Attachment 4 – Flood Impact Study

FLOOD IMPACT OVERVIEW REPORT

SPRING FARM

RIVERSIDE

Prestige. Picturesque. Perfect.

SPRING FARM

Local Environmental Plan & Development Control Plan Amendment – Southern & Western Villages

SPRINGS ROAD, SPRING FARM

For

Cornish Group Spring Farm P/L &
M Collins & Sons (Contractors) P/L

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- Annexure "D" – Extract from Lean & Hayward P/L - "Flood Analysis Report, Nepean River Sand Mining Lot 22 DP 833317 & Lot 1 DP 587631 Macarthur Road, Spring Farm"
- Annexure "E" – Extract from J. Wyndham Prince Pty Ltd - "Water Cycle Master Plan Report – Spring Farm Release Area"

1.0 Introduction

This Flood Impact Overview Report has been prepared on behalf of Cornish Group Spring Farm P/L and M Collins & Sons (Contractors) P/L. The purpose of the report is to outline the potential flood impacts of the proposed Local Environmental Plan (LEP) and Development Control Plan (DCP) Amendment. The embodiment of these LEP & DCP Amendments is the rezoning of Environmental Conservation Land to Residential Land and the potential filling this rezoned area may have on the flood storage area within the Nepean River Catchment immediately adjacent to site.

The description of the subject land for this proposed LEP and DCP Amendment is described as follows:

- Lots 1,2, 5 & 6 DP 1132985 – owner being Cornish Group Spring Farm P/L
- Lot 1 DP 587631 – owner being M Collins & Sons (Contractors) P/L

See ***Annexure "A"*** for the Cadastral Plan and ***Annexure "B"*** for the DCP Amendment Plan.

The purpose of this report is to illustrate the following:

1. *Outline the current planning approvals and impacts on the floodplain.*
2. *Compare the proposed DCP Amendment to the current planning approvals.*
3. *Illustrate the negligible impact the proposed DCP Amendment has on the floodplain and floodplain storage.*

2.0 Source of Information

The following has been referenced in the preparation of this report.

1. J. Wyndham Prince Pty Ltd - "Water Cycle Master Plan Report – Spring Farm Release Area" dated 4 October 2002.
2. M Collins and Sons (Contractors) Pty Ltd - "DA 75/256 – Notice of Modification under Section 96(2) of the Environmental Planning & Assessment Act 1979 – Spring Farm Quarry", dated 4 March 2009.
3. Lean & Hayward P/L - "Flood Analysis Report, Nepean River Sand Mining Lot 22 DP 833317 & Lot 1 DP 587631 Macarthur Road, Spring Farm", dated 14/08/2008 (Flood Analysis Report).
4. Australian Rainfall and Runoff Volume 1 and 2, 1987.
5. Camden Council - "Camden Development Control Plan 2011", dated 8 February 2011.
6. Lean & Hayward Pty Ltd - "Development Control Plan Amendment Plan Set", dated February 2011.

3.0 Scope of this report

This report provides additional information to the previously reported drainage & flood strategy presented in the Master Planning process prepared by J. Wyndham Prince Pty Ltd to facilitate the rezoning of the Spring Farm Release Area. It does not replace nor supersede the reports referenced, but merely provides some critical design information on flood storage that was otherwise unavailable at the time of analysis in 2002.

This report does not provide detailed hydrology and hydraulic calculations. This report provides site description, methodology and previously modelled criteria to draw reasonable civil engineering conclusions to assist in the approval process of the LEP and DCP Amendment applications.

4.0 Methodology

In accordance with Council's stormwater policy, the overall stormwater drainage system proposed as part of the LEP and DCP Amendments shall be designed to cater for both the minor and major storm events. The minor 5 year system shall pipe the minor storm water flows and discharge them into to the downstream creeks, detention basins and water quality devices. Flows in excess of the piped drainage system for larger storm events up to the 100 year event shall flow overland within the road reserve and carriageways to the downstream creek system.

All of the topographical information within the development extents is based on a current field and complied detail survey model prepared by Lean & Hayward P/L.

5.0 Catchment Characteristics

A brief description of the site, percentage impervious, local and surrounding catchments follows. These descriptions give the catchment characteristics of the site and surrounding catchments located above the site.

5.1 Description of Site / Percentage of Impervious

The pre-developed site is relatively undeveloped with grassed open space areas. The pre-developed site and adjoining catchments are made up of large pervious areas which currently have a low percentage of impervious area.

The proposed LEP and DCP Amendments will increase percentage impervious of the developable footprint of cadastral lots referenced in this report by approximately 6%. That is, 94% of the area under consideration in the proposed LEP and DCP Amendments will remain recreational open space and bush regeneration area as approved under the Spring Farm rezoning.

5.2 Sand Mining on the Immediate downstream catchments to the site

Sand mining approval was granted to M Collins & Sons in 2009 by the Minister for Planning. See ***Annexure "C"*** for a copy of an extract from the approval report.

The afore-mentioned Flood Analysis Report, commissioned as part of this sand mining approval, highlights the positive impacts of the proposed 1,000,000 tonnes on the 1:100 year flood level. The flood level on Lot 1 DP 587631 decreases as a resultant impact of the sand mining operations. See ***Annexure "D"*** for a copy of an extract from the Flood Analysis Report.

6.0 Design Criteria

6.1 Design Storm Events

Drainage analysis and modelling for the proposed LEP and DCP Amendments will be prepared in accordance with the Camden Council Engineering Design Specification at Construction Certificate stage. This modelling will be prepared for the Water Quality Storms 3 month & 1.5 year Average Recurrence Interval (ARI) storm events and also the 5 year & 100 year Average Recurrence Interval (ARI) major storm events.

6.2 Development Controls

The post mine subsidence 1:100 year flood level from the Nepean River at Spring Creek is RL 74.3. See ***Annexure "E"*** for a copy of an extract from the Spring Farm Release Area – Water Cycle Masterplan Report. A 500 mm floor level freeboard above this level will be proposed for all future residential allotments proposed under the LEP and DCP Amendments.

6.3 Current Sand Mining Operations

The currently approved Sand Mining operation by M Collins & Sons will remove 1,000,000 tonnes of fill material from the flood plain. This equates to approximately 600,000 cubic metres of fill material to be exported from the flood plain downstream of the proposed DCP Amendment area.

6.4 Proposed DCP Amendment Residential Land Filling

The proposed LEP and DCP Amendments adds approximately 400,000 cubic metres of fill material to the flood plain over and above the currently approved DCP residential zone that will be to subject to filling to meet the approved Post Mine Subsidence Flood Level + freeboard.

7.0 Impact of the Development

It has been well documented in civil engineering publications and research that Water Sensitive Urban Design (WSUD) devices and measures incorporated into a subdivision reduce the impact on the environment and flooding in creeks and river systems.

A summary of the WSUD design concepts and requirements adopted in the design;

- Water Quality designed for 3 month ARI flows
- Water Quantity treated to pre-development levels up to 1.5 year ARI
- Reduction in 5 year and 100 flows to near pre-development level.

To meet Council requirements and generally achieve the outcomes in the Water Cycle Master Plan Report – Spring Farm Release Area, the residential development will need to be designed to the appropriate standards. The proposed LEP and DCP Amendments will be treated no differently under the assessment process outlined in the Environmental Planning & Assessment Act. Therefore, the impact of the additional development will be offset with additional WSUD measures and thus have no detrimental impact on the existing drainage systems and environment.

8.0 Conclusion

This report has been prepared to on behalf of Cornish Group Spring Farm P/L and M Collins & Sons (Contractors) P/L to assist in the approval of the proposed Local Environmental Plan and Development Control Plan Amendment submission to Camden Council.

This report highlights the current planning approvals and compares the proposed LEP and DCP Amendments to the current planning approvals and thence illustrates the negligible impact the proposed LEP and DCP amendment have on the floodplain and floodplain storage.

In basic summary, the current sand mining resource material to excavated and exported equates to approximately 600,000 cubic metres and the additional filling to support the LEP and DCP Amendment is approximately 400,000 cubic metres. That is, the floodplain has a surplus storage capacity of 200,000 cubic metres during the any flood event where the Nepean River breaches its current top of bank.

