Structural

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TaylorThomsonWhitting

Brookvale Community Health Centre
612-624 Pittwater Road, Brookvale
Structural Design Report

For Health Infrastructure

October 2015
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1.0 EXECUTIVE SUMMARY

The Northern Beaches Health Service Redevelopment (NBHSR) Project is consolidating health services across the northern beaches. As a part of this the Brookvale Community Health Centre (BCHC) will be one of three hubs bringing together health services, workforce technology and resources. This facility will improve access to primary and community health services for residents of the northern beaches.

The proposed development consists of the construction of a new Community Health Facility and a new multi level car park structure and a pedestrian bridge. The structures are to be constructed from reinforced concrete with piled foundations being supported on class III foundations.

The structure is to be designed in accordance with all relevant codes of practice and regulations and in accordance with the requirements outlined in SEARS.

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Document Revision Register

Rev	Date	Prepared By	Approved By	Remarks
01	June 2015	PJH	KPB	DRAFT
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Authorised by:
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KEVIN BERRY
Technical Director

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2.0 INTRODUCTION

2.1 General Conditions

The proposed site is located on the corner of Pittwater Road and William Street. The existing site comprises of a number of existing lots with a range of small structures being present. The site has been used in the past for a number of purposes, most notably a Petrol Station which was removed in the past few years at 612 Pittwater Road.

The proposed development consists of a new car park structure, pedestrian bridge and a new Community Health facility which will be built over a large majority of the site footprint.

Figure 1 – Lower Ground Layout showing car park relationship to Community Health Building

2.2 Geotechnical Conditions

The subsurface conditions generally consist of concrete and fill overlying clayey silty sands and weathered sandstone. Fill was observed across the site to depths 1.2 to 1.5 metres. Sandstone bedrock was encountered in all geotechnical boreholes to the depth of auger refusal, 1.7 to 9.7 metres. The bedrock becomes shallower towards the south.

2.3 Structural Solution

The Key Structural Items for building works are as follows;

Bulk Excavation

Excavation on site is to be kept to a minimum with the building being constructed above existing ground levels in most instances. This has also been done to reduce the overall amount of spoil from site due to the issues of contamination and Acid Sulphate Soils.

Substructure

Foundations are proposed to be groups of 750mm diameter bored piers onto Class III sandstone.

Superstructure

Structural systems for slabs are proposed to be banded concrete slab systems. Columns are proposed to be on a generally 8.2m grid. Columns and Core Walls are to be of reinforced concrete construction.

The proposed bridge structure will be a long spanning structural system which will be supported on the new Community Health facility and a new abutment to the west of Pittwater Road.

3.0 EXISTING CONDITIONS

3.1 The Site

The site is located in at 612-624 Pittwater Road, Brookvale on the north-east corner formed between Pittwater Road and William Street.

West of the site is Westfield Warringah Mall shopping centre with areas south of the site predominately consisting of residential properties, while there are commercial properties to the north and east.

Figure 2 - Aerial photo showing site location

The site comprises three Deposited plans (DP375728 [area A, B & C], & DP500541 [area 1 & 2]). The primary street frontage for both DP's is Pittwater Road. DP375728 is located at the southern end of the site, at the corner of Pittwater Road and William Street. No buildings currently stand on this site. The site is currently used for formwork material store.

DP500541 is located in the northern portion of the site. An abandoned single storey brick and tile cottage, is positioned towards the front of Area 1, while a number of single storey 'sheds' are located towards the rear of Area 1. The two largest shed structures are currently in use and are accessed from a common driveway at the northern side of DP. Area 2 is occupied by a single storey steel frame warehouse style building, with corrugated cement sheet roof. This area is currently occupied by BBQ's Galore. To the rear of the BBQ's galore building is a bitumen paved area and another single storey steel frame structure. The use of this area was not able to be determined.

3.1.1 Adjacent Properties

2-4 William Street

A three storey concrete framed commercial building is located to the east of DP375728. Four small tenancies occupy the lower ground and ground floor levels. The construction method of the lower levels is not currently known. Four mobile phone antennae and mounted on the western side of the roof with an additional two antenna mounted on the northern side of the roof.

628 Pittwater Road

A two storey industrial complex comprising offices fronting Pittwater Road and a steel framed warehouse at the rear is currently located on the site to the North.

3.2 Geotechnical Conditions

A desktop review of available data and previous reports and site and environmental geotechnical investigation has been carried out by SMEC in June 2014 as part of the due diligence works. A detailed report of the findings is available for further information not outlined in this summary document.

A stage 2 geotechnical investigation is due to commence on site following the demolition of the existing structures.

3.2.1 Existing Ground Conditions

A summary report has been undertaken by SMEC Testing Services on the works which have been carried out on site. Generally on site, the existing conditions are found to exist.

Geotechnical Unit	Materials	Depth Interval	Consistency
Fill	Gravel, ash and sandstone pieces	Depth varies from 1.2m to 1.5m from EGL	-
Clayey Silty Sands	Clays, Sands and Silts	Varies across the site from 1.2m to 8.5m at the Northern End of the site.	Loose firm to stiff
Sandstone Bedrock	Sandstone	Depth varied from 1.7m to 9.7m at the Northern End of the site	Weathered

Figure 3: Existing Geotechnical Information

Groundwater was observed in the boreholes during the site investigation at depths of 1.8 to 3.8 metres.

The geotechnical report is included in Appendix B.

4.0 DESIGN PARAMETERS

In general all loads and load combinations shall comply with AS/NZS 1170 Parts 0 to 4 Structural Design Actions. Live load reductions will be applied as permitted by AS/NZS 1170.1. Generally the design loads are:

4.1.1 Permanent Actions - Dead Loads

Dead load shall be considered as the self weight of the structure plus an allowance for services, toppings, walls and ceilings which vary significantly throughout the site.

The additional dead loads should not be less than the following:

	Services, ceilings, partitions etc.
Community Health Floors & Office areas	2.0 kPa
Car Park areas	0.25 kPa
Plant and concrete roof areas	2.2 kPa[1.]

[1.] Loading includes allowance of 1 kPa for metal deck roof over.

No facade or masonry wall loading is included in the above loads. At this stage our designs have been based on a facade loading of 1.2 kPa which equates to approximately 5 kN/m depending on the floor to floor heights. This will need to be confirmed (and probably reduced) once the facade type and extent is developed. In areas with a full glass facade the loading could be reduced to around 0.5 kPa.

It is assumed that all internal partitions will be of lightweight stud construction and specific allowance will be made for masonry partitions if required. In particular, masonry walls will most likely be required around services risers and additional band beams will be required around the major risers.

4.1.2 Imposed Actions - Live Loads

Design floor live loadings are to generally satisfy the minimum provisions of AS 1170.1 and in particular the following:

	Uniformly Distributed Actions	**Concentrated Actions**
General Hospital Floors	3.0 kPa	2.7 kN
Theatres / X-ray Rooms	3.0 kPa	4.5 kN
Stairs & Corridors	4.0 kPa	4.5 kN
Office Areas	3.0 kPa	2.7 kN
Car Parking	2.5 kPa	13 kN
Truck areas up to 10,000 kg gross mass	5 kPa	31 kN
Plant and Utility Areas	Plant loads or 5.0 kPa (minimum)	4.5 kN (minimum)
General Store Rooms	2.4 kPa for each metre of storage height (Max 2.1m)	7.0 kN
Compactus	4.0 kPa for each metre of	To be calculated

	storage height. (Locations to be confirmed.)	
Trafficable Roof	4 kPa	1.8 kN
Structural Steel Roof (Non-trafficable)	0.25 kPa	1.4 kN

No live load reductions are to be applied to any floor system elements. Pattern loading will be considered when determining worst case scenarios for strength and serviceability where required by AS1170. Live load reductions will be considered for columns, walls and footing design in accordance with AS1170.1.

Loads in plant areas are to be confirmed by services engineers once layouts are known. Higher loading will be required for large pieces of plant or tanks.

4.1.3 Wind Loads

Wind loads are in accordance with AS1170.2 and based on the following parameters:

Community Health Centre

Region:		A2
Importance Level (BCA Table B1.2a):		3
Annual probability of exceedance (BCA Table B1.2b):		1:1000 (ultimate) 1:25 (serviceability)
Regional Wind Speed:	Ultimate limit states -	V_{1000} = 46 m/s
	Serviceability limit states -	V_{25} = 37 m/s
Terrain Category (all directions):		3

Car Park

Region:		A2
Importance Level (BCA Table B1.2a):		2
Annual probability of exceedance (BCA Table B1.2b):		1:500 (ultimate) 1:25 (serviceability)
Regional Wind Speed:	Ultimate limit states -	V_{500} = 45 m/s
	Serviceability limit states -	V_{25} = 37 m/s
Terrain Category (all directions):		3

4.1.4 Earthquake Loads

Earthquake loadings shall be in accordance with AS1170.4 – 2007 (Earthquake actions in Australia) and AS/NZS1170.0 – 2002.

Community Health Building

Hazard Factor (Z):	0.08
Site Sub-Soil Class:	C_e (Shallow Soil site)
Importance Level (BCA Table B1.2a):	3
Annual probability of exceedance (BCA Table B1.2b):	1:1000
Earthquake Design Category:	III

Car Park Building

Hazard Factor (Z):	0.08
Site Sub-Soil Class:	C_e (Shallow Soil site)
Importance Level (BCA Table B1.2a):	2
Annual probability of exceedance (BCA Table B1.2b):	1:500
Earthquake Design Category:	III

4.1.5 Barriers

Barriers including parapets, balustrades and railings are to be designed in accordance with Table 3.3 of AS/NZS 1170.1.

4.1.6 Design Standards

The structural design will be in accordance with the latest revision of all relevant Australian Design Standards, Codes and other statutory requirements. As a minimum requirement, the design shall be based on, but not limited to;

NUMBER	EDITION	TITLE
AS/NZS 1170.0	2002	Structural design actions Part 0: General Principles
AS/NZS 1170.1	2002	Structural design actions Part 1: Permanent, imposed and other actions
AS/NZS 1170.2	2002	Structural design actions Part 2: Wind actions
AS 1170.4	2007	Structural design actions Part 4: Earthquake loads
AS 2159	2009	Piling – Design and installation
AS 2670.1	2001	Evaluation of human exposure to whole-body vibration
AS 3600	2009	Concrete Structures
AS 3700	2001	Masonry Structures
AS 4100	1998	Steel Structures

4.2 SERVICEABILITY

4.2.1 Deflection Limits

Deflection limits for the concrete structures are generally as follows.

	Maximum Floor Deflection Limit			
	Dead	**Incremental**	**Live**	**DL + LL**
Floors supporting masonry walls	Span/360	Span/1000 [1.]	Span/500	Span/300 (25mm max.)
Compactus areas	N/A	Span/750 [2.]	N/A	25mm max.
Other floor areas	Span/360 (20mm max.)	N/A	Span/500	Span/300 (25mm max.)

[1.] Areas supporting normal weight masonry partitions.

[2.] Incremental deflection after compactus installed

4.2.2 Durability

For concrete elements this will be achieved by specifying all elements in accordance with section 4 of AS 3600 which sets out requirements for plain, reinforced and post tensioned concrete structures and members with a design life of 40 to 60 years. Exposure classifications are as follows.

EXPOSURE CLASSIFICATION	ELEMENTS
A2	Internal
B2	In Ground & External

Protective coatings to structural steel elements shall comply with AS/NZS 2312 and ISO 2063 for the long-term protection category.

4.2.3 Occupant Perception of Motion

The limits to be set on the vibration analysis and slab design are in accordance with Australian Standards and the International Standards Organisation where applicable. The design criteria are also informed by the report “Floor Vibration due to Human Activity” by Thomas Murray, David Allen and Eric Ungar.

If any areas are required these may be subject to tighter vibration limits depending on the use and sensitivity of the equipment.

4.2.4 Fire Resistance Levels

The BCA type of construction required for this building will be type A. Fire Resistance Levels (FRL) for the structural elements will need to be in accordance with Specification C1.1 of the BCA. Typically the FRL (minutes) for concrete structural elements is 120/120/120.

Some specific areas that require a more detailed investigation with regards to structural FRL’s are as follows:

4.2.5 Substation

At this stage the only area that has been identified by the team or the BCA consultant that will require an FRL in excess of 120 minutes is the substation where an FRL of 180/180/180 will be required, if there is a requirement to locate within 10m of the new building.

4.3 Environmentally Sustainable Design

4.3.1 Concrete

The aim of the GBCA Mat-4 Concrete Credit is to help reduce greenhouse gas emissions and resource use associated with the use of concrete. Up to 3 points are available and they are achieved as follows;

- Reducing the Portland cement content by at least 30% by mass when measured against a reference case one point is awarded. This is increased to two points when the reduction is at least 40%. Being a post tensioned slab there are restrictions on how much Portland cement can be replaced with industrial by products and still achieve the required early age strength requirements. This is particularly relevant for slabs cast in the colder months.
- An additional point is available when at least 50% of the mix water for all concrete is captured or reclaimed water and at least 40% of course aggregates is crushed slag aggregates.

In addition to the above initiatives, one of the best ways to minimise resource use is to provide

an efficient structural design. For concrete structures this is best achieved through the use of post tensioning as structural depths and concrete volumes can be reduced by 10 - 25% when compared to a reinforced structure. This would result in even less Portland cement and less materials overall being. Unfortunately it is not currently acknowledged by the GBCA Green Star credit rating.

4.3.2 Steel

The aim of the GBCA Mat-5 Steel Credit is to encourage environmentally responsible production, design and fabrication methods that result in efficient use of steel as a building material. Up to two points are available for this credit and the methods to achieve the points depend on whether or not the majority of steel used is in slab reinforcing or structural steel.

When structural steel comprises 60% of the total steel tonnage, up to two points are awarded when higher strength grades are used and the steel has been supplied by an accredited contractor.

For structures where reinforcing steel comprises 60% of the total steel tonnage, one point is awarded when at least 95% of the supplied reinforcement has a strength grade of at least 500MPa and 60% of the reinforcement is produced using energy reducing processes in its manufacture. An additional point is awarded when at least 15% of the reinforcement is assembled using off site optimal fabrication techniques.

Depending on the final quantities of steel used it is likely that 1 point would be available for this GBCA credit if it were to be used. Please note that post tensioning tendons are not included in these calculations.

5.0 STRUCTURAL SCHEME

The community Health Centre has a basic structural form with columns located on an 8.2m grid in most instances. The structural grid has been developed to work with clinical layouts and the commercial layouts below.

At present, there are no major transfers in the design of the floor structure with the exception of the structure directly above the ambulance bay and in the Gymnasium areas.

A central core provides vertical circulation within the building in addition to services reticulation and provides the majority of the lateral stability for the building. Additional stability is provided by the stair cores at each end of the building.

The building is founded on the lower basalt layer generally through the use of large diameter bored piles.

5.1 Substructure

A new geotechnical investigation of the proposed site area has not been carried out at this stage, as there are existing geotechnical reports for the site that give a good indication of the ground conditions for preliminary design purposes. A new geotechnical investigation will be carried out during detailed design stage as there may be an opportunity to have bearing capacities upgraded and hence reduce the size of new footings.

5.1.1 Foundations

It is proposed that the foundations for the new structures be constructed through pairs of diameter concrete piles which are bearing in Class III sandstone.

It is anticipated that the pile size will vary between 750mm diameter and 900mm diameter depending on the extent of building above. It is expected that the piles will be socketed into the class III rock for a depth of up to 4.0m.

5.1.2 Retaining Structures

As part of the works package for the Community Health Centre, it is proposed that a wall is built along the new Ambulance drop off to allow the building to be constructed close to the existing boundary. The height of the wall will vary with the existing and proposed ground levels but is expected to be retaining a maximum of 4m.

There is a proposal for an Overland Storage Tank to be positioned in the driveway between the Community Health and car park buildings; this tank is likely to be 2.0m deep.

It is likely that some smaller retaining structures will be required around the site to support existing stairs and retaining walls.

5.1.3 Future Substructure Investigations

A detail site investigation will be undertaken to further determine the geotechnical and environmental parameters of the existing ground conditions at the commencement of the next phase of works.

5.2 Superstructure

5.2.1 Lateral System

The Community Health Facility will have Lateral stability provided by reinforced concrete stair and lift core walls. The core is located in the centre of the building with access stairs and risers used to provided additional stability at the ends of the building.

Additional stability and building stiffness is provided by the perimeter edge beams which support the slab on each floor which work with the concrete columns to form a stiffening frame

action. This effect will reduce the buildings sole reliance on one lateral load resisting element.

The car park structure will be will be stabilised by reinforced concrete stair and lift core walls. The cores are located around the buildings perimeter with additional stability being provided by the intermediate walls supporting the ramps and the wall providing fire separation.

5.2.2 Vertical System

The vertical support of the new buildings will be undertaken through reinforced concrete columns which transfer loads directly down into the building foundations. At present, there are no transfer structures in the Community Health or car park building.

In addition to providing lateral support, the core walls of the building also provide vertical support to the structure.

The pedestrian bridge structure will be a long spanning prefabricated structure which will be supported off a headstock at Level 01 of the Community Health facility and a new abutment which will be constructed on the west of Pittwater Road.

5.2.3 Floor System

The Community Health facility and car park will have the base level constructed as a ground bearing slab. This slab will have a compacted sub base which will provide more future flexibility for future services and penetrations.

The Community Health facility will be constructed using a banded concrete slab system. This type of system is commonly used in both commercial and Health care facilities due to its economics and its flexibility. The slab has been schemed to provide tight deflection control and flexibility for office or clinical layouts.

The car park structure is supported in a similar method to the Community Health building. Vertical support is provided by columns which are generally set back from the buildings perimeter to minimise the level of foundation works.

5.3 Link Bridge Structure

The link bridge between the car park and the new Community Health building. The bridge structure will be constructed out of reinforced concrete or structural steel and will be stabilised using frame action.

Appendix A: Structural Documentation

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING NO. ST-TD-001

BROOKVALE COMMUNITY HEALTH CENTRE

612-624 PITTWATTER ROAD, BROOKVALE, NSW

TENDER NOTES

1. These drawings are preliminary drawings issed for tender as an indication of the extent of works only. They are not a complete set of construction drawings.
2. To determine the full extent of work, these drawings shall be read in conjunction with the architectural drawings and other contract documents. Allow for all items shown on architectural and other drawings as not all items are shown on the structural drawings.
3. Should any ambiguity, error, ommision, discrepancy, inconsistency or other fault exist or seem to exist in the documents, immediately notify, in writing, to the superintendent.
4. Rates shown on these drawings are for the final structure in place and do not allow for any wastage, rolling margins, over supply or fabrication requirements etc.

SHEET LIST

GENERAL NOTES

1. These drawings are for structural purposes only and are to be read in conjunction with the specification, architectural drawings, other contract documentation and the requirements of the relevant authorities.
2. Verify all setting out dimensions with the Architect.
3. Do not obtain dimensions by scaling the structural elements.
4. Should any ambiguity, error, omission, discrepancy, inconsistency or other fault exist or seem to exist in the contract documents, immediately notify in writing to the Superintendent.
5. Maintain the structure in a stable condition during construction. Temporary bracing/shoring shall be provided by the contractor to keep the structure and excavations stable at all times, ensuring that no part of the documented structure becomes overstressed. For all temporary batters obtain geotechnical engineer's recommendations.
6. All workmanship and materials shall be in accordance with the requirements of current SAA codes and the bylaws, ordinances or other requirements of the relevant building authorities.
7. All proprietary items are to be installed and fixed in accordance with the manufacturers specifications and instructions.
8. All work is to be carried out in accordance with all Workcover requirements and occupational health and safety act regulations
9. Construction using these drawings shall not commence until a Construction Certificate is issued by the Principal Certifying Authority.

DESIGN LOADS:

Floor loads : REFER LOADING PLANS DRAWINGS S2001-S2003

Wind Loads : Ve = 46 m/s Where R = 1000 years
Region = A2
Terrain Category = TC3

Earthquake Loads: Design Category = III
Site Sub-soil class = Ce
Hazard Factor Z = 0.08
Probability Factor kp = 1.3

SAFETY IN DESIGN

Taylor Thomson Whitting (NSW) Pty Ltd operates under Safe Work Australia's Code of Conduct for the Safe Design of Structures.
These drawings shall be read in conjunction with the Taylor Thomson Whitting Transfer of Information Letter and Structural Risk and Solutions Register.
Under the Code of Conduct it is the Client's responsibility to provide a copy of the Structural Risk and Solutions Register to the Principal Contractor.
It is the Principal Contractor's responsibility to review the hazards and risks identified during the design process to ensure a safe workplace is maintained for the construction, maintenance and eventual demolition of the structure.

CONCRETE NOTES

EXPOSURE CLASSIFICATION : External - B1
Internal - A2
In contact with ground - A2

CONCRETE
Place concrete of the following characteristic compressive strength f'c as defined in AS 1379.

Location	f'c MPa at 28 days	Specified Slump	Nominal Agg. size
All U.N.O.	S40	80	20

1. Use Type 'GP' cement, unless otherwise specified.
2. All concrete shall be subject to project assessment and testingto AS 1379.
3. Consolidate by mechanical vibration. Cure all concrete surfaces as directed in the Specification.
4. For all falls in slab, drip grooves, reglets, chamfers etc. refer to Architects drawings and specifications.
5. Unless shown on the drawings, the location of all construction joints shall be submitted to Engineer for review.
6. No holes or chases shall be made in the slab without the approval of the Engineer.
7. Conduits and pipes are to be fixed to the underside of the top reinforcement layer.
8. Slurry used to locate concrete pump lines is not to be used in any structural members.
9. All slabs cast on ground require sand blinding with a Concrete Underlay
10. (175) Indicates slab or band thickness

FORMWORK

1. The design,certification,construction and performance of the formwork, falsework and backpropping shall be the responsibility of the contractor. The proposed method of installation and removal of formwork is to be submitted to the Superintendent for comment prior to work being carried out.

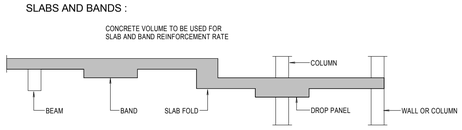
PILING NOTES

1. Piles are to be designed in accordance with AS2159 by the Contractor for the axial loads and moments listed in the piling schedule and all requirements of the specification.
2. The pile design and installation shall follow the recommendations outlined in the geotechnical report No. 1417207 prepared by SMEC Testing Services Pty LTD. Any additional geotechnical investigation work deemed necessary shall be at the Contractor's expense.
3. Pile spacing and pile cap design is based on [600 diameter grout injected auger piles]. Alternative pile systems may be used subject to approval. Any necessary re-design of of pile caps to suit alternative systems shall be at the expense of the Contractor. For single piles under columns the minimum pile diameter shall be [600mm].
4. All piles or pile groups are to be centred under columns and walls U.N.O.
5. Prior to commencing on site, the Contractor must submit for approval:
   (a) pile type proposed
   (b) pile size(s), reinforcement details, founding depths and design certificate. The design certificate is to certify the pile design is in accordance with AS2159 for the loads listed in the piling schedule and be signed by a NPER registered engineer experienced in the type of piling proposed.
   (c) a shop drawing setting out all pile locations from grid
6. The Contractor is to coordinate the location of all underground services and to be responsible for ensuring that these are either avoided or relocated as appropriate.
7. The Contractor shall provide a NPER registered engineer to supervise the pile installation.
8. At the satisfactory completion of the work the Contractor shall provide an inspection certificate signed by a NPER registered engineer.

