- Excavation
- Demolition
- Contract Hire
- Underpinning
- Shoring Systems

Demolition Plan

Demolition License no: AD212768

Location: Ridgecrop Drive, Castle Hill NSW

Demolition Structure Description: Single Story Buildings, Basket Ball Court and Refurbishment of 2 Buildings

Building Type: Two Single Story Building Demolition of Brick and Iron Roofs, Two Buildings Refurbishment Removal of Ceilings, Doors, Windows, Floors and Finishes

Start Date: TBA

Finished Date: TBA

NMK Group Pty Ltd ABN 58 152 310 784
PO Box 4444, Homebush South NSW 2140
Ph. 02 9763 7715 **Fax.** 02 9763 7714 **Email.** info@nmkgroup.com.au

Sequence of Demolition

1. Site Establishment, Install Cattle Grates, Install Tree Protection, Install Silt Fencing and Sediment as per Sediment Control Plan
2. Hazardous Material – Synthetic Mineral Fibres is present in Block A and E, this will be low impact removal, no air monitors required
3. Crew will come onto site to start internal strip out in building A and E,
4. All Windows, Doors and Ceilings will be removed manually using hand tools and reciprocating Saws
5. Material will exit through front of Building, directly into trucks, all vehicles will exit via Ridgecorp Drive as shown on Access drawings
6. Structural Demolition will then start on Blocks D and F, using excavators with grab attachments
7. All material will be loaded into trucks and transported to appropriate licensed waste facilities
8. Excavators will then remove Slabs on D and F Buildings, Foundations, Basket Ball Courts and any other items, small landscaping items, in order to clear area for new building works
9. All material will be taken to licensed land fill facility

Hazardous Material Management

PROCEDURE

NMK Group Pty Ltd is devoted to eliminating or minimising any risk of exposure to asbestos or any relevant contamination in the Samuel Gilbert School. All NMK Group Pty Ltd personnel must follow this policy as the minimum requirements for all the Samuel Gilbert School project and adhere to other requirements of Hutchinson Builders.

NMK Group Pty Ltd shall benefit from the professional external safety hygienist (WPS Report dated 6/8/18) to ensure the proper execution of this policy. The framework mentioned in NMK policy is the minimum safety management operation requirement and will be updated based on the nature of works.

NMK Group Pty Ltd shall follow the hierarchy of controls triangle for asbestos management; proceeding from the minimum to maximum risk using the following control methods: *PPE, Administrative Controls, Engineering Controls, Isolation, Substitution,* and *Elimination*.

NMK Group Pty Ltd considers the following as the minimum requirements to be undertaken by the internal experts of the company:

- Critical controls checklist and preparation of SWMS compatible with the minimum requirements of Hutchinson Builders

- Internal inspection forms and any other forms requested by Hutchinson Builders

- All legislations, regulations, standards and acts up to date regarding Asbestos Management including:

  - Work Health and Safety Act 2011 (NSW)
  - Work Health and Safety Regulation 2017 (NSW)
  - Australian Standard 4964 *Method for the qualititative identification of asbestos in bulk samples*

- Notes and procedures advised by the Manufacturer of the original equipments.

- Any other advices received by the third-party expert (WPS and Greencap)

INVESTIGATION RESULTS

ASBESTOS CONTAINING MATERIALS (ACM)

Representative samples of materials suspected to contain asbestos were collected and analysed at WSP Australia's NATA Accredited. The identification of asbestos fibres is based on using Polarised Light Microscopy supplemented with Dispersion Staining techniques. This is detailed in Australian Standard 4964-2004 '*Method for the qualitative identification of asbestos in bulk samples*'. Asbestos samples were only collected for analysis where the safety of personnel would not be compromised. Sampling was conducted in accordance with the WSP Australia's in house survey guide, SafeWork Australia's Code of Practice, '*How to Manage and Control Asbestos in the Workplace*' and the United Kingdom Health & Safety Executive publication, '*HSG 264: Asbestos: The survey guide*'.

LEAD-BASED PAINTS

Representative samples of paint suspected to be lead based were collected and analysed at Envirolab Services NATA Accredited Laboratory. Laboratory analysis of lead based paints is used to achieve a reportable weight by weight percentage of lead throughout the paint layers and is reported against AS 4361.-2017 *Guide to lead Paint Management, Part 2: Commercial and Residential Buildings* lead containing paint system level of 0.1 per cent (w/w) of the dried film.

The analysis of the physical samples is achieved by digestion of the sample for determination of lead content by one of two methods, atomic absorption spectroscopy (AAS) or inductively coupled plasma emission spectrometry (ICP-AES). Collection of lead based paint samples was only conducted where the safety of personnel would not be compromised. Sampling was conducted in accordance with the WSP Australia's in house survey guide and AS 4361.2-2017 *Guide to lead Paint Management, Part 2: Commercial and Residential Buildings.*

Sampling methodology will consider the various paint coats and record these layers accordingly, these observations will be referred to alongside the analytical sample results to acknowledge that lead paint

layers of varying lead content will affect the analytically observed lead weight concentration recorded from the sample. To this end, where multiple lead paint layers have been visually recorded but analytically determined lead percentage of the collective paint layers is below actionable limits, the paint undercoats may still be determined as hazardous due to its dilution in the sample by the non-lead topcoats. Sampling methodology may also consist of the use of a lead paint chemical colorimetric test reagent that can provide an instantaneous result of lead presence within specific layers. This testing will however be used in conjunction with a physical sample to determine the lead concentration as above.

SYNTHETIC MINERAL FIBRES (SMF)

If representative samples of materials suspected to contain asbestos were collected and analysed at WSP Australia's in- house NATA Accredited Laboratory, SMF can also be identified. The identification of SMF fibres is based on using Polarised Light Microscopy supplemented with Dispersion Staining techniques. Alternatively, our experienced surveyor visually identified and recorded the presence of synthetic mineral fibre products onsite.

POLYCHLORINATED BIPHENYLS (PCBS)

Where access was available and power was isolated representative examples of each major type of fluorescent light fittings were examined to determine, which lights were fitted with PCB containing ballast capacitors. The details of the brand, model of each capacitor and capacity were recorded and checked against with the ANZECC database of known PCB capacitors and PCB free capacitors.

The Australian and New Zealand Environment Conservation Council 'Polychlorinated Biphenyls Management Plan, November 1996' outlines the National Strategy for the management of PCBs.

The document defines PCB materials and wastes as follows:

Table 2.1 PCB Concentration Classification

PCB CONCENTRATION	WASTE CLASSIFACTION
<2 mg/kg	PCB free
2 mg/kg to <50 mg/kg	Non-scheduled PCB material or waste
>50 mg/kg	Scheduled PCB material or waste
>100,000 (10%)	Concentrated PCB material

A very detailed survey was conducted by WPS dated 6/8/18 which the results are reflected in their official report.

APPROACH & METHODOLOGY

Isolation of Contaminated Area

Any of the work zones mentioned in the investigation results will be isolated with an exclusion zone of 10 meters minimum distance away from the contaminations. Physical barriers and signages will be installed to define the limitations.

Setting Up Air Monitors

NMK Group Pty Ltd will install air monitoring devices in all surrounding of the work zones and ACM risk areas to ensure the safety of the works and all time monitoring of the level of the ACM dusts. There will not be any appliance of negative air pressure in the operations, therefore, the risk of sudden attraction of ACM dusts towards the work zones is eliminated. A safe limit of 0.1 fibres per millilitre will be enforced and monitored. Should it exceed the maximum of tolerance the area will be promptly evacuated, and level of ACM dust will be monitored until it is back to the safe operational level.

Personal Protective Equipment:

NMK Group Pty Ltd will provide all workers with PPE that is suitable for asbestos removal work. Workers must also use the PPE given to them. PPE will always be worn during the work in the asbestos removal area.

Specific PPE requirements, as outlined in the *SafeWork NSW Code of Practice: How to Safely Remove Asbestos,* include the following items:

- Disposable coveralls rated type 5, category 3 (prEN ISO 13982–1) or equivalent; hood fitted with cuffs ensuring they are sealed with tape or tucked in
- Single use disposable gloves
- Safety goggles
- Safety footwear including steel-capped work shoes/boots
- Respiratory Protective Equipment (RPE) including P2 face mask/respirators for majority of asbestos removal works. For handling of extensive friable asbestos including removal works of gaskets and insulation, P3 type RPE will be used.

Should further PPE be required, a risk assessment shall be conducted by NMK supervisors and the control measures be implemented accordingly.

All equipment used for the removal of asbestos should be inspected before the commencement of the asbestos removal work, after any repairs and at least once every seven days when it is continually

being used. A register with the details of these inspections, the state of the equipment and any repair details will be maintained.

At the end of the asbestos removal work and upon leaving the asbestos removal work area, all PPE will be disposed of as asbestos waste or decontaminated and stored in sealed double bags before being removed from the site and disposed.

Progression of Works:

Any materials deemed to be consistent with those detailed in the Hazardous Materials Register that have not been previously identified should be presumed to have the same content and be treated accordingly.

Should any additional suspected hazardous materials be observed during or prior to demolition works, works should cease until a suitably qualified consultant can assess the suspected hazardous material and provide appropriate recommendations for management and/or removal.

Unexpected Findings Above Ground Level:

NMK Group Pty Ltd will apply all the above-mentioned methods in all other Buildings that are Identified to be Hazardous but not on the report.

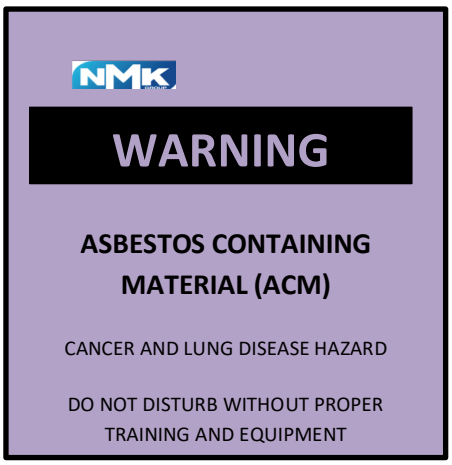
CRITICAL CONTROLS

Primary Inspection and Identification of Asbestos:

Prior to any commencement of works asbestos must be identified by qualified third party (WPS dated 6/8/19 and Greencap). Following the reported results, NMK has updated the asbestos management plan and asbestos register will be revised and updated accordingly (WPS dated 6/8/19 and Greencap).. This update must be controlled and reviewed. The asbestos register must identify the following as the minimum based on the date of identification: *Type of asbestos containing material (ACM), Specific Location, Accessibility of the ACM, Source of the unfixed or uninstalled asbestos, Friability, Sustainability, Likelihood of disturbance of the ACM and related activities*

Labelling of ACM:

Each source of asbestos must be labelled and treated as ACM until proven otherwise by NATA certified test results. The labelling must come in yellow warning signage mentioning the asbestos containing material and relative possible hazards including cancer and lung diseases. It must also warn personnel about minimising the disturbance near the sources of ACM and to consult an asbestos register before commencement of works.



Demolition:

NMK Group Pty Ltd will assign the third-party external experts (WPS /Greencap) to ensure and manage the following prior to the commencement of works:

- Identification any hazardous materials including asbestos and lead
- Notification of asbestos removal work to the relevant regulatory authority

All this information shall be documented both as a hard copy on site and in NMK central office and an electronic version will be uploaded to Acconex.

Hutchinson Builders is responsible for the provision of the risk management plan and NMK and its sub-contractors shall fully comply with the provisions outlined by Hutchinson Builders. NMK considers the conditions of High-Risk work applying to any operation involved with asbestos contamination. Emergency procedures for asbestos-related incidents are included in the NMK SWMS.

Elimination and Removal:

In case of discovery of confirmed ACM in poor condition, it must be promptly removed from the site by **NMK Approved Personnel** to comply with the *NSW Code of Practice: How to Safely Remove Asbestos*. Following the removal of ACM, the clearance certificate must be issued by the above-mentioned expert prior to continuation of works.

In case of discovery of ACM in a damaged condition, the area shall be isolated, encapsulated, or by any other means kept out of access by non-certified personnel until the third-party professional mentioned above removes the ACM from the site.

In case of discovering ACM in good condition, they will be identified with proper asbestos warning labels described in *Labelling of the ACM* section.

Monitoring:

Monitoring of air quality on the site will be done by NMK upon any asbestos handling work is conducted as per the Australian Standard.

Work Health and Safety Act 2011 (NSW): Health Monitoring applies to all personnel exposed or potentially to be exposed to ACM. Furthermore, a frequent Occupational Health Physician must be assigned to monitor personnel health as per physician's decision. The current assigned frequency of health check is every six months after the commencement of asbestos works.

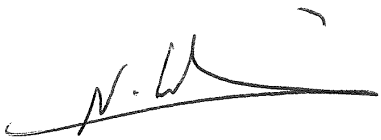
Following removal works, a clearance inspection shall be completed by a hygienist to ensure that asbestos materials have been removed to a satisfactory standard. Following the completion of the clearance inspection, a clearance certificate shall be issued by the hygienist to confirm that the ACMs have been satisfactorily removed.

INTERNAL INSPECTION FORMS

NMK Group Pty Ltd has developed a series of internal inspection forms to make sure of full compliance of the operations and procedures with the above-mentioned policy.

IMPLEMENTATION AND RESPONSIBILITES

NMK Group Pty Ltd will assign site managers and safety supervisors to each work zone to ensure that all workers are aware of the risks and required responses to hazardous materials. This is already described in section 5: Roles and Responsibilites. Proper training shall be provided by the NMK and any updated training will be outsources. The trainings could include but not limited to be based on the scope of works the following subjects: *Asbestos Removal, Asbestos Assessment, Occupational Exposure Training*.

Nick Kollias  24/3/20

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DIRECTOR'S NAME **SIGNATURE** **DATE**

Site Accessibility: Vehicular access: Will be via Ridgecorp Drive

Plant and Equipment

Consideration has been given to the types of plant and equipment that are likely to be used during the whole demolition works.

Table 1: Plant Equipment during demolition works

Plant and Equipment
Excavators
Trucks
Air Monitors – If Required
Compressors
Generator
Concrete Splitters and Saws
EWPs
Floodlights
Cutters, Drills and Small Tools

Hours of Work:

Hours of working are subject to site requirements. Hours are between Monday and Friday 7.30 am to 5.30 pm, Saturdays 7.30 am to 3.30 pm. Excluding Public Holidays and Shut Down weekends.

Boundaries and signage locations: Demolition signage will be on fencing and around the boundary. All entrances will be locked to prevent unauthorized access. Demolition warning signs present on all main entrances. Nick Kollias will remain in the demolition removal site to ensure no unauthorized access.

Emergencies: In case of emergencies, clear access to the emergency location point will always be maintained, all personnel will assemble at designated meeting point as discussed in inductions prior to commencing work.

Emergency Plan:

Front Emergency Assembly point as per induction

Call 000 for all emergencies

First Aid Officer: Nick Kollias

First Aid Kit located in site office

Fire Extinguisher

Emergency plan as per induction

Monitoring, Reviews and Communication: will be as per the HB CEMP Section 7 (Communication and Reporting) and Section 9 (Monitoring and Reviewing of Environmental Performances) as well as the requirements within SSD 9274.

APPENDIX J – CONSTRUCTION SOIL AND WATER MANAGEMENT SUB PLAN

As per Condition B13 (e)

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CONSTRUCTION SOIL AND WATER MANAGEMENT REPORT

SAMUEL GILBERT PRIMARY SCHOOL CASTLE HILL NSW

Prepared For:
Hutchinson Builders
23 Dunning Avenue,
ROSEBERRY NSW 2018

Prepared by:
Birzulis Associates Pty Ltd
583 Darling Street
ROZELLE NSW 2039

***Rev*: F**

DOCUMENT VERIFICATION

Project Title	Construction Soil & Water Management Report
Project No.	7738
Client Contact	Hutchinson Builders

	Name	**Signature**
Amended by	Cameron Amri	
Checked by	Michael Grogan	
Issued by	Michael Grogan	

Document History

Date	**Revision**	**Issued to**	**No. Copies**
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12 Mar 2020	B	Hutchinson Builders	PDF
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9 Nov 2020	F	Hutchinson Builders	PDF

Contents

APPENDICES

1 INTRODUCTION

Birzulis Associates Pty Ltd has been commissioned by Hutchinson Builders Pty Ltd on behalf of NSW Department of Education to prepare this Construction Soil and Water Management Report in support of a proposed development for the site.

The site is located on the northern intersection of Ridgecrop Drive and Gilbert Road, Castle Hill NSW. The proposed additions are for an existing co-educational public primary school consisting of numerous multi storey classroom buildings, office facilities and a multipurpose hall.

This report also provides a summary of the stormwater management design principles and planning objectives for the management of stormwater quality and quantity. The objectives for the development are to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design consistent with the requirements of The Hills Shire Council's water quality objectives.

A set of drawings have been prepared to show that the proposed stormwater quantity and quality requirements for the development can be met. These drawings cover stormwater management elements which cover surface levels and drainage layouts.

At this stage, the engineering and stormwater management policy requirements of The Hills Shire Council has been considered in the concept design. The stormwater management design will incorporate the use of rainwater tanks for water re-use and in conjunction with the use of an on-site detention tank to maintain the permissible site stormwater discharge in accordance with The Hills Shire Council's stormwater management policy.

This report will also provide a plan of how all construction works will be managed in wet-weather events and details of all off-site flows from the site. The measures that are to be implemented to manage stormwater and flood flows for small and large sized events will be discussed.

1.1 PLANNING RELEVANCE, LEGISLATION & ACT

The following legislation and regulatory framework relating to construction soil and water management are outlined below.
Immediate SSD Planning Requirement to be satisfied:

- As stipulated in the State Significant Development Conditions of Consent.

Environmental Planning and Assessment Act 1979 & Environmental Planning & Assessment Regulation 2000.

This Act and regulation establishes a system of environmental planning and assessment of development proposals for the State. This project has been assessed and approved under Section 89E of the Environmental Planning and Assessment Act 1979.

Project Relevance; Approval process for a legal Consent to develop and considerations for such.

Protection of the Environment Operations Act 1997

This Act includes all the controls necessary to regulate pollution and reduce degradation of the environment, provides for licensing of scheduled development work, scheduled activities and for offences and prosecution under this Act.

Project Relevance; This Act is of high relevance to the Project as it provides for the issuing of environmental protection notices to control work and activities not covered by licences. Section 148 of the Act requires a pollution incident-causing or threatening material harm to the environment to be notified to the EPA and other authorities immediately.

Contaminated Land Management Act 1997

This Act provides for a process to investigate and remediate land that has been contaminated and presents a significant risk of harm to human health. Section 60 of the Act is a “Duty to Report Contamination”. This duty applied to owners of land and persons who become aware that their activities have contaminated the land.

Project Relevance; The relevance of this Act will be in the event that suspected or potentially contaminated ground is found during construction activities.

Commonwealth Environment Protection and Biodeversity Act 1999

The main purpose of this Act is to provide for the protection of the environment especially those aspects that are of national environmental importance and to promote ecological sustainable development. The Act binds the Crown. Do not take, use, keep or interfere with “nationally significant” cultural and natural resources, protected wildlife and protected plants without approval.

Project Relevance; This Act is of little relevance to this project as it has been determined not to trigger the provisions of the act.

Soil Conservation Act 1938

This Act makes for the provision for the conservation of soil resources, farm water resources and the mitigation of erosion. The Act is binding on the Crown; however, the Crown is not liable for prosecution. The Act provides for notification in the government gazette catchments where erosion is liable to cause degradation of rivers and lakes (i.e. protected land).

Project Relevance; This Act has low relevance as the site is not located within "protected land". Further, such notification has not been given to the owner of the land.

Water Management Act 2000 & Water Management (General) Regulation 2004

This Act and Regulation provide for the protection, conservation and ecologically sustainable development of water sources of the State and in particular to protect, enhance and restore water sources and their associated ecosystems.

Project Relevance; This Act has no direct relevance at this time to the construction work under this contract. The project approval does not trigger the provisions of this Act

Water Act 1912

This Act provides for licences to extract water for construction purposes either from surface or artesian sources. Should construction water be extracted from surface (other than sedimentation ponds) or artesian sources, a licence will be required.

Project Relevance; This Act has no relevance as it is not proposed that construction water will be obtained from surface (for example, creeks, lakes) or artesian sources.

Rivers and Forseshores Improvement Act, 1948

The Rivers and Foreshores Improvement Act, 1948, is administered by DIPNR for regulating operations involving excavation and fill within the immediate vicinity of coastal rivers, lakes and estuaries. Under this Act, a Part 3A Permit is required for the undertaking of works within 40 metres of the bed and banks of a watercourse. By late 2003, the Water Management Act 2000 (WMA) will have repealed the Rivers and Foreshores Improvement Act, 1948 (RFIA). When this occurs, activities that require a Permit under Part 3A Approvals under the RFIA will require Controlled Activity Approvals under the WMA

Project Relevance; Nil as not within 40m of the bed and banks of a watercourse.

National Parks and Wildlife Act, 1974

(1) The objects of this Act are as follows:

(a) the conservation of nature, including, but not limited to, the conservation of:

(i) habitat, ecosystems and ecosystem processes, and

(ii) biological diversity at the community, species and genetic levels, and

(iii) landforms of significance, including geological features and processes, and

(iv) landscapes and natural features of significance including wilderness and wild rivers,

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:

(i) places, objects and features of significance to Aboriginal people, and

(ii) places of social value to the people of New South Wales, and

(iii) places of historic, architectural or scientific significance,

(c) fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation,

(d) providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation

Project Relevance; nil.

2 SITE CHARACTERISTICS

2.1 Site Description

The proposed development is located in the suburb of Castle Hill on Ridgecrop Drive as shown in **Figure 1.**

The site is bounded by Ridgecrop Drive on the south-western boundary, Gilbert Road on the south-eastern boundary and high-density vegetation land on the northern boundary.

Figure 1. Locality Plan

2.2 Proposed Development

The proposed development is for a co-educational public primary school consisting of numerous multi storey classroom buildings, office facilities and a multipurpose hall.

An indicative layout of the development has been produced by Fulton Trotter Architects and can be seen in **Figure 2**.

The proposed development will include the following engineering components:

- Earthworks to provide foundation support for the classroom buildings including the excavation for an underground on-site detention tank;
- Maintaining the natural gradient of the site and overland flow path through the development site;
- Stormwater drainage system based on a major/ minor design philosophy;
- Management of stormwater quality using a treatment train approach to pollutant loads on a developed catchment in accordance with The Hills Shire Council's recommendations;
- Management of stormwater quantity by reducing post developed flow to

pre-developed over the range of storms between the 1 in 5 year Average Recurrence Interval (ARI) to the 1 in 100 year ARI as per council policy and recommendations; and

- Further measures to manage stormwater and flood flows for 1 in 5 year ARI and 1 in 100 year ARI during construction.