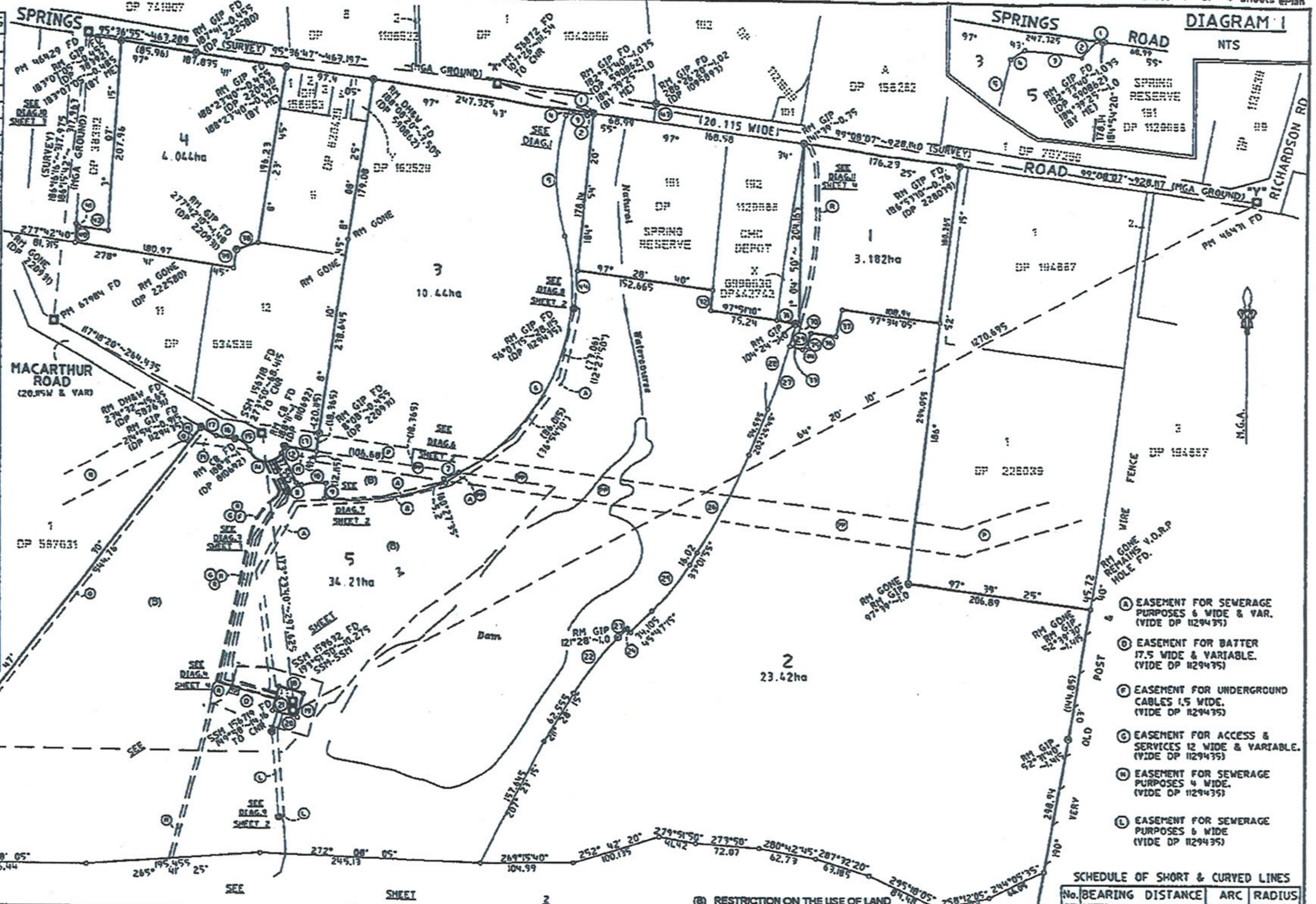
Thus the outcome of these developments from a wholistic perspective is favourable on the immediate Nepean River Catchment given the fact that there is additional backwater floodplain storage in the the floodplain. Hence, this development proposal should be assessed favourably and with confidence that there will be no detrimental outcomes resulting from its approval.

Prepared By
DAVID BOBYREFF BE(Civil) MIEAust CPENG NPER

ANNEXURE "A"

SCHEDULE OF SHORT & CURVED LINES

No.	BEARING	DISTANCE	ARC	RADIUS
1	97°43'55"	2.325	–	–
2	52°41'25"	1.08	–	–
3	97°41'25"	21.37	–	–
4	56°51'05"	6.05	–	–
5	179°57'45"	137.575	139.29	255.79
6	206°24'10"	303.22	332.24	226.4
7	249°27'05"	10.19	10.19	289.555
8	262°52'10"	126.675	127.67	294.7
9	5°16'40"	18.2	–	–
10	265°17'25"	27.745	27.89	80
11	294°01'25"	6.115	–	–
12	19°25'20"	7.795	7.845	20
13	98°11'10"	36.67	–	–
14	128°11'30"	20.005	20.945	20
15	94°25'25"	35.88	44.515	20
16	98°11'10"	21.345	–	–
17	119°39'20"	19.825	–	–
18	105°25'50"	28	–	–
19	195°25'50"	27	–	–
20	285°25'50"	28	–	–
21	15°25'50"	27	–	–
22	218°37'45"	77.31	77.515	310.2
23	225°47'15"	15.47	–	–
24	135°47'15"	5.2	–	–
25	39°24'35"	65.54	65.675	295
26	207°43'50"	126.205	126.385	683
27	19°26'40"	74.48	74.515	715
28	198°24'55"	100.1	100.185	715
29	15°25'50"	25.67	25.67	715
30	100°31'10"	1.4	–	–
31	100°31'10"	22.085	–	–
32	185°09'10"	23.805	–	–
33	286°27'30"	13	–	–
34	276°56'05"	6.07	–	–
35	195°30'30"	16.155	–	–
36	277°34'05"	28.295	–	–
37	193°56'30"	30.185	–	–
38	71°47'00"	25.4	–	–
39	188°09'55"	21.455	–	–



Ⓐ EASEMENT FOR SEWERAGE PURPOSES 6 WIDE & VAR. (VIDE DP 1129435)

Ⓓ EASEMENT FOR BATTER 17.5 WIDE & VARIABLE. (VIDE DP 1129435)

Ⓕ EASEMENT FOR UNDERGROUND CABLES 1.5 WIDE. (VIDE DP 1129435)

Ⓖ EASEMENT FOR ACCESS & SERVICES 12 WIDE & VARIABLE. (VIDE DP 1129435)

Ⓚ EASEMENT FOR SEWERAGE PURPOSES 4 WIDE. (VIDE DP 1129435)

Ⓛ EASEMENT FOR SEWERAGE PURPOSES 6 WIDE (VIDE DP 1129435)

SCHEDULE OF SHORT & CURVED LINES

No.	BEARING	DISTANCE	ARC	RADIUS
40	183°07'15"	21.395	–	–
41	140°25'35"	4.48	–	–
42	97°42'40"	33.53	–	–
43	187°39'10"	20.115	–	–
44	5°42'40"	42.545	–	–

Ⓜ EASEMENT FOR TRANSMISSION LINE 9 WIDE & VARIABLE. (VIDE DP 810692)

Ⓝ EASEMENT FOR TRANSMISSION LINE 30.48 WIDE. (VIDE DP 587631 & BK 7168 No.833)

Ⓟ EASEMENT FOR TRANSMISSION LINE 12.115, 18.365 & 30.48 WIDE. (VIDE DP 626438 & I553973)

(B) RESTRICTION ON THE USE OF LAND (VIDE DP1129435)

ⓅⓅ PROPOSED EASEMENT FOR TRANSMISSION LINE 12.115, 18.365 & 30.48 WIDE (VIDE DP 626438)

Ⓢ EASEMENT FOR ACCESS 4.57 WIDE (VIDE DP 219318 & J532786)

