biodiversity impacts can be avoided and minimised by: *(a) locating the envelope of surface works to avoid direct impacts on the habitat features identified in Paragraph 8.2.1.2* *(b) locating the envelope of sub-surface works, both in the horizontal and vertical plane, to avoid and minimise operations beneath the habitat features identified in Paragraph 8.2.1.2, e.g. locating longwall panels away from geological features of significance or water dependent plant communities and their supporting aquifers* *(c) locating the project to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or local movement pathways* *(d) optimising project layout to minimise interactions with threatened species and ecological communities, e.g. designing turbine layout to allow buffers around features that attract and support aerial species, such as forest edges, riparian corridors and wetlands, ridgetops and gullies* *(e) locating the project to avoid direct impacts on water bodies.*	a) The Subject DA envelope: (i) Does not contain karsts, caves, crevices, cliffs, rocks and other features of geological significance supporting threatened species and ecological communities; (ii) Does not contain rocks supporting habitat for threatened species and ecological communities; (iii) Does not contain human made structures containing habitat for threatened species and ecological communities; (iv) Does not contain non-native vegetation supporting threatened species and ecological communities; As described in Section 8.2.1.2 (b & c) of the BAM and above, connectivity for threatened species on site is negligible. As described in Section 8.2.1.2 (e) of the BAM and above, wind turbines are not a feature of the development proposed. As described in Section 8.2.1.2 (f) of the BAM and above, it is not predicted that the development will increase traffic such that the risk of vehicle strike is increased in the locality. b) Given the nature of the development, consideration of sub-surface works and their impacts to habitat features is deemed unnecessary. c) As discussed above threatened fauna species are not predicted to utilise the site and therefore considered unlikely that movement throughout the landscape will be hindered by the proposed development. d) As above. e) The proposed design will not impact any waterbody.
In selecting a project location, the following should be addressed, as they apply to the project: *(a) an analysis of alternative modes or technologies that would avoid or minimise prescribed biodiversity impacts and justification for selecting the proposed mode or technology* *(b) an analysis of alternative routes that would avoid or minimise prescribed biodiversity impacts and justification for selecting the proposed route* *(c) an analysis of alternative locations that would avoid or minimise prescribed biodiversity impacts and justification for selecting the proposed location*	a) – d) The site contains negligible biodiversity value, as reflected in the low VI score, therefore the site was deemed appropriate for development and analysis of alternatives not applicable.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

(d) an analysis of alternative sites within a property on which the project is proposed that would avoid or minimise prescribed biodiversity impacts and justification for selecting the proposed site.	
Justifications for project location decisions should identify any other site constraints that the proponent has considered in determining the location and design of the project, e.g. bushfire protection requirements including clearing for asset protection zones, flood planning levels, servicing constraints.	No other constraints were identified for the site.
Efforts to avoid and minimise impacts through locating the project must be documented and justified in the BDAR or BCAR.	Refer to **Section 2.1** of the BDAR.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Designing a Project to Avoid and Minimise Prescribed Biodiversity Impacts	
Objectives/Requirements	**Evidence of compliance**
Prescribed biodiversity impacts can be avoided and minimised by: *(a) engineering solutions, e.g. proven techniques to minimise fracturing of bedrock underlying features of geological significance, water dependent communities and their supporting aquifers, proven engineering solutions to restore connectivity and favoured movement pathways* *(b) design of project elements to minimise interactions with threatened and protected species and ecological communities, e.g. designing turbines to dissuade perching and minimise the diameter of the rotor swept area, designing fencing to prevent animal entry to transport corridors* *(c) design of the project to maintain environmental processes critical to the formation and persistence of habitat features not associated with native vegetation* *(d) design of the project to maintain hydrological processes that sustain threatened species and TECs* *(e) design of the project to avoid and minimise downstream impacts on rivers, wetlands and estuaries by control of the quality of water released from the site.*	a)– e) It is considered unlikely given the nature of the development that engineering solutions would be required to avoid prescribed impacts to hydrology or underlying geology. No wind turbines are proposed.
Efforts to avoid and minimise impacts through design must be documented and justified in the BDAR or BCAR.	Refer to **Section 2.1** of the BDAR.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

2.2 Assessment of Impacts

As per section 9 of the BAM, impacts on native vegetation and habitat and prescribed biodiversity impacts are to be assessed, and mitigation and management measures identified.

As stated above the biodiversity value of the site is negligible, and therefore the proposal would not result in any direct, prescribed, indirect or residual impacts requiring additional mitigation measures to those already discussed in Section 2.1.1.

2.3 Impact Summary

Credit requirements were quantified via the input of the site data and impacts detailed above within the BAM Calculator. Both desktop (GIS) and fieldwork data were entered into the Calculator to determine the number of credits required to offset the impacts of the development.

2.3.1 Serious and Irreversible Impacts (SAIIs)

PCT 850 is listed as a candidate SAII, however due to the very low VI score of vegetation present on site, reflecting the degraded state of the vegetation community, no further consideration is required in accordance with Section 3.1.1.3 of the BAM.

The site does not intersect any areas mapped as important habitat for SAII species Swift Parrot or Regent Honeyeater (refer to **Appendix I**). No SAII species were observed within the Subject Site.

2.3.2 Impacts requiring offset

2.3.2.1 Ecosystem Credits

As per Section 3.1.1.3 of the BAM, the vegetation representative of a critically endangered ecological community with a VI score of <15 does not require assessment for offsets. The VI score of vegetation present within the Subject Site was calculated to be 1.7, therefore removal of this vegetation does not require offsetting and no credits were generated within the BAM Calculator.

2.3.2.2 Species Credits

The mapped vegetation within the Subject Site generated a low VI score (1.7) within the Calculator, therefore the habitat suitability for threatened species to occur on site is considered extremely low. In accordance with Section 3.1.1.3 of the BAM, no further assessment of habitat suitability for Species Credit species is required. As such, habitat for predicted Species Credit species has been checked as degraded in the Calculator in accordance with 6.4.1.17 of the BAM, and no credits were generated.

2.3.3 Areas not requiring assessment

As mentioned above, no further assessment is required for offsets in accordance with Section 3.1.1.3 of the BAM.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

2.4 Biodiversity Credit Report

The Biodiversity Credit Report generated within the BAM Calculator is provided in **Appendix F**.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

3.0 Conclusion

Application of the BAM against the proposal has quantified current biodiversity values within the Subject Site and calculated offset requirements for residual impacts following avoid and mitigation efforts.

Regional vegetation determined PCT 850 to potentially occur on site. Site assessment revealed this vegetation to be in a highly degraded state, predominantly exotic grassland.

As a result, the BAM Calculator determined that no biodiversity credits are required to offset the proposal.

The full biodiversity credit report is attached as **Appendix F**.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

4.0 References

Department of Environment, Water, Heritage, and the Arts (2010) *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. A guide to identifying and protecting the nationally threatened ecological community Environment Protection and Biodiversity Conservation Act 1999, Policy Statement 3.31*

DECC (2002) *Descriptions for NSW (Mitchell) Landscapes: Version 2*, NSW Department of Environment and Climate Change, Sydney.

DPIE (2020) *NSW Guide to Surveying Threatened Plants*. April 2020. NSW Department of Planning, Industry and Environment.

Harden, G. (ed) (1992). *Flora of New South Wales, Volume 3.* UNSW, Kensington, NSW.

Harden, G. (ed) (1993). *Flora of New South Wales, Volume 4*. UNSW, Kensington, NSW.

Harden, G. (ed) (2000). *Flora of New South Wales, Volume 1*. Revised edition. UNSW, Kensington, NSW.

Harden, G. (ed) (2002). *Flora of New South Wales, Volume 2*. Revised edition. UNSW, Kensington, NSW.

Keith, D (2004) *Ocean Shores to Desert Dunes*. DEC, Sydney.

NSW Department of Environment and Conservation (2004) *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities*. Working Draft, November 2004.

OEH (2017a) *Biodiversity Assessment Methodology*. August 2017. NSW Office of Environment and Heritage.

OEH (2017b) *Biodiversity Assessment Method (BAM) Calculator User Guide*. August 2017. NSW Office of Environment and Heritage.

OEH (2013) *Remnant Vegetation of the western Cumberland subregion, 2013 Update*. Office of Environment and Heritage, Sydney.

OEH (2017c). *Threatened Species, Populations and Ecological Communities website*. (https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species)

OEH (2020) *BioNet: the website for the Atlas of NSW Wildlife.* (http://www.bionet.nsw.gov.au) Accessed October 2020. NSW OEH, Sydney. NSW Office of Environment and Heritage.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Robinson, L (1991). *Field Guide to the Native Plants of Sydney.* Revised Second Edition. Kangaroo Press.

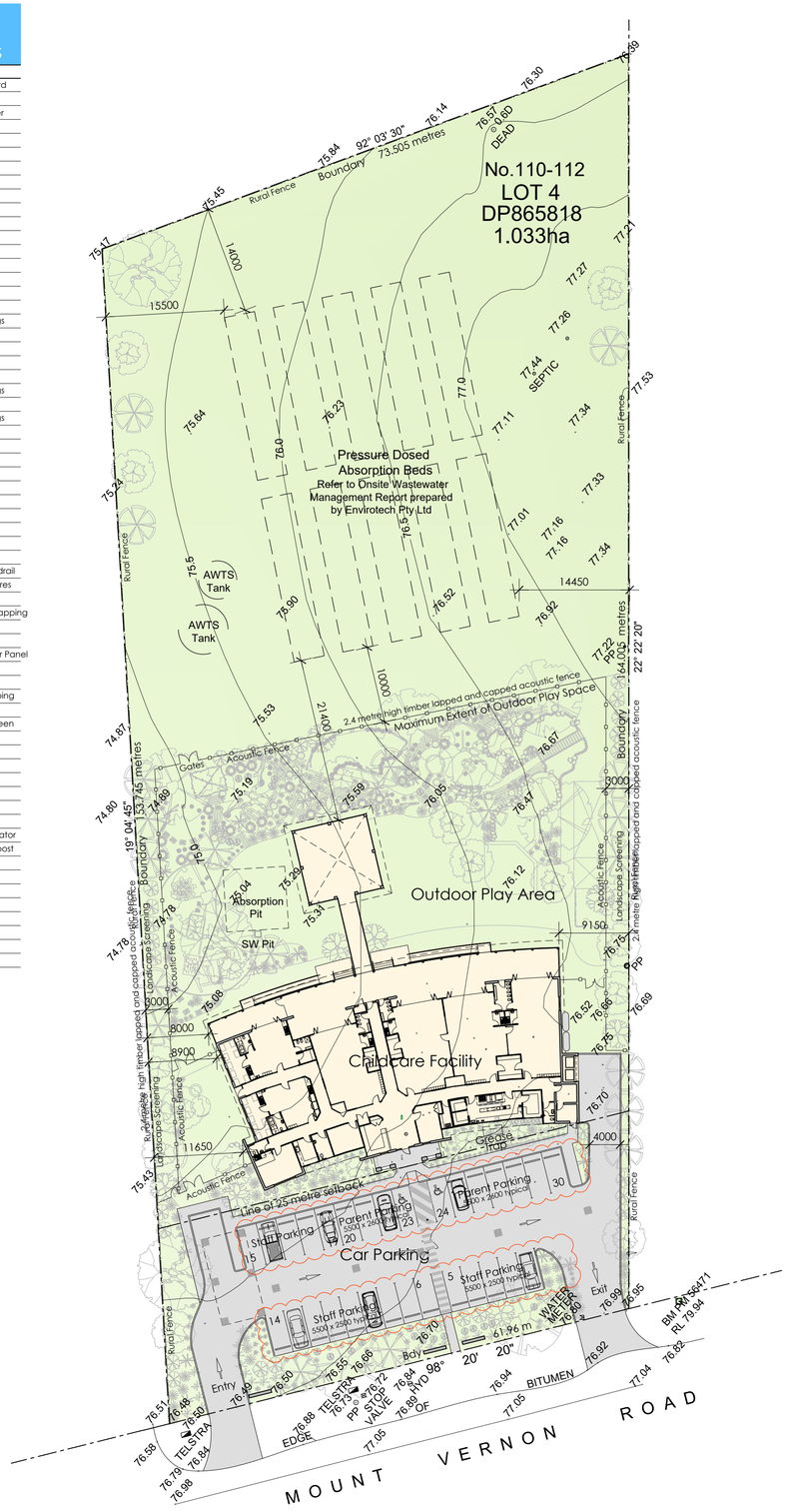
Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix A – Development Plan

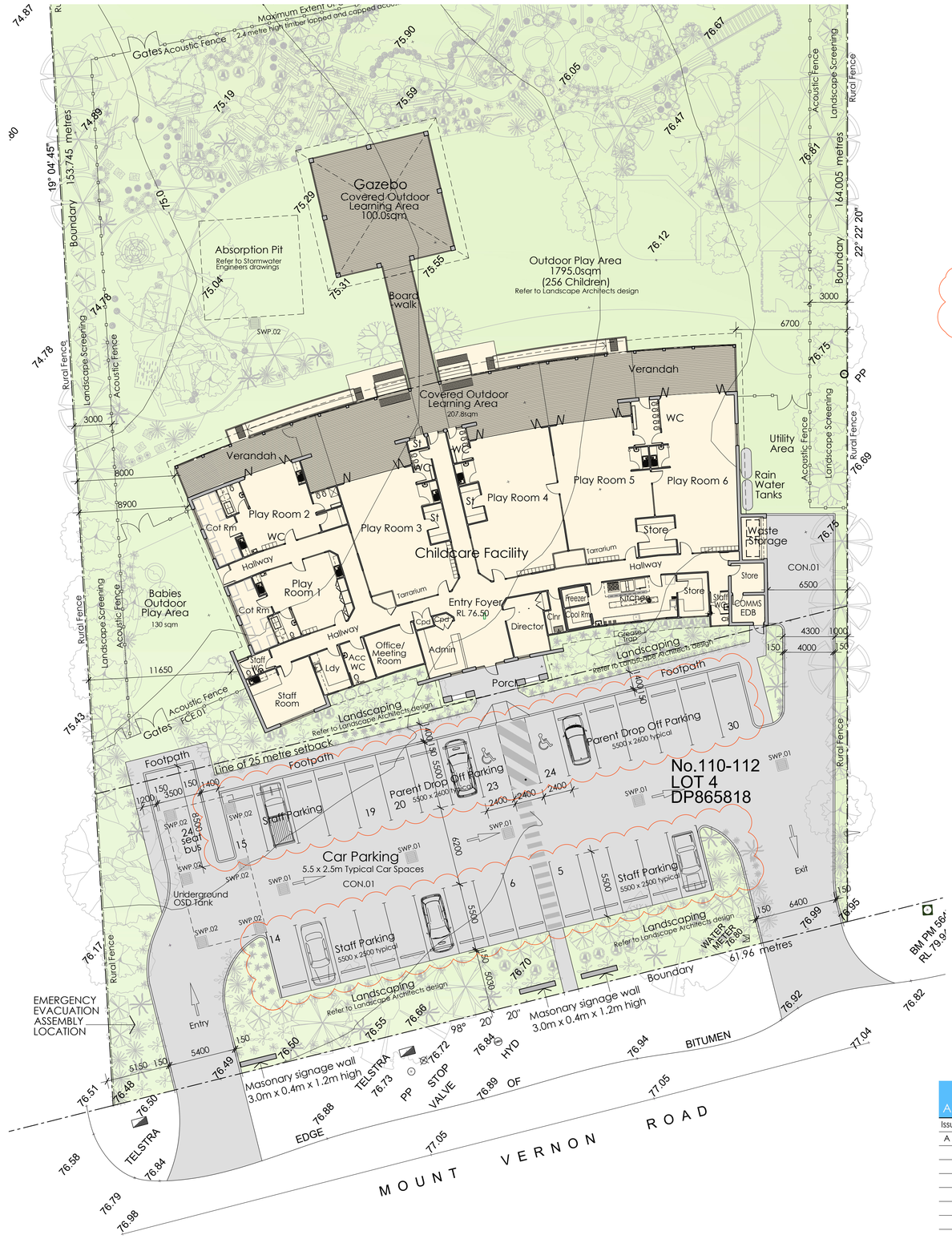
Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

ABBREVIATIONS

Abbr.	Description
B.01	Colorbond Metal Barge Board
BB.01	Stainless steel baby bath
BBS	Electrical Baby Bottle Sanitiser
BAL.01	Select Glazed Balustrade
BG.01	Zincalume Box Gutter
BSN.01	Select Wall Basin
BSN.02	Select Wall Basin
BSN.03	Select Wall Basin
BSN.04	Hands Free Wall Basin
CON.01	Concrete driveway
CPD	Cupboard with benchtop
CRP.01	Cool Room Wall Panel
DK.01	'Modwood' Eco Decking
F.01	Colorbond Metal Fascia
FC.01	Paint Finish to FC Cladding
FCE.01	Decorative Timber Fence
FF.01	Select Vinyl Floor Coverings
FF.02	Select Carpet Floor Coverings
FF.03	Select Floor Tiles
FF.04	Select Floor Tiles
FF.05	Select Vinyl Floor Coverings
FF.06	Select Floor Tiles
FF.07	Select Carpet Floor Coverings
FF.08	Select Vinyl Floor Coverings
FF.09	Select Carpet Floor Coverings
FF.10	Select Vinyl Floor Coverings
FF.11	Select Floor Tiles
FF.12	Select Vinyl Floor Coverings
FF.13	Select Vinyl Floor Coverings
FF.14	Select Vinyl Floor Coverings
FF.15	Select Vinyl Floor Coverings
FF.16	Select Vinyl Floor Coverings
FF.17	Select Vinyl Floor Coverings
FF.18	Select Epoxy Floor Sealer
G.01	Colorbond Metal Gutter
HR.01	Powdercote Aluminium Handrail
LV.01	Powdercote Aluminium Louvres
OHC	Overhead cupboard
PC.01	Colorbond Metal Parapet Capping
PP.01	Laminate Toilet Partitions
PP.02	Laminate Toilet Partitions
PRP.01	Acratex finish to Hebel Power Panel
PWP	Existing power pole
R.01	Colorbond Metal Roof
RC.01	Colorbond metal ridge capping
RS.01	Colorbond roller shutter
SCN.01	'Modwood' Eco Decking Screen
SH.01	Free standing metal shelves
SL.01	Alum Framed Glass Skylight
SLH.01	Slop Hopper
SSS.01	Stainless Steel Sink
SSS.02	Stainless Steel Sink
STC.01	Stone Cladding
TBR.01	'Weathergroove' cladding
TGSI	Tactile Ground Surface Indicator
TP.01	Merbau timber cladding to post
TUB.01	Stainless Steel inset tub
VB.01	Accessible Vanity Basin
VB.02	Vanity Basin
WC.01	Junior Toilet Suite
WC.02	Toilet Suite
WC.03	Accessible Toilet Suite
WM	Washing machine space
WST.01	Stainless Steel Wash Trough



SITE PLAN
SCALE 1:400



PART SITE PLAN
SCALE 1:200

SITE STATISTICS

Site Zoning -	E4 - Environmental Living	
Total Site Area.	10,330 sqm - 1.033 Ha	
Built Upon Area		
Ground Floor Level		798.0 sqm
Verandah		207.8 sqm
Gazebo & Boardwalk		128.7 sqm
Paving and Driveway		1058.0 sqm
Total Built Upon Area		2192.5 sqm
Planning Perameters		
Landscaped Area		8090.0 sqm
Total Site Coverage		1182.0 sqm
Item	Required	Provided
Site Coverage		11.4 %
Gross Floor Area (Previously approved)	600sqm	751.5sqm (891.6sqm)
Floor Space Ratio	N/A	0.0727 : 1
Soft Landscaping		78.3%
Parking		
Parent Car Spaces (Spaces 20-30)	10	11
Staff Car Spaces (Spaces 1-19)	19	19
Total Spaces	29	30

PLAY SPACE AREAS

Indoor Space	Unencumbered Area	No. of Children
Room 1	27.0sqm	8
Room 2	32.2sqm	8
Room 3	65.2sqm	20
Room 4	75.0sqm	20
Room 5	72.0sqm	20
Room 6	72.6sqm	20
Total	344.0sqm	96
Outdoor Space		
Baby Play Area	130.0sqm	Refer
Verandah	207.0 sqm	to
Gazebo and Boardwalk	128.0 sqm	P.O.M.
General Play Area	1795.0sqm	
Total	1316.0sqm	

P.O.M. = Plan of Management

AMENDMENTS

Issue	Description	Date	By
A	Carpark layout amended	10.03.20	GM
	Parking table updated		

Development Application

SCALE - 1:200 @ A1
0 1 2 3 4 5 10 METRES

PROJECT WORKS DESIGN
Project Works Design Pty Ltd
ABN 97 108 707 482
a. p.o. box 5138
chittaway bay nsw 2261
p. 0412 637 875
admin@pwdesign.com.au
www.pwdesign.com.au

©Copyright
This drawing is Copyright and is the property of Project Works Design Pty Limited. It must not be copied or reproduced in any way without the written permission of Project Works Desian Pty Limited

Rev Date Description
Amendments

Vladimir Vanovac and Mark Toma

Proposed Childcare Centre

110 - 112 Mount Vernon Road Mount Vernon NSW

North Point

Title: Proposed Site Plan
Drawn: GM
Date: 14.11.19
Checked: GM
Scale: 1 : 500 / 1:200 @A1
Dwg No. DA01
Job No. 18307
Issue: A

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix B – Expected Fauna Species List

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

EXPECTED FAUNA SPECIES LIST

The following list includes fauna species that could be reasonably expected to occur on the study site at some point, given site attributes and location.

"●" - species observed or indicated by scats, tracks etc. on, over or near the site during recent surveys by AEP (2020).

* - Introduced species

? - Unconfirmed record, anecdotal records etc.

Threatened species listed under the *Biodiversity Conservation Act* 2016 (BC Act) or the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) are indicated in **bold font**.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Family Name		Scientific Name	Common Name
Amphibians			
Hylidae		*Litoria fallax*	Eastern Dwarf Tree Frog
Hylidae		*Litoria peronii*	Peron's Tree Frog
Hylidae		*Litoria phyllochroa*	Leaf-green Tree Frog
Hylidae		*Litoria tyleri*	Tyler's Tree Frog
Hylidae		*Litoria verreauxii*	Verreaux's Frog
Myobatrachidae		*Crinia signifera*	Common Eastern Froglet
Myobatrachidae		*Limnodynastes peronii*	Brown-striped Frog
Reptiles			
Agamidae		*Intellagama lesueurii*	Eastern Water Dragon
Agamidae		*Intellagama lesueurii lesueurii*	Eastern Water Dragon
Agamidae		*Pogona barbata*	Bearded Dragon
Elapidae		*Hemiaspis signata*	Black-bellied Swamp Snake
Elapidae		*Notechis scutatus*	Tiger Snake
Elapidae		*Pseudechis porphyriacus*	Red-bellied Black Snake
Elapidae		*Pseudonaja textilis*	Eastern Brown Snake
Pythonidae		*Morelia spilota spilota*	Diamond Python
Scincidae		*Eulamprus quoyii*	Eastern Water-skink
Scincidae		*Eulamprus tenuis*	Barred-sided Skink
Scincidae		*Lampropholis delicata*	Dark-flecked Garden Sunskink
Scincidae		*Tiliqua scincoides*	Eastern Blue-tongue
Varanidae		*Varanus varius*	Lace Monitor
Birds			
Acanthizidae		*Acanthiza nana*	Yellow Thornbill
Acanthizidae		*Acanthiza pusilla*	Brown Thornbill
Acanthizidae		*Gerygone olivacea*	White-throated Gerygone
Acanthizidae		*Sericornis frontalis*	White-browed Scrubwren
Accipitridae		*Aquila audax*	Wedge-tailed Eagle
Accipitridae		*Haliastur sphenurus*	Whistling Kite
Alcedinidae		*Dacelo novaeguineae*	Laughing Kookaburra
Anhingidae		*Anhinga novaehollandiae*	Australasian Darter
Apodidae		*Apus pacificus*	Fork-tailed Swift
Ardeidae		*Ardea ibis*	Cattle Egret
Ardeidae		*Ardea pacifica*	White-necked Heron
Ardeidae		*Egretta garzetta*	Little Egret
Ardeidae		*Egretta novaehollandiae*	White-faced Heron
Artamidae		*Cracticus nigrogularis*	Pied Butcherbird

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Family Name		Scientific Name	Common Name
Artamidae		*Cracticus tibicen*	Australian Magpie
Artamidae		*Cracticus torquatus*	Grey Butcherbird
Artamidae		*Strepera graculina*	Pied Currawong
Cacatuidae		*Cacatua galerita*	Sulphur-crested Cockatoo
Cacatuidae		*Cacatua sanguinea*	Little Corella
Cacatuidae		*Eolophus roseicapillus*	Galah
Charadriidae		*Vanellus miles*	Masked Lapwing
Columbidae		*Geopelia striata*	Peaceful Dove
Columbidae		*Ocyphaps lophotes*	Crested Pigeon
Corcoracidae		*Corcorax melanorhamphos*	White-winged Chough
Corvidae		*Corvus coronoides*	Australian Raven
Cuculidae		*Cacomantis pallidus*	Pallid Cuckoo
Cuculidae		*Chalcites basalis*	Horsfield's Bronze-Cuckoo
Cuculidae		*Eudynamys orientalis*	Eastern Koel
Cuculidae		*Scythrops novaehollandiae*	Channel-billed Cuckoo
Estrildidae		*Neochmia temporalis*	Red-browed Finch
Hirundinidae		*Hirundo neoxena*	Welcome Swallow
Laridae		*Chroicocephalus novaehollandiae*	Silver Gull
Maluridae		*Malurus cyaneus*	Superb Fairy-wren
Megaluridae		*Megalurus gramineus*	Little Grassbird
Megaluridae		*Megalurus timoriensis*	Tawny Grassbird
Meliphagidae		*Acanthorhynchus tenuirostris*	Eastern Spinebill
Meliphagidae		*Anthochaera chrysoptera*	Little Wattlebird
Meliphagidae		*Manorina melanocephala*	Noisy Miner
Meliphagidae		*Manorina melanophrys*	Bell Miner
Meliphagidae		*Nesoptilotis leucotis*	White-eared Honeyeater
Meliphagidae		*Philemon corniculatus*	Noisy Friarbird
Monarchidae		*Grallina cyanoleuca*	Magpie-lark
Pardalotidae		*Pardalotus punctatus*	Spotted Pardalote
Pardalotidae		*Pardalotus striatus*	Striated Pardalote
Passeridae		*Passer domesticus**	House Sparrow
Pelecanidae		*Pelecanus conspicillatus*	Australian Pelican
Petroicidae		*Petroica rosea*	Rose Robin
Podargidae		*Podargus strigoides*	Tawny Frogmouth
Psittacidae		*Platycercus elegans*	Crimson Rosella
Psittacidae		*Platycercus eximius*	Eastern Rosella
Psittacidae		*Trichoglossus haematodus*	Rainbow Lorikeet
Psophodidae		*Psophodes olivaceus*	Eastern Whipbird
Ptilonorhynchidae		*Ptilonorhynchus violaceus*	Satin Bowerbird

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Family Name		Scientific Name	Common Name
Rhipiduridae		*Rhipidura albiscapa*	Grey Fantail
Rhipiduridae		*Rhipidura leucophrys*	Willie Wagtail
Strigidae		*Ninox novaeseelandiae*	Southern Boobook
Sturnidae		*Sturnus tristis**	Common Myna
Sturnidae		*Sturnus vulgaris**	Common Starling
Timaliidae		*Zosterops lateralis*	Silvereye
Mammals			
Bovidae		*Bos taurus**	European cattle
Bovidae		*Capra hircus**	Goat
Bovidae		*Ovis aries**	Sheep (feral)
Canidae		*Canis lupus**	Dingo, domestic dog
Canidae		*Canis lupus familiaris**	Dog
Canidae		*Vulpes vulpes**	Fox
Cervidae		*Cervus elaphus**	Red Deer
Equidae		*Equus asinus**	Donkey
Equidae		*Equus caballus**	Horse
Felidae		*Felis catus**	Cat
Leporidae		*Lepus capensis**	Brown Hare
Leporidae		*Oryctolagus cuniculus**	Rabbit
Macropodidae		*Macropus giganteus*	Eastern Grey Kangaroo
Macropodidae		*Wallabia bicolor*	Swamp Wallaby
Molossidae		*Austronomus australis*	White-striped Freetail-bat
Molossidae		*Mormopterus ridei*	Eastern Free-tailed Bat
Muridae		*Mus musculus**	House Mouse
Muridae		*Rattus fuscipes*	Bush Rat
Muridae		*Rattus rattus**	Black Rat
Petauridae		*Petaurus breviceps*	Sugar Glider
Phalangeridae		*Trichosurus vulpecula*	Common Brushtail Possum
Pseudocheiridae		*Pseudocheirus peregrinus*	Common Ringtail Possum
Tachyglossidae		*Tachyglossus aculeatus*	Short-beaked Echidna
Vespertilionidae		*Nyctophilus geoffroyi*	Lesser Long-eared Bat
Vespertilionidae		*Nyctophilus gouldi*	Gould's Long-eared Bat

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix C – BAM Plot Field Data & Flora Species List

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

BAM Plot Field Data

HTE – High Threat Exotic
* - Introduced species

Family	Scientific Name	Common Name	BAM Growth Form	HTE	Plot 1
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed	Forb		0.1
Anthericaceae	*Tricoryne elatior*	Yellow Rush Lily	Forb		0.1
Asteraceae	*Bidens pilosa**	Cobbler's Pegs	nil - exotic	Y	0.1
Asteraceae	*Cirsium vulgare**	Spear Thistle	nil - exotic		0.1
Asteraceae	*Hypochaeris radicata**	Flatweed	nil - exotic		0.1
Asteraceae	*Senecio madagascariensis**	Fireweed	nil - exotic	Y	0.1
Asteraceae	*Sonchus oleraceus**	Common Sow-thistle	nil - exotic		0.1
Chenopodiaceae	*Einadia hastata*	Berry Saltbush	Forb		0.1
Cyperaceae	*Carex inversa*	Knob Sedge	Sedge		0.1
Cyperaceae	*Cyperus gracilis*	Slender Flat Sedge	Sedge		0.1
Cyperaceae	*Cyperus rotundus**	Nutgrass	nil - exotic		0.3
Cyperaceae	*Cyperus sesquiflorus**		nil - exotic		0.1
Fabaceae	*Glycine clandestina*	Twining Glycine	Vine		0.1
Fabaceae	*Wisteria sinensis**	Chinese wisteria			0.3
Lamiaceae	*Stachys arvensis**	Stagger Weed			0.1
Malvaceae	*Modiola caroliniana**	Red-flowered Mallow	nil - exotic		0.1
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne	nil - exotic		0.3
Meliaceae	*Melia azedarach*	White Cedar	Tree		0.3
Myrtaceae	*Eucalyptus sp.*		Tree		0.1
Oxalidaceae	*Oxalis corniculata subsp. corniculata**				0.1

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Family	Scientific Name	Common Name	BAM Growth Form	HTE	Plot 1
Poaceae	*Cenchrus clandestinum**	Kikuyu	nil - exotic	Y	27
Poaceae	*Chloris virgata**	Feathertop Rhodes Grass			0.1
Poaceae	*Cynodon sp.**		nil - exotic		5
Poaceae	*Digitaria ciliaris**	Summer Grass	nil - exotic		0.3
Poaceae	*Eragrostis mexicana**	Mexican Lovegrass	nil - exotic		0.1
Poaceae	*Microlaena stipoides*	Weeping Grass	Other Grass		0.2
Poaceae	*Paspalidium distans*		Tussock Grass		0.2
Poaceae	*Paspalum dilatatum**	Paspalum	nil - exotic	Y	10
Poaceae	*Setaria parviflora**	Slender Pigeon Grass	nil - exotic		10
Poaceae	*Sporobolus fertilis**	Giant Parramatta Grass	nil - exotic	Y	0.1
Poaceae	*Stenotaphrum secundatum**	Buffalo Grass	nil - exotic	Y	10
Poaceae	*Themeda australis*	Kangaroo Grass	Tussock Grass		0.1
Polygonaceae	*Rumex crispus**	Curled Dock	nil - exotic		0.1
Primulaceae	*Lysimachia arvensis**	Scarlet Pimpernel	nil - exotic		0.1
Rubiaceae	*Richardia stellaris**		nil - exotic		0.1
Solanaceae	*Solanum sisymbriifolium**		nil - exotic		0.3
Verbenaceae	*Verbena bonariensis**	Purpletop	nil - exotic		0.1

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Flora Species List

Family Name	Scientific Name	Common Name
Alliaceae	*Nothoscordum borbonicum**	Onion Weed
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed
Anthericaceae	*Tricoryne elatior*	Yellow Rush Lily
Asteraceae	*Bidens pilosa**	Cobbler's Pegs
Asteraceae	*Cirsium vulgare**	Spear Thistle
Asteraceae	*Conyza bonariensis**	Flax-leaf Fleabane
Asteraceae	*Hypochaeris radicata**	Flatweed
Asteraceae	*Senecio madagascariensis**	Fireweed
Asteraceae	*Sonchus oleraceus**	Common Sow-thistle
Chenopodiaceae	*Einadia hastata*	Berry Saltbush
Cyperaceae	*Carex inversa*	Knob Sedge
Cyperaceae	*Cyperus gracilis*	Slender Flat Sedge
Cyperaceae	*Cyperus rotundus**	Nutgrass
Cyperaceae	*Cyperus sesquiflorus**	
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-rush
Euphorbiaceae	*Triadica sebifera**	Chinese Tallowood
Fabaceae	*Glycine clandestina*	Twining Glycine
Fabaceae	*Wisteria sinensis**	Chinese wisteria
Lamiaceae	*Stachys arvensis**	Stagger Weed
Liliaceae	*Chlorophytum comosum**	Spider Plant
Lythraceae	*Lagerstroemia indica**	Crepe Myrtle
Malvaceae	*Modiola caroliniana**	Red-flowered Mallow
Malvaceae	*Sida rhombifolia**	Paddy's Lucerne
Meliaceae	*Melia azedarach*	White Cedar
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush
Myrtaceae	*Eucalyptus sp.*	
Oxalidaceae	*Oxalis corniculata subsp. corniculata**	
Poaceae	*Cenchrus clandestinum**	Kikuyu
Poaceae	*Chloris truncata*	Windmill Grass
Poaceae	*Chloris virgata**	Feathertop Rhodes Grass
Poaceae	*Cynodon sp.**	Couch
Poaceae	*Digitaria ciliaris**	Summer Grass
Poaceae	*Eleusine tristachya**	Goose Grass
Poaceae	*Eragrostis brownii*	Brown's Lovegrass
Poaceae	*Eragrostis mexicana**	Mexican Lovegrass
Poaceae	*Eriochloa australiensis*	Australian Cupgrass
Poaceae	*Microlaena stipoides*	Weeping Grass
Poaceae	*Paspalidium distans*	
Poaceae	*Paspalum dilatatum**	Paspalum
Poaceae	*Setaria parviflora**	Slender Pigeon Grass
Poaceae	*Sorghum halepense**	Johnson Grass
Poaceae	*Sporobolus africanus**	Parramatta Grass
Poaceae	*Sporobolus fertilis**	Giant Parramatta Grass
Poaceae	*Stenotaphrum secundatum**	Buffalo Grass
Poaceae	*Themeda australis*	Kangaroo Grass
Polygonaceae	*Rumex crispus**	Curled Dock
Portulacaceae	*Portulaca oleracea*	Purslane
Primulaceae	*Lysimachia arvensis**	Scarlet Pimpernel

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Family Name	Scientific Name	Common Name
Rubiaceae	*Richardia stellaris**	
Solanaceae	*Solanum sisymbriifolium**	
Verbenaceae	*Verbena bonariensis**	Purpletop

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix D – BAM Plot Field Sheets

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Date: 31/3/20	Job number: 2091	Site: Mt Vernon	Plot ID: P1	Bearing: 14	Observers: TM

AEP ECOLOGY | BIOBANKING | OFFSETS | BUSHFIRE

Upper stratum	C	Ab	Mid stratum	C	Ab	Lower stratum	C	Ab	Lower stratum	C	Ab
Eucalyptus sp.	0.1	1	Melia azadarach	0.3	1	Bidens pilosa	0.1	10	Cyperus gracilis	0.1	50
(juv-regrowth)						Kikuyu	27	100+	Paspalidium distans	0.2	20
						Cirsium vulgare	0.1	5	Paspalum dilatatum	10	100+
						Hypochaeris rad.	0.1	20	Sporobolus fertilis	0.1	10
						Senecio madagasc.	0.1	15	Seteria parv.	10	100+
						Alternanthera dent.	0.1	5	Buffalo Grass	10	100+
						Trycorgne elatior	0.1	5	Rumex crispus	0.1	10
						Sonchus oleraceus	0.1	10	Lysimachia arvensis	0.1	5
						Einadia hastata	0.1	5	Richardia stellaris	0.1	15
						Cyperus rotundus	0.3	30	Solanum sisymbrif.	0.3	30
						Cyperus sesquiflorus	0.1	10	Chloris virgata	0.1	10
						Modiola caroliniana	0.1	15	Oxalis corniculata	0.1	15
						Carex inversa	0.1	10	Stachys arvensis	0.1	10
						Microlaena stip.	0.2	50	Wisteria sinensis	0.3	1
						Sida rhombifolia	0.3	100	Glycine clandestina	0.1	5
						Couch	5	100+	Themeda australis	0.1	20
						Digitaria ciliaris	0.3	50	Verbena bon.	0.1	15
						Eragrostis Mexicana	0.1	20			
Total Cover DO FIRST											

20mx20m plot = 400m² **Note:** 0.1% = 63x63cm, 0.5% = 1.4x1.4m, 1% = 2x2m, 5% = 4x5m, 25% = 10x10m

C (%): 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ... (to nearest 5%). Include overhanging plants.

Abundance: 1-20, 50, 100, 500, 1000 etc. (numbers >20 are estimates only. For overhanging plants, record abundance as 1.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Date: 31/3/20	Job number: 2091	Site: Mt Vernon	Plot ID: P1	Bearing: 14	Observers: TM

AEP ECOLOGY | BIOBANKING | OFFSETS | BUSHFIRE

Arrival time: 10am **Departure time:** 2-30pm **Weather:** Sunny

1000m² plot **Mapped Vegetation community:** **Transect photos and GPS points taken** ✓

Tree Stem Size Class DBH (1.3m high)	Presence/Absence Count above 50 cm	Count of Hollow Bearing Trees
< 5 cm	(P) / A	0
5 - 9 cm	P / (A)	
10 – 19 cm	P / (A)	Total
20 – 29 cm	P / (A)	Length of logs (m) **Note:** >10cm diameter, >50cm length
30 – 49cm	P / (A)	
50 -79cm	# 0	10
>80cm	# 0	Total metres

Leaf Litter Cover within 5 x 1m² sub-plots
Note: - located at 5m, 15m, 25m, 35m and 45m along the transect - first plot located 5m on the left of the transect
Litter includes leaves, seeds, twigs and branches less than 10cm in diameter.
Also include dead material attached to living plants that is touching the ground.

	Leaf litter	Live vegetation, bare ground, rocks, etc.
1	15	
2	20	
3	10	
4	18	
5	12	
Average	15	

Plot Disturbance: (weediness, clearing, erosion, edge effects, grazing, fire, other)

Exotic grassland, few natives

Habitat features, comments and incidental fauna observations:

Old log pile

Note: Tree Stem Size Class <5cm refers to any regenerating stems and does not require a height of 1.3m.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix E – Vegetation Integrity Score Table

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Site Attribute	PCT850
Plot #	**1**
Location	6250924E 297526N
Bearing	14°
Tree	2
Shrub	0
Grass & Grass-like	5
Forb	3
Fern	0
Other	1
Total Composition Score	**18**
Tree	0.4
Shrub	0
Grass & Grass-like	0.7
Forb	0.3
Fern	0
Other	0.1
Total Structure Score	**0**
Regenerating Stems (<5cm DBH)	Present
Stem Classes (cm DBH)	-
# Large Trees	0
Hollow-bearing Trees	0
Litter Cover (%)	15
Coarse Woody Debris (m)	10
High Threat Weed Cover	47.3
Total Function Score	**24.7**
Overall Vegetation Integrity Score	**1.7**

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix F – Biodiversity Credit Report

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00022090/BAAS18147/20/00022091	Proposal Name 2091 Mt Vernon	BAM data last updated * 20/08/2020
Assessor Name Ian Douglas Benson	Assessor Number BAAS18147	BAM Data version * 30
Proponent Names Key Business Accountants	Report Created 26/10/2020	BAM Case Status Finalised
Assessment Revision 0	Assessment Type Part 4 Developments (General)	Date Finalised 01/10/2020
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community	850-Cumberland shale hills woodland

Species
Nil

Additional Information for Approval

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

BAM Biodiversity Credit Report (Like for like)

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Haliaeetus leucogaster / White-bellied Sea-Eagle

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
850-Cumberland shale hills woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	0.6	0	0	0

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00022090/BAAS18147/20/00022091

Proposal Name
2091 Mt Vernon

BAM data last updated *
20/08/2020

Assessor Name
Ian Douglas Benson

Assessor Number
BAAS18147

BAM Data version *
30

Proponent Name(s)
Key Business Accountants

Report Created
26/10/2020

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (General)

Date Finalised
01/10/2020

BOS entry trigger

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Cumberland Plain Woodland in the Sydney Basin Bioregion	Critically Endangered Ecological Community	850-Cumberland shale hills woodland

Species
Nil

Additional Information for Approval

PCTs With Customized Benchmarks

PCT
No Changes

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

BAM Biodiversity Credit Report (Variations)

Predicted Threatened Species Not On Site

Name
Haliaeetus leucogaster / White-bellied Sea-Eagle

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
850-Cumberland shale hills woodland	Cumberland Plain Woodland in the Sydney Basin Bioregion	0.6	0	0	0.00

Species Credit Summary

No Species Credit Data

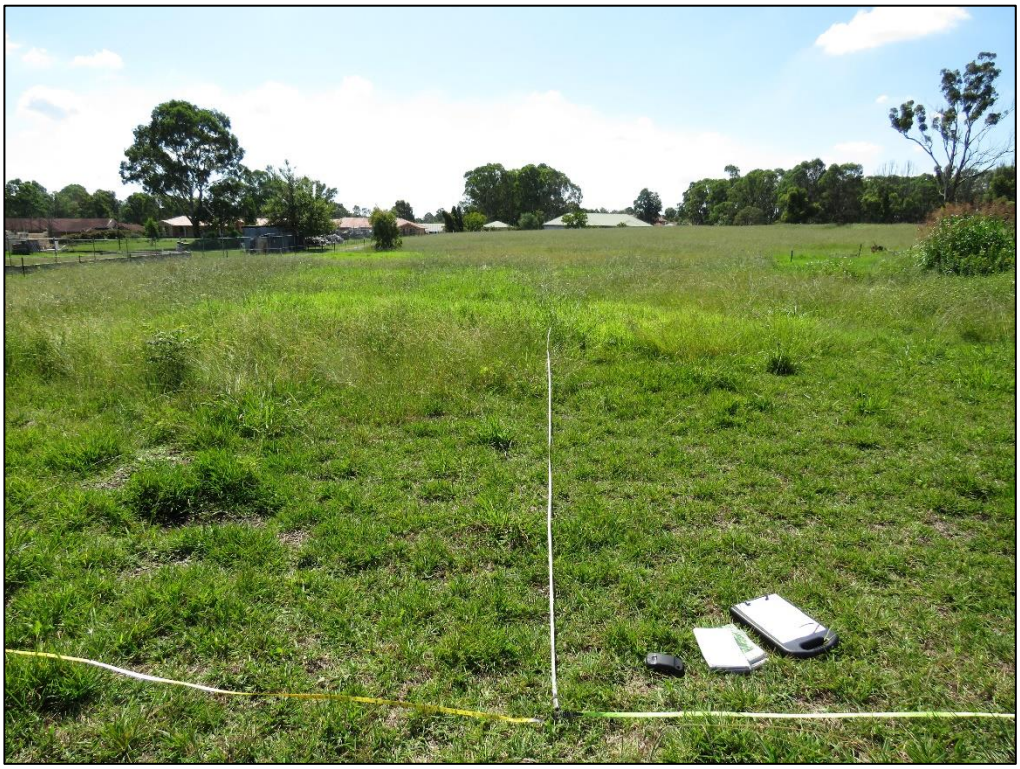
Credit Retirement Options

Like-for-like options

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix G – Site Photographs

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



Above: BAM Plot Start facing north. **Below**: BAM Plot End facing south.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Above: View from eastern edge showing exotic grassland. **Below:** View from western edge showing exotic grassland.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix H – Other Legislation

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

EPBC Act Assessment

A search was conducted in March 2020 of Matters of National Environmental Significance (MNES) as relevant to the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). The following MNES are considered in this assessment.