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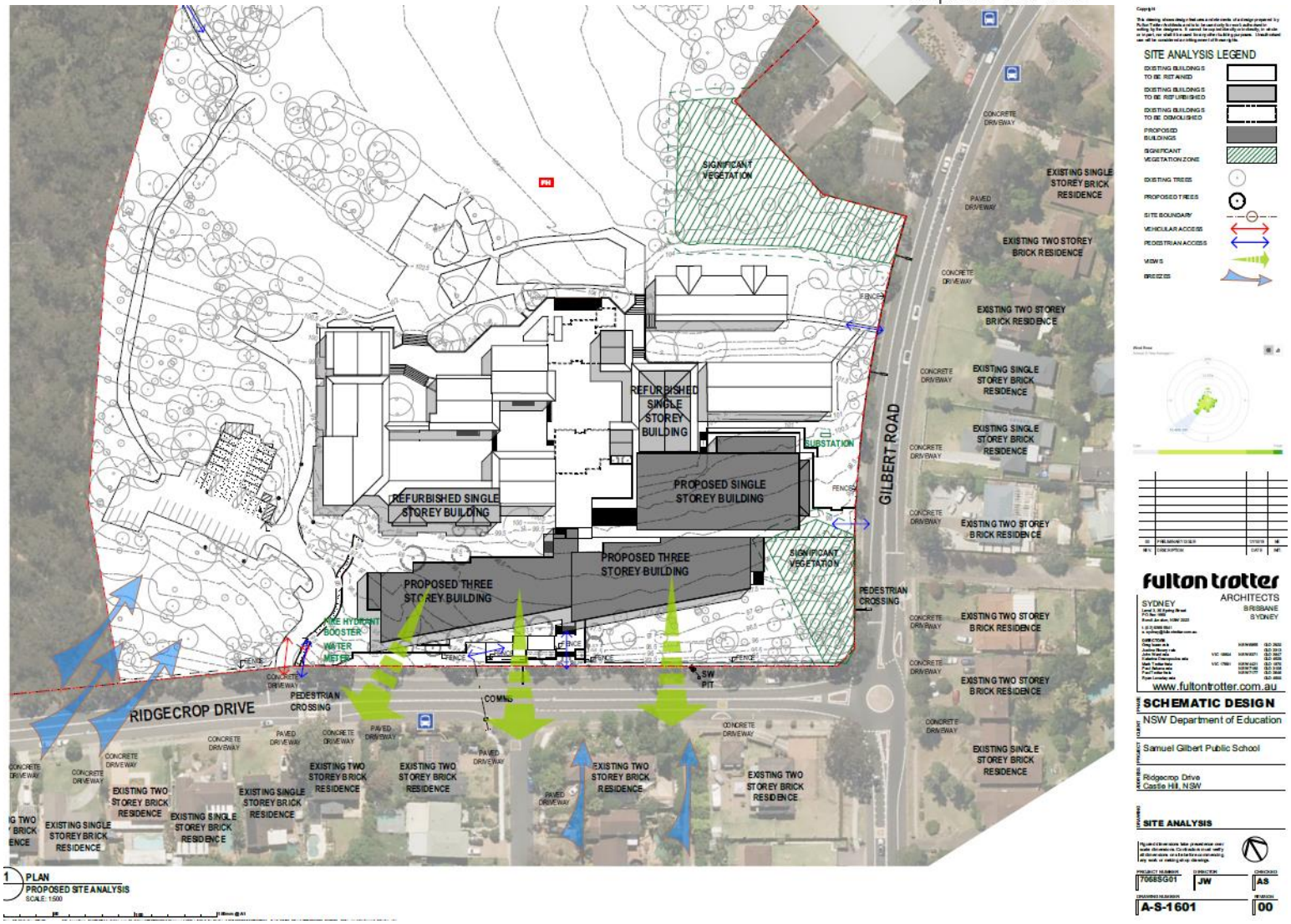


Figure 2. Architectural Plan

2.3 Acid Sulfate Soils

Acid sulfate soil planning maps are indicative and on-site observations and testing should also be used to identify acid sulfate soils. The below shall be used to use visual guidance for more specific onsite assessment.

Potential acid sulfate soil indicators:

- Presence of mangroves, reeds, rushes, salt marsh or swamp vegetation etc
- Sulfurous (rotten egg gas) smell after rain, following a dry spell or when the soils are disturbed • Marine or estuarine sediments
- Soils can be described as unripe muds/sediments (soft, buttery, blue grey or dark greenish grey) which can include sands and gravels
- Milky blue/green water
- Shell fragments in the soil • Waterlogged, scalded or back swamp areas
- Land below 5m AHD elevation

Actual acid sulfate soil indicators:

- Any jarosite (a pale yellow mineral deposit) or iron oxide (rusty) colouring
- Extensive iron stains on any drain surfaces, or iron stained drain water and ochre deposits
- Corrosion of concrete and/or steel structures
- Surface or ground water on or draining from the site with a pH < 5.5, or of an unusually clear or milky green
- Sulfurous (rotten egg gas) smell when soils are disturbed

2.4 Ground Water Protection

Generally possible sources of ground water contamination can be linked to:

- Industrial effluent and manufacturing wastes
- Leaking underground storage tanks and pipelines (not stormwater/rainwater)
- Landfill stockpiles or contaminated soil producing leachate ‘
- Intensive agricultural fertiliser and pesticide use or waste generation
- Contamination from septic tanks and from sewerage and wastewater lagoons
- Mining industry processes and wastes
- Contamination from wells
- Urban stormwater
- Atmospheric fallout
- Inter-aquifer contamination by alteration of flow
- Chemical storage

Dewatering is considered in the EP Act as the process of removal of any water that accumulates in earthwork excavations or below ground structures at or below the existing water table as a result of intersecting aquifers, seepage of soil water/groundwater or storm events

As there is no below ground excavation planned and the noted level of the water table, the anticipated dewatering would be in draining footings and construction areas after rain events.

3 STORMWATER DRAINAGE

3.1 Site Drainage

3.1.1 Existing Site Drainage

The property is currently developed as public primary school with numerous stormwater pits located around the school site. All current overland flows travel towards the south-eastern part of the site via an overland flow route. There are numerous stormwater discharge locations to the kerb and gutter on Ridgecrop Drive and a kerb inlet pit connection on Gilbert Road.

3.1.2 Proposed Site Drainage

The proposed system to be completed generally in accordance with the following general engineering practice, the guidelines of The Hills Shire Council and the following regime:

- The proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge

- The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 5-year ARI to 1-in-20 year ARI storm event. This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. This meets the requirements of The Hills Shire Council's stormwater criteria.

- The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event. The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site.

- The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of The Hills Shire Council and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of

Engineers, Australia publication "Australian Rainfall and Runoff" (2019 Edition), Volumes 1 and 2 (AR&R).

4 IMPACT ASSESSMENT

4.1 Construction

Construction activities such as excavation, other earthworks and the use of water for construction activities may cause runoff, sedimentation and erosion impacts to the local waterways if not appropriately managed.

Potential adverse impacts would include:

- Inadequate containment of spills or leaks of fuels and/or oils from construction plant and equipment and/or from vehicle/trucks that may result in pollutants entering the local waterway;
- Excavation, vegetation clearing and grading that may cause increased sediment and pollutant load in runoff;
- Stockpiling of spoil and construction materials may lead to polluted water runoff and sedimentation of waterways;
- Uncontrolled water use for construction activities resulting in pollutants entering the receiving waterway and potential increased scour and erosion effects;
- Litter from construction activities entering waterways; and
- Exposure of soils containing acid sulphides to oxygen resulting in the production of sulfuric acid, which may negatively affect the environment and waterways.

4.2 Mitigation

Erosion and sediment control measures will be provided in accordance with the "Blue Book" – Managing Urban Stormwater – Soils and Construction (Landcom, 2004) and the The Hills Shire Council's Engineering Guide to mitigate potential impacts to the downstream water quality from construction activities.

Controls would include:

- Sediment management devices, such as fencing, hay bales and sandbags;
- Measures to divert or capture and filter water prior to discharge, such as drainage channels and first flush and sediment basins;
- Installation of measures at work entry and exit points to minimise movement of material onto adjoining roads, such as rumble grids or wheel wash bays;
- Appropriate location and storage of construction materials, fuels and chemicals, including bunding where appropriate;
- All refuelling of vehicles and equipment on site would be undertaken a minimum of 50 metres away from water bodies and surface drains, where possible and;
- Any fuel, oil or other liquids stored onsite would be stored in an appropriately

sized impervious bunded area.
- Measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site.

An erosion and sediment control plan has been prepared as part of the Construction Environmental Management Plan – refer to Appendix 'A'. Implementation of these measures would mitigate off-site impacts to the downstream water quality of the site during construction of the school.

4.3 Wet Weather Management

Prior to a wet weather event and in conjunction with the '*Site Shut Down and Storm Preparation* Checklist', refer to Appendix 'D', all tools and materials will be stored in designated worker areas such as designated containers, sheds etc. During the groundworks stage a Geotechnical Engineer will be on-site regularly and will review all batters and ground conditions to confirm stability.

After periods of wet weather, authorised representatives of the project leadership team and the relevant subcontractors shall inspect all workplaces to determine what, if any, actions are required to declare the site open for regular activity. Situations can present whereby parts of the site remain closed pending further action (dewatering, clean-up etc.) with the rest of the project returning to normal activities. The status of work areas shall be clearly communicated to all project workers at site meeting/s.

In-house and subcontract workers may be required to undertake dewatering and clean-up activities in order that the site be reopened. In these situations appropriate risk assessments shall be undertaken prior to the commencement of clean-up works and appropriate PPE and other equipment shall be issued by the Site Manager.

In the event of inclement weather sites are to refer to the Bureau of Meteorology and/or relevant government website in conjunction with the '*Site Shut Down and Storm Preparation Checklist'.*

During construction, wet weather events will be managed via the use of silt sediment fences, mesh and gravel filters, haybale filters and a sediment basin. The proposed soil and erosion control plan indicate that a sediment control fence is to be installed around the lower side boundary of the site to minimize off-site stormwater runoff from the construction site. A catchment diversion drain will be constructed to divert site runoff towards the proposed sediment basin. Refer to the sediment and erosion control plan for further information. Refer to figure Appendix 'E' for a site plan of the construction site. Appendix 'E' shows the arrangement of the sediment control fences with additional information on how the site will be managed during a storm event.

General Management

- forecast for heavy rain and make decisions on the following accordingly.
- storage of hazardous materials and equipment away from flow paths and known drainage channel
- layout of site compound facilities to take into consideration of the flow paths which are shown on the sediment and erosion control plans and the civil drawings.
- ensure evacuation routes are kept clear during high risk periods based on weather and storm forecasts.
- ensure loose materials, fuel, chemicals and equipment can either be secured or removed during a flood event if required
- equipment shall be covered as required if runoff from equipment can be hazardous or create sediment or oil displacement.
- No greater than 2500m² or soil should be being disturbed at any one time. Ground should be stabalised/sealed prior to disturbing soil greater than 2500m².
- Allow for vehicle washdown during wet weather to ensure sediment is not tracked on roadways leaving when leaving the site. This will be achieved by a hose connection where the vehicle exists are from the site. Surround this and or other wash down areas with sediment fence or bunding and maintain as required. Shaker grates should be located where and vehicles (which have been driving on soil) leave the site.

1-year ARI

- Brief personnel at prestart
- Review of all current ERSED controls and ensure ESCP is still current
- Stormwater would be managed using the following controls
    - o Sediment fencing
    - o Diversion bunds / swales
    - o Coir logs/ sandbags/ silt socks

• Upstream stormwater runoff is expected to bypass the site using the swale system proposed. Other runoff will be minimum given the moderate infiltration rate and be handled by the ESCP.
• High risk soil and erosion activities such as earthworks will not be undertaken immediately before high rainfall.

5 Year ARI

• Implement as above for the 1-year ARI event
• Ensure all plant and equipment are removed from areas of concentrated flow
• Sedimentation basins maximum capacities will be maintained where practically possible

100 Year ARI

• Implement as above for the 1-year ARI event
• Remove all plant and equipment from site areas where there is potential for inundation
• Perimeter controls are not expected to be breached.
• Flow will be directed to the street for the existing buildings in place prior to commencement of the stage 2 works. There will always be a site connection to the street

for site water to be drained based on the stage 1 system or the existing system which is to remain prior to commencement of stage 2 works.

4.3.1 Pre Wet-Weather

The site manager is to carry out a thorough walkthrough of the site to ensure the following control measures are set in place;

- All sediment and erosion controls have been correctly installed and do not need any maintenance works;
- All loose materials/items to be tied down including signage; and
- Where possible machinery and equipment to be placed under cover.

4.3.2 Post Wet-Weather

The site manager is to carry out a thorough walkthrough of the site to ensure the following;

- The sediment and erosion controls have not been damaged. If so, damage is to be rectified immediately;
- Excavated areas to be inspected by authorised person for destabilization;
- Access roads and paths to be cleaned and made good;
- Inspect sediment basin and clean/pump out if required; and
- Inspect all areas to ensure there has been no damage/hazards created by the weather.

5 STATE SIGNIFICANT DEVELOPMENT APPLICATION - CONSENT CONDITIONS

B12.
(b)(iii) *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*
(d) *a program to monitor and report on the:*

> ***(i)*** *impacts and environmental performance of the development;*
> ***(ii)*** *effectiveness of the management measures set out pursuant to paragraph (c) above (a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria)*

(f) *a program to investigate and implement ways to improve the environmental performance of the development over time;*
(g) *a protocol for managing and reporting any:*

> ***(i)*** *incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);*
> ***(ii)*** *complaint;*
> ***(iii)*** *failure to comply with statutory requirements.*

Birzulis Associates offer the following comments in regard to the above conditions:

(b)(iii) Performance indicators will be carried out in accordance with Hutchinson Builder's CEMP report, Section 9.1 'Monitoring and Reviewing of Environmental Performances' and the requirements within the SSD 9274. The construction soil and water management control shall be carried out in accordance with the 'Blue Book – Landcom, Section 8.2 'Maintenance Program'.

(d)(i) & (ii) A program to monitor and report on the environmental impacts and performance of the development, effectiveness of the management measures will be carried out in accordance with Hutchinson Builder's CEMP report, Section 9.1 'Monitoring and Reviewing of Environmental Performances' and the requirements within the SSD 9274. The construction soil and water management control shall be carried out in accordance with the 'Blue Book – Landcom, Section 8.2 'Maintenance Program'.

(f) A program to investigate and implement methods to improve environmental impact for the development over time will be carried out in accordance with Hutchinson Builder's CEMP report, Section 9.1 'Monitoring and Reviewing of Environmental Performances' and the requirements within the SSD 9274.

(g)(i), (ii) & (iii) Protocols for managing incidence, non-compliance, complaints and failure to comply with statutory requirements will be carried out in accordance with Hutchinson Builder's CEMP report, Section 7 'Communication & Reporting' and the requirements within the SSD 9274.

B17. *The Applicant must prepare a Construction Soil and Water Management Plan (CSWMSP) and the plan must address, but not be limited to the following:*
(a) *be prepared by a suitably qualified expert, in consultation with Council;*
(b) *describe all erosion and sediment controls to be implemented during construction;*
(c) *include an Acid Sulfate Soils Management Plan, if required, including measures for the management, handling, treatment and disposal of acid sulfate soils, including monitoring of water quality at acid sulfate soils treatment areas.*
(d) *provide a plan of how all construction works will be managed in a wet-weather events (i.e. storage of equipment, stabilisation of the Site);*
(e) *detail all off-Site flows from the Site; and*
(f) *describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.*

Birzulis Associates offer the following comments in regard to the above conditions:

a) This Construction Soil and Water Management Plan has been prepared by Steven Luu, a civil engineer for Birzulis Associates with over 7 years of experience in the industry. The plan has been reviewed and approved by Michael Grogan, Director of Structural and Civil department with Birzulis Associates (refer to CV included in Appendix 'B'. The sediment and erosion control plan and strategy has been prepared in accordance with Council's recommendations and requirements.

b) All sediment and erosion controls have been described within this report and additional within the sediment and erosion control plans included within Appendix 'A'.

c) The NSW Planning Industry and Environment 'Acid Sulphate Soils Risk Map' indicates that the proposed development site is not affected by acid sulphate soils – refer to Appendix 'F'.

d) Refer to the section 4.3, Wet Weather Management, for details summarizing the action required to be taken immediately before, during and after wet weather events.

e) Refer to the sediment and erosion control drawings included within Appendix 'A' of this report for flow path and discharge point details.

f) During storms up to the 1 in 10yr ARI event (which includes the 1 in 1yr ARI and 1 in 5yr ARI event), flows will be directed to the sediment basins via catch drains or through stormwater pits and pipes that have been constructed. Stormwater that is to be discharged from the basin is to be re-flocculated prior to discharge into Council's stormwater system.

In storms greater than the 1 in 10yr ARI event, flows will similarly discharge to the sediment basin via catch drains and stormwater pits and pipes that have been constructed. Due to natural and unexpected blockages in the stormwater system, it is expected that, in a 1 in 100yr event, the stormwater flows will overtop pits and be conveyed through site overland flows. The sediment basins have not been designed to cater for the 1 in 100yr flows, thus it is likely that flows will discharge overland to Council's stormwater system on Ridgecrop Drive and Gilbert Road. Sediment fences and haybale filters are still expected to perform adequately in larger storm events and contain sediments within the site.

6 CONSTRUCTION IMPACTS

EROSION CONTROL

Erosion control is primary to an erosion and sediment control strategy. This can be achieved through:

- Limiting the area of disturbance and only disturbing what is required. Also limiting the time period of disturbance.
- Integrating elements that reduce or control the volume of water moving over surfaces. This includes, diversion through swales and table drains, and piped or lined channels to stabilised outlets.
- Measures the slow the velocity of water over exposed surfaces within the construction area such as hay bail barriers, introducing roughness, flow check measures, textiles, binding compounds or exposed surface protections. Binding products and surface protection can be spray on stabilisers, mulches, blankets, temporary vegetation and permanent progressive landscape construction.

The above is achieved using the correct implementation of the Erosion and Sediment Control Plan shown on the engineering drawings and any other recommendations in this report.
To achieve the requirements of not concentrating water flows which can lead to transportation of sediment off site it is recommended the swales on the stormwater design drawings be constructed as soon as practicable to divert upstream water around the site.

SEDIMENT MANAGEMENT

This is secondary to erosion control in minimising water pollution as a result of construction. Where required sediment basins are generally located at the low points of site discharges. Requirements for sediment control basins are in accordance with Section 6.3.2.d of the Managing Urban Stormwater: Soils and Construction (the Blue Book). The soil loss from the catchment is led than that required for a sediment basin and as such one is not required.

STOCKPILE STABILISATION

As there is significant volumes of fill being proposed for the site it is foreseeable that material stockpiles will be required. Stockpiles within the site which will be in effect for more than 10 days should be stabalised. As per the Erosion and Sediment Control Plan all stockpiles are to have sediment fences on the downstream slopes and generally should be located a minimum of 5m from overland flow swales. If unused for 10 days then stockpiles shall also be stabalised in accordance with the below relative to the relevant material in the stockpile:

- Coarse grained stockpiles
    - Downstream perimeter rock armouring.
- Less coarse grained stockpiles
    - Polymer binder application

- Application of hydro-seed or hydromulch.

HAZARDOUS MATERIALS

Hazardous material will be addressed in accordance with the Construction Waste Management Sub-Plan (CWMSP) prepared by others.
Reference should be made to the HAZMAT survey relevant for this site to locate any existing hazardous materials.

7 CONCLUSION

This construction soil and water management report has been prepared to support the application for a proposed development at Samuel Gilbert Primary School, Castle Hill NSW.

A stormwater management strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout. The strategy for stormwater quantity and quality management has been developed to reduce both peak flows and pollutant loads in stormwater leaving this site. The stormwater management for the development has been designed in accordance with the development consent.

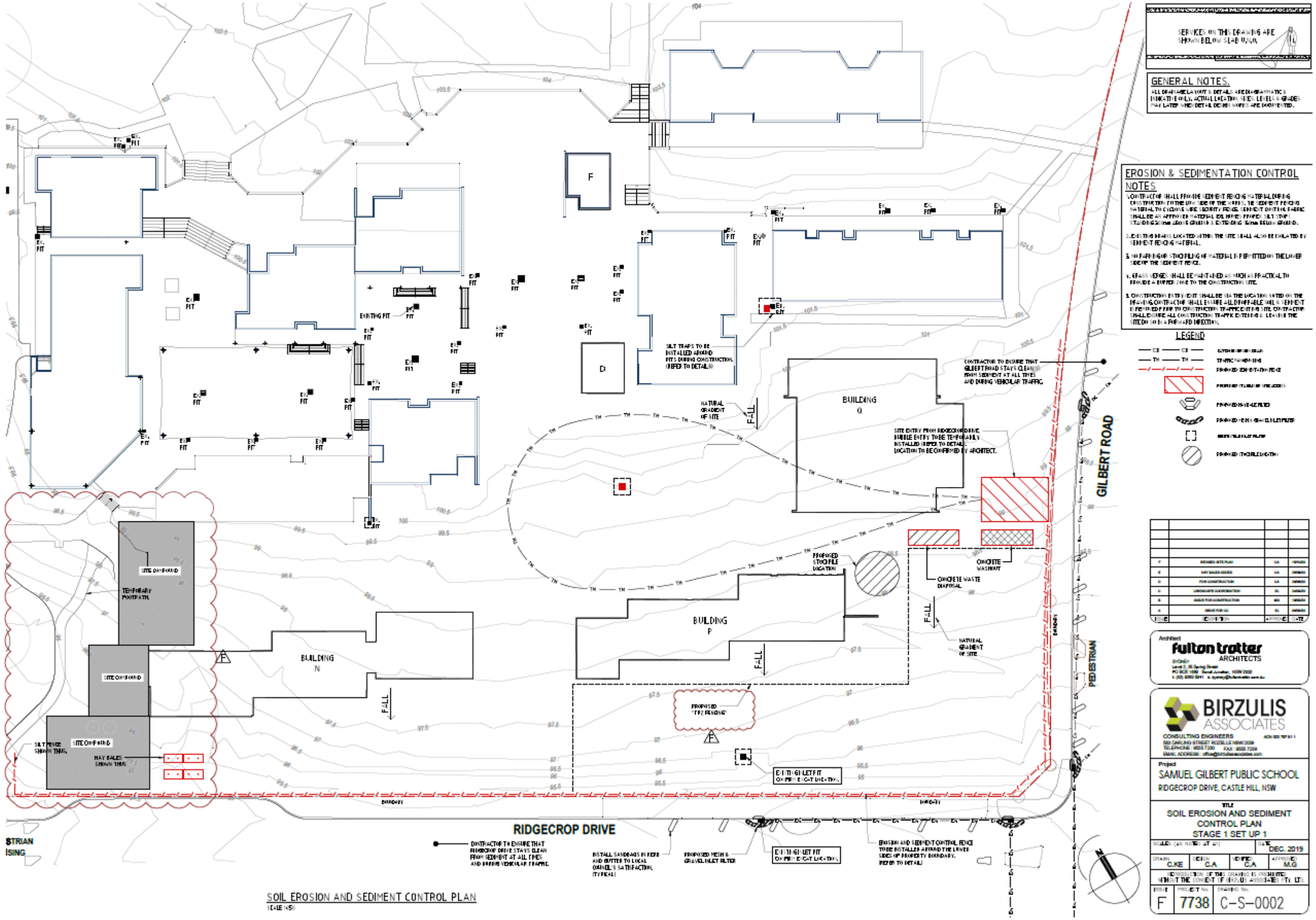
The stormwater layout for the development maintains the existing catchment breakdown and proposed stormwater connection to the existing kerb inlet pit on Ridgecrop Drive. A hydrological assessment has been undertaken which confirms local post development flows from the site will be less than pre-development flows and demonstrates that the site discharge would not adversely affect any land, drainage system or watercourse as a result of the development. A stormwater detention system comprising an active storage of 245m^3 is proposed to attenuate developed stormwater flows to pre-developed flows. This will be provided by an underground detention tank.