Ⓡ RIGHT OF ACCESS 4, 12.5 WIDE AND VARIABLE

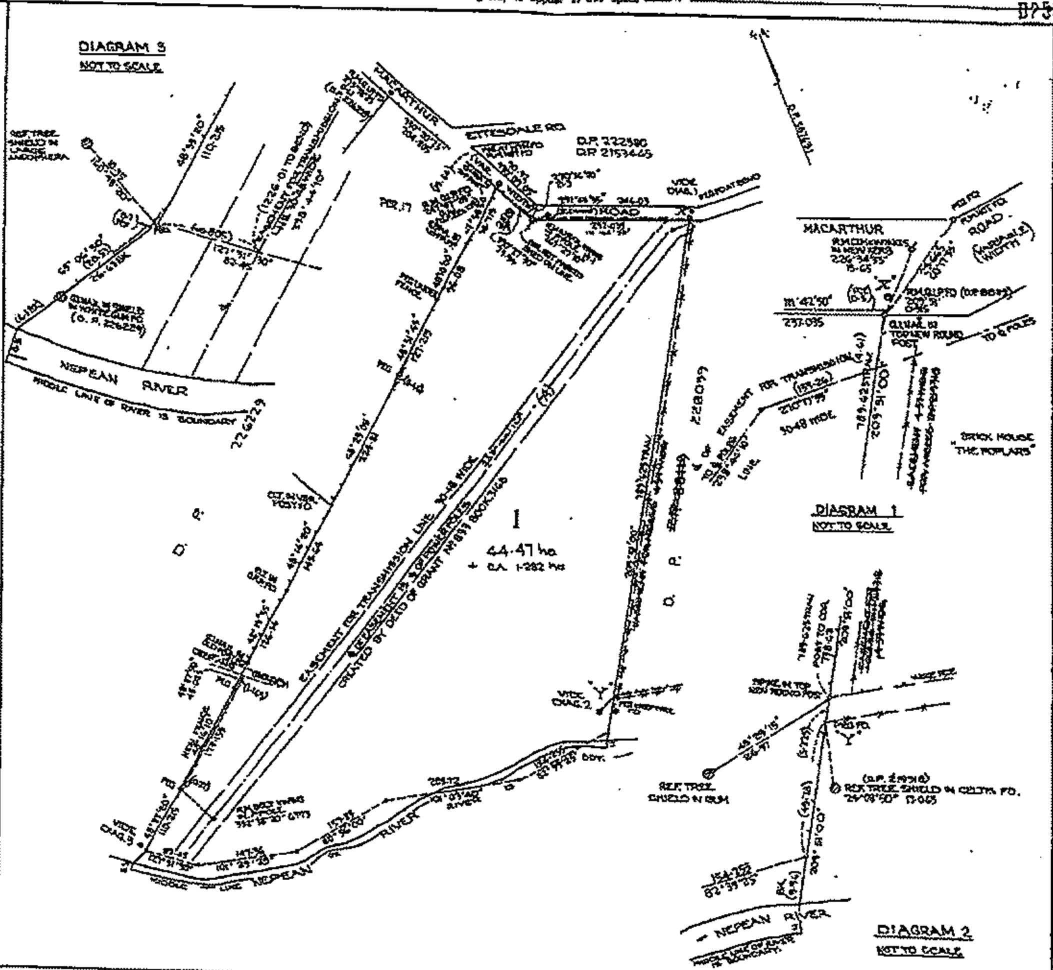
SURVEYING & SPATIAL INFORMATION REGULATION 2006 CL.35(1)(b) & CL.61(2)						
MARK	M.G.A. CO-ORDINATES EASTING	NORTHING	CLASS	ORDER	METHOD	ORIGIN
PM 46429	289 079.804	6 227 884.938	B	2	FROM SCIMS	SCIMS
PM 46431	290 457.309	6 227 692.254	B	2	FROM SCIMS	SCIMS
PM 56872	289 540.842	6 227 839.626	B	2	FROM SCIMS	SCIMS
PM 67984	289 045.12	6 227 568.83	D	5	FROM SCIMS	SCIMS
SSM 156718	289 280.08	6 227 447.54	U	N/A	CALC'D	PLAN
SSM 156719	289 311.86	6 227 141.91	U	N/A	CALC'D	PLAN
SSM 159632	289 314.32	6 227 151.88	U	N/A	CALC'D	PLAN
SOURCE: M.G.A. CO-ORDINATES ADOPTED FROM S.C.I.M.S. AT 10/06/10						
COMBINED SCALE FACTOR 1.000135 ZONE 56						

Surveyor: LARRY DEAN WARD Date of Survey: 30/09/10 Surveyor's Ref: 76371.01.L02K	PLAN OF SUBDIVISION OF LOT 61 DP 810692, LOT 1 DP 217205, LOT 1 DP 590862, LOT 20 DP 1129435 & LOTS 1 & 2 DP 222580.	LGA: CAMDEN Locality: SPRING FARM Subdivision No: 47 of 2010 Lengths are in metres. Reduction Ratio 1:3000	Registered 15.2.2011	DP1132985

PLAN FORM 2

Plan Drawing only to appear in this space

DP587631 OFFICE USE ONLY



D.P. 587631

Registered: 15-7-1977

C.A.:

Title System: OLD SYSTEM

Purpose: P.A. 52748

Ref. Map: PARISH

Last Plan: D.P. 979346

PLAN OF LAND IN REG. CONV. No 467 BOOK 2819 BEING PORTION 18 & PART PORTION 19

Reduction Ratio 1: 4000

Lengths are in metres.

City: CAMDEN

Locality: NARELLAN

Parish: NARELLAN

County: CUMBERLAND

KENNETH JOHN MORROW

31ST OCTOBER, 1975

REFERENCE TO EASEMENT FOR ACCESS 4·57 WIDE STRUCK OUT AT REQUEST OF SURVEYOR IN REG. GEN. DEPT 8/7/77

Surveyor's Reference: 1147/A

Council Clerk's Certificate

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

I, Brook Richard Davies, Registrar General for New South Wales, certify that this negative is a photograph made as a permanent record of a document in my custody this 11th day of July, 1977

ANNEXURE "B"

DRAFT

PROPOSED LEP & DCP AMENDMENT WITH AERIAL OVERLAY - SPRING FARM

AMENDMENT	NO	DATE	INITIAL	CLIENT

SCALE: 1 2000 @ A0 DRAWN: PS/JH
SHEET: 2 OF: 2 AMEND:
DRAWING No: 77466.01.M04
DATE: 15/03/2011

FILE NAME: 77466.01M03-M04

A0

ANNEXURE "C"

NSW GOVERNMENT
Department of Planning

ASSESSMENT REPORT

Spring Farm Quarry
Section 96(2) Modification – Continuation of Operations

BACKGROUND

M. Collins & Sons (Contractors) Pty Limited (Collins) owns and operates the Spring Farm Quarry (the site) at Elderslie, approximately 65 km southwest of Sydney (see Figures 1 and 2).

The site is bounded by the Nepean River to the west and rural residential properties to the north and south, including a vineyard. The site is accessed from Macarthur Road to the east. It is currently zoned 1(a) Rural under the *Camden Local Environmental Plan (LEP) No 121 – Spring Farm 2004*.

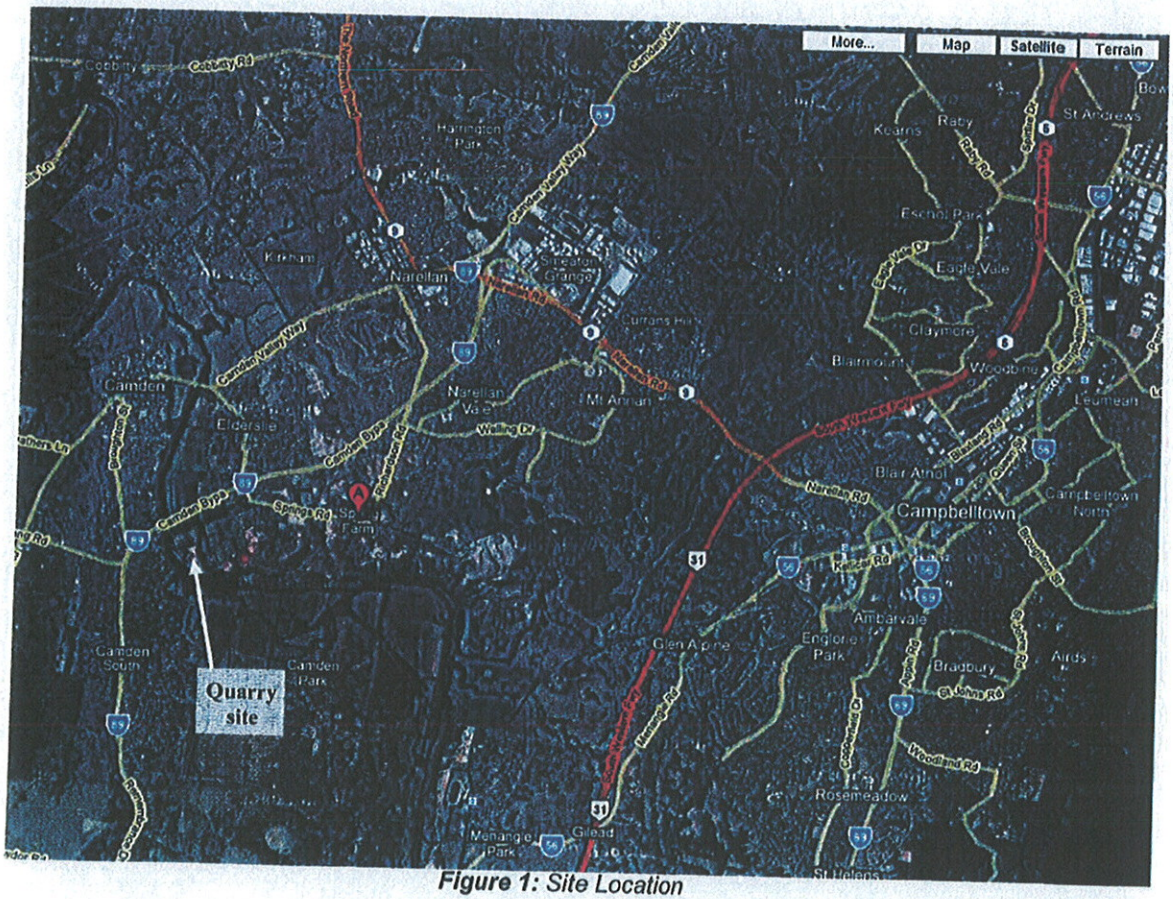


***Figure 1:** Site Location*

Development consent for the extraction of soil was originally granted by the Minister for Planning in 1988 and the consent was modified in 1998 to extend the quarry's life. The site is a major source of soil products for the Sydney region, and comprises part of a regionally significant resource identified in *Sydney Regional Environmental Plan No 9 (Extractive Industry)*.