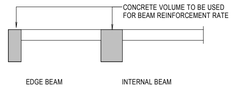
METHOD OF MEASURING REINFORCEMENT RATES

WHERE PROVISIONAL REINFORCEMENT RATES ARE NOTED, QUANTITIES SHALL BE CALCULATED AS FOLLOWS:

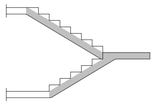
SLABS AND BANDS :



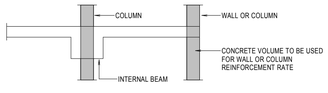
BEAMS :



STAIRS :



WALLS AND COLUMNS :



APPLY REINFORCEMENT RATES NOTED THROUGH INTERSECTING ELEMENTS.
QUANTITIES DO NOT INCLUDE PULL OUT BARS. ALLOWANCE TO BE MADE BY THE CONTRACTOR IF REQUIRED TO SUIT CONTRACTORS CONSTRUCTION METHOD.

SLAB ON GROUND NOTES

Refer to Geotechnical Report No. ..... dated .....
by ..... for all subgrade and subbase/Basecourse requirements and unless directed otherwise the following requirements apply.

1. Strip all topsoil from the construction area and remove from the site.
2. Before placing fill, proof roll exposed subgrade with 6 passes of a 10 tonne minimum roller to test subgrade and then remove soft spots (areas with more than 3mm movement under roller). Soft spots to be replaced with select fill as per table:

SIEVE APERTURE (mm) TO AS1152	PERCENTAGE PASSED (BY MASS)
75.0	100
9.5	100 to 50
2.36	100 to 30
0.6	50 to 15
0.075	<25

Plasticity index to be > or = 2% and < or = 15%
Non dispersive (a rating of nil as defined by the "dispersion" test AS1289.3.8.1) Submit proposed select fill for Engineers approval.

3. Compact fill areas and subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1. Compaction under buildings to extend 2m minimum beyond building footprint.
4. All basecourse material to comply with the following table below and compacted to minimum 98% modified standard dry density in accordance with AS 1289 5.2.1.

SIEVE APERTURE (mm) TO AS1152	PERCENTAGE PASSED (BY MASS)
26.5	100
19.0	95 to 100
13.2	75 to 90
9.5	60 to 90
4.75	42 to 76
2.36	28 to 60
0.425	10 to 28
0.075	2 to 10

- Plasticity Index: Not greater than 10%
- Liquid Limit: Not greater than 25%
- California Bearing Ratio: Not less than 35%
- Unsound rock: Not greater than 20%
- Nondispersive (a rating of nil as defined by the dispersion test AS1289.3.8.1)
- Submit proposed basecourse for Engineers approval.

5. Place sand blinding to areas where Concrete underlays are required.

RETAINING WALL NOTES

1. Drainage shall be provided as shown on the drainage drawings.
2. Backfilling shall be carried out after grout or concrete has reached a minimum strength of 0.85 f'c. Backfilling shall be approved granular material compacted in layers not exceeding 200mm to 95% Standard compaction unless noted otherwise.
3. Provide waterproofing to back of walls as specified or noted.
4. Where retaining walls rely on connecting structural elements for stability, do not backfill against the wall unless it is adequately propped or the elements have been constructed and have sufficient strength to withstand the loads.
5. For all temporary batters obtain geotechnical engineers recommendations.

REINFORCEMENT NOTES

1. Fix reinforcement as shown on drawings. The type and grade is indicated by a symbol as shown below.
   On the drawings this is followed by a numeral which indicates the size in millimetres of the reinforcement.

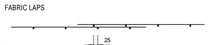
N.	Hot rolled ribbed bar	grade D500N
R.	Plain round bar	grade R250N
SL.	Square mesh	grade 500L
RL.	Rectangular mesh	grade 500L

2. Provide bar supports or spacers to give the following concrete cover to all reinforcement unless otherwise noted on drawings.

Footings	-	40 top, 40 bottom, 40 sides.
Slabs	-	30 top, 30 bottom, 30 sides.
Beams	-	30 bottom, 30 sides, 30 top to ties
Columns	-	30 to ties and spirals.
Walls	-	30 generally

3. Cover to reinforcement ends to be 50 mm u.n.o.
4. Provide N12-450 support bars to top reinforcement as required. Tension Lap U.N.O.
5. Maintain cover to all pipes, conduits, reglets, drip grooves etc.
6. All cogs to be standard cogs unless noted otherwise.
7. Fabric end and side laps are to be placed strictly in accordance with the manufacturers requirements to achieve a full tensile lap. Fabric shall be laid so that there is a maximum of 3 layers at any location.

FABRIC LAPS



8. Laps in reinforcement shall be made only where shown on the drawings unless otherwise approved. Lap lengths as per table below.

TENSION LAPS

BAR SIZE	TOP BARS IN BANDS AND BEAMS	ALL OTHER BARS
N12	570	480
N16	800	700
N20	1150	950
N24	1500	1250
N28	1850	1500
N32	2250	1800
N36	2700	2100

COMPRESSION LAPS

BAR SIZE	
N16	640
N20	800
N24	960
N28	1120
N32	1280
N36	1440

REINFORCEMENT LEGEND

1. Denotes the extent of area covered by bars.
2. Denotes a change in bar shape and/or length.
3. 11 Indicates to repeat bars tagged thus (11) etc. LAY BARS IN DIRECTION INDICATED BY ARROW
4. Bars shown staggered on plan are to be placed alternately.
5. ALT. denotes bars of different length and/or shape to be laid alternately.
6. 13N16 10-250=3 Indicates 10 bars at 250 centres plus 3 bars placed one per space centrally over column.

ABBREVIATIONS USED ON DRAWINGS :

U.N.O.	-	Unless Noted Otherwise	E.W.	-	Each Way
N.S.O.P.	-	Not Shown On Plan	E.F.	-	Each Face
N.S.O.E.	-	Not Shown On Elevation	N.F.	-	Near Face
L.V.	-	Bar Lengths Vary	F.F.	-	Far Face
N.T.S.	-	Not To Scale			

POST-TENSIONED CONCRETE NOTES

GENERAL

1. Submit all test certificates, theoretical extensions, calculations and shop drawing to the Superintendent as required by the Specification prior to construction.
2. All reactions from post-tensioning shall be supplied to the formwork contractor for formwork design.
3. Stressing contractor is to pay particular attention to concrete compaction where ducts cross columns and at all tendon anchors and ensure that pump lines are adequately chained and restrained so as to be kept separate from tendons and reinforcement.
4. Provide mesh over bands where band depth exceeds 350mm or as required by Workcover.
5. Holes cored through post-tensioned slabs must be approved by the structural Engineer in writing.

TENDONS

1. Strand shall be 7 wire stress relieved super grade low relaxation in accordance with AS 4672.1 and AS 4672.2 unless denoted otherwise.
2. Bar shall be cold-worked high-tensile alloy steel bars in accordance with AS 4672.1 and AS 4672.2 and shall be super grade unless noted otherwise.
3. Locate and fix tendons and reinforcement as shown on the contractors drawings & co-ordinate with cast in bolts, conduits & penetrations etc. Tendon profiles shall be parabolic unless noted otherwise.
4. Ducting shall be galvanised steel:
5. Seal off all ducts and securely tape joints to prevent ingress of mortar during concreting.

TENSIONING AND GROUTING

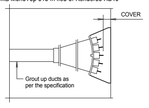
1. Tendons shall be stressed to jacking forces as per the contractors drawings.
2. The first stage of stressing is for 25% of the jacking force to be applied between 18 and 36 hours after concrete placement (fcp = 9 MPa minimum) followed by the remainder of the jacking force at - fcp = 22 MPa unless noted otherwise below. Each individual strand or bar shall be tensioned during the first stage unless noted otherwise.
3. Records of net tendon elongation and other aspects of the tensioning operation required by the Specification shall be submitted to the Engineer and approved prior to cutting of tendons and grouting the ducts.
4. All tendons to be grouted in accordance with the specification.
5. Post-tensioning anchorage pockets shall be fully grouted with a polymer modified repair mortar. Minimum cover to any tendons or anchorage plate shall be as for the element in which they are located.
6. Concrete test cylinders used for assessing strength for tensioning are to be site cured in similar conditions to the concrete element being stressed.

ANCHORAGE RECESS GROUTING
NOT EXPOSED TO WEATHER (INTERNAL)
Exposure Class A1 as per AS3600

1. After final stressing and approval of extensions by the engineer, cut off strands to give 30mm minimum cover to ends of strands.
2. Provide records of measured cover at each anchor recess for the engineer to inspect and provide the opportunity for the engineer to inspect recesses.
3. Thoroughly clean anchorage pocket (use high pressure water jet if necessary) to remove all laitance, polystyrene etc.
4. Prime all concrete surfaces with 'Nitobond EP' or approved equivalent.
5. Grout up recess with 3:1 Sand: Cement grout mix or 'Renderoc HB'. Infill is to be finished flush with surrounding concrete surface.
6. The contractor shall provide records that demonstrate steps 3,4 & 5 have been satisfactorily completed at each anchor recess.

ANCHORAGE RECESS GROUTING
EXPOSED TO WEATHER (EXTERNAL)
Exposure Class B1 as per AS3600 - Near Coastal/Industrial
Exposure Class B2 as per AS3600 - Within 1km of coastline

1. After final stressing and approval of extensions by the engineer, cut off strands to give 30mm minimum cover to ends of strands.
2. Provide records of measured cover at each anchor recess for the engineer to inspect and provide the opportunity for the engineer to inspect recesses.
3. Thoroughly clean anchorage recess (use high pressure water jet if necessary) to remove all laitance, polystyrene etc.
4. Prime all metal surfaces with 'Nitoprime Zincrich' or approved equivalent.
5. Prime all concrete surfaces with 'Nitobond EP' or approved equivalent.
6. Grout up recess with 'Renderoc HB40' - applied as per manufacturers instructions. Infill is to be finished flush with surrounding concrete surface to the Superintenderts requirements. A test sample is to be submitted for approvaland used for acceptance/rejection criteria.
7. The contractor shall provide records that demonstrate steps 3,4,5 & 6 have been satisfactorily completed at each anchor recess.
8. Alternative products may be used as follows:
   SikaTop 110 in lieu of Nitoprime Zincrich and Nitobond EP
   Sika MonoTop 615 in lieu of Renderoc HB40



MASONRY NOTES

1. Temporary bracing shall be provided by the contractor to keep the masonry stable at all times.
2. Masonry to be in accordance with AS 3700
3. Masonry units shall comply with AS/NZS 4455 and as follows:

Type of masonry unit	Characteristic unconfined compressive strength (Fuc)	Characteristic lateral modulus of rupture (Fut)
Clay & Calcium silicate	15 MPa	0.6 MPa
Concrete	15 MPa (hollow units) 10 MPa (solid or cored units)	0.8 MPa

4. Mortar shall consist of the following:
   M3 for general applications
   1 part Type GP cement: 5 parts sand plus water thickener
   M4 for elements in interior environments subject to saline wetting and drying; below a damp-proof course or in contact with ground in aggressive soils; in severe marine environments; in saline or contaminated water including tidal splash zones; and within 1km of an industry producing chemical pollutants.
   1 part Type GP cement: 4 parts sand plus water thickener
5. Provide vertical control joints in masonry over permanent floor joints and as per the architectural drawings.
6. Masonry walls shown on the structural plans are load-bearing UNO. Non-loadbearing walls shall be separated from the concrete structure above with 20mm compressible filler. Masonry walls supporting slabs shall have a layer of mortar troweled smooth on top. Provide M.E.T. slipjoint to separate floor slabs and masonry. Provide Hercules HERCUSLIP COMPOSITE to separate roof slabs and masonry.
7. Other than what is allowed in the specification no chasing or rebates may be made in masonry walls without written approval.
8. The contractor shall provide records that demonstrate all masonry bed joint reinforcement, masonry ties and masonry wall stiffeners have been installed in accordance with the drawings and specification.
9. All load bearing concrete masonry walls shall have all cores filled with grout UNO. Core filling grout shall be thoroughly compacted. Grout to be in accordance with AS3700 and as follows:

Location	f'cg MPa	Specified Slump	Max' Aggregate size
Grout	20	230	10mm

10. All core filled blockwalls shall be constructed with "Double U" blocks
11. In core filled blockwalls cleanout openings shall be provided at the bottom of each core and shall be cleaned of mortar protrusions before grouting.
12. All core filled block walls shall have all cores filled with grout UNO. Core filling grout to be in accordance with note 4.
13. Cover to reinforcement to be 50mm to face of block UNO.
14. Provide bed joint reinforcement as follows
    M.E.T. galvanized masonry reo where M3 mortar is used (supplied by DUNSTONE MAZE in NSW)
    Ancon stainless steel where M4 mortar is used and located as follows
    - in 2 bed joints below and above head and sill flashings to openings
    - in 2 bed joints below and above openings
    - in third bed joint above bottom of wall
    - in second bed joint below top of wall

STRUCTURAL STEELWORK NOTES

1. Provide temporary bracing to maintain stability of steelwork during construction.
2. Unless noted otherwise.
   a. Use 10mm thick gusset, fin & end plates welded all round.
   b. All welds 6mm continuous fillet made with E48XX electrode or W50X
   c. All bolts 20mm dia.
   d. All bolts grade 8.8/S. (including purlin / girt bolts)
   e. All holding down bolts are grade 4.6 U.N.O
   f. All bolts, including holding down bolts are to be hot dip galvanized.
   g. All fillet welds to be category GP.
   h. Butt weld all flanges at end plates and at all mitre cuts.
   i. Gussets to end plates to be butt welded.
   j. All butt welds shall be full penetration, grade SP.
   k. All connections to have a minimum of 2 bolts.
   l. Provide 6mm seal plate to all open ends of tube members U.N.O.
   m. Provide all cleats and holes necessary for fixing Timber and other elements to the steel whether or not detailed on the Structural drawings.
   n. Studs fabricated to AS1554.2
   o. All shear studs (composite slab to steel) grade 410 MPa.
   p. All threaded studs (steel to steel) grade 380 MPa.
   q. Turnbuckles to be quality grade 'S' to AS2319
   r. Stainless steel to be grade 316
3. Bolting categories are identified on the drawings in the following manner.

4.6/S	Commercial bolts of grade 4.6 snug tightened.
8.8/S	High strength bolts of grade 8.8 snug tightened.
8.8/TB	High strength bolts of grade 8.8 fully tensioned to AS4100 as a bearing type joint.
8.8/TF	High strength bolts of grade 8.8 fully tensioned to AS4100 as a friction type joint with faying surfaces left uncoated.

   Note: Grade 8.8 bolts are NOT to be welded.
4. Chip all welds free of slag.
5. Contractor is to confirm with Architect as to where exposed welds are to be ground flush / smooth.
6. Do not grout under base plates until first level steelwork is plumb and fixed by welding or bolting.
7. Submit all shop drawings to the Superintendent before commencing fabrication.

PURLINS AND GIRTS

1. All purlins to be grade AS1397/G450-Z350 U.N.O.
2. Unless noted otherwise, the fixing of purlins, girts, bridging, sheeting and any other component shall be in accordance with the Manufacturer's specification and recommendations.
3. Sheeting / cladding is to be screw fixed to the purlins / girts to provide lateral restraint to the purlins/girts in accordance with the Manufacturer's requirements.
4. Provide double purlins at expansion joints in roof sheeting.
5. Purlin / girt sizes shown are based on the current BLUESCOPE LYSAGHT purlins and girts design data, including restraint from roof sheeting and bridging. The manufacturer should confirm any alternative systems used are equivalent or redesign the purlins / girts to provide an equivalent system.
6. Purlin / girt cleats are to be in accordance with the Manufacturers details. Where the distance between the bottom flange of the purlin and the rafter is greater than 100mm use 75 x 75 x 8EA cleats.
7. Provide 75 x 75 x 4 duragal galvanized angle trimmers to support roof sheeting edges at all hips,valleys and angled sheet edges. Fix to each purlin with one No. 14 Tek screw.
8. Bridging shall be designed and erected in accordance with the Manufacturer's requirements. Rod bridging is not acceptable unless approved in writing.
9. For bridging members to purlins at curved roof areas provide bridging suitable for curved roofs to Manufacturer's details.

STEELWORK FINISHES

REFER TO SPECIFICATION

STEEL WALL FRAMING NOTES

1. All design, materials and workmanship shall be in accordance with AS 4600 Cold Formed Steel Structures Code.
2. Unless noted otherwise on the drawings all wall framing shall be designed and installed by the manufacturer in accordance with the specification and relevant Australian Standards. Refer to General Notes for Design Loads.
3. All framing shall be designed to carry the dead load of all framing members, cladding, linings, folding doors, services etc. as shown on the Architects and other Consultants drawings.
4. All framing dimensions shall be obtained from the Architectural drawings.
5. All wall framing shall be designed as loadbearing to resist all lateral loads. Sufficient bracing shall be provided to resist the full wind load effects from both the walls and roof of the building in all directions.
6. In addition to other design loads all wall framing shall be designed to support the following loads:
   - Up to two rows of 300mm wide shelves. Each row of shelves shall be capable of supporting a vertical load of 50 kg per metre length of the shelf.
   - Comply with the requirements of BCA specification C1.8
7. In addition to the deflection limits specified in the relevant Australian Standards, wall framing shall be designed to achieve the following additional deflection limits:

ELEMENT	MAXIMUM DEFLECTION
Supporting frame masonry walls	Span / 1000

8. The contractor must submit a design certificate to certify the wall framing design is in accordance with AS 4600 for the relevant loads signed by a NPER registered engineer.

PLOTTED BY: A.W ON: 16/10/2015 8:42:13 AM

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PRELIMINARY

Rev	Description	Eng	Draft	Date
P1	ISSUED FOR INFORMATION	P.H	A.W	28.08.15

Client: NSW Health Infrastructure
Level 8, 77 Pacific Highway
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Project: BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject: NOTES SHEET

Scale : A0: 1 : 1
Drawn: A.W
Authorised: K.B
Job No: 121211 K
Drawing No: ST-TD-0001
Revision: P1
16/10/2015 8:42:13 AM

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING NO. ST-TD-001

TENDER NOTES

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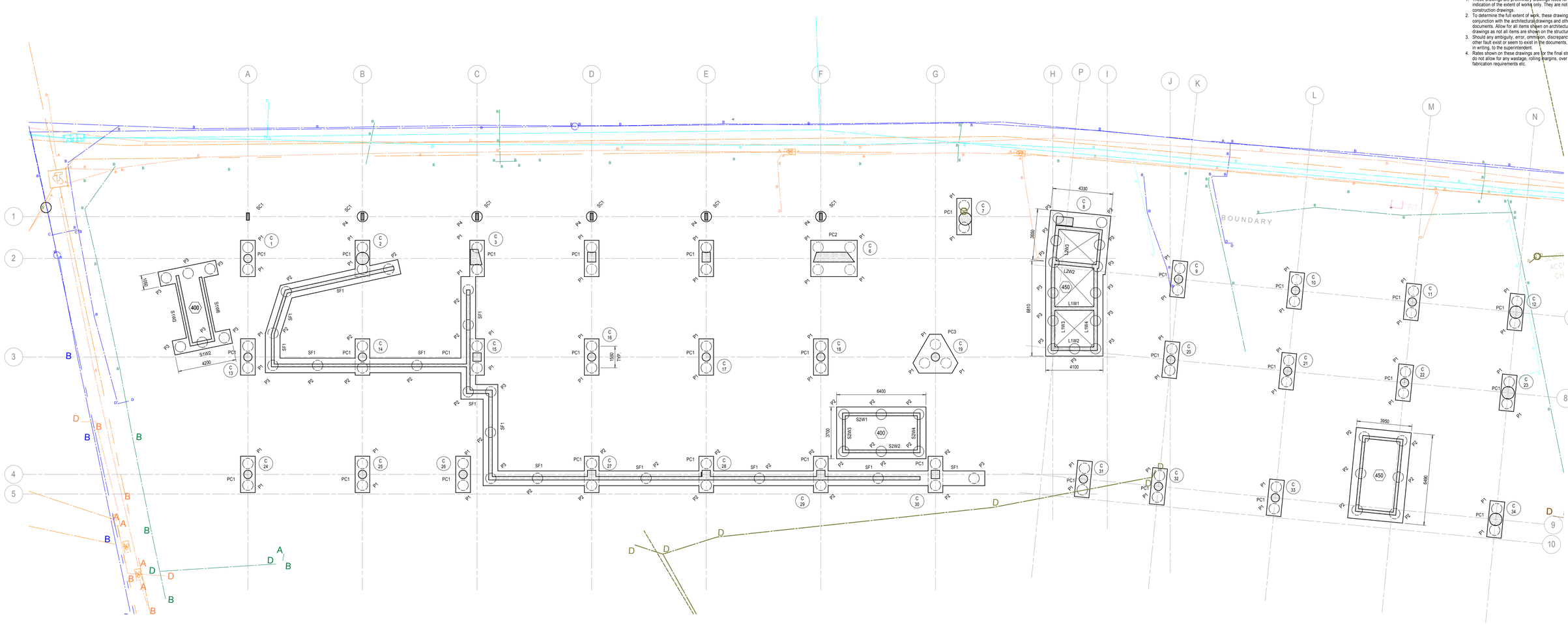

FOOTING PLAN

SCALE 1:100

NOTES

1. REFER TO ARCHITECTS DRAWINGS FOR LOCATION AND SETOUT OF ALL COLUMNS AND WALLS.
2. REFER TO DRAWING S0001 FOR FOOTING NOTES REGARDING ROCK BEARING PRESSURES AND ALLOWABLE SIDE SHEARS.
3. ALL LIFT PIT BASES AND WALLS BELOW GROUND LEVEL ARE TO HAVE XYPEX ADMIXTURE.
4. REFER TO RELEVANT FOOTING DETAILS FOR TOP OF FOOTING LEVELS. ALLOW ADDITIONAL CLEARANCE TO TOP OF FOOTINGS FOR HYDRAULIC SERVICES WHERE REQUIRED. BUILDER TO CONFIRM TOP OF FOOTING LEVELS WITH ARCHITECT AND HYDRAULIC CONSULTANT PRIOR TO CONSTRUCTION.
5. PILES TO BE FOUNDED ON CLASS III SANDSTONE WITH 3500 kPa BEARING CAPACITY. REFER SCHEDULE SOCKET LENGTH.
6. REFER DRAWING S0111 AND S0211 FOR ALL FOOTING, LIFT PIT BASE AND PILE DETAILS.
7. ALL EXISTING SERVICES UNDER EXISTING BUILDING FOOTPRINT TO BE LOCATED AND REMOVED OR DIVERTED IN ACCORDNACE WITH THE SERVICE ENGINEERS REQUIREMENTS PRIOR TO INSTALLATION OF FOOTINGS.
8. CONTRACTOR TO ALLOW FOR GEOTECHNICAL ENGINEER TO INSPECT AND CERTIFY THE REQUIRED BEARING CARACITIES HAVE BEEN ACHIEVED BEFORE CASTING FOOTINGS.
9. FINAL PILE DESIGN TO BE UNDERTAKEN BY CONTRACTOR.