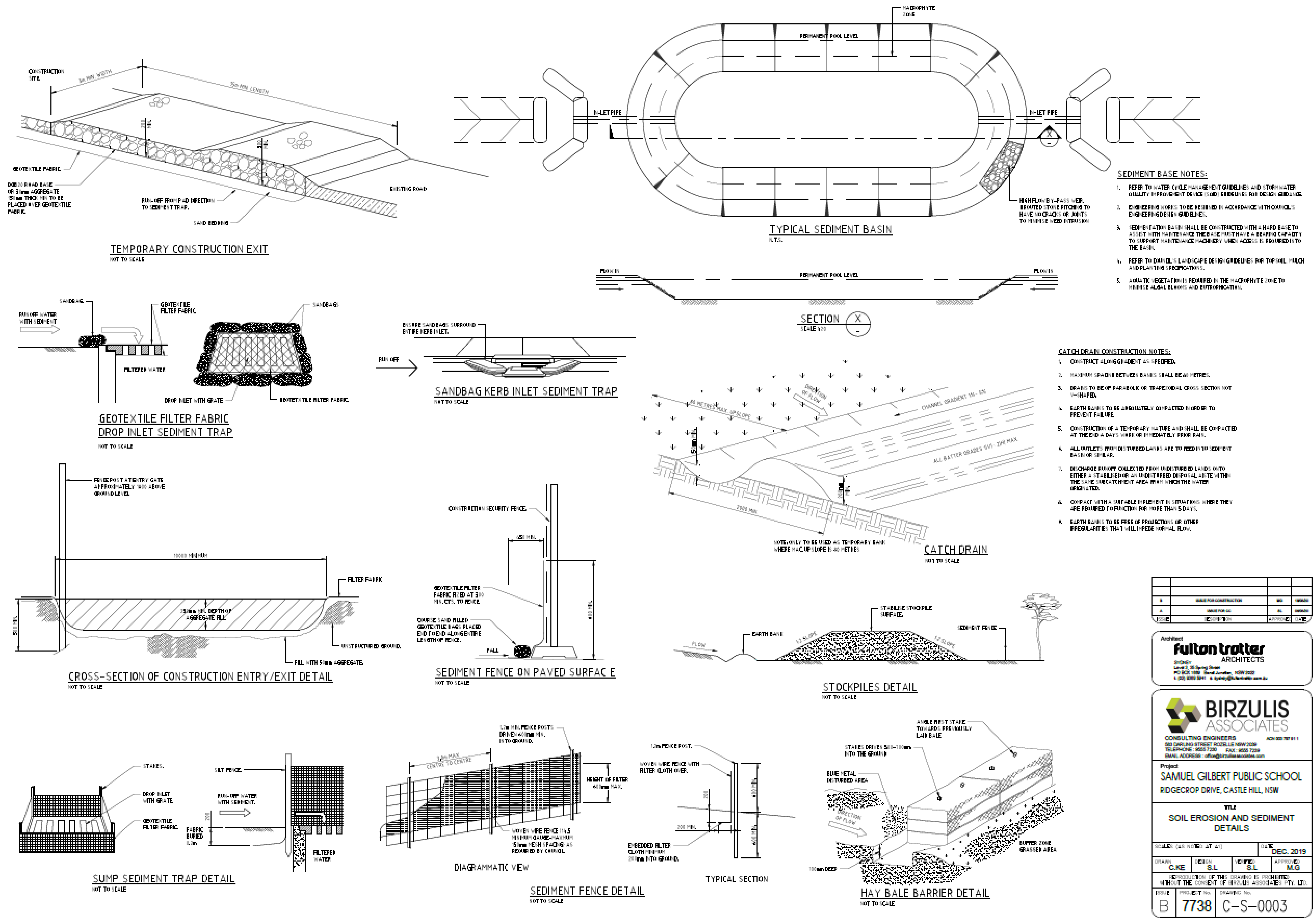
During the construction phase, an erosion and sediment control plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

It is recommended the management strategies in this report be approved and incorporated into the construction phase.

APPENDIX A

EROSION & SEDIMENT CONTROL PLAN & DETAILS


SERVICES ON THIS DRAWING ARE SHOWN BELOW SLAB U.N.O.
GENERAL NOTES.
EROSION & SEDIMENTATION CONTROL NOTES
LEGEND
GILBERT ROAD
RIDGECROP DRIVE
PEDESTRIAN
BUILDING F
BUILDING D
BUILDING Q
BUILDING P
BUILDING N
SITE ENTRY FROM RIDGECROP DRIVE, DOUBLE ENTRY THREE TEMPORARILY INSTALLED REFER TO DETAIL. LOCATION TO BE CONFIRMED BY ARCHITECT.
CONTRACTOR TO ENSURE THAT GILBERT ROAD STAYS CLEAN FROM SEDIMENT AT ALL TIMES AND DURING VEHICULAR TRAFFIC
SILT TRAPS TO BE INSTALLED AROUND PITS DURING CONSTRUCTION. (REFER TO DETAIL)
SITE COMPOUND
TEMPORARY FOOTPATH
SILT FENCE SHOWN THUS
HAY BALES SHOWN THUS
PROPOSED STOCKPILE LOCATION
CONCRETE WASHOUT
CONCRETE WASTE DISPOSAL
NATURAL GRADIENT OF SITE
FALL
PROPOSED TPZ FENCING
EXISTING PIT
EXISTING INLET PIT ON PREVIOUS LOCATION
EROSION AND SEDIMENT CONTROL FENCE TYPE INSTALLED ALONG THE LOWER SIDES OF PROPERTY BOUNDARY. (REFER TO DETAIL)
INSTALL SANDBAGS IN KERB AND GUTTER TO LOCAL COUNCIL'S SATISFACTION. (TYPICAL)
PROPOSED MESH & GRAVEL INLET FILTER
CONTRACTOR TO ENSURE THAT RIDGECROP DRIVE STAYS CLEAN FROM SEDIMENT AT ALL TIMES AND DURING VEHICULAR TRAFFIC
SOIL EROSION AND SEDIMENT CONTROL PLAN
Architect
Fulton trotter ARCHITECTS
BIRZULIS ASSOCIATES
CONSULTING ENGINEERS
Project
SAMUEL GILBERT PUBLIC SCHOOL
RIDGECROP DRIVE, CASTLE HILL, NSW
TITLE
SOIL EROSION AND SEDIMENT CONTROL PLAN
STAGE 1 SET UP 1
DATE
DEC. 2019
DRAWN C.KE
DESIGN C.A
VERIFIED C.A
APPROVED M.G
ISSUE F
PROJECT No. 7738
DRAWING No. C-S-0002


TEMPORARY CONSTRUCTION EXIT
NOT TO SCALE
TYPICAL SEDIMENT BASIN
N.T.S.
INLET PIPE
PERMANENT POOL LEVEL
SECTION X
SEDIMENT BASE NOTES:
1. REFER TO WATER CYCLE MANAGEMENT GUIDELINES AND STORMWATER QUALITY IMPROVEMENT DEVICE (SQID) GUIDELINES FOR DESIGN GUIDANCE.
2. ENGINEERING WORKS TO BE DESIGNED IN ACCORDANCE WITH COUNCIL'S ENGINEERING DESIGN GUIDELINES.
3. SEDIMENTATION BASIN SHALL BE CONSTRUCTED WITH A HARD BASE TO ASSIST WITH MAINTENANCE THE BASE MUST HAVE A BEARING CAPACITY TO SUPPORT MAINTENANCE MACHINERY WHEN ACCESS IS REQUIRED INTO THE BASIN.
4. REFER TO COUNCIL'S LANDSCAPE DESIGN GUIDELINES FOR TOPSOIL, MULCH AND PLANTING SPECIFICATIONS.
5. AQUATIC VEGETATION IS REQUIRED IN THE MACROPHYTE ZONE TO MINIMISE ALGAL BLOOMS AND EUTROPHICATION.
HIGH FLOW BY-PASS WEIR. GROUTED STONE PITCHING TO HAVE NO CRACKS OR JOINTS TO MINIMISE WEED INTRUSION
GEOTEXTILE FILTER FABRIC
DROP INLET SEDIMENT TRAP
NOT TO SCALE
SANDBAG KERB INLET SEDIMENT TRAP
NOT TO SCALE
CATCH DRAIN CONSTRUCTION NOTES:
1. CONSTRUCT ALONG GRADIENT AS SPECIFIED.
2. MAXIMUM SPACING BETWEEN BANKS SHALL BE 80 METRES.
3. DRAINS TO BE OF PARABOLIC OR TRAPEZOIDAL CROSS SECTION NOT V-SHAPED.
4. EARTH BANKS TO BE ADEQUATELY COMPACTED IN ORDER TO PREVENT FAILURE.
5. CONSTRUCTION OF A TEMPORARY NATURE AND SHALL BE COMPACTED AT THE END A DAYS WORK OR IMMEDIATELY PRIOR RAIN.
6. ALL OUTLETS FROM DISTURBED LANDS ARE TO FEED INTO SEDIMENT BASIN OR SIMILAR.
7. DISCHARGE RUNOFF COLLECTED FROM UNDISTURBED LANDS ONTO EITHER A STABILISED OR AN UNDISTURBED DISPOSAL SITE WITHIN THE SAME SUBCATCHMENT AREA FROM WHICH THE WATER ORIGINATED.
8. COMPACT WITH A SUITABLE IMPLEMENT IN SITUATIONS WHERE THEY ARE REQUIRED TO FUNCTION FOR MORE THAN 5 DAYS.
9. EARTH BANKS TO BE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT WILL IMPEDE NORMAL FLOW.
CATCH DRAIN
NOT TO SCALE
CROSS-SECTION OF CONSTRUCTION ENTRY/EXIT DETAIL
NOT TO SCALE
SEDIMENT FENCE ON PAVED SURFACE
NOT TO SCALE
STOCKPILES DETAIL
NOT TO SCALE
SUMP SEDIMENT TRAP DETAIL
NOT TO SCALE
DIAGRAMMATIC VIEW
TYPICAL SECTION
SEDIMENT FENCE DETAIL
NOT TO SCALE
HAY BALE BARRIER DETAIL
NOT TO SCALE
ISSUE
DESCRIPTION
APPROVED
DATE
Architect
fulton trotter ARCHITECTS
BIRZULIS ASSOCIATES
CONSULTING ENGINEERS
Project
SAMUEL GILBERT PUBLIC SCHOOL
RIDGECROP DRIVE, CASTLE HILL, NSW
TITLE
SOIL EROSION AND SEDIMENT DETAILS
SCALES (AS NOTED AT A1)
DATE DEC. 2019
DRAWN C.KE
DESIGN S.L
VERIFIED S.L
APPROVED M.G
REPRODUCTION OF THIS DRAWING IS PROHIBITED WITHOUT THE CONSENT OF BIRZULIS ASSOCIATES PTY. LTD.
ISSUE B
PROJECT No. 7738
DRAWING No. C-S-0003

APPENDIX B - CURRICULUM VITAE

MICHAEL GROGAN Born 2.2.1978

Bachelor of Engineering in Civil Engineering
University of Newcastle

Masters of Engineering (Structural)
University of Technology, Sydney

Member of the Institution of Engineers, Australia
Chartered Professional Engineer
Registered with National Professional Engineers Register
Registered Professional Engineer of Queensland
Registered Building Practitioner with Building Commission Victoria

Since completing his degree in 1999, Michael has worked as a structural engineer for Birzulis Associates Pty Ltd and in 2004 Michael was appointed as an Associate Director of Birzulis Associates Pty Ltd. In 2012 Michael was appointed a Director of Birzulis Associates Pty Ltd.

Michael has had exposure to the design of reinforced and post-tensioned concrete, structural steelwork, glass, brickwork, timber and foundation design along with site supervision through involvement with numerous projects including the following projects:-

- National Gallery of Australia, Canberra
- Ian Thorpe Aquatic Centre, Ultimo
- Hillsong Christian Church with 3500 seat auditorium and chapel
- Presbyterian Ladies College – performing arts centre and indoor swimming complex
- Ocean Breeze Apartments
- Energy Australia Substation, Campbell Street
- Nareen Gardens Retirement Village
- Millers Self Storage, Thornleigh, Rozelle and Auburn Storage Warehouses
- Delany College, Granville
- Penrith Anglican College
- Hamilton Island Apartments
- Kia Ora Stud luxury residence, Scone
- Tara Anglican College – numerous buildings
- Hoxton Park Anglican College – numerous buildings
- Griffith TAFE – nursing and children's services
- Numerous luxury domestic buildings

APPENDIX C
COUNCIL CONSULTATION

Post Approval – Consultation

Consultation needs to be meaningful, done with courtesy and respect and be well documented. These are people/ organisations that we need to be building meaningful relationships with.
Conditions of all consent can require consultation with a range of stakeholders. Consultation in the post approval world needs to be well documented to satisfy the condition requirements.
Examples include Council, service providers (eg. Electricity gas etc.), consult with local bus provider and TfNSW.
Read each condition carefully, any reference to consult triggers consultation. Typically on State Significant Development, there will be a specific consultation condition as to how this piece can be appropriately addressed.

Consultation is not:

- A token gesture
- Done at the end of the piece of work,
- An email to the relevant stakeholder with no response;
- A meeting with the stakeholder with no meeting minutes.

Consultation is:

- Meaningful
- Done prior to the requirement,
- Captures an outcome,
- Identifies matters resolved,
- Identifies matters unresolved,
- Any disagreements are disclosed; and
- How we are going to address unresolved matters?

How to capture all the relevant details on consultation requirements? Any consultation requirement in a condition is required to be accompanied with the following table:

Post Approval Consultation Record

Identified Party to Consult:	The Hills Shire Council
Consultation type:	Teleconference
When is consultation required?	Prior to commencement of construction
Why	To meet condition B17
When was consultation scheduled/held	Consultation scheduled for the 24/02/2020
When was consultation held	Consultation undertaken on the 24/02/2020
Identify persons and positions who were involved	Craig – Subdivision Department The Hills Shire Council Steven Luu – Civil Engineer Birzulis Associates
Provide the details of the consultation	• Consultation undertake via teleconference; • Introductions made; • Description of the site/development ; • Review of relevant SSDA conditions of consent; and • Outline of council policies and councils requests were made.
What specific matters were discussed?	• Discussion regarding location of the site within Council LGA; • Council advise to refer to Landcom (blue book) for specific sediment and erosion control requirements – silt fences, basin design etc; and • Sediment and erosion control measures clarified.
What matters were resolved?	All matters resolved
What matters are unresolved?	None
Any remaining points of disagreement?	No
How will SINSW address matters not resolved?	None

APPENDIX D
SITE SHUTDOWN AND
STORM PREPARATION CHECKLIST

Site Shut Down & Storm Preparation Checklist

HB-HSEQ-F-084

Project Name: Job Number: Date:

Inspected by:

SITE SHUT DOWN OR BUREAU OF METEOROLOGY(BOM) / OFFICIAL GOVERNMENT WARNING RECIEVED			
ITEM	**YES**	**NO**	**N/A**
HOUSEKEEPING			
Ensure loose materials and objects including signage are secured and cannot blow away (check all levels, including formwork deck and roof). This is particularly important where the structure is not enclosed.			
All stored materials (e.g. ply, roofing) have been tied down/strapped.			
For holiday shutdown period – ensure excess waste has been removed from site.			
SECURITY			
Ensure boundary fencing, hoarding and barricading is secured with adequate bracing / counterweights and cannot be blown over.			
Ensure site office is locked and laptops, cameras etc. are taken home to prevent unauthorised access and theft.			
Securely lock all site containers, site sheds and buildings.			
For holiday shutdown period – Site contacts sign is secured and legible, with contact phone numbers displayed.			
For holiday shutdown period - routine security patrols arranged where appropriate.			
For holiday shutdown period - arm security system, as appropriate. Advise monitoring company of any changes to contact phone numbers during shutdown period.			
For holiday shutdown period – advise Client regarding shutdown period and emergency contact phone numbers.			
PUBLIC SAFETY			
For holiday shutdown period - pedestrians have safe passage around/adjacent to project.			
For holiday shutdown period – gantry lighting operational and sharp edges protected (e.g. pvc pipe).			
For holiday shutdown period – traffic control measures would either be removed or covered where not required to be displayed over shutdown (e.g. 'worker ahead' signage).			
EXCAVATION & CONFINED SPACES			
For holiday shutdown period – ensure excavations have been filled, barricaded or covered (load bearing) to prevent persons falling into them.			
For holiday shutdown period – confined spaces signed and locked if possible.			

HUTCHINSON BUILDERS

Site Shut Down & Storm Preparation Checklist

HB-HSEQ-F-084

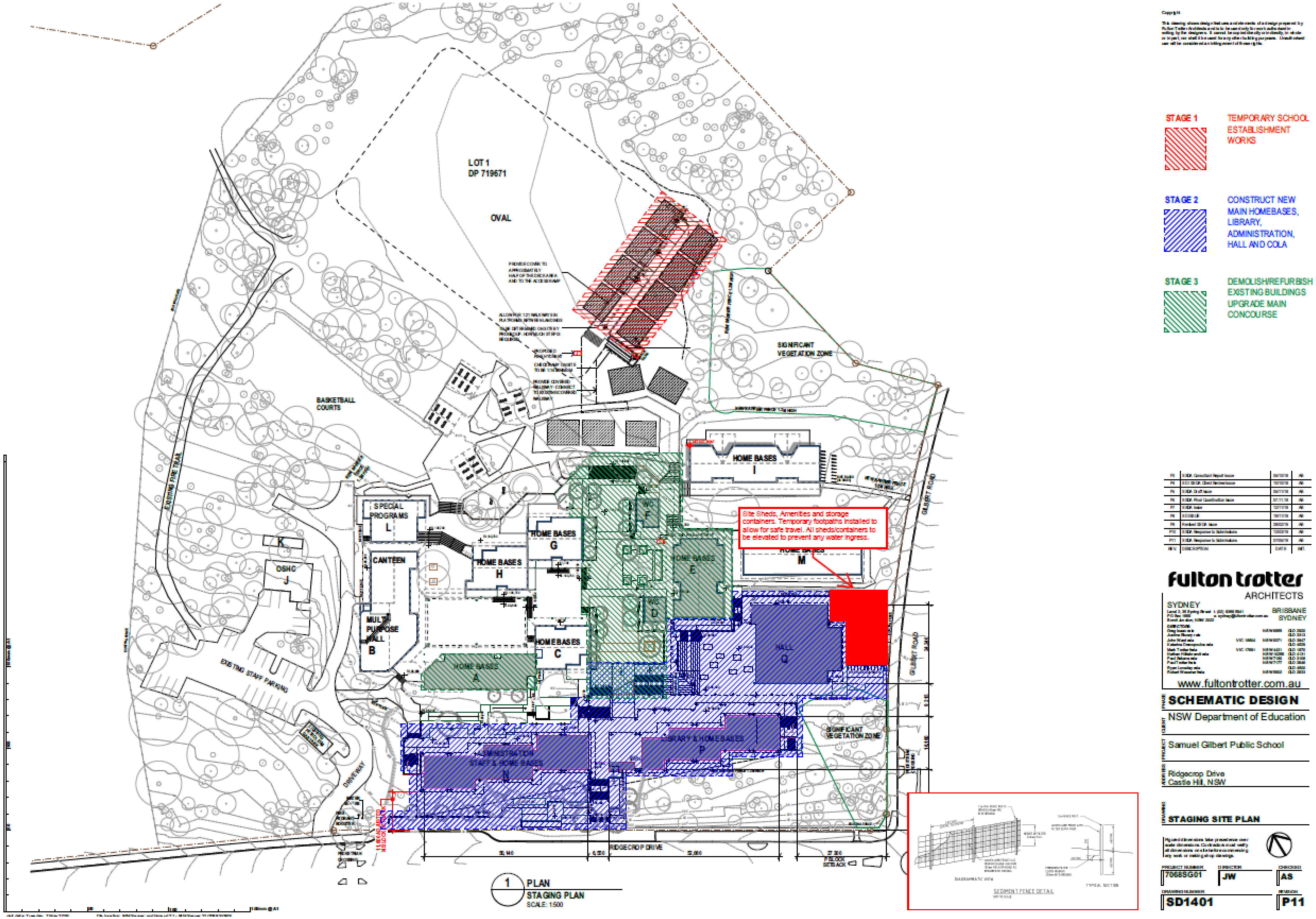
SCAFFOLD			
Ensure scaffold ties are in place and check scaffold couplers that link scaffold components together.			
Check shade cloth / mesh and planks are securely fixed.			
Check scaffold baseplates and ensure potential water runoff is diverted (so they cannot be undermined).			
If scaffold is incomplete, ensure access is restricted (e.g. minimum prominent incomplete scaffold signs and hazard tape).			
Ensure scaffold is free from excess materials and no loose materials.			
STRUCTURE			
Where required incomplete structures are braced to prevent collapse.			
Review all pre-cast panel braces and ensure they are secured and locked.			
Ensure all block & brick walls are supported / braced and/or core filled.			
Finished/sensitive work protected from weather ingress.			
For holiday shutdown period – ensure penetrations in concrete slabs have penetration covers affixed.			
PLANT			
Ensure tower crane warning lights operational.			
Ensure tower crane barricading secured/ lifting hooks and chains removed/ crane in slew mode and crane cabin locked.			
All plant parked in designated area with attachments lowered.			
All plant locked, with keys removed and isolated if possible.			
HAZARDOUS CHEMICALS/MATERIALS			
Dangerous goods and hazardous substances should be correctly disposed of or secured in a location that is unlikely to flood.			
Bunds empty and clean.			
Asbestos removal enclosures sealed and secured, following advice from licenced removalist.			
SERVICES & AMENITIES			
For holiday shutdown period – where required gas, electrical and water supplies / mains have been isolated. This includes isolating temporary boards at the main switchboard, isolating water to site sheds and turning off all lighting and air conditioners inside sheds.			
For holiday shutdown period - all extension leads and power tools removed from site and secured.			
For holiday shutdown period – fridges emptied and cleaned.			
For holiday shutdown period – chemical toilets emptied and cleaned.			
ENVIRONMENTAL			
Erosion and sediment controls in place (and in a clean condition).			

