



TaylorThomsonWhitting

Shoalhaven Cancer Care Centre Part 3A Report – Structural and Civil

for Health Infrastructure

8 April 2011

TTW Job No: 101498 Rev B

Taylor Thomson Whitting (NSW) Pty Ltd Consulting Engineers ACN 113 578 377
48 Chandos Street St Leonards NSW 2065 PO Box 738 Crows Nest 1585
T 61 2 9439 7288 F 61 2 9439 3146 ttwsyd@ttw.com.au www.ttw.com.au

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1.0 EXECUTIVE SUMMARY

As part of the proposed South Coast Regional Cancer Network redevelopment, Taylor Thomson Whitting have been engaged by Health Infrastructure to advise on structural and civil aspects of the Shoalhaven Cancer Care Centre.

The key issues identified are:

- Ground conditions are expected to be clays of approximately 2m depth, over weathered rock. Footings will be either short bored piers or pad footings.
- Structure is proposed to be a conventional reinforced concrete framed structure. Bunkers will comprise thick reinforced concrete walls and roof, with thickness to be determined by the radiation consultant. Roof structure is proposed to be a conventional structural steel frame.
- A balanced cut and fill situation may be achieved.
- Some minor retaining walls may be required.
- OSD is expected on the site with an initial estimate of 250 cu.m
- The existing water easement is to be diverted by the council.
- A detailed services investigation is recommended as there is a risk of encountering unknown services.
- The proposed stormwater connection requires a connection into the existing Council system in North Street. This will require levels within the northern area of the site to be raised up to 1.5m above existing ground levels, necessitating the construction of retaining walls and/or significant batters.
- An alternative to the connection of the stormwater into North Street, is a connection into the existing Council line in Shoalhaven Street. In order to maintain the line within the current and proposed hospital land, it is necessary to run behind the existing carpark and along the boundary of the current hospital site to Shoalhaven Street.

2.0 INTRODUCTION

As part of the proposed South Coast Regional Cancer Network redevelopment, Taylor Thomson Whitting have been engaged by Health Infrastructure to advise on structural and civil aspects of the Shoalhaven Cancer Care Centre.

This report relates to the proposed concept design for the project.

This report will review:

- civil engineering issues such as stormwater, drainage, coordination with existing drainage conditions, site vehicle access and parking requirements, geotechnical qualities and external streetscape.
- structural engineering issues such as structural capacity of existing buildings, foundations, types of building structures and future flexibility.

2.1 THE DEVELOPMENT SITE

The development site is to the south of the current Shoalhaven Hospital site, with the proposed location at the corner of Scenic Drive and North Street, shown outlined in red on the map below.

The site is currently a greenfield site, with the high point of the site in the SW corner, falling towards the north east, towards the current oval.



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3.0 DESCRIPTION OF STRUCTURAL AND CIVIL SERVICES

3.1 STRUCTURAL

Structural works include the elements relating to the building structure including

- Columns
- Foundations
- Walls, including retaining walls associated with the building structure.
- Slabs
- Structural steelwork.

3.2 CIVIL

Civil works include

- Earthworks and retaining walls
- Roads and Carparking
- Stormwater drainage outside of building lines
- Services

4.0 PART 3A REPORT

4.1 STRUCTURAL

The new Shoalhaven CCC is proposed to be of conventional construction on a greenfield site.

The proposed building comprises a series of “pod” structures around a central courtyard. Two bunker structures are located at the southern end of the site.

A delivery dock and plant room area is proposed at the lower ground floor level on the eastern side of the site. Some retaining walls will be required, but the location follows the natural ground levels and minimises the extent of excavation.

Generally the structures will be over two levels.

Ground conditions for the recent extensions to the Shoalhaven Hospital indicate the site comprises a moderately reactive clay of approximately 2 m depth, over an extremely weathered rock with allowable bearing capacity of 1200 kPa. A geotechnical and ground contamination report is currently being carried out.

Foundations will most likely comprise short bored piers approximately 3-4 m long, founded into the weathered rock, or high level pad footings.

Suspended slabs are proposed to be conventional reinforced concrete, supported on concrete columns.