REINFORCEMENT RATES

POST TENSIONING	= 6.5 kg/m²
SLAB AND BAND REINFORCEMENT	= 40 kg/m²
COLUMN	= 250 kg/m³
BEAMS	= 180 kg/m³
WALLS	= 100 kg/m³
RAMPS	= 100 kg/m³
STAIRS	= 120 kg/m³

1. MEASURED QUANTITIES ARE APPROXIMATE AND FOR INFORMATION ONLY. ACTUAL QUANTITIES MAY VARY AS DETAILED DESIGN IS DEVELOPED AND WHILST ALL REASONABLE EFFORTS WILL BE UNDERTAKEN TO MAINTAIN AFC REINFORCEMENT +/- 10% OF THESE QUANTITIES, IT IS NOT POSSIBLE TO GUARANTEE THESE ESTIMATES.
2. IT IS THE BUILDERS RESPONSIBILTY TO MONITOR SCHEDULES OF REINFORCEMENT DELIVERED TO SITE AS CONSTRUCTION PROGRESSES AND CONFIRM THEIR ACCURACY. IF THE AFC REINFORCEMENT QUANTITIES DELIVERED ARE INCORRECT AND IN EXCESS OF TENDER ESTIMATES, NOTIFY TTW IMMEDIATELY FOR OPTIONS TO MINIMISE REINFORCEMENT OVER ORIGINAL TENDER ESTIMATES.
3. NO ALLOWANCE HAS BEEN MADE FOR POST TENSIONING AND REINFORCEMENT WASTAGE.
4. REINFORCEMENT QUANTITIES DO NOT ALLOW FOR:
   (a) FABRIC TO EXPOSED AREAS/SAFETY MESH/REINFORCEMENT REQUIRED BY BUILDER.
   (b) ROLLING MARGINS/POST TENSIONING PAN AND ANTIBURST REINFORCEMENT.

PILE CAP SCHEDULE

MARK	SIZE LENGTH	SIZE WIDTH	SIZE DEPTH	REINFORCEMENT LONG DIRECTION	REINFORCEMENT SHORT DIRECTION	f'c
PC1	2600	1050	1200			
PC2	3330	2600	1200			
PC3	REFER DETAIL	REFER DETAIL	1200			

PILE SCHEDULE

MARK	DIAMETER	REINFORCEMENT	WORKING LOAD	TENSION	LATERAL	f'c
P1	750		2400 kN	-	75	
P2	750		2400 kN	800	220	
P3	750		2800 kN	1600	220	
P4	750		200 kN	-	75	

STRIP FOOTING SCHEDULE

MARK	WIDTH	DEPTH
SF1	1050	1200

PLOTTED BY: A.W ON 16/10/2015 8:42:13 AM

A0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
FOOTING PLAN

Scale : A0 As indicated
Drawn A.W
Authorised K.B
Job No 121211 K
Drawing No ST-TD-0101
Revision P1
16/10/2015 8:42:13 AM

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING NO. ST-TD-001

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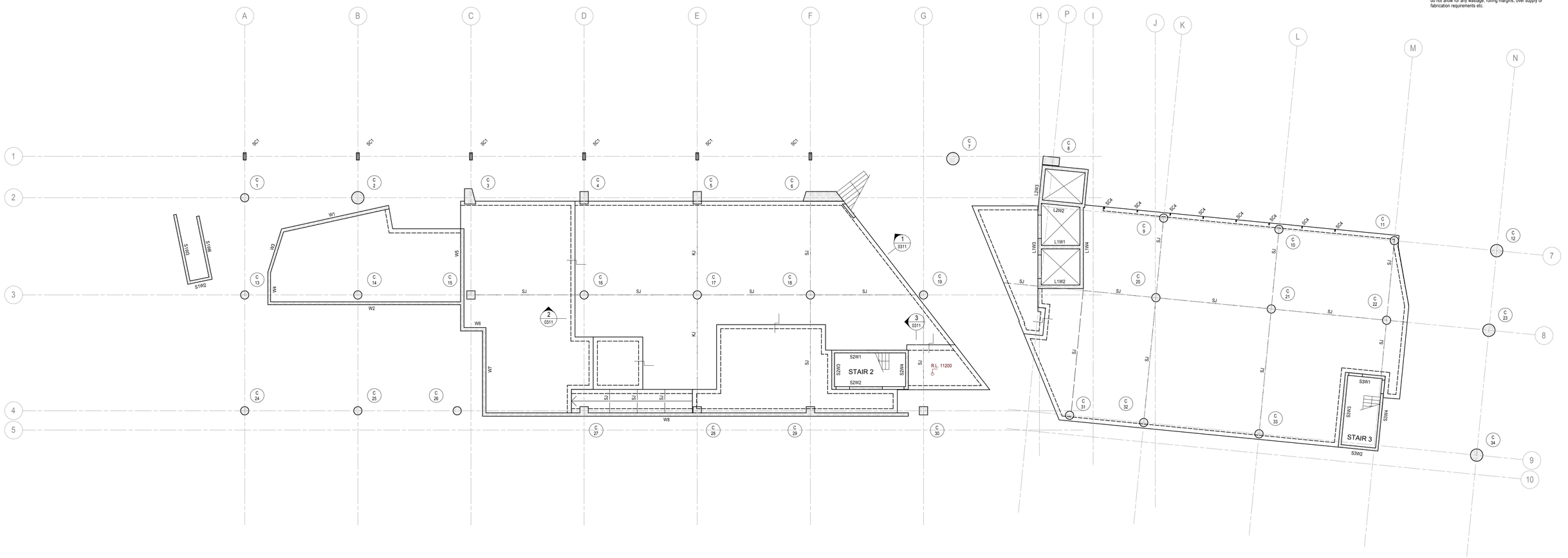

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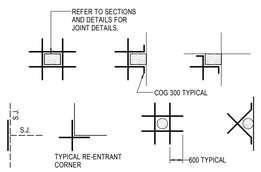

ALL TRIMMERS TO BE 1N16 U.N.O.

TYPICAL SLAB ON GROUND TRIMMER DETAILS

AT ALL COLUMNS, WALLS, PITS, FLOOR WASTES, ETC THAT CAUSE A PENETRATION THROUGH THE SLAB.

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

GROUND FLOOR PLAN - 120 SLAB ON GROUND U.N.O.

SCALE 1:100

NOTES:

1. SLABS ON GROUND TO BE CAST ON A CONCRETE UNDERLAY OVER FREE DRAINING BASECOURSE (REFER TO GEOTECHNICAL ENGINEERS REPORT) AND 30mm SAND SEPERATED BY A SECOND CONCRETE UNDERLAY AS SHOWN IN DIAGRAME. CONCRETE UNDERLAY (0.2mm THICK HIGH IMPACT RESISTANCE FILM TO AS/NZS 4347).
2. REINFORCE SLABS ON GROUND WITH 1 LAYER OF SL82 FABRIC TOP THROUGHOUT 30 COVER
3. ALL LEVELS AND FALLS TO ARCHITECTS DETAILS.
4. REFER TO HYDRAULIC ENGINEERS DETAILS FOR ALL SUB SOIL DRAINAGE, SUMPS, PITS AND GRATED DRAINS U.N.O
5. REFER TO THE GEOTECHNICAL ENGINEER FOR ALL SUBBASE REQUIREMENTS.
6. ____ SJ ____INDICATES SAWN JOINT.
7. _____ KJ _____INDICATES KEYED JOINT

PLOTTED BY: A.W ON: 16/10/2015 8:42:20 AM

A0 0 1 2 3 4 5 6 7 8 9 10

PRELIMINARY

Rev	Description	Eng	Draft	Date
P1	ISSUED FOR INFORMATION	P.H	A.W	28.08.15

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NSW Health Infrastructure
Level 8, 77 Pacific Highway
St. Leonards NSW 2065

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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
GROUND FLOOR PLAN

Scale : A0	Drawn	Authorised
As indicated	A.W	K.B

Job No	Drawing No	Revision
121211 K	ST-TD-0301	P1

16/10/2015 8:42:20 AM

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING NO. ST-TD-001

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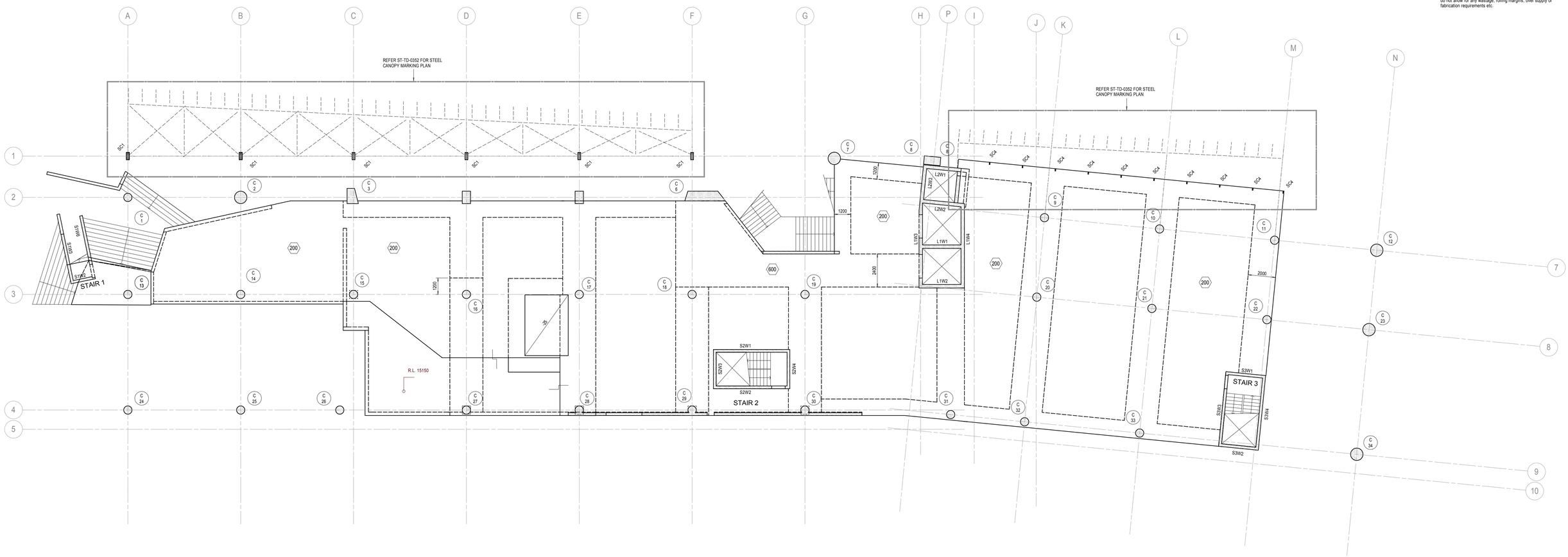

REINFORCEMENT RATES	
POST TENSIONING	= 6.5 kg/m²
SLAB AND BAND REINFORCEMENT	= 40 kg/m²
COLUMN	= 250 kg/m³
BEAMS	= 180 kg/m³
WALLS	= 100 kg/m³
RAMPS	= 100 kg/m³
STAIRS	= 120 kg/m³

1. MEASURED QUANTITIES ARE APPROXIMATE AND FOR INFORMATION ONLY. ACTUAL QUANTITIES MAY VARY AS DETAILED DESIGN IS DEVELOPED AND WHILST ALL REASONABLE EFFORTS WILL BE UNDERTAKEN TO MAINTAIN AFC REINFORCEMENT +/- 10% OF THESE QUANTITIES, IT IS NOT POSSIBLE TO GUARANTEE THESE ESTIMATES.
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3. NO ALLOWANCE HAS BEEN MADE FOR POST TENSIONING AND REINFORCEMENT WASTAGE.
4. REINFORCEMENT QUANTITIES DO NOT ALLOW FOR;
   (a) FABRIC TO EXPOSED AREAS/SAFETY MESH/REINFORCEMENT REQUIRED BY BUILDER.
   (b) ROLLING MARGINS/POST TENSIONING PAN AND ANTIBURST REINFORCEMENT.

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UBB2.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

LEVEL 1 OUTLINE PLAN - 180 SLAB U.N.O.

SCALE 1:100

NOTES:
1. ALL BANDS WIDTH 2400 U.N.O
2. ALL BANDS DEPTH 420 U.N.O.
3. ALL EDGE BEAMS 1200 U.N.O.
4. ALL EDGE BEAMS DEPTH 420 U.N.O.

PLOTTED BY: A.W ON: 16/10/2015 8:42:21 AM

A0 0 1 2 3 4 5 6 7 8 9 10

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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
LEVEL 1 OUTLINE PLAN

PRELIMINARY

Scale : A0	Drawn	Authorised
As indicated	A.W	K.B

Job No	Drawing No	Revision
121211 K	ST-TD-0351	P1

16/10/2015 8:42:21 AM

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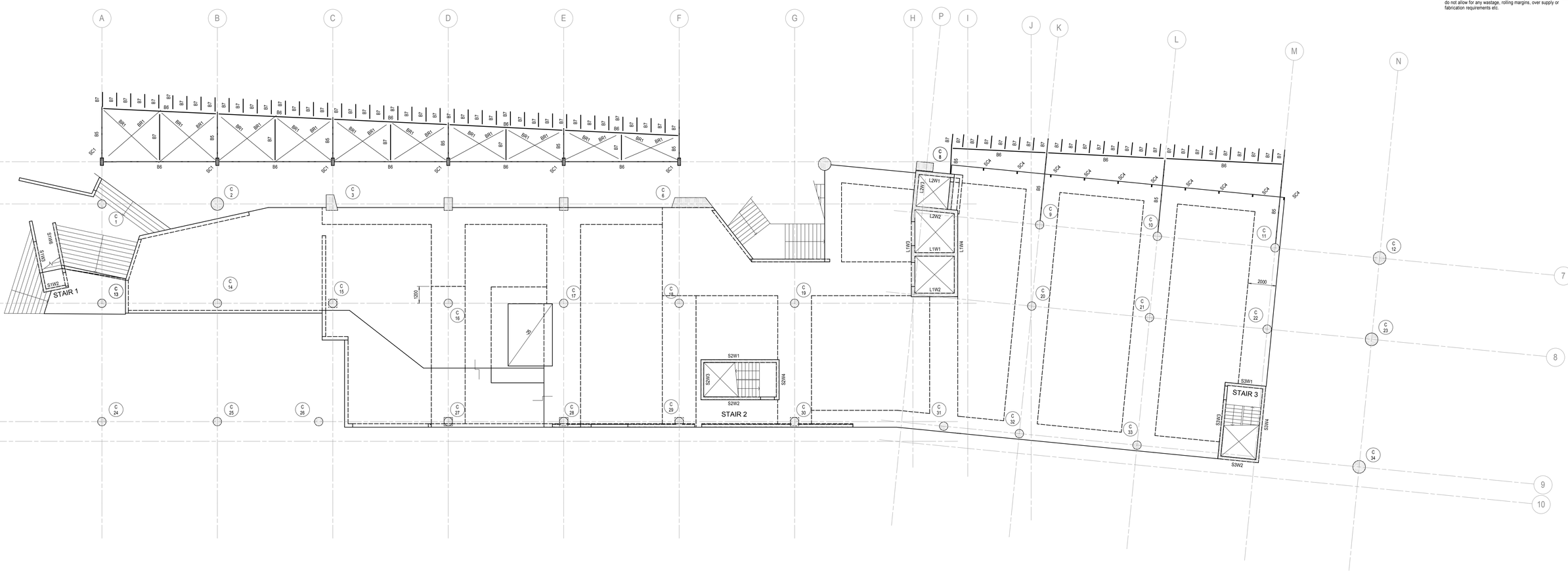

REINFORCEMENT RATES

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SLAB AND BAND REINFORCEMENT	= 40 kg/m²
COLUMN	= 250 kg/m³
BEAMS	= 180 kg/m³
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STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

STEEL MEMBER SCHEDULE			
MARK	SIZE	TYPE	COMMENTS
B1	310UB32.0	BEAM	
B2	250UB25.7	BEAM	
B3	200x200x9.0 SHS	BEAM	
B4	150PFC	BEAM	
B5	125x75x5.0 RHS	BEAM	
B5	360UB44.7	BEAM	
B6	250x250x9.0 SHS	BEAM	
B7	125x75x5.0 RHS	BEAM	
BR1	20 Dia. ROD	BRACING	
P1	Z25024	PURLIN	AT 1200 CENTRES, 2 ROWS OF BRIDGING
VB1	20 Dia. ROD	VERTICAL BRACING	

LEVEL 1 CANOPY AWNING STEEL MARKING PLAN

SCALE 1:100

PLOTTED BY: Author ON16/10/2015 8:42:22 AM

A0 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date

Rev	Description	Eng	Draft	Date

Rev	Description	Eng	Draft	Date

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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
LEVEL 1 AWNING STEEL MARKING PLAN

Scale : A0: As indicated
Drawn: Author
Authorised: Approver
Job No: 121211 K
Drawing No: ST-TD-0352
Revision:
16/10/2015 8:42:22 AM

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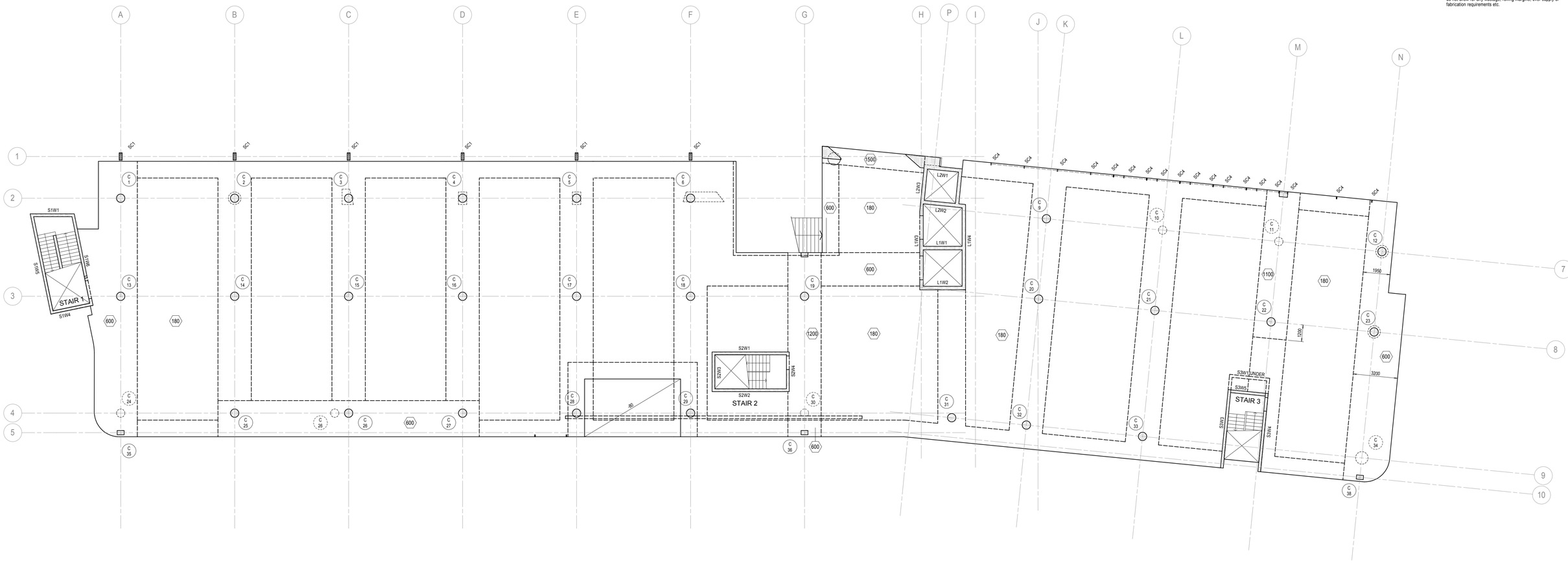

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STEEL COLUMN SCHEDULE

MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

LEVEL 2 OUTLINE PLAN - 160 SLAB U.N.O.

SCALE 1:100

NOTES:
1. ALL BANDS WIDTH 2400 U.N.O.
2. ALL BANDS DEPTH 380 U.N.O.
3. ALL EDGE BEAMS WIDTH 1200 U.N.O.
4. ALL EDGE BEAMS DEPTH 380 U.N.O.

PRELIMINARY

PLOTTED BY: A.W ON: 16/10/2015 8:42:22 AM

A0 ..... 0 1 2 3 4 5 6 7 8 9 10

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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
LEVEL 2 OUTLINE PLAN

Scale : A0	Drawn	Authorised
As Indicated	A.W	K.B

Job No	Drawing No	Revision
121211 K	ST-TD-0401	P1

16/10/2015 8:42:22 AM

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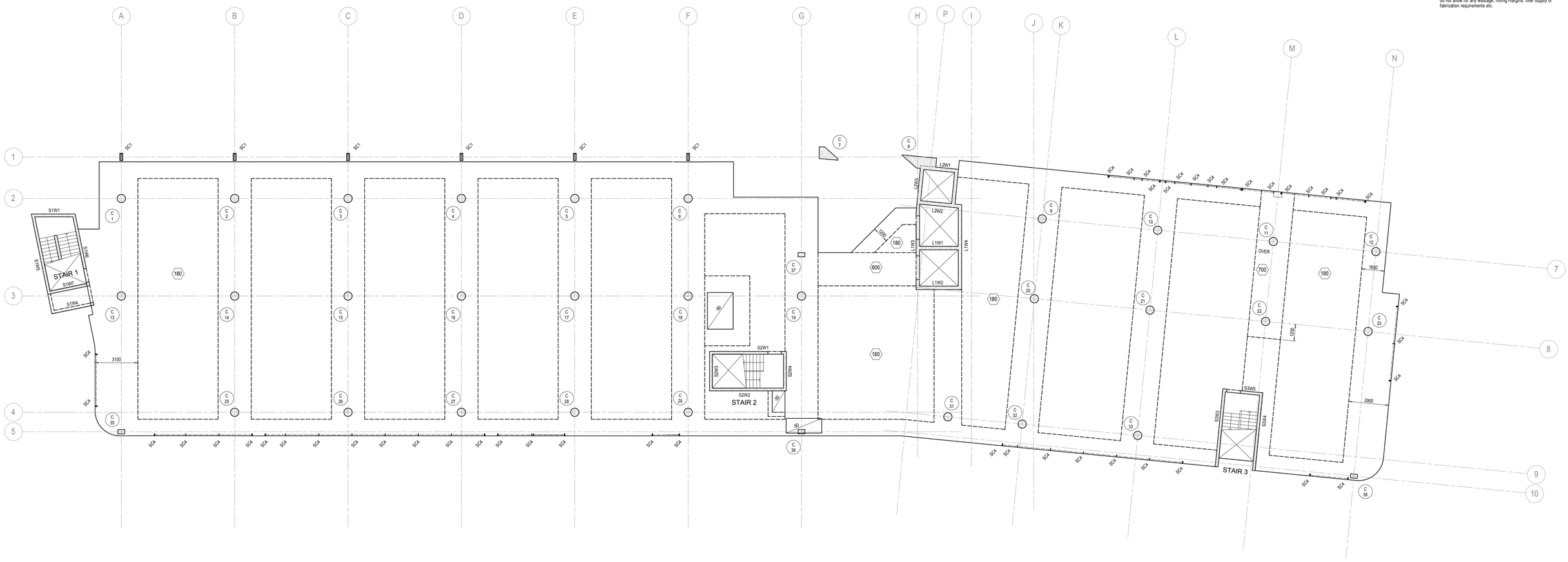

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STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
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LEVEL 3 OUTLINE PLAN - 160 SLAB U.N.O.