Stockpiles covered if required by site plan; covers sufficiently weighed down.			
For holiday shutdown period – road leaving site is clean.			
For holiday shutdown period – dust control arranged if required.			
IF SITE BEING SHUT DUE TO WEATHER EVENT			
Evacuate the site where it is identified that serious and damaging weather is coming and it is safe for workers to travel from site to home			

POST SITE SHUT DOWN OR WEATHER EVENT			
ITEM	**YES**	**NO**	**N/A**
POST SITE SHUTDOWN			
Restore services to site.			
Complete BIG10 inspection, including:			
No evidence of intruders.			
Scaffold inspection, including footings not undermined.			
Condition of erosion and sediment controls.			
Plant operators to conduct a thorough prestart check prior to equipment use.			
POST STORM EVENT			
Electricity – Prior to use ensure there has been a clearance to use live electrical sources by an electrician			
Identify any materials likely to contain asbestos containing material and isolate.			
Check drinking water and hand wash facilities are available			
Check that workers have access to working amenities			
Assess what clean-up work needs to be done			
Plan the clean-up to ensure additional risks / hazards are not introduced			
Determine which tools & equipment will be needed to safely do the work			
Check that the people required to operate the machinery have the right skill and competencies and ensure less skilled workers are supervised			
Be aware of worker fatigue and toolbox all workers on the signs and symptoms of fatigue			
Ensure all correct PPE for the task is being correctly used by all workers			
Ensure all first aid stock and rooms are suitable for treating any injuries			
Complete a monthly scaffold inspection checking: - there has not been soil erosion occur from underneath the sole boards - that the scaffold base jacks are centred on the sole boards			

APPENDIX E

CONSTRUCTION SOIL AND WATER MANAGEMENT
SITE ARRANGEMENT

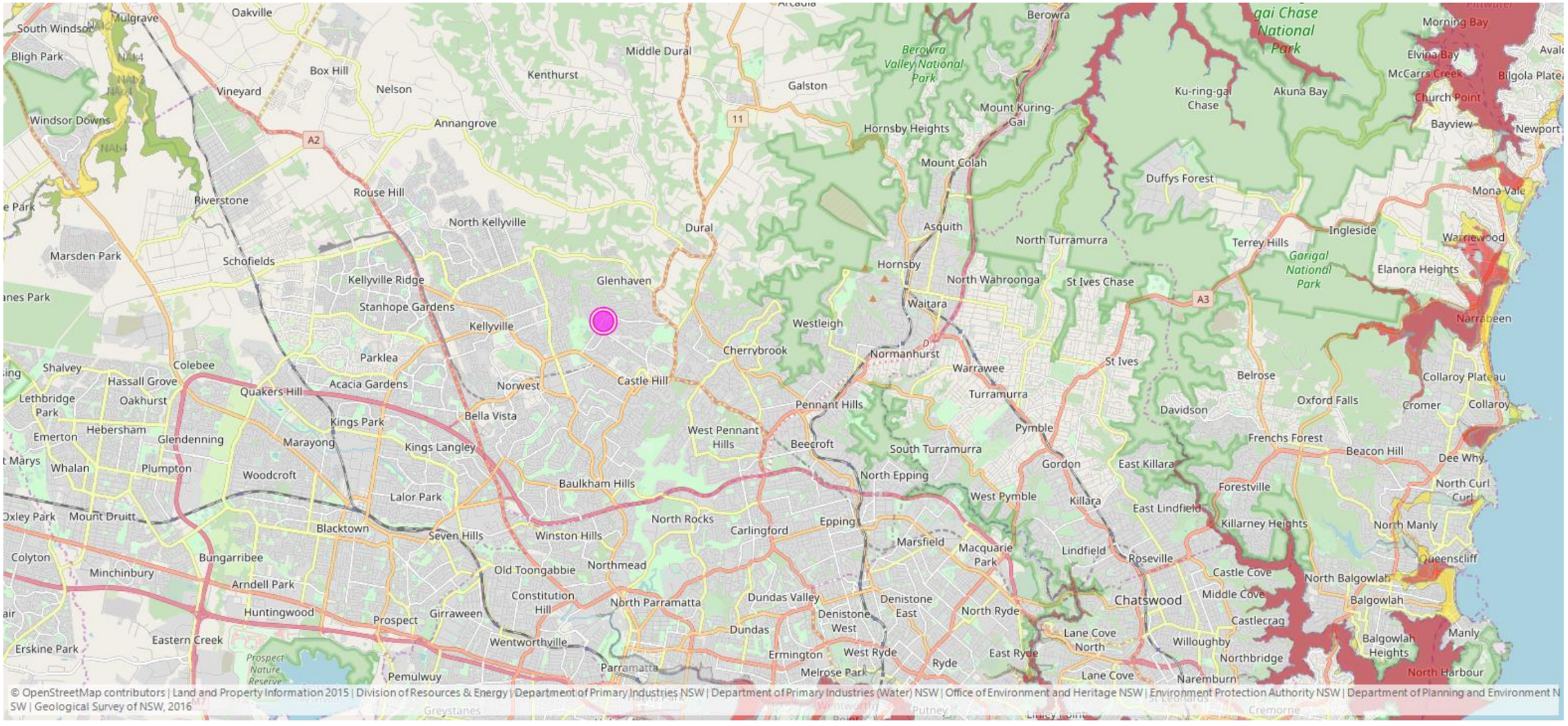

LOT 1
DP 719671
OVAL
BASKETBALL COURTS
SIGNIFICANT VEGETATION ZONE
EXISTING FIRE TRAIL
HOME BASES I
SPECIAL PROGRAMS L
CANTEEN
HOME BASES G
HOME BASES H
HOME BASES F
HOME BASES E
HOME BASES D
HOME BASES M
OSHC J
K
MULTI PURPOSE HALL B
HOME BASES C
HOME BASES A
HALL Q
EXISTING STAFF PARKING
ADMINISTRATION STAFF & HOME BASES N
LIBRARY & HOME BASES P
SIGNIFICANT VEGETATION ZONE
DRIVEWAY
RIDGECROP DRIVE
GILBERT ROAD
Site Sheds, Amenities and storage containers. Temporary footpaths installed to allow for safe travel. All sheds/containers to be elevated to prevent any water ingress.
STAGE 1
TEMPORARY SCHOOL ESTABLISHMENT WORKS
STAGE 2
CONSTRUCT NEW MAIN HOMEBASES, LIBRARY, ADMINISTRATION, HALL AND COLA
STAGE 3
DEMOLISH/REFURBISH EXISTING BUILDINGS UPGRADE MAIN CONCOURSE
1 PLAN
STAGING PLAN
SCALE: 1:500
SEDIMENT FENCE DETAIL
fulton trotter ARCHITECTS
SYDNEY
BRISBANE
SYDNEY
www.fultontrotter.com.au
SCHEMATIC DESIGN
NSW Department of Education
Samuel Gilbert Public School
Ridgecrop Drive
Castle Hill, NSW
STAGING SITE PLAN
7068SG01
JW
AS
SD1401
P11

APPENDIX F

NSW PLANNING INDUSTRY & ENVIRONMENT

-

ACID SULPHATE SOILS RISK MAP


Mulgrave
Oakville
South Windsor
Bligh Park
Box Hill
Vineyard
Nelson
Middle Dural
Kenthurst
Galston
Berowra
Berowra Valley National Park
Morning Bay
Elvina Bay
McCarrs Creek
Bilgola Plateau
Church Point
Bayview
Newport
Windsor Downs
Annangrove
Hornsby Heights
Mount Kuring-Gai
Ku-ring-gai Chase
Akuna Bay
Mount Colah
Duffys Forest
Mona Vale
Riverstone
Rouse Hill
North Kellyville
Dural
Asquith
North Turramurra
Terrey Hills
Ingleside
Warriewood
Marsden Park
Schofields
Kellyville Ridge
Glenhaven
Hornsby
North Wahroonga
St Ives Chase
Garigal National Park
Elanora Heights
Stanhope Gardens
Kellyville
Waitara
Westleigh
Narrabeen
Parklea
Cherrybrook
Normanhurst
Warrawee
St Ives
Shalvey
Colebee
Hassall Grove
Acacia Gardens
Norwest
Castle Hill
Belrose
Collaroy Plateau
Lethbridge Park
Oakhurst
Quakers Hill
Turramurra
Oxford Falls
Cromer
Collaroy
Pennant Hills
Davidson
Kings Park
Bella Vista
Pymble
Emerton
Hebersham
Glendenning
West Pennant Hills
Beecroft
South Turramurra
Frenchs Forest
Beacon Hill
Dee Why
Marayong
Kings Langley
Whalan
Plumpton
Gordon
East Killara
North Epping
Woodcroft
Baulkham Hills
Forestville
North Curl Curl
Lalor Park
West Pymble
Killara
East Lindfield
Killarney Heights
North Manly
Oxley Park
Mount Druitt
Blacktown
North Rocks
Carlingford
Epping
Seven Hills
Winston Hills
Marsfield
Macquarie Park
Lindfield
Roseville
Queenscliff
Colyton
Minchinbury
Bungarribee
Old Toongabbie
Northmead
Castle Cove
North Balgowlah
Arndell Park
Constitution Hill
North Parramatta
Dundas Valley
Chatswood
Middle Cove
Balgowlah
Huntingwood
Prospect
Girraween
Denistone East
North Ryde
Castlecrag
Dundas
Denistone West
Lane Cove North
Willoughby
Balgowlah Heights
Manly
Eastern Creek
Wentworthville
Ermington
West Ryde
Northbridge
Erskine Park
Prospect Nature Reserve
Parramatta
Ryde
East Ryde
Melrose Park
Lane Cove
Naremburn
North Harbour
Pemulwuy
Greystanes
Putney
Cremorne
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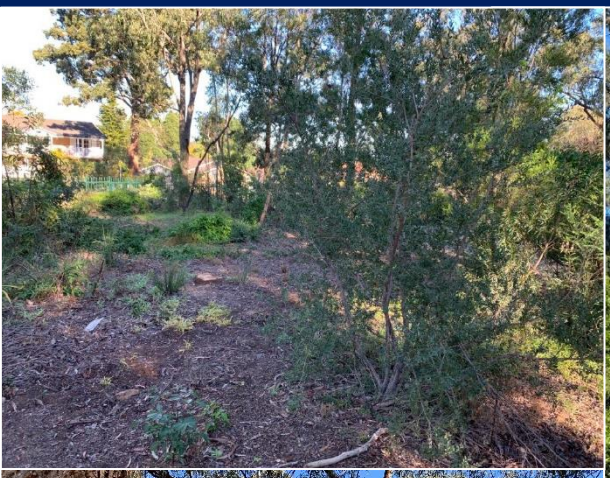
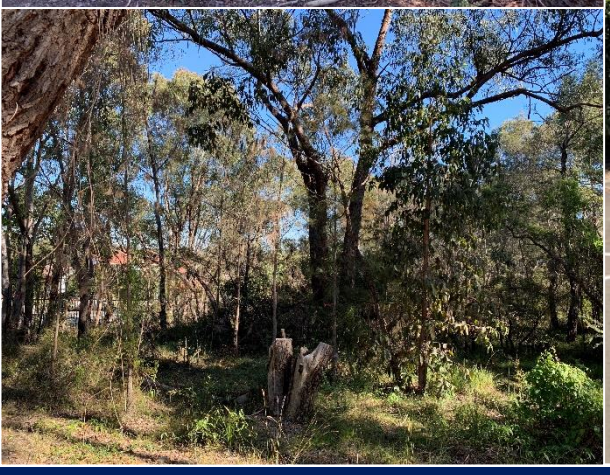
APPENDIX K – BIODIVERSITY MANAGEMENT SUB PLAN

As per Condition B13 (f)

ecoplanning
ecology | planning | offsets

Biodiversity Management Sub-plan


Samuel Gilbert Public School (Lot 1 // DP 719671)

Proposed temporary demountable classrooms

Prepared for: Hutchinson Builders

14 April 2020 Version: 1.2 – Final

PROJECT NUMBER	2020-017			
PROJECT NAME	Biodiversity Management Sub-plan			
PROJECT ADDRESS	Samuel Gilbert Public School (Lot 1 // DP 719671)			
PREPARED FOR	Hutchinson Builders			
AUTHOR/S	Stephanie Cerato			
REVIEW	**Technical**	**QA**	**Version**	**Date to client**
	Bruce Mullins		1.0 - Draft	20 February 2020
			1.1 - Final	10 March 2020
			1.2 – Final	23 March 2020
			1.3 – Finale	14 April 2020

This report should be cited as: 'Ecoplanning (2020). Biodiversity Management Sub-plan– Samuel Gilbert Public School (Lot 1 // DP 719671). Prepared for Hutchinson Builders.'

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Glossary and abbreviations

Acronym	Description
BDAR	Biodiversity Development Assessment Report
BC Act	*Biodiversity Conservation Act 2016*
CEEC	Critically Endangered Ecological Community
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FMSP	Fauna Management Sub-Plan
HBT	Hollow Bearing Tree
THLEP	The Hills Local Environmental Plan 2012
LGA	Local Government Area
SSD	State Significant Development
STIF	Sydney Turpentine-Ironbark Forest
TEC	Threatened Ecological Community
WONS	Weeds of National Significance
VMP	Vegetation Management Plan
VMSP	Vegetation Management Sub-Plan
*	Denotes exotic species

1 Introduction

1.1 Description of project and purpose of the Biodiversity Management Sub-Plan

Ecoplanning were commissioned by Hutchinson Builders to prepare a Biodiversity Management Sub-Plan (BMSP) relating to the development at Lot 1 // DP 719671, Samuel Gilbert Public School, Castle Hill. For the purposes of this report, Lot 1 // DP 719671 is referred to as the 'study area' and the area for the works is referred to as the 'subject site' (**Figure 1.1**). The development is a State Significant Development (SSD) involving the demolition of classrooms and tree removal.

The study area currently contains the existing school grounds including built areas (e.g. classrooms), stands of native bushland and open space areas. A small amount of Sydney Turpentine-Ironbark Forest (STIF) is present in the south eastern part of the site. This community is equivalent to '*Turpentine-Ironbark Forest of the Sydney Basin Bioregion*', a Critically Endangered Ecological Community (CEEC) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NSW *Biodiversity Conservation Act 2016* (BC Act).

This BMSP has been prepared in accordance with the SSD (application number SSD 9274) and fulfils the following consent conditions:

- B18 – Biodiversity Management Sub-Plan (BMSP) that includes a Vegetation Management Sub-plan (VMSP) and Fauna Management Sub-plan (FMSP), and
- B22 – A pre-clearing survey and inspection.

Monitoring, Reviews and Communication will be as per the HB CEMP Section 7 (Communication & Reporting) and Section 9 (Monitoring & Reviewing of Environmental Performances) as well as the requirements within SSD 9274.

Table 1.1 shows the sections of this report that address the matters described in consent conditions B18 and B22.

Table 1.1: Link to where consent conditions are addressed in the report

Consent Conditions		Section of the report
Condition B18		
a)	should any injured fauna species be found during the construction period, construction must stop immediately so that the injured animal can be taken to a vet or wildlife carer. All handling of fauna species must be conducted by a qualified ecologist or wildlife carer	Section 3.2.1 p12 - 13
b)	during vegetation clearing, animals that are injured or displaced are to be captured and relocated by a qualified ecologist or wildlife carer to nearby bushland (subject to landowner approval), or trees containing wildlife must be sectioned and dismantled before relocating the animals;	Section 3.2.1 p12 - 13

Consent Conditions		Section of the report
Condition B18		
c)	nocturnal fauna species such as gliders and possums, if captured and rescued during vegetation clearing are to be secured in suitable enclosures and kept in a quiet, dark and cool environment until they can be released into suitable habitat after dark;	Section 3.2.1 p12 - 13
d)	include a Vegetation Management sub-plan (VMP) for the site during construction works.	Section 2 p8 – 11
e)	include measures to communicate to the construction workforce the biodiversity values that are to be retained and protected;	Section 2.2.1 p9
f)	any hollows removed be salvaged and replaced into trees within the vegetated areas to be retained or they be replaced with nest boxes in consultation with Council suitable to native fauna likely to use the site;	Section 2.2.2 p9 – 10
g)	include a Fauna Management Plan for the site including details of impacts and proposed mitigation measures due to impact on movement, construction traffic, proposed construction hours, details of any fencing, restricting developments in identified areas, light spill, construction noise and on-site crane movements; and	Section 3 p12 – 16 Appendix A p18 – 20
h)	include details to install and maintain exclusion fencing along and around any native vegetation not being removed as part of this development.	Section 2.1.1 p8
Condition B22		
a)	Prior to the commencement of construction and/or vegetation clearing (whichever occurs first), pre-clearing surveys and inspections for fauna must be undertaken. The surveys and inspection, and any subsequent relocation of fauna, must be undertaken under the guidance of a suitably qualified ecologist and must be in accordance with the methodology incorporated in the Biodiversity Management Sub-Plan. Evidence of the pre-clearing surveys and inspections for fauna and any relocation of fauna must be provided to the satisfaction of the Certifying Authority.	Section 3.1 p12

Figure 1.1: Study area and subject site.

1.2 Site description

The study area is located on the corner of Ridgecrop Drive and Gilbert Road, Castle Hill in The Hills Shire Local Government Area (LGA).

The study area consists of a combination of native bushland, planted gardens and mown open space amongst the schools build environment. The main area of interest for this BMSP includes two native vegetation communities located in the subject site; namely, *Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin Bioregion* (PCT 1081) and *Turpentine - Grey Ironbark open forest on shale in the lower Blue Mountains, Sydney Basin Bioregion* (PCT 1281) (**Figure 1.2**). PCT 1281 forms part of the Critically Endangered Ecological Community (CEEC) Sydney Turpentine – Ironbark Forest (STIF) in the Sydney Basin Bioregion under the BC Act and the EPBC Act.

The development involves the demolition of classrooms and tree removal, construction of a new three storey building, construction of a new school hall, alterations and additions to two existing buildings and refurbishment of two toilet blocks. Trees within the construction footprint (including a 3 m setback beyond the construction area) are required for removal (**Figure 1.3** and **Figure 1.4**).

A site-specific survey was undertaken by Travers bushfire & ecology (2018) and Ecoplanning Pty Ltd (2019). For the full description of plant community types and weed management identified within the study area please refer to '*Travers bushfire & ecology (2018). Biodiversity Development Assessment Report (State Significant Development Assessment) Lots 1 & 2 DP 719671 and Lots 551 & 552 DP 734350, Ridgecrop Drive, Castle Hill'* and '*Ecoplanning (2019). Vegetation Management Plan– Samuel Gilbert Public School (Lot 1 // DP 719671). Prepared for Alphitonia.*'

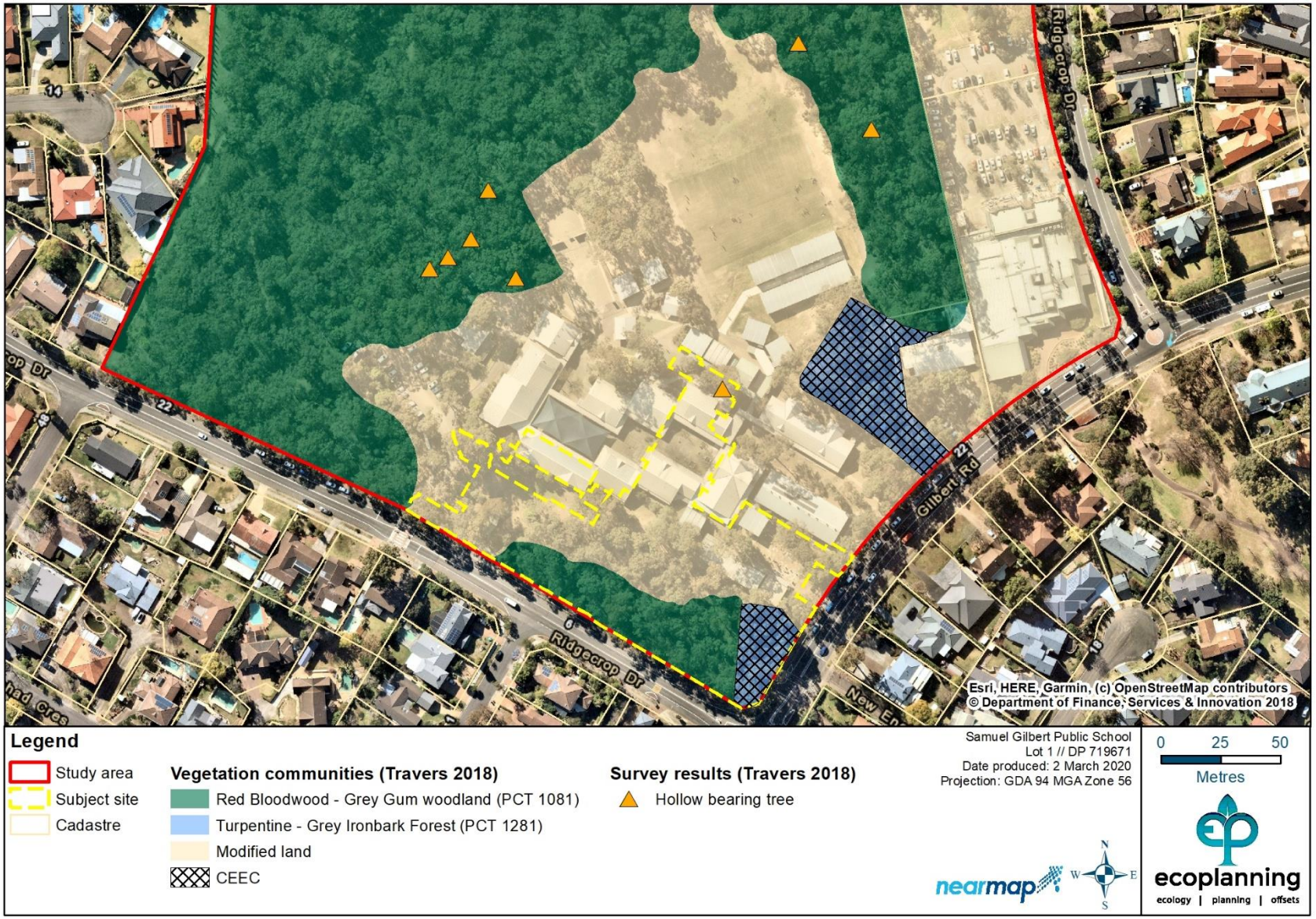

Figure 1.2: Vegetation mapping of the study area, including hollow bearing trees (Travers bushfire and ecology 2018).

Figure 1.3: Development footprint, including construction setback.

Figure 1.4: Tree removal and retention plan (issued by client 11/02/2020).

2 Vegetation Management Sub-plan

The VMSP outlines potential impacts of the process to clear and protect native vegetation prior to and during construction, as required under Consent Condition B18.

2.1 Prior to construction

2.1.1 Fencing

- Exclusion fencing will be erected prior to commencement of demolition, vegetation clearing work or construction to protect the retained vegetation, particularly vegetation adjacent or in proximity to construction,
- sedimentation fencing will be installed at the interface between the works and the retained vegetation to prevent the translocated soil to wash off into the retained vegetation,
- the perimeter of the development should be fenced with post and cable fencing to prevent vehicular access and discourage access by the general public.

Exclusion fencing to be erected prior to commencement of works is provided in **Figure 2.1**.

2.1.2 Signage

- Signs will be installed on fences protecting retained vegetation as “no go” areas and “protected native vegetation”,
- signage around the perimeter of the works will displayed that informs workers, staff and students of the environmental value of the retained vegetation and advise of the need to report sightings of fauna within the construction area.