Roof structure is expected to be a structural steel frame, constructed from non combustible material.

Bunker structures will comprise thick reinforced concrete walls, roof and slab, with thicknesses to be determined by a radiation consultant during detailed design. Typically thicknesses of walls can be up to 2 metres thick. Specific measures to control heat gain in the concrete after pouring will be required. Typically this would include the use of insulated formwork and concrete with a high flyash GGBS concrete.

4.2 CIVIL

4.2.1 Earthworks

The siting of the building has been carried out to minimise cut and fill. A balanced cut and fill is proposed, so that no excavated material is removed from site.

Some retaining walls and batters will be required around the lower ground plant areas, and buildings towards the east of the site. The roads and landscaping areas will follow the natural ground levels where possible to minimise retaining walls.

Excavation is expected to be in the clays, so conventional earthmoving equipment will be utilised.

4.2.2 Roads and Carparking

Road hierarchy is to be confirmed as part of the traffic investigation to confirm proposed road widths, grades and turning radii for each part of the road system, during design.

For truck turning areas pavements shall be rigid in construction. For other areas pavements are proposed to be a flexible asphaltic concrete finish on a compacted subbase. Deck and road areas will be designed for truck loadings (note need to confirm truck sizes with AHS) with turning circles to be confirmed during schematic design stage.

Typical design parameters will be:

All pavements will be designed for a 25 year life, and a design traffic loading of a minimum 1×10^6 repetitions of a standard axle load as defined in AUSTROADS Pavement Design.

Pavement construction design will be based on Douglas Partner's geotechnical investigation with reference number 71850. Borehole investigations will be required at the proposed new roads and loading docks to investigate the extent of rock at subgrade level.

4.2.3 Stormwater

As part of the due diligence process, two options for the stormwater were considered.

A proposed connection to North Street is the preferred option. This drainage route will require levels within the northern area of the site to be raised up to 1.5m above existing ground levels, necessitating the construction of retaining walls and/or significant batters. There will also be some disruption to the existing trees however the route is significantly shorter and simpler than the proposed route to Shoalhaven Street.

A proposed connection to the existing Council line in Shoalhaven Street may cause disruption to the existing services along the route of the proposed outlet, particularly around the existing hospital entrance road, where it is expected that there are multiple services present. For this reason, a connection to the Council system in North Street is preferred.

Appendix A contains sketch plans with the proposed location of both stormwater connections.

In accordance with Council's DCP, stormwater detention will be required for the site. Due to the preferred location of the drainage outlet being to the south of the site, detention is proposed to be in the south corner, near to the North Street vehicular entrance. Initial estimates are for a tank volume of 250 m³.

4.2.4 Flooding

Investigations indicate that the site is not within the floodplain, and there are no records of flooding of the site.

4.2.5 Services

The latest site plan indicates building over the existing water easement. This is to be diverted by the Council. This should be confirmed, and timescales discussed to ensure smooth delivery of this project.

The risks of encountering unknown services is possible therefore TTW recommend detailed services investigation search to ascertain the serviceability requirements for the site.

4.2.6 Soil and Erosion Control

A preliminary Soil and Erosion control plan has been prepared and is included as **Appendix B**.