SCALE 1:100

NOTES:
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PRELIMINARY

PLOTTED BY: A.W ON: 16/10/2015 8:42:29 AM

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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
LEVEL 3 OUTLINE PLAN

Scale : A0 As indicated | Drawn A.W | Authorised K.B
Job No 121211 K | Drawing No ST-TD-0451 | Revision P1
16/10/2015 8:42:23 AM

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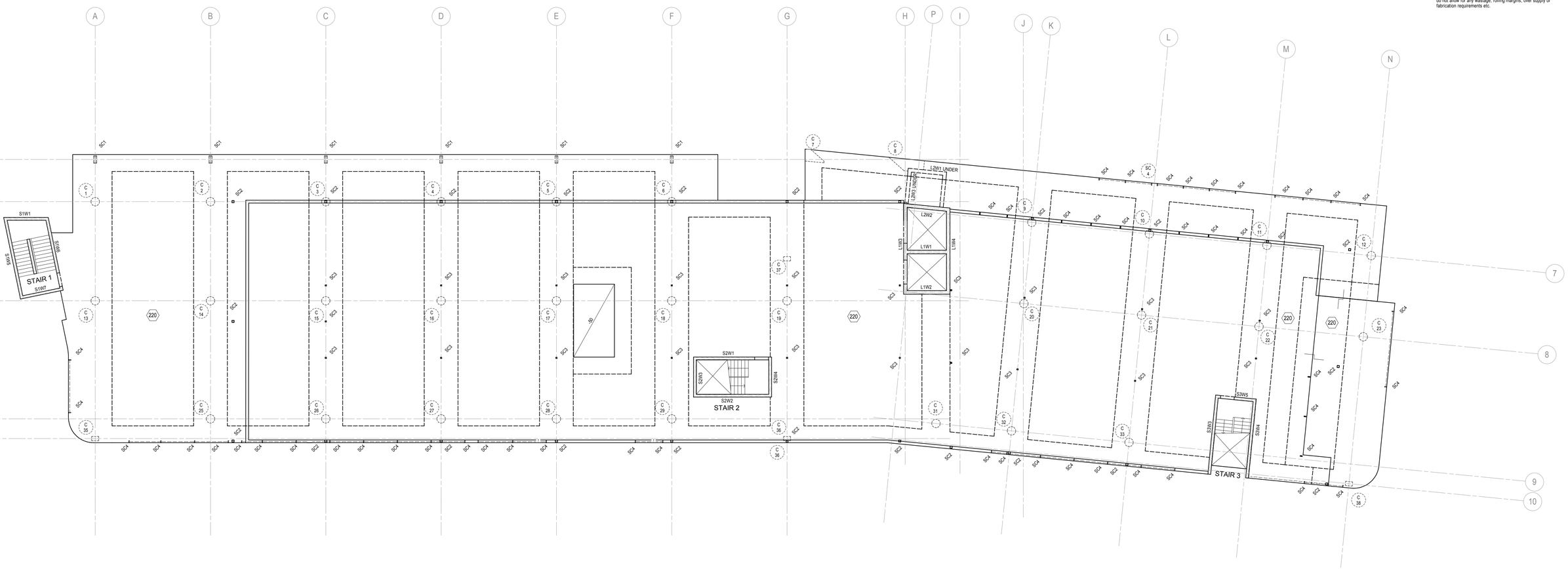

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STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
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SC 4	150x50x6.0 RHS	

LEVEL 4 OUTLINE PLAN - 200 SLAB U.N.O.

SCALE 1:100

NOTES:
1. ALL BANDS WIDTH 2400 U.N.O.
2. ALL BANDS DEPTH 500 U.N.O.
3. ALL EDGE BEAMS WITDH 1200 U.N.O.
4. ALL EDGE BEAM DEPTH 500 U.N.O.

PLOTTED BY: A.W ON: 16/10/2015 8:42:24 AM

A0 0 1 2 3 4 5 6 7 8 9 10

PRELIMINARY

Rev	Description	Eng	Draft	Date
P1	ISSUED FOR INFORMATION	P.H	A.W	28.08.15

Client
NSW Government Health Infrastructure
Level 8, 77 Pacific Highway
St. Leonards NSW 2065

Project Manager
JOHNSTAFF
Level 8, 16 O'Connell Street Sydney NSW 2000
P: +612 8934 2222
F: +612 8934 0001
ABN 62 079 352 515

Cost Planner
Davis Langdon an AECOM Company
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Hydraulic
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ABN 36 300 430 126

Mechanical & Electrical
ARUP
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Sydney NSW 2000
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F: +612 9320 9321
ABN 18 000 966 165

Architect
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35 Richards Avenue
Surry Hills, NSW 2010
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F: 02 9332 2402
e: msjdesign@msjgroup.com.au
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TTW TaylorThomsonWhitting
Consulting Engineers
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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
LEVEL 4 OUTLINE PLAN

Scale : A0 As Indicated
Drawn A.W
Authorised K.B
Job No 121211 K
Drawing No ST-TD-0501
Revision P1
16/10/2015 8:42:24 AM

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING NO. ST-TD-001

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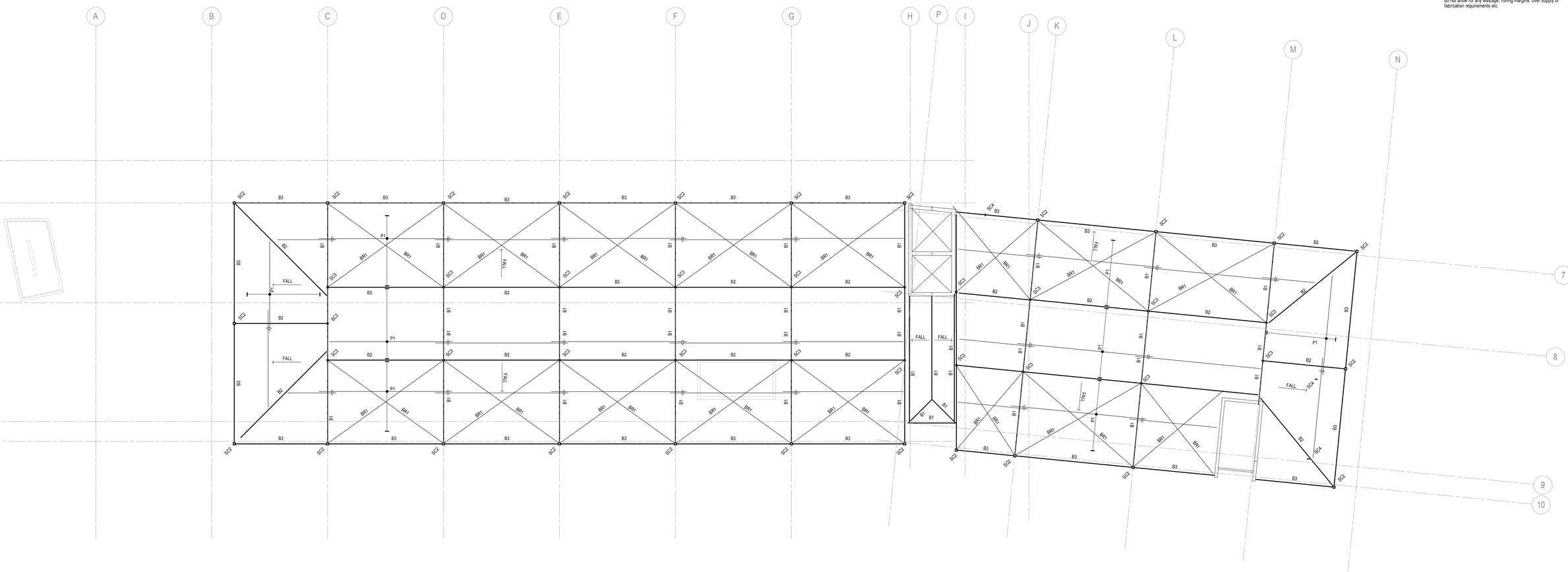

STEEL MEMBER SCHEDULE			
MARK	SIZE	TYPE	COMMENTS
B1	310UB32.0	BEAM	
B2	250UB25.7	BEAM	
B3	200x200x8.0 SHS	BEAM	
B4	150PFC	BEAM	
B5	125x75x5.0 RHS	BEAM	
B5	360UB44.7	BEAM	
B6	250x250x9.0 SHS	BEAM	
B7	125x75x5.0 RHS	BEAM	
BR1	20 Dia. ROD	BRACING	
P1	Z25024	PURLIN	AT 1200 CENTRES, 2 ROWS OF BRIDGING
VB1	20 Dia. ROD	VERTICAL BRACING	

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

ROOF STEEL MARKING PLAN

SCALE 1:100

PLOTTED BY: A.WON 16/10/2015 8:42:24 AM

A0 0 1 2 3 4 5 6 7 8 9 10

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BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
ROOF STEEL MARKING PLAN

PRELIMINARY

Scale : A0	Drawn	Authorised
1 : 100	A.W	K.B

Job No	Drawing No	Revision
121211 K	ST-TD-0601	P1

16/10/2015 8:42:24 AM

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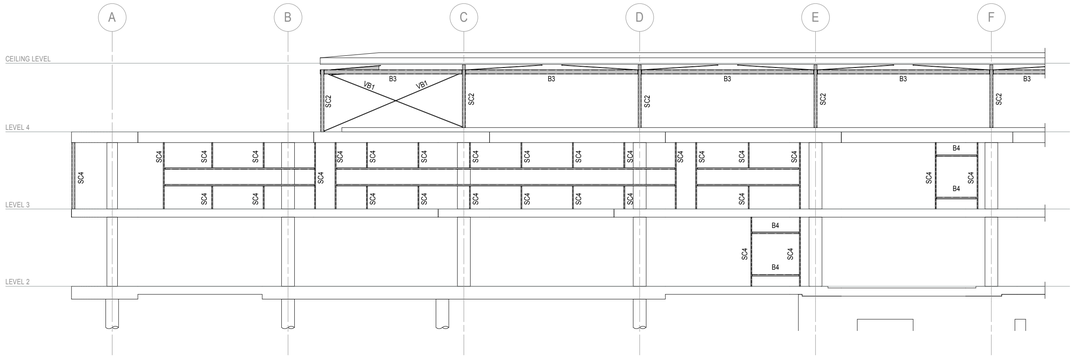
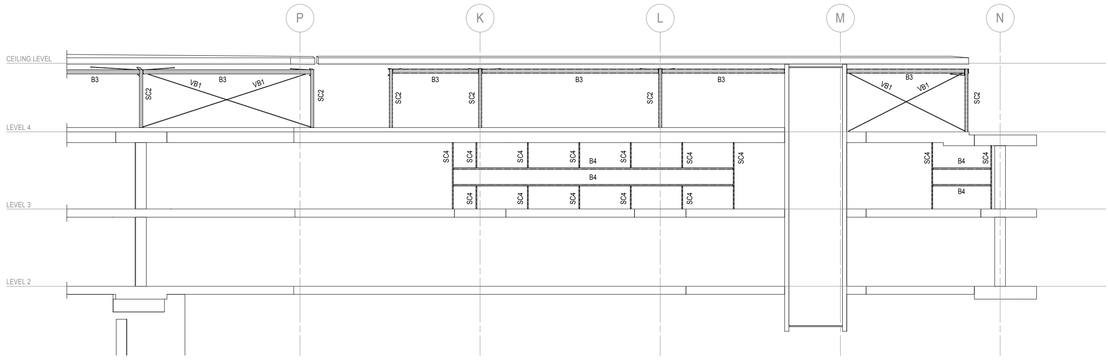
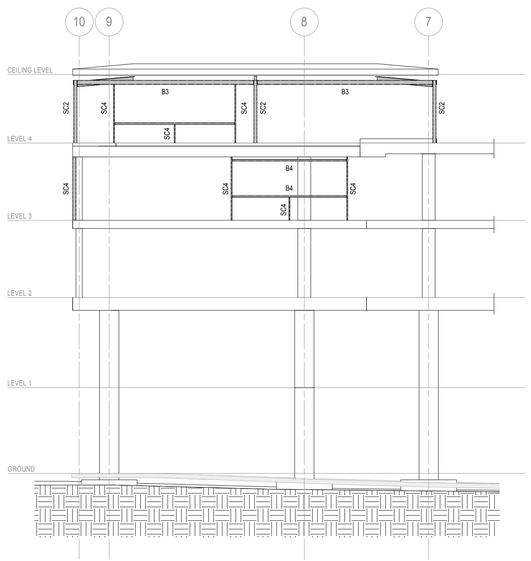


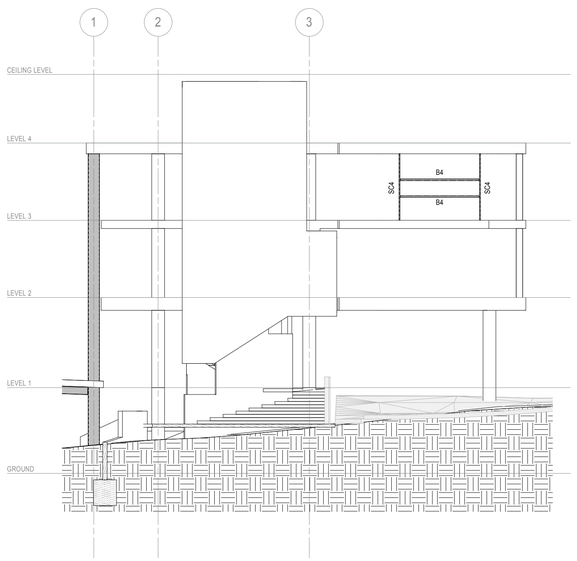
ELEVATION - MAIN BUILDING EAST A
SCALE 1:00



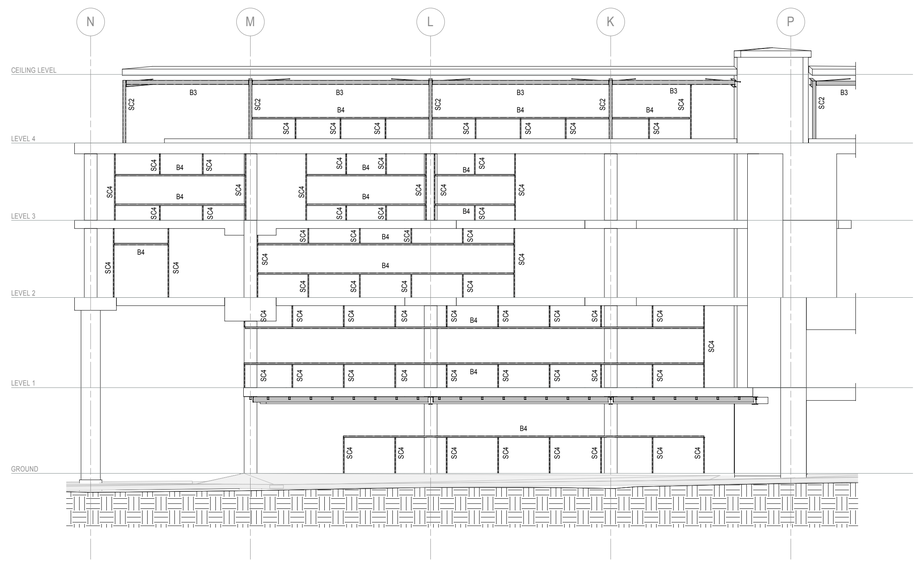
ELEVATION - MAIN BUILDING EAST B
SCALE 1:00



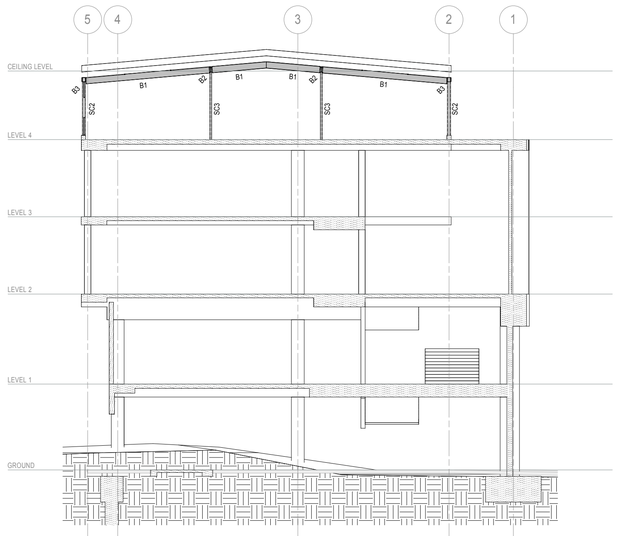
ELEVATION - MAIN BUILDING NORTH
SCALE 1:00



ELEVATION - MAIN BUILDING SOUTH
SCALE 1:00



ELEVATION - MAIN BUILDING WEST A
SCALE 1:00



ELEVATION - MAIN BUILDING GRID G
SCALE 1:00

STEEL MEMBER SCHEDULE			
MARK	SIZE	TYPE	COMMENTS
B1	310UB32.0	BEAM	
B2	250UB25.7	BEAM	
B3	200x200x9.0 SHS	BEAM	
B4	150PFC	BEAM	
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STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
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PLOTTED BY: Author ON16/10/2015 8:42:27 AM

A0 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
BUILDING ELEVATIONS

Scale : A0: 1 : 100
Drawn: Author
Authorised: K.B
Job No: 121211 K
Drawing No: ST-TD-0701
Revision: P1
16/10/2015 8:42:27 AM

PRELIMINARY

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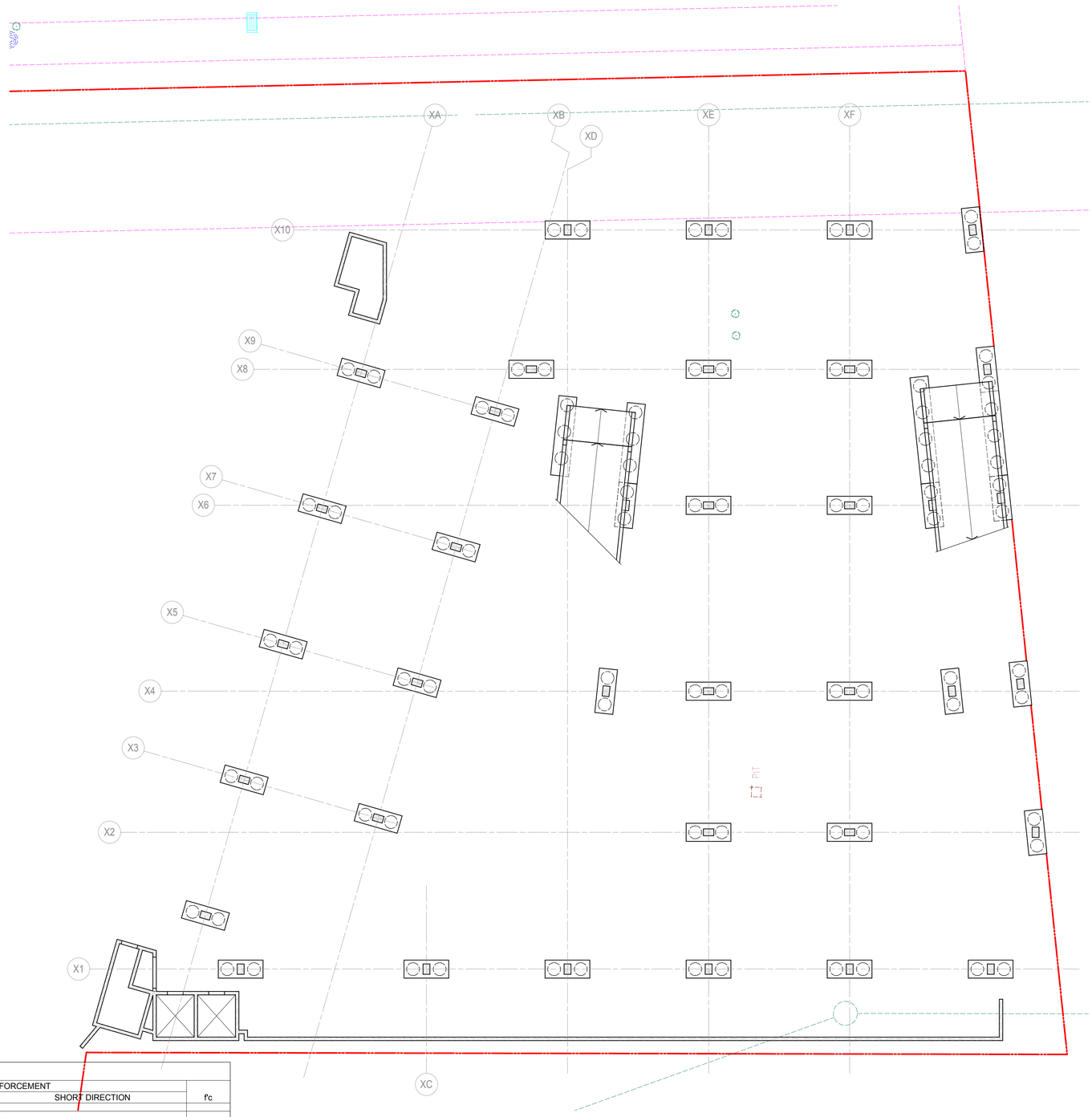
REINFORCEMENT RATES

POST TENSIONING	= 6.5 kg/m²
SLAB AND BAND REINFORCEMENT	= 40 kg/m²
COLUMN	= 250 kg/m³
BEAMS	= 180 kg/m³
WALLS	= 100 kg/m³
RAMPS	= 100 kg/m³
STAIRS	= 120 kg/m³

1. MEASURED QUANTITIES ARE APPROXIMATE AND FOR INFORMATION ONLY. ACTUAL QUANTITIES MAY VARY AS DETAILED DESIGN IS DEVELOPED AND WHILST ALL REASONABLE EFFORTS WILL BE UNDERTAKEN TO MAINTAIN AFC REINFORCEMENT +/- 10% OF THESE QUANTITIES, IT IS NOT POSSIBLE TO GUARANTEE THESE ESTIMATES.
2. IT IS THE BUILDERS RESPONSIBILITY TO MONITOR SCHEDULES OF REINFORCEMENT DELIVERED TO SITE AS CONSTRUCTION PROGRESSES AND CONFIRM THEIR ACCURACY. IF THE AFC REINFORCEMENT QUANTITIES DELIVERED ARE INCORRECT AND IN EXCESS OF TENDER ESTIMATES, NOTIFY TTW IMMEDIATELY FOR OPTIONS TO MINIMISE REINFORCEMENT OVER ORIGINAL TENDER ESTIMATES.
3. NO ALLOWANCE HAS BEEN MADE FOR POST TENSIONING AND REINFORCEMENT WASTAGE.
4. REINFORCEMENT QUANTITIES DO NOT ALLOW FOR:
   (a) FABRIC TO EXPOSED AREAS/SAFETY MESH/REINFORCEMENT REQUIRED BY BUILDER.
   (b) ROLLING MARGINS/POST TENSIONING PAN AND ANTIBURST REINFORCEMENT.