The quarry covers an area of approximately 16 hectares (ha), of which 8 ha remains to be extracted. Under the existing consent the extraction area must not exceed 2 ha at any given time. All quarry operations are currently overseen by Camden Council, under delegation from the Minister for Planning. Progressive rehabilitation and revegetation of the site is undertaken in consultation with Camden Council, a qualified bush regenerator and a horticulturalist.

Current operations comprise the extraction of soil with front end loaders. Soil is screened using one of two mobile screening plants and then taken to a central stockpile and processing area, located on an adjoining lot to the east (also owned by Collins), shown on Figure 2. The processing area operates under a separate consent, granted by Camden Council.

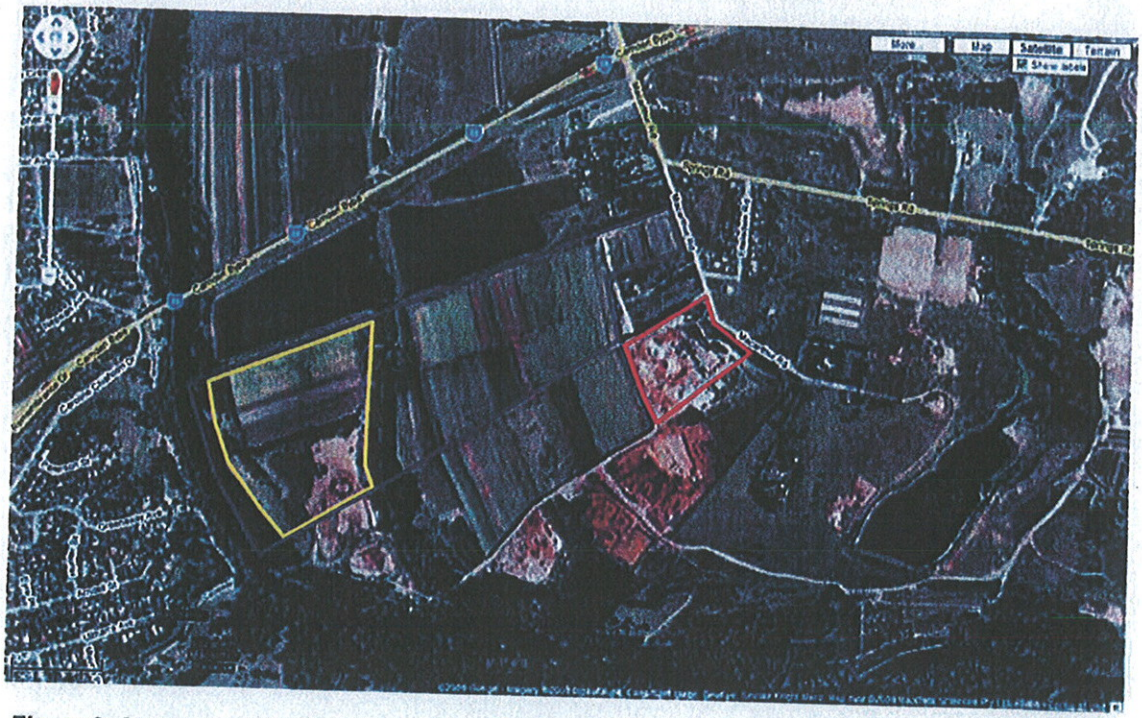


Figure 2: *Subject land (blue) including the extraction area (yellow), processing site (red), local roads and Nepean River.*

The quarry currently produces approximately 100,000 tonnes of soil per year. Following blending and processing, all products are dispatched via truck (averaging 24 truck loads per day). The majority of trucks travel between the site and the Camden Bypass via Macarthur Road, and then on to Sydney.

The existing consent sets limits on the extraction area, including specific setbacks from adjacent properties, public roads and riverbanks. Figure 3 on the following page indicates the current approved extraction area.

It is noted that the site forms part of the Spring Farm Release Area, earmarked for future urban (residential) development (see Figure 5). Camden Council has recently approved a number of residential subdivisions in the Spring Farm urban release area in accordance with the Spring Farm Master Plan. This is discussed further in the following sections.

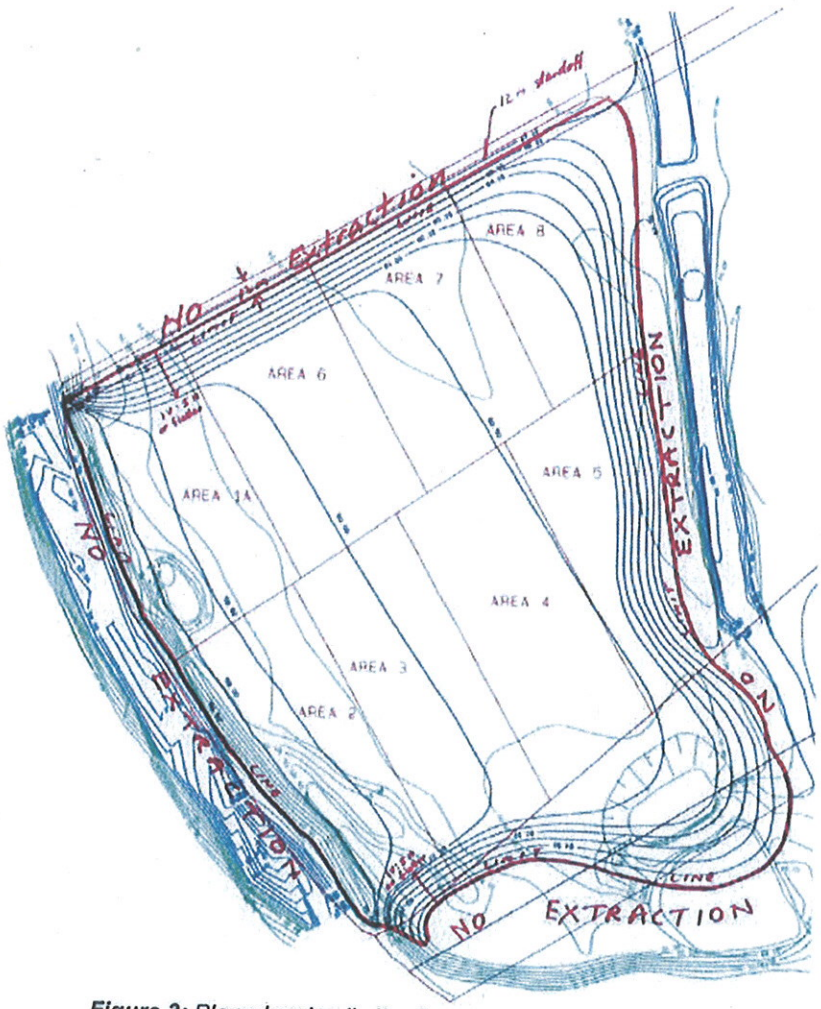


Figure 3: *Plan showing limits of extraction and staging.*

PROPOSED MODIFICATIONS

Collins is proposing to modify the consent to allow extraction operations to continue for an additional ten years. The extension would allow continued extraction of a remaining resource of approximately 1 million tonnes of soil within the presently-consented area. No changes to the hours of quarry operation, method of extraction, product stockpiling and processing, despatch or rehabilitation of the site are proposed.

STATUTORY CONTEXT

Consent Authority

The Minister was the consent authority for the original development application, and is consequently the consent authority for the modification application. However, the Executive Director Major DA Assessment may determine the application under the Minister's delegation of 4 March 2009.

Section 96

Under section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), a consent authority may modify a development consent if:

> *"it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was*

originally granted and before that consent as originally granted was modified (if at all)".

Given the proposed modification is for an extension of extractive operations within land covered by the existing consent, the Department is satisfied that the development to which the consent, if modified, would relate would be substantially the same development as that for which consent was originally granted.

Relevant Planning Instruments

The following planning instruments are relevant to the proposal:

- *State Environmental Planning Policy (SEPP) 33 – Hazardous and Offensive Development;*
- *SEPP 55 – Remediation of Land;*
- *SEPP (Mining, Petroleum Production and Extractive Industries) 2007;*
- *Sydney Regional Environmental Plan (SREP) No 9 – Extractive Industry (No 2- 1995);*
- *SREP No 20 Hawkesbury – Nepean River (No 2-1997);*
- *Camden Local Environmental Plan (LEP) No 121 – Spring Farm 2004;* and
- *Camden Council Development Control Plan (DCP) 2006.*

The Department is satisfied that the proposed modifications can be undertaken in a manner that is consistent with the aims, objectives and provisions of these instruments.