World Heritage Properties:

The site is not a World Heritage area, and is not in close proximity to any such area.

National Heritage Places:

The site is not a National Heritage place, and it is not in close proximity to any such places.

Wetlands of International Significance (declared Ramsar wetlands);

The site does not contain Ramsar Wetlands, and it is not in close proximity to any Ramsar Wetlands.

Great Barrier Reef Marine Park:

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

Commonwealth Marine Areas:

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

Threatened Ecological Communities:

Five (5) Threatened Ecological Communities are listed as likely to occur within the site's area. While Cumberland Plain Shale Woodland CEEC has been utilised for the BAM Assessment, as per the flowchart for condition threshold within the *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. A guide to identifying and protecting the nationally threatened ecological community Environment Protection and Biodiversity Conservation Act 1999, Policy Statement 3.31*, projected foliage cover of the native trees within the site is not greater than 10%, as such the vegetation on site is not considered to be the listed ecological community.

Threatened Species:

No threatened species listed within the EPBC Act were recorded on site during fieldwork.

Given that the Subject Site does not contain areas of potential habitat onsite it is not considered that the development of this land as proposed is likely to significantly impact potential habitat.

Migratory Species:

A number of EPBC listed migratory species have some potential to visit the site on an irregular basis. However, it is not considered that the development of this land as proposed is likely to significantly affect the potential habitat of such species, or disrupt migratory patterns.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

EPBC Act Assessment Conclusion:

No MNES (specifically in this instance threatened species, threatened ecological communities or listed migratory species) are expected to be impacted upon significantly as a result of the proposal.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Koala SEPP Assessment

There is no recorded Koala Plan of Management (KPoM) covering the site and consequently the site is assessed under the draft State Environmental Planning Policy (Koala Habitat Protection) 2019.

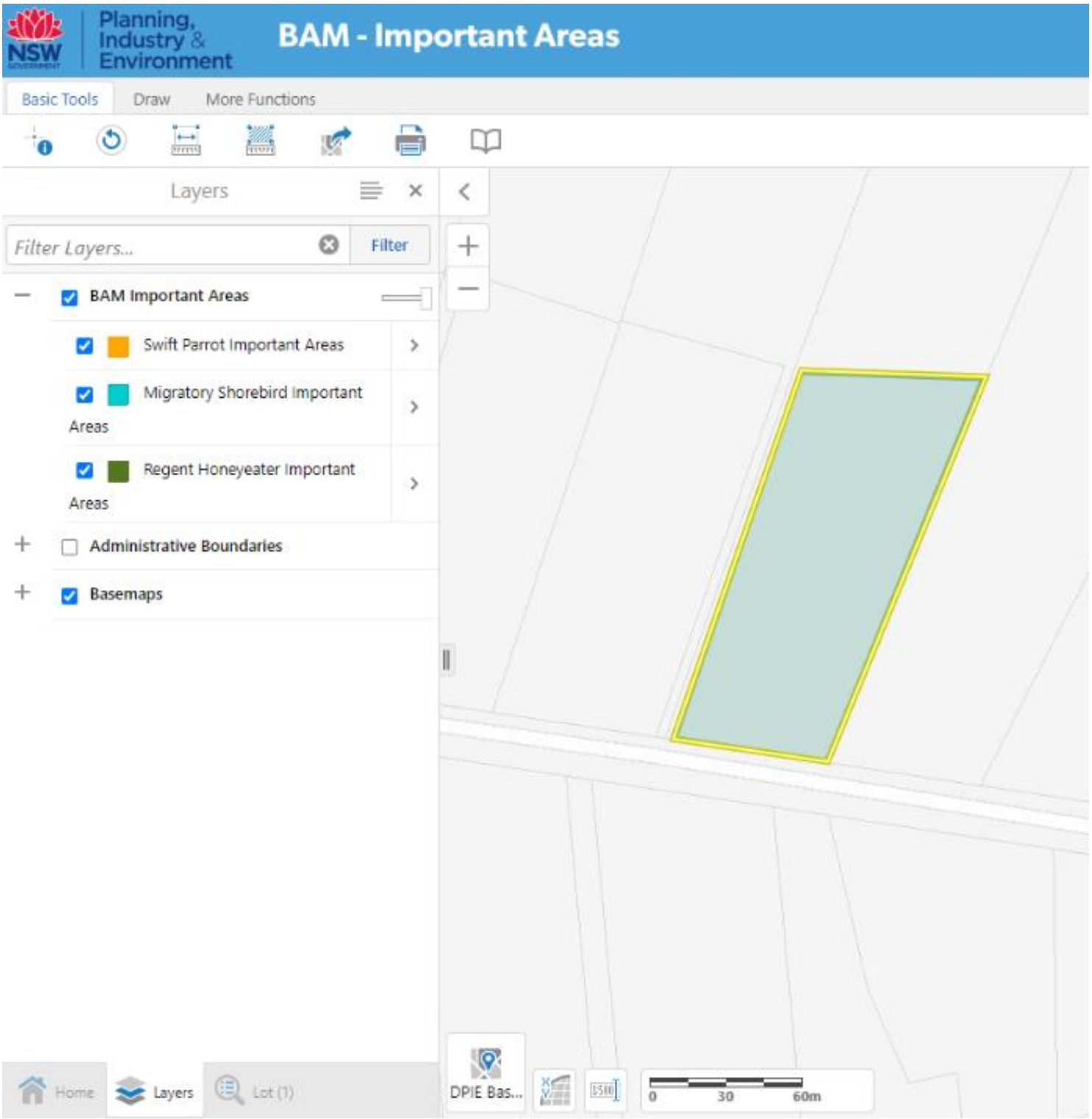
Whilst the site is greater than 1ha in area, it is not located on the Koala Development application map and therefore no further consideration under the SEPP applies.

Furthermore, the SEPP does not apply to the City of Penrith LGA.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix I – Important Area Mapping

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021



Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Appendix J – CVs

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

IAN BENSON
Curriculum Vitae

Ian works with AEP in the role of Senior Ecologist. He is an experienced field ecologist, bird watcher and a regular participant in wader surveys. Ian has previously had a successful career as a project manager with a local geotechnical engineering firm. His background in project management and soil sciences combined with his ecological knowledge is utilised in a diverse array of applications in his current role.

Qualifications

- Graduate Diploma in Science (Ecology) University of New England (2014)
- Bachelor Engineering (Civil) University of Newcastle (2008)

Further Education & Training (select summary)

- Biobank and Biocertification Assessors Training Course (BAAS #18147)
- Advanced Plant Identification (University of New South Wales)
- NSW Class C Driver's Licence. Experienced 4WD operator
- Occupational Health & Safety Training
- Rail Industry Worker
- ARTC Safety Induction for Contractors (NSW)
- ARTC Hunter Bulk Terminal Induction

Fields of Special Competence

- Biobanking & Biodiversity Offset Commissions – initial scoping and feasibility, BAM impact assessments and BDAR reporting, biobank calculations, Stewardship site creation
- Detailed knowledge of environmental legislation and approval pathways
- Ecological field survey and habitat assessment covering terrestrial and aquatic flora and fauna. Experienced in camera trap methods particularly targeting cryptic and difficult to identify mammal species.
- Highly proficient at avifauna surveys, including challenging wetland and shorebird environs
- Project Management
- Soil science

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Professional Affiliations / Memberships (past / present)

- Hunter Bird Observers Club (HBOC)
- Australasian Seabird Group
- Graduate Member of The Institution of Engineers Australia in the Civil College

Relevant Employment History

2018-Current **Senior Ecologist**
Anderson Environment & Planning, Newcastle

Currently employed by Anderson Environment & Planning as a Senior Ecologist overseeing all aspects of the business including training and management of field and office staff undertaking ecology and bushfire works to assist in the provision of consulting services to land, property, mining industry, legal and government sectors. Covering ecological, project management, environmental, planning services, advices, strategy and representation.

2016-2018 **Ecologist**
Anderson Environment & Planning, Newcastle

Currently employed by Anderson Environment & Planning to assist in the provision of consulting services to land, property, mining industry, legal and government sectors. Covering ecological, project management, environmental, planning services, advices, strategy and representation.

2012-2016 **Project Manager**
Douglas Partners, Newcastle

As a project manager with Douglas Partners I was responsible for proposal and tender preparation, planning, implementation and reporting of geotechnical and geo-environmental investigations for a broad range of projects including site classification, foundations, pavements, bridges and slope stability. I was required to liaise with clients regarding project requirements, project goals and deadlines. I was responsible for the development and implementation of Work Health and Safety Plans as well as Environmental Plans and documentation. This included the development of safe work procedures, safety inspections on site and implementing improved safety procedures with staff. I was responsible for ensuring projects were completed on time and on budget whilst meeting the clients' expectations and achieving quality assurance standards.

2008-2012 **Geotechnical Engineer**
Douglas Partners, Newcastle

As a geotechnical engineer for Douglas Partners I was involved in the planning and implementation of geotechnical investigations for a wide range of development in the Hunter Valley area. I was primarily involved in site supervision of geotechnical investigations using drilling rigs for boreholes, truck mounted cone penetration testing and test pit excavations using excavators and backhoes. My role also included site inspections involving the assessment of conditions for piles, piers and shallow footings. I also undertook site walkovers for assessment of mine subsidence and slope stability.

2007-2008 **Undergraduate Geotechnical Engineer**
Douglas Partners, Newcastle

Whilst an undergraduate engineer with Douglas Partners I experienced a broad range of practice areas and developed a diverse range of engineering skills.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Relevant Ecological Experience

2013 - Current **Bird Surveyor**
Hunter Bird Observers Club

Volunteer survey work for Hunter Bird Observers Club for regular wader and water bird counts and Tomago and Kooragang Island.

2017 – Current **Birdata Moderator**
Birdlife Australia

Volunteer moderating and vetting bird surveys from *Birdata* which is the Birdlife Australia Atlas to ensure a robust database for both the Hunter Valley and Central Coast reporting areas totalling approximately 5000 surveys per year.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Tim Mouton
Curriculum Vitae

Tim works with AEP in the role of Ecologist. Tim has over 10 years of professional experience managing projects in the fields of ecology, natural area restoration, biodiversity conservation, community education, and construction environmental management. Tim also has 5 years experience working in the field as a bush regenerator.

Qualifications

- Bachelor of Environmental Science University of Newcastle (2001)
- Conservation Land Management Certificate II Tafe (2003)
- Master of Environmental Science Southern Cross University (2008)

Further Education & Training (select summary)

- Biodiversity Assessment Methodology (BAM) Accredited Assessor (BAAS: 19083)
- NSW Class C Driver's Licence. Experienced 4WD operator.
- OH&S NSW White Card
- Erosion & Sediment Control Training (4 day Blue Book course / CPESC)
- Feral Animal Control training (1080 & Pindone baiting)
- Certificate 3 in Chemical Application (AQF3)

Fields of Special Competence

- Ecological field survey, covering terrestrial and aquatic flora and fauna
- Highly proficient at botanical surveys and establishing monitoring programs
- Project Management and auditing
- Restoration Science

Professional Affiliations / Memberships (past / present)

- Board of Management member for Worimi Conservation Lands (NPWS & Worimi LALC)
- Certified Practitioner in Erosion & Sediment Control (CPESC) (not currently active)

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Relevant Employment History

2019-present **Ecologist**
Anderson Environment & Planning, Newcastle

Currently employed by Anderson Environment & Planning to assist in the provision of consulting services to land, property, mining industry, legal and government sectors. Covering ecological, project management, environmental, planning services, advices, strategy and representation.

2015-2018 **Senior Project Officer / Ecologist**
Conservation Volunteers Australia / WetlandCare Australia

- Project managing on-ground restoration works including revegetation, site stabilisation, weed control and bush regeneration.
- Facilitating community engagement events, and supervision of volunteers.
- Undertaking site assessments, ecological surveys, and preparing plans of management.
- Scoping and preparing grant applications, managing all aspects of grant delivery, budgets, and reporting.

2009-2015 **Senior Ecologist / Environmental Scientist**
Onsite Environmental Management

- Undertaking and project managing detailed environmental assessments including flora and fauna surveys, threatened species assessments, management plans and monitoring reports.
- Environmental site management, monitoring and compliance auditing on large scale infrastructure projects and extractive industries.

2008-2009 **Bush Regenerator / Leading Hand**
Lane Cove Council
Australian Wetlands

- Undertaking bush regeneration activities including removal of environmental/noxious weeds, track construction and maintenance, native seed collection and propagation, fire assisted regeneration, feral animal control and supervision and training of volunteers.
- Supervising bush regeneration and weed management teams.
- Undertaking large scale revegetation works on infrastructure projects involving mass tubestock planting, site stabilisation and maintenance weeding.

2006-2007 **Ecologist / Environmental Scientist**
GeoLINK Consulting

- Undertaking and project managing detailed environmental assessments including flora and fauna surveys, threatened species assessments, management plans and monitoring reports.
- Monitoring and analysis of wetland, groundwater, and domestic wastewater systems.

2002-2006 **Bush Regenerator / Leading Hand**
Gondwana Bush Restoration
Willoughby City Council

- Undertaking bush regeneration activities including removal of environmental/noxious weeds, track construction and maintenance, native seed collection and propagation, fire assisted regeneration, feral animal control and translocation of vegetation.
- Supervision and training of bush regeneration teams and volunteers.

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

2001-2002 John Holland Construction
Environmental Officer

- Environmental site management and monitoring and reporting on large scale infrastructure projects.

Relevant Volunteer Experience

2014 - Current Burwood Beach Coastcare - Facilitator (Volunteer)

Supporting and managing volunteers, on-ground works, promotion and funding opportunities on a monthly basis, to undertake conservation and restoration activities within Glenrock State Conservation Area (NPWS estate).

2013 - 2016 Humane Society International – EPBC Act Nomination Support

Preparation of Threatened Ecological Community (TEC) nominations under the Commonwealth Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act).

Document Set ID: 9441535
Version: 1, Version Date: 14/01/2021

Proposed Childcare Centre

110-112 Mount Vernon Road
MOUNT VERNON NSW

Compliance Report

National Construction Code Series
(Building Code of Australia)
Section J – Energy Efficiency

February 2019

Application Solutions
Suite 405 – 51 Rawson Street
EPPING NSW 2121

Telephone (02) 9868-4339 Facsimile (02) 9868-2655

Document Set ID: 9468592
Version: 1, Version Date: 18/02/2019

This report has been prepared by:
Application Solutions
Suite 405, 51 Rawson Street
EPPING NSW 2121
Telephone: 9868 4339
Facsimile: 9868 2655

The reader's attention is drawn to the following important information:

Disclaimer

Scope Limitations: This report is to assess the proposed development (named above), with reference to the documents listed in the report, with respect to compliance with the Building Code of Australia (2016) Section J Energy Efficiency provisions and report the results of the assessment to the client

Exclusive Use: This report has been prepared for the exclusive use of Application Solutions' client to meet their particular objectives and by its nature is limited in scope. The material contained in this report should not be used for any other purpose or by other persons or entities without contacting Application Solutions. No warrantee is given in relation to the material in this report used for other purposes or by other persons or entities without the consent of Application Solutions.

Copyright: Application Solutions retains all rights to written and graphic materials used in the report. No part may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Application Solutions.

Document Control

Document Number:	AS1492	
Issue Date:	4/03/2019	
Description:	The proposed development comprises a new childcare centre.	
Prepared By:	Andrew Latimer	B. Eng. (Civil)

Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Table of Contents

Executive Summary **5**

Introduction **9**

Proposed Development **10**

Assessment Outline **10**

Section J: On Completion of Construction **11**

Part J1 – Building Fabric **12**

J1.1 Application of Part **12**
J1.2 Thermal construction – general **12**
J1.3 Roof and ceiling construction **13**
J1.4 Roof lights **15**
J1.5 Walls **16**
J1.6 Floors **17**

Part J2 – Glazing **19**

J2.1 Application of Part **19**
J2.2 Blank **19**
J2.3 Blank **19**
J2.4 Glazing **19**
J2.5 Shading **20**

Part J3 – Building Sealing **21**

J3.1 Application of Part **21**
J3.2 Chimneys and flues **21**
J3.3 Roof lights **21**
J3.4 Windows and doors **22**
J3.5 Exhaust fans **22**
J3.6 Construction of roofs, walls and floors **23**
J3.7 Evaporative coolers **23**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J4 24

Part J5 – Air-conditioning and Ventilation Systems 24

J5.1 Application of Part 24
J5.2 Air-conditioning systems 24
J5.3 Mechanical Ventilation systems 28
J5.4 Miscellaneous exhaust systems 30

Part J6 – Artificial Lighting and Power 31

J6.1 Application of Part 31
J6.2 Artificial lighting 31
J6.3 Interior artificial lighting and power control 32
J6.4 Interior decorative and display lighting 33
J6.5 Artificial lighting around the perimeter of a building 34
J6.6 Boiling water and chilled water storage units 35

Part J7 – Heated Water Supply and Swimming Pool and Spa Pool Plant 36

J7.1 Blank 36
J7.2 Heated water supply 36
J7.3 Swimming pool heating and pumping 36
J7.4 Spa pool heating and pumping 36

Part J8 – Access for Maintenance and Facilities for Monitoring 37

J8.1 Application of Part 37
J8.2 Blank 37
J8.3 Facilities for energy monitoring 37

Appendix 1 – Envelope Markup 38

Appendix 2 – Glazing Calculations 39

Appendix 3 – Glazing Specification Tool 41

Appendix 4 – Lighting Calculations 45

© 2019 Application Solutions AL EL
Document Set ID: 9948592
Version: 1, Version Date: 18/12/2019

Executive Summary

The development has been assessed against the Deemed to Satisfy provisions of Section J (Energy Efficiency) of the Building Code of Australia. The items outlined below are the requirements for this development to achieve compliance with Section J. These requirements have been determined based on the information provided to Application Solutions at the time of carrying out this assessment. Any design changes should be checked to ensure these requirements remain correct and accurate. Contact Application Solutions for assistance if reassessment is required.

Part J1 – Building Fabric

1. **Construction Requirements – Installation of Insulation**
   Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:
   (i) abuts or overlaps adjoining insulation other than at supporting members; and
   (ii) forms a continuous barrier…and
   (iii) does not affect the safe or effective operation of a service or fitting.
   Reflective insulation must be installed with:
   (i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
   (ii) the reflective insulation closely fitted against any penetration, door or window opening; and
   (iii) the reflective insulation adequately supported by framing members; and
   (iv) each adjoining sheet of roll membrane being overlapped not less than 50 mm or taped together.
   Bulk insulation must be installed so that:
   (i) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
   (ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.

2. **Construction Requirements – Roof and Ceiling Insulation**
   The minimum total R-Value for the roof/ceiling system which forms part of the envelope required by BCA Table J1.3a is R3.2.
   The proposed roof/ceiling system achieves an R-Value of R0.47. Therefore to achieve compliance, insulation of at least R2.73 is required to be incorporated into the roof/ceiling system which forms part of the envelope.

3. **Construction Requirements – Adjustment for Loss of Ceiling Insulation**
   Where the required insulation is located at ceiling level and the percentage of ceiling area uninsulated is more than 0.5% as a result of loss of ceiling insulation due to operational or safety reasons and where insulation of more than R1.0 is located at ceiling level, the loss of insulation must be compensated for by increasing the R-Value of the insulation in the remainder of the ceiling in accordance with BCA Table J1.3b.
   Note: The percentage of ceiling area uninsulated must not exceed 5% of the total ceiling area forming part of the envelope.

4. **Construction Requirements – Thermal Break**
   Where the ceiling lining is attached directly to the same metal frame as the metal roof, a thermal break of at least R0.2 must be installed between the metal sheet roofing and its supporting metal frame. This applies to areas of roof that form part of the envelope.

5. **Construction Requirements – Wall Insulation (External Envelope)**
   Where external walls form part of the envelope, a total R-value of R2.8 is required to be achieved. The metal stud walls achieve an R-value of R0.22. Therefore, insulation with R-value of at least R2.58 is required to be incorporated into the metal stud wall system where walls form part of the external envelope.
   See Appendix for walls forming part of the envelope.

6. **Construction Requirements – Wall Insulation (Internal Envelope)**
   Where internal walls form part of the envelope, a total R-value of R1.8 is required to be achieved.
   The stud walls achieve an R-value of R0.33. Therefore, insulation with R-value of at least R1.47 is required to be incorporated into the stud wall system where walls form part of the internal envelope.
   See Appendix for walls forming part of the envelope.

7. **Construction Requirements – Thermal Breaks**
   A thermal break with R-Value of not less than R0.2 must be installed between the external cladding and the metal frame of walls that have lightweight external cladding fixed to a metal frame and have a wall lining fixed directly to the same metal frame where walls form part of the envelope.

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

8. Construction Requirements – Floor Insulation

The total R-value required to be achieved by an on-ground concrete slab with no in-slab heating or cooling in climate zone 6 is: *NIL*

Part J2 – Glazing

9. Construction Requirements – Glazing

Glazing elements forming part of the envelope shall have the following thermal properties in terms of their orientations:

Ground Floor

Orientation	Items	Total U-Value	SHGC	Notes
South	New glazing	Equal or **Lower** than **5.4**	Equal or **Higher** than **0.31**	See graph in appendix for a more detailed result
East	New glazing	Equal or **Lower** than **8.0**	Equal or **Lower** than **1.00**	No glazing restriction
North	New glazing	Equal or **Higher** than **3.2**	Equal or **Lower** than **0.54**	See graph in appendix for a more detailed result
West	New glazing	Equal or **Lower** than **6.0**	Equal or **Lower** than **0.99**	Use this result

Refer to Appendix for full calculation of glazing requirements.

10. Construction Requirements – Shading

Shading has been provided as shown on architectural drawings by building elements and shading projections. For further details refer to the glazing calculations in Appendix (see P and H values). No alterations shall be made to shading design dimensions without first checking compliance with this Clause.
Contact Application Solutions for assistance if required.

Part J3 – Building Sealing

11. Construction Requirements – Window and Door Sealing

A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like where forming part of the envelope. The seal may be a foam or rubber compression strip, fibrous seal or the like.
For the bottom edge of an external swing door, a draft protection device must be installed.
For exemptions to this clause see body of report.

12. Construction Requirements – Building Entrance Sealing

An entrance to a building leading to a conditioned space must have an airlock, self-closing door, revolving door or the like.

13. Construction Requirements – Exhaust Fan Sealing

A miscellaneous exhaust fan such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.

14. Construction Requirements – Roof, Wall and Floor Sealing

Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, or the like must be constructed to minimise air leakage when forming part of the envelope and must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed by caulking, skirting, architraves, cornices or the like.

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J5 – Air-conditioning and Ventilation Systems

15. Construction Requirements – Deactivation Capability
An air-conditioning system must be capable of being deactivated when the building or part of the building served is not occupied.

16. Construction Requirements – Air-conditioning Zones
Different air-conditioning zones shall be separately thermostatically controlled and not have their temperature controlled by mixing actively heated air or actively cooled air. Reheating must be limited to not more than a 7.5K rise in temperature for a fixed supply air rate, or for a variable supply air rate, not more than 7.5K rise in temperature at the normal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.

17. Construction Requirements – Economy Cycle
Where the air-conditioning system provides the required mechanical ventilation and exceeds 35 kWr, it shall have an outdoor air economy cycle.

18. Construction Requirements – Air Dampers
Where the air-conditioning unit or system has motorised outside air and return dampers, close the dampers when the air-conditioning unit or system is deactivated.

19. Construction Requirements – Air-conditioning Fans
Fans of any air-conditioning systems serving the building must comply with BCA Specification J5.2a.

20. Construction Requirements - Ductwork Insulation
The ductwork of an air-conditioning system must be insulated and sealed in accordance with BCA Specification J5.2b.

21. Construction Requirements – Energy Efficiency Ratios
Any packaged air-conditioning equipment or refrigerant chillers (as part of an air-conditioning system) must have energy efficiency ratios in compliance with BCA Specification J5.2e.

22. Construction Requirements – Time Switch
A time switch in accordance with BCA Specification J6 must be provided to control all air-conditioning/heating systems of more than 10 kW.

23. Construction Requirements – Ventilation Operation
A mechanical ventilation system (including one which is part of an air-conditioning system) must be capable of being deactivated when the building or part of the building served is not occupied.

24. Construction Requirements – Mechanical Ventilation of Conditioned Space
The mechanical ventilation system shall not provide mechanical ventilation in excess of the minimum quantity required by BCA Part F4 by more than 20% other than in the conditions detailed in the body of the report.

25. Construction Requirements – Ventilation Fans
Any fans of a mechanical ventilation system installed must comply with BCA Specification J5.2a.

26. Construction Requirements –Ventilation Time Switch Control
Any mechanical ventilation system with an air flow rate of more than 1000 L/s must be controlled by a time switch in compliance with BCA Specification J6.
See BCA J5.3(c)(ii) for any appropriate exclusions to this requirement.

27. Construction Requirements – Miscellaneous Exhaust
An exhaust system which has an air flow rate of more than 1000 L/s and is associated with equipment having a variable demand must have the ability for the operator to stop the motor when the system is not in use and must also have a variable speed fan (or similar control system).

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J6 – Artificial Lighting and Power

28. Construction Requirements – Maximum Interior Illumination Power Load

The total maximum allowed interior illumination power load for the development is 6,446 W.
The aggregate design illumination power load must not exceed this allowed wattage.
Note emergency lighting and signage lighting are exempted from this requirement.
See Appendix for detailed calculation of allowed interior illumination power load.

29. Construction Requirements – Lighting Control

Artificial lighting of a room or space must be individually operated by a switch or other control device.

30. Construction Requirements – Lighting Control (Switching)

Artificial lighting switches must be located in a visible position in the room or space being switched or in an adjacent room or space from where the lighting being switched is visible.
Switches must not operate lighting for an area of more than 250 m^2.

31. Construction Requirements – Time Switch or Occupant Sensing Device

95% of the lighting in the building must be controlled by a time switch in accordance with BCA Specification J6 or an occupant sensing device such as a security card reader that registers a person entering and leaving the building or a motion detector in accordance with BCA Specification J6.

32. Construction Requirements – Decorative or Display Lighting

Interior decorative and display lighting (such as for foyer mural art display), shall be controlled separately from other lighting by a manual switch for each area (where the operating times of the displays are the same in multiple areas, they may be combined).
Where the decorative/display lighting exceeds 1 kW, it must be controlled by a time switch in accordance with BCA Specification J6.

33. Construction Requirements – Window Display Lighting

Window display lighting must be controlled separately from other display lighting.

34. Construction Requirements – Perimeter Lighting

Artificial lighting around the perimeter of the building must be controlled by a daylight sensor or a time switch in accordance with BCA Specification J6.
When the total perimeter lighting load exceeds 100 W it shall have an average light source efficacy of not less than 60 Lumens/W or be controlled by a motion detector in accordance with BCA Specification J6.

35. Construction Requirements – Decorative Perimeter Lighting

Where external lighting for decorative or signage purposes is installed, it must be controlled by a time switch (separate from other external lighting) in accordance with BCA Specification J6.

36. Construction Requirements – Boiling/Chilled Water Storage Units

The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with BCA Specification J6.

Part J7 – Heated Water Supply and Swimming Pool and Spa Pool Plant

37. Construction Requirements – Hot Water Heater

Any heated water service for food preparation or sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three - Plumbing Code of Australia.

Part J8 – Access for Maintenance and Facilities for Monitoring

38. Construction Requirements – Gas and Electricity Consumption

The building has a floor area of more than 500 m^2 and therefore must have the facility to record the consumption of gas and electricity.

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Introduction

Application Solutions has been engaged to provide a compliance assessment of the proposed development with respect to the Building Code of Australia (2016) (BCA), Section J – Energy Efficiency. The BCA2016 is part of the National Construction Series.

The assessment is based on the Deemed-to-Satisfy (DTS) provisions of the BCA. The assessment references the National provisions of the BCA and the NSW Appendix to the BCA.

Throughout this report, reference is made to the ***envelope*** of a building. This is an important term in the application of Section J and is defined in the BCA as follows:

> ***Envelope****, for the purposes of Section J, means the parts of a building's fabric that separate a conditioned space or habitable room from-*
> *(a) The exterior of the building; or*
> *(b) A non-conditioned space including-*
> *(i) The floor of a rooftop plant room, lift-machine room or the like; and*
> *(ii) The floor above a carpark or warehouse; and*
> *(iii) The common wall with a carpark, warehouse or the like.*

For complete understanding, the term ***conditioned space*** is also referred to and is defined in the BCA as follows:

> ***Conditioned space*** *means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning, but does not include-*
> *(a) A non-habitable room of a Class 2 building or Class 4 part of a building in which a heater with a capacity of not more than 1.2 kW or 4.3 MJ/hour provides the air-conditioning; or*
> *(b) A space in a Class 6, 7, 8 or 9b building where the input energy to an air-conditioning system is not more than 15 W/m^2 or 15 J/s.m^2 (54 KJ/hour.m^2); or*
> *(c) A lift shaft*

References are also made to Specifications and additional information contained within the BCA. It is important to be aware of these details as relevant to Section J compliance. Copies of these are now available free of charge through the Australian Building Codes Board at www.abcb.gov.au

Contact Application Solutions if you need assistance in accessing the online version of the BCA.

© 2019 Application Solutions AL EL
Document Set ID: 9948592
Version: 1, Version Date: 18/12/2019

Proposed Development

The proposed development comprises a new childcare centre.

The proposed development has been classified:

Childcare Centre	Class 9b

The development is in the Local Government Area (LGA) of City of Penrith

and therefore the relevant climate zone is Climate Zone 6

The designer for the proposed development is:

Project Works Design
PO Box 5138
Chittaway Bay NSW 2261

Assessment Outline

This Assessment examines each Part of Section J in turn and provides an opinion on whether the Part applies in this case and if so whether the Deemed–to-Satisfy provisions have been met. In some cases further clarification is specified in the form of notes to be included on the plans and/or specifications.

A summary of items required to achieve Section J compliance is provided at the beginning of this report. These matters will need to be incorporated into the Construction Certificate documentation before a Construction Certificate is granted.

In the preparation of this assessment, reference was made to the following plans:

Proposed Site Plans	SK01 – B
Proposed Floor Plan	SK02 – B
Proposed Roof Plan	SK03 – B
Proposed Elevations	SK04 – B

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Section J: On Completion of Construction

The section above provides the documentation of Section J requirements which apply to the proposed development. Attention is drawn to the need to provide documentation during construction that each requirement has been met.

This should include, where relevant;

- Certificates from specific suppliers and contractors
- Photographic record and
- Site inspections

It is important that the information in this report be forwarded to the person/s responsible on site to ensure all work is carried out in compliance and that each item is documented appropriately.

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J1 – Building Fabric

J1.1 Application of Part

BCA extract	*The Deemed-to-Satisfy Provisions of this Part apply to building elements forming the envelope of a Class 2 to 9 building.*
Application to Development	**Childcare Centre** | **Class 9b** | **This Part applies**

J1.2 Thermal construction – general

BCA extract	*J1.2 (a) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it-* *(i) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggins, joists, furring channels and the like where the insulation must be against the member; and* *(ii) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and* *(iii) does not affect the safe or effective operation of a service or fitting.* *(b) Where required, reflective insulation must be installed with-* *(i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and* *(ii) the reflective insulation closely fitted against any penetration, door or window opening; and* *(iii) the reflective insulation adequately supported by framing members; and* *(iv) each adjoining sheet of roll membrane being-* *(A) overlapped not less than 50 mm; or* *(B) taped together.* *(c) Where required, bulk insulation must be installed so that-* *(i) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and* *(ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.* *(d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in **BCA Specification J1.2**.*
Application to Development	**This clause applies where insulation is required in the proposed development.**
1. Construction Requirements – Installation of Insulation	**Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:** **(i) abuts or overlaps adjoining insulation other than at supporting members; and** **(ii) forms a continuous barrier…and** **(iii) does not affect the safe or effective operation of a service or fitting.** **Reflective insulation must be installed with:** **(i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and** **(ii) the reflective insulation closely fitted against any penetration, door or window opening; and** **(iii) the reflective insulation adequately supported by framing members; and** **(iv) each adjoining sheet of roll membrane being overlapped not less than 50 mm or taped together.** **Bulk insulation must be installed so that:** **(i) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and** **(ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

J1.3 Roof and ceiling construction

BCA extract	*J1.3 (a) A roof or ceiling that is part of the envelope, other than of a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, must achieve the Total R-Value specified in **BCA Table J1.3a** for the direction of heat flow.* *(b) For compliance with **BCA Table J1.3a**, roof and ceiling construction is deemed to have the thermal properties listed in **BCA Specification J1.3**.*
Application to Development	**This clause applies to the proposed development. The roof/ceiling system which forms part of the envelope shall have a minimum total R-Value as required by BCA Table J1.3a. The components of the proposed new roof/ceiling system and their respective R-Values are tabulated below:**
2. Construction Requirements – Roof and Ceiling Insulation	**The minimum total R-Value for the roof/ceiling system which forms part of the envelope required by BCA Table J1.3a is R3.2.** **The proposed roof/ceiling system achieves an R-Value of R0.47. Therefore to achieve compliance, insulation of at least R2.73 is required to be incorporated into the roof/ceiling system which forms part of the envelope.**

Metal Roof

Item	Description	R-Value	Note
1	Outdoor air film	0.04	from specification J1.3
2	Metal cladding	0.00	from specification J1.3
3	Airgap	0.21	from specification J1.3
4	Insulation		to be specified
5	Plasterboard 10 mm	0.06	from specification J1.3
6	Indoor air film	0.16	from specification J1.3
TOTAL		**R0.47**	

To achieve compliance with the total R-Value requirement, insulation with R-Value of at least R2.73 is required to be incorporated into the roof/ceiling system.

Continues on next page…

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J1.3 (c)* *Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of required ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the R-Value of the insulation in the remainder of the ceiling in accordance with **BCA Table J1.3b**.*
Application to Development	**This clause may apply to the development depending on selection of insulation and location of installation**
3. Construction Requirements – Adjustment for Loss of Ceiling Insulation	**Where the required insulation is located at ceiling level and the percentage of ceiling area uninsulated is more than 0.5% as a result of loss of ceiling insulation due to operational or safety reasons and where insulation of more than R1.0 is located at ceiling level, the loss of insulation must be compensated for by increasing the R-Value of the insulation in the remainder of the ceiling in accordance with BCA Table J1.3b.** **Note: The percentage of ceiling area uninsulated must not exceed 5% of the total ceiling area forming part of the envelope.**

BCA Table J1.3b

ADJUSTMENT OF MINIMUM R-VALUE FOR LOSS OF CEILING INSULATION

Percentage of ceiling area uninsulated	Minimum *R-Value* of ceiling insulation *required* to satisfy J1.3(a)										
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
	Adjusted minimum *R-Value* of ceiling insulation *required* to compensate for loss of ceiling insulation area										
0.5% to less than 1.0%	1.0	1.6	2.2	2.8	3.4	4.0	4.7	5.4	6.2	6.9	
1.0% to less than 1.5%	1.1	1.7	2.3	2.9	3.6	4.4	5.2	6.1	7.0		
1.5% to less than 2.0%	1.1	1.7	2.4	3.1	3.9	4.8	5.8	6.8			
2.0% to less than 2.5%	1.1	1.8	2.5	3.3	4.2	5.3	6.5				
2.5% to less than 3.0%	1.2	1.9	2.6	3.6	4.6	5.9					
3.0% to less than 4.0%	1.2	2.0	3.0	4.2	5.7						
4.0% to less than 5.0%	1.3	2.2	3.4	5.0							
5.0% or more											

Not Permitted

Note:
Where the minimum *R-Value* of ceiling insulation *required* to satisfy **BCA J1.3(a)** is between the values stated, interpolation may be used to determine the adjusted minimum *R-Value*.

© 2019 Application Solutions AL EL
Document Set ID: 8963592
Version: 1, Version Date: 18/12/2019

BCA extract	*J1.3 (d) A roof that-* *(i) is required to achieve a minimum Total R-Value; and* *(ii) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and* *(iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see **BCA Specification J1.3 Figure 2(c)** and **Figure (f)**),* *must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.*
Application to Development	**This clause applies to the proposed development where the ceiling lining is attached directly to the same metal frame as the metal roof.**
4. Construction Requirements – Thermal Break	**Where the ceiling lining is attached directly to the same metal frame as the metal roof, a thermal break of at least R0.2 must be installed between the metal sheet roofing and its supporting metal frame. This applies to areas of roof that form part of the envelope.**

J1.4 Roof lights

BCA extract	*Roof lights, including any associated shaft and diffuser, that form part of the envelope, other than of a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, must-* *J1.4 (a) if the roof lights are not required for compliance with **BCA Part F4**, comply with **BCA Table J1.4**; or* *(b) if the roof lights are required for compliance with **BCA Part F4**-* *(i) have an area not more than 150% of the minimum area required by **BCA F4.6**; and* *(ii) have transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of not more than-* *(A) 0.29 SHGC; and* *(B) 2.9 Total U-Value.*
Application to Development	**This clause does not apply as there are no roof lights forming part of the envelope of the development.**

Continues on next page…

© 2019 Application Solutions AL EL
Document Set ID: 9963592
Version: 1, Version Date: 18/12/2019

J1.5 Walls

BCA extract	*J1.5 (a) Each part of an external wall that is part of the envelope, other than of a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, must satisfy one of the options in **BCA Table J1.5a** except for-* *(i) opaque non-glazed openings in external walls such as doors (including garage doors), vents, penetrations, shutters and the like; and* *(ii) glazing; and* *(iii) an earth retaining wall or earth-berm, in other than climate zone 8.*
Application to Development	**External walls forming part of the envelope (see Appendix) must satisfy one of the options in BCA Table J1.5a.** **The components of the proposed external wall system and their respective R-Values are tabulated below:**
5. Construction Requirements – Wall Insulation (External Envelope)	**Where external walls form part of the envelope, a total R-value of R2.8 is required to be achieved. The metal stud walls achieve an R-value of R0.22. Therefore, insulation with R-value of at least R2.58 is required to be incorporated into the metal stud wall system where walls form part of the external envelope.** **See Appendix for walls forming part of the envelope.**

Metal Stud wall

Item	Description	R-Value	Note
1	Outdoor air film	0.04	from specification J1.5
2	Metal cladding	0.00	from specification J1.5
3	Insulation		to be specified
4	Plasterboard 10 mm	0.06	from specification J1.5
5	Indoor air film	0.12	from specification J1.5
TOTAL		**R0.22**	

To achieve compliance with the total R-Value requirement, insulation with R-Value of at least R2.58 is required to be incorporated into the external wall system where walls form part of the envelope.

BCA extract	*J1.5 (b) Any wall, other than an external wall, that is part of the envelope must achieve the Total R-Value in **BCA Table J1.5b**.*
Application to Development	**Internal walls shown in Figure 1.5 to form part of the envelope (see Appendix) must achieve the Total R-value in BCA Table J1.5b.** **The components of the proposed internal wall system and their respective R-Values are tabulated below:**
6. Construction Requirements – Wall Insulation (Internal Envelope)	**Where internal walls form part of the envelope, a total R-value of R1.8 is required to be achieved.** **The stud walls achieve an R-value of R0.33. Therefore, insulation with R-value of at least R1.47 is required to be incorporated into the stud wall system where walls form part of the internal envelope.** **See Appendix for walls forming part of the envelope.**

Stud wall

Item	Description	R-Value	Note
1	Indoor air film	0.12	from specification J1.5
2	Fibre-cement 6 mm	0.03	from specification J1.5
3	Insulation		to be specified
4	Plasterboard 10 mm	0.06	from specification J1.5
5	Indoor air film	0.12	from specification J1.5
TOTAL		**R0.33**	

To achieve compliance with the total R-Value requirement of R1.8, insulation with R-Value of at least R1.47 is required to be incorporated into the internal wall system where walls form part of the envelope.