PILE CAP SCHEDULE						
	SIZE			REINFORCEMENT		
MARK	LENGTH	WIDTH	DEPTH	LONG DIRECTION	SHORT DIRECTION	f'c
PC1	2600	1050	1200			
PC2	3330	2600	1200			
PC3	REFER DETAIL	REFER DETAIL	1200			

PILE SCHEDULE						
MARK	DIAMETER	REINFORCEMENT	WORKING LOAD	TENSION	LATERAL	f'c
P1	750		2400 kN	-	75	
P2	750		2400 kN	800	220	
P3	750		2800 kN	1600	220	
P4	750		200 kN	-	75	

STRIP FOOTING SCHEDULE		
MARK	WIDTH	DEPTH
SF1	1050	1200

CARPARK LEVEL 1 OUTLINE PLAN

SCALE 1:100

NOTES

1. REFER TO ARCHITECTS DRAWINGS FOR LOCATION AND SETOUT OF ALL COLUMNS AND WALLS.
2. REFER TO DRAWING S0001 FOR FOOTING NOTES REGARDING ROCK BEARING PRESSURES AND ALLOWABLE SIDE SHEARS.
3. ALL LIFT PIT BASES AND WALLS BELOW GROUND LEVEL ARE TO HAVE XYPEX ADMIXTURE.
4. REFER TO RELEVANT FOOTING DETAILS FOR TOP OF FOOTING LEVELS. ALLOW ADDITIONAL CLEARANCE TO TOP OF FOOTINGS FOR HYDRAULIC SERVICES WHERE REQUIRED. BUILDER TO CONFIRM TOP OF FOOTING LEVELS WITH ARCHITECT AND HYDRAULIC CONSULTANT PRIOR TO CONSTRUCTION.
5. PILES TO BE FOUNDED ON CLASS III SANDSTONE WITH 3500 kPa BEARING CAPACITY. REFER SCHEDULE SOCKET LENGTH.
6. REFER DRAWING S0111 AND S0211 FOR ALL FOOTING, LIFT PIT BASE AND PILE DETAILS.
7. ALL EXISTING SERVICES UNDER EXISTING BUILDING FOOTPRINT TO BE LOCATED AND REMOVED OR DIVERTED IN ACCORDNACE WITH THE SERVICE ENGINEERS REQUIREMENTS PRIOR TO INSTALLATION OF FOOTINGS.
8. CONTRACTOR TO ALLOW FOR GEOTECHNICAL ENGINEER TO INSPECT AND CERTIFY THE REQUIRED BEARING CARACITIES HAVE BEEN ACHIEVED BEFORE CASTING FOOTINGS.
9. FINAL PILE DESIGN TO BE UNDER TAKEN BY CONTRACTOR.

PLOTTED BY: A.WON 16/10/2015 8:42:27 AM

A0 0 1 2 3 4 5 6 7 8 9 10

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Project: BROOKVALE COMMUNITY HEALTH CENTRE, 612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject: CARPARK LEVEL 1 OUTLINE PLAN

Scale : A0: As indicated | Drawn: A.W | Authorised: K.B

Job No: 121211 K | Drawing No: ST-TD-1201 | Revision: P1

16/10/2015 8:42:27 AM

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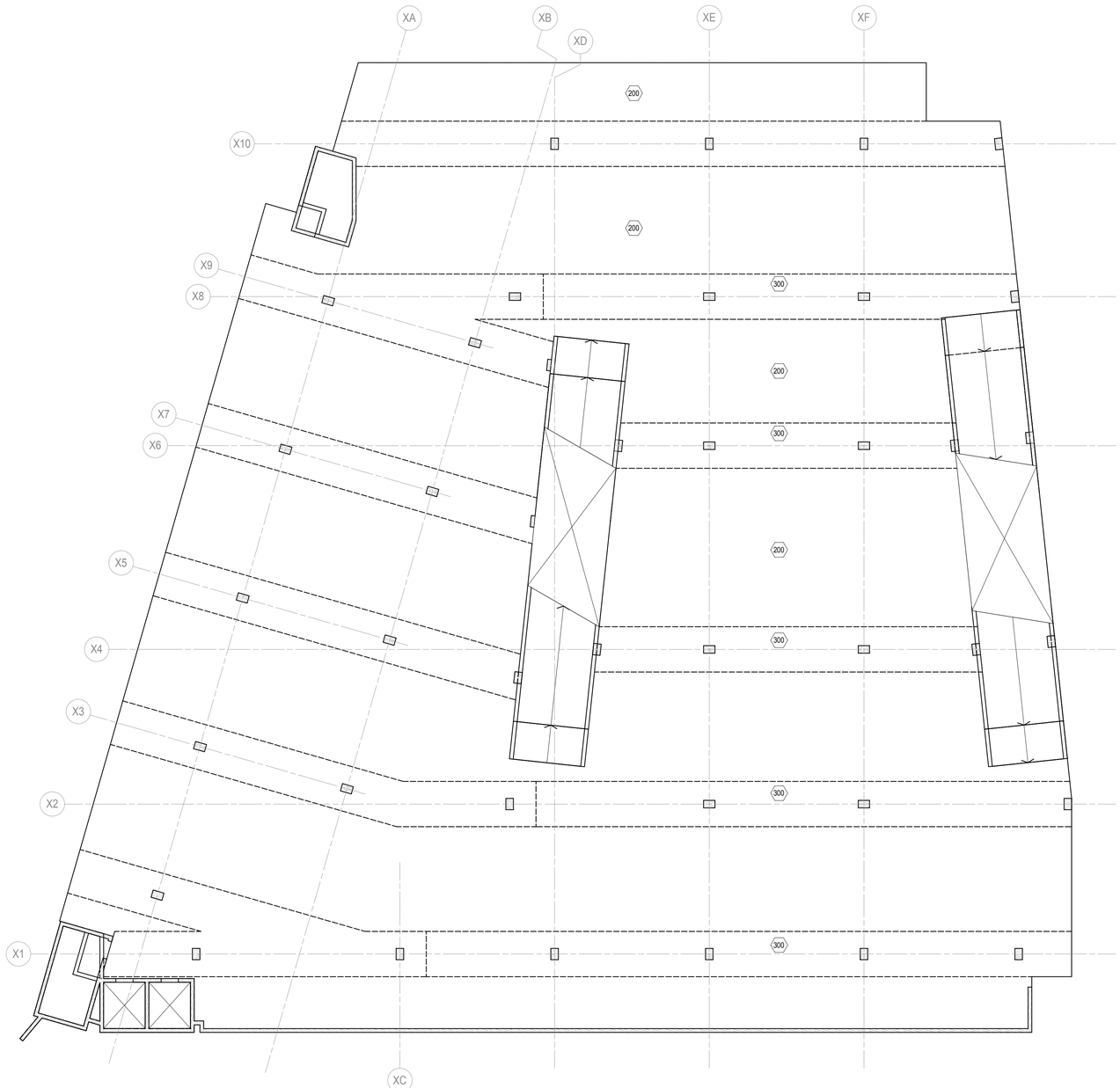

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

CARPARK LEVEL 2 OUTLINE PLAN - 160 SLAB U.N.O.

SCALE 1:100

NOTES:
1. ALL BANDS WIDTH 2400 U.N.O.
2. ALL BANDS DEPTH 400 U.N.O.
3. ALL FALLS IN SLAB TO ARCHITECTS DRAWINGS

PLOTTED BY: A.WON 16/10/2015 8:42:28 AM

A0 0 1 2 3 4 5 6 7 8 9 10

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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
CARPARK LEVEL 2 OUTLINE PLAN

Scale : A0: As indicated
Drawn: A.W
Authorised: K.B
Job No: 121211 K
Drawing No: ST-TD-1351
Revision: P1
16/10/2015 8:42:28 AM

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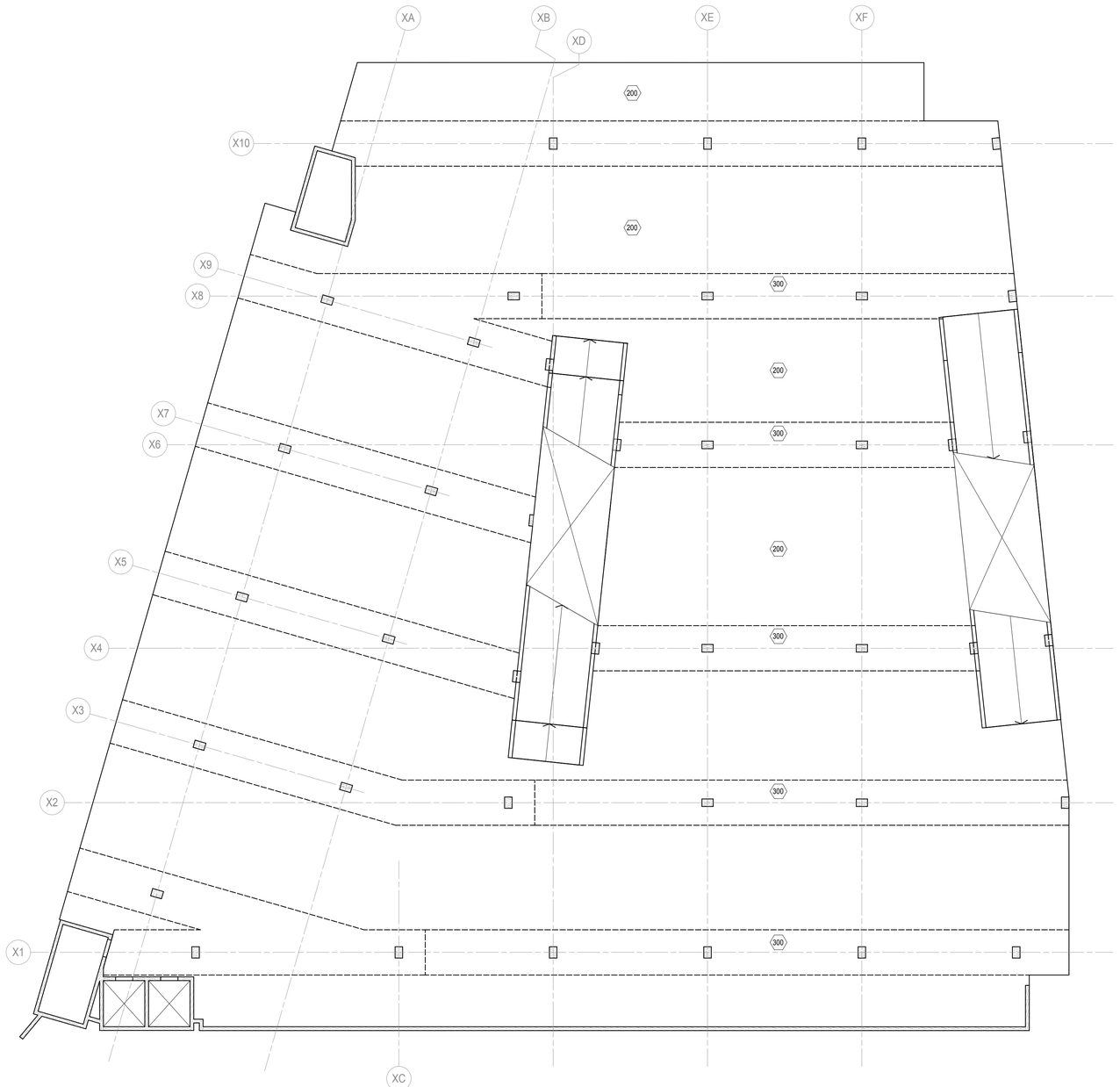

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SC 1	530UB82.0 + 2/10 PLATE	
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CARPARK LEVEL 3 OUTLINE PLAN - 160 SLAB U.N.O.

SCALE 1:100

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1. ALL BANDS WIDTH 2400 U.N.O.
2. ALL BANDS DEPTH 400 U.N.O.

PLOTTED BY: A.WON 16/10/2015 8:42:29 AM

A0 0 1 2 3 4 5 6 7 8 9 10

PRELIMINARY

Rev	Description	Eng	Draft	Date
P1	ISSUED FOR INFORMATION	P.H	A.W	28.08.15

Client: NSW Government Health Infrastructure
Level 8, 77 Pacific Highway
St. Leonards NSW 2065

Project Manager: JOHNSTAFF
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ABN 62 079 352 515

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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Project: BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject: CARPARK LEVEL 3 OUTLINE PLAN

Scale : A0: As indicated
Drawn: A.W
Authorised: K.B
Job No: 121211 K
Drawing No: ST-TD-1401
Revision: P1
16/10/2015 8:42:29 AM

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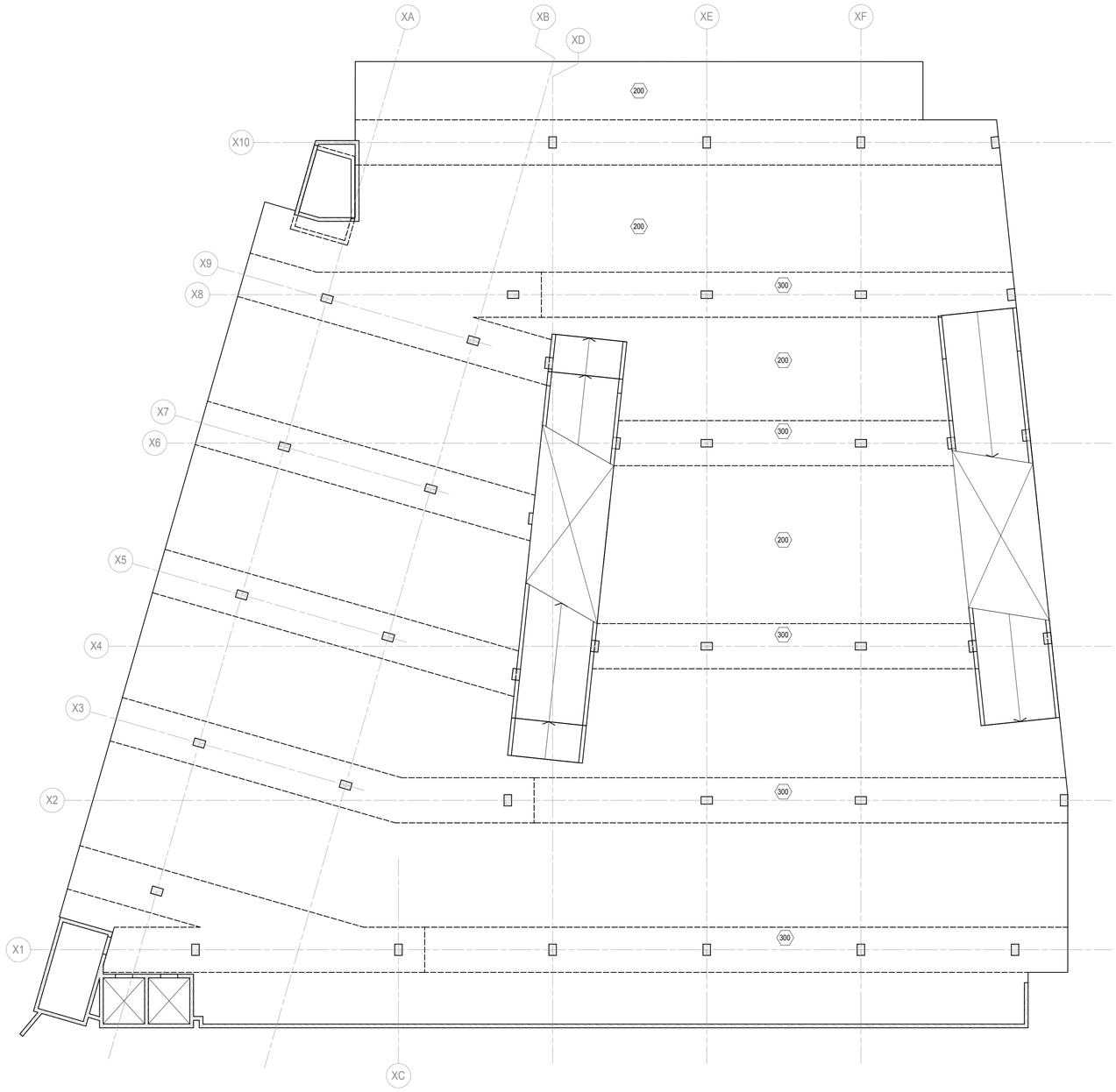

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
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SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

CARPARK LEVEL 4 OUTLINE PLAN - 160 SLAB U.N.O.

SCALE 1:100

NOTES:
1. ALL BANDS WIDTH 2400 U.N.O.
2. ALL BANDS DEPTH 400 U.N.O.

PLOTTED BY: A.W ON: 16/10/2015 8:42:29 AM

A0 0 1 2 3 4 5 6 7 8 9 10

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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Project: BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject: CARPARK LEVEL 4 OUTLINE PLAN

Scale : A0: As indicated
Drawn: A.W
Authorised: K.B
Job No: 121211 K
Drawing No: ST-TD-1451
Revision: P1
16/10/2015 8:42:29 AM

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING NO. ST-TD-001

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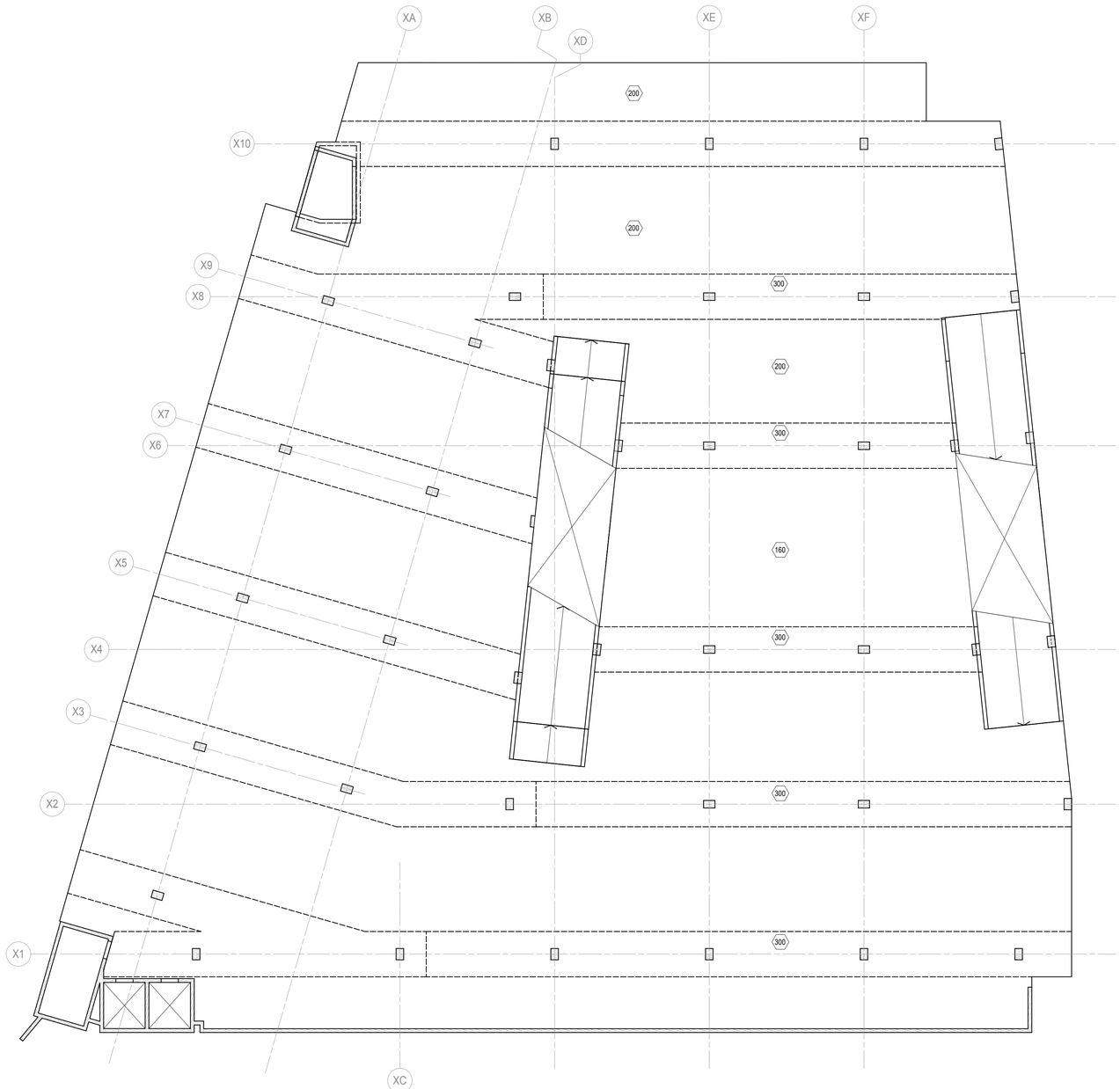

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC_1	530UB82.0 + 2/10 PLATE	
SC_2	150x150x6.0 SHS	
SC_3	89x89x6.0 SHS	
SC_4	150x50x6.0 RHS	

CARPARK LEVEL 5 OUTLINE PLAN - 160 SLAB U.N.O.

SCALE 1:100

NOTES:
1. ALL BANDS WIDTH 2400 U.N.O.
2. ALL BANDS DEPTH 400 U.N.O.