Prepared by:
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**



ANDREW WALLACE
Senior Civil Engineer

Authorised by:
**TAYLOR THOMSON WHITTING
(NSW) PTY LTD**

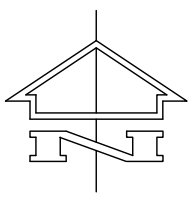
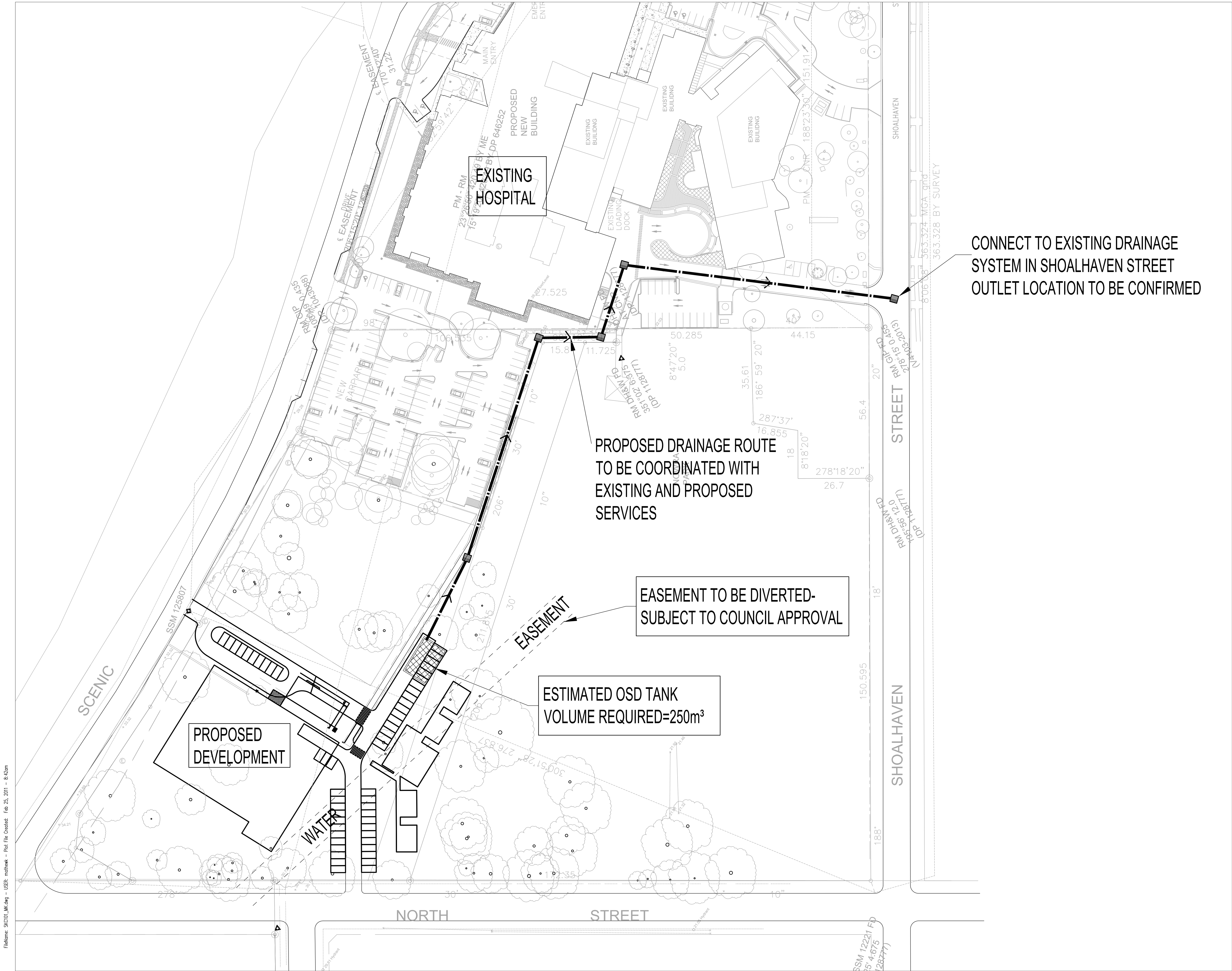


R MACKELLAR
Director

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Appendix A

Proposed Stormwater Connection



P3	PRELIMINARY	AW	MK	25.02.11
P2	PRELIMINARY	AW	MK	11.02.11
P1	PRELIMINARY	SB	MK	12.11.10
Rev	Description	Eng	Draft	Date

Project
**SHOALHAVEN HOSPITAL-
CANCER UNIT**

Sheet Subject
PROPOSED SITEWORKS

Architect
PTW Architects
Level 17, 9 Castlereagh Street
Sydney NSW 2000 Australia

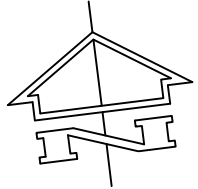
TaylorThomsonWhitting
Consulting Engineers
48 Chandos Street St Leonards NSW 2065
T: +61 2 9439 7288 F: +61 2 9439 3146 ttwsyd@ttw.com.au
Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