2.1.3 Vegetation for removal

- All plant, equipment, hand tools and work boots must be cleaned prior to delivery onsite to ensure that they are free of soil or vegetation material,
- priority and Weeds of National Environmental Significance (as identified in school wide VMP (Ecoplanning 2019)) within the construction footprint will be subject to primary and secondary treatment, and disposed of in accordance with Ecoplanning (2019),
- all canopy trees proposed to be removed will be clearly marked prior to construction works, with hollow bearing trees and habitat trees marked individually,
- the boundary of the clearing zone must be clearly delineated,
- all personnel involved in vegetation clearing must be trained in this vegetation clearance procedure and of the significance of the vegetation to be retained,
- access to the study area will be limited to the subject site and no additional trails or tracks to access this area will be established.

2.2 During construction

2.2.1 General

- Plant, equipment and stockpiles must not be stored in retained vegetation,
- all construction workers will be informed about the ecological significance of the retained vegetation and procedures should native fauna be encountered in the construction area,
- weed monitoring and control must occur during construction. The school wide VMP (Ecoplanning 2019) is the point of reference for weed control and revegetation of the site,
- exclusion fencing must be periodically inspected to ensure that it is functioning as intended in the BMSP, and that any breaches in this BMSP have not occurred.

2.2.2 Vegetation clearing

Vegetation clearing should follow the following procedure, in the order outlined:

- the midstorey, ground layer and woody debris will be cleared leaving canopy trees. Canopy trees will be left standing overnight following complete removal of the midstorey, ground layer and woody debris from the construction area,
- canopy trees that are not HBTs or habitat trees (i.e. trees that contain nests) can be cleared in the construction area. These trees must be felled with caution to avoid impact to HBTs and habitat trees. HBTs and habitat trees must be left overnight following complete removal of other canopy trees,
- HBTs and habitat trees must be cleared carefully. It is preferred that each tree is lopped with a chainsaw commencing with the non-hollow bearing portions of the tree, or sections of the tree containing the habitat element. Hollow bearing portions must be lopped in manageable sections so that they can be gradually lowered to the ground to injury to resident fauna,
- if a heavy machinery is used to remove HBTs and habitat trees, then the following procedure should be followed:
    - prior to felling HBTs and habitat trees, the trees will be nudged or shaken by tree felling equipment to create enough disturbance and encourage any fauna to voluntarily vacate the tree
    - if no animals emerge from the hollows after shaking or nudging, then the tree will be ‘slow-dropped’ in a controlled manner, which gentle lowers the tree to the ground,
    - once the tree has been felled, a search will be made of the branches around the tree for any fauna and hollows should be inspected with a torch for the presence of any animals.
- the ecologist will salvage tree hollows suitable for re-use in retained vegetation and set aside. If suitable, the hollows will be erected in retained vegetation or replaced with nest boxes of equivalent size and function. The location for hollows and/or nest boxes will be selected by a qualified ecologist,
- the ecologist will record the number of HBTs and habitat trees removed, the number of fauna identified and/or captured and relocated while removing HBTs and habitat trees.

General principles for tree felling include:

- where possible, chainsaws will be used for clearing of vegetation to reduce impacts of heavy machinery on surrounding vegetation and soil disturbance,
- where possible, the trees proposed for removal will be felled at an angle so that they fall within the development footprint area. This will prevent surrounding vegetation from being crushed and damaged during the tree removal process,
- work will cease when native fauna are detected in the vegetation clearing area and a suitably qualified ecologist called to site to capture and assessment the animal,
- a suitably qualified ecologist will be on site when HBTs and habitat trees are removed. Refer to **Section 3** for more information.

2.2.3 Soil disturbance

- Soil disturbance will be limited to the digging required to install required foundations,
- excess soil generated from construction will be removed from the site and not stored within the retained vegetation,
- implement sediment and erosion control plans to limit mobilisation of exposed soils.

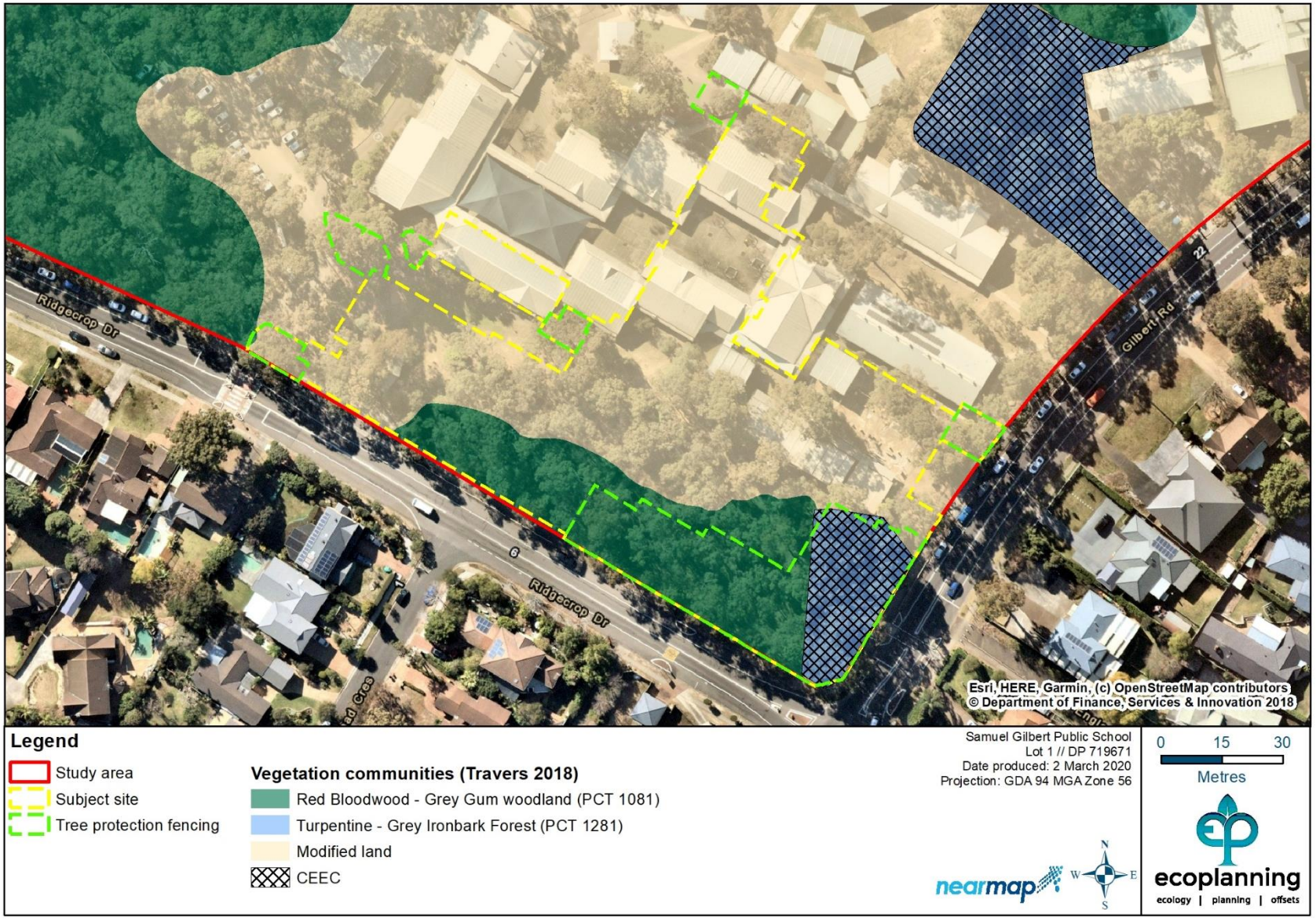

Figure 2.1: Indicative exclusion fencing for vegetation within the subject site.

3 Fauna Management Sub-plan

The development will impact native vegetation, threatened species and their habitat, and has the potential to increase edge effects on retained vegetation and reduce the function of native vegetation for native fauna (Travers bushfire & ecology 2018).

This section outlines actions to reduce the potential impact of the construction phase of the development on native fauna, in accordance with Consent Conditions B18 and B22. The FMSP should be read in concert with the VMSP.

3.1 Pre-clearance protocols

- Prior to the commencement of any construction or vegetation clearing, all habitat trees and HBTs proposed for removal must be clearly marked,
- an appropriate release location for any rescued fauna identified during construction will be identified by the suitably qualified ecologist, but this is preferably in retained vegetation on or adjacent to the school ground on property owned by the Department of Education,
- pre-clearing surveys and inspections for fauna must be undertaken under the guidance of a suitably qualified ecologist, and must include:
    - a review of the BDAR (Travers bushfire & ecology 2019) to identify threatened species that have the potential to occur in the construction area,
    - pre-clearing surveys no more than 5 days prior to the commencement of construction and or vegetation clearing (whichever comes first),
    - a survey of the construction area that includes stag watches and spotlight survey of HBTs and habitat trees, and general spotlight survey of the native vegetation,
    - any fauna captured during the survey will be relocated.
- a brief letter report will be prepared describing the methods and outcomes of the pre-clearing survey and fauna species relocated as evidence the pre-clearing survey has been conducted.

3.2 During construction

- Construction hours should take place during daylight hours only to reduce noise disturbance,
- any lighting must not be directed towards retained native vegetation. In addition, shade cloth or similar material could be hung from the fence around the construction area to reduce light spill into retained vegetation,
- fences must be erected around retained vegetation, as described in **Section 2**. Retained vegetation will be a ‘no-go” area for vehicular and pedestrian traffic. Plant, equipment and stockpiles must not be stored in retained vegetation,
- all construction workers must be inducted during which the significance of the native vegetation will be addressed and “no-go” areas clearly identified.

3.2.1 Fauna management during vegetation clearing

The vegetation clearing procedure describe in **Section 2** must be followed:

- vegetation clearing will be supervised by a qualified ecologist or wildlife carer,
- if fauna are detected during vegetation clearing, work will cease, and the qualified ecologist or wildlife carer contacted immediately. The qualified ecologist or wildlife carer will capture and assess the health of the animal and determine if veterinary assistance is required. If veterinary assistance is not required, the animal will be released at the agreed relocation point,
- should any injured fauna species be found during the tree felling, work must stop immediately and the injured fauna species be taken to a vet or wildlife carer by the supervising ecologist or wildlife carer,
- the qualified ecologist or wildlife carer supervise the removal of HBTs and habitat trees. Any fauna displaced during vegetation clearing will be captured by the ecologist or wildlife carer, subject to a health assessment and either released at the agreed relocation point or, if injured, taken to a vet or other wildlife carer for treatment,
- nocturnal fauna captured during vegetation clearing will be secured in a clean, dry calico bag and kept in a dark, cool and dry environment during the day, the released at the agreed relocation point after dark,
- HBTs must should be sectionally dismantled for relocation and all hollows must be inspected for occupation, signs of previous activity and potential for reuse,
- once felled, HBTs and habitat trees should be left overnight lying on the ground to allow animals to self-relocate.

3.2.2 Fauna handling and rescue procedure

- Relocation of any fauna must be undertaken under the guidance of a suitably qualified ecologist or wildlife carer and taken to an agreed location. It is advised that fauna be relocated to native vegetation retained within the school property (**Figure 3.1**),
- if an animal emerges from a hollow following shaking or nudging of the tree, then at least 30 minutes will be allowed for the animal to leave the tree. If the animal comes to the ground, or when it is on the lower trunk, attempts will be made to capture the animal using a net,
- captured animals will be immediately transferred to a suitably sized cotton bag and checked for obvious injury during the transfer process,
- captured animals will be placed in individual bags unless they are a family group to which separation would risk the survival of the young (i.e. lactating female with young),
- animals that are uninjured will be released by the ecologist or wildlife carer to nearby retained native vegetation (ideally within the school property) as soon as practicable,
- if a fauna species is found inside a felled tree, the animal should be extracted by hand and/or the tree must be sectioned and dismantled before relocating the animal,
- if extraction is impossible, then the hollow section must be left lying on the ground and reinspected the following day by the qualified ecologist or wildlife carer,
- if an animal flees from an already felled tree, attempts will be made to capture the fleeing fauna with a net.

A list of previously identified fauna within the study area is provided in **Appendix A** (Travers bushfire & ecology 2018). A search of the Atlas of NSW Wildlife (OEH 2020) was performed to identify threatened fauna recorded within 1 km of the study area (**Figure 3.2**).

Figure 3.1: Fauna relocation area within school property.

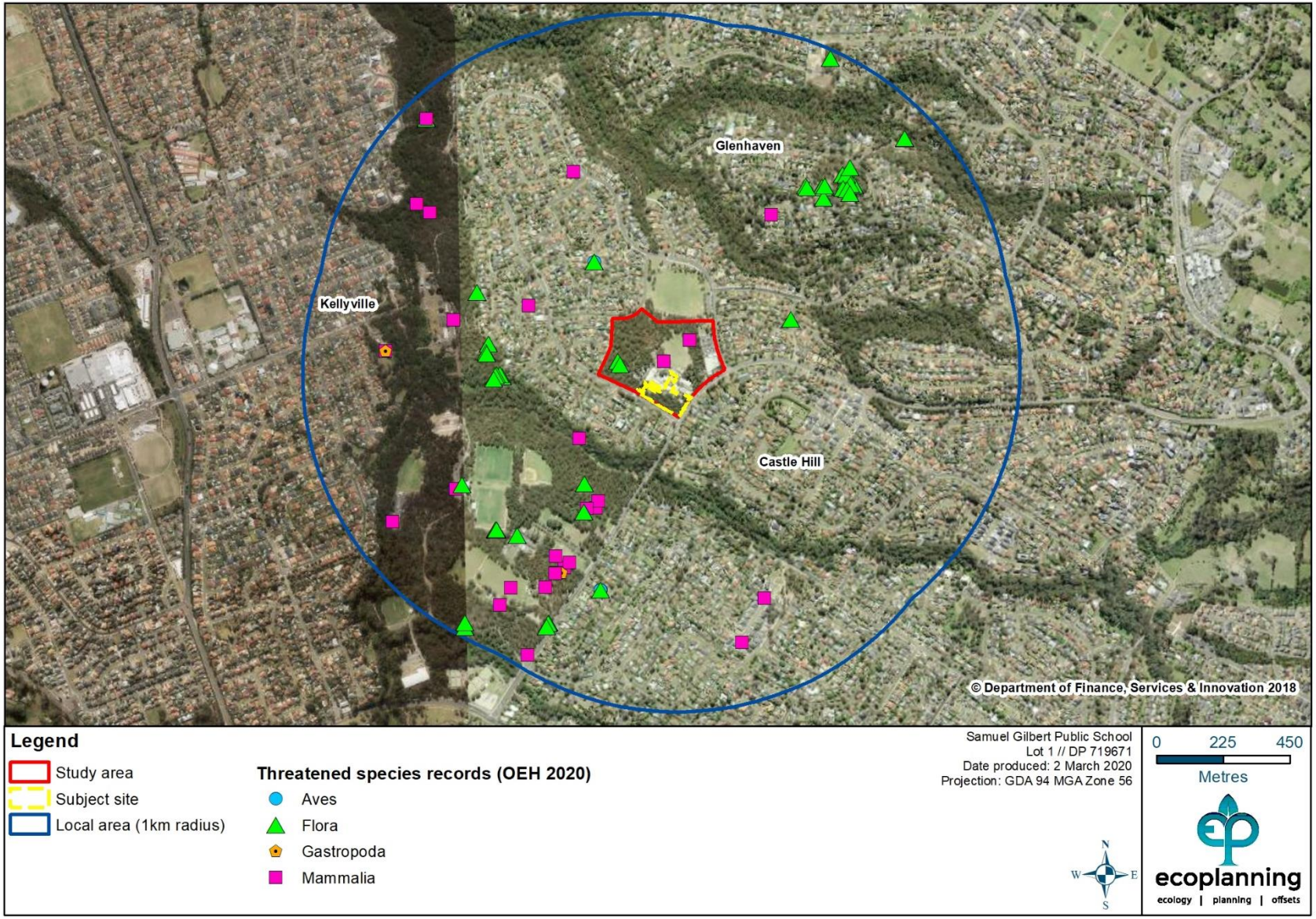

Figure 3.2: Threatened species in the local area (OEH 2020).

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Appendix A Fauna species previously identified (Travers bushfire & ecology 2018)

Class	Family	Scientific name	Common name	Native/Exotic	Method Observed	
					Dec-17	Sep-18
Aves	Accipitridae	*Lophoictinia isura*	Square-tailed Kite	Native	O	
Aves	Alcedinidae	*Dacelo novaeguineae*	Laughing Kookaburra	Native	OW	OW
Aves	Artamidae	*Cracticus tibicen*	Australian Magpie	Native	O	O
Aves	Artamidae	*Cracticus torquatus*	Grey Butcherbird	Native	W	W
Aves	Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-Cockatoo	Native		G
Aves	Cacatuidae	*Cacatua tenuirostris*	Long-billed Corella	Native		O
Aves	Cacatuidae	*Cacatua galerita*	Sulphur-crested Cockatoo	Native	OW	W
Aves	Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	Native	W	
Aves	Columbidae	*Phaps chalcoptera*	Common Bronzewing	Native	O	O
Aves	Columbidae	*Ocyphaps lophotes*	Crested Pigeon	Native		O
Aves	Corvidae	*Corvus coronoides*	Australian Raven	Native	W	OW
Aves	Hirundinidae	*Hirundo neoxena*	Welcome Swallow	Native		O
Aves	Meliphagidae	*Manorina melanocephala*	Noisy Miner	Native	OW	OW

Class	Family	Scientific name	Common name	Native/Exotic	Method Observed	
					Dec-17	Sep-18
Aves	Psittacidae	*Platycercus eximius*	Eastern Rosella	Native	O	W
Aves	Psittacidae	*Glossopsitta concinna*	Musk Lorikeet	Native	W	OW
Aves	Psittacidae	*Trichoglossus haematodus*	Rainbow Lorikeet	Native	OW	OW
Mammalia	Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	Native	U	
Mammalia	Molossidae	*Mormopterus ridei*	Eastern Free-tailed Bat	Native	U	
Mammalia	Molossidae	*Austronomus australis*	White-striped Freetail-bat	Native	U	
Mammalia	Petauridae	*Petaurus breviceps*	Sugar Glider	Native	F	F
Mammalia	Pseudocheiridae	*Pseudocheirus peregrinus*	Common Ringtail Possum	Native	O	EP
Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	Native	OW	
Mammalia	Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	Native	U	
Mammalia	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	Native	U	U
Mammalia	Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	Native	U	
Mammalia	Vespertilionidae	*Vespadelus vulturnus*	Little Forest Bat	Native	U	U
Mammalia	Vespertilionidae	*Nyctophilus* sp.	long-eared bat	Native		U

Class	Family	Scientific name	Common name	Native/Exotic	Method Observed	
					Dec-17	Sep-18
Reptilia	Scincidae	*Eulamprus quoyii*	Eastern Water-skink	Native	O	
Reptilia	Scincidae	*Lampropholis delicata*	Dark-flecked Garden Sunskink	Native	O	O
Reptilia	Scincidae	*Lampropholis guichenoti*	Pale-flecked Garden Sunskink	Native	O	

E – Nest/roost, F – Tracks/scratchings, G = crushed cones, O = observed, W – heard, OW – observed & heard, P – scat, EP – nest & scat, U – ultrasound

APPENDIX L – BUSH FIRE EMERGENCY RESPONSE SUB PLAN

As per Condition B13 (g)

peterson bushfire.

expert consulting services

Bushfire Emergency Response Sub-Plan

Samuel Gilbert Public School, Ridgecrop Drive, Castle Hill

5 March 2020

(Ref: 17037)

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report by
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BPAD LEVEL 3 ACCREDITED PRACTITIONER
ABN 28 607 444 833

Contents

Review of emergency procedures contained in this plan

Australian Standard *AS 3745-2010 Planning for emergencies in facilities* requires that the Emergency Planning Committee (EPC) ensure the emergency procedures remain viable and effective by review and monitoring at periods not exceeding 12 months. In addition, the EPC shall ensure that the procedures are reviewed after an emergency event, a training exercise or any changes that might affect this Plan.

Amendments are to be recorded in the following table and inserted into the body of the document.

Date of review	Reviewed by	Pages amended

1 Introduction

1.1 Purpose

This is the Bushfire Emergency Response Sub-Plan (the 'Plan') for Samuel Gilbert Public School (the 'School') located at Ridgecrop Drive, Castle Hill in Sydney's Hills district. This Plan aims to increase the preparedness of the School community, including contractors, to ensure a rapid and safe shelter within the School or evacuation from the School prior to bushfire impact.

This Plan provides a set of procedures to manage an emergency response based on the nature of the School, the bushfire threat and an analysis of the issues that may be encountered during a bushfire emergency. A key component of the Plan is ensuring that employees, contractors and students have a clear understanding of their roles and responsibilities, and they understand when to act. The communication of emergency response arrangements to employees, contractors and students is critical to safe and coordinated bushfire response and evacuation.

This Plan satisfies Condition B.19 and D.12 of the State Significant Development (SSD 9274) development consent (dated 15th February 2020) which requires the preparation of such a plan prior to construction of the approved development at the School (refer to Section 1.3 below).

This Plan forms a sub-plan of the Construction Environmental Management Plan and acts as a standalone plan to address a bushfire emergency. This Plan provides a procedure that outlines what action people are required to undertake to take shelter on site or initiate evacuation off site, as well as the return of those people to the School property when the bushfire threat has passed.

1.2 How to read this report in an emergency

The Plan provides for planned and orderly shelter on site or evacuation off site of employees, contractors and students. The Plan will be activated and implemented by the Emergency Control Organisation (ECO) (Section 4) or senior officers of emergency services (NSW Police and Fire and Rescue NSW).

An important element of this Plan is that it provides for shelter on site for certain situations where procedural arrangements enable the School community to seek refuge within an appropriate location within the School property. The decision-making process for selecting either shelter on site or evacuation off site and circumstances under which each will be implemented are outlined in Section 2 of this Plan.