PLOTTED BY: A.WON 16/10/2015 8:42:30 AM

A0 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	ISSUED FOR INFORMATION	P.H	A.W	28.08.15

Client: Health Infrastructure, Level 8, 77 Pacific Highway, St. Leonards NSW 2065

Project Manager: Johnstaff, Level 8, 16 O'Connell Street Sydney NSW 2000, P: +612 8934 2222, F: +612 8934 0001, ABN 62 079 352 515

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Project: BROOKVALE COMMUNITY HEALTH CENTRE, 612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject: CARPARK LEVEL 5 OUTLINE PLAN

Scale : A0: As indicated | Drawn: A.W | Authorised: K.B

Job No: 121211 K | Drawing No: ST-TD-1501 | Revision: P1

16/10/2015 8:42:30 AM

PRELIMINARY

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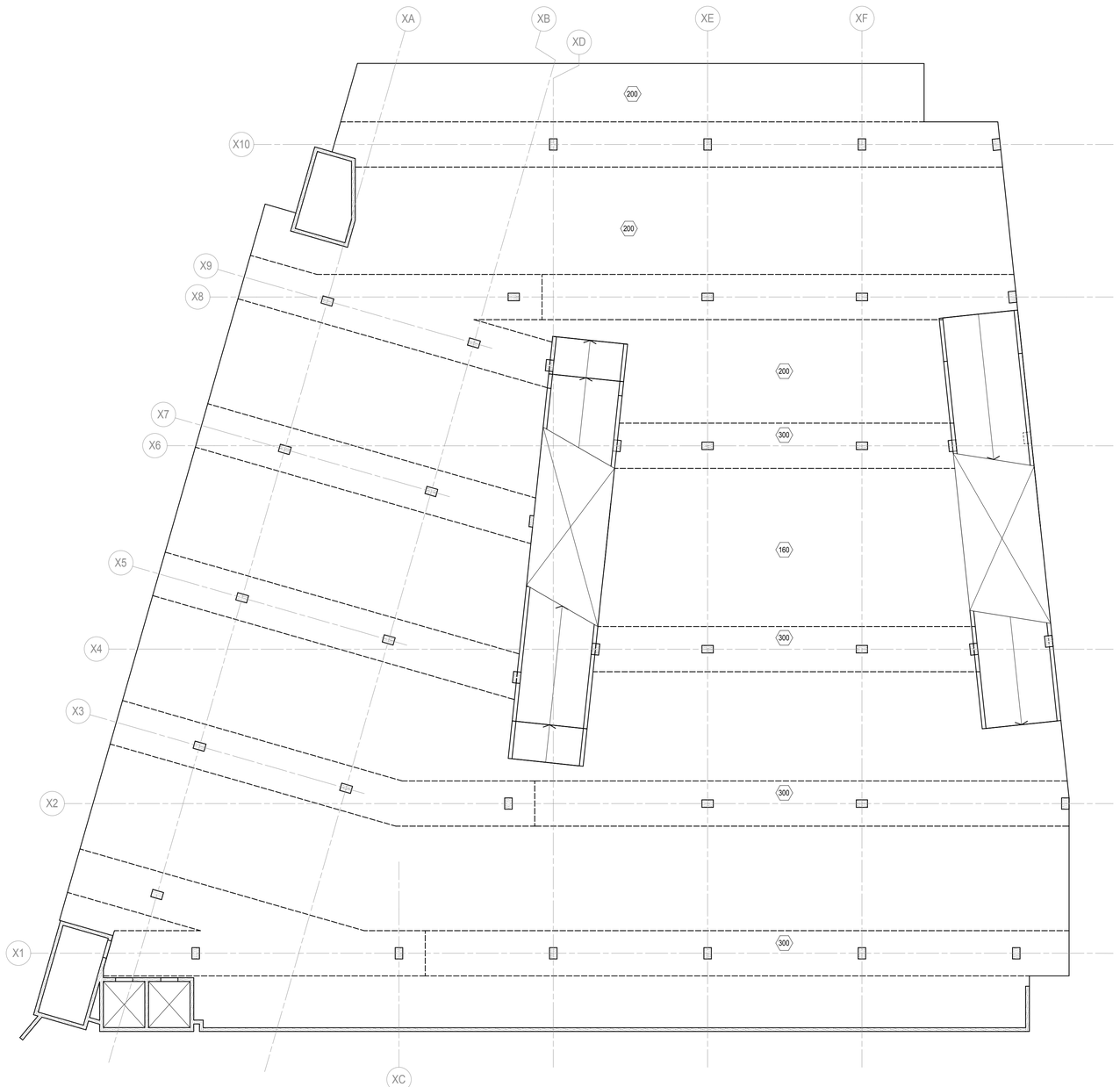

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC 1	530UB82.0 + 2/10 PLATE	
SC 2	150x150x6.0 SHS	
SC 3	89x89x6.0 SHS	
SC 4	150x50x6.0 RHS	

CARPARK LEVEL 6 OUTLINE PLAN - 160 SLAB U.N.O.

SCALE 1:100

NOTES:
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PLOTTED BY: A.WON 16/10/2015 8:42:30 AM

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Project
BROOKVALE COMMUNITY HEALTH CENTRE
612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
CARPARK LEVEL 6 OUTLINE PLAN

Scale : A0: As indicated
Drawn: A.W
Authorised: K.B
Job No: 121211 K
Drawing No: ST-TD-1551
Revision: P1
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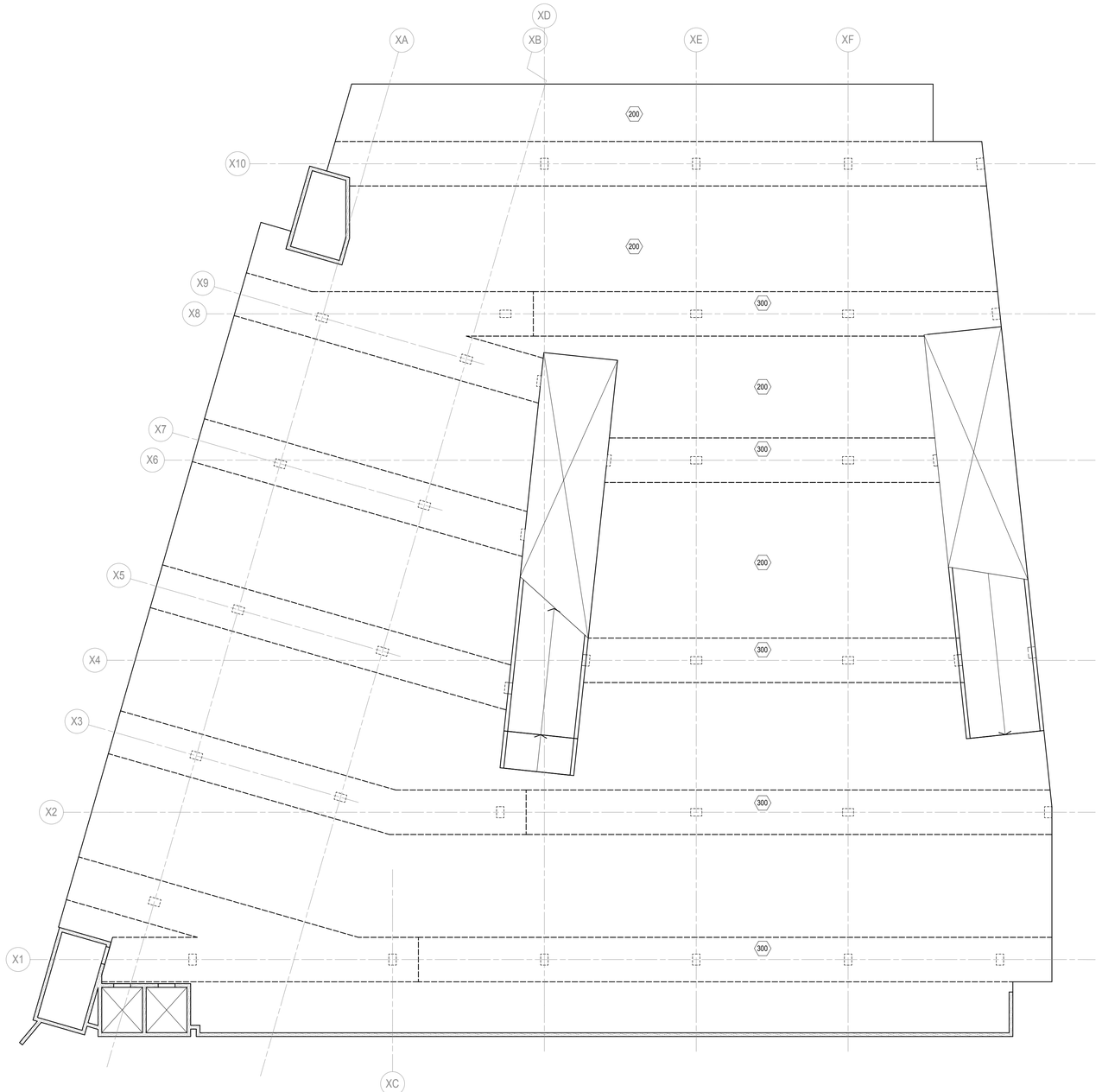

STEEL COLUMN SCHEDULE		
MARK	TYPE	COMMENT
SC_1	530UB82.0 + 2/10 PLATE	
SC_2	150x150x6.0 SHS	
SC_3	89x89x6.0 SHS	
SC_4	150x50x6.0 RHS	

CARPARK LEVEL 7 OUTLINE PLAN - 160 SLAB U.N.O.

NOTES:
1. ALL BANDS 2400W X 400D U.N.O.

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A0 0 1 2 3 4 5 6 7 8 9 10

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612-624 PITTWATER ROAD, BROOKVALE, NSW

Sheet Subject
CARPARK LEVEL 7 OUTLINE PLAN

Scale : A0: As indicated
Drawn: A.W
Authorised: K.B
Job No: 121211 K
Drawing No: ST-TD-1601
Revision: P1
16/10/2015 8:42:31 AM

PRELIMINARY

Appendix B: Geotechnical Report

SMEC Testing Services Pty Ltd
ACN 101 164 702 ABN 22 101 164 702
CONSULTING GEOTECHNICAL & ENVIRONMENTAL ENGINEERS
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3 Dingadee Place
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NSW 2164
Phone: (02) 9756 2166 Fax: (02) 9756 1137
Email: enquiries@smectesting.com.au
PO BOX 6969
Wetherill Park
NSW 2164

GEOTECHNICAL INVESTIGATION
CNR. OF WILLIAM STREET AND PITTWATER ROAD, BROOKVALE

FOR

SMEC AUSTRALIA PTY LIMITED

PROJECT NO. 19733/4378C **JUNE 2014**
REPORT NO. 14/1207

TABLE OF CONTENTS **PAGE NO.**

1. INTRODUCTION

This report presents the results of a geotechnical investigation undertaken by SMEC Testing Services Pty Limited (STS) for a proposed new development to be constructed at the corner of William Street and Pittwater Road, Brookvale (the 'site'). The proposed development will include several above ground levels. A basement excavation is not proposed at this time.

The purpose of the investigation was to:

- determine the subsurface conditions over the site including groundwater depth,
- provide recommendations regarding the appropriate foundation system for the site including design parameters,
- comment on the aggressivity of the soils to buried steel and concrete.

The work was carried out at the request of Daniel Saunders of SMEC Australia Pty Limited.

SMEC Australia is separately providing an environmental report for the subject site. This geotechnical report will not provide comments on the results of the environmental investigation.

2. NATURE OF THE INVESTIGATION

2.1 Fieldwork Details

The geotechnical fieldwork consisted of drilling five (5) boreholes numbered BH1 to BH5, inclusive, at the locations shown on Drawing No. 14/1207. The boreholes were drilled using an Edson RP70 drilling rig owned and operated by SMEC Testing Services Pty Limited. The boreholes were advanced using solid flight augers and were drilled at

locations nominated by SMEC Australia. In order to determine soil strengths, Dynamic cone penetrometer (DCP) tests were carried out at each geotechnical borehole location. Drilling operations were undertaken by one of STS's senior geologists who also logged the subsurface conditions encountered.

The subsurface conditions observed are recorded on the borehole logs in Appendix A. An explanation of the terms used on the logs is also given in Appendix A. Notes relating to geotechnical reports are also attached.

2.2 Laboratory Testing

For the purpose of assessing the soil aggressiveness representative samples were tested to determine pH, sulphate content and chloride content. These tests were carried out at the laboratory of Envirolab who are NATA accredited for these tests.

Detailed test reports are given in Appendix B.

3. GEOLOGY AND SITE CONDITIONS

The Sydney geological series sheet at a scale of 1:100,000 shows that part of the site is underlain by the Quaternary Age alluvial soils comprising silty sand, silt and clay. The site is located close to a geological boundary with Triassic Age Hawkesbury Sandstone. Rocks within this formation typically consist of medium to quartz grained sandstone with minor shale and laminite lenses.

At the time of the fieldwork, there were several existing buildings and structures present on the site, these typically comprised factory units, a single storey brick house and a multi storey concrete building. The existing surface comprised a mixture of asphaltic concrete and concrete pavements. Site vegetation comprised grass, weeds and shrubs. The groundsurface falls about 2.5 metres towards the northwest.

4. SUBSURFACE CONDITIONS

When making an assessment of the subsurface conditions across a site from a limited number of boreholes there is the possibility that variations may occur between test locations. The data derived from the site investigation programme are extrapolated across the site to form a geological model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. The actual conditions at the site may differ from those inferred, since no subsurface exploration programme, no matter how comprehensive, can reveal all subsurface details and anomalies.

The subsurface conditions generally consist of concrete and fill overlying clayey silty sands, silty sands, clayey sands, sandy silty clays, sandy clays, silty clays and weathered sandstone. Concrete was cored in BH5 and has thicknesses of 120 mm. Fill was observed across the site to depths 1.2 to 1.5 metres. The fill appears to be uncontrolled and contains gravel, ash and sandstone pieces.

Underlying the concrete and fill are natural clayey silty sands, silty sands, clayey sands, sandy silty clays, sandy clays and silty clays to depths of 1.2 to 8.5 metres. The strength of these materials varied between very loose/firm to stiff, becoming very stiff with depth. Sandstone bedrock was encountered in all geotechnical boreholes to the depth of auger refusal, 1.7 to 9.7 metres. The bedrock becomes shallower towards the south.

Groundwater was observed in the boreholes during drilling at depths of 1.8 to 3.8 metres. Due to the shallow nature of the groundwater, piezometers were not installed.

5. GEOTECHNICAL ASSESSMENT

5.1 Site Classification

The classification has been prepared in accordance with the guidelines set out in the Residential Slabs and Footings" Code, AS2870 - 2011.

More than 400 mm of uncontrolled fill is present, therefore the site is classified a *problem site (P).*

5.2 Foundations

The allowable bearing pressures given below have been determined using the procedures given by Pells et al, in their paper titled "Design Loadings for Foundations on Shale and Sandstone in the Sydney Region," published in the Australian Geomechanics Journal, 1998.

The fill materials encountered on the site do not appear to have been placed in a controlled manner, and therefore must not be relied upon for support. It is recommended that the loads be transferred to the underlying natural materials using piers.

Piers founded in the very stiff clays may be proportioned using an allowable bearing pressure of 450 kPa, provided that their depth to diameter ratio exceeds a value of 4. An allowable adhesion of 20 kPa applies to the portion of the shaft within the natural soils.

Piers founded in weathered sandstone may be proportioned using an allowable bearing pressure of 800 kPa. An allowable adhesion of 80 kPa applies to the portion of the shaft within the weathered rock. When piers are founded in weathered rock the adhesion in the overlying soils must be ignored. These values may be increased to 1000 kPa and 100 kPa respectively when founding below the depth of auger refusal as noted on the borehole logs.

The boreholes encountered alluvial soils and uncontrolled fill with a high water table, therefore the site will not be suitable for open hole bored piers. In this regard the site may be better suited to either steel screw piers or continuous flight auger (CFA) grout injected piers.

In order to ensure the bearing values given can be achieved, care should be taken to ensure the base of the excavations is free of all loose material prior to concreting. To this end, it is recommended that all excavations be concreted as soon as possible, preferably immediately after excavation, cleaning, inspection and approval.

During construction it is recommended that the founding level be inspected by a geotechnical engineer to assess adequate bearing has been achieved.

5.3 Soil Aggressiveness

The aggressiveness or erosion potential of an environment in building materials, particularly concrete and steel is dependent on the levels of soil pH and the types of salts present, generally sulphates and chlorides. In order to determine the degree of aggressiveness, the test values obtained are compared to Tables 6.4.2 (C) and 6.5.2 (C) in AS2159 – 2009 Piling – Design and Installation. The test results are summarised in the table below.

Sample No.	Location	Depth (m)	Chloride (mg/kg)	pH	Sulfate (mg/kg)
GB1 2.0	BH1	2.0	<10	6.1	10
GB1 3.5	BH2	3.5	<10	5.8	57

The report results range between:

- pH - 5.8 and 6.1
- soluble SO_4 - 10 and 57 mg/kg (ppm)
- soluble chloride - <10 mg/kg (ppm)

The soils on the site consist of sands and clays below the water table. Therefore, the soil conditions A are considered appropriate.

A review of the durability aspects indicates that:

- pH : minimum value of 5.8
- SO_4 : maximum 57 mg/kg (ppm) < 5000 ppm
- C1 : maximum <10 mg/kg (ppm) < 5000 ppm

The exposure classification for the onsite soils is non-aggressive for steel and mildly aggressive for concrete.

6. FINAL COMMENTS

During construction should the subsurface conditions vary to those inferred in this report, a suitably experienced geotechnical engineer should review the design and recommendations given above to determine if any alterations are required.

Matt Green BSC Hons
Engineering Geologist

Laurie Ihnativ, BE, MEngSc, MBA, FIE Aust.
Manager, SMEC Testing Services Pty Limited

SMEC TESTING SERVICES Pty. Ltd.	Scale: Unknown	Date: June 2014
Client: SMEC AUSTRALIA		
PRELIMINARY GEOTECHNICAL INVESTIGATION **CNR WILLIAM STREET & PITTWATER ROAD, BROOKVALE** **BOREHOLE AND PENETROMETER LOCATIONS**	Project No. 19733/4378C Drawing No: 14/1207	

NOTES RELATING TO GEOTECHNICAL REPORTS

Introduction

These notes have been provided to outline the methodology and limitations inherent in geotechnical reporting. The issues discussed are not relevant to all reports and further advice should be sought if there are any queries regarding any advice or report.

When copies of reports are made, they should be reproduced in full.

Geotechnical Reports

Geotechnical reports are prepared by qualified personnel on the information supplied or obtained and are based on current engineering standards of interpretation and analysis.

Information may be gained from limited subsurface testing, surface observations, previous work and is supplemented by knowledge of the local geology and experience of the range of properties that may be exhibited by the materials present. For this reason, geotechnical reports should be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Where the report has been prepared for a specific purpose (eg. design of a three-storey building), the information and interpretation may not be appropriate if the design is changed (eg. a twenty storey building). In such cases, the report and the sufficiency of the existing work should be reviewed by SMEC Testing Services Pty Limited in the light of the new proposal.

Every care is taken with the report content, however, it is not always possible to anticipate or assume responsibility for the following conditions:

- Unexpected variations in ground conditions. The potential for this depends on the amount of investigative work undertaken.
- Changes in policy or interpretation by statutory authorities.
- The actions of contractors responding to commercial pressures.

If these occur, SMEC Testing Services Pty Limited would be pleased to resolve the matter through further investigation, analysis or advice.

Unforeseen Conditions

Should conditions encountered on site differ markedly from those anticipated from the information contained in the report, SMEC Testing Services Pty Limited should be notified immediately. Early identification of site anomalies generally results in any problems being more readily resolved and allows re-interpretation and assessment of the implications for future work.

Subsurface Information

Logs of a borehole, recovered core, test pit, excavated face or cone penetration test are an engineering and/or geological interpretation of the subsurface conditions. The reliability of the logged information depends on the drilling/testing method, sampling and/or observation spacings and the ground conditions. It is not always possible or economic to obtain continuous high quality data. It should also be recognised that the volume or material observed or tested is only a fraction of the total subsurface profile.

Interpretation of subsurface information and application to design and construction must take into consideration the spacing of the test locations, the frequency of observations and testing, and the possibility that geological boundaries may vary between observation points.

Groundwater observations and measurements outside of specially designed and constructed piezometers should be treated with care for the following reasons:

- In low permeability soils groundwater may not seep into an excavation or bore in the short time it is left open.
- A localised perched water table may not represent the true water table.
- Groundwater levels vary according to rainfall events or season.
- Some drilling and testing procedures mask or prevent groundwater inflow.

The installation of piezometers and long term monitoring of groundwater levels may be required to adequately identify groundwater conditions.

Supply of Geotechnical Information or Tendering Purposes

It is recommended tenderers are provided with as much geological and geotechnical information that is available and that where there are uncertainties regarding the ground conditions, prospective tenders should be provided with comments discussing the range of likely conditions in addition to the investigation data.

APPENDIX A

BOREHOLE LOGS AND EXPLANATION SHEETS

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: SMEC Australia
Project: Cnr William Street and Pittwater Road, Brookvale
Location: Refer to Drawing No. 14/1207

Project No.: 19733/4378C
Date : June 6, 2014
Logged: JK

BOREHOLE NO.: BH 1

Sheet 1 of 2

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			ASPHALT: (70 mm thick)			
			SANDY GRAVEL: dark grey, fine to medium grained, dark grey gravel/ash	GW	VERY LOOSE TO LOOSE	D
		1.0	ASH/FILL			
			SILTY SAND: dark grey, fine to medium grained, trace of clay	SM	VERY LOOSE	M
WT						
	GB1 @ 2.0 m	2.0				
			CLAYEY SILTY SAND: dark grey, fine to medium grained	SM	VERY LOOSE	W
		3.0	SILTY SANDY CLAY: red brown, fine to medium grained, low plasticity	CL	STIFF	W
	GB1 @ 3.6 m		SANDY CLAY: orange brown with light grey and red brown, fine to medium grained, medium plasticity, occasional gravel	CL	VERY STIFF	M
		4.0				
		5.0				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: SMEC Australia
Project: Cnr William Street and Pittwater Road, Brookvale
Location: Refer to Drawing No. 14/1207

Project No.: 19733/4378C
Date : June 6, 2014
Logged: JK

BOREHOLE NO.: BH 1

Sheet 2 of 2

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			SANDY CLAY: orange brown with light grey and red brown, fine to medium grained, medium plasticity, occasional gravel	CL	VERY STIFF	M
		7.0				
		8.0				
			WEATHERED SANDSTONE: light grey with orange brown and red brown, fine to medium grained		EXTREMELY LOW STRENGTH	M-D
		9.0				
			AUGER REFUSAL AT 9.7 M ON WEATHERED SANDSTONE			
		10.0				
		11.0				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: SMEC Australia
Project: Cnr William Street and Pittwater Road, Brookvale
Location: Refer to Drawing No. 14/1207

Project No.: 19733/4378C
Date : June 6, 2014
Logged: JK

BOREHOLE NO.: BH 2

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			ASPHALT: (50 mm thick)			
			SANDY GRAVEL: dark grey, fine to medium grained	GW	LOOSE	D
			CLAYEY GRAVELLY SAND: light brown with dark grey and red brown, fine to medium grained	GP	LOOSE	M-D
		1.0	FILL			
			SANDY CLAY: light grey with orange brown/yellow brown, fine to medium grained, medium plasticity	CL	SOFT TO FIRM	M-VM
		2.0			FIRM TO STIFF	
					STIFF	
		3.0			VERY STIFF	
WT						
		4.0				
			SILTY CLAY: yellow brown with light grey, medium to high plasticity	CL/CH	VERY STIFF	M-VM
		5.0				
			WEATHERED SANDSTONE: light grey with occasional orange brown, fine to medium grained		EXTREMELY LOW STRENGTH	D
			AUGER REFUSAL AT 5.7 M ON WEATHERED SANDSTONE			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: SMEC Australia
Project: Cnr William Street and Pittwater Road, Brookvale
Location: Refer to Drawing No. 14/1207

Project No.: 19733/4378C
Date : June 6, 2014
Logged: JK

BOREHOLE NO.: BH 3

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			GRAVELLY SANDY CLAY: light grey with light brown, fine to medium grained, low plasticity, gravel	CL	VARIABLE	M
		1.0	SANDSTONE/FILL			
			SANDY CLAY: light grey/dark grey, fine to medium grained, medium plasticity	CL	FIRM	M
		2.0			STIFF	
		3.0			VERY STIFF	
			WEATHERED SANDSTONE: yellow brown/orange brown, fine to medium grained		EXTREMELY LOW STRENGTH	D
			AUGER REFUSAL AT 3.5 M ON WEATHERED SANDSTONE			
		4.0				
		5.0				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: SMEC Australia
Project: Cnr William Street and Pittwater Road, Brookvale
Location: Refer to Drawing No. 14/1207