CONSULTATION

After accepting the Statement of Environmental Effects (SEE) for the proposed modification, the Department:

- made it publicly available for a period of 17 days from 14 October until 31 October 2008:
  - at the Department's Information Centre; and
  - at Camden Council, 37 John Street, Camden.
- notified relevant State government agencies by letter; and
- advertised the exhibition in the Wollondilly Advertiser and Camden Advertiser.

During the exhibition period, the Department received submissions from the Department of Environment and Climate Change (DECC), the Roads and Traffic Authority (RTA) the Department of Primary Industries (DPI) and Camden Council. The Department also received one submission from a member of the general public.

DECC initially raised concerns about the lack of noise modelling in the SEE to determine potential noise impacts from the ongoing development. Further consideration of potential noise impacts was undertaken by the proponent, including additional modelling, in a Supplementary Noise Report. DECC did not object to the development proceeding and recommended conditions of consent to manage noise impacts.

The **RTA** did not object to the proposal but stressed that Collins should pay contributions for the maintenance of local roads used by quarry trucks, and that all truck loads leaving the site should be covered.

The **DPI** supported the proposal as the site is a major source of sand and soil products in the Sydney region.

Camden Council supported the proposed modification, acknowledging that the site contains a valuable resource, and that the proposed 10 year extension would allow the completion of extraction. However, Council noted that development associated with the recent urban release at Spring Farm is starting to encroach upon the extraction site, and requested that the Department consider an extension of only 5 years with a view to assessing a further extension at that the completion of that period. Council also requested an annual contribution from Collins for

the maintenance of the length of Macarthur Road from the site entrance to the intersection with Springs Road. Further consideration of Council's submission is provided below.

The submission received from the general public was from a neighbouring property owner. The neighbour did not object to the proposal but raised concerns about the potential impacts of the modification on amenity and on water quality.

ASSESSMENT

The Department has assessed the application and submissions in accordance with the relevant requirements of the EP&A Act. The key issues for the proposed modification are discussed below.

Future Land Uses

The quarry site is zoned 1(A) Rural under *Camden LEP No. 121 – Spring Farm* 2004, in which extractive industry is permissible. The Spring Farm urban release area is subject to a Master Plan recently prepared by Camden Council (see Figures 4 and 5).

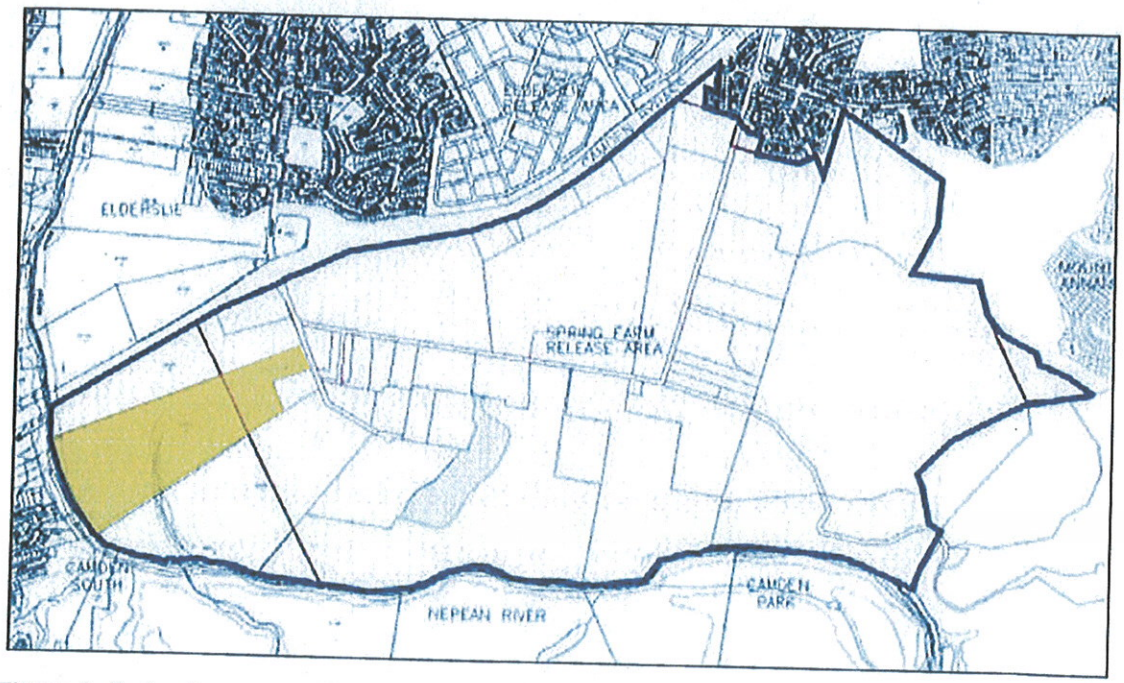


Figure 4: *Spring Farm Urban Release Area, shown outlined in blue. The development site is shown highlighted in yellow.*

Residential subdivisions are presently underway in the eastern portions of the release area (Stage 4, see Figure 6) and a development application for an adjoining property east of the site is currently being assessed by Council. While the desired future character for the area is stated as the development of a series of residential villages within an ecologically sustainable, mixed use environment, the LEP recognises that residential development would coincide with current quarrying operations. Furthermore, the LEP's aims include:

> *"(i) to ensure the urban development and the protection of residential amenity does not jeopardise the recovery of regionally valuable sand deposits, as identified in Sydney Regional Environmental Plan No 9—Extractive Industry (No 2—1995)."*

Council's submission acknowledged that Collins has scheduled excavation activities to initially complete the easternmost portions of the site, which has been of benefit to the future development of the Spring Farm release area. Council also noted that residential development in

the Spring Farm urban release area is starting to encroach on the extraction site, and with a ten year extension, the main potential impact of the proposed extension would be associated with vehicle movements from the stockpiling and processing site. However, Council noted that these impacts would be along a relatively small section of Macarthur Road and Springs Road, on the edge of the residential area of the development site.

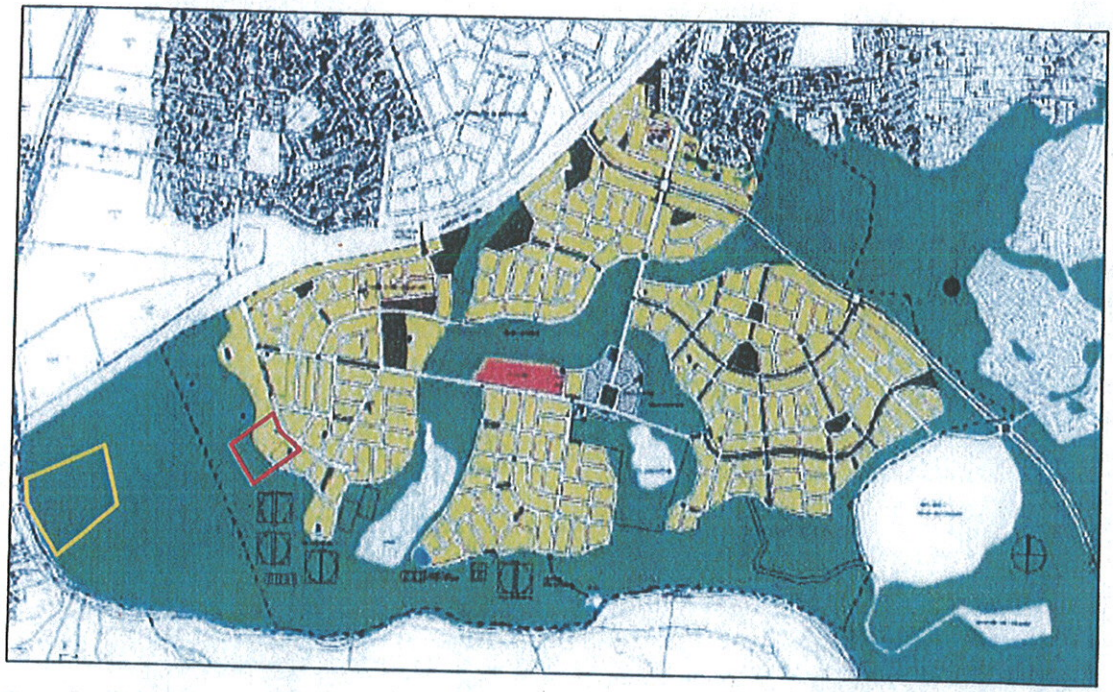


Figure 5: *Spring Farm Master Plan. The development site (yellow) is principally proposed to become green space. The processing site (red) is on the fringes of residential development.*

In response to Council's request to consider granting a 5 year extension, Collins argues that a 10 year extension would allow extraction of the remaining resource at current intensities in line with market demand. If a 5 year consent were granted, Collins would be required to increase the intensity of quarrying operations, which would have resultant increased amenity impacts (particularly by way of noise, dust and traffic) on the release area. Further, Collins notes that the Camden DCP provides for staged development of the Spring Farm release area, with the final stage being that closest to the site (Figure 6).