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Drawing No
SKC101
Revision
P3

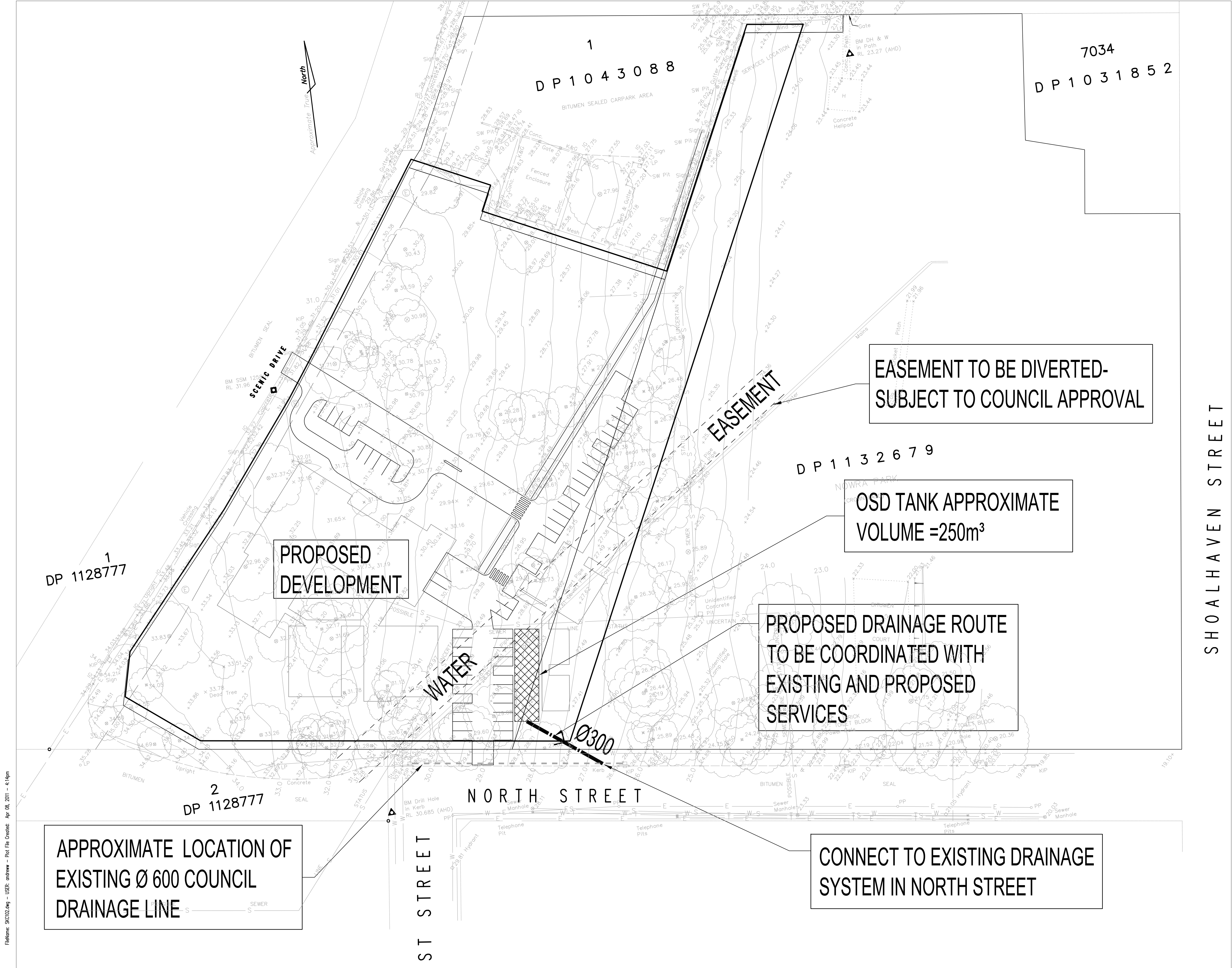
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PRELIMINARY



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P1	PRELIMINARY	AW	??	04.04.11
Rev	Description	Eng	Draft	Date