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J1.5 (c) A wall that-* *(i) is required to achieve a minimum Total R-Value; and* *(ii) has lightweight external cladding such as weatherboards, fibre cement or metal sheeting fixed to a metal frame; and* *(iii) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame,* *must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed between the external cladding and the metal frame.*
Application to Development	**This clause applies to the metal stud walls forming part of the envelope where lightweight external cladding is fixed to a metal frame and the wall lining is fixed directly to the same metal frame.**
7. Construction Requirements – Thermal Breaks	**A thermal break with R-Value of not less than R0.2 must be installed between the external cladding and the metal frame of walls that have lightweight external cladding fixed to a metal frame and have a wall lining fixed directly to the same metal frame where walls form part of the envelope.**

BCA extract	*J1.5 (d) For compliance with **BCA Table J1.5a** and **BCA Table J1.5b**, wall construction is deemed to have the thermal properties listed in **BCA Specification J1.5**.*

J1.6 Floors

BCA extract	*J1.6 (a) A floor that is part of the envelope of a building, other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building, including a floor above or below a carpark or a plant room-* *(i) must achieve the Total R-Value specified in **BCA Table J1.6**; and* *(ii) with an in-slab or in-screed heating or cooling system, must be insulated around the vertical edge of its perimeter with insulation having an R-Value of not less than 1.0* *(b) In climate zones 1 to 6, the minimum Total R-Value required in **BCA J1.6 (a)** may be reduced by R0.5 provided R0.75 is added to the Total R-Value required for the roof and ceiling construction.*
Application to Development	**Floors shown in Figure 1.6 to form part of the envelope must achieve the Total R-Value specified in BCA Table J1.6.** **The total R-value required to be achieved by an on-ground concrete slab with no in-slab heating or cooling in climate zone 6 is: *NIL*** **The total R-value required to be achieved by an on-ground concrete slab with no in-slab heating or cooling in climate zone 6 is: *NIL***
8. Construction Requirements – Floor Insulation	

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J1.6 (c) A concrete slab-on-ground-* *(i) with an in-slab or in-screed heating or cooling system; or* *(ii) located in climate zone 8,* *must have insulation installed around the vertical edge of its perimeter.* *(d) Insulation required by **BCA J1.6 (c)** must-* *(i) have an R-Value of not less than 1.0; and* *(ii) be water resistant; and* *(iii) be continuous from the adjacent finished ground level-* *(A) to a depth of not less than 300 mm; or* *(B) for the full depth of the vertical edge of the concrete slab-on-ground.*
Application to Development	**This clause does not apply as there are no in-slab heating/cooling systems shown to be planned.**

BCA extract	*J1.6 (e) The requirements of **BCA J1.6 (a)(ii)** and **BCA J1.6 (c)(ii)** do not apply to an in-screed heating or cooling system used solely in a bathroom, amenity area or the like.*

BCA extract	*J1.6 (f) Floor construction is deemed to have the thermal properties listed in **BCA Specification J1.6**.*

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J2 – Glazing

J2.1 Application of Part

BCA extract	*The Deemed-to-Satisfy Provisions of this Part apply to elements forming the envelope of a building other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building.*
Application to Development	**Childcare Centre** / **Class 9b** / **This Part applies**

J2.2 Blank

This clause has deliberately been left blank.

J2.3 Blank

This clause has deliberately been left blank.

J2.4 Glazing

BCA extract

*J2.4 (a) The glazing in each storey, including any mezzanine, of a building must be assessed separately in accordance with **BCA J2.4 (b)** and **BCA J2.4 (c)** for-*

(i) glazing in the external fabric facing each orientation; and

(ii) glazing in the internal fabric

*(b) The aggregate air-conditioning energy value attributable to the glazing must not exceed the allowance obtained by multiplying the façade area that is exposed to the conditioned space for the orientation by the energy index in **BCA Table J2.4a**.*

(c) The aggregate air-conditioning energy value must be calculated by adding the air-conditioning energy value through each glazing element in accordance with the following formula:

A1[SHGC1(CA×SH1+CB×SC1)+CC×U1] + A2[SHGC2(CA×SH2+CB×SC2)+CC×U2] + …

where-

A1, 2, etc	=	*the area of each glazing element; and*
CA, B and C	=	*the energy constants A, B and C for the specific orientation from **BCA Table J2.4b**; and*
SHGC1, 2, etc	=	*the SHGC of each glazing element; and*
SH1, 2, etc	=	*the heating shading multiplier for each glazing element obtained from **BCA Table J2.4c**; and*
SC1, 2, etc	=	*the cooling shading multiplier for each glazing element obtained from **BCA Table J2.4d**; and*
U1, 2, etc	=	*the Total U-Value of each glazing element.*

*(d) For the purposes of **BCA J2.4 (c)** -*

(i) where the air-conditioning energy value of a glazing element is calculated to be negative, it must be taken to be zero; and

(ii) where glazing is in the internal fabric, the aggregate air-conditioning energy value must be calculated using –

*(A) the energy constants A, B and C for the south orientation sector in **BCA Table J2.4b**; and*

*(B) the shading multipliers in **BCA Table J2.4e.***

Continues on next page…

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Application to Development	**The glazing forming part of the envelope must comply with this Part. The appropriate Energy Index (Option A) for this assessment of a childcare centre in Climate Zone 6 is 0.116. Glazing shall have the thermal parameters as set-out below.** **Refer to Appendix for full calculation of glazing requirements.** **Ground Floor** **Orientation** / **Items** / **Total U-Value** / **SHGC** / **Notes** South / New glazing / Equal or **Lower** than **5.4** / Equal or **Higher** than **0.31** / See graph in appendix for a more detailed result East / New glazing / Equal or **Lower** than **8.0** / Equal or **Lower** than **1.00** / No glazing restriction North / New glazing / Equal or **Higher** than **3.2** / Equal or **Lower** than **0.54** / See graph in appendix for a more detailed result West / New glazing / Equal or **Lower** than **6.0** / Equal or **Lower** than **0.99** / Use this result
9. Construction Requirements – Glazing	**Glazing elements forming part of the envelope shall have the following thermal properties in terms of their orientations:** **Ground Floor** **Orientation** / **Items** / **Total U-Value** / **SHGC** / **Notes** South / New glazing / Equal or **Lower** than **5.4** / Equal or **Higher** than **0.31** / See graph in appendix for a more detailed result East / New glazing / Equal or **Lower** than **8.0** / Equal or **Lower** than **1.00** / No glazing restriction North / New glazing / Equal or **Higher** than **3.2** / Equal or **Lower** than **0.54** / See graph in appendix for a more detailed result West / New glazing / Equal or **Lower** than **6.0** / Equal or **Lower** than **0.99** / Use this result **Refer to Appendix for full calculation of glazing requirements.**

J2.5 Shading

BCA extract	*Where shading is required to comply with **BCA J2.4**, it must-* *J2.5 (a) be provided by an external permanent projection, such as a verandah, balcony, fixed canopy, eaves or shading hood, which-* *(i) extends horizontally on both sides of the glazing for the same projection distance P in **BCA Figure J2.4**; or* *(ii) provides the equivalent shading to **(i)** with a reveal or the like; or* *(b) be provided by an external shading device, such as a shutter, blind, vertical or horizontal building screen with blades, battens or slats, which-* *(i) is capable of restricting at least 80% of summer solar radiation; and* *(ii) if adjustable, is operated automatically in response to the level of solar radiation.*
Application to Development	**This clause applies to the shading provided to the glazing of the development.**
10. Construction Requirements – Shading	**Shading has been provided as shown on architectural drawings by building elements and shading projections. For further details refer to the glazing calculations in Appendix (see P and H values). No alterations shall be made to shading design dimensions without first checking compliance with this Clause.** **Contact Application Solutions for assistance if required.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J3 – Building Sealing

J3.1 Application of Part

BCA extract	*The Deemed-to-Satisfy Provisions of this Part apply to elements forming the envelope of a Class 2 to 9 building, other than-* *(a) a building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or* *(b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or* *(c) a building or space where the mechanical ventilation required by **BCA Part F4** provides sufficient pressurisation to prevent infiltration; or* *(d) **NSW BCA J3.1(d)** parts of the building that cannot be fully enclosed.*
Application to Development	**Childcare Centre** | **Class 9b** | **This Part applies**

J3.2 Chimneys and flues

BCA extract	*The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.*
Application to Development	**This clause does not apply as there is no chimney/flue shown in the development.**

J3.3 Roof lights

BCA extract	*J3.3 (a) A roof light must be sealed, or capable of being sealed, when serving-* *(i) a conditioned space; or* *(ii) a habitable room in climate zones 4, 5, 6, 7 and 8.* *(b) A roof light required by **BCA J3.3 (a)** to be sealed, or capable of being sealed, must be constructed with-* *(i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or* *(ii) a weatherproof seal; or* *(iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.*
Application to Development	**These clauses do not apply as there are no roof lights forming part of the envelope of the development.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

J3.4 Windows and doors

BCA extract	*J3.4 (a) A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like forming part of-* *(i) the envelope of a conditioned space; or* *(ii) the external fabric of a habitable room or public area in climate zones 4, 5, 6, 7 and 8.* *(b) The requirements of **BCA J3.4 (a)** do not apply to-* *(i) a window complying with AS 2047; or* *(ii) a fire door or smoke door; or* *(iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.* *(c) A seal required by **BCA J3.4 (a)** –* *(i) for the bottom edge of an external swing door, must be a draft protection device; and* *(ii) for the other edges of an external door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.*
Application to Development	**These clauses apply to the development.**
11. Construction Requirements – Window and Door Sealing	**A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like where forming part of the envelope. The seal may be a foam or rubber compression strip, fibrous seal or the like.** **For the bottom edge of an external swing door, a draft protection device must be installed.** **For exemptions to this clause see body of report.**

BCA extract	*J3.4 (d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than-* *(i) where the conditioned space has a floor area of not more than 50 m^2; or* *(ii) where a café, restaurant, open front shop or the like has-* *(A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and* *(B) at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.*
Application to Development	**This clause applies to the development.**
12. Construction Requirements – Building Entrance Sealing	**An entrance to a building leading to a conditioned space must have an airlock, self-closing door, revolving door or the like.**

J3.5 Exhaust fans

BCA extract	*A miscellaneous exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving-* *J3.5 (a) a conditioned space; or* *(b) a habitable room in climate zones 4, 5, 6, 7 and 8.*
Application to Development	**This clause applies to the development**
13. Construction Requirements – Exhaust Fan Sealing	**A miscellaneous exhaust fan such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

J3.6 Construction of roofs, walls and floors

BCA extract	*J3.6 (a) Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with **BCA J3.6** **(b)** when forming part of-* *(i) the envelope; or* *(ii) the external fabric of a habitable room or a public area in climate zones 4, 5, 6, 7 and 8.* *(b) Construction required by **BCA J3.6 (a)** must be-* *(i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or* *(ii) sealed by caulking, skirting, architraves, cornices or the like.* *(c) The requirements of **BCA J3.6 (a)** do not apply to openings, grilles or the like required for smoke hazard management.*
Application to Development	**This clause applies to the development**
14. Construction Requirements – Roof, Wall and Floor Sealing	**Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, or the like must be constructed to minimise air leakage when forming part of the envelope and must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions or sealed by caulking, skirting, architraves, cornices or the like.**

J3.7 Evaporative coolers

BCA extract	*An evaporative cooler must be fitted with a self-closing damper or the like when serving-* *J3.7 (a) A heated space; or* *(b) A habitable room or a public area of a building in climate zones 4, 5, 6, 7 and 8.*
Application to Development	**This clause does not apply as there is no evaporative cooler shown to be planned.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J4

This Part has deliberately been left blank due to its removal in BCA 2010.

Part J5 – Air-conditioning and Ventilation Systems

J5.1 Application of Part

BCA extract	*The Deemed-to-Satisfy Provisions of this Part do not apply to a Class 8 electricity network substation.*
Application to Development	**Childcare Centre** | **Class 9b** | **This Part applies**

J5.2 Air-conditioning systems

BCA extract	*J5.2 (a) (i) An air-conditioning system-* *(A) must be capable of being deactivated when the building or part of a building served is not occupied; and*
Application to Development	**This clause applies to the development**
15. Construction Requirements – Deactivation Capability	**An air-conditioning system must be capable of being deactivated when the building or part of the building served is not occupied.**

BCA extract	*J5.2 (a) (i) (B) when serving more than one air-conditioning zone or area with different heating or cooling needs, must-* *(aa) thermostatically control the temperature of each zone or area; and* *(bb) not control the temperature by mixing actively heated air and actively cooled air; and* *(cc) limit reheating to not more than-* *(AA) for a fixed supply air rate, a 7.5 K rise in temperature; and* *(BB) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased; and*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup**
16. Construction Requirements – Air-conditioning Zones	**Different air-conditioning zones shall be separately thermostatically controlled and not have their temperature controlled by mixing actively heated air or actively cooled air. Reheating must be limited to not more than a 7.5K rise in temperature for a fixed supply air rate, or for a variable supply air rate, not more than 7.5K rise in temperature at the normal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J5.2 (a) (i) (C) which provides the required mechanical ventilation, other than in process-related applications where humidity control is needed, must have an outdoor air economy cycle-* *(aa) in climate zone 2 and 3, when the air-conditioning system capacity is more than 50 kWr; and* *(bb) in climate zones 4, 5, 6, 7 or 8, when the air-conditioning system capacity is more than 35 kWr; and*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup**
17. Construction Requirements – Economy Cycle	**Where the air-conditioning system provides the required mechanical ventilation and exceeds 35 kWr, it shall have an outdoor air economy cycle.**

BCA extract	*J5.2 (a) (i) (D) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and*
Application to Development	**The planned air-conditioning system is a packaged DX type – ie not water based. Therefore, this clause is not applicable.**

BCA extract	*J5.2 (a) (i) (E) except for a packaged air-conditioning system, must have a variable speed fan when its supply air quantity is varied; and*
Application to Development	**The planned air-conditioning system is a packaged DX type.Therefore, this clause is not applicable.**

BCA extract	*J5.2 (a) (i) (F) when serving a sole-occupancy unit in a Class 3 building, must not operate when any external door of the sole-occupancy unit that opens to a balcony or the like, is open for more than one minute.*
Application to Development	**This clause does not apply to the development as it is not a Class 3 building.**

BCA extract	*J5.2 (a) (ii) when an air-conditioning system is deactivated, any motorised outside air and return dampers must close.*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup**
18. Construction Requirements – Air Dampers	**Where the air-conditioning unit or system has motorised outside air and return dampers, close the dampers when the air-conditioning unit or system is deactivated.**

BCA extract	*J5.2 (a) (iii) Compliance with **BCA Clause J5.2(a)(i)** must not adversely affect-* *(A) smoke hazard management measures required by **BCA Part E2**; and* *(B) ventilation required by **BCA Part E3** and **BCA Part F4**.*

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J5.2 (b) Fans of an air-conditioning system must comply with **BCA Specification J5.2a**.*
Application to Development	**This clause applies to the development**
19. Construction Requirements – Air-conditioning Fans	**Fans of any air-conditioning systems serving the building must comply with BCA Specification J5.2a.**

BCA extract	*J5.2 (c) (i) An air-conditioning system, where water is circulated by pumping at more than 2 L/s, must be designed so that the maximum pump power to the pump complies with **BCA Table J5.2**.*
Application to Development	**The planned air-conditioning system is a packaged DX type – ie not water based. Therefore, this clause is not applicable.**

BCA Table J5.2 MAXIMUM PUMP POWER

Cooling or heating load (W/m² of the *floor area* of the *conditioned space*)	Maximum *pump power* (W/m² of the *floor area* of the *conditioned space*)		
	Chilled water	Condenser Water	Heating Water
Up to 100	1.3	0.9	1.0
101 to 150	1.9	1.2	1.3
151 to 200	2.2	2.2	1.7
201 to 300	4.3	3.0	2.5
301 to 400	5.0	3.6	3.2
More than 400	5.6	5.6	3.6
Note: Values do not include any motor losses.			

BCA extract	*J5.2 (c) (ii) An air-conditioning system pump that is rated at more than 3 kW of pump power and circulates water at more than 2 L/s must be capable of varying its speed in response to varying load.*
Application to Development	**The planned air-conditioning system is a packaged DX type – ie not water based. Therefore, this clause is not applicable.**

BCA extract	*J5.2 (c) (iii) A spray water pump of an air-conditioning system's closed circuit cooler or evaporative condenser must not use more than 150 W of pump power for each L/s of spray water circulated.*
Application to Development	**The planned air-conditioning system is a packaged DX type – ie not water based. Therefore, this clause is not applicable.**

BCA extract	*J5.2 (d) (i) The ductwork of an air-conditioning system must be insulated and sealed in accordance with **BCA Specification J5.2b**.*
Application to Development	**This clause may apply to the development depending on air-conditioning system selection and setup**

© 2019 Application Solutions AL EL
Document Set ID: 9948592
Version: 1, Version Date: 18/12/2019

20. Construction Requirements - Ductwork Insulation	**The ductwork of an air-conditioning system must be insulated and sealed in accordance with BCA Specification J5.2b.**

BCA extract	*J5.2 (d) (ii) Piping, vessels, heat exchangers and tanks containing heating or cooling fluid that are part of an air-conditioning system, other than those with insulation levels covered by MEPS, must be insulated in accordance with **BCA Specification J5.2c**.*
Application to Development	**The planned air-conditioning system is a packaged DX type – ie does not include heat exchangers etc. Therefore, this clause is not applicable.**

BCA extract	*J5.2 (e) A heater used for air-conditioning or as part of an air-conditioning system must comply with **BCA Specification J5.2d**.*
Application to Development	**The planned air-conditioning system is a packaged DX type – ie does not include a heater. Therefore, this clause is not applicable.**

BCA extract	*J5.2 (f) With respect to energy efficiency ratios; (i) refrigerant chillers used as part of an air-conditioning system; and (ii) packaged air-conditioning equipment, must comply with **BCA Specification J5.2e**.*
Application to Development	**This clause applies to the development**
21. Construction Requirements – Energy Efficiency Ratios	**Any packaged air-conditioning equipment or refrigerant chillers (as part of an air-conditioning system) must have energy efficiency ratios in compliance with BCA Specification J5.2e.**

BCA extract	*J5.2 (g) (i) A time switch complying with **BCA Specification J6** must be provided to control- (A) an air-conditioning system of more than 10 kWr; and (B) a heater of more than 10 $kW_{heating}$ used for air-conditioning.*
Application to Development	**This clause may apply to the development depending on air-conditioning system and/or heater selection**
22. Construction Requirements – Time Switch	**A time switch in accordance with BCA Specification J6 must be provided to control all air-conditioning/heating systems of more than 10 kW.**

© 2019 Application Solutions AL EL
Document Set ID: 9963692
Version: 1, Version Date: 18/12/2019

BCA extract	*J5.2 (g) (ii) The requirements of **BCA Clause J5.2 (g) (i)** do not apply to-* *(A) an air-conditioning system that serves-* *(aa) only one sole-occupancy unit in a Class 2 or 3 building; or* *(bb) a Class 4 part of a building; or* *(cc) only one sole-occupancy unit in a Class 9c building; or* *(B) a building where air-conditioning is needed for 24 hour occupancy.*

J5.3 Mechanical Ventilation systems

BCA extract	*J5.3 (a) (i) A mechanical ventilation system, including one that is part of an air-conditioning system, except where the mechanical system serves only one sole-occupancy unit in a Class 2 building or serves only a Class 4 part of a building, must-* *(A) be capable of being deactivated when the building or part of the building served by that system is not occupied; and*
Application to Development	**This clause applies to the development where mechanical ventilation systems are installed**
23. Construction Requirements – Ventilation Operation	**A mechanical ventilation system (including one which is part of an air-conditioning system) must be capable of being deactivated when the building or part of the building served is not occupied.**

BCA extract	*J5.3 (a) (i) (B) when serving a conditioned space-* *(aa) not exceed the minimum outdoor air quantity required by **BCA Part F4**, where relevant, by more than 20%; and* *(bb) in other than climate zone 2, where the number of square metres per person is not more than 1 as specified in **BCA D1.13** and the air flow rate is more than 1000 L/s, have-* *(AA) an energy reclaiming system that preconditions outside air; or* *(BB) the ability to automatically modulate the mechanical ventilation required by **BCA Part F4** in proportion to the number of occupants.*
Application to Development	**Clause J5.3(a)(i)(B)(aa) applies where mechanical ventilation systems serve conditioned space.** **Clause J5.3(a)(i)(B)(bb) does not apply as the number of square metres per person according to the use of an early childhood centre in BCA Part D1.13 is 4 m^2 per person.**
24. Construction Requirements – Mechanical Ventilation of Conditioned Space	**The mechanical ventilation system shall not provide mechanical ventilation in excess of the minimum quantity required by BCA Part F4 by more than 20% other than in the conditions detailed in the body of the report.**

© 2019 Application Solutions AL EL
Document Set ID: 8963592
Version: 1, Version Date: 18/12/2019

BCA extract	*J5.3 (a) (ii) The requirements of **BCA J5.3(a)(i)(B)(aa)** do not apply where-* *(A) additional unconditioned outside air is supplied for free cooling or to balance process exhaust;* *(B) additional exhaust ventilation is needed to balance the required mechanical ventilation; or* *(C) an energy reclaiming system preconditions all the outside air.*

BCA extract	*J5.3 (a) (iii) Compliance with **BCA J5.3(a)(i)** must not adversely affect-* *(A) smoke hazard management measures required by **BCA Part E2**; and* *(B) ventilation required by **BCA Part E3** and **BCA Part F4**.*

BCA extract	*J5.3 (b) Fans of a mechanical ventilation system covered by **BCA Clause J5.3(a)** must comply with **BCA Specification J5.2a**.*
Application to Development	**This clause applies to the development where mechanical ventilation systems are installed**
25. Construction Requirements – Ventilation Fans	**Any fans of a mechanical ventilation system installed must comply with BCA Specification J5.2a.**

BCA extract	*J5.3 (c) (i) A time switch complying with **BCA Specification J6** must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s.*
Application to Development	**This clause applies to the development where mechanical ventilation systems are installed**
26. Construction Requirements – Ventilation Time Switch Control	**Any mechanical ventilation system with an air flow rate of more than 1000 L/s must be controlled by a time switch in compliance with BCA Specification J6.** **See BCA J5.3(c)(ii) for any appropriate exclusions to this requirement.**

BCA extract	*J5.3 (c) (ii) The requirements of **BCA Clause J5.3(c)(i)** do not apply to-* *(A) a mechanical ventilation system that serves-* *(aa) only one sole-occupancy unit in a Class 2 or 3 building; or* *(bb) a Class 4 part of a building; or* *(cc) only one sole-occupancy unit in a Class 9c building; or* *(B) a building where mechanical ventilation is needed for 24 hour occupancy.*

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

J5.4 Miscellaneous exhaust systems

BCA extract	*J5.4 (a) A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand, must-* *(i) be capable of stopping the motor when the system is not needed; and* *(ii) have a variable speed fan or the like.*
Application to Development	**This clause applies to the exhaust system serving the kitchen cooking area.**
27. Construction Requirements – Miscellaneous Exhaust	**An exhaust system which has an air flow rate of more than 1000 L/s and is associated with equipment having a variable demand must have the ability for the operator to stop the motor when the system is not in use and must also have a variable speed fan (or similar control system).**

BCA extract	*J5.4 (b) The requirements of **BCA J5.4(a)** do not apply-* *(i) to a miscellaneous exhaust system in-* *(A) a sole-occupancy unit in a Class 2, 3 or 9c building; or* *(B) a Class 4 part of a building; or* *(ii) where additional exhaust ventilation is needed to balance the required outside air for ventilation.*

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J6 – Artificial Lighting and Power

J6.1 Application of Part

Application to Development	**Childcare Centre**	**Class 9b**	**This Part applies**

J6.2 Artificial lighting

BCA extract	*J6.2 (a) In a sole-occupancy unit of a Class 2 building or a Class 4 part of a building-* *(i) the lamp power density or illumination power density of artificial lighting must not exceed the allowance of -* *(A) 5 W/m^2 within a sole-occupancy unit; and* *(B) 4 W/m^2 on a verandah, balcony or the like attached to a sole occupancy unit; and* *(ii) the illumination power density in **BCA J6.2 (a) (i)** may be increased by dividing it by the illumination power density adjustment factor for a control device in **BCA Table J6.2b** as applicable; and* *(iii) when designing the lamp power density or illumination power density, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires; and* *(iv) halogen lamps must be separately switched from fluorescent lamps.*
Application to Development	**This clause does not apply to the development as it is not a Class 2 or Class 4 building.**

BCA extract	*J6.2 (b) In a building other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building-* *(i) for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density in **BCA Table J6.2a**; and* *(ii) the aggregate design illumination power load for **BCA J6.2 (b) (i)** is the sum of the design illumination power loads in each of the spaces served; and*
Application to Development	**This clause applies to the development. Refer to Appendix for calculation of maximum allowable lighting power.** **Note: That Table J6.2b allows the maximum power load to be adjusted by a factor provided in the table where lighting is controlled by movement detectors or dimmers. The adjustment would have the effect of increasing the maximum allowable illumination power. At this stage no adjustment has been made.**
28. Construction Requirements – Maximum Interior Illumination Power Load	**The total maximum allowed interior illumination power load for the development is 6,446 W.** **The aggregate design illumination power load must not exceed this allowed wattage. Note emergency lighting and signage lighting are exempted from this requirement.** **See Appendix for detailed calculation of allowed interior illumination power load.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J6.2 (c) The requirements of **BCA J6.2 (a)** and **BCA J6.2 (b)** do not apply to the following:* *(i) emergency lighting in accordance with **BCA Part E4**.* *(ii) signage and display lighting within cabinets and display cases that are fixed in place.* *(iii) lighting for accommodation within the residential part of a detention centre.* *(iv) a heater where the heater also emits light, such as in bathrooms.* *(v) lighting of a specialist process nature such as in an operating theatre, fume cupboard or clean workstation.* *(vi) lighting of performances such as theatrical or sporting.* *(vii) lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.*

J6.3 Interior artificial lighting and power control

BCA extract	*J6.3 (a) Artificial lighting of a room or space must be individually operated by a switch or other control device.*
Application to Development	**This clause applies to the development**
29. Construction Requirements – Lighting Control	**Artificial lighting of a room or space must be individually operated by a switch or other control device.**

BCA extract	*J6.3 (b) An occupant activated device, such as a room security device, a motion detector in accordance with **BCA Specification J6**, or the like, must be provided in the sole occupancy unit of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the sole-occupancy unit is unoccupied.*
Application to Development	**This clause does not apply to the development as it is not a Class 3 building**

BCA extract	*J6.3 (c) An artificial lighting switch or other control device in **BCA J6.2 (a)** must-* *(i) if an artificial lighting switch, be located in a visible position-* *(A) in the room or space being switched; or* *(B) in an adjacent room or space from where the lighting being switched is visible; and* *(ii) for other than a single functional space such as an auditorium, theatre, swimming pool, sporting stadium or warehouse-* *(A) not operate lighting for an area of more than 250 m^2 if in a Class 5 building or a Class 8 laboratory; or* *(B) not operate lighting for an area of more than-* *(aa) 250 m^2 for a space of not more than 2000 m^2; or* *(bb) 1000 m^2 for a space of more than 2000 m^2, if in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.*
Application to Development	**This clause applies to the development**
30. Construction Requirements – Lighting Control (Switching)	**Artificial lighting switches must be located in a visible position in the room or space being switched or in an adjacent room or space from where the lighting being switched is visible.** **Switches must not operate lighting for an area of more than 250 m^2.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J6.3 (d) 95% of the light fittings in a building or storey of a building, other than a Class 2 or 3 building or a Class 4 part, of more than 250 m^2 must be controlled by-* *(i) a time switch in accordance with **BCA Specification J6**; or* *(ii) an occupant sensing device such as-* *(A) a security key card reader that registers a person entering and leaving the building; or* *(B) a motion detector in accordance with **BCA Specification J6**.*
Application to Development	**This clause applies to the development**
31. Construction Requirements – Time Switch or Occupant Sensing Device	**95% of the lighting in the building must be controlled by a time switch in accordance with BCA Specification J6 or an occupant sensing device such as a security card reader that registers a person entering and leaving the building or a motion detector in accordance with BCA Specification J6.**

BCA extract	*J6.3 (e) In a Class 5, 6 or 8 building of more than 250 m^2, artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same storey except where-* *(i) the room containing the natural lighting zone is less than 20 m^2; or* *(ii) the room's natural lighting zone contains less than 4 luminaires; or* *(iii) 70% or more of the luminaires in the room are in the natural lighting zone.*
Application to Development	**This clause does not apply as the development is not a Class 5, 6 or 8 building**

BCA extract	*J6.3 (f) The requirements of **BCA J6.3 (a)**, **(b)**, **(c)**, **(d)** and **(e)** do not apply to the following:* *(i) emergency lighting in accordance with **BCA Part E4**.* *(ii) where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.* *(g) The requirements of **(d)** do not apply to the following:* *(i) artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a patient care area in a Class 9a building or in a Class 9c aged care building.* *(ii) a heater where the heater also emits light, such as in bathrooms.*

J6.4 Interior decorative and display lighting

BCA extract	*J6.4 (a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled-* *(i) separately from other artificial lighting; and* *(ii) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case they may be combined; and* *(iii) by a time switch in accordance with **BCA Specification J6** where the display lighting exceeds 1 kW.*
Application to Development	**This clause applies to the development if decorative or display lighting is planned**
32. Construction Requirements – Decorative or Display Lighting	**Interior decorative and display lighting (such as for foyer mural art display), shall be controlled separately from other lighting by a manual switch for each area (where the operating times of the displays are the same in multiple areas, they may be combined). Where the decorative/display lighting exceeds 1 kW, it must be controlled by a time switch in accordance with BCA Specification J6.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

BCA extract	*J6.4 (b) Window display lighting must be controlled separately from other display lighting.*
Application to Development	**This clause applies to the development if window display lighting is planned**
33. Construction Requirements – Window Display Lighting	**Window display lighting must be controlled separately from other display lighting.**

J6.5 Artificial lighting around the perimeter of a building

BCA extract	*J6.5 (a) Artificial lighting around the perimeter of a building, must-* *(i) be controlled by-* *(A) a daylight sensor; or* *(B) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and* *(ii) when the total perimeter lighting load exceeds 100 W-* *(A) have an average light source efficacy of not less than 60 Lumens/W or;* *(B) be controlled by a motion detector in accordance with **BCA Specification J6**; and*
Application to Development	**This clause applies to the development if external lighting is planned**
34. Construction Requirements – Perimeter Lighting	**Artificial lighting around the perimeter of the building must be controlled by a daylight sensor or a time switch in accordance with BCA Specification J6.** **When the total perimeter lighting load exceeds 100 W it shall have an average light source efficacy of not less than 60 Lumens/W or be controlled by a motion detector in accordance with BCA Specification J6.**

BCA extract	*J6.5 (a) (iii) when used for decorative purposes, such as façade lighting or signage lighting, have a separate time switch in accordance with **BCA Specification J6**.*
Application to Development	**This clause applies to the development if external lighting for decorative purposes is planned**
35. Construction Requirements – Decorative Perimeter Lighting	**Where external lighting for decorative or signage purposes is installed, it must be controlled by a time switch (separate from other external lighting) in accordance with BCA Specification J6.**

BCA extract	*J6.5 (b) The requirements of **BCA J6.5 (a)(ii)** do not apply to the following:* *(i) emergency lighting in accordance with **BCA Part E4**.* *(ii) lighting around a detention centre*

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

J6.6 Boiling water and chilled water storage units

BCA extract	*Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with **BCA Specification J6**.*
Application to Development	**This clause applies to the development if boiling water or chilled water storage units are planned**
36. Construction Requirements – Boiling/Chilled Water Storage Units	**The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with BCA Specification J6.**

© 2019 Application Solutions AL EL
Document Set ID: 9963592
Version: 1, Version Date: 18/12/2019

Part J7 – Heated Water Supply and Swimming Pool and Spa Pool Plant

J7.1 Blank

Application to Development	**Childcare Centre**	**Class 9b**	**This Part applies**

J7.2 Heated water supply

BCA extract	*A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with **Part B2 of NCC Volume Three – Plumbing Code of Australia**.*
Application to Development	**This clause applies to the development**
37. Construction Requirements – Hot Water Heater	**Any heated water service for food preparation or sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three - Plumbing Code of Australia.**

J7.3 Swimming pool heating and pumping

BCA extract	*J7.3 (a) Heating for a swimming pool must be by-* *(i) a solar heater not boosted by electric resistance heating; or* *(ii) a heater using reclaimed energy; or* *(iii) a gas heater; or* *(iv) a heat pump; or* *(v) a combination of 2 or more of **(i)**, **(ii)**, **(iii)** and **(iv)**.*
Application to Development	**Clause J7.3 does not apply to the development as there is no swimming pool included in the works**

J7.4 Spa pool heating and pumping

BCA extract	*J7.4 (a) Heating for a spa pool that shares a water recirculation system with a swimming pool must be by-* *(i) a solar heater; or* *(ii) a heater using reclaimed energy; or* *(iii) a gas heater; or* *(iv) a heat pump; or* *(v) a combination of 2 or more of **(i)**, **(ii)**, **(iii)** and **(iv)**.*
Application to Development	**Clause J7.4 does not apply to the development as there is no spa pool included in the works.**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Part J8 – Access for Maintenance and Facilities for Monitoring

J8.1 Application of Part

BCA extract	*The Deemed-to-Satisfy Provisions of this Part do not apply-* *(a) within a sole-occupancy unit of a Class 2 building or a Class 4 part of a building; or* *(b) to a Class 8 electricity network substation.*
Application to Development	**Childcare Centre** | **Class 9b** | **This Part applies**

J8.2 Blank

This clause has deliberately been left blank in BCA2016.

J8.3 Facilities for energy monitoring

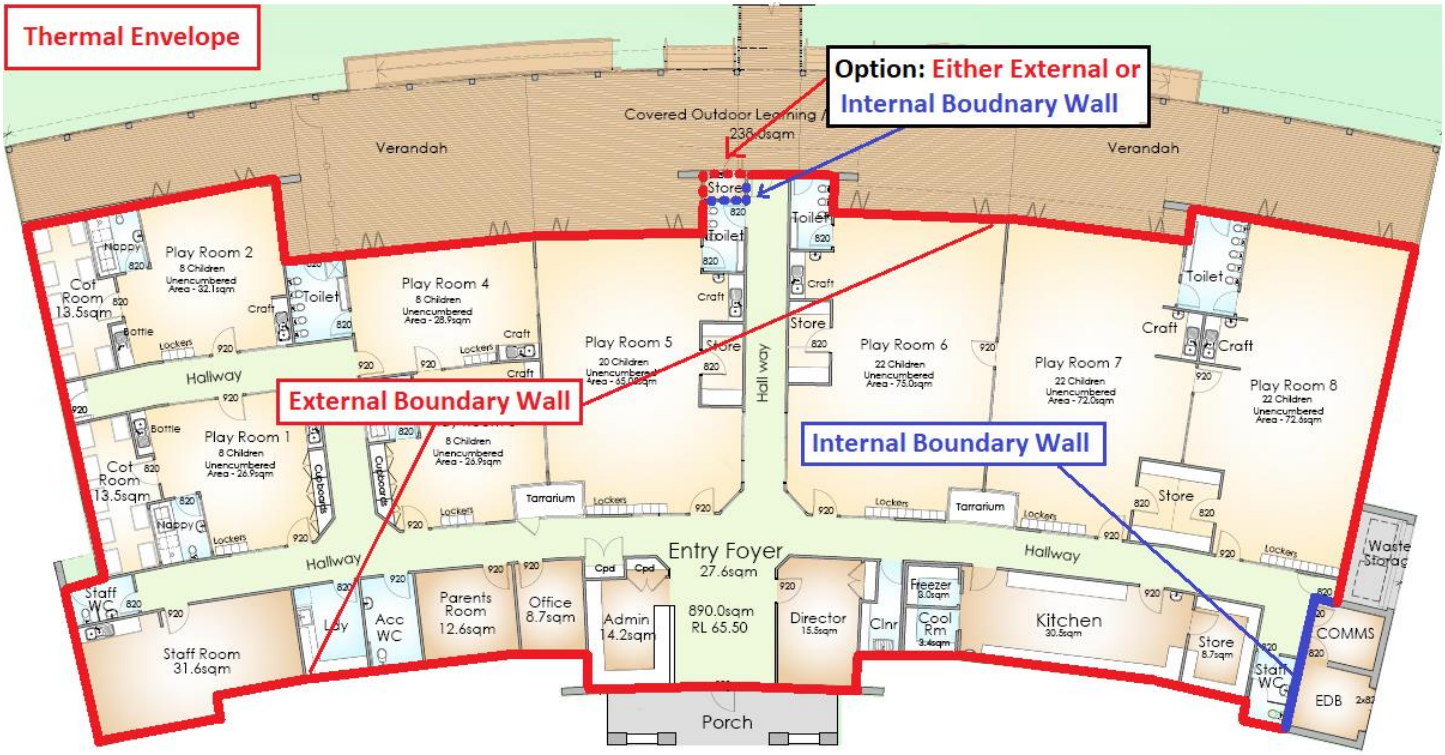
BCA extract	*J8.3 (a) A building or sole-occupancy unit with a floor area of more than 500 m^2 must have the facility to record the consumption of gas and electricity.*
Application to Development	**This clause applies to the development as the floor area of the development is greater than 500 m^2.**
38. Construction Requirements – Gas and Electricity Consumption	**The building has a floor area of more than 500 m^2 and therefore must have the facility to record the consumption of gas and electricity.**

BCA extract	*J8.3 (b) A building with a floor area of more than 2,500 m^2 must have the facility to record individually the energy consumption of-* *(i) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and* *(ii) artificial lighting; and* *(iii) appliance power; and* *(iv) central hot water supply; and* *(v) internal transport devices including lifts, escalators and travelators where there is more than one serving the building; and* *(vi) other ancillary plant.*
Application to Development	**This clause does not apply as the building floor area is less than 2,500 m^2.**

BCA extract	*J8.3 (c) The provisions of **BCA J8.3 (b)** do not apply to a Class 2 building with a floor area of more than 2,500 m^2 where the total area of the common areas is less than 500 m^2.*

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Appendix 1 – Envelope Markup



© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

application solutions
your sustainability partner

Document Set ID: 9061692
Version: 1, Version Date: 18/02/2019

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

Building name/description: **Proposed Childcare Centre**

Application: **other**

Climate zone: **6**

Storey: **GF**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	153m²		73.1m²		240m²		73.1m²		
Option B									n/a
Glazing area (A)	*81.2m²*		*4.79m²*		*41m²*		*12.1m²*		

Number of rows preferred in table below: **48** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
	Staff Room W1	S		0.60	3.00		5.4	0.31	0.000			0.00	1.00	1.00	1.80	4% of 100%
2	Staff Room W2	S		0.90	0.90		5.4	0.31	0.920	1.050	0.88	0.15	0.81	0.73	0.81	2% of 100%
3	Staff Room W3	S		0.90	0.90		5.4	0.31	0.920	1.050	0.88	0.15	0.81	0.73	0.81	2% of 100%
4	Laundry	S		0.90	0.90		5.4	0.31	0.920	1.050	0.88	0.15	0.81	0.73	0.81	2% of 100%
5	Acc WC	S		0.60	1.80		5.4	0.31	0.920	0.780	1.18	0.18	0.75	0.68	1.08	3% of 100%
6	Parents Room	S		1.23	1.80		5.4	0.31	0.920	1.380	0.67	0.15	0.86	0.79	2.21	5% of 100%
7	Office	S		1.23	1.80		5.4	0.31	1.030	1.380	0.75	0.15	0.84	0.77	2.21	5% of 100%
8	Admin	S		1.45	1.00		5.4	0.31	1.850	1.650	1.12	0.20	0.76	0.69	1.45	4% of 100%
9	Entry	S		2.45	2.39		5.4	0.31	2.350	2.740	0.86	0.29	0.82	0.74	5.86	14% of 100%
10	Director	S		1.45	1.00		5.4	0.31	1.850	1.650	1.12	0.20	0.76	0.69	1.45	4% of 100%
11	Kitchen W1	S		0.60	2.00		5.4	0.31	0.900	0.780	1.15	0.18	0.76	0.69	1.20	3% of 100%
12	Kitchen W2	S		0.60	2.00		5.4	0.31	0.900	0.780	1.15	0.18	0.76	0.69	1.20	3% of 100%
13	Kitchen Store	S		0.60	2.13		5.4	0.31	0.850	0.780	1.09	0.18	0.77	0.70	1.28	3% of 100%
14	Staff WC	S		0.60	1.40		5.4	0.31	0.000			0.00	1.00	1.00	0.84	2% of 100%
15	High W1	S		0.60	3.73		5.4	0.31	0.900	1.100	0.82	0.50	0.83	0.75	2.24	5% of 100%
16	High W2	S		0.60	1.48		5.4	0.31	0.900	1.100	0.82	0.50	0.83	0.75	0.89	2% of 100%
17	High W3	S		0.60	4.26		5.4	0.31	0.900	1.100	0.82	0.50	0.83	0.75	2.56	6% of 100%
18	High W4	S		0.60	4.87		5.4	0.31	0.900	1.100	0.82	0.50	0.83	0.75	2.92	7% of 100%
19	High W5	S		0.60	1.53		5.4	0.31	0.900	1.100	0.82	0.50	0.83	0.75	0.92	2% of 100%
20	High W6	S		0.60	4.89		5.4	0.31	0.900	1.100	0.82	0.50	0.83	0.75	2.93	7% of 100%
21	High W7	S		0.60	4.31		5.4	0.31	0.900	1.100	0.82	0.50	0.83	0.75	2.59	6% of 100%

© 2019 Application Solutions AL EL

Report from PW Design - Mount Vernon - glazing_v2014 FR.xlsx *printed 27/02/2019*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
22	High W8	S		0.60	4.84		5.4	0.31		0.900	1.100	0.82	0.50	0.83	0.75	2.90	7% of 100%
23	Director	E		2.20	1.23		8.0	1.00		1.231	2.740	0.45	0.54	0.96	0.93	2.71	60% of 52%
24	Playroom 8	E		0.60	1.80		8.0	1.00		0.550	2.385	0.23	1.79	1.00	0.99	1.08	25% of 52%
25	Toilet (Playroom 6)	E		1.12	0.90		8.0	1.00		device		2.00	0.00	0.01	0.29	1.01	15% of 52%
26	Playroom 8	N		2.20	5.40		3.2	0.54		3.711	2.200	1.69	0.00	0.00	0.30	11.88	14% of 100%
27	Toilet (Playroom 7/8)	N		2.20	0.90		3.2	0.54		4.830	2.200	2.20	0.00	0.00	0.30	1.98	2% of 100%
28	Playroom 7	N		2.20	5.46		3.2	0.54		6.110	2.200	2.78	0.00	0.00	0.30	12.01	15% of 100%
29	Playroom 6	N		2.20	5.46		3.2	0.54		6.090	2.200	2.77	0.00	0.00	0.30	12.01	15% of 100%
30	Toilet (Playroom 6) Win	N		1.32	0.52		3.2	0.54		4.780	1.320	3.62	0.00	0.00	0.30	0.69	1% of 100%
31	Toilet (Playroom 6) Door	N		2.20	0.77		3.2	0.54		4.780	2.200	2.17	0.00	0.00	0.30	1.69	2% of 100%
32	Hallway Entry Window	N		1.32	0.51		3.2	0.54		4.760	1.320	3.61	0.00	0.00	0.30	0.67	1% of 100%
33	Hallway Entry Door	N		2.20	0.85		3.2	0.54		4.760	2.200	2.16	0.00	0.00	0.30	1.87	2% of 100%
34	Store Door	N		2.20	0.77		3.2	0.54		4.740	2.200	2.15	0.00	0.00	0.30	1.69	2% of 100%
35	Store Window	N		1.32	0.50		3.2	0.54		4.740	1.320	3.59	0.00	0.00	0.30	0.66	1% of 100%
36	Playroom 5	N		2.20	5.19		3.2	0.54		6.890	2.200	3.13	0.00	0.00	0.30	11.42	14% of 100%
37	Playroom 4	N		2.20	5.90		3.2	0.54		6.900	2.200	3.14	0.00	0.00	0.30	12.98	16% of 100%
38	Toilet (Playroom 4)	N		2.20	0.85		3.2	0.54		device		2.00	0.00	0.00	0.30	1.87	2% of 100%
39	Playroom 2	N		2.20	4.20		3.2	0.54		3.530	2.200	1.60	0.00	0.00	0.30	9.24	11% of 100%
40	Staff WC	N		0.60	0.90		3.2	0.54		1.000	2.180	0.46	1.58	0.99	0.93	0.54	2% of 100%
41	Toilet (Playroom 7/8)	W		1.12	0.88		6.6	0.99		device		2.00	0.00	0.05	0.31	0.99	9% of 100%
42	Toilet (Playroom 5)	W		1.12	0.90		6.6	0.99		device		2.00	0.00	0.05	0.31	1.01	10% of 100%
43	Cot Room (PR2) W1	W		0.60	1.80		6.6	0.99		0.550	1.910	0.29	1.31	0.99	0.98	1.08	9% of 100%
44	Cot Room (PR2) W2	W		0.60	1.80		6.6	0.99		*0.550*	2.440	*0.00*	*1.84*	*1.00*	*1.00*	1.08	10% of 100%
45	Hallway Door/Window	W		2.75	1.53		6.6	0.99		1.450	2.750	0.53	0.00	0.69	0.65	4.21	32% of 100%
46	Cot Room (PR1) W1	W		0.60	1.80		6.6	0.99		*0.550*	3.470	*0.00*	*2.87*	*1.00*	*1.00*	1.08	10% of 100%
47	Cot Room (PR1) W2	W		0.60	1.80		6.6	0.99		0.550	2.270	0.24	1.67	0.99	0.99	1.08	9% of 100%
48	Admin	W		1.23	1.26		6.6	0.99		1.000	1.380	0.72	0.15	0.75	0.68	1.55	11% of 100%

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters.
While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.
Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

Copyright © 2014 – Australian Government, State and Territory Governments of Australia. All Rights Reserved

© 2019 Application Solutions AL EL

Appendix 3 – Glazing Specification Tool

The graphs below are a more comprehensive glazing assessment compared to the tables. The information is generated using the tables in appendix 2, however, the graphs combine the results of multiple iterations, rather than just one, giving a full range of results.