1.3 The School and approved development

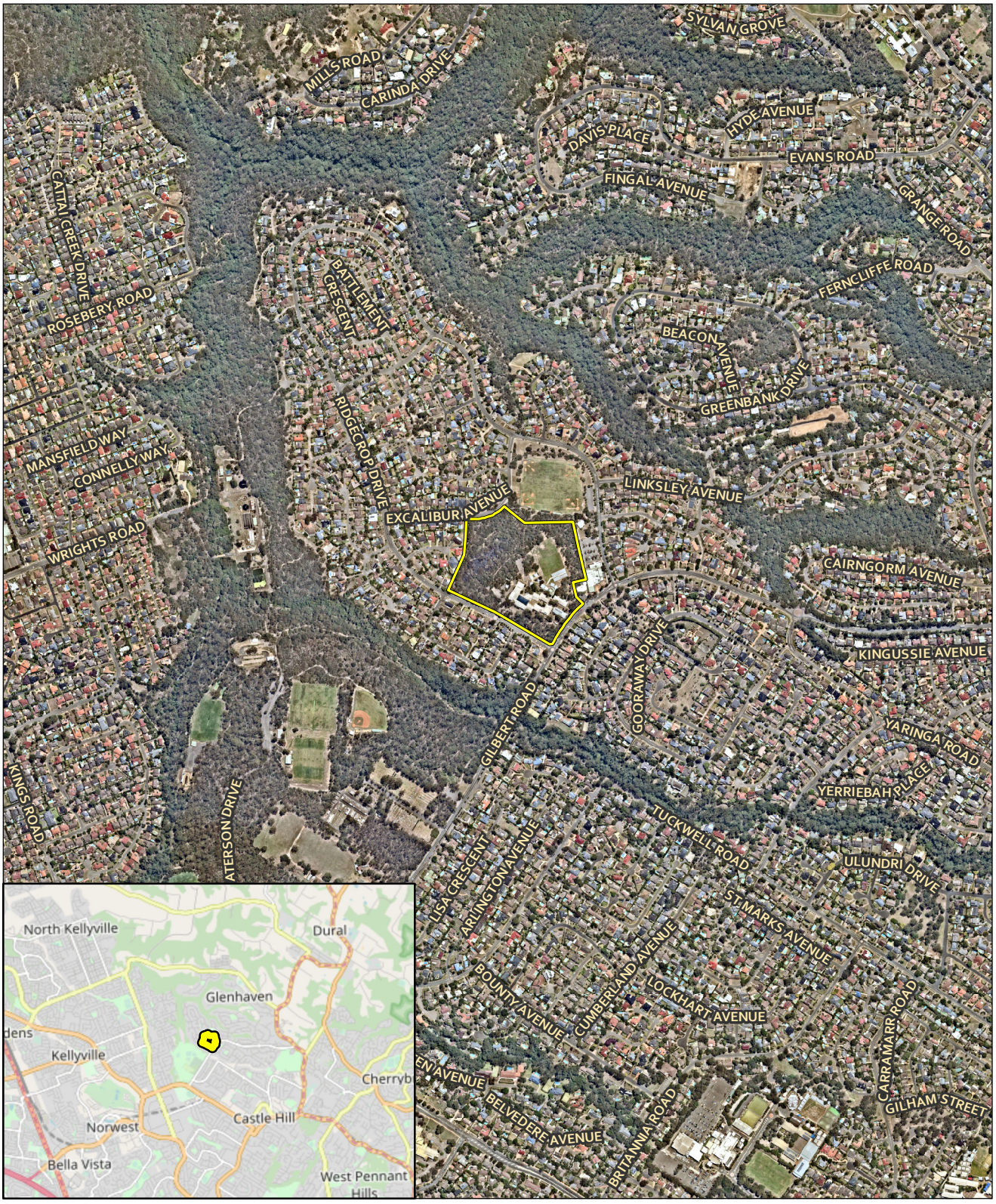
The School is located at the corner of Ridgecrop Drive and Gilbert Road, Castle Hill (Lot 1 DP 719671). Figure 1 shows the location of the School and its context with the bushfire hazard (detailed further at Section 1.4). The School buildings are clustered in the south-eastern portion of the School property, with the remainder of the property consisting of playing fields and forest vegetation.

A redevelopment of the School has been approved, consisting of the following:

- Construction of a new three storey building fronting Ridgecrop Drive to the south containing 23 new teaching spaces, new staff and administion offices and a new library;
- Construction of a new hall fronting Gilbert Road to the east;

- Refurbishment of the existing administration and library buildings to create six new home bases; and
- Refurbishment of two toilet blocks.

This Plan addresses the emergency management arrangements during and after construction of the above new components.



Legend

Subject Land

N

DKGIS

Date: 26/02/2020

0 125 250 500

Metres

Figure 1: The Location of the Subject Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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1.4 Bushfire hazard

The bushfire hazard was described in the Bushfire Assessment Report prepared by Peterson Bushfire (28th February 2019) to accompany the Environmental Impact Statement (EIS) for the SSD application. To summarise, the hazard consists of approximately 4.5 hectares of dry sclerophyll forest located predominantly within the School property as shown on Figure 2. The forest is situated on a gradient within the slope class of 'downslope 0-5 degrees'.

There are two fire scenarios that could impact the School:

1. A fire burning within the Castle Hill Creek system (to the south) and/or Cattai Creek system (to the west and north-west) located 140-180 m away could spot into the school property during adverse fire weather (strong winds from the western sector during spring and summer). A spot fire could develop within the School property and spread uphill towards the buildings.

2. Ignition within the School property and fire development and spread confined to the immediate area of hazard. Ignition would occur by point source ignition from such causes as lightning strike, accidental ignition or arson.

Both fire scenarios are based on point source ignition and not a landscape-wide fire front. The length of fire run ranges between 90 and 180 m.

1.5 Bushfire protection attributes of the School

The School benefits from a relatively high level of bushfire protection due to the outcomes of the redevelopment and location within a highly urbanised area. The following bushfire protection attributes are available at the school:

- The School is to have an Asset Protection Zone (APZ) established prior to commencement of construction. The APZ works are detailed on Figure 2 and show improvement to the standard of vegetation management amongst the existing built form, such as adjacent Ridgecrop Drive, and new APZ establishment to the west. The APZ will ensure that the redevelopment will not be exposed to a bushfire radiant heat flux greater than 10 kW/m^2 (based on the accepted design fire scenario – refer to the Peterson Bushfire report). The APZ will greatly assist in the protection of the School from the impact of bushfire and is compliant with NSW Rural Fire Service standards.

- When completed, the new buildings will comply with Australian Standard 'AS 3959 Construction of buildings in bushfire-prone areas' Bushfire Attack Level BAL-12.5. Existing Building M (homebase building adjacent Gilbert Road) also complies with BAL-12.5.

- The school benefits from two road frontages with hydrants as well as additional hydrants located throughout the school property (refer to Figure 2 for hydrant locations).

- Access and egress are very good with the adjoining roads providing direct access through the immediate suburban area away from bushfire prone areas.

Legend

- Hydrant
- Subject Land
- Proposed Building
- Fence
- Fire Trail
- Contour - 1m
- Sydney Turpentine Ironbark Forest
- Change from OPA to IPA

Vegetation Formations

- Forest
- Garden Bed

Approved BER Asset Protection Zone

- OPA - Outer Protection Area
- IPA - Inner Protection Area

Asset Protection Zone - Exisiting BPED

- Asset Protection Zone - 18m
- Asset Protection Zone - 23m

Asset Protection Zone - 60m

- Inner Protection Area - 40m
- Outer Protection Area - 20m

Asset Protection Zone - 70m

- Inner Protection Area - 50m
- Outer Protection Area - 20m

N

DKGIS

Date: 4/03/2020

0 12.5 25 50

Metres

Figure 2: Bushfire Hazard Analysis and Asset Protection Zone

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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2 Decision to shelter or evacuate

Care is required to avoid confusion between shelter on site related to bushfire attack and the evacuation of the School for other purposes. The latter requires the School to be cleared of people whereas with shelter on site it is important that people stay inside a building within the School to avoid exposure to the impacts of bushfire, such as radiant heat, ember attack and smoke. The emergency procedures of the School Emergency Management Plans should be consulted for threats other than bushfire.

2.1 Evacuation decision matrix

The decision to shelter on site or evacuate off site should be reached following the evacuation decision matrix at Table 1 (following Figures 3 and 4). The matrix has been formulated based on the vulnerability of the School (building protection and occupants) and known bushfire risk.

The **refuge building for taking shelter on site** depends on whether construction of the new hall is completed:

- Prior to completion of New Hall (Building Q) – the refuge building to shelter on site will be Buildings E and M.
- Once New Hall (Building Q) is completed – the refuge building to shelter on site will be the New Hall (Building Q).

The location of both refuge scenarios is identified on Figure 3. The New Hall (Building Q) will offer the best level of protection as it will be located furthest from the hazard, have direct access onto Gilbert Road and will have the ability to accommodate the entire School community. Prior to the construction of the New Hall being completed, Buildings E and M will be able to accommodate the School community across the two buildings with a level of hazard separation similar to the New Hall. Building M is also compliant with BAL-12.5. The existing hall (Building B) is located on the hazard side of the school and therefore does not offer a safe level of refuge.

Off-site evacuation for the School community will be Castle Hill Public School (5 Les Shore Place, Castle Hill - refer to Figure 4).

Given the relatively small area of bushland adjacent the school buildings, and the large distance between the school and the surrounding gully systems, it is envisaged that on site shelter in place would be a suitable option. Otherwise it is expected that the School be closed prior to the start of the school day if significant fire activity was reported within the surrounding gully systems. Off site evacuation may occur if a significant fire started within a gully system during the school day and spread towards the site impacting the School with smoke and embers. It is important to recognise that the NSW Police are responsible for protection of life and any lawful request of Police must be followed. The decision to evacuate should be guided by NSW Police or Senior Officers of Fire and Rescue NSW.

Legend

- Subject Land
- Proposed Building
- New Hall Building Q - refuge building post construction

On Site Refuge

- Buildings E and M - refuge building prior to completion of Building Q

N

DKGIS

Date: 4/03/2020

0 12.5 25 50

Metres

Figure 3: On Site Refuge Buildings (Shelter in Place)

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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Legend

- Evacuation Route A
- Evacuation Route B
- Subject Land
- Off Site Evacuation Point - Castle Hill Public School

N

DKGIS

Date: 26/02/2020

0 125 250 500

Metres

Figure 4: Off Site Evacuation Point

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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If a bushfire is spotted near the School, the Chief Warden or Deputy Warden is to telephone NSW Rural Fire Service, The Hills Fire Control Centre (see Appendix B) to clarify the location of the fire and seek advice on the next point of contact if more information is required. Alternatively, any member of the ECO may contact '000' by following these steps:

1. Ring '000' and you will be asked 'Would you like Police, Fire or Ambulance'.
    a. Respond 'Fire' and advise Emergency Services of:
    b. The exact location of the incident;
    c. The nature of the incident;
    d. Any persons trapped or injured or likely to be injured;
    e. A contact number;
    f. A contact name;
    g. Any requirement for further assistance (e.g. an Ambulance if anyone is injured).

Table 1: Evacuation Decision Matrix

THREAT	FDR – FIRE DANGER RATING*1					
	LOW/MOD	HIGH	VERY HIGH	SEVERE	EXTREME	CATASTROPHIC
Fire predicted to impact site	Option to shelter on site	Option to shelter on site	Evacuate off-site if safe to do so*2	Evacuate off-site if safe to do so*2	Evacuate off-site if safe to do so*2	Evacuate off-site for forecast period if safe to do so*2
Time to fire impact is less than time required to relocate*3	Last resort. Shelter on site	Last resort. Shelter on site	Last resort. Shelter on site	Last resort. Shelter on site	Last resort. Shelter on site	Last resort. Shelter on site
Fires exist in region but no risk to site*4	Monitor situation	Monitor situation	Monitor situation	Prepare for evacuate off site	Prepare for evacuate off site	Consider evacuate off site
No fires	No action	No action	No action	No action	No action	Prepare for evacuate off site

*1 FDR can be sourced from NSW Rural Fire Service website for the current day or in the afternoon of the day before (http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=1109). Fire weather information is also available from the Bureau of Meteorology (BoM) website (www.bom.gov.au). The BoM is able to distribute a daily information update regarding the weather forecasts and Fire Danger Rating should this be required by the ECO.

*2 Evacuate ONLY if safe to do so. Shelter on site if unsafe.

*3 Time to evacuate is the estimated time for all employees, students and contractors to be transported off School grounds and onto the road towards the off-site evacuation point. This may take more than an hour depending on the availability of transport.

*4 Fires may be located many kilometres away and therefore may only pose a negligible risk. However, under higher FDR precautionary evacuation may be wise because of depleted local fire-fighting resources and the unpredictability of fires at higher FDR.

2.2 Shelter on site procedures

1. Chief Warden to advise School community, including contractors, of the decision to shelter on site.
2. Chief Warden to activate fire siren.
3. Upon being alerted by fire siren, Area Wardens are to visit each classroom/building within their area advising all people to move to the on site shelter (refer to Figure 3 for location of refuge building).
4. Students/contractors are to leave school bags and possessions within the classroom/building.
5. All employees, students and contractors are to be registered (refer to Appendix E for example form).
6. The Chief Warden or Deputy Chief Warden is the 'Incident Controller' until relieved by arriving authorities e.g. Fire & Rescue NSW or Police.
7. The Chief Warden or Deputy Chief Wardens will ensure that a person able to further advise people of their welfare on an ongoing basis occupies the on site shelter.
8. The ECO will ensure that additional drinking water is available in the on site shelter.
9. If staff availability and time permit, personnel delegated by the ECO may be required to assist emergency services personnel to secure the School buildings by ensuring all windows and external doors are closed.
10. When in the on-site shelter building close all windows and doors.
11. Ensure the welfare of all evacuees through advice and first aid where required.
12. Watch for sparks and embers entering the on site refuge building and extinguish.
13. Upon finalisation of the shelter in place, the Chief Warden/Deputy Chief Warden will ensure that the incident is declared over, and when it is appropriate to do so, a debriefing of the incident will occur for all involved staff and Emergency Services representatives.

2.3 Evacuate off site procedures

Safe off-site evacuation of the School may take more than an hour to complete, depending on the availability of transport. Wherever possible, off-site evacuation should commence at least 2-3 hours ahead of the anticipated arrival of a bushfire.

The following procedures are to be followed when NSW Police or Fire and Rescue NSW initiate an off-site evacuation of the School.

1. Chief Warden to advise School community, including contractors, of the decision to evacuate off site.
2. Chief Warden to activate fire siren.
3. Upon being alerted by fire siren, Area Wardens are to visit each classroom/building within their area advising all people to move to the on site refuge building (refer to Figure 3 for location of

refuge building) to assembly ready for evacuation off site.

4. Students/contractors are to leave school bags and possessions within the classroom/building.

5. All employees, students and contractors are to be registered (refer to Appendix E for example form).

6. The Chief Warden or Deputy Chief Warden is the 'Incident Controller' until relieved by arriving authorities e.g. Fire & Rescue NSW or Police.

7. If staff availability and time permit, personnel delegated by the ECO may be required to assist emergency services personnel to secure the School buildings by ensuring all windows and external doors are closed.

8. A briefing on arrangements for transporting people to an off-site evacuation location will be provided by the Chief Warden/Deputy Chief Warden. At the briefing the School community are to be advised of the potential duration of the off-site evacuation.

9. The location of the selected off-site evacuation point will be made by NSW Police or Fire and Rescue NSW - this may or may not be the Castle Hill Public School (location shown on Figure 4). Authorities may instruct evacuation to an alternate location dependent upon the nature of the bushfire and its existing and predicted effects. Should time allow and safety permit, evacuation may consist of students being picked up by parents and contractors leaving site.

10. Once the evacuation procedure has been instigated, delegated School staff members are to close and secure the School to prevent unauthorised people entering the School grounds.

11. Employees, students and contractors should be checked off the personnel list when they reach the off-site evacuation centre.

12. The Chief Warden/Deputy Chief Warden or local authority will notify the School community of the ability to leave the off site evacuation centre. All employees, students and contractors are to be checked off prior to departing (refer to Appendix E for example form).

3 Preparedness for shelter on site

3.1 Bushfire protection provisions

Regular bushfire protection audits of the buildings and adjacent APZs are recommended and should consider:

- The maintenance of APZs in relation to designated area and fuel management standards (refer to Peterson Bushfire Bushfire Assessment Report).
- The provision of appropriate access/egress to the property so occupants leaving, and firefighters/rescuers accessing the property can do so in relative safety.
- Checks and maintenance of the water supply (e.g. ensure hydrants and extinguishers) prior to the declaration of the bushfire danger period each year.
- Site familiarity e.g. employees are familiar with fire detection systems such as alarms etc., evacuation procedures and the operation of any fire suppression equipment.

The above provisions are essential for adequate protection for sheltering on site.

The ECO shall arrange for the audit prior to the Bush Fire Danger Period each year which normally starts on 1st October but can occasionally start earlier depending on seasonal conditions. If the start and/or end date of the annual Bush Fire Danger Period is altered, changes will be notified on the NSW Rural Fire Service website.

3.2 Signage

The shelter on-site building is to be marked with a sign affixed to the wall near the main doors with the wording 'Bushfire Shelter On-site Refuge Building'. An updated list of Chief Warden and Deputy Chief Warden (along with first aid officers) is to be prominently displayed here and at other locations.

3.3 First aid equipment

The School is to provide basic first aid equipment to staff that may be involved in evacuation operations.

3.4 Bushfire information

Contact details for NSW Rural Fire Service are detailed in Appendix B.

Fire weather information is available from the Bureau of Meteorology (BoM) and the NSW Rural Fire Service (www.rfs.nsw.gov.au). Region specific information is available from the BoM website (www.bom.gov.au). The BoM are able to distribute a daily information update regarding the weather forecasts and Fire Danger Index should this be required by the ECO.

4 Emergency Control Organisation (ECO)

In accordance with *AS 3745-2010 Planning for emergencies in facilities*, an Emergency Control Organisation (ECO) is to be established for the School. The ECO has overall responsibility for the planning, preparation and implementation of the emergency procedures.

The ECO should consist of a Chief Warden, Deputy Chief Warden and Area Wardens. The ECO will also perform the duties of the Emergency Planning Committee (EPC) (Standards Australia 2010).

The ECO does not have a 'statutory standing'. It must follow instructions and advice from Emergency Service personnel related to the preparedness for and response to an evacuation. The managers of the School will ensure that instructions given by employees identified within the ECO overrule the normal management structure during emergency events/training when operating under this Plan.

Persons appointed to the ECO are to:

- Be physically capable of performing the duties required;
- Have strong leadership qualities;
- Have maturity of judgement, good decision-making skills and be capable of remaining calm under pressure;
- Have a comprehensive knowledge of the local area;
- Generally be on site during the Bush Fire Danger Period; and
- Be able to complete the required training (Section 6).

The person selected for Chief Fire Warden, in addition to the above, is to have a good knowledge of the layout of the School and the location of all fire protection equipment. The appointment of the Deputy is to ensure continuity of the Chief Warden's functions during absences.

It is essential that the persons appointed as Area Wardens have the qualities needed to enable them to perform duties required in emergencies. Area Wardens will be delegated by the Chief Warden or Deputy Chief Warden from suitable people who meet the requirements listed below:

- Availability;
- Ability to organise others in an emergency; and
- Reliability.

The School is to ensure that the ECO are indemnified against civil liability resulting from practice or emergency evacuations, where the personnel act in good faith and in the course of the duties as defined by this Plan

5 Responsibility of ECO, Chief Warden and Area Wardens

The Chief Warden and Deputy Chief Warden will coordinate the activities of staff during a bushfire event and ensure emergency responsibilities and duties are carried out. The primary role of members of the ECO is to ensure that protection of life, health and welfare of School community, including contractors, takes precedence over asset protection.

Each officer in the ECO shall have clearly defined duties and responsibilities.

5.1 Emergency Control Organisation (ECO)

The following is a list of the responsibilities of the ECO:

- Annual update of the Plan.
- Annual testing of the Plan.
- Reviewing and correcting any deficiencies in the Plan identified during annual testing or actual events.
- Distributing a current Plan in August each year to the Local Emergency Management Committee (LEMC) and other appropriate authorities. (e.g. NSW Rural Fire Service, Fire and Rescue NSW) – see Appendix D for document distribution details.
- Issue, to all staff with any responsibility for evacuation or firefighting, a copy of those components of the Plan necessary for their efficient and effective involvement.
- Display the emergency procedures and assembly area maps and to ensure that all signage is affixed in appropriate locations within the School as specified in Appendix A.
- During the Bush Fire Danger Period, a brief outline of the emergency procedures (Section 2 and Figures 2 and 3) is to periodically be included with all written handout material provided to staff.
- Maintain a Chief Warden and Warden roster.
- Provide safety equipment for the Chief Warden, Deputy Chief Warden and Wardens as outlined in Appendix C (i.e. safety vest, helmet, torch, mobile phone, portable radio, loud hailer) and any additional equipment determined appropriate by the ECO.
- Invite representatives of the Local Emergency Management Committee (LEMC) to participate in a review of evacuation exercises.

5.2 Chief Warden and Deputy Chief Warden

The Chief Warden and/or Deputy Chief Warden are responsible for the following:

- Monitoring fire risk (e.g. weather patterns) during the Bush Fire Danger Period (Section 3.4).
- Monitoring through contact with NSW Rural Fire Service, the progress and situation of bushfires in the local region (Section 2).
- Supervision of the ECO.
- Ensuring the ECO achieves its responsibilities (see Section 4).
- Preparation, management and activation of the Plan (in conjunction with the ECO).
- Liaising with Emergency Services and maintaining the Emergency Service contact lists (Appendix B).
- Maintaining and displaying a current list of internal contact telephone numbers in prominent positions (Appendix B).
- Movement of transport during evacuation until this function is undertaken by emergency service personnel.
- Setting up the evacuee registration system to check people into and out of the off site evacuation centre (see Appendix E).
- Arrange for the bushfire audit prior to the bushfire season each year.
- Implement annual evacuation exercises prior to the bushfire season to ensure that the School community know what to do and where to assemble in the event of a bushfire emergency.
- On becoming aware of a bushfire emergency or potential emergency:
  - Ascertain the nature of the emergency and determine appropriate response in accordance with the Plan.
  - Ensure that the appropriate Emergency Services are notified.
  - Ensure the suitability of the shelter on site building.
  - Instigate the operation of an evacuee registration system to check people into and out of the shelter on site building or off-site evacuation location.
  - Ensure the School community, including contractors, are notified that an orderly shelter on site or evacuation off site has been initiated.
  - Monitor the progress of the fire and notify fire authorities on their arrival and whenever else required.
  - Supervise the shelter or evacuation unless relieved of this responsibility by the attending

commanding officer of Emergency Services.

- Brief and co-operate with the Emergency Services personnel upon their arrival.

- Undertake a debrief with the School and, if appropriate, the local emergency services within one month of the conclusion of the emergency.

5.3 Area Wardens

Area Wardens are responsible for the following:

- Assisting with the notification and implementation of the shelter/evacuation.
- Assisting the Emergency Service personnel on their arrival, unless otherwise directed.
- Keeping the Chief Warden and/or Deputy Chief Warden regularly informed of the status of the emergency, and their current activities and location by telephone.

Area Wardens will also be responsible for assistance with setting up the evacuee registration system to check people into and out of the shelter on site building or off-site evacuation location.

6 ECO training and education

All members of the ECO are to be trained in evacuation procedures. Guidance should be sought from the LEMC concerning the format and content of evacuation training exercises where no such material is available.

The Chief, Deputy Chief and Area Wardens are to receive training/awareness in the following:

- The layout of the School, including evacuation routes, shelter building and evacuation centre.
- The operation of communication equipment (if specialist equipment is supplied).
- The operation of a registration system for the shelter on-site building or off-site evacuation centre (see example in Appendix E).
- The operation of the Plan.
- The staging of annual evacuation exercises.
- Bushfire awareness training.

7 Plan awareness

The Emergency Procedures of the Plan are to be displayed as specified in Appendix A. During the Bush Fire Danger Period, information from Appendix A is to be periodically distributed to residents and staff.

Staff and contractors are to be provided with an updated summary version of the entire Plan in September each year.

8 Debriefing

A debriefing, to be held within one month of each practice (or actual) evacuation and emergency, is essential to identify shortcomings in the procedures and Plan.