Project
**SHOALHAVEN HOSPITAL
CANCER CARE CENTRE**

Sheet Subject
PROPOSED SITEWORKS OPTION B

Architect
PTW Architects
Level 17, 9 Castlereagh Street
Sydney NSW 2000 Australia

TaylorThomsonWhitting
Consulting Engineers
48 Chandos Street St Leonards NSW 2065
T: +61 2 9439 7298 F: +61 2 9439 5146 ttwsyd@ttw.com.au
Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

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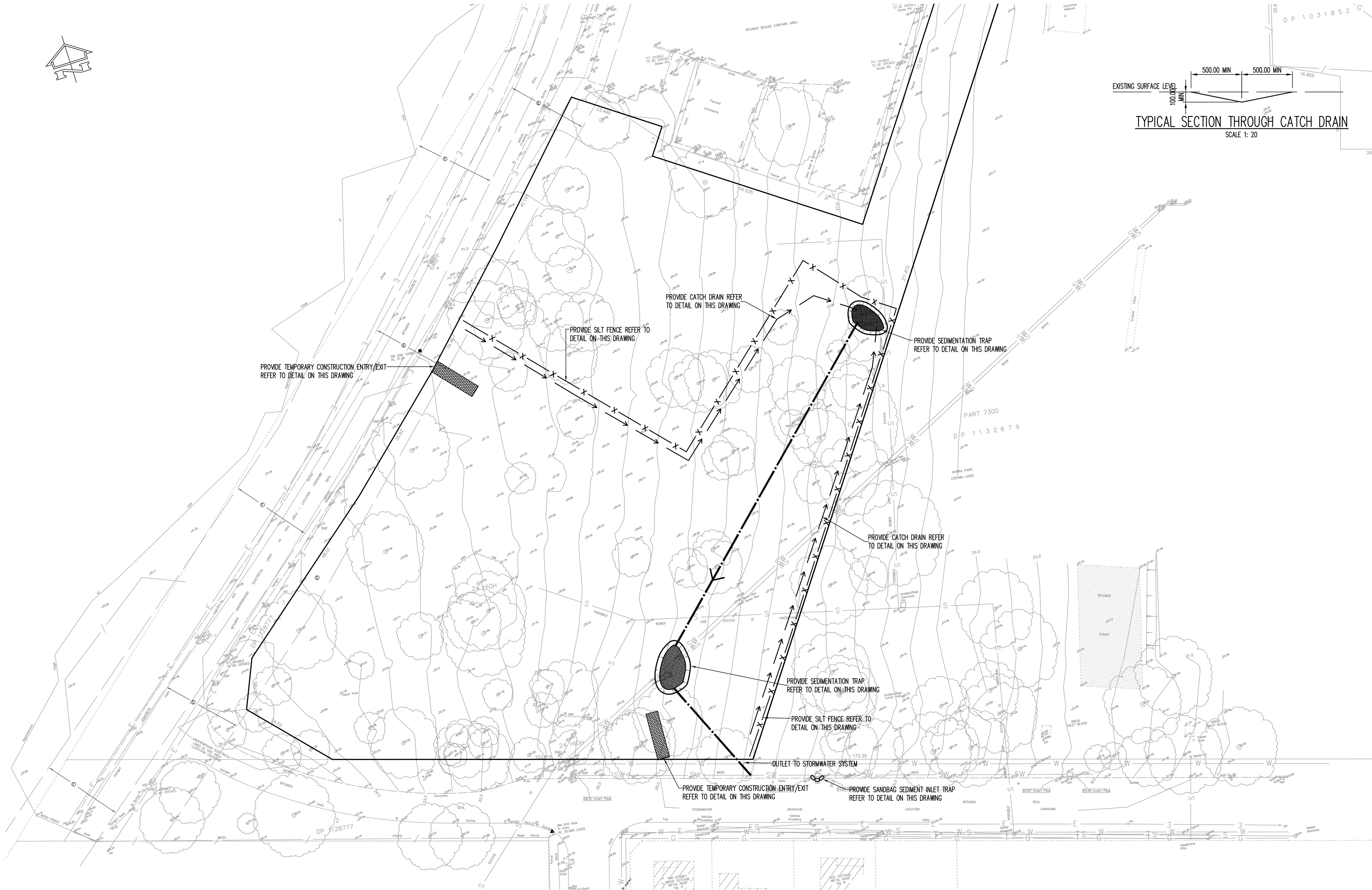
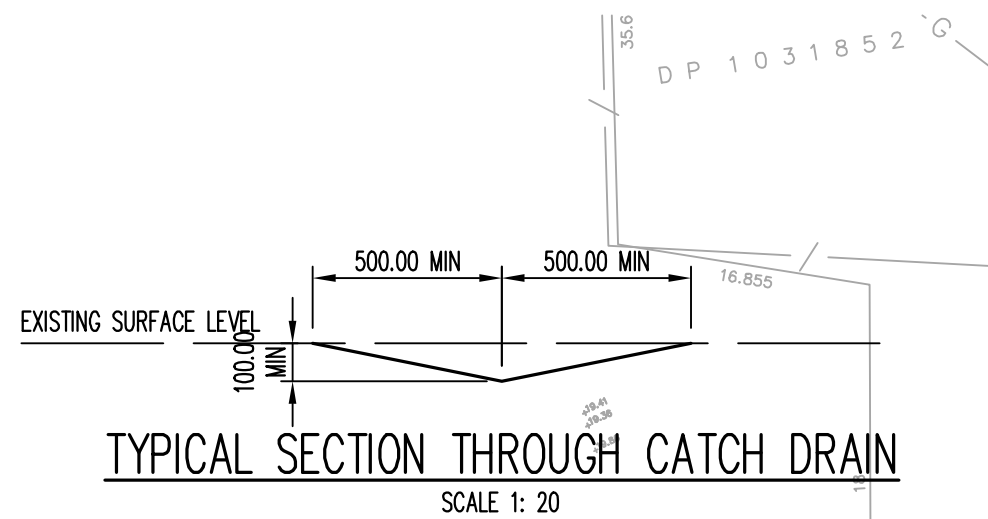