To create these graphs, the full spectrum of values has been assessed and therefore if the specifications of a particular glass fits in the shaded area of the graph, it DOES comply.

U- and SHGC Values

U-Value relates to the overall heat transmissibility of a glass and is represented by numbers between 1 and 8.

SHGC relates to the solar heat gain and is represented by numbers between 0 and 1. The lower the SHGC of the glass, the less solar heat transmits.

U-Values and SHGC values work in combination with each other. Often when one goes up, the other goes down. The exact behavior of the results depends on the façade orientation.

One valid result may appear contradictory to another valid result because as one value has moved, it has given more or less room for the other value to move. How much one value can move compared to the other cannot be guessed and is difficult to explain in a table therefore we are presenting all the results in a graph.

If the selected glazing has U and SHGC values that appear in the shaded area, it is one of the acceptable combinations and DOES comply.

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

How to use the graphs

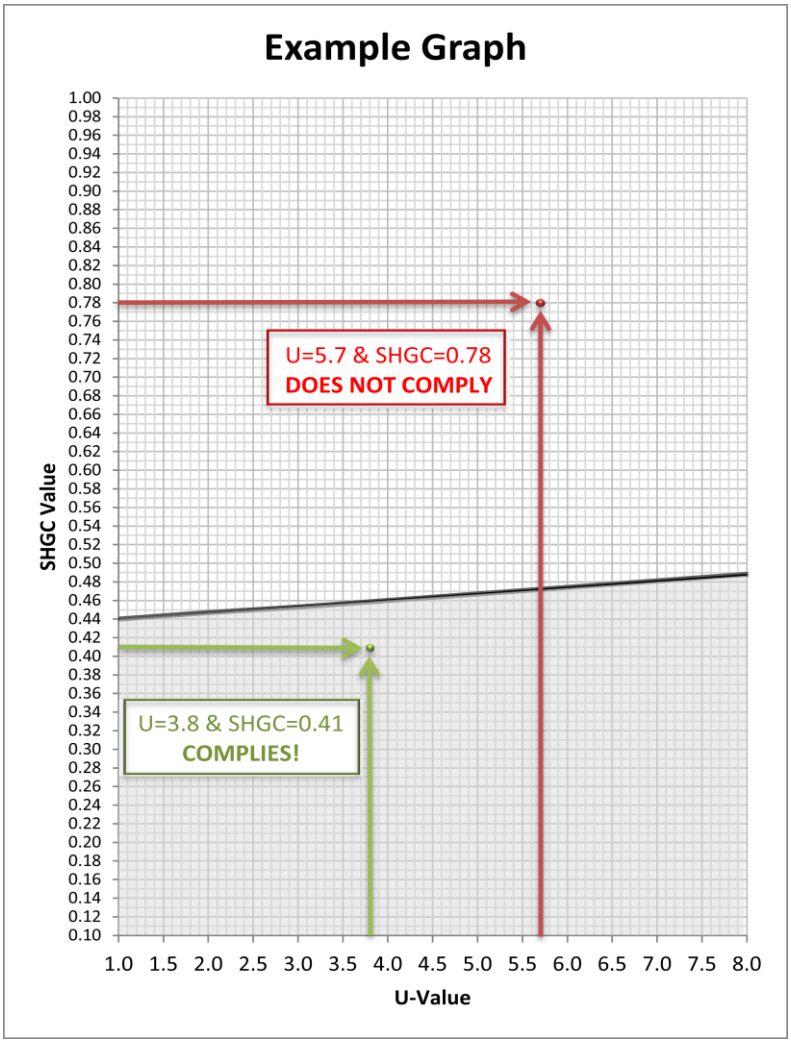
The U-Values are along the bottom and the SHGC values along the left side.

Find both the U-Value and the SHGC value you are interested in, and then find where they meet up at one point. That will be where that particular combination lies on that particular assessment.

Any of the combination of values that lie in the shaded area comply for that particular façade.

There are two examples on the graph. One falls in the shaded area and therefore complies. The other falls outside the shaded area and therefore does not comply.

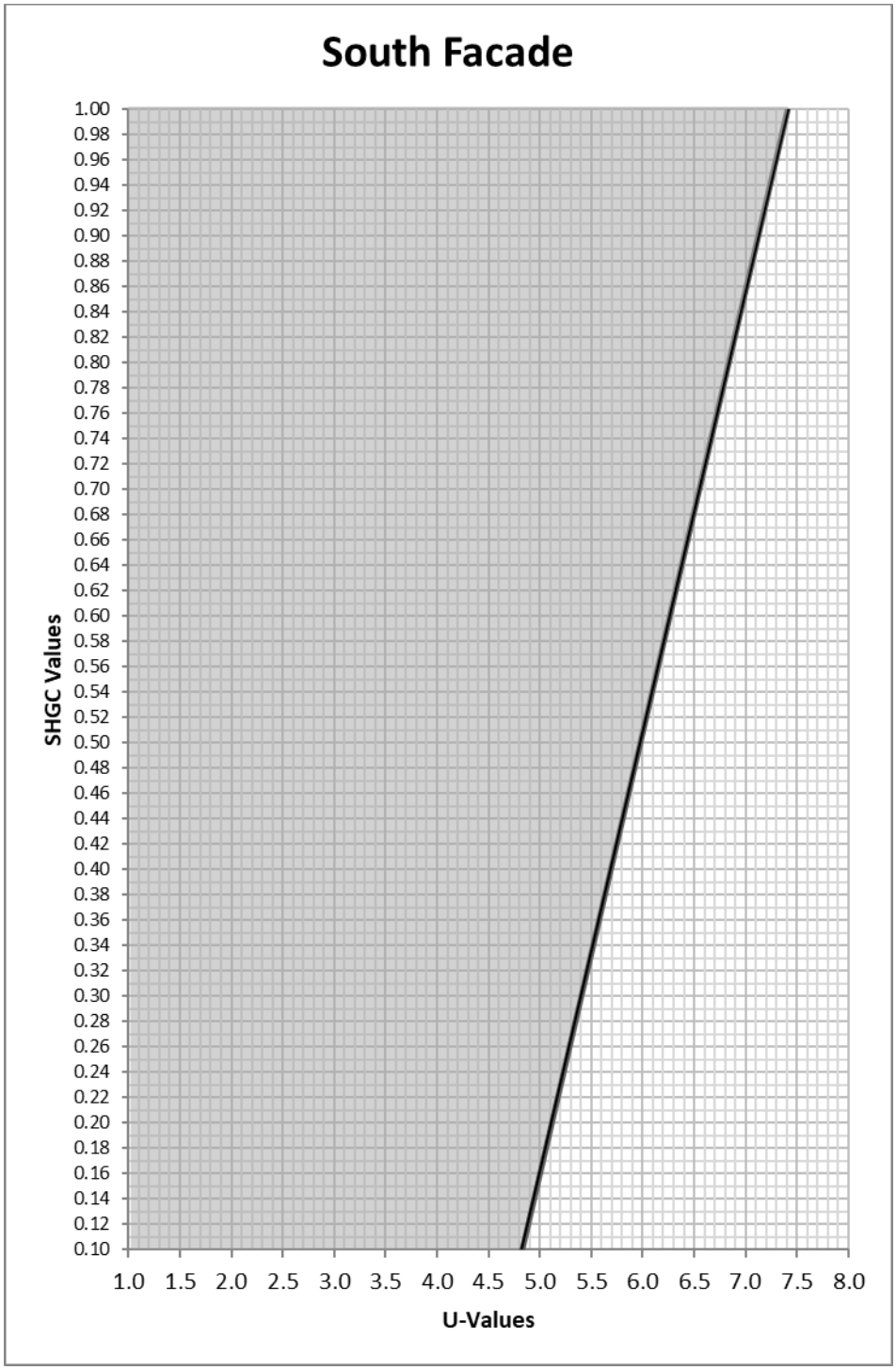
The closer to the line your glass option lies, the cheaper that glass is likely to be and/or the easier that glass is likely to be to source.



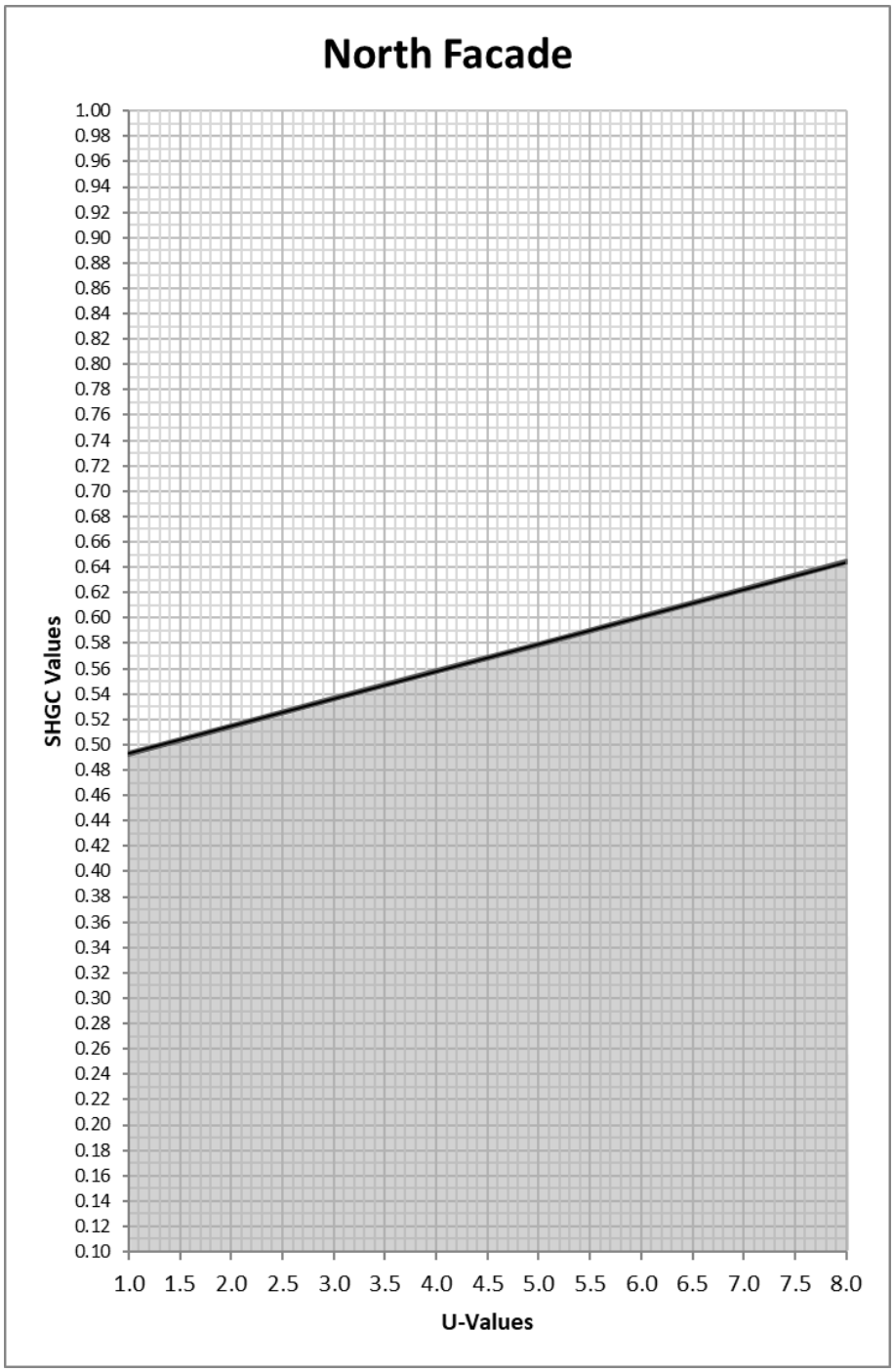
Please contact Application Solutions if you require assistance in interpreting these graphs.

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Glazing assessment for Mount Vernon



© 2019 Application Solutions AL EL
Document Set ID: 8968592
Version: 1, Version Date: 18/12/2019



© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Appendix 4 – Lighting Calculations

Proposed Childcare Centre - 110-112 Mount Vernon Rd, Mount Vernon NSW

Spaces	Space Categories	Area (m^2)	Power Density (W/m^2)	Maximum Power Load (W)
Comms	Control room, switch room, and the like	5.6	9	50
EDB	Control room, switch room, and the like	6.7	9	60
Staff WC	Toilet, locker room, staff room, rest room and the like	4.1	6	25
Kitchen Store	Storage with shelving higher than 75% of the height of the aisle lighting	8.7	10	87
Kitchen	Kitchen and food preparation area	30.5	8	244
Cool Room	Storage with shelving higher than 75% of the height of the aisle lighting	3.4	10	34
Freezer	Storage with shelving higher than 75% of the height of the aisle lighting	3.0	10	30
Cleaner	Service area, cleaner's room and the like	4.3	5	21
Director	Office - artificially lit to an ambient level of 200 lx or more	15.5	9	140
Foyer	Entry lobby from outside the building	17.4	15	261
Admin	Office - artificially lit to an ambient level of 200 lx or more	12.5	9	113
Office	Office - artificially lit to an ambient level of 200 lx or more	8.7	9	78
Parents Room	Toilet, locker room, staff room, rest room and the like	12.6	6	76
Acc WC	Toilet, locker room, staff room, rest room and the like	7.0	6	42
Laundry	Service area, cleaner's room and the like	8.5	5	42
Staff Room	Toilet, locker room, staff room, rest room and the like	31.6	6	190
Staff WC	Toilet, locker room, staff room, rest room and the like	3.7	6	22
Playroom 1	School - general purpose learning areas and tutorial rooms	30.3	8	243
Nappy (Playroom 1)	Toilet, locker room, staff room, rest room and the like	4.5	6	27
Cot Room (Playroom 1)	Toilet, locker room, staff room, rest room and the like	13.5	6	81
Playroom 2	School - general purpose learning areas and tutorial rooms	32.1	8	257
Nappy (Playroom 2)	Toilet, locker room, staff room, rest room and the like	4.5	6	27
Cot Room (Playroom 2)	Toilet, locker room, staff room, rest room and the like	13.5	6	81
Playroom 3	School - general purpose learning areas and tutorial rooms	29.4	8	235
Toilet (Playroom 3)	Toilet, locker room, staff room, rest room and the like	4.5	6	27
Playroom 4	School - general purpose learning areas and tutorial rooms	31.1	8	249
Toilet (Playroom 4)	Toilet, locker room, staff room, rest room and the like	6.6	6	40
Playroom 5	School - general purpose learning areas and tutorial rooms	69.2	8	553
Store (Playroom 5)	Storage with shelving higher than 75% of the height of the aisle lighting	4.9	10	49
Toilet (Playroom 5)	Toilet, locker room, staff room, rest room and the like	4.2	6	25
Store	Storage with shelving higher than 75% of the height of the aisle lighting	1.3	10	13
Playroom 6	School - general purpose learning areas and tutorial rooms	79.0	8	632
Store (Playroom 6)	Storage with shelving higher than 75% of the height of the aisle lighting	4.8	10	48
Toilet (Playroom 6)	Toilet, locker room, staff room, rest room and the like	4.2	6	25
Playroom 7	School - general purpose learning areas and tutorial rooms	75.8	8	606
Store (Playroom 7/8)	Storage with shelving higher than 75% of the height of the aisle lighting	9.5	10	95
Toilet (Playroom 7/8)	Toilet, locker room, staff room, rest room and the like	8.0	6	48
Playroom 8	School - general purpose learning areas and tutorial rooms	77.7	8	621
Hallways	Corridors	118.8	8	950
Total		**811**		**6,446**

© 2019 Application Solutions AL EL
Document Set ID: 8948592
Version: 1, Version Date: 18/12/2019

Operational Plan of Management
For
Mount Vernon Early Learning Centre

110-112 Mount Vernon road, Mount Vernon NSW

Document Set ID: 9429587
Version: 1, Version Date: 08/05/2020

1 Executive Summary

This Plan of Management (POM) forms an essential part of the ongoing management requirements for the Child Care Centre. It is a document required by Council and that reflects a reasonable agreement between the Centre Operators and the Council in order to minimise any adverse effects upon neighbors. It is required by and reflects the intention of the requirements of Council's conditions of development consent for the Centre.

Capacity of Centre

The Centre's capacity is for a total of 96 Children as follows:

Age Group	Children per educator	Number of children	Total Educators
0-2 yo	4	16	4
2-3 yo	5	20	4
3-5 yo	10	60	6
5+	15	0	0
Total		96	14

Outdoor Play

Number of (0-2yrs) within the babies' outdoor area will be restricted to a maximum of 4 children at any given time.

Number of (2-3yrs) within the outdoor area will be restricted to a maximum of 5 children at any given time.

Number of (3-5yrs) within the outdoor area will be restricted to a maximum of 20 children at any given time.

Hours of Operation

The Centre opens daily Monday to Friday from 7.00 am to 6.00pm, fifty-two (52) Weeks a year.

The Centre closes for Public Holidays.

Staffing

The Centre will be operated by 19 staff at any one time (including 1 director/nominated supervisor, 1 admin, 14 educators, 2 educator floaters to cover staff meal breaks, and 1 cook).

There will be a structured routine where the children will be divided between their age groups of 0-1 years and 1-2years (Babies), 2-3 years (Toddlers) and 3-4 and 4-5 years. A daily program will be based on their needs and individual development/progress.

Each group will be required to maintain staff to children ratios in accordance with the Childcare Regulations.

Staff Arrival

Not all staff arrive at the same time. The arrivals are usually staggered between the hours of 7.00am to 10.00am. Full-time staff work for 8 hours a day. Part-time or Casual staff work shifts as required. A minimum of 2 staff will open and close the Centre on any given day.

Document Set ID: 9429787
Version: 1, Version Date: 08/05/2020

Parents/Children Arrival and Departure

In the morning, parents usually arrive between the hours of 7.00am-10:00am. Similarly, for pick-up, the parents will start arriving from 3.00pm and stagger until 6.00pm. Predominately most children will arrive between 7.30am and 8.30am.

Childcare Centre Car Parking

The following procedures are to be adopted for the use of the Early Learning Centre's car parking area:

1. All parking associated with the childcare Centre must occur within the signposted spaces
2. Vehicles must enter and exit the site car parking area in a forward direction at all times
3. The disabled car space must be used by people with a valid disability permit only
4. The pedestrian walkway connecting the car parking spaces to be kept clear at all times
5. No double parking is permitted in the car parking aisle - i.e. the hardstand area in between the two opposite rows of car spaces
6. The security door at the entrance to the car park should remain open during childcare Centre operating hours
7. The car parking area is not to be used for storage purposes, thereby reducing the number of available car spaces. The car park must be kept available for parking at all times
8. Staff, parents and educators must be encouraged to report improper use of the car parking area to the Centre's manager. In this regard, regular parent education is paramount and should be undertaken by email or letters in children's bags
9. Staff are to regularly monitor the car park during operating hours to ensure the above items are adhered to, particularly during peak drop-off/pick-up periods
10. This Traffic & Parking Management Plan must be issued to all new parents and staff, with a copy to be included on the Centre's website
11. This Traffic & Parking Management Plan is to be regularly reviewed and amended as deemed necessary.

Document Set ID: 9429587
Version: 1, Version Date: 08/05/2020

Noise Management Plan

The Early Learning Centre should not become a source of 'offensive noise' impacting adversely on the acoustic amenity of neighboring residential properties or businesses.

Children

Time out of doors is an essential component of the child's experience of the Centre

Whilst active play is encouraged, screaming and shouting is not. This type of behavior can be intimidating to other children, and can be disturbing to neighbors. Children who persist in such behavior may need to be excluded from outdoor activities.

A crying or distressed child will be attended to immediately (without delay). The child will be taken to a quiet area to be comforted and to be assessed for any injury, or other cause of distress.

When children are in the "Active" play area, each group will be fully supervised by teachers / educators at all times.

Educators

Centre management recognise the importance of ensuring all Educators and staff are properly trained.

In-house training will include familiarisation with the procedures and requirements set out in the Noise Management Plan.

Recent graduates and relieving teachers (who may lack experience in the operation of the Centre) will be supervised by permanent staff members.

Staff will be instructed to engage the children in educational play activities that the children will find both mentally and physically stimulating, at all times.

All temporary & permanent staff will be required to read the Noise Management Plan before starting work and to comply with it at all times.

Management

Centre management will maintain a Log of any, and all, noise complaints received. Any complaints received shall be logged with details of the nature of the complaint, time of the event and contact details of the complainant.

Centre management will endeavor to respond to any noise complaint as quickly as possible, and will advise the complainant within 48 hours of what, if any, actions have been undertaken as a result of reviewing the complaint. These actions will be recorded in the Log.

The Log will be located in the Nominated Superior's office and will be accessible to Council at any time within normal operating hours.

Centre management will provide Council the name and position of the designated person (or persons) responsible for the addressing noise complaints.

At least one designated responsible person shall be available on site at all times during operational hours.

A laminated copy of the Noise Management Plan will be displayed in the entry foyer.

Document Set ID: 9429587
Version: 1, Version Date: 08/05/2020

All Educators (temporary and permanent) will be required to read the Noise Management Plan.

All parents / guardians will be required to read the section of the Noise Management Plan relating to their Children. Continued attendance at the Centre will be contingent on the parent and I or guardian abiding by the requirements of the Noise Management Plan.

Should noise complaints persist, the Centre will engage the services of a recognised Acoustical Consultant (being a full and current member of the Australian Acoustical Society) to monitor noise levels and provide advice on any additional noise mitigation measures (if required).

Such a report will form part of the Log and be freely available to Council and to the Complainant. Attended noise monitoring may require access to the complainant premises.

Investigation of any noise complaint requiring the services of a recognised Acoustical Consultant will be contingent on this permission being given.

Complainants should be made aware that this will be a requirement of the investigation.

Centre Management is committed to being a responsible and good neighbor to local residents and businesses.

Document Set ID: 9429737
Version: 1, Version Date: 08/05/2020

Our Daily Routine
In the 0-2 Years Rooms

7.00am: Centre opens

7.30am- 8.30am: Breakfast & Family Grouping in the room
A quiet, settling time for children of mixed ages.

8.30am - 9am: Free play in the rooms
A time for babies to participate in a variety of free play learning experiences.

9.00am: Nappy Change Time

9am - 9.30am: Progressive Morning Tea & Various Learning Centre Activities
A time for hand washing, fruit and a healthy snack; and, for babies to practice their developing self-help skills. Daily Communication Chart record completed for individual babies eating.

9.30am - 9.45am: Sleep Time and One-on one Activity Time
A time for some babies to sleep; and a time for staff to be able to focus on babies individual interests. Staff use this time to record Morning Meeting Notes involving a written record of babies play interests.

10am: Transition to Indoor/Outdoor Active Play Area
A time for babies and staff to tidy the Room then transition to the Indoor/ Outdoor play area. Transition strategies include music and movement. A staff member stays upstairs with babies who are still sleeping, and bring them Outdoor as they wake.

Number of (0-2yrs) within the babies' outdoor area will be restricted to a maximum of 4 children at any given time on a rotating roster

10am -10.45am: Planned and Spontaneous Indoor/Outdoor Active Activities
A time for babies who are interested to participate in planned and spontaneous activities and projects that are based on developing babies emerging skills and development. These are pre-planned and/or spontaneous activities based on meeting the Early Years learning Framework Outcomes; and, babies developing interests, skills and needs.

10.30am: Music and Movement Time
A time for babies who are interested to actively participate in various music and movement experiences.

10.45am - 11am: Nappy Change Time

11am: Transition to the 0-2 years Room
A time for babies to tidy the Outdoor play area then transition to the 0-2 year's room.

11am-11.30am: Progressive Lunch Time
A time for hand washing, lunch; and, for babies to practice their developing self-help skills. Daily Communication Chart record completed for individual babies eating.

11.30am-1pm: Sleep Time and One-on one Activity Time
A time for some babies to sleep; and a time for staff to be able to focus on babies individual interests. Staff use this time to record Morning Meeting Notes involving a written record of babies play interests.

1pm-1.15pm: Nappy Change Time

Document Set ID: 9429787
Version: 1, Version Date: 08/05/2020

1.15pm - 1.30pm: Progressive Afternoon Tea Time
A time for hand washing, a healthy snack and for babies to practice their developing self-help skills. Daily Communication Chart record of individual babies eating.

1.30pm-2pm: Sleep Time and Free Play Time
A time for some babies to sleep; and a time for babies to choose what they would like to play with.

2.00pm- 2.15pm: Music and Movement Group Time
A time for babies who are interested to participate in a music and movement session.

2.30pm: Transition to Play Area for Free Play and Family Grouping
A time for babies and staff to tidy the room and then transition to the Outdoor play area. Transition strategies include music and movement. Once outdoors, this is a time for babies who are interested to engage with various Learning centre and play experiences provided both indoors and outdoors. The glass sliding doors may be left open for babies to choose indoor/outdoor play (staff/child ratio permitting).

2.45pm - 3pm: Story reading Time
A time for babies who are interested to listen to a story book and everyone to assist in the tidying of our classroom.

3.45pm - 4pm: Music and Movement Group Time
A time for babies who are interested to participate in music and movement session.

4:00pm: Nappy Change Time

4.00pm- 4.30pm: Progressive Late Afternoon Snack Time
A time for hand washing, a healthy snack and for babies to practice their developing self-help skills.

4:30pm Nappy Change Time

5.30pm: Story Time
A time for packing the Indoor and Outdoor play areas away, gathering belongings and reading a story together.

6.00pm: Centre closes

Document Set ID: 9429787
Version: 1, Version Date: 08/05/2020

In the 2-3 Years Rooms

7.00am: Centre opens

7.30am- 8.30am: Breakfast & Family Grouping in the Room
A quiet, settling time for children of mixed ages.

8.30am - 9.00am: Free play in the Active Indoor/Outdoor Area
A time for children to participate in a variety of free play learning experiences. Children are given the choice and flexibility to play indoors or outdoors (weather permitting).

9am - 9.30am: Progressive Morning Tea & Various Learning Centre Activities
Held in the Outdoor play area. A time for hand washing, fruit and a healthy snack; and, for children to practice their developing self-help skills. Daily Communication Chart record completed for individual children's eating.

9.30am - 9.45am: Good Morning Circle Group Time
A time for staff and children to say hello; discuss overview of day including activities provided; revisit project interests; and record Morning Meeting Notes involving a written record of children's requests & play interests.

9.45am- 10am: Planned Outdoor Activities
A time for children who are interested to participate in planned outdoor activities and projects.

- Number of (2-3yrs) within the outdoor area will be restricted to a maximum of 5 children at any given time on a rotating roster

10am: Transition to the Classroom
A time for children to tidy the Outdoor play area then transition to the class room. This involves children having to follow teacher instruction. Transition strategies include music and movement.

10am -10.15am: Music and Movement Time
A time for children who are interested to actively participate in various music and movement experiences. Educators can also use this time to prepare experiences for the children.

10:15am- 11.00am approx.: Planned Indoor Experiences including Art & Craft
A time for children who are interested to participate in various activities those are based on developing children's emerging skills and development. These are pre-planned activities based on meeting the Early Years learning Framework Outcomes; and, children's developing interests, skills and needs.

11.00am: Nappy Change Time

11:30am -12pm: Progressive Lunch Time
A time for hand washing, lunch; and, for children to practice their developing self- help skills. Daily Communication Chart record completed for individual children's eating. This is also a time for educators to prepare beds.

12pm - 1:30pm: Progressive Nap Time
A time for children to sleep or rest and restore their energy for the afternoon session. Daily Communication Chart record completed for individual children's sleeping times. This is also a time for educator's to document children's learning and create classroom displays.

1.30pm: Nappy Change Time

Document Set ID: 9429587
Version: 1, Version Date: 08/05/2020

1:30pm- 2pm: Free Play, Quiet Activities
A time for children to participate in quiet activities while other children are still sleeping.

2pm- 2.30pm: Progressive Afternoon Tea
A time for hand washing, a healthy snack and for children to practice their developing self-help skills. Daily Communication Chart record of individual children's eating.

2.20pm-2.30pm: Story reading Time and Tidying of Room
A time for children who are interested to listen to a story book and everyone to assist in the tidying of our classroom.

2:30pm: Transition to Outdoor Play Area for Free Play and Family Grouping
A time for children to transition to the Outdoor play area. This involves children following teacher instruction. Transition strategies include music and movement, e.g. our 'Lining up Song.' Once outdoors, this is a time for children who are interested to engage with various Learning Centre and play experiences provided both indoors and outdoors. The glass sliding doors may be left open for children to choose indoor/outdoor play.

3:45pm-4pm: Music and movement Group Time
A time for children who are interested to participate in a music and movement session. This could also be a gross motor game outside (weather permitting).

4.00pm- 4.30pm: Progressive Late Afternoon Snack Time
A time for hand washing, a healthy snack and for children to practice their developing self-help skills.

4:30pm Nappy Change Time 5.30pm: Story Time
A time for packing the Indoor and Outdoor play areas away, gathering belongings and reading a story together.

6.00pm: Centre closes

Document Set ID: 9429787
Version: 1, Version Date: 08/05/2020

In the 3 - 5 Years Rooms

In this room we follow individual routines based on family input.

7.00am: Centre opens

7.30am - 8.30am: Breakfast & Family Grouping
A quiet, settling time for children of mixed ages.

8.30am -9.00am: Free play in the Indoor/Outdoor Active Play Area
A time for children to participate in a variety of free play learning experiences. Children are given the choice and flexibility to play indoors or outdoors (weather permitting).

9am - 9.30am: Progressive Morning Tea & Various Learning Centre Activities
Held in the Outdoor play area. A time for hand washing, ·fruit and a healthy snack; and, for children to practice their developing self-help skills. Daily Communication Chart record completed for individual children's eating.

9.30am - 9.45am: Good Morning Circle Group Time
A time for staff and children to say hello; discuss overview of day including activities provided; revisit project interests; and record Morning Meeting Notes involving a written record of children's requests & play interests.

9.45am - 10am: Planned Outdoor Activities
A time for children who are interested to participate in planned outdoor activities and projects.

- Number of (3-5yrs) within the outdoor area will be restricted to a maximum of 20 children at any given time on a rotating roster

10am: Transition
A time for children to tidy the Indoor/Outdoor Active play area then transition to the class room. This involves children having to follow teacher instruction. Transition strategies include music and movement.

10am - 10.15am: Music and Movement Time
A time for children who are interested to actively participate in various music and movement experiences. Educators can also use this time to prepare experiences for the children.

10:15am - 11.00am approx.: Planned Indoor Experiences including Art & Craft and School Readiness
A time for children who are interested to participate in various activities those are based on developing children's emerging skills and development. These are pre-planned activities based on meeting the Early Years learning Framework Outcomes; and, children's developing interests, skills and needs.

11:30-12:00: Progressive Lunch Time
A time for hand washing, lunch; and, for children to practice their developing self- help skills. Daily Communication Chart record completed for individual children's eating. This is also a time for educators to prepare beds.

12pm - 1:30pm: Progressive Nap Time
A time for children to sleep or rest and restore their energy for the afternoon session. Daily Communication Chart record completed for individual children's sleeping times. This is also a time for educator's to document children's learning and create classroom displays

Document Set ID: 9429737
Version: 1, Version Date: 08/05/2020

1.30pm- 2pm: Free Play, Quiet Activities

A time for children to participate in quiet activities while other children are still sleeping.

2pm- 2.30pm: Progressive Afternoon Tea
A time for hand washing, a healthy snack and for children to practice their developing self-help skills. Daily Communication Chart record of individual children's eating.

2.20pm-2.30pm: Story reading Time and Tidying of Room
A time for children who are interested to listen to a story book and everyone to assist in the tidying of our classroom.

2:30pm: Transition to Indoor/Outdoor Play Area for Free Play and Family Grouping (Rotating roster)
A time for children to transition to the indoor/Outdoor play area. This involves children following teacher instruction. Transition strategies include music and movement, e.g. our 'Lining up Song.' Once outdoors, this is a time for children who are interested to engage with various Learning Centre and play experiences provided both indoors and outdoors. The glass sliding doors may be left open for children to choose indoor/outdoor play.

3:45pm-4pm: Music and movement Group Time
A time for children who are interested to participate in a music and movement session. This could also be a gross motor game outside (weather permitting).

4.00pm- 4.30pm: Progressive Late Afternoon Snack Time and Free play
A time for hand washing, a healthy snack and for children to practice their developing self-help skills.

5.30pm: Story Time
A time for packing the Indoor and Outdoor play areas away, gathering belongings and reading a story together.

6.00pm: Centre closes

Document Set ID: 9429737
Version: 1, Version Date: 08/05/2020

Mechanism for Conveying Policies and Updates to Parents

The Centre's operations are documented in our Policies and Procedures.

These Policies and Procedures make up many volumes. All educators and staff must read the Policies and Procedures and confirm in writing that they have done so. The Policies and Procedures are discussed at Staff Meetings and are continually updated and redistributed as they are amended to retain relevance and compliance.
Policies will be located in the front foyer for all families and visitors to have access to at any time
Centre Policies are reviewed throughout the year on a monthly basis following a schedule. All revised policies are mentioned in the Centre monthly Newsletter as well as displayed in the front foyer of the Centre's for families to be updated and advised of changes that have been made.

Aim

As a part of our commitment to the National Quality Framework (NQF), our service will annually review our policies and procedures to ensure excellence and compliance. Our review processes also provides an important opportunity for families to offer their valuable input into the practices at the service and how best to meet the needs of each child being educated and cared for.

Security Measures Policy

The Centre will have the following security measures in place:

Surrounding child-proof fences and gates, Security cameras and CCTV - external and internal back to base alarms. Individual Pin Code access to all staff and parents to access the Centre. Individual Pin codes will be cancelled upon families cancelling their child's position at the service.

Aim

The aim of this policy is to ensure that delivery and collection procedures are consistent with the safety of children. It is also paramount that children are delivered to and collected from the Centre by an authorised person.

Quality childcare must provide a safe and secure environment for children. The happiness of children in care is also dependent on the feelings of parents, who are more likely to feel comfortable in leaving their child or children in a setting where their security is assured.

Supervision of Children

The Outdoor Area is 50% undercover and will have a very natural sustainable design. This area will contain a variety of fixed and specialist outdoor child care design equipment.

Outdoor Play Schedule (0-2yrs age group)

The outdoor play schedule is set out above for age group 0 to 2. Maximum of 4 children to play in the outdoor play area at any one time. Children under 12 months of age normally stay with educators.

Outdoor Play Schedule (2-3yrs age group)

The outdoor play schedule is set out above for age group 2 to 3. Maximum of 5 children to play in the outdoor play area at any one time.

Outdoor Play Schedule (3-5yrs age group)

The outdoor play schedule is set out above for age group 3 to 5. Maximum of 20 children to play in the outdoor play area at any one time.

Document Set ID: 9429787
Version: 1, Version Date: 08/05/2020

Activities

Outdoor activities vary from day to day and are dependent upon the weather and the program. They include:

- Ball games
- Team play
- Balancing, Climbing, Stepping
- Using variety of gross motor skills development equipment
- Environmental and nature based activities
- Supervised play
- Sand play
- Water based play (not swimming pool)
- Free play

Different age groups will be given the opportunity to participate each day in both the Indoor/Outdoor Area and the Secondary Outdoor Area.

Monitoring The monitoring process for outdoor play is the same as for indoor as follows:

The outside play area will be used only during the Centre hours of operation, depending on the weather conditions. All outdoor activities are fully supervised and monitored. Teachers and children are encouraged to participate in quiet play activities. The specified outdoor play policy and times shall be adhered to. Exceptional circumstances may apply. The Centre manager shall ensure that outdoor play activities are conducted in an orderly fashion and that excessive noise from children playing, etc., is avoided wherever possible and practical.

Age Group	**Monitoring Ratio**
0-2 Years	1 Staff: 4 Children
2-3 Years	1 Staff: 5 Children
3-6 Years	1 Staff: 10 Children

Comprehensive Complaints Handling Procedure

Aim

To ensure that all grievances (complaints} are investigated in a timely, transparent, thorough and impartial manner, and that affected parties are advised of the outcome and their rights of appeal.

Implementation

It is vitally important that all educators/staff are aware of and adhere to the following procedure while addressing a parental grievance:

- The educators/staff are to ensure that a parent is referred to the following procedure should they have a grievance:
- The parent is to first communicate their concern to their child's Group Leader.
- If the grievance is not resolved to the parent's satisfaction, he or she can be referred to the Nominated Supervisor to contact the parent or guardian.
- If the issue is still unresolved, the parent will be referred directly to the Area Manager.
- If the parent is still unhappy after speaking with the Area Manager, they can contact the ACECQA on 1300 136 554 or their relevant state department.

The Parent Grievances procedure must be communicated to the parents at the time when they are enrolling their child into the Centre and is also noted in the parent handbook

Document Set ID: 9429787
Version: 1, Version Date: 08/05/2020

All grievances are to be addressed seriously and educators/staff must make their best attempts to resolve the issue to the best of their abilities.

All outcomes are to be discussed with the parent/s concerned and recorded on the parent grievance record and placed in the parent communication folder and/or review and revise folder.

Should the grievance be lodged against another person(s), these person(s) should be interviewed separately and impartially. Individuals must be given the opportunity to respond fully to the allegations and may have another person present, as an observer, if they wish. If after investigation, it is concluded that the grievance is substantiated:

- Both parties should be told of the decision and the reason for it.
- Immediate and appropriate steps should be taken to prevent the grievance from recurring
- If after investigation, it is concluded that the grievance is not substantiated both parties should be told of the decision and the reason for it
- The grievant should be informed that if they are not satisfied with any decision relating to the grievance procedure that they should consult with an external body for further advice such as the Department of Education and Communities.

The procedure should be held.in a timely manner and all parties should be kept informed of progression and any outcomes as they occur.

The Nominated Supervisor will establish unbiased Centre policies to reduce any potential power inequities between families and the service. Families will be guaranteed that they will not be treated unfairly nor that care will be withheld if they raise a concern, grievance or complaint.

In the event of a serious complaint being made, the Service supervisor/ 2ic must complete the Notification of complaints form on the ACECQA Portal; it is required to be sent through to the Department of Education and Communities within 24 hours.

Document Set ID: 9429737
Version: 1, Version Date: 08/05/2020

Insurances

In order to be licensed the operator will take out the following insurances: Childcare Insurance which covers all aspects of a childcare Centre and includes Public Liability Insurance of $20 Million and Workers Compensation Insurance.

Centre Cleanliness, Waste Management and Maintenance

Center will be kept clean by both staff and after hours -external professional cleaners and gardeners.

The Centre will have a designated WH & S officer who maintains a schedule of required maintenance which is routinely undertaken by handymen, builders and other tradesmen as required.

As the Centre educates children on environmental issues, it is a core objective to recycle our waste as best as possible.

Fire Safety, Flood and Emergency

(Refer to Fire, Flood and Evacuation Plan)

Administration

The Centre will have an administration office which provides administration, technical, accounting, human resource and general management resources to the Centre as required.

Sales and Marketing

The Centre's sales and marketing plan may include the following avenues for publicising the Centre:

- Branding
- Site advertising
- Bulk advertising - e.g. flyers
- Internet/web page
- Centre opening
- Newsletter

Document Set ID: 9429587
Version: 1, Version Date: 08/05/2020

Emergency Management and Evacuation Policy

Mount Vernon

NQS

QA2	2.2.1	Supervision - At all times, reasonable precautions and adequate supervision ensure children are protected from harm and hazard.
	2.2.2	Incident and emergency management - Plans to effectively manage incidents and emergencies are developed in consultation with relevant authorities, practised and implemented.
QA6	6.2.3	Community engagement - The service builds relationships and engages with its local community.

National Regulations

Regs	168(2)(e)	Policies and procedures in relation to emergency and evacuation
	97	Emergency and evacuation procedures
	98	Telephone or other communication equipment

EYLF

LO3	Children become strong in their social and emotional wellbeing.