A representative of the Local Emergency Management Committee (LEMC) is to be invited to attend any debrief where emergency personnel have had an involvement in the exercise or actual emergency.

Minutes of the debriefing are to be recorded and distributed to all relevant agencies and personnel. Amendments are to be recorded within this document. Annual dissemination of the plan is to include these amendments.

Appendix A – Procedures display

The following evacuation procedures are to be displayed in conjunction with the on site refuge and off site evacuation figures (Figure 2 and Figure 3).

PLEASE READ THIS

WHAT TO DO IN A BUSHFIRE EMERGENCY REQUIRING EVACUATION

1. **DO NOT PANIC. Do not leave the School grounds under any circumstances until directed by emergency services or the Chief Warden unless there is imminent danger and to delay departure would jeopardise life.**

2. On hearing the fire siren or being alerted of an evacuation, all employees, students and contractors are to make their way to the shelter on site refuge building (Figure 2). The Fire Wardens wearing white, yellow or red helmet and/or a vest marked 'Warden' will assist in the evacuation. Please take directions from these persons.

3. Wherever possible, in a bushfire evacuation, avoid walking in areas with direct exposure to bushland areas or visible fire, and attempt to remain shielded from these hazard areas by a building. Generally, if a bushfire's flames are visible you should be within the shelter on-site building or making your way to it by a route as far away from the flames as possible.

4. Remain in the shelter on site building until further instruction – which may involve evacuating off site. Directions and procedures will be provided to execute off-site evacuation if required.

Appendix B – Contact lists

Internal contacts:

Position	Name	Telephone number
Chief Warden		M:
Deputy Chief Warden		M:
Area Warden		M:
Area Warden		M:

External contacts:

Emergency Services (**EMERGENCY**) police, ambulance, fire	**000**
NSW Rural Fire Services, The Hills Fire Control Centre	(02) 9654 1244
NSW Rural Fire Service information line	1800 679 737
NSW Rural Fire Service - Website	www.rfs.nsw.gov.au
Bureau of Meteorology - Website	www.bom.gov.au
Fire & Rescue NSW (Castle Hill Fire Station)	(02) 9680 1282
NSW Police (Castle Hill Police Station)	(02) 9680 5399
Blacktown Hospital	(02) 9105 5000
Westmead Hospital	(02) 8890 5555
Ryde Hospital	(02) 9858 7888
(SES) State Emergency Services	(02) 132 500

Appendix C – Equipment for Wardens

The following is a list of tools and safety equipment to be provided to the Wardens for use in bushfire emergencies and evacuations:

- Drinking water containers;
- Torch with spare batteries;
- A copy of the emergency procedures (Section 2).

Warden Identification:

Chief Warden and Deputy Chief Warden – White helmet, cap or hat and vest with the marking 'Chief Warden'.

Area Warden – Yellow helmet, cap or hat and vest with the marking 'Warden'.

Appendix D – Plan distribution

A copy of the plan is to be located in a prominent position in the shelter on-site building. All members of the Emergency Control Organisation (ECO) are to have a personal copy.

Copies are also to be sent to, and held by the following authorities:

- Castle Hill Police Station;
- Castle Hill Fire & Rescue NSW;
- Local Emergency Management Committee (c/- The Hills Shire Council)

Amendments made after annual reviews are also to be disseminated to the aforementioned organisations

Appendix E – Example check in/out form

Name	Staff, student or contractor	Time in	Medical requirements	Time out	Proposed destination after emergency

peterson bushfire
expert consulting services

david peterson
0455 024 480 • david@petersonbushfire.com.au
po box 391 terrigal nsw 2260 • petersonbushfire.com.au
FPA AUSTRALIA (NO.BPAD18882) BPAD LEVEL 3 ACCREDITED PRACTITIONER • ABN 28 607 444 833

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David Peterson

David is a business owner specialising in bushfire protection consulting, planning and design. He has over 20 years' experience in managing environmental projects of a variety of backgrounds including over 17 years dedicated to bushfire protection planning within both the public and private sectors. David has been consulting at a senior level for over 16 years.

An accredited practitioner at the highest level, he is an expert in bringing solutions to challenging projects where environmental, engineering or planning constraints need consideration amongst bushfire planning requirements.

Operating since August 2015, Peterson Bushfire provides advice to clients from the development industry and government, Australia-wide.

Qualifications

- Accredited bushfire consultant (Level 3 – Alternate Solutions); Fire Protection Association of Australia BPAD scheme (2008).
- Graduate Diploma in Design for Bushfire Prone Areas; University of Western Sydney (2008).
- Bachelor of Environmental Science, Land Resources, First Class Honours; University of Wollongong (2002).

Previous positions held

- Principal Bushfire Consultant, Manager Central Coast; Eco Logical Australia (June 2010 – July 2015).
- Principal Bushfire Consultant; Eco Logical Australia (November 2008 – June 2010).
- Senior Bushfire Consultant; Bushfire and Environmental Services (January 2003 – November 2008).
- Conservation and Natural Resources Cadet; Wollongong City Council (January 1996 – January 2003).

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Examples of recent project experience, clientele and location

- Preparation of Bushfire Assessment reports for various subdivision applications in the Rouse Hill precinct (Castle Group, February 2017 – present).
- Preparation of Bushfire Assessment Reports for various subdivisions at Calderwood Valley and Jordan Springs East (Lendlease, January 2016 – present).
- Preparation of Bushfire Assessment reports for various subdivision stages at Huntley, Avondale (Visionary Investment Group, January 2016 – present).
- Preparation of Bushfire Attack Level (BAL) assessments for properties damaged during the Wye River and Separation Creek bushfire event, Victoria (Suncorp, January 2016).
- Preparation of Bushfire Assessment report for the Mooney Mooney and Peat Island Planning Proposal (NSW Government Property, August 2016).
- Preparation of Bushfire Fuel Load Monitoring Assessments for the M7 road corridor (M7 Westlink Services, June 2016 – present).

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APPENDIX M – SITE LOCATION PLAN

1 PLAN
PROPOSED SITE PLAN
SCALE: 1:500

50 100 150mm @ A1

plot date: Tuesday, 7 May 2019 file location: BIM Server: sydbimsyd 21 - BIM Server 21/7068 SGPS

PROPOSED SITE PLAN LEGEND

- EXISTING BUILDINGS TO BE RETAINED
- EXISTING BUILDINGS TO BE REFURBISHED
- PROPOSED BUILDINGS
- EXISTING TREES
- PROPOSED TREES
- SITE BOUNDARY
- ROOF OVER
- CONTOURS (95.0)
- FENCE: EXISTING
- FENCE: NEW

P15	SSDA Draft Issue	05/11/18	AB
P16	SSDA Final Coordination Issue	07.11.18	AB
P17	SSDA Final Coordination Issue REV A	08.11.18	AB
P18	SSDA Issue	12/11/18	AB
P19	SD ISSUE	19/11/18	AB
P20	SD Draft Amendments	05/02/18	WG
P21	Revised SSDA Issue	28/02/19	AB
P22	SSDA Response to Submissions	13/03/19	AB
P23	SSDA Response to Submissions	07/05/19	AB
REV.	DESCRIPTION	DATE	INIT.

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Katerina Dracopoulos raia			QLD 4529
Mark Trotter fraia	VIC 17691	NSW 4421	QLD 1870
Nathan Hildebrandt raia		NSW 10256	QLD 4131
Paul Sekava raia		NSW 7180	QLD 3108
Paul Trotter fraia		NSW 7177	QLD 2646
Ryan Loveday raia			QLD 4500
Robert Wesener fraia		NSW 5802	QLD 2633

www.fultontrotter.com.au

PHASE **SCHEMATIC DESIGN**

CLIENT NSW Department of Education

PROJECT Samuel Gilbert Public School

ADDRESS Ridgecrop Drive
Castle Hill, NSW

DRAWING **PROPOSED SITE PLAN**

Figured dimensions take precedence over scale dimensions. Contractors must verify all dimensions on site before commencing any work or making shop drawings.

PROJECT NUMBER	DIRECTOR	CHECKED
7068SG01	JW	AS

DRAWING NUMBER **SD1001** REVISION **P23**

APPENDIX N – TREE PLAN & ARBORICULTURAL REPORT

TREETALK
ARBORICULTURAL CONSULTING

ABN 36 323 568 677

Arboricultural Impact Assessment

Samuel Gilbert Public School
Ridgecrop Street Cnr Gilbert Road
Castle Hill

Project No 5229/J1

September 2019

Prepared for

Fulton Trotter Architects
Level 3, 35 Spring Street
Bondi Junction

Alison Sheil
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By Consulting Arborist

Sue Wylie *AQF Level 5*

Sue Wylie *AAust. AAUK ISA*
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Table of Contents

Appendices

1.0 Summary

Trees at Samuel Gilbert Public School (SGPS) have been considered in relation to extensive works proposed within the school grounds. New and extended buildings are proposed on the site. This report provides an assessment of the larger site trees, and then considers tree protection and management measures required during the planned works processes.

Over 600 trees or tree groups were considered. The trees are discussed in terms of their location in relation to works and their future longevity and beneficial outcome. Many trees are located within the works areas and will require removal.

The trees beyond works can be managed by isolating them from damage by all works processes. Those trees closest to works will require that specific on-site management be undertaken with the project arborist present to advise on intrusions and protection of roots and canopy during early processes.

General tree protection measures are provided within the report. This includes protection by isolation of tree groups and limiting works processes within the TPZ.

Image 1: Tall healthy trees providing shade and natural environment for school children

Specific tree protection measures are discussed in Sections 7 of the report, and general protection measures given in Sections 8 of the report.

2.0 Background

TreeTalk Arboricultural Consulting has been engaged by the project architects Fulton Trotter, to assess trees likely to be impacted upon by works proposed. The school is to be extensively enlarged to accommodate a greater number of children. New buildings are proposed in the south-eastern section of the site forward of, and linking to existing buildings. This area is currently naturally vegetated bushland with locally endemic trees and understorey.

Demountable buildings will be replaced with new buildings, and some are to be temporarily relocated in the eastern section of the oval at the rear of the site. A plan of the proposed building footprint is copied into Appendix A2.

The aims of this report are:
To satisfy the requirements of the consenting authority, by providing arboricultural data on the trees including their species, dimensions, health, structural condition and viability.

To provide arboricultural information, to the property owners, architects and other consultants, on the constraints presented by the trees, to assist in the design process.

Also, to provide information, during site works, for trees being retained, and necessary management measures required.

To advise the project manager, site managers and contractors on setbacks and tree protection measures, and necessary management measures required to retain each tree in a healthy and viable condition.

3.0 Method

Consulting arborist Sue Wylie, and assistants, visited the site on several occasions between April and July 2018, to assess the site and trees, and consider the likely impact by the works proposed.

Tree Assessment

The trees were assessed by the Visual Tree Assessment (VTA) method as described in Mattheck & Breloer (1994)[1], using non-invasive tools such as binoculars and acoustic mallet.

The VTA was performed from the ground considering overall *health* and vitality, including percentage of canopy, epicormic growth, deadwood, predation by pests and diseases, and *Structural condition*. Consideration was given to faults such as *Bark Inclusion*, poor branch attachment and mechanical or biological damage and, in some cases, Useful Life Expectancy (ULE). Neither internal probing of living tree tissue nor aerial inspection by climbing was undertaken.

Health and condition was rated as *Good, Fair* or *Poor* (see Glossary), based on assessment at the time of inspection. Notes are recorded on any tree concerns or matters found to be outside normal tree development.
Tree height was estimated, and where relevant the orientation of the canopy is given. The trunk diameter was estimated at breast height 1.4 metres (DBH) and/or above root buttress (arb.).

Tree Protection Measures

The Tree Protection Zone (TPZ)[2] and Structural Root Zone (SRZ)[3] has been arrived at using widely recognised methods as detailed in *Australian Standard AS 4970–2009* (Appendix B2).

Tree Numbering Anomality

Each line in the *Tree Data Table* - Appendix F, has been assessed as one tree. This may be because it represents a group of trees that either functions as a whole, or are dependent on each other for survival where removal of any one tree, may impact on the whole group. (i.e. trees that have develop as a group (possibly sharing canopy or roots), or the less successful ones may be suppressed and become insignificant).

Some survey points had no tree/s present, and we became aware that some trees were removed between site visits due to bush fire control measures.

1 Mattheck, Claus; Breloer, Helge (1994) *The Body Language of Trees: A Handbook for Failure Analysis - Research for Amenity Trees No 4*, Pub. Forestry Commission, London.
2 Tree Protection Zone: TPZ = an area around a tree with radius of 12 x DBH.
3 Structural Root Zone: SRZ = $64(D \times 50)^{0.42}$. As per Australian Standard AS 4970 – 2009, *Protection of Trees on Development Sites*.

4.0 The Site and Tree Location

The site comprises an extensive area of land rising from south to the north. The site is bounded by streets to the south and south-east. Remnant bushland is present to the west and north, between residential areas to the west, and a public oval to the north. Also, a preschool and shopping centre to the north-east (See Image 2).

The western and north western area of bushland is to be addressed in a separate report.

Existing structures include the main permanent buildings to the south with demountables nearby to the east and the north.

Vegetation is dominant throughout the site with mostly mature trees in *Good* to Fair health and condition.

There are no trees on adjacent land likely to be impacted upon by works proposed.

Note: The north-eastern boundary near the shops is fenced, however, not on the boundary.

Image 2: Aerial view of school from Google maps
Inset School symbol with tall trees from school web site

4.0 The Site and Tree Location

Trees in Ecologically Significant Areas

The building designs have been planned to avoid works in the ecologically important (Sydney Turpentine-Ironbark Forest (STIF) areas (see blue areas on Image 3),

The Southern corner STIF area is near extensive works and works processes.

The north-eastern STIF area is outside the area of works.

Trees South of Works

The densely vegetated area of tall trees along Ridgecrop Street and south of the existing buildings, will require removal of many trees to perform the works proposed.

Trees near Oval Area

Tree near the oval and those east beyond are outside the area of works with the exception of those west of the STIF area. These may be impacted upon by the temporary relocation of demountables.

Image 3: Aerial view of school & vegetation groups discussed in report from Travers s report

4.0 The Site and Tree Location

Trees East of Buildings

The trees east of the buildings are near the main pedestrian entrance from Gilbert Street. This area is near proposed works and may be impacted upon by work processes, particularly the excavation of the existing paths. There are few trees of significance in this location.

Trees West of Oval

Trees west of the oval provide an exemplary example of tall trees and sensitively installed play areas. Works will not impact on these trees.

Trees West of Buildings (OOSH)

This area to the west of buildings in the south-west of site, is utilised by the OOSH group. Works will impact on three trees in this area.

Trees near Car Park and Trees to South of Car Park

The south-western area of site, along Ridgecrop Street, and west of car entrance is beyond most of the works.

Image: 4 Trees near buildings with limited soil available

5.0 Findings

Larger trees on the site have been assessed individually, or in groups and the results are listed in Appendix F - T*ree Data Schedule.*

The history of impact on the trees is evident near the buildings and expansions to the west and north. The installation of demountables does not appear to have significantly impacted on trees to the south.

There was very little, large deadwood present, and this appears to have been successfully managed during annual tree inspections.

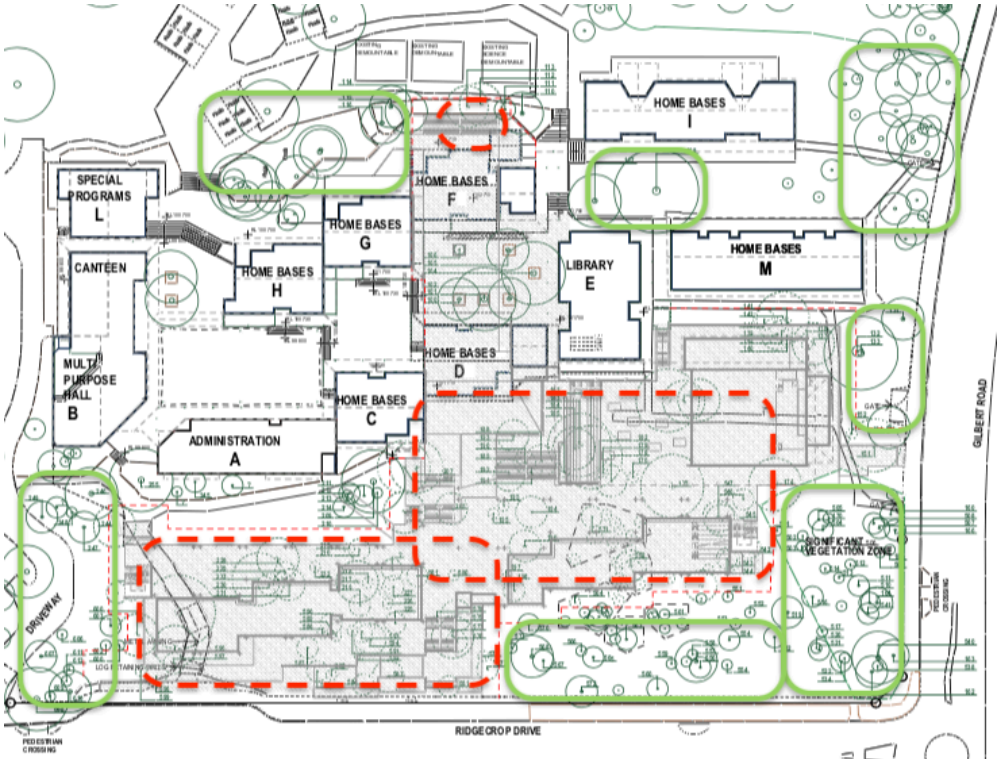
Summary of Findings

A definitive number of trees requiring removal is difficult to determine at this stage. All trees within the building platform will require removal, i.e. all trees within the red dashed areas. (See plan below).

Trees within three (3) metres of the building platform will require removal to facilitate the works processes.

Trees beyond three metres of works will require that careful management of most of their Tree Protection Zone (i.e.10 x trunk diameter) must be undertaken.

This information is summarized in Sections 8 : *Tree Protection Measures*, of this report.



Plan: Aerial view of tree management. See Appendix A4 for larger plan

5.0 Findings (continued)

The total number of removals has been determined on the site plan (Appendix A2) which reflect the building platform. An allowance of three (3) metres has been made beyond the building platform. All trees within works area are to be removed and nearby trees can then be considered for future potential at the completion of works.

Trees Proposed for Removal:

- Trees within the building platform – Removal of all trees within the building platform is proposed. See Appendix F for colour coding (Red) and Appendix E3.

Trees Requiring Protection and further consideration:

Trees three metres from building platform, can be isolated from works with fencing.
Colour coded Green.

- Trees with canopies overhanging the building envelope will require pruning (Appendix E1) Colour coded Blue.

This is detailed on plan Appendix A4. Distance of TPZ and SRZ are provided in Appendix E1.
Some trees where encroachment into TPZ is greater than 10% will require further consideration.

Reasons for further consideration include:

- Mature trees of significance with a short Useful Life Expectancy, or structural or health concerns.
- Understorey protection and soil management.

On-site Management

Arboricultural management of works near trees must be undertaken, and this should be established when trees are isolated with fencing from works processes. This will include trees with limited futures, trees requiring formative pruning and trees unsuitable as an *edge tree*.

Pruning

Clearance pruning will be required to perform some works (scaffolding or building process) near trees. Works must be performed to AS4373 (Appendix D). Pruning requirements for trees near works i.e. branches that may conflict with building processes or are likely to become long lever arms (this can be managed in annual tree assessment).

5.1 Discussion by Area

Ecologically Significant Areas

Areas of ecological significance have been identified in the Travers Ecological report, one in the south-eastern corner and one in the north-eastern section of the site.

These areas are shown in blue on the map (see Image 3) including areas Q4 and Q5 and have been identified as STIF (Sydney Turpentine-Ironbark Forest community) an endangered ecological community, listed by the NSW Scientific Committee.

STIF Area South

Trees in the south-eastern corner of the site have works proposed up-hill, and nearby. These must be carefully protected and isolated from the works processes. Trees in this area with unusual growth or damage, appear to be those where mechanical damage has occurred (possibly from mechanical clearing or tree removal). In most cases these tree have managed to maintain their structural strength by compartmentalisation (CODIT).

STIF Area North

Trees in the north-eastern corner (Lilli Pilli [sic] Grove) (see Image 5 below), are outside most works proposed. They impact upon these trees can be avoided by managing the relocation of demountables nearby Upon close inspection, most trees in this area are in *Fair to Poor* health and structural condition, many with signs of stresses that require remediation of the soil area.

This area does not have the benefits of the understorey of the lower area south of the buildings.

Image 5: Lilli Pilli Grove – STIF north
Fill under trees causing decline

The reasons for the poor growing conditions are not clear, however, it appeared to be due to human elements rather than natural occurrences.

There is fill and rubble in this area and this has built up around the trunks of trees. If this area is to survive in the longer term, this fill and rubble should be removed to clear the tree trunks.

5.1 Discussion by Area (continued)

Oval Area

The area north of the buildings comprised the school oval. The contrast between the dry open oval and the healthy tree canopy in sandpit area are an excellent example of the benefits of trees.

The area east of oval is relatively undisturbed natural bushland. Several dead trees were noted; however, we were advised that this is an 'out of bounds area' where children are not allowed to play, and therefore maintenance has been limited.

Images 6- 8:
Oval area and compacted soil

5.1 Discussion by Area (continued)

West of Oval

Trees in this area are very tall and heathy, with the under area modified to provide active play. The soil in this area was not compacted and not as dry as was the area around oval. The trees in this area are an exemplary example of the possibilities for interaction between children and trees (see Images 9-11 below).

Images 9 - 11: West of Oval natural area of tall trees with sensitive understorey additions

5.1 Discussion by Area (continued)

South of Works

Trees in the area south of the works are similar to the STIF community in the south-eastern corner of the site. This is the area where most building works are proposed and many of the trees close to the buildings will require removal. With the exception of one Turpentine (Tree 174), no one tree is significantly more beneficial than any other. Rather the whole area is made up of relatively healthy trees with an understorey of smaller remanet, and endemic, trees and shrubs.

Bush fire mitigation measures appear to be having an adverse impact on tree health and longevity, also on the understorey. The long-term outcome, if this method of management is continued, will be the loss of a unique and exceptionally beneficial environment. (See notes on bushfire mitigation in Appendix B4) of trees in the south and south-east of the site.

Careful and specific management will be required to limit the impact on retained trees.

East of Buildings

The area east of buildings, near the main pedestrian entrance from Gilbert Street has some revegetation. Also, near this and the entrance from Ridgecrop Street, appears to have been revegetated. Trees are mostly planted mid-storey and understorey native species (non endemic), in generally *Fair* health and condition. Works are proposed in this location and none of the trees are individually significant.

West of Buildings (OOSH)

The area to the west of buildings in the south-west of the site is utilised by the OOSH group. There are many examples of creative play and enjoyment evident with the children using the natural materials such as sticks, bark and gum nuts. This area appears to be used for both active and passive activities. Car parking will impact on three trees in this area.

Image 12: Tree #13 near car park with damage under main leader

Car Park and Trees to South.