The DCP (Part G, Chapter 18) explicitly states that staging is designed to "protect the amenity of residents from the effects of mining, industrial and waste disposal activities, including heavy vehicle access to and from those activities." Following review of Council's submission and Collins' response, the Department consulted further with Council regarding the implications of granting a further 10 year extension. Council confirmed that it did not object to a 10 year extension, given the operation of the quarry to date and the staging of the release area.

The Department is also satisfied that the granting of a 10 year extension is justified, particularly given:

- that the proposed extraction areas are within zones earmarked for green space in the Master Plan;
- that the processing, dispatch and transport activities are on the perimeter of the residential development zones;
- that the release of Spring Farm is being planned to commence in areas farthest from the quarry;
- the performance of the quarry to date; and

- that any potential impacts resulting from the continued operation of the quarry can be effectively managed and/or mitigated through appropriate environmental management and monitoring (see following sections).

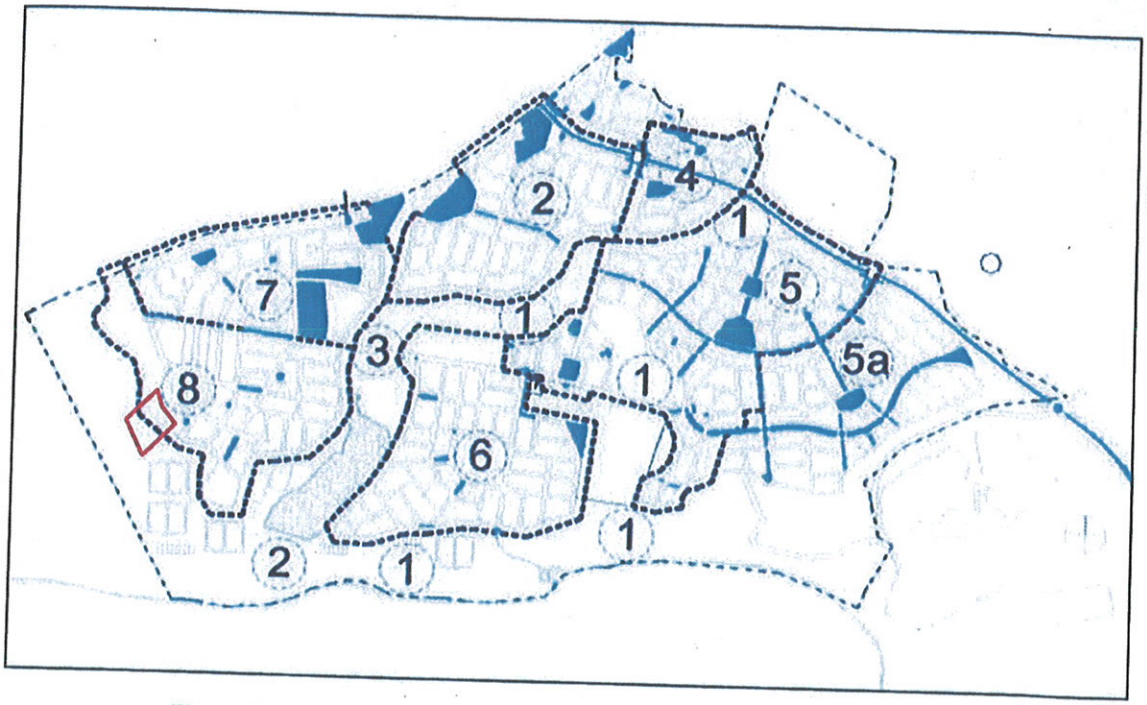


Figure 6: *Spring Farm Master Plan Staging – processing site shown in red.*

Consequently, the Department considers that the modification is able to be undertaken in a manner that is compatible with both existing and proposed nearby land uses. In this regard, the Department is satisfied that the proposal is consistent with the requirements of clause 12 of the Mining SEPP, which requires a consent authority to consider the compatibility of proposed extractive industries with other land uses.

Traffic

Following initial screening at the extraction site, all quarry products are transported by truck to the processing site (located on Lot 1 DP 587631, to the east of the proposed extraction area), which operates under a separate Council consent. From the processing site, trucks carry product along Macarthur Road to the Camden Bypass, and then onto Sydney (see Figure 2).

An average of approximately 24 truck loads of product are despatched each day from the processing site. The processing site also receives approximately 9 truck loads of material used for blending the soil products. Collins has advised that at times the total truck movements have reached 80 in one day due to market demand, however this number is not expected to be exceeded. The proposed modification does not seek to modify traffic volumes, transport routes or operating hours.

Truck movements to and from the processing site are not regulated in the existing quarry consent. The only truck movements from the quarry site are associated with transport to the processing site along a private haul road. Therefore conditions limiting truck movements directly from the quarry to public roads would not be practical. Consequently, Collins has provided a commitment which would restrict the average daily truck movements from the site to 36 with a maximum upper limit of 80.

The SEE found that average truck movements generated by the operation constitute the majority of heavy vehicle traffic (between 70-80%) along approximately 250m of Macarthur Road between the site entrance and Springs Road (see Figure 2). Once Macarthur Road intersects with Springs Road, this proportion of heavy vehicles from the operation reduces to approximately 13%.

Although the SEE does not deal specifically with road safety impacts, it is implied in the traffic assessment that, with the short distance and relatively low traffic numbers of Macarthur Road, and the low proportion of vehicles on other sections of the route, the impacts on road user safety would be minimal. The Department is satisfied that the traffic generated by the proposed modifications is unlikely to significantly impact on road user safety.

Collins proposes to remove obsolete conditions of consent relating to the payment of a levy to Camden Council, based on a Section 94 Contributions Plan that has since been repealed. This levy related to maintenance of the short section of Macarthur Road between the site and the intersection with Springs Road. This section of Macarthur Road is built to a rural standard dual carriageway comprising unmarked sealed lanes.

Initially, Collins proposed to fully maintain this section of Macarthur Road itself. However, Council has requested that the company instead re-institute an annual contribution for the maintenance of this section of road by Council. Council nominated an amount of $6,500 annually, subject to CPI indexing. Collins has agreed to this proposal.

The RTA raised no objections to the proposal with regard to traffic impacts and Council accepted the proposal on the proviso that vehicle movements do not increase and maintain the use of current transport routes.

The Department is satisfied that the proposed modification is unlikely to have a significant impact on the local and regional road networks, and that the continued traffic produced by the proposal is acceptable. The Department recommends that Collins pay contributions to the Council for road maintenance, as proposed.

Groundwater

The one submission from the general public raised concerns about potential impacts of continued extraction on groundwater supply. The Department notes that alluvial deposits on the site are highly permeable and that a groundwater aquifer is located between 11 and 15 m below natural surface levels. Collins has demonstrated that the depth of extraction proposed would remain approximately 7 m above the aquifer, and that the final landform would remain above the water table.

Groundwater monitoring is currently being undertaken at a test bore located on the northern boundary of the site. Collins has indicated that monitoring would continue throughout the life of the project to ensure groundwater levels are not impacted by extraction operations. An agreement has been reached between the neighbouring land owner and Collins with respect to the concerns raised in the submission.

The Department is satisfied that the proposed continuation of operations would not significantly affect groundwater.

Surface Water

The proposed extraction area is within the western one third of the subject lot. This area is bound to the west by the Nepean River and to the east by a north-south trending anabranch of the River, which is generally dry but carries ephemeral surface water flows. The proposal has the potential to impact on surface water quality if site run off is not adequately managed.

Under existing operations, all stormwater and sediment is captured using sediment detention basins and sediment ponds, sediment fences and straw bale filters. A bund wall of a minimum 0.5 m in height is also erected around extraction and processing areas.

In addition, the existing consent requires Collins to seek the requirements of the then Department of Water Resources (now Department of Water and Energy (DWE)) and the Catchment Areas Protection Board for setbacks to the riverbank and anabranch. The existing setbacks, endorsed by the DWE have been included in the recommended conditions.

The Department is satisfied that, subject to ongoing management and monitoring measures, the proposed continuation of operations would not adversely affect the Nepean River or any of its tributaries.

Flood Risk

The subject site is located on the Nepean River flood plain, below the 5% AEP (or 1 in 20 year event) flood level. The development has the potential to both influence flood flows and be impacted by flooding.

A flood study was undertaken by Collins in consultation with Council to determine the impacts of the operation on the Nepean River. The study found that the proposal would have a negligible impact on flood levels both upstream and downstream of the site.