Aim

In the event that the service needs to be evacuated, we aim to conduct this in a rehearsed, timely, calm and safe manner to secure the safety of each person using the service. The safety and wellbeing of each child, educator and person using the service is paramount above any other consideration in the time of an emergency or evacuation. Any other procedures will be carried out only if it is safe to do so.

Related Policies

Emergency Service Contact Policy
Lockdown Policy
Incident, Injury and Trauma and Illness Policy
Administration of Authorised Medication Policy
Death of a Child Policy
Medical Conditions Policy

Document Set ID: 9963635
Version: 1, Version Date: 18/12/2019

Implementation

The Nominated Supervisor and where relevant each educator is responsible for:

- conducting a risk assessment to identify potential emergencies that could affect the principal office and each residence/venue and use this to prepare emergency and evacuation procedures. eg an evacuation may be necessary in the event of a fire, chemical spill, bomb scare, earthquake, siege, flood etc. (Optional template at Appendix C)

- developing and implementing an Emergency Management Plan based on all identified risks and which includes appropriate responses including evacuation, lockdown, lockout and shelter-in-place, and drill and training schedules. If appropriate, local emergency services (eg fire, police, ambulance), local government, community leaders and other relevant agencies will be consulted for advice about issues like evacuation routes and assembly points

  The Victorian Guide to Developing an Emergency Management Plan will be used as a best practice model and tailored to Service operations.

  The **Emergency Management Plan** will include:
  - Emergency contact details for people who have specific roles or responsibilities
  - Contact details for local emergency services
  - A description of how we will alert people to an emergency eg siren/bell
  - Evacuation procedures (see Appendix A)
  - How we will assist any child or person with special needs
  - An evacuation diagram based on the floor plans of the principal office or residence/venue showing the location of fire equipment, emergency exits and assembly points
  - Processes for advising neighbouring businesses/residences about emergencies
  - Processes to ensure staff are trained in our emergency procedures
  - Processes we will follow after an incident
  - Procedures we will follow to test the Plan and familiarise children and staff with the Plan

  The **Evacuation Diagram** will include:
  - an A3 size diagram of the floor or area
  - a title eg Evacuation Plan
  - the “You are here” location
  - designated exits in green
  - communication equipment and where installed in red
  - hose reels, hydrants, extinguishers in red.
  - designated shelter-in-place location and assembly area.
  - date plan validated.
  - location of assembly areas
  - a legend

- Ensuring relevant information from the Emergency Management Plan is displayed prominently at every exit point to ensure it can be easily identified and is accessible to all educators, , staff, visitors, volunteers and families.

Document Set ID: 9963635
Version: 1, Version Date: 18/12/2019

Relevant information includes:

- Emergency service telephone numbers which will be displayed near telephones and service exits
- evacuation procedures and diagrams which will be displayed near each exit

- Establishing an Incident Management Team
- Ensuring that visitors and relief staff are aware of the emergency response procedures
- Implementing the Emergency Management Plan in emergency situations and:
  - **Disseminating information** about the Plan and the procedures to educators, , staff, children, visitors and families. Families will receive written notification from the service. We will use informal games and discussions to familiarise children with our evacuation and emergency procedures as well as regular rehearsals
  - **Scheduling training for** all educators, , staff and volunteers eg how to use fire extinguishers, fire blankets and other emergency equipment, evacuation drills, identifying assembly points and the location of emergency equipment, first aid arrangements and how to turn off the electricity and gas supplies. All new educators, and staff will receive training during their induction and refresher training for all educators and staff will take place at least annually.
  - **Testing t**he Plan every quarter
  - **Reviewing t**he Plan annually
- Keeping records of all emergencies
- Keeping records of meetings and emergency drills

Communication during Emergency

The Nominated Supervisor will ensure there is access to reliable communication channels in the event of an emergency by maintaining access to a telephone (such as fixed-line telephone, mobile phone, satellite phone, 2-way radio, video conferencing equipment) at all times.

The main telephone at the principal office is located at 110-112 Mount Vernon road, Mount Vernon NSW. If there is a complete loss of electricity and the telephones at the Principal Office are not available, a mobile phone will be available and ready to use at all times to ensure educators can make emergency contact.
The Nominated Supervisor will also ensure there is a torch and a supply of fully charged batteries at the Principal office.

Document Set ID: 9963635
Version: 1, Version Date: 18/12/2019

Emergency Communication Plan

The Nominated Supervisor will regularly remind families via conversations, email and newsletters that the Principal Office maintain a Register of emergency telephone numbers for families and we must have current contact information. The Register is located in the following location at the Principal Office at 110-112 Mount Vernon road, Mount Vernon NSW

The Nominated Supervisor will share information about families' updated emergency contacts.

Emergency and Evacuation Procedures and Drills

The service will add to each child's sense of security, predictability and safety, and ensure all educators and staff are familiar with our emergency evacuation procedures, by conducting rehearsal evacuation drills **every three months**. The service will develop a schedule for conducting drills for the different types of emergencies identified in the Emergency Management Plan. The drills will:

- take place at various times of the day and week (rather than always on a Tuesday at 10 am for example) to ensure all children and staff members get the opportunity to rehearse. All persons present at the service during the evacuation drill must participate
- be documented and assessed against specific outcomes using the Checklist at Appendix B. We will appoint an observer if possible
- be immediately followed by a debriefing session if possible, to identify any improvements that may be made. Any training needs will be identified, and action taken to implement the relevant training.

The Nominated Supervisor will implement measures to ensure educators comply with the procedures and requirements outlined in this policy

Sources

Education and Care Services National Law and Regulations
National Quality Standard
Work Health and Safety Act 2011
Work Health and Safety Regulations 2011
Fact Sheet Emergency Plans – Safe Work Australia
Guide to Developing an Emergency Management Plan - DEECD Victoria

Review

The policy will be reviewed annually or when there are changes to the service which may affect the Emergency Management Plan such as renovations or changes to the number of staff or children. The review will be conducted by:

- Management
- Employees
- Families
- Interested Parties

Last reviewed: <insert date here>

Date for next review: <insert date here>

Document Set ID: 9968535
Version: 1, Version Date: 18/12/2019

Appendix A

Emergency Procedures

Evacuation procedures: on-site and offsite

If it is unsafe for children, staff and visitors to remain inside the building, the children's service will be evacuated. The Nominated Supervisor ,or the Incident Management Team will take charge and activate the emergency evacuation procedures by:

- Sounding the alarm.
- Calling 000.
- Informing emergency services of the nature of the emergency (e.g. "There is smoke in the building").
- Determining which on-site or off-site evacuation assembly point will be used.
- Evacuating staff, children and visitors out of the building or residence in accordance with the evacuation plan, checking toilet, kitchen, playrooms and cot rooms to the assembly area.
- Taking the children's attendance list (sign in/sign out roll), staff roster and the Emergency Kit/First Aid kit.
- Ensuring all children, staff and visitors are accounted for once at assembly area.
- Supervising and reassuring children (educators).
- Waiting for emergency services to arrive or provide further information.

Lockdown procedures

Refer Lockdown Policy

Lockout Procedure

The following lockout procedure will be used when an internal immediate danger is identified, and it is determined that children or staff should be excluded from buildings for their safety. The Nominated Supervisor or the Incident Management Team:

- Activates lockout procedures.
- Announces lockout with instructions about what is required. The Nominated Supervisor will:
    - lock doors to prevent entry
    - check the premises for anyone left inside
    - obtain Emergency Kit.

- Contacts emergency services on 000.
- Goes to the designated assembly area.
- Checks that children, staff and visitors are all accounted for.

Document Set ID: 9963635
Version: 1, Version Date: 18/12/2019

Actions after lockout

- Determine if there is any specific information staff, children, parents and visitors need to know (e.g. areas of the facility to avoid).
- Ensure any children, staff or visitors with medical or other needs are supported.
- Follow up with any children, staff or visitors who need support.
- Prepare and maintain records and documentation.
- Undertake operational debrief if possible, to review the lockout and procedural changes that may be required.
- Notify the Regulatory Authority of incident as set out in our Incident, Injury, Trauma and Illness Policy.

Shelter-in-place procedures

The following shelter-in-place procedure will be considered when an event takes place outside of the children's service and emergency services determine the safest course of action is to keep children and staff inside a designated building in the children's service until the external event is handled.

If a shelter-in-place action is determined the Nominated Supervisor or the Incident Management Team:

- Activates shelter-in-place procedures.
- Moves all children, staff and visitors to the pre-determined shelter-in-place area.
- Obtains emergency kit.
- Notifies parents/families if the shelter-in-place is going to extend beyond the services hours of operation.
- Notifies the Regulatory Authority of incident as set out in our Incident, Injury, Trauma and Illness Policy.

Emergency response procedures (specific emergencies)

FIRE

All staff will remain calm. The Nominated Supervisor will:

- activate the fire alarm.
- Phone **000** to notify the fire brigade.
- Extinguish the fire **(if safe to do so).**
- Implement evacuation procedures if threat exists and close all doors and windows.
- Check that all areas have been cleared.
- Check children, staff and visitors are accounted for.
- Notify the Regulatory Authority of incident as set out in our Incident, Injury, Trauma and Illness Policy.

BUSHFIRES/GRASS FIRES

Refer Bushfire Policy

Document Set ID: 9968535
Version: 1, Version Date: 18/12/2019

SEVERE WEATHER /STORMS AND FLOODING

The Nominated Supervisor will (direct staff to):

- Store or secure loose items external to the building, such as outdoor furniture.
- Secure windows (close curtains & blinds) and external doors. If necessary, tape windows and glass entrances. Utilise boards and sandbags if required.
- Protect valuables and disconnect electrical equipment – cover and/or move this equipment away from windows.
- (During a severe storm) remain in the building and ensure they and children keep away from windows. Restrict the use of telephone landlines to emergency calls only.
- Tune in to ABC radio if possible, to follow any emergency instructions.
- Evaluate the status of children, staff and visitor's safety.

After the storm passes, the Nominated Supervisor will evaluate the need to evacuate if uncontrolled fires, gas leaks, or structural damage has occurred as a result of the storm.

PANDEMIC

The Nominated Supervisor will:

- Ensure basic hygiene measures are in place including the display of hygiene information.
- Provide convenient access to water and liquid soap and/or alcohol-based sanitiser.
- Educate staff and children about covering their cough to prevent the spread of germs.
- Stay alert and follow any instructions issued by Health authorities.
- Be prepared for multiple waves.
- Notify the Regulatory Authority of incident as set out in our Incident, Injury, Trauma and Illness Policy.

BOMB/CHEMICAL THREAT

The Nominated Supervisor will implement the following procedures:

- If a bomb/chemical threat is received by telephone:
    - **stay calm**
    - **do not** hang up
    - refer to the bomb threat checklist.
- If a bomb/chemical threat is received by mail:
    - avoid handling of the letter or envelope
    - place the letter in a clear bag or sleeve
    - inform the Police immediately.
- If a bomb/chemical threat is received electronically or through the service's website:
    - do not delete the message
    - contact police immediately.
- Ensure doors are left open.
- **Do not** touch any suspicious objects found.
- If a suspicious object is found or if the threat specifically identified a given area, then evacuation may be considered.
- Notify the Regulatory Authority of incident as set out in our Incident, Injury, Trauma and Illness Policy.

Document Set ID: 9963535
Version: 1, Version Date: 18/12/2019

Bomb/substance threat checklist

This checklist should be held by persons who regularly accept incoming telephone calls.

KEEP CALM

CALL TAKER		CALL TAKEN	
Name		Date/Time:	
Telephone #		Duration of call	
Signature		Number of	

Complete the following for a BOMB THREAT

QUESTIONS	RESPONSES
When is the bomb going to explode?	
Where did you put the bomb?	
What does the bomb look like?	
What kind of bomb is it?	
What will make the bomb explode?	
Did you place the bomb?	
What is your name?	
Where are you going?	
What is your address?	

Complete the following for a SUBSTANCE THREAT

QUESTIONS	RESPONSES
When will the substance be released?	
Where is it?	
What does it look like?	
When did you put it there?	
How will the substance be released?	
Is the substance a liquid, powder or gas?	
Did you put it there?	

CHARACTERISTICS OF THE CALLER	
Sex of caller	
Estimated age	
Accent if any	
Speech impediments	
Voice (loud, soft, etc)	
Speech (fast, slow etc)	
Dictation (clear, muffled, etc)	

Document Set ID: 9968535
Version: 1, Version Date: 18/12/2019

Manner (calm, emotional, etc)	
Did you recognise the voice?	
If so, who do you think it was?	
Was the caller familiar with the	

LANGUAGE	
[ ] Abusive	[ ] Taped
[ ] Well Spoken	[ ] Irrational
[ ] Incoherent	[ ] Message read by caller
[ ] Other (Specify)	

BACKGROUND NOISE	
[ ] Music	[ ] Local call
[ ] Machinery	[ ] Long Distance Call
[ ] Aircraft	[ ] Other (specify)

EXACT WORDING OF THREAT

ACTIONS	
REPORT CALL TO:	
ACTIONS:	

Document Set ID: 9963631
Version: 1, Version Date: 18/12/2019

MAJOR EXTERNAL EMISSIONS/SPILL (includes gas leaks)

The Nominated Supervisor will:

- Call the Fire Brigade on 000.
- Turn off gas supply.
- If it's a gas leak onsite, notify the gas provider (number can be found on the emergency numbers and key contacts page).
- Implement evacuation procedures.
- Check staff, children and visitors are accounted for.
- Await 'all clear' or further advice before resuming normal children's services activities.
- Notify the Regulatory Authority of incident as set out in our Incident, Injury, Trauma and Illness Policy.
- Notify WorkSafe if required.

INTERNAL EMISSION/SPILL (e.g. cleaner's storeroom)

The Nominated Supervisor will:

- Move staff/children away from the spill to a safe area.
- If safe to do so, (direct staff to) clean the spill. Personal Protective Equipment should be worn as per the requirements of the Material Safety Data Sheet.
- Contact the Fire Brigade if the nature of the emission/spill is unknown or it is unsafe to manage.
- Notify WorkSafe if required.

EARTHQUAKE

- Don't panic.

If outside

The Nominated Supervisor will instruct staff or children to:

- Stay outside and move away from buildings, streetlights and utility wires.
- DROP, COVER and HOLD
    - DROP to the ground
    - Take COVER by covering their head and neck with your arms and hands
    - HOLD on until the shaking stops.

If inside

The Nominated Supervisor will instruct staff or children to:

- Move away from windows, heavy objects, shelves etc.
- DROP, COVER and HOLD
    - DROP to the ground

Document Set ID: 9963635
Version: 1, Version Date: 18/12/2019

- Take COVER by getting under a sturdy table or other piece of furniture or go into the corner of the building covering their faces and head in their arms
- HOLD on until the shaking stops.

After the earthquake the Nominated Supervisor will:

- Evaluate the need to evacuate if there are uncontrolled fires, gas leaks or structural damage to the building.
- Instruct staff and children to watch out for fallen trees, power lines, and stay clear of any structures that may collapse.
- Ask educators and staff about the status of staff, children and visitor safety.
- Arrange medical assistance where required.
- Instruct staff to help others if possible.
- Tune in to ABC radio if possible, to follow any emergency instructions.

If there is damage to the facility and it is OK to do so, you may take notes and photographs for insurance purposes.

MEDICAL EMERGENCY

- Check for any threatening situation and remove or control it (if safe to do so).
- Remain with the casualty and provide appropriate support.
- Notify First Aid Officer and the Nominated Supervisor
- Notify the ambulance by dialling '000'.
- The Nominated Supervisor will designate someone if possible, to meet and direct the ambulance to the location of the casualty.
- Try not to leave the casualty alone unless emergency help arrives.
- Do not move the casualty unless exposed to a life-threatening situation.

Refer "Administration of First Aid" in our Incident, Injury, Trauma and Illness Policy.

INTRUDER/PERSONAL THREAT

- The Nominated Supervisor will request assistance from the police by dialling '000'.
- Do not do or say anything to the person to encourage irrational behaviour.
- Initiate action to restrict entry to the building if possible and confine or isolate the threat from building occupants.
- The Nominated Supervisor will determine if evacuation or lockdown is required. Evacuation only should be considered if safe to do so.

Document Set ID: 9963635
Version: 1, Version Date: 18/12/2019

Appendix B

Emergency Drill/Exercise 'Observer' Record

Item	Yes ✓	No ✓
Were emergency services briefed on exercise prior to exercise being started?		
Did the person discovering the emergency alert the other occupants?		
Was the alarm activated?		
Was the emergency service notified promptly?		
Did staff direct persons from the building/site per the evacuation procedures?		
Were isolated areas searched?		
Was the evacuation logical and methodical?		
Did someone take charge? If yes, who?		
Did occupants act as per instructions?		
Was a roll call conducted for:		
Children		
Staff (Co-ordination Unit)		
Visitors (including contractors and volunteers)		
Was someone appointed to liaise with the emergency service/s?		
Was someone appointed to liaise with the parents/community?		
Was the emergency service given the correct information?		
Did anyone re-enter the premises before the "all clear" was given?		
Did anyone refuse to leave the building/site?		
Area of Emergency plan tested by current exercise:		

Document Set ID: 9963635
Version: 1, Version Date: 18/12/2019

Appendix C

Risk assessment template for emergencies

This is an example taken from the Victorian Guide to Developing an Emergency Management Plan - refer for further information and written example

1. Identified Hazard	2. Description of Risk	3. Current control measures implemented at our early childhood service	4. Risk Rating			5. Treatments to be Implemented	6. Revised Risk Rating after implementing Treatments		
			A Consequence	B Likelihood	C Risk Level		A Consequence	B Likelihood	C Risk Level
Only include in your EMP those hazards that are applicable to your early childhood service *The examples provided below are not intended to be exhaustive.*		*Only include in this column those controls that have actually been implemented in your early childhood service.* *If you choose to use any of the examples below, make sure the wording describes the situation in your workplace.*				*Measures to be taken by our early childhood service to eliminate or reduce impact of the risk*			

Document Set ID: 9963631
Version: 1, Version Date: 18/12/2019

GEOTECHNICAL INVESTIGATION REPORT

TO

Cornerstone Construction & Development

ON

Geotechnical Investigation

FOR

Proposed New Childcare Centre

LOCATION

110-112 Mount Vernon Rd, Mount Vernon 2178 NSW

Job Number: COCD0206 - GEO AA Rev_01
March 2019

GREYWACKE GROUP PTY LTD
Trading As Greywacke Geotechnics
ABN 59 607 441 716

Postal Address: Unit 11, 6 Hume Road, Smithfield NSW 2164
Tel: 02 8798 8796
Email: admin@greywacke.com.au
Web: www.greywacke.com.au

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Table of contents

Job Number: COCD0206 - GEO AA i

1. Introduction 3
   - 1.1 General 3
   - 1.2 Scope of work 3
2. Site setting 4
   - 2.1 Site Identification Details 4
   - 2.2 Environmental Setting 4
   - 2.3 Acid Sulfate Soils 5
   - 2.4 Salinity Potential 5
3. Investigation results 6
   - 3.1 Preliminaries 6
   - 3.2 Fieldwork 6
   - 3.3 Subsurface Profile 6
   - 3.4 Laboratory Testing and Results 7
   - 3.5 Groundwater 8
4. Geotechnical Assessment 9
   - 4.1 General 9
   - 4.2 Excavation Conditions 9
   - 4.3 Temporary Excavation Stability 9
   - 4.4 Reuse of Excavated Material 10
   - 4.5 Foundation Conditions 11
   - 4.6 Groundwater 13
5. Limitations 14
6. References 15

Table index

Table 1 Borehole and DCP Summary 6

Table 2 Summary of Subsurface Profiles 7

Table 3 Summary of geotechnical laboratory testing 8

Table 4 Typical Material Properties 10

Table 5 General Definition of Site Classification 11

Table 6 Suggested Geotechnical Design Values for footing design 12

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Figures

Figure 1 Geology Map Excerpt.....5

Appendices

Appendix A – General Notes

Appendix B – Figures

Appendix C – Borehole Logs and DCP Records

Appendix D – Laboratory Test Certificates

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

1. Introduction

1.1 General

This report presents the results of a geotechnical investigation carried out by Greywacke Geotechnics (Greywacke) for a proposed new childcare centre development at 110-112 Mount Vernon Road, Mount Vernon, 2178 NSW. The investigation was carried out in general accordance with Greywacke's proposal to Cornerstone Construction and Development and was commissioned by Mr. Moussa Alam.

Under this engagement, a geotechnical site investigation was completed for the purpose of informing the designers and contractors managing/planning the works of ground conditions and ground related issues at the site.

The proposed works will generally involve demolition of the existing residence and other notable structures at the site and shallow to moderately deep excavations (i.e. cut earthworks), most notably, cut earthworks for the construction of footings.

This report provides the factual results of the geotechnical investigation, including details of the fieldwork, the inferred subsurface conditions encountered during the investigations and general site observations made during the investigations.

It is understood that this geotechnical report may be submitted to Council to accompany a Development Application (DA) process.

1.2 Scope of work

This report entails the geotechnical investigation undertaken for the proposed new childcare centre development. The investigated fieldwork was undertaken on the 14th of May 2018 and comprised of four (4) boreholes and four (4) Dynamic Cone Penetration (DCP) testing at selected locations across the site, where physical and legal access was available (see **Figure 3** in **Appendix B** for test locations).

Specifically, the purpose of this report is to provide information on and discuss the following geotechnical aspects:

- Develop a preliminary understanding of the geological and geotechnical conditions;
- Identify potential geotechnical constraints for assessment and planning;
- Excavation conditions (i.e. excavatability, stability etc.) at the proposed development site;
- Groundwater, and;
- Foundation conditions including site / lot classification in accordance with AS2870, and recommendations on suitable footing types.

This report has been prepared with reference to the following information, collated from publicly available sources:

- Geological maps and notes;
- Soil landscape maps and notes;
- Aerial imagery (i.e. Google Earth);
- Design/Architectural drawings of the proposed development, and;
- Limited observations made during the geotechnical investigations across the proposed development site.

Document Set ID: 9463538
Version: 1, Version Date: 18/12/2019

2. Site setting

2.1 Site Identification Details

The subject site (**Figure 2** contained in **Appendix B**) being considered for development is part of an existing property compromising of a single storey brick type structure, most likely supported on shallow foundations founded on residual clay soils. Other notable structures include a detached car port structure adjacent to the eastern boundary line. The site located at 110-112 Mount Vernon Road, Mount Vernon, is approximately 1.8km northeast of Kemps Creek.

The subject site is bounded by Mount Vernon Road, which defines its southern boundary lines. Residential buildings lie immediately adjacent to its northern, western and eastern boundary lines.

The subject allotment is almost rectangular in shape providing a total site area of approximately 1.026 ha.

2.2 Environmental Setting

2.2.1 Topography

Imagery available on the Department of Lands and Spatial Information Exchange website shows that Mount Vernon is located at an approximate elevation of 100m AHD. The elevation provided in this report is provided as a guideline and should not be relied upon.

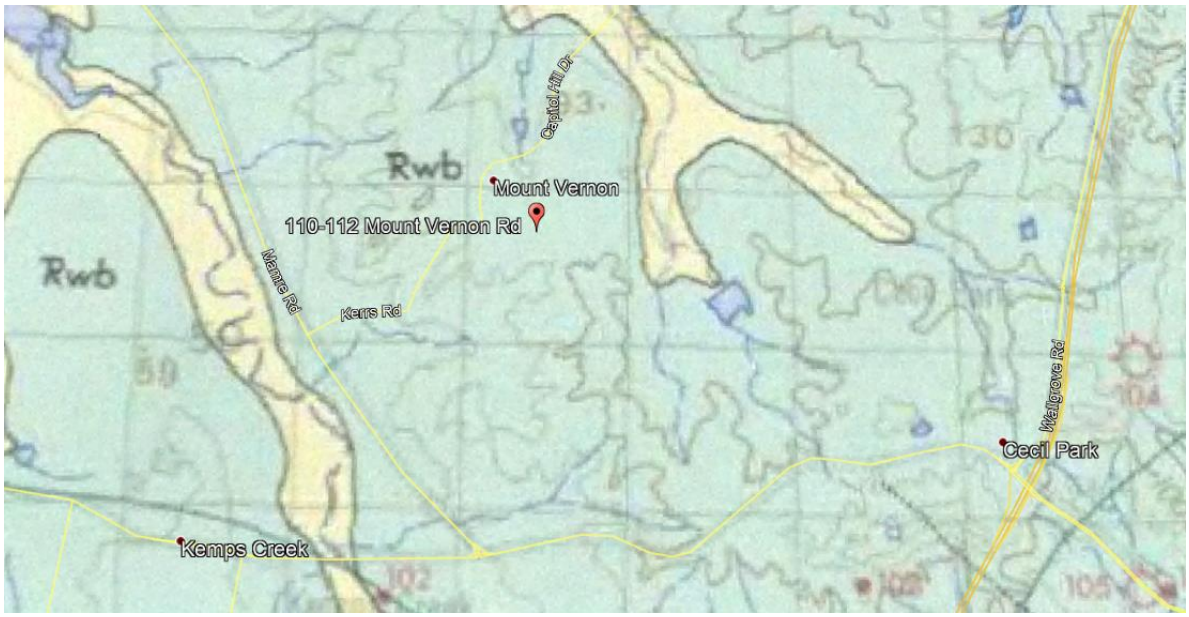
Locally, the site terrain appears moderately flat and consistent. The topography of the surrounding area also appears to be flat and consistent, generally undulating with broad rounded crests and ridges with gently declined slopes.

2.2.2 Regional geology

The 1:100,000 scale Penrith Geological Series Sheet (Geological Survey of NSW, Department of Minerals and Energy, Sheet 9130, 1983) indicates that the proposed development site is underlain by Bringelly Shale of the Wianamatta Group. This stratum occurs extensively throughout the Penrith Basin and comprises of shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone with rare coal and tuff. A map excerpt of the Penrith Geological map is provided in **Figure 1** below.

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Figure 1 Geology Map Excerpt



Rwb - **Bringelly Shale of the Wianamatta Group**

2.3 Acid Sulfate Soils

No known occurrence of acid sulfate soils has been reported in this environment. Furthermore, the elevated terrain (as described in sub Section 2.2.1) is inconsistent with typical acid sulfate soil environments. Therefore, development and construction activities are not likely to be affected by acid sulfate soil materials.

2.4 Salinity Potential

The Salinity Potential in Western Sydney map (Department of Infrastructure, Planning and Natural Resources, 2002) indicates that in general, the site comprises moderate salinity potential. It is noted that more saline areas may occur in this zone, which have not yet been identified or may occur if risk factors change.

Notwithstanding the above, in Western Sydney, saline effects are typically manifested in low lying areas, for example, in the vicinity of creeks, as the groundwater is often saline. The subject site is located across a moderately steep hillside (i.e. not low lying), however, and as noted above, there are creeks in the vicinity of the site.

Document Set ID: 9463538
Version: 1, Version Date: 18/12/2019

3. Investigation results

3.1 Preliminaries

In accordance with Greywacke Geotechnics occupational health and safety policy, a Project Health Safety and Environmental (HSE) Plan was prepared prior to conducting fieldwork. All site staff were briefed on the requirements set out in the plan by the supervising geotechnical engineer.

Prior to the site investigation, relevant plans of buried utilities obtained from 'Dial Before You Dig' service were collated and reviewed. The plans showed no buried services or utilities were present adjacent to test locations.

3.2 Fieldwork

The geotechnical site investigation was carried out on the 14th of May 2018 under the full-time supervision of an experienced Greywacke geotechnical engineer, who nominated the test positions and recorded its location using a hand held autonomous GPS (accuracy ±3m).

The investigation comprised the drilling of four (4) boreholes (BH 1, BH 2, BH 3, and BH 4) at selected locations to a maximum of 3.5m depth (BH 1). Dynamic Cone Penetrometer (DCP) tests were conducted adjacent to the boreholes to provide a soil consistency / strength correlation. The boreholes were drilled using a 4-WD mounted drilling rig and was advanced through the soil and rock profiles using a solid flight auger fitted with a Tungsten Carbide bit (TC-bit). All boreholes were terminated past the target depth.

The borehole and DCP locations are shown in **Figure 3** contained in **Appendix B** and summarised in **Table 1** below. The borehole log sheets and DCP records are provided in **Appendix C**. These should be read in conjunction with the attached General Notes in **Appendix A**.

Table 1 Borehole and DCP Summary

Test ID	Approximate Location (MGA)		Investigation Depth (m)
	Easting	Northing	
BH 1 / DCP 1	297534.188	6250918.804	3.5 / 2.3
BH 2 / DCP 2	297553.074	6250909.259	3.0 / 2.3
BH 3 / DCP 3	297554.678	6250935.921	2.5 / 2.3
BH 4 / DCP 4	297564.147	6250951.815	2.7 / 2.3

3.3 Subsurface Profile

3.3.1 General

In general terms, subsurface conditions encountered across the proposed development site comprised shallow topsoil and/or fill materials overlying very stiff residual clay soils in turn overlying extremely weathered shale bedrock. This sequence is consistent with our expectations, based on the geological conditions described in **Section 2**.

Notwithstanding the above, **Table 2** below summarises the sub-surface profile encountered at each of the boreholes at the site. The more pertinent aspects of the subsurface conditions are described in sections 3.3.2 to 3.3.4 below.

Reference to the individual borehole log sheets (**Appendix C**) should be made for a detailed description of the conditions encountered during the investigations.

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Table 2 Summary of Subsurface Profiles

Test ID	Topsoil/Fill (mbgl)	Residual Clay (mbgl)	Shale Bedrock (mbgl)
BH 1	0.0 - 0.5	0.5 - 3.0	3.0-3.5^{+}
BH 2	0.0 - 0.6	0.6 - 3.0^{+}	-
BH 3	0.0 - 0.5	0.5 - 2.5^{+}	-
BH 4	0.0 - 0.6	0.6 - 2.7^{+}	-

Notes: 1. '+' Refers to depth of material extending beyond the termination depths.
2. 'mbgl' Refers to metres depth below the ground surface.

3.3.2 Topsoil and/or Fill

This material was encountered at all test locations overlying the residual clay soil. The topsoil typically comprised clayey sand with minor proportions of gravel and trace clay/silt. Organic material (i.e. leaves, grass and rootlets) were present in minor / variable proportions. The fill material typically comprised low plasticity clay with traces of fine to medium gravel.

3.3.3 Residual Clay

This material was encountered at all test locations underlying the topsoil and/or fill materials and typically comprised medium plasticity clay with minor proportions of fine size gravel with traces of shale fragments found near the end depths of each boreholes. This material was typically of stiff to very stiff consistency, generally increasing in stiffness with depth.

3.3.4 Bedrock

The general bedrock stratigraphy encountered at the site is summarised below. We note that, and based on the scope of works, no coring of bedrock material was undertaken at the site, and as such, bedrock description and strength values was inferred from tactile and visual observations.

Nevertheless, where it has been considered necessary for the purpose of the engineering discussion, the weathered bedrock unit observed has been classified using the rock classification system developed for the Sydney Sandstones and Shales as per the Australian Geomechanics publication (Pells et al., 1998).

In summary:

- Extremely weathered shale was encountered in one of the boreholes (BH1) and fragments of shale were noticed in the residual clay layer for the remaining boreholes (BH 2, BH 3 and BH 4) and was noted to be brown-grey-red, at depth, laminated, extremely weathered to highly weathered, extremely low to very low strength (i.e. Class V to Class IV).

3.4 Laboratory Testing and Results

Geotechnical classification testing was undertaken on a soil sample recovered from Borehole BH 3 and was submitted to Australian Soil and Concrete Testing Pty Ltd (ASCT), a NATA accredited laboratory located in Wetherill Park NSW. The testing undertaken comprised:

- Atterberg Limit (1 no.) tests to assess soil plasticity and confirm soil descriptions obtained in the field.

The laboratory test results are summarised in **Table 3** and the laboratory test certificates are included in **Appendix D**. A summary and discussion of the test results are presented below

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

These should be read in conjunction with the General Notes, which explain the limitations of the testing undertaken.

Table 3 Summary of geotechnical laboratory testing

Test location	Depth (mbgl)	Material Description	LL (%)	PL (%)	PI (%)	LS (%)
BH 2	1.0 - 1.2	CLAY	48	27	21	6

LL - Liquid Limit
Pl - Plastic Limit
PI - Plasticity Index
LS - Linear Shrinkage

The results of the testing (refer **Table 3**) indicate the following:

- The tested soil is predominantly medium plasticity clay.

3.5 Groundwater

During drilling, standing groundwater/ groundwater seepage was not observed in any of the open boreholes.

We note that, and based on the scope of works, monitoring of groundwater levels at the site has not been undertaken.

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

4. Geotechnical Assessment

4.1 General

The proposed development site (see **Figure 3**) is situated over a generally flat and consistent terrain with minor ground crack formations noticed along the midpoint of the lot area. This may indicate presence of highly

It is understood based on architectural drawings that the proposed development and civil earthworks related activities at the site will include, but not limited to:

- The demolition of the existing structure and other notable structures prior to construction.
- Construction of a new childcare centre, a carpark with associated driveways for access and other notable outdoor structures.
- Excavations in predominantly clay material will be required for the purpose of levelling the site and for the proposed swimming pool prior to the development of the proposed residence.

4.2 Excavation Conditions

It is understood that for the construction of the proposed residence minor to moderate excavations will be required, as such, excavations will be predominantly through existing shallow topsoil and/or fill, and residual clay soils.

It is envisaged that excavations for the proposed structures are likely to be carried out with an excavator of the order of 10 to 15 tonne mass fitted with a toothed bucket through the soil and if encountered, weathered shale bedrock profile.

Care should be taken for detailed excavation across the site and at the founding levels of the proposed structures. The shale bedrock unit, which may include boulders and the possibility of floaters (large rock inclusions not coupled to parent rock material), could be easily disturbed / loosened below the founding levels or excavation faces if large excavation plant or typical ripping methods are used. If disturbance of loose material below founding levels does occur we recommend that removal and replacement of the loosened material with mass concrete backfill be used.

We note that, unwanted material will need to be disposed of offsite in accordance with DECC (2009) Waste Classification Guidelines.

4.3 Temporary Excavation Stability

The requirements for the excavation support at the site will be governed by the geotechnical conditions and occupational health and safety requirements.

For cut operations through soil layers deeper than 1.5m, unsupported batter slopes should not exceed **2H:1V**. Where this is not practicable due to site constraints, the installation / construction of an appropriate shoring system will be required.

We understand that a vertical excavation may provide the most practicable form of construction in terms of minimising the footprint of ground disturbed at the surface and, thereby, also minimising the volume of excavated material (i.e. spoil). The duration that such an excavation can be relied upon to remain self-supporting before installation of a support system is reliant on the strength/cohesion of the strata forming the excavation sides, unfavourable rock mass defect

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

orientations and the presence of groundwater (if any) may require excavation support or stabilisation to be put in place at a shallower depth.

The above should be reviewed by an experienced geotechnical engineer if unexpected ground conditions are encountered.

4.3.1 Temporary and Permanent Support

Typical material properties for the design of temporary or permanent support (e.g. as part of the basement garage) are given in **Table 4**. These have been derived from the results of the in-situ tests (i.e. DCPs).

Table 4 Typical Material Properties

Parameter		Stiff Residual Clay	Very Stiff Residual Clay	Shale Bedrock (Class V)
Φ' (degrees)		26	28	30
Lateral Earth Pressure Coefficients	K_a	0.39	0.36	0.33
	K_0	0.56	0.53	0.5
	K_p [1]	2.56	2.76	3.0
Bulk Unit Weight (kN/m^3)		19	20	22

Notes: 1. 1/2 Kp is recommended for passive resistance calculations due to strain compatibility considerations.

The temporary (short term) support may be designed for active pressure (K_a) conditions. The design of permanent (long term) support structures should be conducted using at-rest earth pressures (K_0). The nominal values of K_0 for the residual soils and extremely weathered shale bedrock are presented in **Table 4** above.

Note that the at-rest lateral earth pressure coefficient (K_0) is dependent on the over-consolidated state of the materials, which varies in depth, and may be complicated by the effects of soil desiccation and repeated wetting and drying cycles. Furthermore, the DCP test can be sensitive to conditions un-associated with soil strength, such as soil fabric and/or coarse particles.

For the design of both temporary excavation support and lateral earth pressures on retaining walls, we recommend the following lateral loading criteria:

- The structure be designed for the critical case considering 'at-rest' (K_0) earth pressures using triangular pressure distribution (plus surcharge) calculated as the summation of $K_0\sigma'_v$ for the component strata given in **Table 4** and where σ'_v is the effective vertical stress. Further, we suggest that increased lateral stress due to backfill compaction be considered as described in AS4678 Cl J9.
- Lateral thrust from surcharge loads (for example, from construction loads and nearby structures) and from groundwater pressure, should be added to the above lateral earth pressures.

4.4 Reuse of Excavated Material

We expect that the excavated residual clay material would be the most economic source of backfill. The backfill could include all excavated material free of rock, cemented lumps or clay clods larger than say 150mm size.

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

We note that the residual clay soils encountered in the boreholes was generally of low plasticity. These materials may be used as general backfill, but will require care in moisture conditioning and compaction.

The topsoil and/or fill material will be unsuitable for reuse as backfill, and should be disposed of off-site. The upper sections of the fill should simulate the proposed design levels, particularly in trafficable areas.

Any material to be disposed of off-site should be subject to waste classification in accordance with the DECC (2009) Waste Classification Guidelines.

4.5 Foundation Conditions

4.5.1 Site Classification

Australian Standard AS 2870 - Residential Slabs and Footing (2011) establishes performance requirements and specific designs for common foundation conditions as well as providing guidance on the design of footing systems using appropriate engineering principals and judgement. Site classes as defined in Table 2.1 and 2.3 of AS 2870 are reproduced in **Table 5** below.

Table 5 General Definition of Site Classification

Site Class	Foundation	Characteristic Surface Movement
A	Most sand and rock sites with little or no ground movement from moisture changes	-
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes	0 – 20mm
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes	20 – 40mm
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes	40 – 60mm
H2	Highly reactive clay sites, which may experience high ground movement from moisture changes	60 – 75mm
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes	> 75mm
A to P sites	Filled sites (refer to clause 2.4.6 of AS 2870)	
P	Sites which include soft soils, such as soft clay or silt or loose sands; landslip, mine subsidence; collapsing soil; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.	

Based on the soil profile encountered and information reviewed and collated herein, the site is classified, in accordance with AS 2870 - 2011 (Residential Slabs and Footings Standard) as:

- **Class 'P'**

We note however that, the site classification can be adjusted to **Class 'H1'** based on the assumption that the founding levels (i.e. foundations) of the proposed structure will be supported on very stiff residual clay soil.

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

4.5.2 Footings

General

All foundations systems shall be designed and constructed in accordance with AS2870, with reference to the site classification as presented above.

Shallow Footings

In terms of foundation support to the proposed structure, shallow footing systems (e.g. slab on ground with stiffened edge beams, pad footings to support concentrated loads or pre-cast floor elements) founded on very stiff clay (undisturbed) are considered suitable, provided that reactive clay shrink-swell effects are taken into account. Suggested design parameters for shallow footings founded on stiff to hard residual clays are provided in **Table 6**.

Piled / Piered Footings

Alternatively, to the above, if shallow footing systems are not favourable, piled foundations in very stiff residual clay or shale bedrock (Class V/IV) may be adopted.

Suggested design parameters for reinforced concrete cast in-situ piles founded on residual clays and/or shale bedrock (Class V/IV) are provided in **Table 6**. These should be used in conjunction with the design procedure of AS 2159-2009. The design parameters are for single piles in downward compression only. Piles should be spaced apart sufficiently to avoid group effects.

Table 6 Suggested Geotechnical Design Values for footing design

Material	Allowable End Bearing Pressure [1] (kPa)	Allowable Shaft Adhesion [2] (kPa)	Elastic Modulus E_{field} (MPa)
Very Stiff Residual Clay	150	20	30
Shale Bedrock (Class V/IV)	700-1000	80	200

Table 5 Notes: 1. Pile base at least 75% free of debris is required.
2. For uncased portion of shaft in rock only. Values should be reduced if sidewall smear occurs.

In addition to the allowable geotechnical capacity of piles, pile design should consider settlement of the pile as settlement / serviceability requirements often control the geotechnical capacity of the piles. Typical modulus (E_{field}) values are provided in **Table 6** for this purpose.

Note, that for rock socket lengths of less than one pile diameter, 30 to 100% of the axial load is likely to be carried in end bearing.

An experienced geotechnical engineer should confirm the foundation conditions (e.g. bedrock/socket levels, bedrock quality, socket cleanliness, etc.) during construction for quality and design verification purposes. Pile base clean out should be confirmed immediately prior to placement of concrete and/or reinforcing steel.

The design parameters provided in **Table 6** are based on simple design calculation procedures presented in AS2159 - 2009. More sophisticated methods such as elastic, side slip or non-linear analysis are available and higher pile capacities are likely to be achievable using more rigorous geotechnical design methods. If required, Greywacke can provide additional services in this regard.

4.6 Groundwater

As noted in **Section 3.5**, groundwater was not encountered in any of the boreholes during the investigation stages. Therefore, it is likely that construction activities within the investigated depths (i.e. shallower than say 3.5m depth below the ground surface) may not be affected by groundwater.

Notwithstanding the above groundwater levels may be subjected to seasonal variations, prolonged rainfall periods, topography of the surrounding area and may therefore fluctuate, which has not been assessed.

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

5. Limitations

This report has been prepared by Greywacke Geotechnics (Greywacke) for Cornerstone (Client) and may only be used and relied on by the Client for the purpose agreed between Greywacke and the Client as set out in Section 1.2 of this report.

Greywacke otherwise disclaims responsibility to any person other than the Client arising in connection with this report. Greywacke also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by Greywacke in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. Greywacke has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

Greywacke has prepared this report on the basis of information provided by the Client and others who provided information to Greywacke, which Greywacke has not independently verified or checked beyond the agreed scope of work. Greywacke does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by particular site conditions, such as the location and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions may change after the date of this report. Greywacke does not accept responsibility arising from, or in connection with, any change to the site conditions. Greywacke is also not responsible for updating this report if the site conditions change.

This report should be read in conjunction with the Explanatory Notes (contained in Appendix A).

Document Set ID: 9463538
Version: 1, Version Date: 18/12/2019

6. References

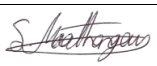
1. Geological Survey of NSW, Department of Minerals and Energy, *Penrith 1:100,000 scale Geological Series Sheet,* Sheet 9130 Edition 1, 1983;
2. Soil Conservation Service, NSW, *Penrith 1:100,000 scale Soil Landscape Series Sheet*, Sheet 9130, 1989;
3. Standards Australia, *AS 4678-2002, Earth Retaining Structures, 2002;*
4. Standards Australia, *AS 2870-2001, Residential Slabs and Footings,* 2011;
5. Standards Australia, *AS 2159-2009, Piling – Design and Installation;*
6. P.J.N. Pells, G. Mostyn and B.F. Walker, *Foundations on Sandstone and Shale in the Sydney Region,* Australian Geomechanics, December 1998, pp 17-29;
7. NSW Department of Natural Resources website, NSW Natural Resource Atlas, http://nratlas.nsw.gov.au, May 2016.