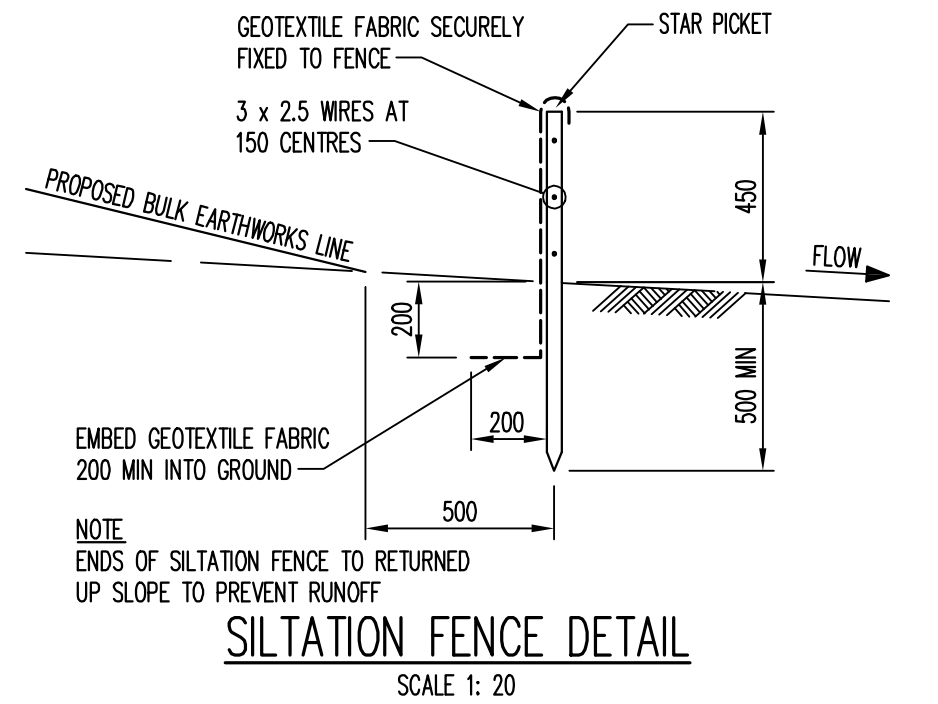
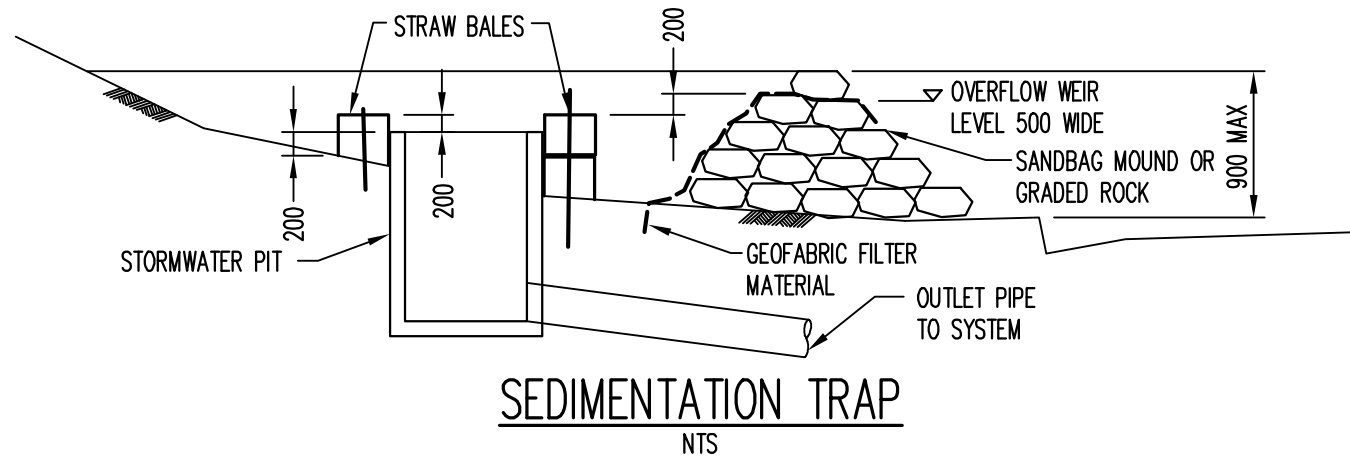
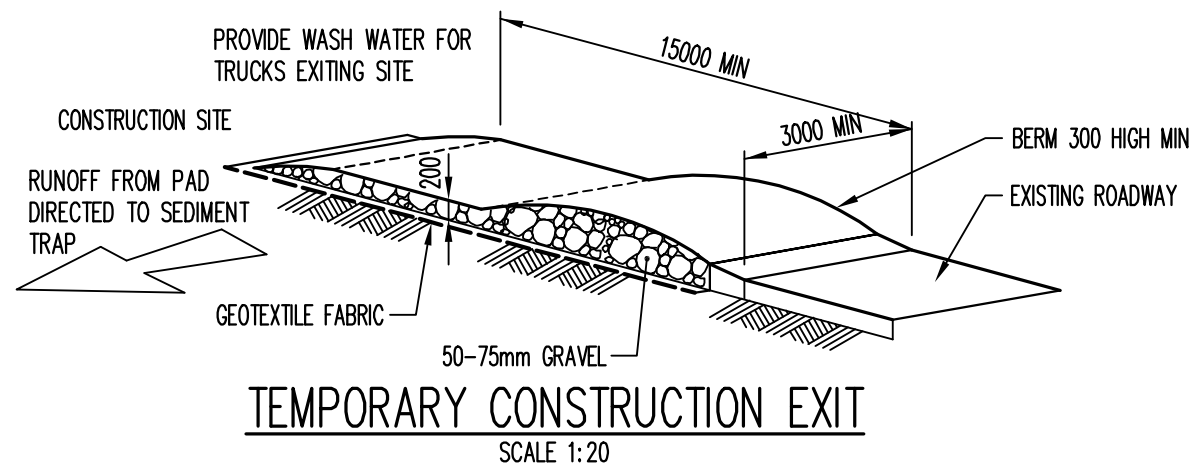
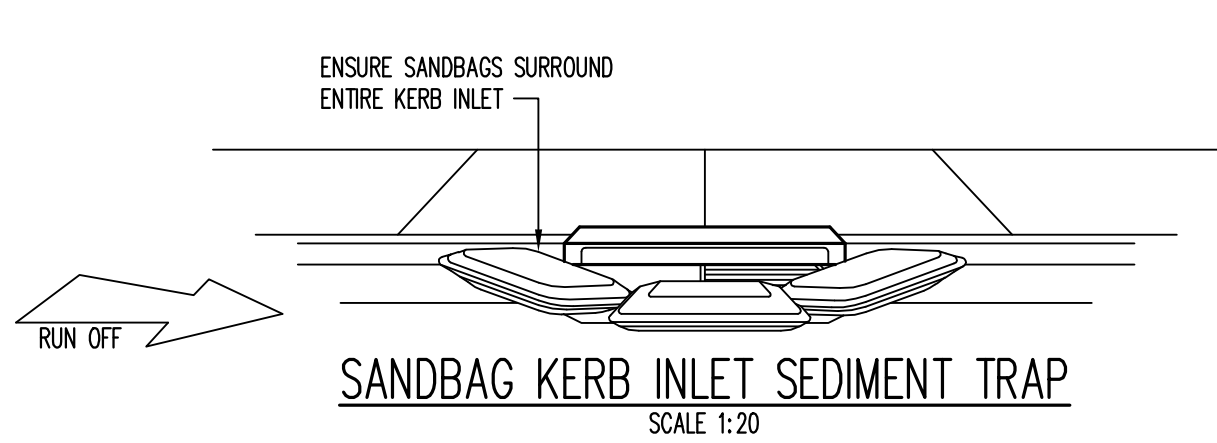
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Appendix B