This area south-west along Ridgecrop Street, is west of car entrance to site and below the carpark. One tree (Tree 13) on the corner of the carpark entrance presents a high risk and should be assessed further and will most likely require removal (see Image 12). This area is beyond most works.

6.0 Discussion of Assessment

Background in Assessment

Trees can be assessed in two separate ways which can potentially appear contradictory. These are listed as tree *Heath* and tree *Condition*, and are an important summary of the tree assessment. These are recorded in the relevant columns in the *Tree Schedule* Appendix F,

Tree Health

A tree's *health* (and vitality) depends upon its growing conditions, and limiting factors such as access to water and air - particularly in their root systems. Prolonged stress in the form of limited water availability, or lack of air from soil compaction or fill over roots, will severely impact on a tree's Health. The tree will be stressed while using stored sugars, and can become vulnerable to damage and diseases that it would normally be manage by the tree using its defence mechanisms of Compartmentalisation Of Decay (or damage) In Trees (CODIT).

A tree can be resilient, and overcome periods of decline in the short-term. Where adverse conditions are eliminated or are remediated, a tree can re-establish and improve in health and vigour as smaller roots are regenerated. This is apparent in the north-eastern corner (Lilli Pilli Grove) area, where most trees are in only *Fair* health and condition. It appears likely that this is due to fill or building rubble – which limits air to smaller roots, and has adverse impacts on the root crown (flare at the base of trunk) in many trees.

Tree Condition

A tree's *Condition* (and structural stability) is important in its ability to stay upright, and be of sound structural condition. This is important both above and below-ground and particularly to the root crown (base of trunk see note above about Lilli Pilli Grove).

Above-ground structural *Condition* can often be managed by removing or managing weak attachments e.g. formative pruning, removing '*included bark'* and managing crossed or poorly formed branches. Also, to allow good leading branches in semi-mature or supressed trees by removing overhanging branches of a dominant tree (as in the area south of the buildings).

6.0 Discussion of Assessment (continued)

Below-ground condition of a tree is less accessible for assessment and consideration of the sites history is one of the only guides.

This is the primary reason for *setting back* works near a tree. (i.e. outside SRZ). Where concern such as this arise, root mapping can be undertaken to better understand the tree's below-ground conditions and root strength.

Further assessment of canopies after removals is recommended for the trees at the edge of retained group.

Crowded Tree Canopies

The structural condition of trees to being retained in the area south of the buildings are of concern where competition for light and space limits the growth of adjacent younger – (future canopy) trees.

While this is of little concern in natural areas, where this occurs (as in the area south of proposed works), changes such as those proposed, will require assessment to ensure that the tree is able to develop in a structurally sound way (see Image 13).

This can be managed with formative pruning such as removing overhanging branches of an adjacent tree to allow a good strong leader in the supressed tree.

Image 13: Crowded and competing canopies

7.0 Discussion of Tree Groups

Canopy Trees - Eucalypts

The canopy trees are mostly those of the Sydney *Turpentine Ironbark Forest community* (STIF) and the *Sandstone Ridgetop Woodland*. This wide variety of these trees and tree species provided an excellent environment for the school and wider area. This island of tall trees has many benefits and can continue to provide these into the future if appropriately managed.

This vegetation also providing an appreciation of tall trees as a positive experience for the students, and an awareness and understanding of native species and natural bushland, often lacking in many schools.

Understorey Species

Trees as identified in the Tree Data schedule and the understorey as identified in the Travers report are suitable for replacement planting. The under and mid-storey vegetation are important in attracting birds and other fauna.

Weedy Species

There are a few weedy species present on the site. One area requiring management is the area south of the carpark. This is to be expected as this is the lowest point in the land and run-off from the hard surfaces of the bitumen surfaces, concentrates weeds and allows germination.

Solutions to managing weeds are as follows:

Ensure that the understorey is maintained in a natural state (e.g. bush regeneration techniques), and allow endemic seed sources to succeed. Limit weed seeds entering or germinating in this area by e.g. diverting run-off from parking area/hard surfaces into drains or away from natural areas. Plant endemic species on higher land. Finally, avoid exotics that readily self-seed e.g. *Koelreuteria species* –Rain Tree.

7.0 Discussion of Tree Groups (continued)

Future Planting

Where tree planting is desired, initial species considerations should be those of the Cumberland Plain selection, and planted in appropriate soil in areas of as defined in *Travers maps.* These trees include Turpentine-Ironbark Forest and Sandstone Ridgetop Woodland. Also, a selection of rainforest trees that may have been present in the past, is another good option.

Locally Endemic Shrubs, grasses and ground covers

An understorey is beneficial to whole tree health and survival, as well as protection of the soil area for healthy tree growth and protecting fauna.

Exotic Trees

Exotic trees, where required, must be considered for their future weed potential. It is noted that the *Koelreuteria species* - Rain Tree appears to be becoming of greater weed potential in the Sydney region (It is noted as a weed in dryer locations and it is becoming (anecdotally) apparent, that this species is now self-seeding in areas not previously considered a problem. This is possibly due to 'climate change/warming' creating more suitable growing conditions).

Maintenance Pruning Works

Maintenance works, as performed in the areas near buildings, have been managed well. The changes of site usage will require that new areas of impact are closely considered in annual reviews of the trees, e.g. management of deadwood. All deadwood (3cm∅ at branch junction) should be removed in *high target* areas.

Consideration should also be given to conflicting branches that could weaken a tree, as well as branches that could limit growth of a beneficial and supressed tree (See image 13).

7.1 Discussion of Tree Removal / Retention

Tree Removal for works proposed

All trees within the building platform will require removal Appendix E3. An additional distance to allow for the building process will also be required. Three (3) metres will accommodate most works processes. Trees beyond the additional three metres will require assessment of their suitability for retention.

Note: It has been requested by the ecologist that dead trees be retained for habitat. Where these dead trees are outside the proposed works, these have been noted for retention.

Table 1: Tree Removals or Consideration

Species	Location	Reason / Works Required
Various Trees mainly Eucalypts	South of existing buildings	Removal of trees within building platform
Various Trees mainly Eucalypts	South of existing buildings Building envelope – 3m around areas of works	Removal of trees 3m from building platform Soil surface protection required.
Various Trees mainly Eucalypts	South of existing buildings Trees beyond 3m works process allowance	Isolation and protection of trees. Reassessment manage trees E.g. unsuitable for *edge* location.
Weedy species	As required	Weedy species
Various	demountable class rooms relocation process	Route taken may impact on existing trees
Single Eucalypt	Tree 13 - near car parking access	High risk tree – assess further

Tree Protection

As all works are to be above existing grade, the impact on trees is limited to footings, which must be by pier or beam construction (not strip footings).

Landscaping: Ideally any new paths can be designed to be *entirely* above, existing grade. Features such as paving or paths should be designed to be entirely above existing grade within the Tree Protection Zone (TPZ) of retained trees.

The process of removing and relocating demountable class rooms to the oval area can be managed to limit impacting on retained trees in the moving process. The route taken by the buildings and the equipment used must be carefully considered to limit damage to trees (including the soil beneath these trees) proposed for retention.

7.2 General Summary of Discussion

There are no individual trees that are more prominent others. Rather the groups of trees present extensive canopies providing many amenity and environmental benefits.

Most trees are growing and surviving as expected. Taller canopy trees (mostly locally endemic Eucalypts and Allocasuarina) are growing well in natural areas and are growing less vigorously with limited growth in impacted areas of compacted soil and planter beds.

Shorter lived and understorey species such as wattles and hakeas are in various degrees of ageing and becoming over-mature.

Regeneration of this important understorey and mid-storey layers are being adversely impacted upon by bushfire mitigation measures (see Appendix B3).

As currently practiced this is likely to lead to gradual tree decline of the overall area. It is recommended that this be managed to halt a decline of the beneficial elements and ensure the survival of this unique area.

The exception to tree health is the fallen tree in the south-western section of the site and this appears to be due to changes/failure to soil strength and cohesion and increase water into the area. The drainage along the southern area has mounding present, apparently in relation to surface water management. It is possible that this, followed by extreme weather conditions, is the reason for the fallen tree.

Trees further east, along this drainage areas do not appear to have been adversely affected.

One tree that requires further consideration if it is to be retained, is the tree near the corner of the car park. This tree (see Image 12) has significant faults under the main branches and is in a high target area of frequent usage by people and cars.

Image 12: Tree near car park with damage under main leader

8.0 Tree Protection Measures and Likely Impact on Retained Trees

Site Preparation

The site preparation process is the initial time that trees are likely to be adversely impacted upon. Protection fencing, soil surface protection and run-off management must be in place before any other works occur (Appendix A4 and C1).

Care must be taken to isolate the trunks of any trees where works are proposed within the SRZ (Appendix C2). This will be defined when closer inspection of trees near works is undertaken.

General Tree Protection measures are provided in the following section Sections 9.0, 9.1 and 9.2. Any level changes will adversely impact on retained trees as their roots are mostly in the top 20cm of soil.

Work Between Buildings and Trees

All works between buildings and the TPZ of trees must be managed. Installation of, or changes to drainage must be addressed as this is likely to impact on adjacent trees. Landscaping features, such as soil surfacing, walkways or paving must be above existing ground level (and including and accommodating all base works; not just FFL's).

Key to Tree Outcome (including Ecological and landscaping considerations)

The outcome of trees in the area of works are colour coded in Appendix F and individually provided in Tables E.

Key to Tree outcome	Colour code in Appendix F
Trees proposed for retention and protection	# Retain & Protect within 3m of works # Retain & Protect
Trees proposed for removal	# Remove
Other uncoloured tree #'s	Beyond works areas

8.1 Trees

Areas of Semi-Mature Trees – Trees with Long-term Potential

Semi mature or supressed trees are an opportunity to consider the future canopy growth. The southern boundary along the fence line is an area where semi-mature trees are growing. Individual inspection of these trees was not undertaken as they can be isolated beyond other trees being protected. Also, they are not indicated on the survey.

Mature Trees

Mature trees are at their best both aesthetically and environmentally with large canopies, large amounts of stored carbon and expansive canopies of photosynthesising leaves. Mature trees also require management. This is not difficult, rather it requires considered assessment in managing risk.

Exotic Trees

Some exotic trees have been planted around and between the buildings providing a contrast with most being deciduous

Weeds

The area south of the car park, is weedy compared with other areas on the site. Run-off from the car park area has introduced competition in the form of weed establishment.

8.2 General Protection for Retained Trees

Tree protection measures for tree/s being retained will include isolating each to the extent of TPZ/works **before any other works begin**. And maintaining the soil area in its existing condition until the landscaping phase (see Appendices A4 and C1).

Both above and below-ground sections of each tree require protection. Fence (See Appendix C1) each tree or group of trees to TPZ. Where this is not possible or where works or access are required near the tree/s, wrap trunk and install mulch and rumble boards (See Appendix C2) and isolate root zone as diagrammatically represented on plans in Appendix A4.

TPZ

To protect soil from compaction or contamination storage of material must be outside the TPZ.
Where access is required within the TPZ the area should be mulched and rumble boards added (as per Appendix C2). Where there are difficulties isolating tree and tree root zones from works processes, please discuss this further with your project arborist.

Engineering works must be considered by your project arborist and be outside SRZ and most of TPZ.

Surfacing and all associated works must be above existing grade, and performed with consideration of tree roots below. Do Not mechanically scour under tree/s being retained as this will detrimentally impact on roots which are near the surface.

There must not be any level changes with TPZ by an area greater than 15% unless specific arboricultural consideration is given to the works proposed.

SRZ

Any works within SRZ requires that specific and detailed arboricultural assessment be undertaken.
Where access is required within the SRZ the trunk must be isolated/wrapped, the area mulched and rumble boards added as per Appendix C2.
Footings for works or boundary fencing within SRZ - must be of pier and beam construction and NOT strip footings.

8.3 General Tree Protection at Work Phases

Site Preparation

To ensure that adequate tree protection is in place, it is important that protection measures are the first works on site. Fence tree/s to the extent of the TPZ or to specific distances given in the report (see Table 1).

Where access is required within the TPZ, wrap trunk and protect soil within TPZ with geotextile fabric, mulch and rumble boards where fencing is not possible (this must be specifically discussed).

- Consider branches that may interfere with works process and manage or prune (See Appendix D).
- Consider where materials are to be stored and keep this outside tree protection zones.
- Protect tree from run-off from works processes, particularly materials that can change soil chemistry, as this is detrimental to trees, particularly native species.
- DO NOT CHANGE SOIL LEVELS within TPZ without arboricultural advice (Tree roots are usually located in the top 30cm of soil and reductions in soil level can remove most of a tree's roots. Additionally, and increases in soil levels or fill can reduce available air to roots and cause them to die).

Table 2: Tree Protection at Stages of Works

Works Phase	Protection Required	Solution
Site Preparation	Protect Tree canopy, trunk and roots with clear separation from work processes.	Install tree isolation fencing as per distances given in Table 2. (Protect soil where staged works are proposed within the SRZ). Install soil surface and run-off protection for TPZ.
Site Works	Protect tree canopy, trunk and roots. Maintain soil in current condition. Protect soil and roots run off.	Maintain soil surface protection and retain fencing. Contractors should be made aware of the importance of retaining tree protection measures and avoiding damage to vegetation being retained.
Services	Maintain soil in current condition.	Install all services outside tree protection area. No excavation below existing grade without specific arboricultural advice being provided.
Landscaping	Soil and tree roots zone. Cut and Fill.	No significant level changes (no reduction in soil level unless specified. No fill over 10cm unless it is with **structural soils**).

Do not perform works within SRZ without your arborist on site & specific information provided.

9.0 Summary of Assessment

Most trees at Samuel Gilbert School (SGPS) are relatively healthy and in mostly *Good – Fair* condition. This is particularly the case in the areas of dense vegetation. Understorey retention (even with clearing for fire management) has retained a natural level of soil protection by vegetation at ground level. Canopy competition and suppression are the main causes of limitations on future canopy trees.

Factors affecting some trees are compaction near the heavily used areas e.g. around the oval. Trees in the north-eastern ecological area are in decline due to damage to their growing conditions and fill around the base of many trees. It is possible that this was caused during much earlier works on the site, with fill dumped in this area. Remediation of this area is recommended to remove fill from the base of trees and see if this tree decline can halted.

The Tree Data Schedule (Appendix F), provides the initial assessment of tree *Health and Condition*. The trees have then been considered regarding the impact of works proposed. Methods to minimise the impact of works on retained trees is discussed in Sections 6 and 7 of the report.

Tree Protection measures are provided in Sections 8.0 8.1, 8.2, and 8.3 of this report. *A diagrammatic representation of tree protection fencing is provide in Appendix A4 and specific distances of fencing given in Appendix E2.* An intrusion of 10% of TPZ *area* is acceptable (as per AS4970) and possibly a greater area if arboriculturally managed. Intrusion into the Structural Root Zone (SRZ), is likely to affect tree stability and therefore increasing risk to nearby property and people.

Specific Calculations of tree protection distances, for *set-backs* for works from trees are provided (see Appendix E). On-site tree management advice prior to site works, in a discussion between the site manager and the project arborist is recommended.

Important factors to consider during works will be that:

- Soil areas around retained trees, must be kept un-compacted and free of fill or building rubble. Fill and building rubble must not be discarded within the TPZ of retained trees.
- Run-off from works processes must be diverted to ensure that it does not enter TPZ of retained trees. Ideally run off can be diverted into drains or away from vegetated areas.
- To prevent tearing by works processes, ensure adequate clearance from canopy. Pruning must be performed before works (See Appendix E1 and Appendix D).

10.0 Conclusion

Over 600 trees and tree groups have been considered. The location of the new buildings has been determined by many factors beyond individual trees and tree health and tree structural condition. Some ecologically sensitive areas of the STIF endangered community have been defined in the Travers ecological report and this has been a critical factor in their retention, protection and management. On-ground assessment of these areas defined two areas of concern beyond the scope of this report and these should be considered for future site management (see Management of soil in north-eastern area, and management of fire mitigation in other areas).

Many large trees will be removed, however, with the exception of the Turpentine's (of which there are few remaining on the site, (and after which the Sydney Turpentine STIF community is named) other trees are generally similar with none being more individually significant than another. The trees have been considered by area of different growing conditions. While understorey trees were not individually assessed, it is important to note that they are important in the overall health of the larger trees.

As all building work, with the exception of footings, are to be above ground, management of works near a large tree, can be managed by isolating them as groups. Discussion of findings is provided in Sections 6 and 7.

Necessary protection measures, set-backs, and constraints required to adequately manage all trees being retained, are provided in this report. See Sections 8 and diagrams in Appendices A4, C1, C3 and E1.

11.0 Recommendations

To minimise the impact on the trees being retained, works must be performed as discussed in Sections 8.0, 8.1, 8.2 and 8.3 of this report.

The site manager and contractors must be advised of Tree Protection requirements, and a copy of this report should be available on-site at all times.

The most relevant sections of the report are *Appendix A4 – Indicative Tree Protection Diagrams*, Sections 8.0 and Appendices C1 and C2.

Please contact me directly on 0417 022 692, if any sections of this report require clarification.

Sue Wylie
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Diploma of Horticulture (Arboriculture)
Australian Qualification Framework (AQF5)

Age of Tree:

Young: Less than 1/3 life expectancy
Semi-mature: 1/3 to 2/3 life expectancy
Mature: Older than 2/3 life expectancy
Over-Mature /Senescent: Older than 2/3 life expectancy and showing signs of irreversible decline

Condition of Tree:

Good: Tree is generally healthy and free from and obvious signs of structural weakness or significant adverse effects of pests and diseases or infection.

Fair: Tree is generally vigorous although has some indication of being adversely affected by the early effects of disease or infection or environmental or mechanical damage. Appropriate tree maintenance can usually improve trees overall health and halt decline.

Poor: Tree in decline and is not likely to improve with reasonable maintenance practices or has a structural fault such as bark *inclusion*.

Dead: Tree no longer capable of sustained growth

Compartmentalisation: CODIT – Compartmentalisation of Decay or Damage in Tree

Diameter at breast height (DBH): The nominal trunk diameter at 1.4 m above ground level

D = Ø arb = Trunk diameter, in m, measured above the root buttress

Dead Wood: Noted in tree data table **D/w**. All deadwood will eventually fall and should be removed in high target/high usage areas, as per AS4373 (Appendix D).

Development Works: Includes any physical activity in relation to land that is specified by the determining authority.

Edge Effect: Tree/s where changes/sudden exposure of its growing conditions, may affect canopy growth or structural condition.

Included Bark: Patterns of development at branch junctions where bark is turned inwards rather than pushed out. – A potentially weak attachment.

Project Arborist: The person responsible for carrying out the tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The project arborist will be suitably experienced and competent in arboriculture, having acquired through training, qualification (minimum Australian Qualification Framework (AQF) Level 5, Diploma of Horticulture (Arboriculture)) and/or equivalent experience, the knowledge and skills enabling that person to perform the tasks required by this Standard.

Structural root zone (SRZ): The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.

Tree: Long-lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks (or as defined by the determining authority).

Tree Protection Zone (TPZ): A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.

TMO/TPO Tree Management Order/ Tree Preservation Order – Legislation (usually part of Local Environment Plan (LEP) directing management of trees and vegetation).

ULE: Useful Life Expectancy (after Barrell) A modified version of this ULE has been used to include only Long/Medium/Short ULE (see Table in Appendix B5).

Vigour: Ability of a tree to sustain its life processes. The term 'vigour' in this document is synonymous with commonly used terms such as 'health' and 'vitality'.

References

Boland, D.J., Brookner, M.I.H., et al, (1992), *Forest Trees of Australia*, CSIRO, Australia

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Lonsdale, D. (1999) *Principles of Tree Hazard Assessment and Management*, Pub. Forests Commission, The Stationery Office, London.

Mattheck, C., and Breloer, H., (2003) *The Body Language of Trees – A handbook for failure analysis*. Research for Amenity Trees No 4. Pub. The Stationary Office London.

Shigo, Alex L. (1991) *Modern Arboriculture - Touch Trees*, Pub. Shigo and Tree Associates, Snohomish, WA, USA.

Smiley, Thomas E; Matheny, Nelda; Lilly, Sharon (2011!) *Best Management Practices – Tree Risk Assessment*. The International Society of Arboriculture (ISA).

Standards Australia (2007) Australian Standard AS4373-2007 *Pruning of Amenity Trees,* Pub. Standards Australia, Sydney.

Standards Australia (2009) Australian Standard AS4970-2009 *Protection of Trees on Development Sites*, Pub. Standards Australia, Sydney. Licensed to Ms Sue Wylie

Travers Bushfire and Ecology: REF: A17205, Biodiversity Constraints Assessment Report, Lot 1 DP 719671 Ridgecrop Drive Castle Hill, December 2017

www.environment.nsw.gov.au/determinations/SydneyTurpentineIronbarkForestEndComListing.htm

[1] Australian Standard 4970-2009: *Protection of trees on development sites* Licensed to Ms Sue Wylie

Useful References

Planting
http://hort.ifas.ufl.edu/woody/documents/RPG%20Tree%20Planting%20Cue%20Card[1].pdf
http://www.mortonarb.org/trees-plants/tree-and-plant-advice/horticulture-care/how-plant-trees

Tree Benefits
http://www.mortonarb.org/trees-plants/benefits-trees/sources-benefits-tree*s*

www.treesaregood.com/treeowner/treeownerinformation.aspx
www.treesaregood.com/treecare/resources/WhyToppingHurts.pdf
www.treesaregood.com/treecare/resources/New_TreePlanting.pdf
http://www.naturewithin.info/
www.greenhealth.washington.edu
http://www.isa-arbor.sk/dokumenty/Tree_stability_%20Engels_Peter%20Sterken.pdf
http://hort.ifas.ufl.edu/woody/

Site Specific
www.samuelgilbert.nsw.edu.au/our-school.html

Trees are dynamic living structures, growing and adapting to conditions around them. A Tree's condition will change and vary over time depending on weather, environmental factors and mechanical or human interaction.
Assessment is limited to the conditions at the time of the inspection and only trees discussed in the report have been assessed. Plans used to assess likely impact are those appended (Appendix A).

Ongoing monitoring of all nearby trees is advised and where significant changes are observed, further advice should be requested. Unusual developments or sudden changes in a tree's condition should be addressed immediately.

There should be **NO changes within the Structural Root Zone** (SRZ) of a tree without specific arboricultural advice and supervision being provided from an experienced AQF Level 5 arborist.
This also applies to underground utilities and services such as plumbing/gas/drainage and can also apply to landscaping works such as paving below existing grade and fill greater than 10cm above grade.

Photographs are inserted as a guide to matters discussed however these could be misleading and may exaggerate or minimise the elements under discussion. The text should be the main guide to the importance of images and diagrammatic representation on plans.

This report is primarily about tree protection measures as they relate to the works proposed (as given in the attached plans) and does not necessarily address tree maintenance or tree management works required.

The report is to be considered in its entirety and where unclear clarification should be sought.

Tree Numbers added to Site survey by LandPartners Limited, Drawing No. SY074362-SV1, Dated 06/12/2017
*see larger format plan and latest modifications sent separately

Tree Plan by Fulton Trotter Architects, Project No:7068SG01, Dwg No: SD1609/Rev P1, Dated 18/10/18
*see larger format plan and latest modifications sent separately