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

© GREYWACKE GEOTECHNICS 2019

This document is and shall remain the property of GREYWACKE GEOTECHNICS. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

For and on behalf of Greywacke Geotechnics

Rev No.	Author	Reviewer	Signature	Position	Approved for Issue
					Date
1		Kadir Oncu		Senior Geotechnical Engineer	25/03/2019
	Maathangan Sivappirakasam			Geotechnical Engineer	28/05/2018

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Appendices

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Appendix A – General Notes

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

GENERAL NOTES

GREYWACKE GEOTECHNICS
Unit 3, 20-22 Barry Road Chipping Norton, NSW 2170 Australia
T: 61 2 7900 2489 M: 0434 837 859 E: admin@greywacke.com.au
CONSULTING GEOTECHNICAL ENGINEERS

This report contains the results of a geotechnical investigation conducted for a specific purpose and client. The results should not be used by other parties, or for any other purposes, as they may contain neither adequate nor appropriate information. In particular, the investigation does not cover contamination issues unless specifically required to do so by the client.

TEST HOLE LOGGING

The information on the test hole logs (boreholes, test pits, exposures etc.) is based on a visual and tactile assessment, except at discrete locations where test information is available (field and/or laboratory results). The test hole logs include both factual data and inferred information. Moreover, the location of test holes should be considered approximate, unless noted otherwise (refer report). Reference should also be made to the relevant standard sheets for the explanation of logging procedures (Soil and Rock Descriptions, Core Log Sheet Notes etc.).

GROUNDWATER

Unless otherwise indicated, the water levels presented on the test hole logs are the levels of free water or seepage in the test hole recorded at the given time of measuring. The actual groundwater level may differ from this recorded level depending on material permeabilities (i.e. depending on response time of the measuring instrument). Further, variations of this level could occur with time due to such effects as seasonal, environmental and tidal fluctuations or construction activities. Confirmation of groundwater levels, phreatic surfaces or piezometric pressures can only be made by appropriate instrumentation techniques and monitoring programmes.

INTERPRETATION OF RESULTS

The discussion or recommendations contained within this report are normally based on a site evaluation from discrete test hole data, often with only approximate locations (e.g. GPS). Generalised, idealised or inferred subsurface conditions (including any geotechnical cross-sections) have been assumed or prepared by interpolation and/or extrapolation of these data. As such these conditions are an interpretation and must be considered as a guide only.

Ref. GW1.1.1 Issue 1.0 DATE:06/06/2016

CHANGE IN CONDITIONS

Local variations or anomalies in the generalised ground conditions do occur in the natural environment, particularly between discrete test hole locations. Additionally, certain design or construction procedures may have been assumed in assessing the soil-structure interaction behaviour of the site. Furthermore, conditions may change at the site from those encountered at the time of the geotechnical investigation through construction activities and constantly changing natural forces.

Any change in design, in construction methods, or in ground conditions as noted during construction, from those assumed or reported should be referred to this company for appropriate assessment and comment.

GEOTECHNICAL VERIFICATION

Verification of the geotechnical assumptions and/or model is an integral part of the design process - investigation, construction verification, and performance monitoring. Variability is a feature of the natural environment and, in many instances, verification of soil or rock quality, or foundation levels, is required. There may be a requirement to extend foundation depths, to modify a foundation system and/or to conduct monitoring as a result of this natural variability. Allowance for verification by appropriate geotechnical personnel must be recognised and programmed for construction.

FOUNDATION

Where referred to in the report, the soil or rock quality, or the recommended depth of any foundation (piles, caissons, footings etc.) is an engineering estimate. The estimate is influenced, and perhaps limited, by the fieldwork method and testing carried out in connection with the site investigation, and other pertinent information as has been made available. The material quality and/or foundation depth remains, however, an estimate and therefore liable to variation. Foundation drawings, design and specifications should provide for variations in the final depth, depending upon the ground conditions at each point of support, and allow for geotechnical verification.

REPRODUCTION OF REPORTS

Where it is desired to reproduce the information contained in our geotechnical report, or other technical information, for the inclusion in contract documents or engineering specification of the subject development, such reproductions must include at least all of the relevant test hole and test data, together with appropriate Standard Description sheets and remarks made in the written report of a factual or descriptive nature.

Reports are the subject of copyright and shall not be reproduced either totally or in part without the express permission of Greywacke Geotechnics.

Document Set ID: 9463538
Version: 1, Version Date: 18/12/2019

STANDARD SHEETS

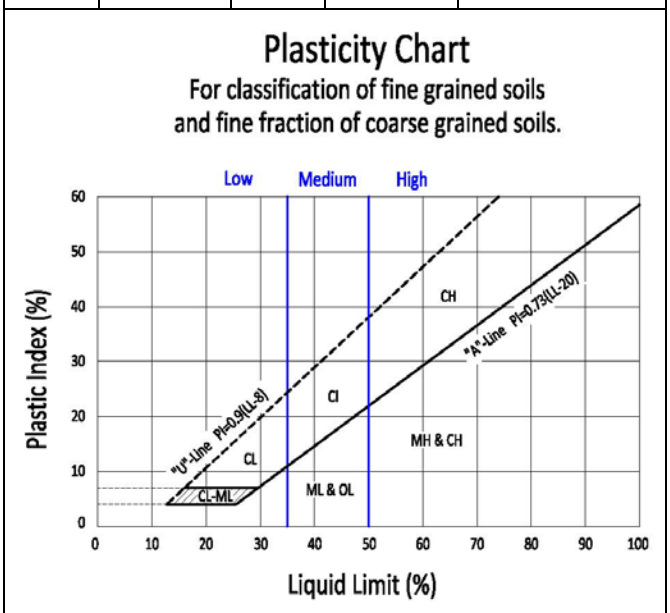
The following information is intended to assist in the interpretation of terms and symbols used in geotechnical borehole logs, test pit logs and reports issued by Greywacke Geotechnical Consultants. More detailed information relating to specific test methods is available in the relevant Australian Standards.

Soil Descriptions

Description and Classification of Soils for Geotechnical Purposes: Refer to AS1726-1993 (Appendix A).

The following chart (adapted from AS1726-1993, Appendix A, Table A1) is based on the Unified Soil Classification System (USCS).

Major Divisions		Particle size mm	USCS Group Symbol	Typical Names	Laboratory Classification				
					% < 0.075 mm (2)	Plasticity of fine fraction	$C_u = \frac{D_{60}}{D_{10}}$	$C_c = \frac{(D_{30})^2}{(D_{10})(D_{60})}$	NOTES
COARSE GRAINED SOILS (more than half of material less than 63 mm is larger than 0.075 mm)	BOULDERS	____200							
	COBBLES	_____63							
	GRAVELS (more than half of coarse fraction is larger than 2.36 mm)	coarse _____20 medium _____6 fine ___2.36	GW	Well graded gravels and gravel-sand mixtures, little or no fines	0-5	—	>4	Between 1 and 3	(1) Identify fines by the method given for fine-grained soils.
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels	0-5	—	Fails to comply with above		
			GM	Silty gravels, gravel-sand-silt mixtures (1)	12-50	Below 'A' line or PI<4	—	—	
			GC	Clayey gravels, gravel-sand-clay mixtures (1)	12-50	Above 'A' line and PI>7	—	—	
	SANDS (more than half of coarse fraction is smaller than 2.36 mm)	coarse ____0.6 medium ____0.2 fine 0.075	SW	Well graded sands and gravelly sands, little or no fines	0-5	—	>6	Between 1 and 3	(2) Borderline classifications occur when the percentage of fines (fraction smaller than 0.075 mm size) is greater than 5% and less than 12%. Borderline classifications require the use of SP-SM, GW-GC.
			SP	Poorly graded sands and gravelly sands, little or no fines	0-5	—	Fails to comply with above		
			SM	Silty sands, sand silt mixtures (1)	12-50	Below 'A' line or PI<4	—	—	
			SC	Clayey sands, sand-clay mixtures (1)	12-50	Above 'A' line and PI>7	—	—	
FINE GRAINED SOILS (more than half of material less than 63 mm is smaller than 0.075 mm	SILTS & CLAYS (Liquid Limit ≤50%)		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Use the gradation curve of material passing 63 mm for classification of fractions according to the criteria given in 'Major Divisions'				
			CL CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					
			OL	Organic silts and clays of low plasticity					
	SILTS & CLAYS (Liquid Limit >50%)		MH	Inorganic silts, mic- aceous or diato-maceous fine sands or silts, elastic silts					
			CH	Inorganic clays of high plasticity, fat clays					
			OH	Organic silts and clays of high plasticity					
	HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils					



Soil Colour: Is described in the moist condition using black, white, grey, red, brown, orange, yellow, green or blue. Borderline cases can be described as a combination of two colours, with the weaker followed by the stronger. Modifiers such as pale, dark or mottled, can be used as necessary. Where colour consists of a primary colour with secondary mottling, it should be described as follows:

(Primary) mottled (Secondary). Refer to AS 1726-1993, A2.4 and A3.3.

Soil Moisture Condition: Is based on the appearance and feel of soil. Refer to AS 1726-1993, A2.5.

Term	Description
Dry	Cohesive soils; hard and friable or powdery, well dry of plastic limit. Granular soils; cohesionless and free-running.
Moist	Soil feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet	Soil feels cool, darkened in colour. Cohesive soils usually weakened and free water forms on hands when handling. Granular soils tend to cohere and free water forms on hands when handling.

Consistency of Cohesive Soils: May be estimated using simple field tests, or described in terms of a strength scale. In the field, the undrained shear strength (s_u) can be assessed using a simple field tool appropriate for cohesive soils, in conjunction with the relevant calibration. Refer to AS 1726-1993, Table A4.

Consistency - Essentially Cohesive Soils					
Term	**Field Guide**	**Symbol**	**SPT "N" Value**	**Undrained Shear Strength s_u (kPa)**	**Unconfined Compressive Strength q_u (kPa)**
Very soft	Oozes between fingers when squeezed in hand.	VS	0-2	<12	<25
Soft	Easily moulded with fingers.	S	2-4	12-25	25-50
Firm	Can be moulded by strong pressure of fingers.	F	4-8	25-50	50-100
Stiff	Not possible to mould with fingers.	St	8-15	50-100	100-200
Very stiff		VSt	15-30	100-200	200-400
Hard	Can be indented with difficulty by thumb nail.	H	>30	>200	>400

Soil Particle Sizes	
Term	**Size Range**
BOULDERS	>200 mm
COBBLES	63-200 mm
Coarse GRAVEL	20-63 mm
Medium GRAVEL	6-20 mm
Fine GRAVEL	2.36-6 mm
Coarse SAND	0.6-2.36 mm
Medium SAND	0.2-0.6 mm
Fine SAND	0.075-0.2 mm
SILT	0.002-0.075 mm
CLAY	<0.002 mm

Note: SPT - N to q_u correlation from Terzaghi and Peck, 1967. (General guide only).

Consistency of Non-Cohesive Soils: Is described in terms of the density index, as defined in AS 1289.0-2000. This can be assessed using a field tool appropriate for non-cohesive soils, in conjunction with the relevant calibration. Refer to AS 1726-1993, Table A5; BS5930-1999, p117.

Consistency - Essentially Non-Cohesive Soils				
Term	**Symbol**	**SPT N Value**	**Field Guide**	**Density Index (%)**
Very loose	VL	0-4	Foot imprints readily	0-15
Loose	L	4-10	Shovels Easily	15-35
Medium dense	MD	10-30	Shovelling difficult	35-65
Dense	D	30-50	Pick required	65-85
Very dense	VD	>50	Picking difficult	85-100

Standard Penetration Test (SPT): Refer to. AS 1289.6.3.1-2004. Example report formats for SPT results are shown below:

Test Report	Penetration Resistance (N)	Explanation / Comment
4, 7, 11	N=18	Full penetration; N is reported on engineering borehole log
18, 27, 32	N=59	Full penetration; N is reported on engineering borehole log
4, 18, 30/15 mm	N is not reported	30 blows causes less than 100 mm penetration (3rd interval) – test discontinued
30/80 mm	N is not reported	30 blows causes less than 100 mm penetration (1st interval) – test discontinued
rw	N<1	Rod weight only causes full penetration
hw	N<1	Hammer and rod weight only causes full penetration
hb	N is not reported	Hammer bouncing for 5 consecutive blows with no measurable penetration – test discontinued

Rock Descriptions

Refer to AS 1726-1993 (Appendix A3.3) for the description and classification of rock material composition, including:

(a) Rock type (Table A6, (a) and (b))

(b) Grain size

(c) Texture and fabric

(d) Colour (describe as per soil).

The condition of a rock material refers to its weathering characteristics, strength characteristics and rock mass properties. Refer to AS 1726-1993 (Appendix A3 Tables A8, A9 and A10).

Weathering Condition (Degree of Weathering):

The degree of weathering is a continuum from fresh rock to soil. Boundaries between weathering grades may be abrupt or gradational.

Rock Material Weathering Classification		
Weathering Grade	**Symbol**	**Definition**
Residual Soil	RS	Soil-like material developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the material has not been significantly transported.
Extremely Weathered Rock	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded in water, but substance fabric and rock structure still recognisable.
Highly Weathered Rock	HW	Strong discolouration is evident throughout the rock mass, often with significant change in the constituent minerals. The intact rock strength is generally much weaker than that of the fresh rock.
Moderately Weathered Rock	MW	Modest discolouration is evident throughout the rock fabric, often with some change in the constituent minerals. The intact rock strength is usually noticeably weaker than that of the fresh rock.
Slightly Weathered Rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh Rock	FR	Rock shows no sign of decomposition or staining.

Notes:

1. Minor variations within broader weathering grade zones will be noted on the engineering borehole logs.
2. Extremely weathered rock is described in terms of soil engineering properties.
3. Weathering may be pervasive throughout the rock mass, or may penetrate inwards from discontinuities to some extent.
4. The 'Distinctly Weathered (DW)' class as defined in AS 1726-1993 is divided to incorporate HW and MW in the above table. The symbol DW should not be used.

Strength Condition (Intact Rock Strength):

Strength of Rock Material (Based on Point Load Strength Index, corrected to 50 mm diameter – $I_{s(50)}$. Field guide used if no tests available. Refer to AS 4133.4.1-2007.			
Term	**Symbol**	**Point Load Index (MPa)** $I_{s(50)}$	**Field Guide to Strength**
Extremely Low	EL	≤0.03	Easily remoulded by hand to a material with soil properties.
Very Low	VL	>0.03 ≤0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
Low	L	>0.1 ≤0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	>0.3 ≤1.0	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
High	H	>1 ≤3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	VH	>3 ≤10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High	EH	>10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Notes:

1. These terms refer to the strength of the rock material and not to the strength of the rock mass which may be considerably weaker due to the effect of rock defects.
2. Anisotropy of rock material samples may affect the field assessment of strength.

Discontinuity Description: Refer to AS 1726-1993, Table A10.

Anisotropic Fabric	
BED	Bedding
FOL	Foliation
LIN	Mineral lineation
Defect Type	
LP	Lamination Parting
BP	Bedding Parting
FP	Cleavage / Foliation Parting
J, Js	Joint, Joints
SZ	Sheared Zone
CZ	Crushed Zone
BZ	Broken Zone
HFZ	Highly Fractured Zone
AZ	Alteration Zone
VN	Vein

Roughness (e.g. Planar, Smooth is abbreviated Pl / Sm)		Class
Stepped (Stp)	Rough or irregular (Ro)	I
	Smooth (Sm)	II
	Slickensided (Sl)	III
Undulating (Un)	Rough (Ro)	IV
	Smooth (Sm)	V
	Slickensided (Sl)	VI
Planar (Pl)	Rough (Ro)	VII
	Smooth (Sm)	VIII
	Slickensided (Sl)	IX

Aperture		**Infilling**		
Closed	CD	No visible coating or infill	Clean	Cn
Open	OP	Surfaces discoloured by mineral/s	Stain	St
Filled	FL	Visible mineral or soil infill <1mm	Veneer	Vr
Tight	TI	Visible mineral or soil infill >1mm	Coating	Ct

Other	
Cly	Clay
Fe	Iron
Co	Coal
Carb	Carbonaceous
Sinf	Soil Infill Zone
Qz	Quartz
CA	Calcite
Chl	Chlorite
Py	Pyrite
Int	Intersecting
Inc	Incipient
DI	Drilling Induced
H	Horizontal
V	Vertical

Discontinuity Spacing: On the geotechnical borehole log, a graphical representation of defect spacing vs depth is shown. This representation takes into account all the natural rock defects occurring within a given depth interval, excluding breaks induced by the drilling / handling of core. Refer to AS 1726-1993, BS5930-1999.

Defect Spacing			**Bedding Thickness (Sedimentary Rock Stratification)**	
Spacing/Width (mm)	**Descriptor**	**Symbol**	**Descriptor**	**Spacing/Width (mm)**
			Thinly Laminated	< 6
<20	Extremely Close	EC	Thickly Laminated	6 – 20
20 – 60	Very Close	VC	Very Thinly Bedded	20 – 60
60 – 200	Close	C	Thinly Bedded	60 – 200
200 – 600	Medium	M	Medium Bedded	200 – 600
600 – 2000	Wide	W	Thickly Bedded	600 – 2000
2000 – 6000	Very Wide	VW	Very Thickly Bedded	> 2000
>6000	Extremely Wide	EW		

Defect Spacing in 3D	
Term	**Description**
Blocky	Equidimensional
Tabular	Thickness much less than length or width
Columnar	Height much greater than cross section

Defect Persistence (areal extent)
Trace length of defect given in metres

Symbols

The list below provides an explanation of terms and symbols used on the geotechnical borehole, test pit and penetrometer logs.

Test Results			
PI	Plasticity Index	c'	Effective Cohesion
LL	Liquid Limit	c_u	Undrained Cohesion
LI	Liquidity Index	c'_R	Residual Cohesion
DD	Dry Density	ϕ'	Effective Angle of Internal Friction
WD	Wet Density	ϕ_u	Undrained Angle of Internal Friction
LS	Linear Shrinkage	ϕ'_R	Residual Angle of Internal Friction
MC	Moisture Content	c_v	Coefficient of Consolidation
OC	Organic Content	m_v	Coefficient of Volume Compressibility
WPI	Weighted Plasticity Index	$c_{\alpha\varepsilon}$	Coefficient of Secondary Compression

Test Symbols	
DCP	Dynamic Cone Penetrometer
SPT	Standard Penetration Test
CPTu	Cone Penetrometer (Piezocone) Test
PANDA	Variable Energy DCP
PP	Pocket Penetrometer Test
U50	Undisturbed Sample 50 mm (nominal diameter)
U100	Undisturbed Sample 100mm (nominal diameter)
UCS	Uniaxial Compressive Strength
Pm	Pressuremeter

Test Results			
WLS	Weighted Linear Shrinkage	e	Voids Ratio
DoS	Degree of Saturation	ϕ'_{cv}	Constant Volume Friction Angle
APD	Apparent Particle Density	q_t / q_c	Piezocone Tip Resistance (corrected / uncorrected)
s_u	Undrained Shear Strength	q_d	PANDA Cone Resistance
q_u	Unconfined Compressive Strength	$I_{s(50)}$	Point Load Strength Index
R	Total Core Recovery	*RQD*	Rock Quality Designation

Test Symbols	
FSV	Field Shear Vane
DST	Direct Shear Test
PR	Penetration Rate
A	Point Load Test (axial)
D	Point Load Test (diametral)
L	Point Load Test (irregular lump)

28/11/13 Groundwater level on the date shown	Water Inflow	Water Outflow

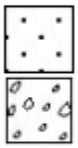
SOIL SYMBOLS

Main Components

SAND | CLAY | SILT

GRAVEL | FILL | TOPSOIL

Minor Components



sandy | clayey | silty

gravelly | vegetation, roots

Note: Natural soils are generally a combination of constituents, e.g. sandy CLAY

ROCK SYMBOLS

Sedimentary

SANDSTONE | SHALE

CLAYSTONE | CONGLOMERATE

SILTSTONE | COAL

Igneous

GRANITIC ROCK

IGNEOUS DYKE

BASALTIC ROCK

Note: Additional rock symbols may be allocated for a particular project.

Appendix B – Figures

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Paper Size A3

Scale

NTS

Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

LEGEND

Proposed Development

GREYWACKE GEOTECHNICS

Cornerstone Construction & Development
Proposed Childcare Centre
Geotechnical Site Investigation

Job Number	COCD0206
Revision	A
Date	15-May-18

SITE LOCALITY PLAN

Figure 2

F:\Projects\CornerstoneConstruction&Development\Figures\Fig2_SiteLocalityPlan.pdf

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Paper Size A3

Scale

NTS

Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

LEGEND

Borehole/DCP Test Locations

GREYWACKE GEOTECHNICS

Cornerstone Construction & Development
Proposed Childcare Centre
Geotechnical Site Investigation

Job Number	COCD0206
Revision	A
Date	15-May-18

TEST LOCATION PLAN

Figure 3

F:\Projects\CornerstoneConstruction&Development\Figures\Fig3_TestLocationPlan.pdf

Document Set ID: 8968538
Version: 1, Version Date: 18/12/2019

Appendix C – Borehole Logs and DCP Records

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

BOREHOLE LOG SHEET

Client :	Cornerstone Construction and Development	**HOLE No. BH1**	
Project :	Proposed New Childcare Centre		
Location :	110-112 Mt Vernon Rd, Mt Vernon	**SHEET 1 OF 1**	
Position :	Refer to test location plan	**Surface RL:**	**Angle from Horiz. :** 90°	**Processed :** S.H
Rig Type :	Cristie	**Mounting:** Mounting 4-WD	**Contractor :**	**Driller :** D.S	**Checked :** K.O
Date Started :	14/5/2018	**Date Completed :** 14/5/2018	**Logged by :** M.S	**Date:**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
			None Encountered		0.10		-	Clayey SAND; dark brown, fine to medium grained sand, traces of fine gravel, traces of organic content (i.e. grass rootlets etc.) (topsoil).		-	
								Silty CLAY; brown-yellow, low to medium plasticity, with fine to coarse grained gravel.	D	St-VSt	
					0.50		Cl	CLAY; red brown, medium plasticity, traces of fine gravel, with silt.	D	VSt	
1	TC-bit auger	Nil						At 1.5m, as above, but colour changes to grey-red-orange.	SM	VSt	
2								At 2.5m, as above, but with shale fragments.		VSt	
3					3.00			Extremely weathered SHALE; brown-grey-red.		St	
					3.50			End of borehole at 3.5 metres. Target Depth.			
4											

Note: * indicates signatures on original issue of log or last revision of log

See standard sheets for details of abbreviations & basis of descriptions

GREYWACKE GEOTECHNICS

Unit 11, 6 Hume Road, Smithfield, NSW 2164 Australia
T: 61 2 8798 8796 M: 0434 837 859 E: admin@greywacke.com.au
CONSULTING GEOTCHNICAL ENGINEERS

Job No.
COCD0206 - GEO AA

Document
Version: 1, Version Date: 18/12/2019

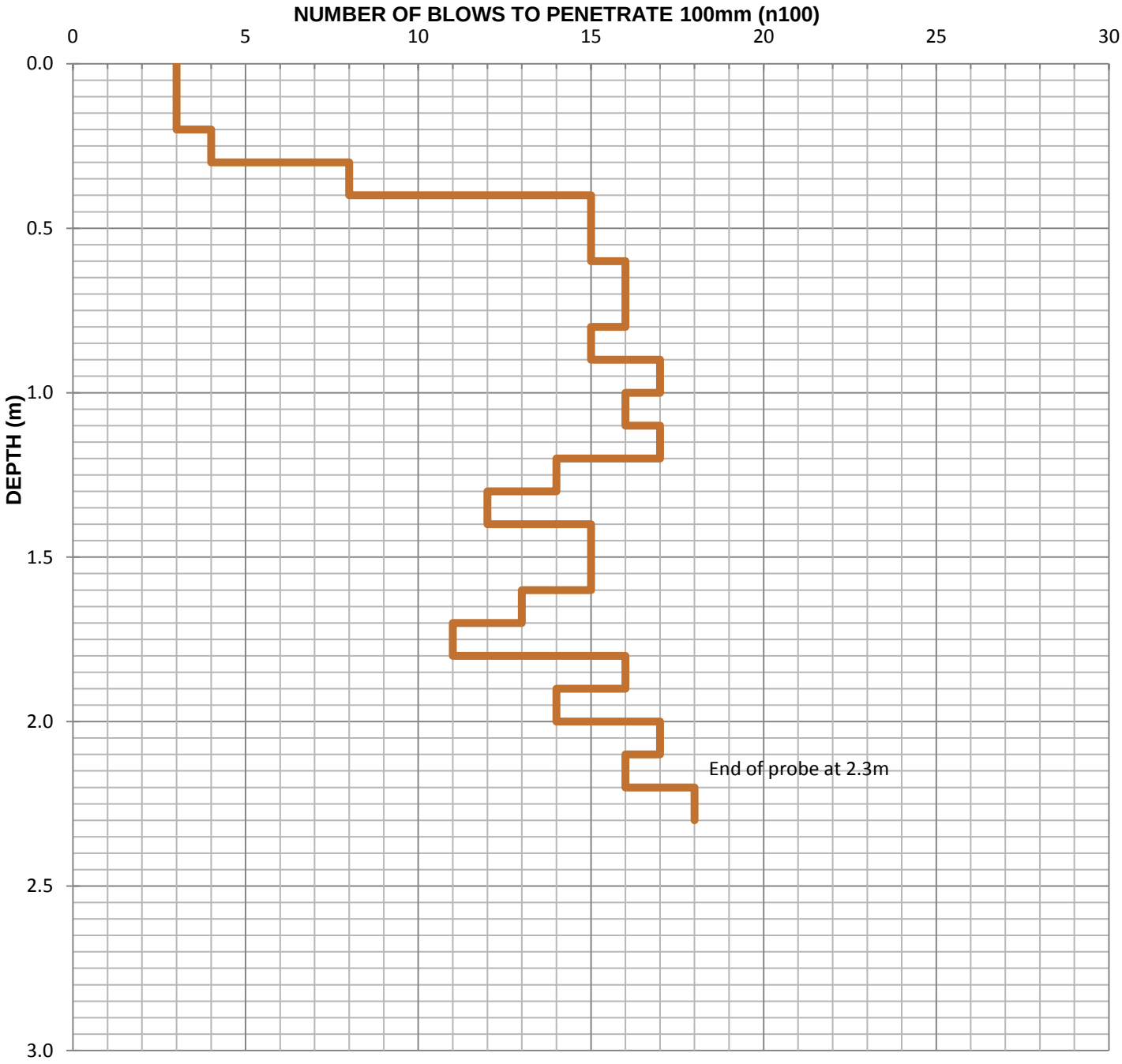
DYNAMIC CONE PENETROMETER LOG SHEET

Client: Cornerstone Construction and Development
Project: Proposed New Childcare Centre
Location: **110-112 Mt Vernon Rd, Mt Vernon**

PROBE: DCP 1

AS 1289.6.3.2-1997 (Cone Tip) 510 mm drop height.

Position:	**Chainage:** -	**Operator:** MS & SH
Elevation: -	**Offset:** -	**Date:** 14/05/2018
Adjacent Test Hole / Pit:		**Checked:**
Position Relative to Test Hole / Pit:		**Date:**



Comments:

CONSULTING GEOTECHNICAL ENGINEERS
Unit 3, 20-22 Barry Road, Chipping Norton, NSW, 2170 Australia
Telephone: 61 2 7900 2489 Mob: 61 434 837 859 Email: admin@greywacke.com.au
GREYWACKE GEOTECHNICS

Job No.
COCD0206 - GEO AA

Document Set ID: 9633535
Version: 1, Version Date: 18/12/2019

BOREHOLE LOG SHEET

Client :	Cornerstone Construction and Development	**HOLE No. BH2**	
Project :	Proposed New Childcare Centre		
Location :	110-112 Mt Vernon Rd, Mt Vernon	**SHEET 1 OF 1**	
Position :	Refer to test location plan **Surface RL:**	**Angle from Horiz. :** 90°	**Processed :** S.H
Rig Type :	Cristie **Mounting:** Mounting 4-WD **Contractor :**	**Driller :** D.S	**Checked :** K.O
Date Started :	14/5/2018 **Date Completed :** 14/5/2018	**Logged by :** M.S	**Date:**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
			None Encountered		0.10			Clayey SAND; dark brown, fine to medium grained sand, traces of fine gravel, traces of organic content (i.e. grass rootlets etc.) (topsoil).			
								Silty CLAY; brown-yellow, low to medium plasticity, with fine to coarse grained gravel, with silt.	SM	St-VSt	
					0.60		Cl	CLAY; red brown, medium plasticity, traces of fine gravel.	SM	VSt	
1	TC-bit auger	Nil						At 0.9m, as above, but colour changes to grey-orange-red.	SM	VSt	
2								At 2.7m, as above, but with shale fragments		VSt	
3					3.00			End of borehole at 3 metres. Target Depth.			
4											

Note: * indicates signatures on original issue of log or last revision of log

See standard sheets for details of abbreviations & basis of descriptions

GREYWACKE GEOTECHNICS

Unit 11, 6 Hume Road, Smithfield, NSW 2164 Australia
T: 61 2 8798 8796 M: 0434 837 859 E: admin@greywacke.com.au
CONSULTING GEOTCHNICAL ENGINEERS

Job No.
COCD0206 - GEO AA

Document
Version: 1, Version Date: 18/12/2019

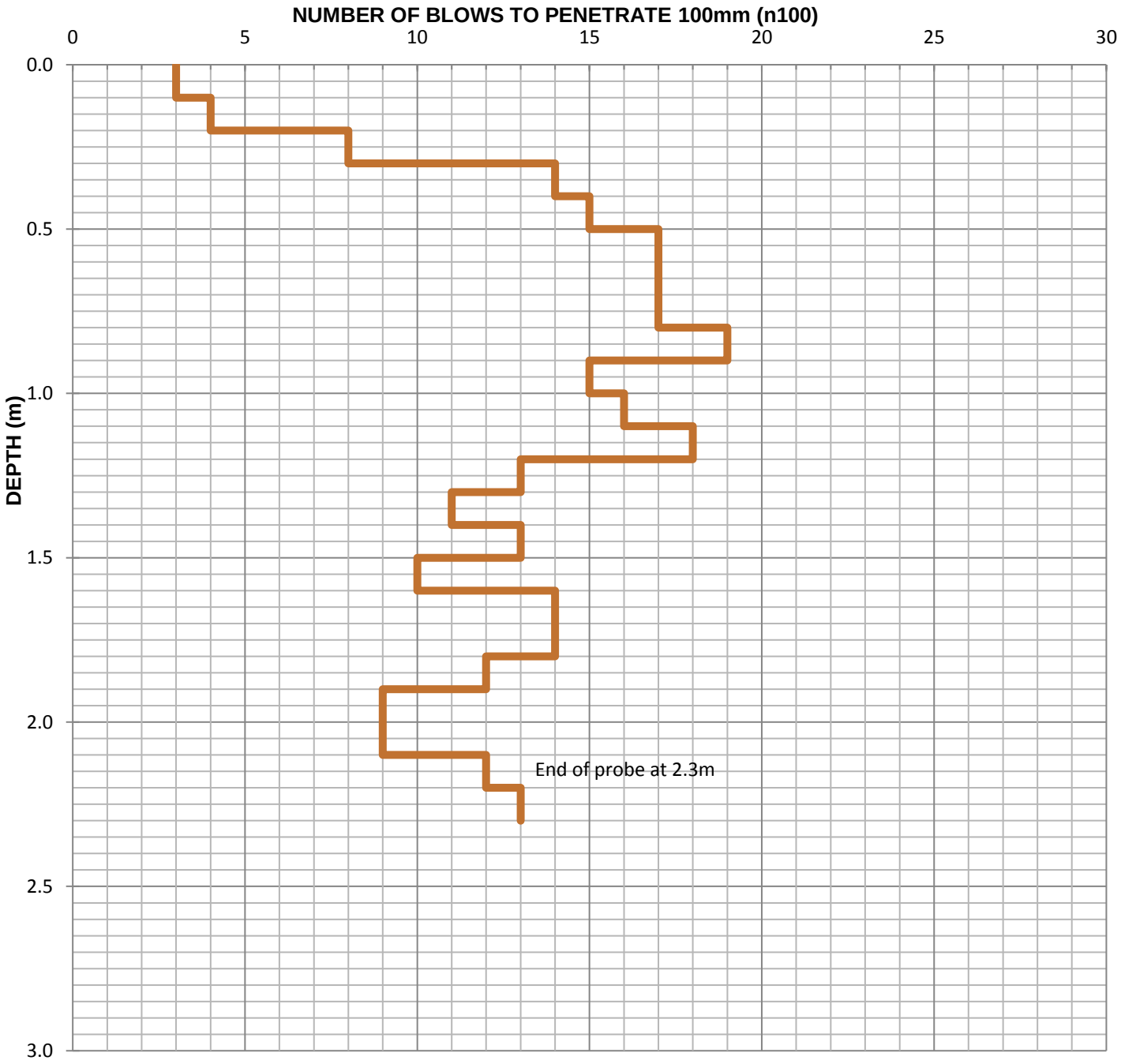
DYNAMIC CONE PENETROMETER LOG SHEET

Client: Cornerstone Construction and Development
Project: Proposed New Childcare Centre
Location: **110-112 Mt Vernon Rd, Mt Vernon**

PROBE: DCP 2

AS 1289.6.3.2-1997 (Cone Tip) 510 mm drop height.

Position:	**Chainage:** -	**Operator:** MS & SH
Elevation: -	**Offset:** -	**Date:** 14/05/2018
Adjacent Test Hole / Pit:		**Checked:**
Position Relative to Test Hole / Pit:		**Date:**



Comments:

CONSULTING GEOTECHNICAL ENGINEERS
Unit 3, 20-22 Barry Road, Chipping Norton, NSW, 2170 Australia
Telephone: 61 2 7900 2489 Mob: 61 434 837 859 Email: admin@greywacke.com.au
GREYWACKE GEOTECHNICS

Job No.
COCD0206 - GEO AA

Document Set ID: 9933535
Version: 1, Version Date: 18/12/2019

BOREHOLE LOG SHEET

Client :	Cornerstone Construction and Development	**HOLE No. BH3**	
Project :	Proposed New Childcare Centre		
Location :	110-112 Mt Vernon Rd, Mt Vernon	**SHEET 1 OF 1**	
Position :	Refer to test location plan **Surface RL:**	**Angle from Horiz. :** 90°	**Processed :** S.H
Rig Type :	Cristie **Mounting:** Mounting 4-WD **Contractor :**	**Driller :** D.S	**Checked :** K.O
Date Started :	14/5/2018 **Date Completed :** 14/5/2018	**Logged by :** M.S	**Date:**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
			None Encountered		0.10			Clayey SAND; dark brown, fine to medium grained sand, traces of fine gravel, traces of organic content (i.e. grass rootlets etc.) (topsoil).	D	St-VSt	
								Silty CLAY; brown-yellow, low to medium plasticity, with fine to coarse grained gravel.			
					0.50		Cl	CLAY; red brown, medium plasticity, traces of fine gravel, with silt.	D	VSt	
1	TC-bit auger	Nil						At 1.2m, as above, but colour changes to grey-red.	D	VSt	
2								At 2.3m, as above, but with shale fragments.		VSt	
					2.50			End of borehole at 2.5 metres. Target Depth.			
3											
4											

Note: * indicates signatures on original issue of log or last revision of log

See standard sheets for details of abbreviations & basis of descriptions

GREYWACKE GEOTECHNICS

Unit 11, 6 Hume Road, Smithfield, NSW 2164 Australia
T: 61 2 8798 8796 M: 0434 837 859 E: admin@greywacke.com.au
CONSULTING GEOTCHNICAL ENGINEERS

Job No. **COCD0206 - GEO AA**

Document
Version: 1, Version Date: 18/12/2019

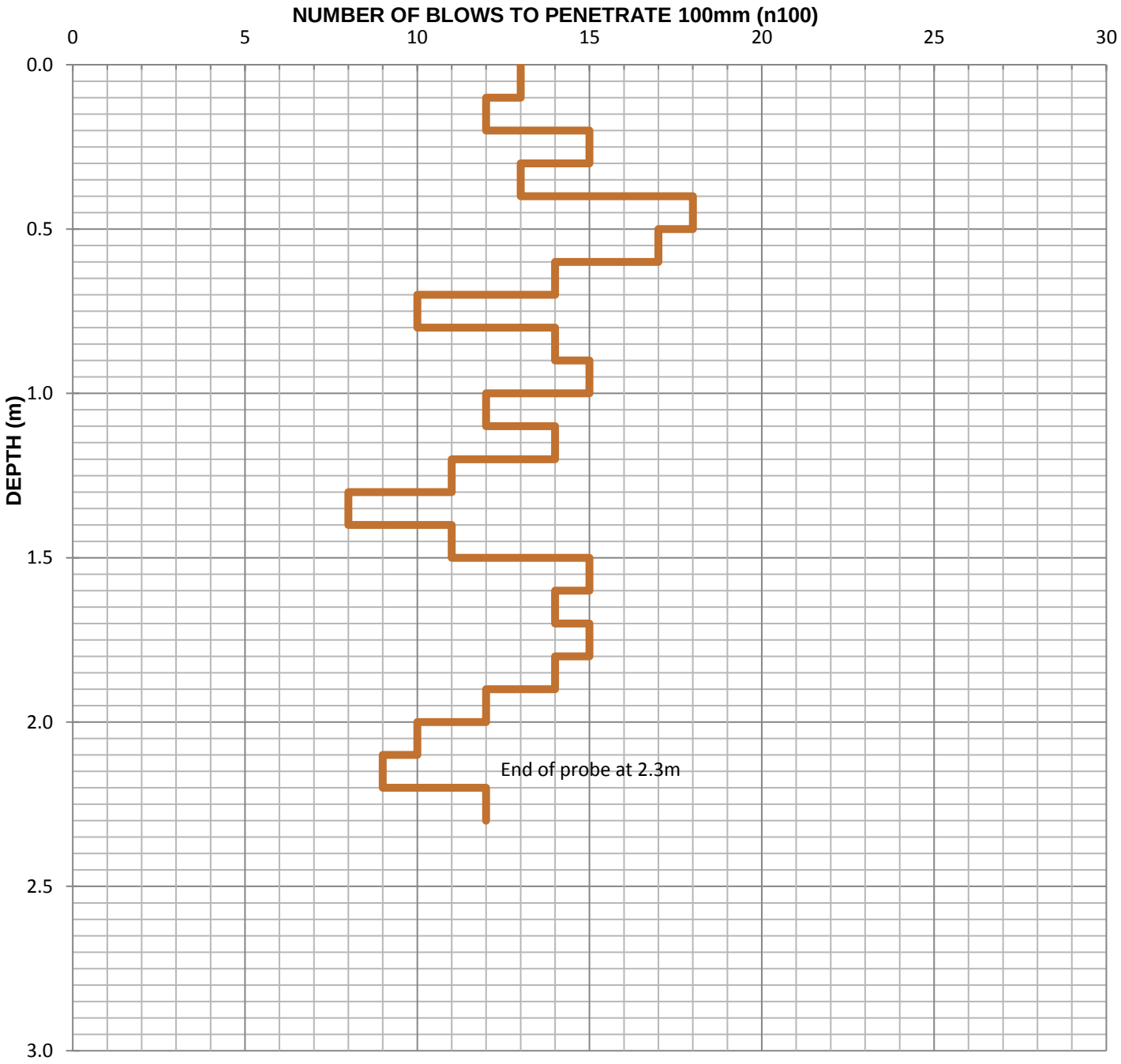
DYNAMIC CONE PENETROMETER LOG SHEET

Client: Cornerstone Construction and Development
Project: Proposed New Childcare Centre
Location: **110-112 Mt Vernon Rd, Mt Vernon**

PROBE: DCP 3

AS 1289.6.3.2-1997 (Cone Tip) 510 mm drop height.