Project No.: 19733/4378C
Date : June 6, 2014
Logged: JK

BOREHOLE NO.: BH 4

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			CLAYEY SILTY SAND: dark brown, fine to medium grained, occasional gravel	SM	LOOSE	M-VM
			TOPSOIL/FILL			
			SANDY CLAY: yellow brown with orange brown, fine to medium grained, occasional gravel, low plasticity	CL	FIRM TO STIFF	M
		1.0	FILL			
			SANDY CLAY: light grey with orange brown, fine to medium grained, medium plasticity	CL	STIFF	M
		2.0			VERY STIFF	
		3.0	WEATHERED SANDSTONE: orange brown with light grey, fine to medium grained, clayey seams		EXTREMELY LOW STRENGTH	M-D
			AUGER REFUSAL AT 3.5 M ON WEATHERED SANDSTONE			
		4.0				
		5.0				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: SMEC Australia
Project: Cnr William Street and Pittwater Road, Brookvale
Location: Refer to Drawing No. 14/1207

Project No.: 19733/4378C
Date : June 6, 2014
Logged: JK

BOREHOLE NO.: BH 5

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			CONCRETE: (120 mm thick)			
			CLAYEY SAND: orange brown, fine to medium grained, occasional gravel	SC	FIRM	M
			SANDY CLAY: orange brown with light grey, fine to medium grained, medium plasticity, occasional gravel	CL	FIRM TO STIFF	M
		1.0	SANDY CLAY: light grey with orange brown, fine to medium grained, low plasticity	CL	STIFF TO VERY STIFF	M-D
			WEATHERED SANDSTONE: light grey with orange brown, fine to medium grained, clayey seams		EXTREMELY LOW STRENGTH	D
			AUGER REFUSAL AT 1.7 M ON WEATHERED SANDSTONE			
		2.0				
		3.0				
		4.0				
		5.0				

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

SMEC Testing Services Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 Fax: (02)9756 1137 Email: enquiries@smectesting.com.au

Dynamic Cone Penetrometer Test Report

Project: Cnr William Street & Pittwater Road, Brookvale
Client: SMEC Australia
Address: PO Box 1052, North Sydney
Test Method: AS 1289.6.3.2

Project No.: 19733/4378C
Report No.: 14/1207
Report Date: 10/06/2014

Site No.	P1	P2	P3	P4		P1	P2	P3	P4
Location	Refer to Drawing No. 14/1207	Refer to Drawing No. 14/1207	Refer to Drawing No. 14/1207	Refer to Drawing No. 14/1207					
Starting Level	Surface Level	Surface Level	Surface Level	Surface Level					
Depth (m)	Penetration Resistance (blows / 150mm)				Depth (m)	Penetration Resistance (blows / 150mm)			
0.00 - 0.15	*	*	22	1	3.00 - 3.15	6	10	18	
0.15 - 0.30	*	*	Refusal	2	3.15 - 3.30	7	12	22	
0.30 - 0.45	2	2	*	2	3.30 - 3.45	11	14	Refusal	
0.45 - 0.60	3	3	*	3	3.45 - 3.60	12	19		
0.60 - 0.75	2	4	*	3	3.60 - 3.75	13	22		
0.75 - 0.90	3	5	5	5	3.75 - 3.90	14	Refusal		
0.90 - 1.05	1	3	4	4	3.90 - 4.05	16			
1.05 - 1.20	1	2	6	4	4.05 - 4.20	18			
1.20 - 1.35	2	2	2	3	4.20 - 4.35	22			
1.35 - 1.50	1	1	2	5	4.35 - 4.50	Refusal			
1.50 - 1.65	2	2	2	4	4.50 - 4.65				
1.65 - 1.80	1	2	2	4	4.65 - 4.80				
1.80 - 1.95	1	2	2	4	4.80 - 4.95				
1.95 - 2.10	1	3	3	5	4.95 - 5.10				
2.10 - 2.25	1	3	4	8	5.10 - 5.25				
2.25 - 2.40	1	4	5	12	5.25 - 5.40				
2.40 - 2.55	1	5	6	14	5.40 - 5.55				
2.55 - 2.70	1	7	8	22	5.55 - 5.70				
2.70 - 2.85	1	8	14	Refusal	5.70 - 5.85				
2.85 - 3.00	1	8	10		5.85 - 6.00				

Remarks: * = Pre-drilled hole prior to testing

Approved Signatory..... .....
Technician: JK
Laurie Ihnativ - Manager

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Dynamic Cone Penetrometer Test Report

Project: Cnr William Street & Pittwater Road, Brookvale
Client: SMEC Australia
Address: PO Box 1052, North Sydney
Test Method: AS 1289.6.3.2

Project No.: 19733/4378C
Report No.: 14/1207
Report Date: 10/06/2014

Site No.	P5								
Location	Refer to Drawing No. 14/1207								
Starting Level	Surface Level								
Depth (m)	Penetration Resistance (blows / 150mm)				Depth (m)	Penetration Resistance (blows / 150mm)			
0.00 - 0.15	*				3.00 - 3.15				
0.15 - 0.30	*				3.15 - 3.30				
0.30 - 0.45	2				3.30 - 3.45				
0.45 - 0.60	3				3.45 - 3.60				
0.60 - 0.75	3				3.60 - 3.75				
0.75 - 0.90	4				3.75 - 3.90				
0.90 - 1.05	5				3.90 - 4.05				
1.05 - 1.20	9				4.05 - 4.20				
1.20 - 1.35	19				4.20 - 4.35				
1.35 - 1.50	22				4.35 - 4.50				
1.50 - 1.65	Refusal				4.50 - 4.65				
1.65 - 1.80					4.65 - 4.80				
1.80 - 1.95					4.80 - 4.95				
1.95 - 2.10					4.95 - 5.10				
2.10 - 2.25					5.10 - 5.25				
2.25 - 2.40					5.25 - 5.40				
2.40 - 2.55					5.40 - 5.55				
2.55 - 2.70					5.55 - 5.70				
2.70 - 2.85					5.70 - 5.85				
2.85 - 3.00					5.85 - 6.00				

Remarks: * = Pre-drilled hole prior to testing

Approved Signatory..... .....
Technician: JK
Laurie Ihnativ - Manager

E1. CLASSIFICATION OF SOILS

E1.1 Soil Classification and the Unified System

An assessment of the site conditions usually includes an appraisal of the data available by combining values of engineering properties obtained by the site investigation with descriptions, from visual observation of the materials present on site.

The system used by SMEC in the identification of soil is the Unified Soil Classification system (USC) which was developed by the US Army Corps of Engineers during World War II and has since gained international acceptance and has been adopted in its metricated form by the Standards Association of Australia.

The Australian Site Investigation Code (AS1726-1981, Appendix D) recommends that the description of a soil includes the USC group symbols which are an integral component of the system.

The soil description should contain the following information in order:

Soil composition

- SOIL NAME and USC classification symbol (IN BLOCK LETTERS)
- plasticity or particle characteristics
- colour
- secondary and minor constituents (name estimated proportion, plasticity or particle characteristics, colour

Soil condition

- moisture condition
- consistency or density index

Soil structure

- structure (zoning, defects, cementing)

Soil origin

interpretation based on observation eg FILL, TOPSOIL, RESIDUAL, ALLUVIUM.

E1.2 Soil Composition

(a) Soil Name and Classification Symbol

The USC system is summarized in Figure E1.2.1. The primary division separates soil types on the basis of particle size into:

- Coarse grained soils - more than 50% of the material less than 60 mm is larger than 0.06 mm (60 µm).

- Fine grained soils - more than 50% of the material less than 60 mm is smaller than 0.06 mm (60 µm).

Initial classification is by particle size as shown in Table E1.2.1. Further classification of fine grained soils is based on plasticity.

TABLE E1.2.1 - CLASSIFICATION BY PARTICLE SIZE

NAME	SUB-DIVISION	SIZE
Clay (1)		< 2 µm
Silt (2)		2 µm to 60 µm
Sand	Fine Medium Coarse	60 µm to 200 µm 200 µm to 600 µm 600 µm to 2 mm
Gravel (3)	Fine Medium Coarse	2 mm to 6 mm 6 mm to 20 mm 20 mm to 60 mm
Cobbles (3)		60 mm to 200 mm
Boulders (3)		> 200 mm

Where a soil contains an appropriate amount of secondary material, the name includes each of the secondary components (greater than 12%) in increasing order of significance, eg sandy silty clay.

Minor components of a soil are included in the description by means of the terms “some” and “trace” as defined in Table E1.2.2.

TABLE E1.2.2 - MINOR SOIL COMPONENTS

TERM	DESCRIPTION	APPROXIMATE PROPORTION (%)
Trace	presence just detectable, little or no influence on soil properties	0-5
Some	presence easily detectable, little influence on soil properties	5-12

The USC group symbols should be included with each soil description as shown in Table E1.2.3

TABLE E1.2.3 - SOIL GROUP SYMBOLS

SOIL TYPE	PREFIX
Gravel	G
Sand	S
Silt	M
Clay	C
Organic	O
Peat	Pt

The group symbols are combined with qualifiers which indicate grading, plasticity or secondary components as shown on Table E1.2.4

TABLE E1.2.4 - SOIL GROUP QUALIFIERS

SUBGROUP	SUFFIX
Well graded	W
Poorly Graded	P
Silty	M
Clayey	C
Liquid Limit <50% - low to medium plasticity	L
Liquid Limit >50% - low to medium plasticity	H

(b) Grading

"Well graded" Good representation of all particle sizes from the largest to the smallest.

"Poorly graded" One or more intermediate sizes poorly represented

"Gap graded" One or more intermediate sizes absent

"Uniformly graded" Essentially single size material.

(c) Particle shape and texture

The shape and surface texture of the coarse grained particles should be described.

Angularity may be expressed as "rounded", "sub-rounded", "sub-angular" or "angular".

Particle **form** can be "equidimensional", "flat" or elongate".

Surface texture can be "glassy", "smooth", "rough", pitted" or striated".

(d) Colour

The colour of the soil should be described in the moist condition using simple terms such as:

Black White Grey Red
Brown Orange Yellow Green
Blue

These may be modified as necessary by "light" or "dark". Borderline colours may be described as a combination of two colours, eg. red-brown.

For soils that contain more than one colour terms such as:

- Speckled Very small (<10 mm dia) patches
- Mottled Irregular
- Blotched Large irregular (>75 mm dia)
- Streaked Randomly oriented streaks

(e) Minor Components

Secondary and minor components should be individually described in a similar manner to the dominant component.

E1.3 ***S****oil Condition*

(a) Moisture

Soil moisture condition is described as "dry", "moist" or "wet".

The moisture categories are defined as:
Dry (D) - Little or no moisture evident. Soils are running.
Moist (M) - Darkened in colour with cool feel. Granular soil particles tend to adhere. No free water evident upon remoulding of cohesive soils.

In addition the moisture content of cohesive soils can be estimated in relation to their liquid or plastic limit.

(b) Consistency

Estimates of the consistency of a clay or silt soil may be made from manual examination, hand penetrometer test, SPT results or from laboratory tests to determine undrained shear or unconfined compressive strengths. The classification of consistency is defined in Table E1.3.1.

TABLE E1.3.1 - CONSISTENCY OF FINE-GRAINED SOILS

TERM	UNCONFINED STRENGTH (kPa)	FIELD IDENTIFICATION
Very Soft	<25	Easily penetrated by fist. Sample exudes between fingers when squeezed in the fist.
Soft	25 – 50	Easily moulded in fingers. Easily penetrated 50 mm by thumb.
Firm	50 – 100	Can be moulded by strong pressure in the fingers. Penetrated only with great effort.
Stiff	100 – 200	Cannot be moulded in fingers. Indented by thumb but penetrated only with great effort.
Very Stiff	200 – 400	Very tough. Difficult to cut with knife. Readily indented with thumb nail.
Hard	>400	Brittle, can just be scratched with thumb nail. Tends to break into fragments.

Unconfined compressive strength as derived by a hand penetrometer can be taken as approximately double the undrained shear strength ($q_u = 2\ c_u$).

(c) Density Index

The insitu density index of granular soils can be assessed from the results of SPT or cone penetrometer tests. Density index should not be estimated visually.

TABLE E1.3.2 - DENSITY OF GRANULAR SOILS

TERM	SPT N VALUE	STATIC CONE VALUE q_c (MPa)	DENSITY INDEX (%)
Very Loose	0 – 3	0 - 2	0 - 15
Loose	3 – 8	2 - 5	15 - 35
Medium Dense	8 – 25	5 - 15	35 - 65
Dense	25 – 42	15 - 20	65 - 85
Very Dense	>42	>20	>85

E1.4 Soil Structure

(a) Zoning

A sample may consist of several zones differing in colour, grain size or other properties. Terms to classify these zones are:

Layer - continuous across exposure or sample
Lens - discontinuous with lenticular shape
Pocket - irregular inclusion
Each zone should be described, their distinguishing features, and the nature of the interzone boundaries.

(b) Defects

Defects which are present in the sample can include:

- fissures
- roots (containing organic matter)
- tubes (hollow)
- casts (infilled)

Defects should be described giving details of dimensions and frequency. Fissure orientation, planarity, surface condition and infilling should be noted. If there is a tendency to break into blocks, block dimensions should be recorded

E1.5 Soil Origin

Information which may be interpretative but which may contribute to the usefulness of the material description should be included. The most common interpreted feature is the origin of the soil. The assessment of the probable origin is based on the soil material description, soil structure and its relationship to other soil and rock materials.

Common terms used are:

“Residual Soil” - Material which appears to have been derived by weathering from the underlying rock. There is no evidence of transport.

“Colluvium” - Material which appears to have been transported from its original location. The method of movement is usually the combination of gravity and erosion.

“Landslide Debris” - An extreme form of colluvium where the soil has been transported by mass movement. The material is obviously distributed and contains distinct defects related to the slope failure.

“Alluvium” - Material which has been transported essentially by water. Usually associated with former stream activity.

“Fill” - Material which has been transported and placed by man. This can range from natural soils which have been placed in a controlled manner in engineering construction to dumped waste material. A description of the constituents should include an assessment of the method of placement.

E1.6 Fine Grained Soils

The physical properties of fine grained soils are dominated by silts and clays.

The definition of clay and silt soils is governed by their Atterberg Limits. Clay soils are characterised by the properties of cohesion and plasticity with cohesion defines as the ability to deform without rupture. Silts exhibit cohesion but have low plasticity or are non-plastic.

The field characteristics of clay soils include:

- dry lumps have appreciable dry strength and cannot be powdered
- volume changes occur with moisture content variation
- feels smooth when moist with a greasy appearance when cut.

The field characteristics of silt soils include:

- dry lumps have negligible dry strength and can be powdered easily
- dilatancy - an increase in volume due to shearing - is indicted by the presence of a shiny film of water after a hand sample is shaken. The water disappears upon remoulding. Very fine grained sands may also exhibit dilatancy.
- low plasticity index
- feels gritty to the teeth

E1.7 Organic Soils

Organic soils are distinguished from other soils by their appreciable content of vegetable matter, usually derived from plant remains.

The soil usually has a distinctive smell and low bulk density.

The USC system uses the symbol Pt for partly decomposed organic material. The O symbol is combined with suffixes “O” or “H” depending on plasticity.

Where roots or root fibres are present their frequency and the depth to which they are encountered should be recorded. The presence of roots or root fibres does not necessarily mean the material is an “organic material” by classification.

Coal and lignite should be described as such and not simply as organic matter.

APPENDIX B

LABORATORY TEST RESULTS

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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CERTIFICATE OF ANALYSIS 111198

Client:
SMEC Australia
Level 5, 20 Berry St
North Sydney
NSW 2060

Attention: Daniel Saunders

Sample log in details:

Your Reference:	**30011256**		
No. of samples:	31 soil, 6 water		
Date samples received / completed instructions received	09/06/2014	/	09/06/2014

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	10/06/14	/	10/06/14
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	111198-1	111198-2	111198-5	111198-8	111198-10
Your Reference	----------	GB1	GB1	GB2	GB3	GB5
Depth	----------	0.5	2.0	0.5	1.5	11
Date Sampled		6/06/2014	6/06/2014	6/06/2014	6/06/2014	6/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	360	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	590	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	560	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	11	<1
m+p-xylene	mg/kg	<2	<2	<2	16	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	6	<1
Surrogate aaa-Trifluorotoluene	%	78	80	88	82	72

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	111198-11	111198-13	111198-18	111198-19	111198-21
Your Reference	----------	EB1	EB2	EB3	EB4	EB5
Depth	----------	0.3-0.4	0.5-0.6	2.6-2.7	0.2-0.3	1.4-1.5
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	84	86	93	95	97

vTRH(C6-C10)/BTEXN in Soil				
Our Reference:	UNITS	111198-24	111198-26	111198-30
Your Reference	----------	EB6	EB7	QC1
Depth	----------	2.6-2.7	0.2-0.3	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014
TRHC$_6$ - C$_9$	mg/kg	47	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	57	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	57	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	84	89

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	111198-1	111198-2	111198-5	111198-8	111198-10
Your Reference	----------	GB1	GB1	GB2	GB3	GB5
Depth	----------	0.5	2.0	0.5	1.5	11
Date Sampled		6/06/2014	6/06/2014	6/06/2014	6/06/2014	6/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	570	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	440	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	410	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	400	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	330	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	750	<100	<100
Surrogate o-Terphenyl	%	81	87	91	90	86

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	111198-11	111198-13	111198-18	111198-19	111198-21
Your Reference	----------	EB1	EB2	EB3	EB4	EB5
Depth	----------	0.3-0.4	0.5-0.6	2.6-2.7	0.2-0.3	1.4-1.5
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	120
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	230
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	350
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	130
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	130
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	480
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	180
Surrogate o-Terphenyl	%	86	82	79	81	79

svTRH (C10-C40) in Soil				
Our Reference:	UNITS	111198-24	111198-26	111198-30
Your Reference	----------	EB6	EB7	QC1
Depth	----------	2.6-2.7	0.2-0.3	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	93	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	75	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	75	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100
Surrogate o-Terphenyl	%	82	82	81

PAHs in Soil						
Our Reference:	UNITS	111198-1	111198-5	111198-11	111198-13	111198-18
Your Reference	----------	GB1	GB2	EB1	EB2	EB3
Depth	----------	0.5	0.5	0.3-0.4	0.5-0.6	2.6-2.7
Date Sampled		6/06/2014	6/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	0.4	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.2	1.4	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	1.5	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.7	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.7	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	1.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.09	0.89	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	1.0	<0.5	<0.5
Total +ve PAH's	mg/kg	NIL (+)VE	0.59	8.5	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	83	87	90	85	90

PAHs in Soil					
Our Reference:	UNITS	111198-21	111198-24	111198-26	111198-30
Your Reference	----------	EB5	EB6	EB7	QC1
Depth	----------	1.4-1.5	2.6-2.7	0.2-0.3	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.4	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	0.3	0.1	<0.1
Pyrene	mg/kg	0.6	0.2	0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.30	0.06	0.07	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	2.2	1.1	0.28	NIL (+)VE
Surrogate p-Terphenyl-d14	%	87	92	88	87

Organochlorine Pesticides in soil		
Our Reference:	UNITS	111198-26
Your Reference	----------	EB7
Depth	----------	0.2-0.3
Date Sampled		7/06/2014
Type of sample		Soil
Date extracted	-	10/06/2014
Date analysed	-	10/06/2014
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCMX	%	74

Organophosphorus Pesticides		
Our Reference:	UNITS	111198-26
Your Reference	----------	EB7
Depth	----------	0.2-0.3
Date Sampled		7/06/2014
Type of sample		Soil
Date extracted	-	10/06/2014
Date analysed	-	10/06/2014
Diazinon	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Surrogate TCMX	%	74

Total PCBs in Soil		
Our Reference:	UNITS	111198-26
Your Reference	----------	EB7
Depth	----------	0.2-0.3
Date Sampled		7/06/2014
Type of sample		Soil
Date extracted	-	10/06/2014
Date analysed	-	10/06/2014
Total PCB (Arochlor 1016-1260)	mg/kg	1.5
Surrogate TCLMX	%	77

Total Phenolics in Soil		
Our Reference:	UNITS	111198-26
Your Reference	----------	EB7
Depth	----------	0.2-0.3
Date Sampled		7/06/2014
Type of sample		Soil
Date extracted	-	10/06/2014
Date analysed	-	10/06/2014
Total Phenolics (as Phenol)	mg/kg	<5

Acid Extractable metals in soil						
Our Reference:	UNITS	111198-1	111198-2	111198-5	111198-8	111198-10
Your Reference	----------	GB1	GB1	GB2	GB3	GB5
Depth	----------	0.5	2.0	0.5	1.5	11
Date Sampled		6/06/2014	6/06/2014	6/06/2014	6/06/2014	6/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Arsenic	mg/kg	<4	<4	10	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	7	24	31	10
Copper	mg/kg	20	1	24	2	<1
Lead	mg/kg	15	2	33	6	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	10	<1	23	2	<1
Zinc	mg/kg	28	3	50	2	<1

Acid Extractable metals in soil						
Our Reference:	UNITS	111198-11	111198-13	111198-18	111198-19	111198-21
Your Reference	----------	EB1	EB2	EB3	EB4	EB5
Depth	----------	0.3-0.4	0.5-0.6	2.6-2.7	0.2-0.3	1.4-1.5
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Arsenic	mg/kg	8	<4	<4	5	4
Cadmium	mg/kg	0.5	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	34	9	15	32	17
Copper	mg/kg	26	8	<1	15	5
Lead	mg/kg	120	6	5	14	22
Mercury	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	8	2	13	7
Zinc	mg/kg	180	12	1	39	56

Acid Extractable metals in soil				
Our Reference:	UNITS	111198-24	111198-26	111198-30
Your Reference	----------	EB6	EB7	QC1
Depth	----------	2.6-2.7	0.2-0.3	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil
Date digested	-	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	0.6	<0.4
Chromium	mg/kg	40	44	15
Copper	mg/kg	<1	150	13
Lead	mg/kg	7	660	9
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	1	32	12
Zinc	mg/kg	<1	500	18

Miscellaneous Inorg - soil			
Our Reference:	UNITS	111198-2	111198-3
Your Reference	----------	GB1	GB1
Depth	----------	2.0	3.5
Date Sampled		6/06/2014	6/06/2014
Type of sample		Soil	Soil
Date prepared	-	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014
pH 1:5 soil:water	pH Units	6.1	5.8
Chloride, Cl 1:5 soil:water	mg/kg	<10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	10	57

sPOCAS field test					
Our Reference:	UNITS	111198-2	111198-4	111198-6	111198-7
Your Reference	----------	GB1	GB1	GB2	GB2
Depth	----------	2.0	4.5	1.2	3.5
Date Sampled		6/06/2014	6/06/2014	6/06/2014	6/06/2014
Type of sample		Soil	Soil	Soil	Soil
pH_F (field pH test)*	pH Units	6.4	5.1	5.9	6.3
pH_{FOX} (field peroxide test)*	pH Units	3.5	3.8	4.3	3.4
Reaction Rate*	-	Slight	Slight	Moderate	Moderate