Soil and Erosion Control Plan



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EROSION AND SEDIMENT CONTROL NOTES

- All work shall be generally carried out in accordance with
 - Local authority requirements,
 - EPA - Pollution control manual for urban stormwater,
 - LANDCOM NSW - Managing Urban Stormwater: Soils and Construction ("Blue Book").
- Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities. The erosion and sediment control plan shall be implemented and adapted to meet the varying situations as work on site progresses.
- Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
- When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
- Minimise the area of site being disturbed at any one time.
- Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
- All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
- Control water from upstream of the site such that it does not enter the disturbed site.
- All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
- All vehicles leaving the site shall be cleaned and inspected before leaving.
- Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
- Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

- Prior to commencement of excavation the following soil management devices must be installed.
 - Construct silt fences below the site and across all potential runoff sites.
 - Construct temporary construction entry/exit and divert runoff to suitable control systems.
 - Construct measures to divert upstream flows into existing stormwater system.
 - Construct sedimentation traps/basin including outlet control and overflow.
 - Construct turf lined swales.
 - Provide sandbag sediment traps upstream of existing pits.
 - Construct geotextile filter pit surround around all proposed pits as they are constructed.
- On completion of pavement provide sand bag kerb inlet sediment traps around pits.
- Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

EROSION AND SEDIMENT CONTROL LEGEND

— X — Siltation fence

P5	FOR CONSTRUCTION DRAFT	AW	WW	07.10.11
P4	FOR CONSTRUCTION DRAFT	AW	RP	23.08.11
P3	PRELIMINARY	AW	MK	05.08.11
P2	PRELIMINARY	AW	MK	02.08.11
P1	PRELIMINARY	AW	EN	01.06.11
Rev	Description	Eng	Draft	Date

SHOALHAVEN HOSPITAL CANCER CARE CENTRE

Sheet Subject EROSION AND SEDIMENT CONTROL PLAN

Architect
HASSELL LIMITED
88 CUMBERLAND STREET SYDNEY NSW
2000 AUSTRALIA

TaylorThomsonWhitting
Consulting Engineers
48 Chandos Street St Leonards NSW 2065
T: +61 2 9439 7288 F: +61 2 9439 3146 ttwsyd@ttw.com.au

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101498	TTW-SC-CVT-0003	P5

PRELIMINARY