Position:	**Chainage:** -	**Operator:** MS & SH
Elevation: -	**Offset:** -	**Date:** 14/05/2018
Adjacent Test Hole / Pit:		**Checked:**
Position Relative to Test Hole / Pit:		**Date:**



Comments:

CONSULTING GEOTECHNICAL ENGINEERS
Unit 3, 20-22 Barry Road, Chipping Norton, NSW, 2170 Australia
Telephone: 61 2 7900 2489 Mob: 61 434 837 859 Email: admin@greywacke.com.au
GREYWACKE GEOTECHNICS

Job No.
COCD0206 - GEO AA

Document Set ID: 9633535
Version: 1, Version Date: 18/12/2019

BOREHOLE LOG SHEET

Client :	Cornerstone Construction and Development	**HOLE No. BH4**	
Project :	Proposed New Childcare Centre		
Location :	110-112 Mt Vernon Rd, Mt Vernon	**SHEET 1 OF 1**	
Position :	Refer to test location plan **Surface RL:**	**Angle from Horiz. :** 90°	**Processed :** S.H
Rig Type :	Cristie **Mounting:** Mounting 4-WD **Contractor :**	**Driller :** D.S	**Checked :** K.O
Date Started :	14/5/2018 **Date Completed :** 14/5/2018	**Logged by :** M.S	**Date:**

DRILLING					MATERIAL						
SCALE (m)	Drilling Method	Hole Support \ Casing	Water	Samples & Tests	Depth / (RL) metres	Graphic Log	USC Symbol	Description SOIL TYPE, colour, structure, minor components (origin), and ROCK TYPE, colour, grain size, structure, weathering, strength	Moisture Condition	Consistency / Density Index	Comments/ Observations
			None Encountered		0.10			Clayey SAND; dark brown, fine to medium grained sand, traces of fine gravel, traces of organic content (i.e. grass rootlets etc.) (topsoil).	SM	St-VSt	
								Silty CLAY; brown-yellow, low to medium plasticity, with fine to coarse grained gravel.			
					0.60		Cl	CLAY; red brown, medium plasticity, traces of fine gravel, with silt.	SM	VSt	
1	TC-bit auger	Nil									
								At 1.3m, as above, but colour changes to grey-red.		VSt	
2					2.70						
								End of borehole at 2.7 metres. Target Depth.			
3											
4											

Note: * indicates signatures on original issue of log or last revision of log

See standard sheets for details of abbreviations & basis of descriptions

GREYWACKE GEOTECHNICS

Unit 11, 6 Hume Road, Smithfield, NSW 2164 Australia
T: 61 2 8798 8796 M: 0434 837 859 E: admin@greywacke.com.au
CONSULTING GEOTCHNICAL ENGINEERS

Job No. **COCD0206 - GEO AA**

Document
Version: 1, Version Date: 18/12/2019

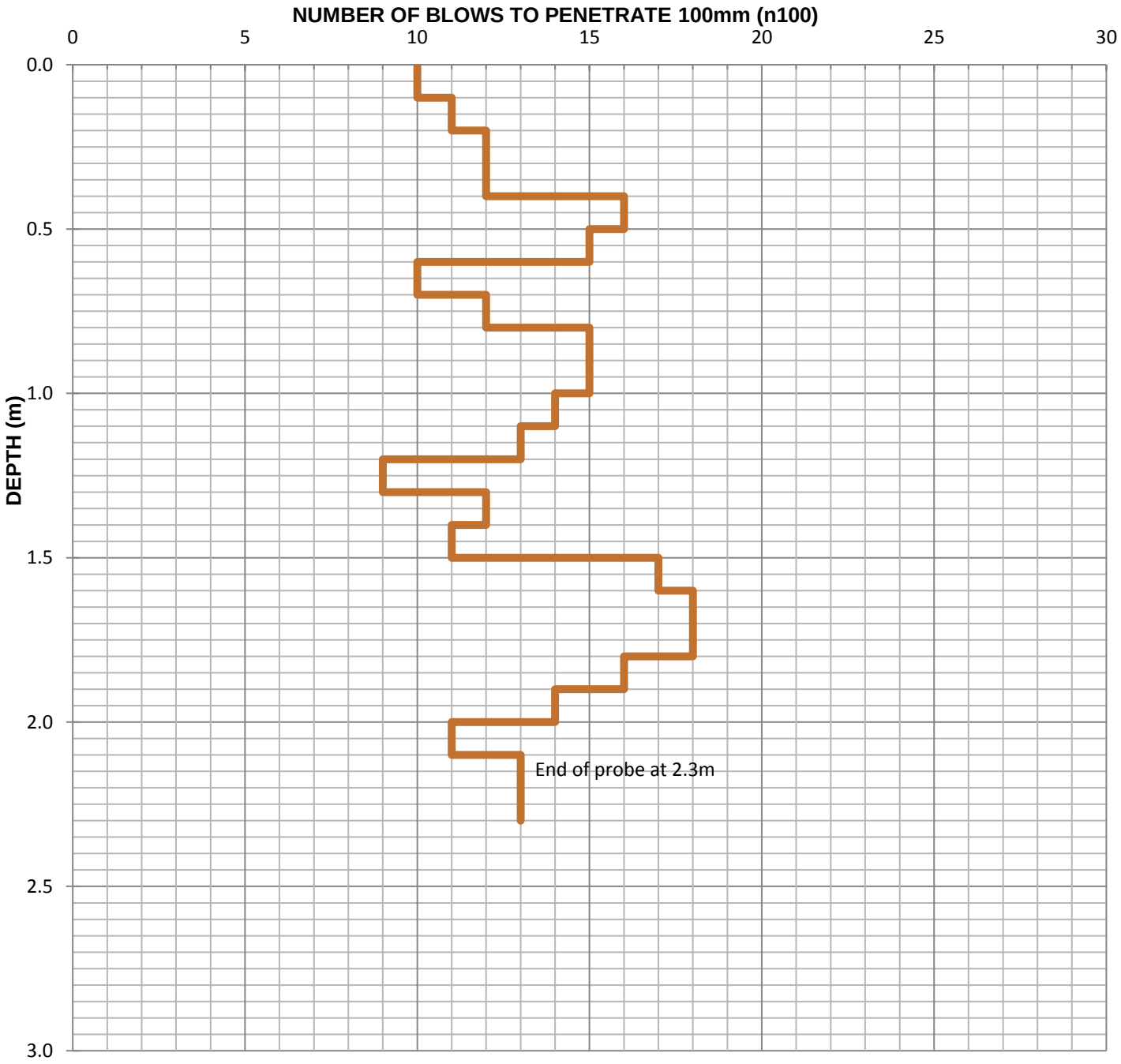
DYNAMIC CONE PENETROMETER LOG SHEET

Client: Cornerstone Construction and Development
Project: Proposed New Childcare Centre
Location: **110-112 Mt Vernon Rd, Mt Vernon**

PROBE: DCP 4

AS 1289.6.3.2-1997 (Cone Tip) 510 mm drop height.

Position:	**Chainage:** -	**Operator:**	MS & SH
Elevation: -	**Offset:** -	**Date:**	14/05/2018
Adjacent Test Hole / Pit:		**Checked:**	
Position Relative to Test Hole / Pit:		**Date:**	



Comments:

CONSULTING GEOTECHNICAL ENGINEERS
Unit 3, 20-22 Barry Road, Chipping Norton, NSW, 2170 Australia
Telephone: 61 2 7900 2489 Mob: 61 434 837 859 Email: admin@greywacke.com.au
GREYWACKE GEOTECHNICS

Job No.
COCD0206 - GEO AA

Document Set ID: 9633535
Version: 1, Version Date: 18/12/2019

Appendix D – Laboratory Test Certificates

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

AUSTRALIAN SOIL AND CONCRETE TESTING

ASCT Sydney South Laboratory
Unit 18, 2-8 Daniel Street, Wetherill Park NSW

Telephone: (02) 9725 5842
E-Mail: sydney.south@asct.com.au
Mobile: 0410 609 142
A.B.N. 92 328 384 368

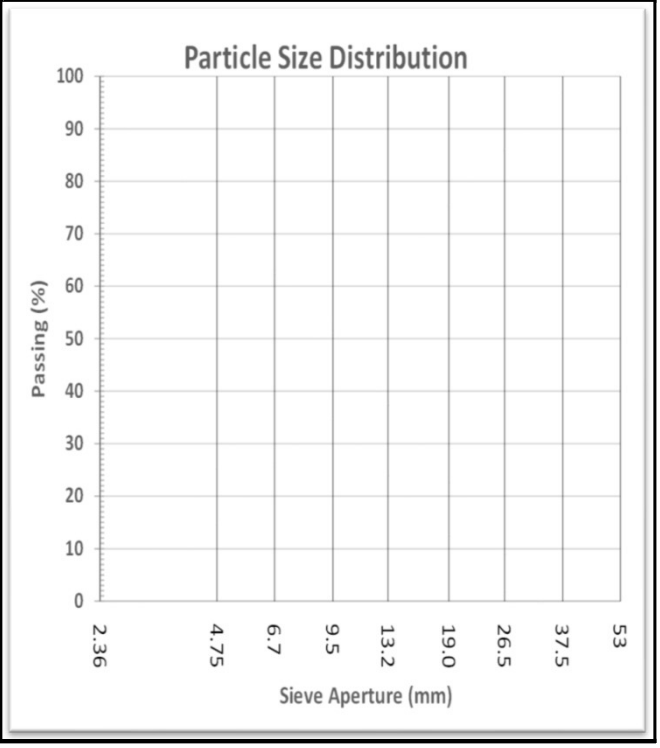
Report on PSD (AS1289.3.6.1) and AS Atterbergs

Client:	Greywacke Geotechnics	Report No:	**2**
Client Address:	1, 182 Waldron Road, Chester Hill, NSW 2162	Report Date:	29/05/2018
Project:	110-112 Mt Vernon Road, Mount Vernon	Report Page:	Page 1 of 2
Works Component:	BH3	Project No:	59
Material Used:	Existing	Test Request:	ID:1
Material Description:	Silty Clay	Lot Number:	Borehole 3
Lot Comments:	-	ITP/PCP Number:	N/A
		Control Line:	N/A

Sample Number	Sample Date	Chainage/Location	Offset	Level of Test	Test Depth
8022	**Client**	**N/A**	**N/A**	**1.0-1.2m**	**N/A**

Test Parameter	Units	Result	Specification Limits
Pre-Treatment	Units	**Result**	**Specification Limits**
Retained 53.0mm Sieve	%		
Pretreatment by Weathering	%		
Pretreatment by Compaction	%		
Particle Size Distribution	Units	**Result**	**Specification Limits**
Passing Sieve - 150mm	%		
Passing Sieve - 125mm	%		
Passing Sieve - 100mm	%		
Passing Sieve - 75mm	%		
Passing Sieve - 53mm	%		
Passing Sieve - 37.5mm	%		
Passing Sieve - 26.5mm	%		
Passing Sieve - 19.0mm	%		
Passing Sieve - 13.2mm	%		
Passing Sieve - 9.5mm	%		
Passing Sieve - 6.7mm	%		
Passing Sieve - 4.75mm	%		
Passing Sieve - 2.36mm	%		
Passing Sieve - 1.18mm	%		
Passing Sieve - 0.600mm	%		
Passing Sieve - 0.425mm	%		
Passing Sieve - 0.300mm	%		
Passing Sieve - 0.150mm	%		
Passing Sieve - 0.075mm	%		

Specification Name



Sampling & Test Methods

AS 1289.1.4.2: Stratified Random Number Method
AS1141.3.1, Cl 9.3: Sampling aggregates - Powered - Backblading
AS 1289.1.1: Preparation of disturbed soil samples for testing
AS 1289.3.6.1: Particle Size Distribution of a soil (Standard, by Sieving)
AS 1289.3.1.1: Liquid Limit, Four point Casagrande
AS 1289.3.2.1: Plastic Limit of a soil
AS 1289.3.3.1: Plasticity Index of a soil
AS 1289.3.4.1: Linear Shrinkage of a soil

Report Remarks & Endorsement

NATA

Accredited for compliance with ISO/IEC 17025 - Testing.
NATA Accreditation number: 20078

Issued By:
D.Heathcote
Approved Signatory

Document Set ID: 9463538
Version: 1, Version Date: 18/12/2019

AUSTRALIAN SOIL AND CONCRETE TESTING

ASCT Sydney South Laboratory
Unit 18, 2-8 Daniel Street, Wetherill Park NSW

Telephone: (02) 9725 5842
E-Mail: sydney.south@asct.com.au
Mobile: 0410 609 142
A.B.N. 92 328 384 368

Report on PSD (AS1289.3.6.1) and AS Atterbergs

Client:	Greywacke Geotechnics	Report No:	**2**
Client Address:	1, 182 Waldron Road, Chester Hill, NSW 2162	Report Date:	29/05/2018
Project:	110-112 Mt Vernon Road, Mount Vernon	Report Page:	Page 2 of 2
Works Component:	BH3	Project No:	59
Material Used:	Existing	Test Request:	ID:1
Material Description:	Silty Clay	Lot Number:	Borehole 3
Lot Comments:	-	ITP/PCP Number:	N/A
		Control Line:	N/A

PSD Curve Characteristics	Units	**Result**	**Specification Limits**	**Remarks**
Ratio A - 0.425mm/2.36mm	--			
Ratio B - 0.075mm/0.425mm	--			
Ratio C - 0.0135mm/0.075mm	--			
D60	mm			
D30	mm			
D10	mm			
Coefficient of Uniformity (Cu):	--			
Coefficient of Curvature (Cc):	--			
Plasticity	Units	**Result**	**Specification Limits**	**Remarks**
Liquid Limit	%	**48**		Oven Dried & Dry Sieved
Plastic Limit	%	**27**		Oven Dried & Dry Sieved
Plastic Index	%	**21**		Oven Dried & Dry Sieved
Linear Shrinkage	%	**6.0**		Oven Dried & Dry Sieved. Cracked/Broken Bar
WPI (Weighted Plasticity Index)	--			
WLS (Weighted Linear Shrinkage)	--			

Document Set ID: 9463538
Version: 1, Version Date: 18/12/2019

www.greywacke.com.au

GREYWACKE
GEOTECHNICS

Document Set ID: 9963538
Version: 1, Version Date: 18/12/2019

Date: 25 February 2019
Our Ref: P19031

Mr Vladimir Vanovac
P.O. Box 3038
North Parramatta NSW 1750

Dear Vladimir,

RE: 110 -112 Mount Vernon Rd, Mount Vernon
BCA COMPLIANCE ASSESSMENT

Please find enclosed our BCA Compliance Report prepared in respect of the proposed design contained within the architectural documentation provided.

In reviewing the content of this Report, particular attention is drawn to the content of Parts 3 and 4, as: –

- Part 3 summarizes the compliance status of the proposed design in terms of each prescriptive provision of the BCA.

  The inclusion of this summary enables an immediate understanding of the compliance status of the proposed design to be obtained.

- Part 4 contains a detailed analysis of the proposed design, and provides informative commentary & recommendation in respect of each instance of prescriptive non-compliance and area of preliminary only (design) detail, as applicable.

  This commentary enables the project team to readily identify and understand the nature and extent of information required within the Construction Certificate application to demonstrate the attainment of BCA compliance.

Should you require any further information, please do not hesitate to contact me on the number provided.

Yours faithfully

Kieran Tobin
Director

Document Set ID: 9068629
Version: 1, Version Date: 18/02/2019

BCA COMPLIANCE ASSESSMENT

PREPARED FOR

Mr Vladimir Vanovac

REGARDING
110 -112 Mount Vernon Rd, Mount Vernon

Prepared By

BCA vision

REPORT REGISTER

The following report register documents the development and issue of this report and project as undertaken by this office, in accordance with the *Quality Assurance* policy of BCA Vision Pty Ltd.

Our Reference	Issue No.	Remarks	Issue Date
P19031	1	Design Compliance Report	25 February 2019

The format, technical content and intellectual property associated with this report remain the property of BCA Vision Pty Limited, and has been prepared and may only be used, for the development / buildings the subject of this report.

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

CONTENTS PAGE

1.0 INTRODUCTION 1

1.1 General 1

1.2 Report Basis 1

1.3 Exclusions 1

1.4 Report Purpose 2

2.0 BUILDING DESCRIPTION 3

2.1 General 3

2.2 Rise in Storeys (Clause C1.2) 3

2.2 Building Classification (Clause A3.2) 3

2.4 Type of Construction (Table C1.1) 3

2.6 General Floor Area Limitations (Table C2.2) 4

3.0 BCA ASSESSMENT – SUMMARY 5

3.1 General 5

3.2 Section C – Fire resistance 5

3.3 Section D – Access and Egress 6

3.4 Section E – Services and Equipment 7

3.5 Section F – Health and Amenity 8

4.0 BCA ASSESSMENT – DETAILED ANALYSIS 1

4.1 General 1

4.2 Section C – Fire Resistance 1

4.4 Section D – Access and Egress 4

4.5 Section E – Services and Equipment 14

4.6 SECTION F – HEALTH AND AMENITY 17

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

1.0 INTRODUCTION

1.1 GENERAL

This "BCA Compliance Assessment" report has been prepared at the request of Mr Vladimir Vanovac, and relates to the premises located at 110 -112 Mount Vernon Rd, Mount Vernon.
The project proposal is for a new single storey childcare centre.

1.2 REPORT BASIS

The content of this report reflects –

(a) The principles and provisions of BCA 2016, Parts C, D, E & F;
(b) Concept Architectural documentation provided by Project Works Design –

Numbered	Titled	Dated
SK01	Site Plan	01/11/18
SK02	Floor Plan	08/02/18
SK03	Roof Plan	08/02/18
SK04	Elevations	08/02/18

1.3 EXCLUSIONS

It is conveyed that this report should not construed to infer that an assessment for compliance with the following has been undertaken –

(a) Structural and services design documentation;
(b) General building services;
(c) The individual requirements of service providers (i.e. Telstra, Water Supply, Energy Australia);
(d) The individual requirements of the Workcover Authority;
(e) Disability Discrimination Act (DDA);
(f) Assessment of any structural elements or geotechnical matters relating to the building, including any;
(g) Consideration of any fire services operations (including hydraulic, electrical or other systems);
(h) Assessment of plumbing and drainage installations, including stormwater;
(i) Assessment of mechanical plant operations, electrical systems or security systems;
(j) Heritage significance;
(k) Consideration of energy or water authority requirements;
(l) Consideration of Council's local planning policies;
(m) Environmental or planning issues;
(n) Requirements of statutory authorities;
(o) Sections B, G, H, J or I of the BCA are not considered.

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

1.4 REPORT PURPOSE

The purpose of this report is to identify the extent to which the proposed works comply with the relevant prescriptive provisions of BCA 2016, Parts C, D, E & F.

Assessment of the proposed design considers each prescriptive BCA provision, and identifies such as either: –

(a) Being complied with; or
(b) Not being complied with; or
(c) Requiring the provision further detail with the future Building Permit or other application or
(d) Not being relevant to the particular building works proposal.

The status of the design, in terms of these four (4) categories, is summarised within Part 3 of this report.

Where prescriptive non-compliance is identified, suitable recommendations to remedy the non-compliance shall be detailed in Part 4.

In instances where preliminary only detail exists, summary of the information required from the project team for inclusion within future applications (i.e. Construction Certificate) shall also be outlined in Part 4.

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

2.0 BUILDING DESCRIPTION

2.1 GENERAL

In the context of the Building Code of Australia (BCA), the subject development is described within items 2.2 – 2.6 below.

2.2 RISE IN STOREYS (CLAUSE C1.2)

The buildings are proposed to have a rise in storeys of one (1).

2.2 BUILDING CLASSIFICATION (CLAUSE A3.2)

The Building currently contains the following classifications

Class	Description
Class 9b	an assembly building, including a trade workshop, laboratory or the like in a primary or secondary school, but excluding any other parts of the building that are of another Class

2.3 Effective Height (Clause A1.1)

The buildings have an effective height of less than 12m.

2.4 TYPE OF CONSTRUCTION (TABLE C1.1)

Table 5 TYPE C CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	**Class of building—FRL: (in minutes)**
	Structural adequacy/ Integrity/ Insulation
	5, 7a or 9
EXTERNAL WALL (including any column and other building element incorporated therein) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—	
Less than 1.5 m	90/ 90/ 90
1.5 to less than 3 m	60/ 60/ 60
3 m or more	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—	
Less than 1.5 m	90/–/–
1.5 to less than 3 m	60/–/–
3 m or more	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90
INTERNAL WALLS-	
Bounding *public corridors*, public lobbies and the like—	–/–/–
Between or bounding *sole-occupancy units*—	–/–/–
Bounding a stair if *required* to be rated—	60/ 60/ 60
ROOFS	–/–/–

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

2.6 GENERAL FLOOR AREA LIMITATIONS (TABLE C2.2)

Subject to the following maximum fire compartment floor area and volume limits for Construction: –

Table C2.2 – Maximum size of Fire Compartments				
Building Class		Type A	Type B	**Type C**
5, 9b, 9c	Max Floor area Max Volume	8000 m^2 48,000 m^3	5,500 m^2 33,000 m^3	**3000 m^2** **18,000 m^3**

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

3.0 BCA ASSESSMENT – SUMMARY

3.1 GENERAL

The tables contained within items 3.2 – 3.5 below summarise the compliance status of the proposed architectural design in terms of each prescriptive provision of the Building Code of Australia.

For those instances of either "prescriptive non-compliance" or "preliminary only detail", a detailed analysis and commentary is provided within Part 4.

3.2 SECTION C – FIRE RESISTANCE

BCA reference	Complies	Does not comply	Detail Required	Not relevant
Spec. C1.1 – fire resisting construction			✓	
C1.3 – buildings of multiple classification				✓
C1.4 – mixed types of construction				✓
C1.5 – two storey Class 2 or 3 buildings				✓
C1.6 – Class 4 parts of a building				✓
C1.7 – open spectator stands & indoor sports stadiums				✓
C1.8 – lightweight construction				✓
C1.9 – non-combustible materials				
C1.10 – fire hazard properties			✓	
C1.11 – performance of external walls				✓
C2.2 – general floor area & volume limits	✓			
C2.3 – large isolated buildings				✓
C2.4 – requirements for open spaces & vehicular access				✓
C2.5 – Class 9a and 9c buildings				✓
C2.6 – vertical separation of openings in external walls				✓
C2.7 – separation of firewalls				✓
C2.8 – separation of classifications in same storey				✓
C2.9 – separation of classifications in different storeys				✓
C2.10 – separation of lift shafts				✓
C2.11 – stairways and lifts in one shaft				✓
C2.12 – separation of equipment				✓
C2.13 – electricity supply system				✓
C2.14 – public corridors in Class 2 and 3 buildings				✓
C3.1 – application of part				✓
C3.2 – openings in external walls	✓			
C3.3 – separation of external walls & associated openings				✓
C3.4 – acceptable methods of protection				✓
C3.5 – doorways in firewalls				✓
C3.6 – sliding fire doors				✓
C3.7 – doorways in horizontal exits				✓
C3.8 – openings in fire-isolated exits				✓
C3.9 – service penetrations in fire-isolated exits				✓
C3.10 – openings in fire-isolated lift shafts				✓
C3.11 – bounding construction: Class 2, 3, 4 buildings				✓
C3.12 – openings in floors & ceilings for services				✓
C3.13 – openings in shafts				✓
C3.15 – openings for service installations				✓
C3.16 – construction joints				✓
C3.17 – columns protected with f/r lightweight construction				✓

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

3.3 SECTION D – ACCESS AND EGRESS

BCA reference	Complies	Does not comply	Detail Required	Not relevant
D1.2 – number of exits required	✓			
D1.3 – when fire-isolated exits are required				✓
D1.4 – exit travel distances	✓			
D1.5 – distance between alternative exits	✓			
D1.6 – dimensions of exits and paths of travel to exits	✓			
D1.7 – travel via fire-isolated exits				✓
D1.8 – external stairways or ramps in lieu of fire-isolated exits				✓
D1.9 – travel via non-fire isolated stairways or ramps				✓
D1.10 – discharge from exits			✓	
D1.11 – horizontal exits				✓
D1.12 – non-required stairways or ramps				✓
D1.16 – plant rooms and lift motor rooms: concession				✓
D1.17 – access to lift pits				✓
D2.2 – fire-isolated stairways and ramps				✓
D2.3 – non-fire isolated stairways and ramps				✓
D2.4 – separation of rising and descending stair flights				✓
D2.5 – open access ramps and balconies				✓
D2.6 – smoke lobbies				✓
D2.7 – installations in exits and paths of travel			✓	
D2.8 – enclosure of space under stairs and ramps				✓
D2.9 – width of stairways				✓
D2.10 – pedestrian ramps				✓
D2.11 – fire-isolated passageways				✓
D2.12 – roof as open space				✓
D2.13 – goings and risers				✓
D2.14 – landings				✓
D2.15 – thresholds			✓	
D2.16 – balustrades				✓
D2.17 – handrails				✓
D2.18 – fixed platforms, walkways, stairways and ladders				✓
D2.19 – doorways and doors				✓
D2.20 – swinging doors	✓			
D2.21 – operation of latch			✓	
D2.22 – re-entry from fire-isolated exits				✓
D2.23 – signs on doors				✓
D2.24 – Protection of Openable windows				✓
D3.1 – General Building Access Requirements			✓	
D3.2 – Access to Buildings			✓	
D3.3 – parts of buildings to be accessible			✓	
D3.4 – concessions			✓	
D3.5 – car parking			✓	
D3.6 – signage			✓	
D3.7 – hearing augmentation services and features				✓
D3.8 – tactile indicators				✓
D3.9 – Wheelchair Seating				✓
D3.10 – Swimming Pools				✓
D3.11 - Ramps				✓
D3.12 – Glazing on Access ways			✓	

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

3.4 SECTION E – SERVICES AND EQUIPMENT

BCA reference	Complies	Does not comply	Detail Required	Not relevant
E1.3 – fire hydrants			✓	
E1.4 – fire hose reels			✓	
E1.5 – sprinklers				✓
E1.6 – portable fire extinguishers			✓	
E1.8 – fire control centres				✓
E1.9 – fire precautions during construction				✓
E1.10 – provision for special hazards				✓
E2.2a – general provisions			✓	
E2.2b – specific provisions				✓
E2.3 – provision for special hazards				✓
E3.2 – stretcher facility in lifts				✓
E3.3 – warning against use of lifts in fire				✓
E3.4 – emergency lifts				✓
E3.5 – landings				✓
E3.6 – facilities for people with disabilities				✓
E3.7 – fire service controls				✓
E3.8 – aged care buildings				✓
E3.9 – Fire Service Recall Switch				✓
E3.10 – Lift Car Fire Service Drive Control Switch				✓
E4.2 – emergency lighting			✓	
E4.4 – design and operation of emergency lighting			✓	
E4.5 – exit signs			✓	
E4.6 – direction signs			✓	✓
E4.7 – Class 2 and 3 buildings and Class 4 parts: exemptions				✓
E4.8 – design and operation of exit signs			✓	
E4.9 – Sound Systems & Intercom Systems for Emergencies				✓

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

3.5 SECTION F – HEALTH AND AMENITY

BCA reference	Complies	Does not comply	Can Readily Comply	Not relevant
F1.1 – stormwater drainage			✓	
F1.5 – roof coverings			✓	
F1.6 – sarking			✓	
F1.7 – water proofing of wet areas			✓	
F1.9 – damp proofing			✓	
F1.10 – damp proofing of floors on ground			✓	
F1.11 – floor wastes				✓
F1.12 – sub-floor ventilation				✓
F1.13 – glazed assemblies			✓	
F2.1 – facilities in residential buildings				✓
F2.3 – facilities in Class 3 to 9 buildings		✓		
F2.4 – facilities for people with disabilities			✓	
F2.5 – construction of sanitary compartments				✓
F2.7 – microbial (legionella) control				✓
F2.8 – waste management				✓
F3.1 – height of rooms			✓	
F4.1 – provision of natural light			✓	
F4.2 – methods and extent of natural lighting			✓	
F4.3 – natural lighting borrowed from adjoining room				✓
F4.4 – artificial lighting			✓	
F4.5 – ventilation of rooms			✓	
F4.6 – natural ventilation			✓	
F4.7 – ventilation borrowed from an adjoining room				✓
F4.8 – restriction on position of water closets and urinals				✓
F4.9 – airlocks				✓
F4.11 – car parks				✓
F4.12 – kitchen local exhaust ventilation			✓	
F5.2 – sound transmission class: interpretation				✓
F5.3 – sound transmission of floors between units				✓
F5.4 – sound insulation of walls between units				✓
F5.5 – sound insulation rating of walls				✓
F5.6 – sound insulation rating of services				✓
F5.7 – sound insulation of pumps				✓

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

4.0 BCA ASSESSMENT – DETAILED ANALYSIS

4.1 GENERAL

With reference to the "BCA Assessment Summary" contained within Part 3 above, the following detailed analysis and commentary is provided. This commentary is formulated to enable the design documentation to be further progressed, for the purpose of evidencing the attainment of compliance with the relevant provisions of the BCA.

4.2 SECTION C – FIRE RESISTANCE

C1.1	Fire resistance Levels Are required to comply with Table 4 of Specification C1.1	Generally, compliance is required with Table 5 of Specification C1.1 We note setbacks indicate that all external walls are greater than 3m from a property boundary Fire Source Feature
C1.10	Fire Hazard Properties (a) The *fire hazard properties* of the following linings, materials and assemblies in a Class 2 to 9 building must comply with Specification C1.10: (i) Floor linings and floor coverings. (ii) Wall linings and ceiling linings. (iii) Air-handling ductwork. (iv) Lift cars. (v) In Class 9b buildings used as a theatre, public hall or the like— (A) fixed seating in the audience area or auditorium; and (B) a proscenium curtain *required* by Specification H1.3. (vi) Escalators, moving walkways and non-*required* non *fire-isolated*	Further detail is required within the construction documentation.

Document Set ID: 9068629
Version: 1, Version Date: 18/12/2019

	*stairway*s or pedestrian ramps subject to Specification D1.12. (vii) *Sarking-type materials*. (viii) Attachments to floors, ceilings, internal walls and the internal linings of external walls. (ix) Other materials including insulation materials other than *sarking-type materials*. (b) Paint or fire-retardant coatings must not be used to make a substrate comply with the *required fire hazard properties*. (c) The requirements of (a) do not apply to a material or assembly if it is— (i) plaster, cement render, concrete, terrazzo, ceramic tile or the like; or (ii) a *fire-protective covering*; or (iii) a timber-framed *window*; or (iv) a solid timber handrail or skirting; or (v) a timber-faced solid-core door or timber-faced fire door; or (vi) an electrical switch, socket-outlet, cover plate or the like; or (vii) a material used for— (A) a roof insulating material applied in continuous contact with a substrate; or (B) an adhesive; or (C) a damp-proof course, flashing, caulking, sealing, ground moisture barrier, or the like; or (viii) a paint, varnish, lacquer or similar finish, other than nitro-cellulose lacquer; or (ix) a clear or translucent roof light of glass fibre reinforced polyester if— (A) the roof in which it is installed forms part of a single *storey*	

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	building *required* to be Type C construction; and (B) the material is used as part of the roof covering; and (C) it is not closer than 1.5 m from another roof light of the same type; and (D) each roof light is not more than 14 m^2 in area; and (E) the area of the roof lights per 70 m^2 of roof surface is not more than 14 m^2; or (x) a face plate or neck adaptor of supply and return air outlets of an air handling system; or (xi) a face plate or diffuser plate of light fitting and emergency *exit* signs and associated electrical wiring and electrical components; or (xii) a joinery unit, cupboard, shelving, or the like; or (xiii) an attached non-building fixture and fitting such as— (A) a curtain, blind, or similar decor, other than a proscenium curtain *required* by Specification H1.3; and (B) a whiteboard, *window* treatment or the like; or (xiv) any other material that does not significantly increase the hazards of fire.	

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

4.4 SECTION D – ACCESS AND EGRESS

Cl. D1.10	Discharge from exits (a) An *exit* must not be blocked at the point of discharge and where necessary, suitable barriers must be provided to prevent vehicles from blocking the *exit*, or access to it. (b) If a *required* *exit* leads to an *open space*, the path of travel to the road must have an unobstructed width throughout of not less than— (i) the minimum width of the *required* *exit*; or (ii) 1 m, whichever is the greater. (c) If an *exit* discharges to *open space* that is at a different level than the public road to which it is connected, the path of travel to the road must be by— (i) a ramp or other incline having a gradient not steeper than 1:8 at any part, or not steeper than 1:14 if *required* by the *Deemed-to-Satisfy Provisions* of Part D3	Further detail is required within the construction documentation.
Cl. D2.15	Thresholds The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless— (c) in a building *required* to be *accessible* by Part D3, the doorway— (i) opens to a road or *open space*; and (ii) is provided with a threshold ramp or step ramp in accordance with AS 1428.1	Further detail is required within the construction documentation.
Cl. D2.20	Swinging doors A swinging door in a required exit or forming part of a required exit— (a) must not encroach—	For reference

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

	(i) at any part of its swing by more than 500 mm on the required width (including any landings) of a required— (A) stairway; or (B) ramp; or (C) passageway, if it is likely to impede the path of travel of the people already using the exit; and (ii) when fully open, by more than 100 mm on the required width of the required exit, and the measurement of encroachment in each case is to include door handles or other furniture or attachments to the door; and (b) must swing in the direction of egress	
Cl. D2.21	Operation of latch (a) A door in a *required exit*, forming part of a *required exit* or in the path of travel to a *required exit* must be readily openable without a key from the side that faces a person seeking egress, by— (i) a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor and if serving an area *required* to be *accessible* by Part D3— (A) be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and (B) have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45 mm; or (ii) a single hand pushing action on a single device which is located between 900 mm and 1.2 m from the floor. (b) The requirements of (a) do not apply to a door that— (i) serves a vault, strong-room, *sanitary compartment*, or the like; or (iii) serves the secure parts of a bank, *detention centre*, mental health facility, *early childhood centre* or the like and it can be immediately unlocked—	Further detail is required within the construction documentation.

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	(A) by operating a fail-safe control switch, not contained within a protective enclosure, to actuate a device to unlock the door; or (B) by hand by a person or persons, specifically nominated by the owner, properly instructed as to the duties and responsibilities involved and available at all times when the building is lawfully occupied so that persons in the building or part may immediately escape if there is a fire	
Cl. D3.1	General building access requirements Buildings and parts of buildings must be *accessible* as *required* by Table D3.1, unless exempted by D3.4.	Specific non compliances were identified as follows:- 1) A technical non compliance exists where an Accessible sanitary facility is not positioned adjacent to 50% of banks of toilets – if raised by the nominated Certifier an Access Performance Report may be required 2) The staff sanitary facilities must be compliant as "Accessible" Sanitary facilities 3) The rear external ramp landings must be increased to 1500 x1500mm to allow for a 90 degree turn Compliance with the AS 1428.1 Clauses following must be observed/demonstrated through construction:- Clause 6 - CONTINUOUS ACCESSIBLE PATHS OF TRAVEL

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

		Clause 7 - FLOOR OR GROUND SURFACES ON CONTINUOUS ACCESSIBLE PATHS OF TRAVEL AND CIRCULATION SPACES Clause 10 - WALKWAYS, RAMPS AND LANDINGS Clause 13 - DOORWAYS, DOORS AND CIRCULATION SPACE AT DOORWAYS Clause 14 - SWITCHES AND GENERAL PURPOSE OUTLETS (POWER POINTS) Clause15 - SANITARY FACILITIES Clause 16 – AMBULANT SANITARY FACILITIES
Cl. D3.2	Access to buildings (a) An *accessway* must be provided to a building *required* to be *accessible*— (i) from the main points of a pedestrian entry at the allotment boundary; and (ii) from another *accessible* building connected by a pedestrian link; and (iii) from any *required* *accessible* carparking space on the allotment. (b) In a building *required* to be *accessible*, an *accessway* must be provided through the	For Reference

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

principal pedestrian entrance, and—

(i)

through not less than 50% of all pedestrian entrances including the principal pedestrian entrance; and

(ii) in a building with a total *floor area* more than 500 m^2, a pedestrian entrance which is not *accessible* must not be located more than 50 m from an *accessible* pedestrian entrance,

except for pedestrian entrances serving only areas exempted by D3.4.

(c) Where a pedestrian entrance *required* to be *accessible* has multiple doorways—

(i) if the pedestrian entrance consists of not more than 3 doorways — not less than 1 of those doorways must be *accessible*; and

(ii) if a pedestrian entrance consists of more than 3 doorways — not less than 50% of those doorways must be *accessible*.

(d) For the purposes of (c)—

(i) an *accessible* pedestrian entrance with multiple doorways is considered to be one pedestrian entrance where—

(A) all doorways serve the same part or parts of the building;

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	and (B) the distance between each doorway is not more than the width of the widest doorway at that pedestrian entrance (see Figure D3.2); and (ii) a doorway is considered to be the clear, unobstructed opening created by the opening of one or more door leaves (see Figure D3.2). (e) Where a doorway on an *accessway* has multiple leaves, (except an automatic opening door) one of those leaves must have a clear opening width of not less than 850 mm in accordance with AS 1428.1.	
Cl. D3.3	Parts of buildings to be accessible In a building *required* to be *accessible*— (a) every ramp and stairway, except for ramps and stairways in areas exempted by D3.4, must comply with— (i) for a ramp, except a *fire-isolated ramp*, clause 10 of AS 1428.1; and (ii) for a stairway, except a *fire-isolated stairway*, clause 11 of AS 1428.1; and (iii) for a *fire-isolated stairway*, clause 11.1(f) and (g) of AS 1428.1; and (b) every passenger lift must comply with E3.6; and	For Reference

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

(c) *accessways* must have—

(i) passing spaces complying with AS 1428.1 at maximum 20 m intervals on those parts of an *accessway* where a direct line of sight is not available; and

(ii) turning spaces complying with AS 1428.1—

(A) within 2 m of the end of *accessways* where it is not possible to continue travelling along the *accessway*; and

(B) at maximum 20 m intervals along the *accessway*; and

(d) an intersection of *accessways* satisfies the spatial requirements for a passing and turning space; and

(e) a passing space may serve as a turning space; and

(f) a ramp complying with AS 1428.1 or a passenger lift need not be provided to serve a *storey* or level other than the entrance *storey* in a Class 5, 6, 7b or 8 building—

(i) containing not more than 3 *storeys*; and

(ii) with a *floor area* for each *storey*, excluding the entrance *storey*, of not more than 200 m^2; and

(g) clause 7.4.1(a) of AS 1428.1 does not apply and

Document Set ID: 9468629
Version: 1, Version Date: 18/12/2019

	is replaced with 'the pile height or pile thickness shall not exceed 11 mm and the carpet backing thickness shall not exceed 4 mm'; and (h) the carpet pile height or pile thickness dimension, carpet backing thickness dimension and their combined dimension shown in Figure 8 of AS 1428.1 do not apply and are replaced with 11 mm, 4 mm and 15 mm respectively.	
Cl. D3.4	Exemptions The following areas are not *required* to be *accessible*: **(a)** An area where access would be inappropriate because of the particular purpose for which the area is used. **(b)** An area that would pose a health or safety risk for people with a disability. **(c)** Any path of travel providing access only to an area exempted by (a) or (b).	Consideration is required by the PCA as to whether a clause D3.4 (a) concession is available for the following areas Cot rooms Store rooms Nappy change Bottle Prep
Cl. D3.5	Accessible carparking Accessible carparking spaces— (a) subject to (b), must be provided in accordance with Table D3.5 in— (i) a Class 7a building required to be accessible; and (ii) a carparking area on the same allotment as a building required to be accessible; and (b) need not be provided in a Class 7a building or a carparking area where a parking service is provided and direct access to any of the carparking spaces is not available to the public; and (c) subject to (d), must comply with AS/NZS 2890.6; and (d) need not be designated where there is a total of not more than 5 carparking spaces, so as to restrict the use of the carparking space only for people with a disability.	Further detail is required within the construction documentation.
Cl. D3.6	Signage In a building *required* to be *accessible*— (a) braille and tactile signage complying with Specification D3.6 must—	Further detail is required within the construction documentation.

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

	(i) incorporate the international symbol of access or deafness, as appropriate, in accordance with AS 1428.1 and identify each— (A) sanitary facility, except a sanitary facility within a *sole-occupancy unit* in a Class 1b or Class 3 building; and (B) space with a hearing augmentation system; and (ii) identify each door *required* by E4.5 to be provided with an *exit* sign and state— (A) "Exit"; and (B) "Level" followed by the floor level number; and (b) signage including the international symbol for deafness in accordance with AS 1428.1 must be provided within a room containing a hearing augmentation system identifying— (i) the type of hearing augmentation; and (ii) the area covered within the room; and (iii) if receivers are being used and where the receivers can be obtained; and (c) signage in accordance with AS 1428.1 must be provided for *accessible* unisex sanitary facilities to identify if the facility is suitable for left or right handed use; and (d) signage to identify an ambulant *accessible* sanitary facility in accordance with AS 1428.1 must be located on the door of the facility; and (e) where a pedestrian entrance is not *accessible*, directional signage incorporating the international symbol of access, in accordance with AS 1428.1 must be provided to direct a person to the location of the nearest *accessible* pedestrian entrance; and (f) where a bank of sanitary facilities is not provided with an *accessible* unisex sanitary facility, directional signage incorporating the international symbol of access in accordance with AS 1428.1 must be placed at the location of the sanitary facilities that are not *accessible*, to direct a person to the location of the nearest *accessible* unisex sanitary facility.	

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

Cl. D3.12	Glazing on an accessway On an *accessway*, where there is no chair rail, handrail or transom, all frameless or fully glazed doors, sidelights and any glazing capable of being mistaken for a doorway or opening, must be clearly marked in accordance with AS428.1.	Further detail is required within the construction documentation.