Moisture						
Our Reference:	UNITS	111198-1	111198-2	111198-5	111198-8	111198-10
Your Reference	----------	GB1	GB1	GB2	GB3	GB5
Depth	----------	0.5	2.0	0.5	1.5	11
Date Sampled		6/06/2014	6/06/2014	6/06/2014	6/06/2014	6/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Moisture	%	11	15	11	13	12

Moisture						
Our Reference:	UNITS	111198-11	111198-13	111198-18	111198-19	111198-21
Your Reference	----------	EB1	EB2	EB3	EB4	EB5
Depth	----------	0.3-0.4	0.5-0.6	2.6-2.7	0.2-0.3	1.4-1.5
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Moisture	%	17	13	16	12	11

Moisture				
Our Reference:	UNITS	111198-24	111198-26	111198-30
Your Reference	----------	EB6	EB7	QC1
Depth	----------	2.6-2.7	0.2-0.3	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil
Date prepared	-	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014
Moisture	%	13	13	22

Asbestos ID - soils					
Our Reference:	UNITS	111198-11	111198-13	111198-26	111198-30
Your Reference	----------	EB1	EB2	EB7	QC1
Depth	----------	0.3-0.4	0.5-0.6	0.2-0.3	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Sample mass tested	g	Approx 45g	Approx 30g	Approx 35g	Approx 25g
Sample Description	-	Grey coarse-grained soil	Grey fine-grained soil	Brown coarse-grained soil & rocks	Grey fine-grained soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

vTRH(C6-C10)/BTEXN in Water						
Our Reference:	UNITS	111198-32	111198-33	111198-34	111198-35	111198-36
Your Reference	----------	TRIP BLANK	TRIP SPIKE	SP1	SP2	MB1
Depth	----------	-	-	-	-	-
Date Sampled		5/06/2014	5/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014	10/06/2014
TRHC$_6$ - C$_9$	µg/L	<10	[NA]	<10	<10	<10
TRHC$_6$ - C$_{10}$	µg/L	<10	[NA]	<10	<10	<10
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10	[NA]	<10	<10	<10
Benzene	µg/L	<1	90%	<1	<1	<1
Toluene	µg/L	<1	92%	<1	<1	<1
Ethylbenzene	µg/L	<1	90%	<1	<1	<1
m+p-xylene	µg/L	<2	91%	<2	<2	<2
o-xylene	µg/L	<1	92%	<1	<1	<1
Naphthalene	µg/L	<1	[NA]	<1	<1	<1
Surrogate Dibromofluoromethane	%	101	102	102	101	102
Surrogate toluene-d8	%	100	101	100	98	101
Surrogate 4-BFB	%	102	102	99	101	102

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	111198-37
Your Reference	----------	QA1
Depth	----------	-
Date Sampled		7/06/2014
Type of sample		Water
Date extracted	-	10/06/2014
Date analysed	-	10/06/2014
TRHC$_6$ - C$_9$	µg/L	<10
TRHC$_6$ - C$_{10}$	µg/L	<10
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	103
Surrogate toluene-d8	%	100
Surrogate 4-BFB	%	101

svTRH (C10-C40) in Water					
Our Reference:	UNITS	111198-34	111198-35	111198-36	111198-37
Your Reference	----------	SP1	SP2	MB1	QA1
Depth	----------	-	-	-	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Water	Water	Water	Water
Date extracted	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014
TRHC$_{10}$ - C$_{14}$	µg/L	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	µg/L	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	µg/L	<100	<100	<100	<100
TRH>C$_{10}$ - C$_{16}$	µg/L	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L	<50	<50	<50	<50
TRH>C$_{16}$ - C$_{34}$	µg/L	<100	<100	<100	<100
TRH>C$_{34}$ - C$_{40}$	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	79	81	78	110

HM in water - dissolved					
Our Reference:	UNITS	111198-34	111198-35	111198-36	111198-37
Your Reference	----------	SP1	SP2	MB1	QA1
Depth	----------	-	-	-	-
Date Sampled		7/06/2014	7/06/2014	7/06/2014	7/06/2014
Type of sample		Water	Water	Water	Water
Date prepared	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Date analysed	-	10/06/2014	10/06/2014	10/06/2014	10/06/2014
Arsenic-Dissolved	µg/L	2	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	0.1	<0.1
Chromium-Dissolved	µg/L	2	2	1	2
Copper-Dissolved	µg/L	6	3	3	3
Lead-Dissolved	µg/L	2	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	1	<1	3	<1
Zinc-Dissolved	µg/L	83	80	170	62

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 22nd ED, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA 22nd ED, 4110 -B.
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Date analysed	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
TRHC$_{6}$ - C$_{9}$	mg/kg	25	Org-016	<25	111198-1	<25 || <25	LCS-13	77%
TRHC$_{6}$ - C$_{10}$	mg/kg	25	Org-016	<25	111198-1	<25 || <25	LCS-13	77%
Benzene	mg/kg	0.2	Org-016	<0.2	111198-1	<0.2 || <0.2	LCS-13	65%
Toluene	mg/kg	0.5	Org-016	<0.5	111198-1	<0.5 || <0.5	LCS-13	79%
Ethylbenzene	mg/kg	1	Org-016	<1	111198-1	<1 || <1	LCS-13	82%
m+p-xylene	mg/kg	2	Org-016	<2	111198-1	<2 || <2	LCS-13	80%
o-Xylene	mg/kg	1	Org-016	<1	111198-1	<1 || <1	LCS-13	91%
naphthalene	mg/kg	1	Org-014	<1	111198-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	84	111198-1	78 || 76 || RPD: 3	LCS-13	80%
QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Date analysed	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	111198-1	<50 || <50	LCS-13	99%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	111198-1	<100 || <100	LCS-13	100%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	111198-1	<100 || <100	LCS-13	91%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	111198-1	<50 || <50	LCS-13	99%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	111198-1	<100 || <100	LCS-13	100%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	111198-1	<100 || <100	LCS-13	91%
Surrogate o-Terphenyl	%		Org-003	84	111198-1	81 || 87 || RPD: 7	LCS-13	95%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Date analysed	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	LCS-13	105%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	LCS-13	104%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	LCS-13	105%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	LCS-13	103%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	LCS-13	105%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	LCS-13	99%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	111198-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	111198-1	<0.05 || <0.05	LCS-13	111%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	111198-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	93	111198-1	83 || 87 || RPD: 5	LCS-13	97%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	111198-26	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Date analysed	-			10/06/2014	111198-26	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
HCB	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	71%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	82%
Heptachlor	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	77%
delta-BHC	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	90%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	108%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	91%
Dieldrin	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	94%
Endrin	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	72%
pp-DDD	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	95%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	LCS-13	108%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	92	111198-26	74 || 76 || RPD: 3	LCS-13	80%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	111198-26	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Date analysed	-			10/06/2014	111198-26	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Diazinon	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	LCS-13	107%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	LCS-13	88%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	111198-26	<0.1 || <0.1	LCS-13	93%
Surrogate TCMX	%		Org-008	92	111198-26	74 || 76 || RPD: 3	LCS-13	79%
QUALITY CONTROL Total PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	111198-26	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Date analysed	-			10/06/2014	111198-26	10/06/2014 || 10/06/2014	LCS-13	10/06/2014
Total PCB (Arochlor 1016-1260)	mg/kg	0.6	Org-006	<0.6	111198-26	1.5 || 0.6 || RPD: 86	LCS-13	110%
Surrogate TCLMX	%		Org-006	92	111198-26	77 || 74 || RPD: 4	LCS-13	100%
QUALITY CONTROL Total Phenolics in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	[NT]	[NT]	LCS-1	10/06/2014
Date analysed	-			10/06/2014	[NT]	[NT]	LCS-1	10/06/2014
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	LCS-1	101%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-2	10/06/2014
Date analysed	-			10/06/2014	111198-1	10/06/2014 || 10/06/2014	LCS-2	10/06/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	111198-1	<4 || <4	LCS-2	105%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	111198-1	<0.4 || <0.4	LCS-2	112%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	111198-1	7 || 5 || RPD: 33	LCS-2	107%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	111198-1	20 || 13 || RPD: 42	LCS-2	106%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	111198-1	15 || 9 || RPD: 50	LCS-2	107%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	111198-1	<0.1 || <0.1	LCS-2	86%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	111198-1	10 || 6 || RPD: 50	LCS-2	107%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	111198-1	28 || 18 || RPD: 43	LCS-2	108%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			10/06/2014	[NT]	[NT]	LCS-1	10/06/2014
Date analysed	-			10/06/2014	[NT]	[NT]	LCS-1	10/06/2014
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	101%
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	LCS-1	104%
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	LCS-1	108%

QUALITY CONTROL sPOCAS field test	UNITS	PQL	METHOD	Blank
pH_F (field pH test)*	pH Units		Inorg-063	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	[NT]

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	[NT]	[NT]	LCS-W1	10/06/2014
Date analysed	-			10/06/2014	[NT]	[NT]	LCS-W1	10/06/2014
$TRHC_6$ - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	98%
$TRHC_6$ - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	98%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	98%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	99%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	97%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	97%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	97%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Surrogate Dibromofluoromethane	%		Org-016	102	[NT]	[NT]	LCS-W1	102%
Surrogate toluene-d8	%		Org-016	99	[NT]	[NT]	LCS-W1	101%
Surrogate 4-BFB	%		Org-016	99	[NT]	[NT]	LCS-W1	102%
QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			10/06/2014	[NT]	[NT]	LCS-W1	10/06/2014
Date analysed	-			10/06/2014	[NT]	[NT]	LCS-W1	10/06/2014
TRHC$_{10}$ - C$_{14}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	117%
TRHC$_{15}$ - C$_{28}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	108%
TRHC$_{29}$ - C$_{36}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	101%
TRH>C$_{10}$ - C$_{16}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	117%
TRH>C$_{16}$ - C$_{34}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	108%
TRH>C$_{34}$ - C$_{40}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	101%
Surrogate o-Terphenyl	%		Org-003	103	[NT]	[NT]	LCS-W1	115%
QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			10/06/2014	[NT]	[NT]	LCS-W1	10/06/2014
Date analysed	-			10/06/2014	[NT]	[NT]	LCS-W1	10/06/2014
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	100%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W1	99%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	95%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	99%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	102%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W1	104%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	98%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	98%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	111198-30	10/06/2014 || 10/06/2014	111198-2	10/06/2014
Date analysed	-	111198-30	10/06/2014 || 10/06/2014	111198-2	10/06/2014
TRHC$_6$ - C$_9$	mg/kg	111198-30	<25 || <25	111198-2	69%
TRHC$_6$ - C$_{10}$	mg/kg	111198-30	<25 || <25	111198-2	69%
Benzene	mg/kg	111198-30	<0.2 || <0.2	111198-2	60%
Toluene	mg/kg	111198-30	<0.5 || <0.5	111198-2	72%
Ethylbenzene	mg/kg	111198-30	<1 || <1	111198-2	72%
m+p-xylene	mg/kg	111198-30	<2 || <2	111198-2	71%
o-Xylene	mg/kg	111198-30	<1 || <1	111198-2	74%
naphthalene	mg/kg	111198-30	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	111198-30	89 || 86 || RPD: 3	111198-2	72%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	111198-30	10/06/2014 || 10/06/2014	111198-2	10/06/2014
Date analysed	-	111198-30	10/06/2014 || 10/06/2014	111198-2	10/06/2014
TRHC$_{10}$ - C$_{14}$	mg/kg	111198-30	<50 || <50	111198-2	101%
TRHC$_{15}$ - C$_{28}$	mg/kg	111198-30	<100 || <100	111198-2	107%
TRHC$_{29}$ - C$_{36}$	mg/kg	111198-30	<100 || <100	111198-2	117%
TRH>C$_{10}$-C$_{16}$	mg/kg	111198-30	<50 || <50	111198-2	101%
TRH>C$_{16}$-C$_{34}$	mg/kg	111198-30	<100 || <100	111198-2	107%
TRH>C$_{34}$-C$_{40}$	mg/kg	111198-30	<100 || <100	111198-2	117%
Surrogate o-Terphenyl	%	111198-30	81 || 81 || RPD: 0	111198-2	97%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	111198-30	10/06/2014 || 10/06/2014
Date analysed	-	111198-30	10/06/2014 || 10/06/2014
Naphthalene	mg/kg	111198-30	<0.1 || <0.1
Acenaphthylene	mg/kg	111198-30	<0.1 || <0.1
Acenaphthene	mg/kg	111198-30	<0.1 || <0.1
Fluorene	mg/kg	111198-30	<0.1 || <0.1
Phenanthrene	mg/kg	111198-30	<0.1 || <0.1
Anthracene	mg/kg	111198-30	<0.1 || <0.1
Fluoranthene	mg/kg	111198-30	<0.1 || <0.1
Pyrene	mg/kg	111198-30	<0.1 || <0.1
Benzo(a)anthracene	mg/kg	111198-30	<0.1 || <0.1
Chrysene	mg/kg	111198-30	<0.1 || <0.1
Benzo(b+k)fluoranthene	mg/kg	111198-30	<0.2 || <0.2
Benzo(a)pyrene	mg/kg	111198-30	<0.05 || <0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	111198-30	<0.1 || <0.1
Dibenzo(a,h)anthracene	mg/kg	111198-30	<0.1 || <0.1

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Benzo(g,h,i)perylene	mg/kg	111198-30	<0.1 || <0.1
Surrogate p-Terphenyl-d14	%	111198-30	87 || 91 || RPD: 4

QUALITY CONTROL Total PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	[NT]	[NT]
Date analysed	-	[NT]	[NT]
Total PCB (Arochlor 1016-1260)	mg/kg	[NT]	[NT]
Surrogate TCLMX	%	[NT]	[NT]

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	111198-30	10/06/2014 || 10/06/2014	111198-2	10/06/2014
Date analysed	-	111198-30	10/06/2014 || 10/06/2014	111198-2	10/06/2014
Arsenic	mg/kg	111198-30	<4 || <4	111198-2	105%
Cadmium	mg/kg	111198-30	<0.4 || <0.4	111198-2	112%
Chromium	mg/kg	111198-30	15 || 7 || RPD: 73	111198-2	102%
Copper	mg/kg	111198-30	13 || 14 || RPD: 7	111198-2	113%
Lead	mg/kg	111198-30	9 || 8 || RPD: 12	111198-2	106%
Mercury	mg/kg	111198-30	<0.1 || <0.1	111198-2	90%
Nickel	mg/kg	111198-30	12 || 8 || RPD: 40	111198-2	108%
Zinc	mg/kg	111198-30	18 || 11 || RPD: 48	111198-2	110%

Report Comments:

Asbestos-ID in soil: Excessive sample volumes were provided for asbestos analysis. A portion of each of the supplied samples were sub-sampled according to Envirolab procedures. We cannot guarantee that these sub-samples are indicative of the entire samples. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 111198-1 for Pb & Ni. Therefore a triplicate result has been issued as laboratory sample number 111198-38.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 111198-30 for Cr. Therefore a triplicate result has been issued as laboratory sample number 111198-39.

PCB's in soil: The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

1517

SMEC

CHAIN OF CUSTODY FORM

SMEC OFFICE: NORTHSYD
PROJECT: 30011256
PROJECT NUMBER:
PROJECT MANAGER: DANIEL SAUNDERS
SAMPLED BY: DS
DATE SAMPLED: 6/6/14
Email Reports to (will default to PM if blank): penelope.ford@smec.com
Email Invoice to (will default to PM if blank):
Special Laboratory Instructions:

TURNAROUND REQUIREMENTS: ☐ Standard - 5 day TAT
24hr TAT ☑ Non Standard TAT (List due date): (50% surcharge)
LAB GUOTE NO.:
CONTACT PH: 0413456085

COC SEQUENCE NUMBER (Circle)
COC: (1) 2 3 4 5 6 7
OF: 1 2 3 (1) 5 6 7

LAB: ENVIROLAB
ATTENTION: David Springar
DISPATCH TO (ADDRESS & PHONE NO.):
12 Ashley St
Chatswood NSW 2067

RELINQUISHED BY: Penelope Ford
DATE/TIME: 9/6/14 7:15pm
RECEIVED BY: [signature]
DATE/TIME: 9/6/14 12pm
RELINQUISHED BY:
DATE/TIME:
RECEIVED BY:
DATE/TIME:

REPORT TUESDAY AM
GB - GEOTECH BORE LOCATIONS

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 111198
COMMENTS
Date Received: 9/6/14
Time Received: 12pm
Received by: [signature]
Temp: Cool/Ambient 6.2°
Cooling: Ice/Ice pack
Security: Intact/Broken/None

LAB ID	SAMPLE ID	DATE / TIME	SAMPLE MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NO. CONTAINERS	ANALYSIS REQUIRED: COMBO 1/M	COMBO 3	CL	SO4	pH	PHP	pH H2O	COMBO 3A	Pb
1	GB4/0.5	6/6/14	S	Jar / ICE	1		✓							0
2	GB1/2.0					✓		✓	✓	✓	✓	✓		0.5
3	GB2/3.5							✓	✓	✓				1.5
4	GB1/4.5										✓	✓		0
5	GB2/0.5						✓							0.2
6	GB2/1.2										✓	✓		0.4
7	GB2/3.5										✓	✓		0.1
8	GB3/1.5					✓								700
9	GB4/4													
10	GB5/11	↓	↓	↓	↓	✓								0.0
11	EB1/0.3-0.4	7/6/14	↓	↓ zip lock	2								✓	
				TOTAL										

Notes: Low reporting limits required for groundwater as specified by SMEC Australia Pty Ltd

Copies: WHITE: send to lab, YELLOW: to be placed in project file, PINK: to be retained in CoC book

SMEC

CHAIN OF CUSTODY FORM

SMEC OFFICE: North Sydney	TURNAROUND REQUIREMENTS: ☐ Standard - 5 day TAT	LAB: ENVIROLAB	
PROJECT: Brookvale	☒24hr TAT ☑ Non Standard TAT (List due date):	ATTENTION: David Springer	
PROJECT NUMBER: 30011256	LAB QUOTE NO.:	COC SEQUENCE NUMBER (Circle): COC 1 ⓪ 2 3 4 5 6 7; SOC 1 2 3 ⓪ 5 6 7	DISPATCH TO (ADDRESS & PHONE NO.): 12 Ashley St Chatswood NSW 2067
PROJECT MANAGER: Daniel Saunders	CONTACT PH: 0413456085		
SAMPLED BY: DF			
DATE SAMPLED: 7·6·14	RELINQUISHED BY: Phoebe Ford	RECEIVED BY: David Springer	RELINQUISHED BY:
Email Reports to (will default to PM if blank): penelope.ford@smec.com	DATE/TIME: 9/6/14 7:15a	DATE/TIME: 9/6/14	DATE/TIME:
Email Invoice to (will default to PM if blank):			RECEIVED BY:
Special Laboratory Instructions: Report Tuesday PM			DATE/TIME:

SAMPLE DETAILS						ANALYSIS REQUIRED								COMMENTS
LAB ID	SAMPLE ID	DATE / TIME 7·6·14	SAMPLE MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NO. CONTAINERS	Combo 1a	Combo 3	Combo 3a	Combo 8a					
12	EB1/2.5-2.6	[illegible]	S	jar + Zip Lock	2									
13	EB2/0.5-0.6							✓						
14	EB2/1.0-1.1													
15	EB2/2.7-2.8													
16	EB3/0.2-0.3													
17	EB3/1.0-1.1													
18	EB3/2.6-2.7						✓							
19	EB4/0.2-0.3					✓								
20	EB5/0.3-0.4													
21	EB5/1.4-1.5						✓							
22	EB5/3.2-3.3													
					TOTAL									

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SMEC

CHAIN OF CUSTODY FORM

SMEC OFFICE: North Sydney	TURNAROUND REQUIREMENTS: ☐ Standard - 5 day TAT	LAB: ENVIROLAB	
PROJECT: Brookvale	24hr TAT ☑ Non Standard TAT (List due date):	ATTENTION: David Springer	
PROJECT NUMBER: 30011256	LAB QUOTE NO.:	COC SEQUENCE NUMBER (Circle): COC 1 2 (3) 4 5 6 7; OF 1 2 3 (4) 5 6 7	DISPATCH TO (ADDRESS & PHONE NO.): 12 Ashley St Chatswood NSW 2067
PROJECT MANAGER: Daniel Saunders	CONTACT PH: 0413456085		
SAMPLED BY: P.F			
DATE SAMPLED: 7-6-14	RELINQUISHED BY: [signature] DATE/TIME: 9/6/14 7:15a	RECEIVED BY: [signature] DATE/TIME: 9/6/14	RELINQUISHED BY: DATE/TIME:
Email Reports to (will default to PM if blank): penelope.ford@smec.com			RECEIVED BY: DATE/TIME:
Email Invoice to (will default to PM if blank):			

Special Laboratory Instructions: Report Tuesday PM

SAMPLE DETAILS						ANALYSIS REQUIRED						COMMENTS
LAB ID	SAMPLE ID	DATE / TIME	SAMPLE MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NO. CONTAINERS	Combo 1 (M)	Combo 3	Combo 3A	Combo 8A	BTEX	TRHC6-C9	
23	EB6/0.9-1.0	7-6-14	S	jar+ziplock	2							
24	EB6/2.6-2.7	↓	↓	↓			✓					
25	EB6/2.7-2.8											
26	EB7/0.2-0.3								✓			
27	EB7/0.5-0.6											
28	EB7/1.8-1.9											
29	EB7/3.5-3.6											
30	QC1							✓				
31	QC2	↓	↓	↓								
32	Trip blank	5-6-14	W	40ml vial						✓	✓	
33	Trip spike	5-6-14	W	40ml vial						✓		
				TOTAL								

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SMEC

CHAIN OF CUSTODY FORM

SMEC OFFICE: North Sydney	TURNAROUND REQUIREMENTS: ☐ Standard - 5 day TAT		LAB: Envirolab
PROJECT: Brookvale	24hr TAT ☐ Non Standard TAT (List due date):		ATTENTION: David Springer
PROJECT NUMBER: 30011256	LAB QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	DISPATCH TO (ADDRESS & PHONE NO.):
PROJECT MANAGER: Daniel Saunders	CONTACT PH: 0413456085	COC: 1 2 3 **0** 5 6 7	12 Ashley St
SAMPLED BY: P. F		OF: 1 2 3 **6** 5 6 7	Chatswood NSW 2067
DATE SAMPLED: 7.6.14	RELINQUISHED BY: Penelope Ford	RECEIVED BY:	RELINQUISHED BY:
Email Reports to (will default to PM if blank): penelope.ford@smec.com	DATE/TIME: 7/6/14 7:15	DATE/TIME: 8/6/14	DATE/TIME:
Email Invoice to (will default to PM if blank):			RECEIVED BY:
Special Laboratory Instructions: Report Tuesday PM			DATE/TIME:

SAMPLE DETAILS						ANALYSIS REQUIRED								COMMENTS
LAB ID	SAMPLE ID	DATE / TIME	SAMPLE MATRIX	CONTAINER TYPE & PRESERVATIVE	TOTAL NO. CONTAINERS	Combo 1m *								
34	SP1	7.6.14	W	Amber 1 red plastic 6reed filtered 1 green plastic, 2 vials	5	✓								* Metals = As, Cd, Cr, Cu, Pb, Hg, Ni, Zn
35	SP2	↓	↓	↓	↓	✓								
36	MB1					✓								
37	QA1					✓								
				TOTAL										

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