The existing consent restricts operations at the site to a maximum disturbance area of 2 ha at any one time. Stockpiles on the adjacent processing site are also maintained in height and alignment to minimise the risks of erosion and scour during flooding. This would minimise risks during flooding both in relation to impacts on water quality and on the operations (through loss of resource).

The Department is satisfied that the proposal would not adversely impact the flood risk of the Nepean River floodplain nor would operations be subject to significant risks of flood impact which could not be managed, minimised or avoided.

Air Quality

Dust monitoring was undertaken between April and June 2008 at a single location on the northern boundary of the site. Preliminary data obtained from monitoring is set out below:

Month	Total Insoluble Matter (g/m^2/month)	Combustible Matter (g/m^2/month)	Non-Combustible Matter (g/m^2/month)
April 2008	0.7	0.5	0.2
May 2008	0.6	0.2	0.4
June 2008	0.4	0.2	0.2

The combustible matter within the dust deposition is unlikely to be sourced from extraction operations. Thus the data indicate that the extraction operation is contributing around 0.2 - 0.4 g/m^2/month to local dust pollution. DECC standards for deposited dust are a maximum of 2.0 g/m^2/month for an individual development and a limit for background plus project contributions of 4.0 g/m^2/month, both calculated on an annual average.

The Department is satisfied that this data indicates that current operations meet DECC's requirements for air quality. Notwithstanding, the Department has recommended conditions that would require Collins to undertake dust monitoring on a continuing basis.

Noise

A noise assessment, including predictive noise modelling, was undertaken for the SEE, based on attended and unattended monitoring undertaken at five locations in July 2008. Although quarry

operating hours, production volumes, processing and transport operations would remain unchanged, the location of extraction activities would change over time under the proposed modification.

Sources of background noise include highway traffic (particularly from the Camden Bypass) and light aircraft. Excluding background noise, the noise generated by existing quarry operations was measured at less than 50 dB(A) at each monitoring location. Two of these locations are within the area to be developed as part of the Spring Farm Release Area. Consequently, compliance was indicated with the limit of 55 dB(A), set out in the quarry's EPL.

DECC indicated that the EPL is likely to be updated to reflect current policy. The Department has therefore included a condition requiring compliance with noise criteria as set out in the EPL to cater for any future change in EPL noise criteria. Further, the noise modelling was based on activities occurring behind a 7m high earth bund as currently provided in the site EMP. It is proposed to move the bund east as extraction progresses, to ensure maximum protection from noise for the residential properties to the west of the project site. A condition has been included to maintain this bund at the western edge of future extraction activities.

The noise impact assessment in the SEE found that the majority of traffic noise at receiver locations along the transport route is generated by the Camden Bypass. The Department is satisfied that noise impacts from traffic generated by the proposed modification would be minimal, given:

- the short section of Macarthur Road on which quarry trucks form the majority of traffic;
- the historical presence of the quarry and the continuation of existing truck movements (i.e. no proposed increase in truck numbers); and
- the low proportion of heavy vehicle traffic from the operation on the remainder of the transport route.

The Department is satisfied that the proposed modification is unlikely to result in any increase in noise impacts generated by quarry operations, subject to implementation of conditions and ongoing management provisions.

Visual Amenity

The topography of the area surrounding the subject site is relatively flat. Visual screening from residential areas on the western side of the Nepean River is afforded by bunding and plantings along the site's western boundary. Plantings along the northern boundary also offer visual screening. The practices of establishing visual bunds and screen plantings and promptly rehabilitating areas following extraction would continue, thereby protecting the visual amenity of the surrounding area by screening extraction and stockpiling areas.

The Department is satisfied that the proposal is unlikely to significantly increase the visual impacts associated with the quarry.

Flora and Fauna

Previous clearing of the site for use as a turf farm has removed all original vegetation. Existing vegetation on site comprises screen planting, particularly concentrated along the western boundary. Native species have been used, however vegetation is limited to trees, with no grasses or understorey present. As such the vegetation provides limited habitat value. The fauna survey contained in the SEE confirms the small range of fauna found on the site.

None of the flora and fauna recorded on the site are listed as threatened or endangered species.

The removal of sections of screen plantings for the purposes of extraction would have minimal impact on flora and fauna due to the absence of good quality habitat and wildlife corridors on the site. The Department is satisfied that the proposed rehabilitation program, which would re-establish a complex natural environment including understorey, and ongoing environmental

management, would effectively mitigate any potential impacts and would likely improve biodiversity on the site.

Heritage

Due to the history of agricultural uses of the site, objects and sites of known or potential Aboriginal heritage significance are not likely to occur.

The Nesbitt property, a heritage item listed in Schedule 2 of *Camden LEP No 121 – Spring Farm*, adjoins the south-eastern corner of the subject site. The curtilage of this property, as shown in the map contained in LEP 121, extends north and south of the property boundary and includes the eastern portion of the subject site. The property adjoining the site to the north contains a potential heritage item listed in Schedule 3 of *Camden LEP No 121– Spring Farm.* Number 176 Macarthur Road is listed as 'Residence, associated structures and curtilage'.

Although the SEE does not assess potential impacts of the proposal on the identified items of heritage and potential heritage significance, the Department is satisfied that the proposed extraction area is located a sufficient distance from these items so as not to adversely impact them.

Need for the Proposal

The Department accepts that the modification to continue operations at the Spring Farm Quarry is required in order to access a regionally significant resource of soil and sand. Accordingly, the Department is satisfied that the proposed modification is justified and represents a logical and economic use of the land.

SECTION 79C

Under section 96 the EP&A Act, a consent authority is required to consider the relevant matters in section 79C(1) of the Act when determining an application to modify a development consent. These matters include:

(a) the provisions of:
  (i) any environmental planning instrument;
  (ii) any draft environmental planning instrument…;
  (iii) any development control plan;
  (iv) the regulations (to the extent that they prescribe matters…);
  that apply to the land to which the application relates;
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality;
(c) the suitability of the site for the development;
(d) any submissions made in accordance with this Act or the regulations; and
(e) the public interest.

The Department has assessed the proposed modification against these matters, and is satisfied that:

- the proposed modifications are generally consistent with the provisions of relevant planning instruments;
- the potential impacts of the proposed modifications can either be mitigated or managed;
- the site is suitable for the development as modified; and
- the proposed modifications are generally in the public interest.

RECOMMENDED CONDITIONS

The Department has reviewed the existing consent for the operations and has drafted recommended conditions for the proposed modification. Collins has accepted these conditions.

CONCLUSION

The Department has assessed the application, the SEE and all submissions regarding the proposed modification.

The Department is satisfied that the proposed modification would provide continued access to a valuable soil resource and that potential impacts can be effectively minimised through good environmental management. The Department is satisfied that the proposed modification would not result in adverse environmental impacts.

The Department acknowledges that the proposed modification would potentially coincide with residential development in the surrounding urban release area. However, given the proposed staging of development and the location of the quarry and processing plant in relation to the residential area, the Department is satisfied that the proposed modification would not significantly impact on the new urban release area. Further, ongoing monitoring would be undertaken to ensure that, prior to any inappropriate conflict in land uses, it would be promptly and effectively managed.

Consequently, the Department believes the Executive Director Major DA Assessment, as delegate of the Minister, should approve the proposed modification, subject to conditions.

RECOMMENDATION

It is recommended that the Executive Director Major DA Assessment, as delegate of the Minister:

- consider the findings and recommendations of this report;
- determine that the development to which the consent, as modified, relates is substantially the same development for which consent was originally granted;
- approve the proposed modification under section 96(2) of the EP&A Act; and
- sign the attached notice of modification.

David Kitto
Director
Major Development Assessment

Chris Wilson
Executive Director
Major DA Assessment

ANNEXURE "D"

FLOOD ANALYSIS REPORT
NEPEAN RIVER

SAND MINING

Lot 22 DP 833317 & Lot 1 DP 587631
MACARTHUR RD
SPRING FARM

For

M.COLLINS & SONS

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File: 77065.01.Flood Analysis

Date: 14th August 2008

Introduction

This flood analysis report has been prepared to show the level of impact from Sand Mining adjacent to the Nepean River and its effect on the flooding of the Nepean River in the major storm event.

This report is limited to determining the effect of sand mine subsidence (sand mining) on the 100 year flood levels for the Nepean River specifically adjacent Lot 22 DP 833317 ('site').

Source of Information

The following has been referenced in the preparation of this report.