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

4.5 SECTION E – SERVICES AND EQUIPMENT

Cl. E1.3	Fire hydrants (a) A fire hydrant system must be provided to serve a building— (i) having a total floor area greater than 500 m2; and (ii) where a fire brigade is available to attend a building fire. (b) The fire hydrant system— (i) must be installed in accordance with AS 2419.1, except a Class 8 electricity network substation need not comply with clause 4.2 of AS 2419.1 if— (A) it cannot be connected to town main supply; and (B) one hour water storage is provided for firefighting	Verification will be required with the Construction Documentation
Cl. E1.4	Fire hose reels (a) E1.4 does not apply to— (i) a Class 2 or 3 building or Class 4 part of a building; or (ii) a Class 8 electricity network substation; or (iii) a Class 9c building; or (iv) classrooms and associated corridors in a primary or secondary school. (b) A fire hose reel system must be provided— (i) to serve the whole building where one or more internal fire hydrants are installed; or (ii) where internal fire hydrants are not installed, to serve any fire compartment with a floor area greater than 500 m2 (c) The fire hose reel system must— (i) have fire hose reels installed in accordance with AS 2441; and (ii) provide fire hose reels to serve only the storey at which they are located, except a sole-occupancy unit of not more than 2 storeys in a Class 5, 6, 7, 8 or 9 building may be served by a single fire hose reel located at the level of egress from that sole-occupancy unit provided the fire hose reel can provide coverage to the whole of the sole-occupancy unit. (d) Fire hose reels must be located internally, externally or in combination, to achieve the system coverage specified in AS 2441.	Verification will be required with the Construction Documentation
Cl. E1.6	Portable fire extinguishers (a) Portable fire extinguishers must be—	Verification will be required with the Construction Documentation

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	(i) provided as listed in Table E1.6; and (ii) for a Class 2 or 3 building or Class 4 part of a building, provided— (A) to serve the whole Class 2 or 3 building or Class 4 part of a building where one or more internal fire hydrants are installed; or (B) where internal fire hydrants are not installed, to serve any *fire compartment* with a *floor area* greater than 500 m^2, and for the purposes of this clause, a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building is considered to be a *fire compartment*; and (iii) subject to (b), selected, located and distributed in accordance with Sections 1, 2, 3 and 4 of AS 2444. (b) Portable fire extinguishers provided in a Class 2 or 3 building or Class 4 part of a building must be— (i) an ABE type fire extinguisher; and (ii) a minimum size of 2.5 kg; and (iii) distributed outside a *sole-occupancy unit*— (A) to serve only the *storey* at which they are located; and (B) so that the travel distance from the entrance doorway of any *sole-occupancy unit* to the nearest fire extinguisher is not more than 10 m.	
Cl. E2.2	Unless otherwise described in (b), in a building or part of a building used as an assembly building (not being a night club, discotheque or the like; or an exhibition hall, museum or art gallery) where the floor area of a fire compartment is more than 2000 m2, the fire compartment must be provided with— (i) an automatic smoke exhaust system complying with Specification E2.2b; or (ii) roof mounted automatic smoke-and-heat vents complying with Specification E2.2c, in a single storey building or the top storey of a multi storey building; or (iii) if the floor area of the fire compartment is not more than 5000 m2 has a rise in storeys of not more than — and the building	Verification will be required with the Construction Documentation

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

	(A) an automatic smoke detection and alarm system complying with Specification E2.2a; or (B) a sprinkler system complying with Specification E1.5. (b) The following buildings are exempt from the provisions of (a): (i) Sporting complexes, (including sports halls, gymnasiums, swimming pools, ice and roller rinks, and the like) other than indoor sports stadiums with total spectator seating for more than 1000 persons. (ii) Churches and other places used solely for religious worship. (iii) School classrooms.	
Cl. E4.2 **Cl. E4.4**	AS 2293.1 compliant emergency lighting must be provided throughout the car parking area and egress points from it.	Verification will be required with the Construction Documentation
Cl. E4.5 **Cl. E4.8**	AS 2293.1 compliant Exit Signage is required above each Exit door	Verification will be required with the Construction Documentation
Cl. E4.6 **Cl. E4.8**	AS 2293.1 compliant Directional signage must be provided where Exit signage is not directly visible	Verification will be required with the Construction Documentation

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

4.6 SECTION F – HEALTH AND AMENITY

Cl. F1.1	Stormwater drainage Stormwater drainage must comply with AS/NZS 3500.3.	Further details of compliance will be required within the Construction Documentation
Cl. F1.5	Roof coverings A roof must be covered with— metal sheet roofing complying with AS 1562.1	Further details of compliance will be required within the Construction Documentation
Cl. F1.6	Sarking *Sarking-type materials* used for weatherproofing of roofs and walls must comply with AS/NZS 4200 Parts 1 and 2.	Further details of compliance will be required within the Construction Documentation
Cl. F1.7	Waterproofing of wet areas in buildings In a Class 5, 6, 7, 8 or 9 building, building elements in the bathroom or shower room, a slop hopper or sink compartment, a laundry or *sanitary compartment* must— (i) be *water resistant* or *waterproof* in accordance with Table F1.7; and (ii) comply with AS 3740, as if they were in a Class 2 or 3 building or a Class 4 part of a building. (c) Where a slab or stall type urinal is installed— (i) the floor surface of the room containing the urinal must— (A) be an impervious material; and (B) where no step is installed— (aa) be graded to the urinal channel for a distance of 1.5 m from the urinal channel; and (bb) the remainder of the floor be graded to a floor	Further details of compliance will be required within the Construction Documentation

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	waste; and (C) where a step is installed— (aa) the step must have an impervious surface and be graded to the urinal channel; and (bb) the floor behind the step must be graded to a floor waste; and (ii) the junction between the floor surface and the urinal channel must be impervious. (d) Where a wall hung urinal is installed— (i) the wall must be surfaced with impervious material extending from the floor to not less than 50 mm above the top of the urinal and not less than 225 mm on each side of the urinal. (ii) the floor must be surfaced with impervious material and graded to a floor waste. (e) In a room with timber or steel framed walls and containing a urinal— (i) the wall must be surfaced with an impervious material extending from the floor to not less than 100 mm above the floor surface; and (ii) the junction of the floor surface and the wall surface must be impervious.	
Cl. F1.9	Damp-proofing (a) Except for a building covered by (c), moisture from the ground must be prevented from reaching— (i) the lowest floor timbers and the walls above the lowest floor joists; and	Further details of compliance will be required within the Construction Documentation

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	(ii) the walls above the damp-proof course; and (iii) the underside of a suspended floor constructed of a material other than timber, and the supporting beams or girders. (b) Where a damp-proof course is provided, it must consist of— (i) a material that complies with AS/NZS 2904; or (ii) impervious termite shields in accordance with AS 3660.1. (c) The following buildings need not comply with (a): (i) A Class 7 or 8 building where in the particular case there is no necessity for compliance. (ii) A garage, tool shed, *sanitary compartment*, or the like, forming part of a building used for other purposes. (iii) An *open spectator stand* or *open-deck car park.*	
Cl. F1.10	Damp-proofing of floors on the ground If a floor of a room is laid on the ground or on fill, moisture from the ground must be prevented from reaching the upper surface of the floor and adjacent walls by the insertion of a vapour barrier in accordance with AS 2870, except damp-proofing need not be provided if— (a) weatherproofing is not *required*; or (b) the floor is the base of a stair, lift or similar *shaft* which is adequately drained by gravitation or mechanical means.	Further details of compliance will be required within the Construction Documentation
Cl. F1.13	Glazed assemblies (a) Subject to (b) and (c), the following glazed assemblies in an	Further details of compliance will be required within the Construction Documentation

Document Set ID: 9068529
Version: 1, Version Date: 18/12/2019

	external wall, must comply with AS 2047 requirements for resistance to water penetration: (i) Windows. (ii) Sliding doors with a frame. (iii) Adjustable louvres. (iv) Shopfronts. (v) Window walls with one piece framing. (b) The following buildings need not comply with (a): (i) A Class 7 or 8 building where in the particular case there is no necessity for compliance. (ii) A garage, tool shed, *sanitary compartment*, or the like, forming part of a building used for other purposes, except where the construction of the garage, tool shed, *sanitary compartment* or the like contributes to the weatherproofing of the other part of the building. (iii) An *open spectator stand* or *open-deck car park*. (c) The following glazed assemblies need not comply with (a): (i) All glazed assemblies not in an *external wall*. (ii) Hinged doors, including French doors and bi-fold doors. (iii) Revolving doors. (iv) Fixed louvres. (v) Skylights, roof lights and windows in other than the vertical plane. (vi) Sliding doors without a frame. (vii) Shopfront doors. (viii) Windows constructed on site and architectural one-off windows, which are not design tested in accordance with	

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	AS 2047. (ix) Second-hand windows, re-used windows, recycled windows and replacement windows. (x) Heritage windows.	
Cl. F2.3	Facilities in Class 3 to 9 buildings (a) Sanitary facilities must be provided for Class 3, 5, 6, 7, 8 or 9 buildings in accordance with Table F2.3. (b) If not more than 10 people are employed, a unisex facility may be provided instead of separate facilities for each sex. (c) If the majority of employees are of one sex, not more than 2 employees of the other sex may share toilet facilities if the facilities are separated by means of walls, partitions and doors to afford privacy. (d) Employees and the public may share the same facilities in a Class 6 and 9b building (other than a *school* or *early childhood centre*) provided the number of facilities provided is not less than the total number of facilities *required* for employees plus those *required* for the public. (e) Adequate means of disposal of sanitary towels must be provided in sanitary facilities for use by females. (g) A Class 9b *early childhood centre* must be provided with—	The quantity of sanitary facilities comply. The following additional detail is required:- Childcare Centre In addition to the sanitary facilities documented:- • the kitchen facilities must be protected by a door or gate with child proof latches to prevent unsupervised access to the facilities by children younger than 5 years old; • a bench type baby bath, which is within 1 m of the nappy change bench; and • A Nappy Changing Bench as follows:- (aa) is within 1 m of separate adult hand washing facilities and bench type baby bath; and (bb) must be not less than 0.9 m^2 in area and at a height of not less than 850 mm, but not more than 900 mm above the finished floor level; and (cc) must have a space not less than 800 mm high,

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

	(i) a kitchen or food preparation area with a kitchen sink, separate hand washing facilities, space for a refrigerator and space for cooking facilities, with— (A) the facilities protected by a door or gate with child proof latches to prevent unsupervised access to the facilities by children younger than 5 years old; and (B) the ability to facilitate supervision of children from the facilities if the *early childhood centre* accommodates children younger than 2 years old; and (ii) one bath, shower or shower-bath; and (iii) if the centre accommodates children younger than 3 years old— (A) a laundry facility comprising a washtub and space in the same room for a washing machine; and (B) a bench type baby bath, which is within 1 m of the nappy change bench; and (C) a nappy changing bench	500 mm wide and 800 mm deep for the storage of steps Further details of compliance will be required within the Construction Documentation

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	which— (aa) is within 1 m of separate adult hand washing facilities and bench type baby bath; and (bb) must be not less than 0.9 m^2 in area and at a height of not less than 850 mm, but not more than 900 mm above the finished floor level; and (cc) must have a space not less than 800 mm high, 500 mm wide and 800 mm deep for the storage of steps; and (dd) is positioned to permit a staff member changing a nappy to have visibility of the play area at all times. (h) Class 9b theatres and sporting venues must be provided with one shower for each 10 participants or part thereof. (i) Not less than one washbasin must be provided where closet pans or urinals are provided.	
Cl. F2.4	Accessible sanitary facilities	1) A technical non compliance exists where an Accessible sanitary facility is not positioned

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	In a building *required* to be *accessible*— (a) *accessible* unisex *sanitary compartments* must be provided in *accessible* parts of the building in accordance with Table F2.4(a); and (c) at each bank of toilets where there is one or more toilets in addition to an *accessible* unisex *sanitary compartment* at that bank of toilets, a *sanitary compartment* suitable for a person with an ambulant disability in accordance with AS 1428.1 must be provided for use by males and females; and (d) an *accessible* unisex *sanitary compartment* must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary towels; and (e) the circulation spaces, fixtures and fittings of all *accessible* sanitary facilities provided in accordance with Table F2.4(a) and Table F2.4(b) must comply with the requirements of AS 1428.1 and (f) an *accessible* unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only; and (g) where two or more of each type of *accessible* unisex sanitary facility are provided, the number of left and right handed mirror image facilities must be provided as evenly as possible; and	adjacent to 50% of banks of toilets – if raised by the nominated Certifier an Access Performance Report may be required 2) The staff sanitary facilities must be compliant as "Accessible" Sanitary facilities

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

	(h) where male sanitary facilities are provided at a separate location to female sanitary facilities, *accessible* unisex sanitary facilities are only *required* at one of those locations; and (i) an *accessible* unisex *sanitary compartment* or an *accessible* unisex shower need not be provided on a *storey* or level that is not *required* by D3.3(f) to be provided with a passenger lift or ramp complying with AS 1428.1.	
Cl. F3.1	Height of rooms and other spaces The height of rooms and other spaces must be not less than in a Class 9b building— (i) a school classroom or other assembly building or part that accommodates not more than 100 persons — 2.4 m; and (ii) a theatre, public hall or other assembly building or part that accommodates more than 100 persons — 2.7 m; and (iii) a corridor— (A) that serves an assembly building or part that accommodates not more than 100 persons — 2.4 m; or (B) that serves an assembly building or part that accommodates more than 100 persons — 2.7 m; and in any building— (i) a bathroom, shower room, sanitary compartment, airlock, tea preparation room, pantry, store room, garage, car parking area, or the like — 2.1 m; and (ii) a commercial kitchen — 2.4 m; and (iii) above a stairway, ramp, landing or the like — 2 m measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like.	Further details of compliance will be required within the Construction Documentation

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

Cl. F4.1	Provision of natural light Natural light must be provided in: Class 9b buildings — to all general purpose classrooms in primary or secondary schools and all playrooms or the like for the use of children in an early childhood centre.	Further details of compliance will be required within the Construction Documentation
Cl. F4.2	Methods and extent of natural lighting *Required* natural lighting must be provided by— (i) *windows*, excluding *roof lights*, that— (A) have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 10% of the *floor area* of the room; and (B) are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like; or (ii) *roof lights*, that— (A) have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other (B) obstructions of not less than 3% of the *floor area* of (iii) the room; and In a Class 9b *early childhood centre*, the sills of 50% of *windows* in children's rooms must be located not more than 500 mm above the floor level.	Further details of compliance will be required within the Construction Documentation
Cl. F4.4	Artificial lighting (a) Artificial lighting must be provided— (i) in *required* stairways, passageways, and ramps; and	Further details of compliance will be required within the Construction Documentation

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

	(ii) if natural lighting of a standard equivalent to that *required* by F4.2 is not available, and the periods of occupation or use of the room or space will create undue hazard to occupants seeking egress in an emergency, in— (A) Class 4 parts of a building — to *sanitary compartments*, bathrooms, shower rooms, airlocks and laundries; and (B) Class 2 buildings — to *sanitary compartments*, bathrooms, shower rooms, airlocks, laundries, common stairways and other spaces used in common by the occupants of the building; and (C) Class 3, 5, 6, 7, 8 and 9 buildings — to all rooms that are frequently occupied, all spaces *required* to be *accessible*, all corridors, lobbies, internal stairways, other circulation spaces and paths of egress. (b) The artificial lighting system must comply with AS/NZS 1680.0. (c) The system may provide a lesser level of illumination to the following spaces during times when the level of lighting would be inappropriate for the use: (i) A theatre, cinema or the like, when performances are in progress, with the exception of aisle lighting *required* by Part H1. (ii) A museum, gallery or the like, where sensitive displays require low lighting levels. (iii) A discotheque, nightclub or the like, where to create an ambience and character for the space, low lighting levels are used.	

Document Set ID: 9963639
Version: 1, Version Date: 18/12/2019

Cl. F4.5	Ventilation of rooms A *habitable room*, office, shop, factory, workroom, *sanitary compartment*, bathroom, shower room, laundry and any other room occupied by a person for any purpose must have— (a) natural ventilation complying with F4.6; or (b) a mechanical ventilation or air-conditioning system complying with AS 1668.2 and AS/NZS 3666.1.	Further details of compliance will be required within the Construction Documentation
Cl. F4.6	Natural ventilation (a) Natural ventilation provided in accordance with F4.5(a) must consist of permanent openings, *windows*, doors or other devices which can be opened— (i) with an aggregate opening or openable size not less than 5% of the *floor area* of the room *required* to be ventilated; and (ii) open to— (A) a suitably sized court, or space open to the sky; or (B) an open verandah, carport, or the like; or (C) an adjoining room in accordance with F4.7. (b) The requirements of (a)(i) do not apply to a Class 8 *electricity network substation*.	Further details of compliance will be required within the Construction Documentation
Cl. F4.12	Kitchen local exhaust ventilation A commercial kitchen must be provided with a kitchen exhaust hood complying with AS/NZS 1668.1 and AS 1668.2 where— (a) any cooking apparatus has— (i) a total maximum electrical power input	Further details of compliance will be required within the Construction Documentation

Document Set ID: 9963629
Version: 1, Version Date: 18/12/2019

	exceeding 8 kW; or (ii) a total gas power input exceeding 29 MJ/h; or (b) the total maximum power input to more than one apparatus exceeds— (i) 0.5 kW electrical power; or (ii) 1.8 MJ gas, per m^2 of *floor area* of the room or enclosure.	

Author

Kieran Tobin
Senior NCC Consultant (GD BS UWS),
Accredited BPB

Document Set ID: 9068629
Version: 1, Version Date: 18/12/2019

lindsay perry access

Disability Access Report

Proposed Childcare Centre

110-112 Mount Vernon Road
MOUNT VERNON NSW

For: Vladimir Vanovac & Mark Toma
Ref: LP_19025

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

Executive Summary

Development application documentation for the Proposed Childcare Centre located at 110-112 Mount Vernon Road Mount Vernon, has been reviewed against the requirements of the Building Code of Australia 2019 and The Disability Discrimination Act 1992 with regard to access for persons with a disability. The requirements of the Disability Standards for Access to Premises (Buildings) and the Access Code for Buildings have also been addressed.

We consider that the drawings presented for assessment, for the purposes of a development application, generally comply with the abovementioned legislation.

The following table summarises compliance status.

Item No.	Description	Compliance Status
Access and Approach		
3.1	Street Boundary to Entrance	Compliant
3.2	Carparking to Entrance	Compliant
3.3	Pathways	Capable of compliance
3.4	Accessible Carparking	Capable of compliance
3.5	Kerb Ramp	Capable of compliance
3.6	Entrance	Capable of compliance
Interior		
4.1	Extent of Access Generally	Compliant
4.2	Circulation Areas	Compliant
4.3	Doorways	Compliant
4.4	Exempt Areas	Compliant
4.5	Floor Finishes	To be addressed during detailed design
4.6	Visual Indication to Glazing	To be addressed during detailed design
4.7	Signage	To be addressed during detailed design
4.8	Slip Resistance	To be addressed during detailed design
Sanitary Facilities		
5.1	Distribution	Compliant
5.2	Accessible Toilets	Capable of compliance
Vertical Circulation		
6.1	Accessible Ramps	Capable of compliance
6.2	Stairs	Capable of compliance

Construction is to be in accordance with the recommendations made in this access report to ensure compliance. Where construction differs from the drawings, further assessment will be required to ascertain compliance.

This report is limited to items within drawings listed in this report only. Future alterations and additions to the building will render the recommendations in this report null and void as we cannot guarantee continued compliance where changes to the building fabric are made. A high level of maintenance is recommended to ensure continued compliance with access legislation.

Document Set ID: 9963535
Version: 1, Version Date: 18/12/2019

All dimensions quoted throughout this report and within Australian Standards are CLEAR dimensions, not structural. This needs to be considered in the preparation of the construction certificate documentation to account for wall linings and the like.

Best practice options, as noted in the report, are not mandatory but will minimise the risk of a complaint made under the DDA.

The recommendations throughout this report reflect the professional opinion and interpretation of Lindsay Perry. This may differ from that of other consultants. We aim to provide practical, performance-based advice based on project specifics that will maximize access for persons with a disability to the built environment.

Lindsay Perry is a qualified Access Advisor, being an accredited within Australia (ACAA No. 136) and at the international level (GAATES No. BE-02-106-18). Lindsay Perry Access Pty Ltd carries public liability insurance, professional indemnity insurance and workers compensation insurance.

LINDSAY PERRY
B.Arch, M.Dis.Stud.

Internationally Certified Access Consultant GAATES ICAC BE-02-106-18
ACAA Accredited Access Consultant No. 136 |
Registered Architect NSW 7021
Livable Housing Assessor 20047 | Changing Places Assessor CP005

Revision Summary

Date	Description	Revision
26 Feb. 2019	draft Disability Access Report	0
7 March 2019	Disability Access Report	1
16 October 2019	Disability Access Report	2

Document Set ID: 9068525
Version: 1, Version Date: 18/12/2019

1. Project Background

This Access Report considers the Proposed Childcare Centre located at 110-112 Mount Vernon Road Mount Vernon, against the requirements of the Building Code of Australia 2016 (BCA), Disability (Access to Premises) Standards 2010 and The Disability Discrimination Act 1992 (DDA), with regard to access for persons with a disability.

The proposed childcare centre is provided over a single level and accommodates ninety-six (96) children within six (6) play rooms. The childcare areas are arranged along a north facing verandah with access to outdoor play areas. Ancillary areas are provided along the southern side of the building. Carparking is provided at the front of the building with easy access provided to the building entrance.

Documentation prepared by Project Works Design has been reviewed as follows:

- DA01 - Proposed Site Plan
- DA02 - Proposed Floor Plan

It is estimated that one in five people in Australia have a long-term disability (Australian Bureau of Statistics – 2003). This includes physical disability, intellectual disability, and sensory impairments such as vision and hearing. It does not include those with a short-term (temporary) disability or the continuing aging population.

Lindsay Perry Access have adopted a best practice, performance-based approach to access. Assessment is based on project specifics and takes into account various factors such as site topography, heritage and existing site conditions.

2. Legislation

Access assessment has been made against Access Legislation including:

- The Commonwealth Disability Discrimination Act 1992 (DDA)
- Disability (Access to Premises (Buildings)) Standards 2010
- Access Code for Buildings 2010
- The Building Code of Australia 2019 (BCA) Section D3 – Access for People with Disabilities
- The Building Code of Australia 2019 (BCA) Section D2 (in part) – thresholds and slip resistant
- The Building Code of Australia 2016 (BCA) Section E3.6 – Lifts
- Australian Standards AS1428.1(2009) Amendment 1, AS1428.2(1992), AS1428.4(2009) – Design for Access and Mobility
- Australian Standard AS2890.6 (2009) – Parking Facilities – Off street carparking For People with Disabilities.

A summary of the requirements of relevant legislation follows.

- The DDA requires independent, equitable, dignified access to all parts of the building for all building users regardless of disability. The DDA makes it unlawful to discriminate against a person on the grounds of disability. The DDA is a complaint-based law and is administered by the Human Rights Commission

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

- The **DDA Premises Standards** include an **Access Code** written in the same style as the Building Code of Australia. That is, the Access Code has a number of Performance Requirements that are expressed in broad terms and references to a number of technical Deemed-to-Satisfy Provisions. The Deemed-to-Satisfy provisions refer in many cases to technical details in Australian Standards such as AS1428.1, the primary Australian Standard relating to building access for people with a disability.

- The **BCA 2019** for Class 9b Childcare buildings requires access for people with disabilities to and within all areas usually used by the occupants.

- **AS1428 – Design for Access and Mobility** requires the inclusion of a continuous accessible path of travel from the street footpaths and carparking areas to the entry and facilities within the building. It also includes requirements for doorways, stairs, toilets, etc.

  Part 1 (2009) of this standard contains access requirements that are mandatory for the provision of access for persons with a disability and is referred by the BCA. Amendment 1 of this document was released in 2010.

  Part 2 (1992) provides enhanced and best practice requirements. While AS1428.2 is not mandatory, the inclusion of its requirements such as accessible reception counters reduce the risk of a complaint made under the DDA. AS1428.2 is referenced by the Human Rights and Equal Opportunities Commission Advisory Notes for Access to Premises that accompanies the DDA.

  Requirements for tactile indicators are included in Part 4.1 (2009) of this standard.

  Part 5 (2010) provides requirements for Communication for people who are deaf or hearing impaired but is not referenced by the BCA.

- **AS2890.6** applies to the carparking areas generally.

3. Access and Approach

The approach to the building needs to be considered when considering access for persons with a disability. The BCA has three requirements for the approach to the building for persons with a disability.

An accessible path of travel is required to the building entrance from the allotment boundary at the main points of pedestrian entry, from accessible carparking areas and from any adjacent and associated accessible building.
In this instance, the approach to the building has been considered as follows:

- from the allotment boundary at the pedestrian entrance along Mount Vernon Road;
- from the carparking area to the entrance.

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

3.1 Approach from Street Boundary

The BCA requires that a continuous accessible path of travel be provided from the allotment boundary at the main points of pedestrian entry to the main entrance.

Compliance Summary:

Compliant

A formed pedestrian pathway is provided to the entrance from the allotment boundary along Mount Vernon Road. Spot levels indicate that the area is level and conducive to the provision of an accessible path of travel.

3.2 Approach from Accessible Carparking

The BCA requires that a continuous accessible path of travel be provided from the accessible carparking areas to the main entrance.

Compliance Summary:

Compliant

A formed pedestrian pathway is provided to the entrance from the accessible carparking areas. Spot levels indicate that the area is level and conducive to the provision of an accessible path of travel.

3.3 Pathways Generally

An accessible path of travel is required from the accessible carparking areas to the main entrance of the building and from the allotment boundary to the main entrance. The accessible path of travel refers to a pathway which is grade restricted and provides wheelchair access as per the requirements of AS1428.

Compliance Summary:

Capable of compliance

Recommendations:

For compliance with AS1428.1, the following access requirements apply and should be addressed during preparation of the construction certificate documentation to ensure compliance.

a. The minimum unobstructed width of all pathways is to be 1000mm (AS1428.1, Clause 6.3). A width of 1200mm is preferred for compliance with AS1428.2.

b. All pathways are to be constructed with no lip or step at joints between abutting surfaces (a construction tolerance of 3mm is allowable, or 5mm for bevelling edges).

c. The maximum allowable crossfall of pathways is to be 1:40.
d. The ground abutting the sides of the pathways should follow the grade of the pathway and extend horizontally for 600mm. We note that this is not required where there is a kerb or handrail provided to the side of the pathway.

e. Pathways to have passing bays complying with AS1428.1 at maximum 20m intervals where a direct line of site is not available.

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

3.4 Accessible Carparking

Where in excess of five carparking spaces are provided on the site, there is a requirement for the provision of accessible carparking.

Compliance Summary:

Capable of compliance

Two accessible carparking spaces are nominated on the site plan. Configuration is in accordance with AS2890.6.

Recommendations:

Access requirements for the accessible carparking are as follows and should be addressed during preparation of the construction certificate documentation to ensure compliance.

a. Accessible carparking to be a minimum of 2400mm wide with a shared area to one side of the space 2400mm wide. Circulation space can be shared between adjacent accessible carparks.

b. Provide a bollard to the shared circulation space as illustrated in AS2890.6, Figure 2.2.

c. The maximum allowable crossfall of accessible carparking area to be, 1:33 (for outdoor spaces). This crossfall applies both parallel and perpendicular to the angle of parking.

d. Designated accessible carparking is to be identified using the International Symbol for Access (ISA) –ground and vertical signage is required. Signage is to comply with AS1428.1.

3.5 Kerb Ramp

A kerb ramp is provided to facilitate an accessible path of travel from the carparking area to the porch / entrance area.

Compliance Summary:

Capable of compliance

The configuration of the kerb ramp is generally in accordance with AS1428.

Recommendations:

The following access requirements apply to kerb ramps and should be addressed during preparation of the construction certificate documentation to ensure compliance.

a. Kerb ramps to comply with AS1428(2009) Amendment 1, Clause 10.7

b. Maximum gradient of the kerb ramps to be 1:8 and maximum length to be 1520mm (providing a maximum height of 190mm).

c. Kerb ramps to have a non-slip surface as required by AS1428.

d. A tooled joint should be provided between parts of the kerb ramp to assist persons with a vision impairment with orientation.

Document Set ID: 9068525
Version: 1, Version Date: 18/12/2019

3.6 Entrance

In a building required to be accessible, an accessway must be provided through the principal pedestrian entrance, and not less than 50% of all pedestrian entrances including the principal pedestrian entrance. In a building with a total floor area more than 500 sqm a pedestrian entrance which is not accessible must not be located more than 50m from an accessible pedestrian entrance.

Compliance Summary:

Capable of compliance
A single swinging doorway with 920mm leaf and adequate circulation areas provides entry to the building.

Recommendations:

The following access requirements apply to the entrance and should be addressed during preparation of the construction certificate documentation to ensure compliance.

a. Entrance to comply with AS1428.1(2009), Clause 13 as part of the accessible path of travel.

b. Door are to have a minimum clear opening width of 850mm to comply AS1428.1(2009), Clause 13.2 as part of the accessible path of travel.

c. Door threshold to be level to provide seamless entry as part of the accessible path of travel. Maximum allowable construction tolerance is 3mm for compliance with AS1428.1(2009), 5mm where beveled edges are provided between surfaces – refer to Figure 6.

d. For glass doors, provide decals to assist persons with a vision impairment. Decals to be solid and have a minimum 30% luminance contrast to the background colour and be not less than 75mm high located within the height range of 900-1100mm above the finished floor level. Decals are to be solid. AS1428.1, Clause 6.6.

4. Interior

The childcare centre is required to be accessible to people with disabilities. BCA requires access to and within ALL areas used by the occupants. Within a childcare centre, staff are required to have a degree of mobility due to the nature of the duties performed as a part of their position descriptions.

Position descriptions for childcare workers commonly list the following attributes:

- Strong interpersonal communication skills;
- Instructional skills;
- Physical stamina (in the context of meeting the demands of the physical energy exerted by the children).

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

Physical activities listed within position descriptions for childcare workers often include the following:

- Sitting on the floor;
- Bending;
- Walking;
- Ability to distinguish colour; Lifting children up to 15kg.

With regard to staff only ancillary areas, we note that BCA Clause D3.4 Exemptions could be argued. It states the following:

> *The following areas are not required to be accessible:*
> *a) An area where access would be inappropriate because of the particular purpose for which the area is used.*
> *b) An area that would pose a health or safety risk for people with a disability.*
> *c) Any path of travel providing access only to an area exempted by (a) or (b).*

Given the typical position description for a childcare worker and the physical activities expected, it would be highly unlikely for a staff member to have a non-ambulant disability. Therefore, we consider that access for people with disabilities is not required to the following rooms: store rooms; cot rooms; and nappy change rooms.

4.1 Extent of Access Generally – BCA

Accessibility provisions of the BCA have generally been met. Access is provided to and within the childcare centre.

Compliance Summary:

Compliant

4.2 Circulation Areas

BCA (Clause D3.3) requires the provision of turning spaces and passing areas to corridors to enable wheelchair circulation throughout a building.

Compliance Summary:

Compliant

4.3 Doorways Generally

AS1428 has requirements for doorways within the accessible path of travel to enable independent access for people using a wheelchair.

Compliance Summary:

Compliant – performance-based approach due to nature of the building as a childcare centre with regard to circulation areas.
We note provision of a 920mm door leaf to doorways within the accessible path of travel.

Recommendations:

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

Access requirements for doorways within the accessible path of travel are as follows and should be addressed during preparation of the construction certificate documentation to ensure compliance

a. Doorways within the accessible path of travel to have a minimum clear opening width of 850mm (AS1428.1(2009), Clause 13.2). We recommend the use of a 920 leaf door as a minimum to achieve adequate clear width.

b. All doorways within the accessible path of travel to have complying circulation areas as illustrated in AS1428.1(2009), Figure 31. Circulation areas to have a maximum crossfall of 1:40.

c. Doorways to have minimum 30% luminance contrast as described in AS1428.1(2009), Clause 13.1.

   Door handles and related hardware shall be able to be unlocked and opened with one hand per AS1428.1 (2009), Clause 13.5.1. The handles shall enable a person who cannot grip to operate the door without their hand slipping from the handle. We recommend the use of lever handles.

d. Doorways to have operational forces per AS1428.1 (2009), Clause 13.5.2. A maximum allowable force of 20N is required to operate the door.

4.4 Exempt Areas

BCA Clause D3.4 does not require access for people with disabilities to areas that would be inappropriate due to the particular use of the area or would pose a health and safety risk. This includes the path of travel to these areas.

4.5 Floor Finishes

All floor finishes are to be flush to provide an accessible path of travel throughout the different areas of the building. Maximum allowable construction tolerance is 3mm (5mm for bevelled edges) as part of the accessible path of travel. Refer to AS1428.1(2009), Clause 7.2 for further details. This should be implemented during construction to ensure compliance.

Compliance Summary:

To be addressed during detailed design stages.

4.6 Visual Indication to Glazing

Provide decals to all full height glazing that can be mistaken for a doorway to assist persons with a vision impairment. Decals to be solid and have a minimum 30% luminance contrast to the background colour and be not less than 75mm high located within the height range of 900-1100mm above the finished floor level. Decals are to be solid. AS1428.1, Clause 6.6.

Compliance Summary:

To be addressed during detailed design stage.

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

4.7 Signage

Signage to identify sanitary facilities, hearing augmentation and required exits are to be provided in accordance with BCA Clause D3.6. This includes provision of the International Symbol for Access or International Symbol for Deafness as appropriate. Signage to comply with AS1428.1 (2009), Clause 8.

Compliance Summary:

To be addressed during detailed design stage.

Recommendations:

Signage to include information in Braille and tactile signage formats as outlined within BCA Specification D3.6.

a. Braille and tactile components of the sign to be located not less than 1200mm and not higher than 1600mm affl.

b. Signage identifying rooms with accessible features or facilities nominated in Clause D3.6 to be located at the latch side of the doorway with the leading edge of the sign 50-300mm from the architrave. Where this is not possible, the sign can be located on the door. This is to allow use of the Braille without obstructing pedestrian traffic through the doorway.

c. For signage identifying an exit, “exit” and the level must be stated on the sign. It must be located at the latch side of the doorway with the leading edge of the sign 50-300mm from the architrave. Where this is not possible, the sign can be located on the door.

4.8 Slip Resistance

The BCA defines the following slip resistance requirements for stairs and ramps:

Application	Surface Conditions	
	Dry	Wet
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or Landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

Compliance Summary:

To be addressed during detailed design stage.

5. Sanitary Facilities

The BCA / Access Code for Buildings (Clause F2.4) require the provision of sanitary facilities catering for persons with a disability.

5.1 Distribution of Accessible Sanitary Facilities

The following is required to satisfy BCA requirements:

Document Set ID: 9963625
Version: 1, Version Date: 18/12/2019

- A unisex accessible toilet at each level. Where more than one bank of toilets is provided at any level, at least 50% of those banks will have an accessible toilet facility.

- A unisex accessible shower is required where showers are required by F2.3. In this regard, BCA only requires accessible showers within hospitals, early childhood centres, theatres and sporting venues. Showers are not r*equired* within commercial, retail or industrial premises. If ***required by Clause F2.3,*** where one or more showers are provided, 1 accessible shower for every 10 or part thereof must be provided.

  To minimize the risk of a complaint made under the DDA, we recommend that where showers are provided for general use, an accessible shower should be provided.

- At each bank of toilets where there is one or more toilets in additional to an unisex accessible sanitary compartment at the bank of toilets, a sanitary compartment suitable for a person with an ambulant disability in accordance with AS1428.1 must be provided for use by males and females

Compliance Summary:

Compliant – a unisex accessible toilet is provided within the building.
There is no requirement for the provision of an accessible shower or ambulant cubicles.

5.2 Unisex Accessible Toilet

A unisex accessible toilet is provided within the building. Room dimensions and arrangement of fixtures is considered capable of compliance.

Compliance Summary:

Capable of compliance

Recommendations:

Access requirements for the accessible toilet facilities are as follows and should be addressed during preparation of the construction certificate documentation to ensure compliance. For compliance with AS1428.1(2009), the minimum room dimensions of the accessible toilet are to be 1900x2300mm plus additional area for the handbasin. These are **CLEAR** dimensions. Provision for wall linings needs to be considered.

a. Accessible toilet facilities to be unisex facilities for compliance with the BCA.

b. Unisex accessible facilities to comply with AS1428.1(2009), Clause 15 including set-out of fittings and fixtures, circulation areas and doorways.

   Crucial dimensions for the toilet are 450mm from centreline of pan to side wall, 800mm from front of pan to rear wall and a seat height of 470mm.
   A minimum clear dimension of 1400mm is required from the toilet pan to any other fixture (see figure 43).

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

For the basin, a minimum dimension of 425mm is required from the centreline of the basin to the side wall and height of basin to be between 800 and 830mm.

Grabrails to be provided at the side and rear of the toilet in compliance with AS1428.1 at a height of 800mm.

c. Taps to have lever handles, sensor plates or similar controls. For lever taps, a minimum 50mm clearance to be provided to adjacent surfaces.

d. Toilet seat shall be of the full round type, be securely fixed in position when in use and have fixings that create lateral stability. They should be load rated to 150kg, have a minimum 30% luminance contrast to the background colour (eg pan, wall or floor) and remain in the upright position when fully raised.

e. Provide a backrest to accessible toilets to comply with AS1428.1, Clause 15.2.4.

f. Accessible toilet to be identified using the International Symbol for Access. Pictograms / lettering to have a minimum 30% luminance contrast to the background colour. Signage is to comply with AS1428.1, Clause 8 and include information in tactile and Braille formats (as required by the BCA).

g. Doorways to have a minimum clear opening width of 850mm to comply AS1428.1(2009), Clause 13.2 as part of the accessible path of travel. Adequate circulation area at the latch side of the doorway is required to allow independent access to the facility – for details refer to AS1428.1, Figure 31.

h. Door hardware to be located within the accessible height range of 900-1100mm above the finished floor level. The use of lever handles is encouraged to assist persons with a manual disability such as arthritis.

i. Controls such as light switches within the accessible toilet facilities to be in the accessible height range of 900-1100mm above the finished floor level to comply with AS1428.1(2009), Clause 14. Controls should be located not less than 500mm to a corner.

6. Vertical Circulation

An accessible ramp and stairs provide the means of access from the verandah to the outdoor play areas at the rear of the building.

6.1 Accessible Ramps

Two accessible ramps are provided, and overall configuration is in keeping with accessibility requirements.

Compliance Summary:
Capable of compliance

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

Recommendations:
Access requirements for the ramps are as follows and should be addressed during preparation of the construction certificate documentation to ensure compliance.

a. Ramps to comply with AS1428.1, Clause 10.3.

b. Maximum allowable gradient of the ramp is 1:14, minimum clear width to be 1000mm and maximum length between landings to be 9m (for 1:14 gradient).

c. Provide handrails, with extensions, to both sides of the ramp to comply with AS1428.1, Clause 12. Handrails to have an external diameter between 30-50mm to assist persons with a manual disability such as arthritis. Handrails are required on both sides of the ramp to cater for left and right-handed disabilities.

d. Where ramp is not enclosed, provide kerb rails in accordance with AS1428.1. The height of kerb rails is to be less than 65mm or greater than 150mm above the finished surface level. This is to ensure that the foot plate of a wheelchair cannot become lodged on the kerb rail.

e. Provide tactile indicators at the top and bottom of the ramps to comply with BCA Clause D3.8 and AS1428.4.1. Tactile indicators to be detectable, durable, non-slip and have a minimum 30% luminance contrast to the background colour.

   Tactile indicators at the top and bottom of the ramps to be 600-800mm deep across the width of the ramp and set back 300mm from the edge of the ramp (refer AS1428.4.1, Figure A1).

6.2 Stairs

Stairs are provided adjacent to the accessible ramps. AS1428.1 has access requirements for all public access stairs and is applicable in this instance.

Compliance Summary:
Capable of compliance

Recommendations:
Access requirements for public access stairs are as follows and should be addressed during preparation of the construction certificate documentation to ensure compliance.

a. Stair construction to comply with AS1428.1, Clause 11.1.

b. Stairs to have closed or opaque risers. Open risers cause confusion for persons with a vision impairment and may trigger conditions such as epilepsy due to light penetrating through the open risers.

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

c. Provide handrails, with extensions, to both sides of the stair (AS1428.1, Clause 11.2). Handrails to have an external diameter between 30-50mm to assist persons with a manual disability such as arthritis. Handrails should be continuous around the landings where possible.

   Handrails are required on both sides of the stair to cater for left and right-handed disabilities. A central handrail is also an acceptable solution where adequate width is available.

e. Stair nosings to have minimum 30% luminance contrast strip 50-75mm wide to the top of the stair tread to assist persons with a vision impairment. The strip can be set back 15mm from the edge of the riser.

f. Stair nosings shall not project beyond the face of the riser.

g. Provide tactile indicators at the top and bottom of the stair to comply with BCA Clause D3.8 and AS1428.4.1.

   Tactile indicators to be detectable, durable, non-slip and have a minimum 30% luminance contrast to the background colour. For discrete tactile indicators, 45% luminance contrast is required (60% where two-tone indicators are used).

   Tactile indicators at the top and bottom of the stair to be 600-800mm deep across the width of the stair set back 300mm from the edge of the stair.

.

Document Set ID: 9963525
Version: 1, Version Date: 18/12/2019

lindsay perry access

Lindsay Perry
B.Arch., M. Dis. Stud.
Accredited Access Consultant
Registered Architect NSW 7021

0418 909 180
lindsay@lpaccess.com.au
PO Box 453,
New Lambton NSW 2305
www.lpaccess.com.au

Document Set ID: 9963535
Version: 1, Version Date: 18/12/2019

WASTE MANAGEMENT PLAN
DEMOLITION, CONSTRUCTION AND USE OF PREMISES

If you need more space to give details, you are welcome to attach extra pages to this form.

PLEASE COMPLETE ALL PARTS OF THIS FORM THAT ARE RELEVANT TO YOUR DEVELOPMENT APPLICATION (DA).

IF YOU NEED MORE SPACE TO GIVE DETAILS, YOU ARE WELCOME TO ATTACH EXTRA PAGES TO THIS FORM.

Council will assess the information you provide on this form along with your attached plans. We will take into account the types and volumes of waste that could be produced as a result of your proposed development, and how you are planning to:

- minimise the amount of waste produced
- maximise re-use and recycling
- store, transport and dispose of waste safely and thoughtfully.

APPLICANT DETAILS

First name: Mark

Surname: Toma

Postal Address

Street No.: Unit 56 / 4-2

Street name: Picrite Close

Suburb: Pemulwuy

Post code: 2145

Contact phone number: 0433 623 355

Email address: mark19374@gmail.com

DETAILS OF YOUR PROPOSED DEVELOPMENT

Street No.: 110-112

Street name: Mount Vernon Road

Suburb: Mount Vernon

Post code: 2178

What buildings and other structures are currently on the site?

Vacant Site

Briefly describe your proposed development

96 Place Childcare Facility

Applicant Signature: p.p.a

Date: 30.04.19

PENRITH CITY COUNCIL

Document Set ID: 9063705
Version: 1, Version Date: 18/12/2019

SECTION 1: DEMOLITION

*Please include details on the plans you submit with this form, for example location of on-site storage areas/ containers, vehicle access point/s.

Materials		Destination		
		Re-use and recycling		Disposal
Material	Estimated volume (m^2 or m^3)	ON-SITE* Specify proposed re-use or on-site recycling	OFF-SITE Specify contractor and recycling facility	Specify contractor and landfill site
Excavation (eg soil, rock)	N/A			
Green waste	N/A			
Bricks	N/A			
Concrete	N/A			
Timber (Please specify type/s)	N/A			
Plasterboard	N/A			
Metals (Please specify type/s)	N/A			
Other	Asbestos		Refer to Contamination Report	

Document Set ID: 9063705
Version: 1, Version Date: 18/12/2019

SECTION 2: CONSTRUCTION

*Please include details on the plans you submit with this form, for example location of on-site storage areas/ containers, vehicle access point/s.

Materials		Destination		
		Re-use and recycling		Disposal
Material	Estimated volume (m^2 or m^3)	ON-SITE* Specify proposed re-use or on-site recycling	OFF-SITE Specify contractor and recycling facility	Specify contractor and landfill site
Excavation (eg soil, rock)	50m3	Reuse topsoil on-site		
Green waste	5m3	Reuse on-site for mulch		
Bricks	1m3	To be used on site where possible	Remainder to go to Boral Recycling	
Concrete	5m3		Concrete Recyclers, Camellia	
Timber (Please specify type/s)	2m3	Offcuts used on-site for form work	Or chipped for landscaping - ANL	
Plasterboard	2m3			
Metals (Please specify type/s)	Various - Colorbond steel, aluminium		ADL Scrap Metal Recyclers, Silverwater	
Other				

Document Set ID: 9063705
Version: 1, Version Date: 18/12/2019

SECTION 3: WASTE FROM ON-GOING USE OF PREMISES

If relevant, please list the type/s of waste that may be generated by on-going use of the premises after the development is finished.	Expected volume (average per week)
RUBISH: Soiled Disposable Nappies, Food scraps, Art supplies (paints etc)	1m3
RECYCLING: Paper, Cardboard, Used office supplies, etc.	1m3
GREEN WASTE: Landscaping off cuts, grass, etc.	0.2m3

SECTION 4: ON-GOING MANAGEMENT OF PREMISES

If relevant, please give details of how you intend to manage waste on-site after the development is finished, for example through lease conditions for tenants or an on-site caretaker/manager. Describe any proposed on-site storage and treatment facilities. Please attach plans showing the location of waste storage and collection areas, and access routes for tenants and collection vehicles.

The proposed development is design to include a waste storage room which is accessible for a 8.8m long rigid vehicle. The waste storage bins will consist of a 1100 litre Waste Bin and a 1100 litre recycling bin
The proposed development will be serviced by a Waste Disposal Contractor who will collect and empty the bins once a week. Should the waste requirements increase, the contractor will collect the bins twice a week. Green waste will be mulched on site by the landscaping maintenance contractor and reused on site to maintain the landscaping.

Document Set ID: 9063705
Version: 1, Version Date: 18/12/2019