1. Australian Rainfall and Runoff Volume 1 and 2, (2001 & 1987).
2. 'Camden Area Flood Prone Land Study', Second Edition, (March 1993)
3. 'Water Cycle Master Plan Report', Spring Farm Release Area, (October 2002)
4. Nepean River Cross-Sections & Site plans, Job No. JET0328, Drawing Numbers 11-14, provided by Johnstone Environmental Technology (1996)
5. Plan showing Spot Levels and Contours for Lot 1 DP 587631 prepared by K.J Morrow & R.W.Young Registered Surveyors, Ref 7747/B
6. Final Reinstated Landform Spring Farm, Job No. JET0989, Drawing Number 3 Issue 4, provided by Johnstone Environmental Technology (2001)

Hydrological Data

Hydrological Data for the Nepean River was sourced from a Mine Subsidence Board publication, 'Camden Area Flood Prone Land Study' (1993). Table 2.2 within this document provides 100 year ARI peak discharge estimates for the sub catchments within the Camden Area shown in Figure 5A, refer to Appendix A.

The proposed site is located between sub-catchments 1.03 & 1.04 so the larger discharge estimate was adopted which gave a peak flow of 7200cum/s for the upstream side of the site.

Hydraulic Analysis

Hydraulic modelling has been done using HEC-RAS Version 3 developed by the US Army Corps of Engineers in America. HEC-RAS has been used to model the water levels and inundation areas caused by the 100-year storm event.

The program calculates one-dimensional steady flow based on the energy equation. Basic losses are modelled by HEC RAS to estimate water levels based on normal depth and known water surface levels.

This program has been used to model the approximate 1120m of Lot 22 DP 833317 & Lot 1 DP 587631 fronting the Nepean River. Using the cross-sections provided by

Johnstone Environmental Technology, refer to Appendix B, and contour & detail plans by K.J.Morrow/R.W.Young, refer to Appendix C, a channel model was formed to analyse both the pre & post sand mining 100 year water levels and river velocities.

Contour & detail information was not provided on the opposite bank of the river to the site. For the purpose of this analysis this side of the flood plane was kept consistent for both pre & post development calculations. The purpose of this is to measure the 'impact' of the mining operation on the flood level and not determine the flood level as such.

An existing 100 year flood level RL 72.2 for downstream of the lot was sourced using Table 5.1 of 'Camden Area Flood Prone Land Study' (1993), refer to Appendix C, with a assumed normal depth grade of 0.005m/m. Manning's numbers of 0.15 were assumed for the creek channel and between 0.05-0.075 for the plains on either side of the Nepean River.

Mixed Steady flow modelling was completed on the pre & post mining channels and a results table was produced for both these scenarios, refer to Appendix D. Table 1.0 below shows a summary of pre-mining and post mining 100 yr flood levels produced of the HEC-RAS modelling.

Table 1.0 Pre & Post-Mining 100 yr flood levels

River Station	Pre-Mining	Post-Mining
16	72.2m	72.2m
17	72.25m	72.25m
18	72.28m	72.26m
19	72.32m	72.26m
20	72.36m	72.28m
21	72.4m	72.28m
25	72.58m	72.45m
26	72.61m	72.46m
27	72.62m	72.47m
28	73.63m	72.47m
29	73.66m	72.50m
30	73.69m	72.52m

(Table 1.0 shows the small decrease between the 100 yr storm for the pre & post development situations)

Impact on the Nepean River

The impact of sand mining on the Nepean River in the 1 in 100 year storm event adjacent the proposed site has been found to be negligible. Table 1.0 above shows that the 100 yr flood levels in the post-mining scenario will be slightly lower than the calculated pre-mining levels.

This result is supported by the discussed results within the supporting document 'Camden Area Flood Prone Land Study (1993). Figures 18A &19 as well as Table 5.1 shows that the existing 100 yr water levels within the Nepean River decrease as mine subsidence occurs, refer to Appendix D & F.

The proposed sand mining has minimum to no impact on the northern bank of the Nepean River and the surrounding properties due to width of the 100 yr flood plain and difference in level between the 100 yr flood level, RL 72.2, and where the mining excavation returns to natural surface, RL67.0.

Impact Upstream Subdivisions

Due to the modelled decrease in 100 yr floods level within the 'site' in regard to sand mining adjacent to the Nepean River and the relative small different between pre & post development flood levels the impact on upstream subdivisions would be negligible.

Conclusion

This report has been prepared to address the key issue of assessing the impact of the proposed sand mining on the Nepean River with regard to flooding as outlined in the statement of environmental effects requirements.

This report used hydrological data and existing flood levels found in 'Camden Area Flood Prone Land Study' (1993) to produce a computer model to show the impact of excavated area on the 100 yr flood level from the Nepean River.

All the calculated results, supporting tables and figures are attached in Appendices A-F. Assumptions and information used in estimating the flood levels are listed in this report.

The report has relied upon the natural & design surface profile of the proposed site and the Nepean River from provided survey data from Johnstone Environmental Technology.

On the basis of this analysis it is concluded that extraction from the site will have a negligible impact on the Nepean River and surrounding properties.

ANNEXURE "E"

- To ensure stability within the watercourses, manage salinity, bank erosion and sedimentation and control pollutants to minimise adverse impacts on aquatic ecosystems.

- To provide a safe, efficient, maintainable urban water management system which also contributes to the amenity, appearance and urban structure of the suburb.

- To ensure that after development is complete peak stormwater runoff to the Nepean River system does not exceed pre-development levels.

- To ensure that there is no decline in the quality of the stormwater in the Nepean River system.

- To conserve and enhance the biological diversity and ecological health of the exiting watercourses within the site.

4.6 Regional Flooding

4.6.1 Current Situation

Regional flooding information for the Nepean River adjacent to the Spring Farm Release Area was obtained from Camden Council.

100 year ARI Flood levels along the section of the Nepean River adjacent the site vary from RL 74.6m at Jacks Gully to RL 72.2 m at the Macarthur Bridge. The release area boundary generally follows the 100 year ARI flood line along the south western edge of the site. Flood levels affecting the Spring Creek portion of the site are presented in Table 4.1 below.

Table 4.1

NEPEAN RIVER FLOOD LEVELS AT SPRING CREEK (SECTION B9)

ARI (yr)	Flood Level (m AHD)
100	72.7
PMF	76.5

The minimum ground level within the release area is RL 71.0 m AHD on Spring Creek. This means a portion of the release area is affected by the 100 year ARI flood. The existing Nepean River 100 year flood extents are indicated on Figure 2.

4.6.2 Post Mining Situation

Regional flooding information was obtained from the report prepared by Mitchell McCotter for the Mine Subsidence Board titled "Camden Area Flood Prone Land Study" (Ref. 7). The report provided information on 100 year Average Recurrence Interval (ARI) flood levels on the Nepean River from Bringelly Creek upstream to Menangle Park.

For the three mining scenarios considered in the "Camden Area Flood Prone Land Study" the post-mining subsidence and flood impact predictions are as follows:

Table 4.2

PRE AND POST MINE SUBSIDENCE FLOOD AFFECTATION

Scenario	Max. Subsidence	Existing 100 yr ARI Flood Level (RL)	Max. Post Subsidence 100 yr ARI Flood Level (RL)	Max. Pre-Subsidence Flood Affectation (RL).
1	1.6 m*	72.3 m	70.6 m	72.2 m
2	1.6 m*	72.3 m	71.7 m	73.3 m
3	0.0 m	72.3 m	72.3 m	72.3 m

* As confirmed by the Department of Mineral Resources and Mines Subsidence Board.

It is the recommendation of the Mines Subsidence board however that, because of the possibility of differential settlement, the maximum subsidence (1.6m) be added to the existing 100 yr ARI flood level (RL 72.7 at Spring Creek)

Therefore, within the Spring Creek Area, land that is currently below RL 74.3 m or is not filled to RL 74.3 m could be affected by the post mine subsidence 1% AEP flood.

4.7 Public Safety Guidelines (Drainage and Flooding)

Council's design standards for stormwater drainage design stipulates that all detailed drainage designs shall incorporate an assessment of major system flows to ensure that the major system provides a safe and adequate escape route for stormwater from rare and extreme events.

Council's design standard for the major system is the 100 year ARI event.

Roads, pathways, open space reserves and drainage reserves are to generally form the flow path by which major system flows are safely routed through a new subdivision.

Major structures are to be designed for the 100 year ARI storm event. The effects of the PMF on bridges shall be addressed as part of the bridge design process.

Retarding structures shall be designed to contain a minimum of the 100 year ARI flood event. Additional spillway capacity may be required depending on the ANCOLD (1986) hazard category of the structure.

The above public safety guidelines have been incorporated in the development of the stormwater drainage strategy for the Spring Farm Release Area.

4.8 Site Geology and Soils

Geotechnical testing and investigation was undertaken on the Release Area by SMEC Testing Services Pty. Ltd. in conjunction with the Masterplan process. The results of the investigation are presented in the report titled "Geotechnical Assessment Spring Farm Release Area" (Ref. 8). The locations of boreholes and test pits within the Release Area are indicated on Figure 3. In summary it was determined:

- The site is generally located on the Wianamatta Group bedrock.
- Three soil landscape groups are located on the site: