MICHAEL FITZGERALD
Consulting Engineers Pty Ltd ABN 73 075 676 854
Structural and Civil Engineers

JOB NUMBER 15.E186

18th February, 2016

WATER CYCLE MANAGEMENT PLAN
PROPOSED JUNIOR SCHOOL
NARARA CREEK ROAD NARARA
FOR ST. PHILIPS CHRISTIAN COLLEGE

CONTENTS

1.0 Background

2.0 Site Context

3.0 Proposed Development

4.0 Water Cycle Management

5.0 Stormwater Management

6.0 Stormwater Quality Management

7.0 Interaction with Urban Design

8.0 Costs to the Owner

9.0 Operation & Maintenance

10.0 Stormwater Drainage Calculations

Attachments
- Drawing 438 – S04 Master Plan prepared by Ian Easton Architect
- Civil Engineering Drawings 15- E186 C1 - C4 prepared by Michael Fitzgerald Consulting

147 Parkway Avenue, Hamilton South NSW 2303
Phone: (02) 49613924 Fax: (02) 49613924 Mobile:0412 056 934
Email: m.fitzgerald@hunterlink.net.au

1.0 Background

The proposed development consists of a new Junior School Building being constructed within the confines of the existing School Campus.

The School Campus has an existing water management plan for the site and the proposed development's new stormwater drainage has been designed to not adversely impact on the existing stormwater system.

The existing stormwater management collects water through a piped system which discharges into Narara Creek Rd. Detention & Nutrient Control measures of the existing system utilise the banked and bermed school playing field as a collection pond.

2.0 Site Context

The proposed junior school building is located within the existing school campus. A site plan for the building is shown on Architectural Drawing 438-S04 prepared by Ian Easton Architect (see attached).

This proposed junior school building replaces a smaller demountable building and hard paved areas of the existing school campus. The new junior school will have a unique and separate stormwater drainage system which will be connected within the school campus to an existing drainage pit upstream of the existing detention basin & nutrient pond. The increased impervious area has a negligible impact on the existing stormwater drainage parameters and does not increase the outlet flows to the street drainage in Narara Creek Road.

The receiving environment for the stormwater system is primarily rooves with minor paved area collection.

3.0 Proposed Development

The proposed junior school building is located within the existing school campus. A site plan for the building is shown on Architectural Drawings 438-S10 to S12 prepared by Ian Easton Architect.

The civil engineering documentation is shown on Drawings 15-E186 C1 – C4 prepared by Michael Fitzgerald Consulting Engineers.

4.0 Water Cycle Management

The Stormwater Drainage & Water Re-Use for the proposed junior school building is shown on our Drawing 15-E186 C3 & C4.

147 Parkway Avenue, Hamilton South NSW 2303
Phone: (02) 49613924 Fax: (02) 49613924 Mobile:0412 056 934
Email: m.fitzgerald@hunterlink.net.au

The Water Cycle is managed as follows:-
- The roof water from the building is collected in storage tanks (40,000 litres) in the subfloor area of the building. This water is re-used into the toilets to supplement potable water use and for landscaped watering.
- Water from Paving and landscaped areas is collected in a piped system, bypassing the water re-use tanks and discharging to an existing pit upstream of the existing nutrient and detention basin.
- For normal storm events rainwater discharges through a piped system into the existing pie system and discharges into Narara Creek Rd drainage system.
- For abnormal storm events the water discharges onto the sporting oval of the school which is a detention basin and nutrient pond. Water infiltrates into the ground or is throttled through the pipe system into Narara Creek Rd drainage system. Stormwater discharge values to Narara Creek Road are not increased.
- The oval has a banked & bermed perimeter which is designed for collection of excess water in this catchment. The stormwater from the increased impervious area from the new junior school building is catered for by the introduction of the water collection tanks in the subfloor of the building and a nominal 11mm increase in the depth of the water collected on the oval. The oval detention basin has sufficient additional capacity to cater for the increased water volumes.
- The new piped system has a minimal impact on the existing stormwater system as it is separate to the existing system until the pit immediately upstream of the detention are.
- Overland flow & flooding from the catchment is directed to the sporting oval which borders the downstream perimeter of the junior school catchment. All water from the junior school development is captured by a piped or overland flow system to the sporting oval.

5.0 Stormwater Management

The Stormwater Drainage & Water Re-Use for the proposed junior school building is shown on our Drawings 15-E186 C3 & C4.

The increased volume of water from the increased impervious area of the Junior School within the existing school precinct catchment is collected onto the oval through an existing piped system or by overland flow.

Roof water is collected in water re-use tanks to supplement potable water from the local water authority. This water is directed to the junior school toilets and to landscaped watering.

Water is detained within the oval basin and infiltration into the soil acts as the nutrient control devise for the stormwater system.

6.0 Stormwater Quality Management

Stormwater quality management is provided initially by water re-use tanks for roof water. First flush control is provided by these water re-use tanks.

Stormwater overflow from these water re-use tanks and paved areas achieve water quality and nutrient control by infiltration into the soil at the school oval.

147 Parkway Avenue, Hamilton South NSW 2303
Phone: (02) 49613924 Fax: (02) 49613924 Mobile:0412 056 934
Email: m.fitzgerald@hunterlink.net.au

7.0 Interaction with Urban Design

The stormwater system proposed for the Junior School Building utilises the existing urban design principles through landscaped watering from the water collection tanks and infiltration into the soils of the sporting oval.

In normal storm events no water is discharged from the site above stormwater outlet values set by Gosford City Council.

Discharge from the site is controlled through a piped system which has minimal impact on the urban street environment.

8.0 Costs to the Owner

The stormwater drainage system documented has a significant cost saving to the school as potable water from the local water authority is augmented by water re-sue measures as set out above.

9.0 Operation & Maintenance

The maintenance of the stormwater drainage system shall include:-
- regular routine plumbing checks of all water re-use pumps, valves, float switches and ancillary equipment. Routine checks shall be undertaken on a monthly basis and repairs carried out as required in accordance with the supplier and manufacturers requirements.
- first flush devices shall be cleaned on a regular basis
- all pipes and pits shall be routinely inspected for blockages or debris build up. Pipes and pits shall be cleared to ensure the system can deliver the design water flow. Inspections shall be undertaken on a three monthly basis.
- the berm of the sporting filed shall be maintained at its present height. Any scouring of the beam or bank shall be repaired as required.

10.0 Stormwater Drainage Calculations

10.1) Water Quality - Roof Water from Roof of Building to Re-use

Rainwater Harvesting - Re-use of roof only water to toilet cisterns. Water Re-use collection tanks of 40,000 litre capacity are provided in tanks vin the subfloor of the building.. An overflow discharge pipe from each tanks is gravity fed to an existing pit in the school oval detention basin area

Site Discharge Index

Total Site Area = 2900 sqm

Impervious Site Area not Controlled Area = 80 sqm

SDI = 80 / 2900 = 0.03 < 0.1 Acceptable

Water Quality Management

This is achieved as follows:-

Junior School Roof Water – Water Re-Use Tank for Toilets & Landscaped Watering

147 Parkway Avenue, Hamilton South NSW 2303
Phone: (02) 49613924 Fax: (02) 49613924 Mobile:0412 056 934
Email: m.fitzgerald@hunterlink.net.au

First Flush Control from Paved Areas bypassing the Water Re-use Tanks

Managed Rainfall Intensity I = 7mm Carpark / Paved Area = 250sqm
Volume Required = 1.75 cum – in Bermed School Oval Acceptable
Infiltration I – 10mm/hr
School Oval – 100m x 50m
Infiltration Area = 5000sqm
Q = IA = 5000 x 10 = 50 l/s Acceptable

10.2) Stormwater Detention

Junior School Site Area = 2900 sqm

Time of Concentration for Site

Site Overland Flow - Distance travelled = 50 metres
Site Slope - 1.02 metres over 50m = 2%

Rainfall Coefficients

1) Pre – development – Grassed Pervious Area Only

C1/10 = 0.43

2) Post- development

C1/10 = 0.76 - 70% Impervious Site Coverage
C = Fy x C1/10

Rainwater Outflow Pre Development 1in1 year storm to 1in100year Storm Events

Q = 0.43 x I x A / 3600 Storm Duration = 10 minutes

Storm	Intensity	Outflow
1 in 1 yr	58.47 mm/hr	20.5 l/s
1 in 5 yr	96.43mm/hr	33.8 l/s
1 in 10 yr	109.06mm/hr	38.5 l/s
1 in 20 yr	125.80mm/hr	44.1 l/s
1 in 50 yr	147.89mm/hr	51.8 l/s
1 in 100yr	164.82mm/hr	57.8 l/s

Rainwater Inflow - Post Development 1 in 1 year storm to 1 in 100year Storm Events

Q = Cx Fy x I x A / 3600 Storm Event = 6 minutes

Storm	Intensity	Frequency Factor	Coefficient	Outflow
1 in 1 yr	76.41 mm/hr	0.8	0.61	30.2 l/s
1 in 5 yr	118.40mm/hr	0.95	0.72	65.4 l/s
1 in 10 yr	134.05mm/hr	1.0	0.76	82.5 l/s
1 in 20 yr	154.78mm/hr	1.05	0.8	105.5 l/s
1 in 50 yr	182.15mm/hr	1.15	0.88	149.2 l/s
1 in 100yr	203.16mm/hr	1.2	0.91	179.6 l/s

147 Parkway Avenue, Hamilton South NSW 2303
Phone: (02) 49613924 Fax: (02) 49613924 Mobile:0412 056 934
Email: m.fitzgerald@hunterlink.net.au

Detention Volume Required = (Qin - Qout) x t x 60 for Various Events

Storm	Inflow	Outflow	Volume
1 in 1 yr	30.2 l/s	20.5 l/s	3.5 cum
1 in 5 yr	65.4 l/s	20.5 l/s	16.2 cum
1 in 10yr	82.5 l/s	38.5 l/s	15.8 cum
1 in 20yr	105.5 l/s	38.5 l/s	24.1 cum
1 in 50yr	149.2 l/s	38.5 l/s	39.9 cum
1 in 100yr	179.6 l/s	38.5 l/s	50.8 cum *

Detention Volume provided by

- Provide an Above Ground Detention Basin – Bermed Sporting Oval

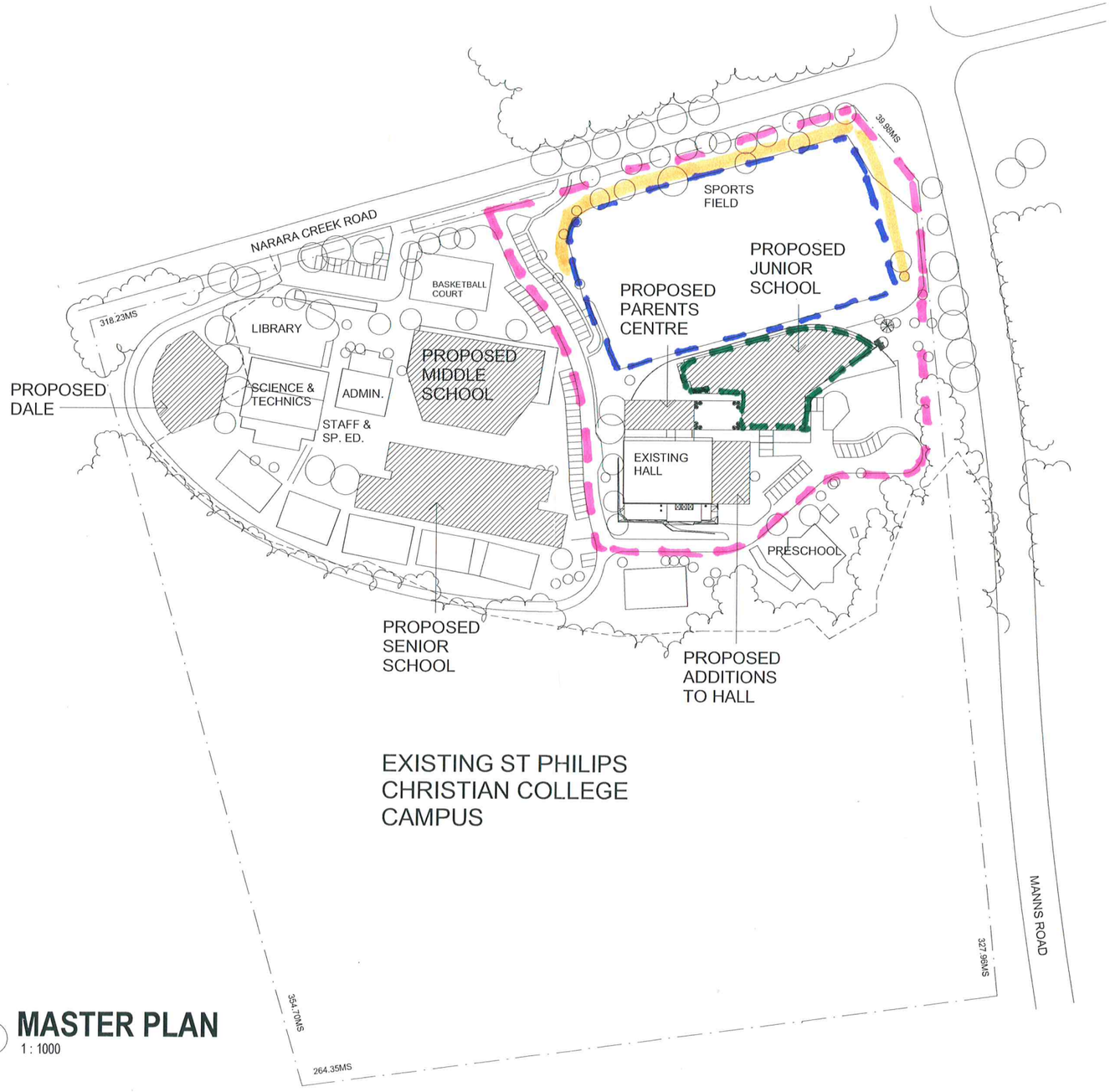
Area = 5000 sm Maximum Depth = 11mm Volume = 55cum

Increase in Depth of Detention Water on Sporting Oval due to increased impervious area from Junior School = 11mm Acceptable

Designed By:-

Michael Fitzgerald
MIEAust CPEng

147 Parkway Avenue, Hamilton South NSW 2303
Phone: (02) 49613924 Fax: (02) 49613924 Mobile:0412 056 934
Email: m.fitzgerald@hunterlink.net.au



LEGEND

- EXISTING CATCHMENT CONTAINING PROPOSED JUNIOR SCHOOL.
- PROPOSED JUNIOR SCHOOL BUILDING
- SPORTING OVAL, POTENTIAL BASIN & NUTRIENT POND
- EXISTING EARTH BERM CAPTURING OVERLAND FLOW WATER WITHIN OVAL POTENTIAL BASIN.

1 MASTER PLAN
1 : 1000

200mm ON ORIGINAL A1 | 100mm | 25mm | 0

IAN EASTON ARCHITECT
112 The Lane, Wickham NSW 2293
P. 02 49691360 F. 02 49691359
E. ian@ianeastonarchitects.com
ARN 4787 ABN 45 774 395 883

No.	DESCRIPTION	DATE

No.	DESCRIPTION	DATE

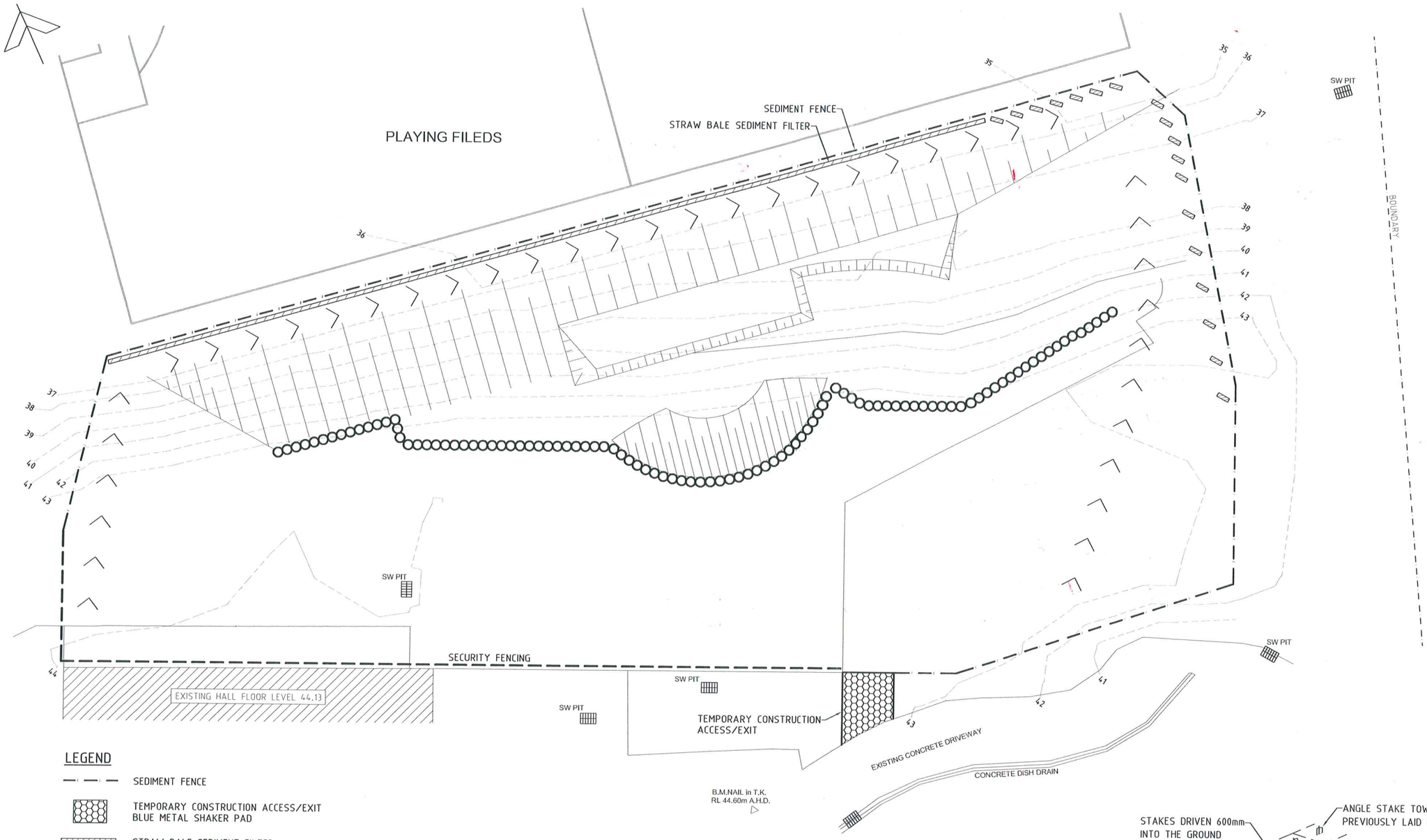
ST PHILIPS CHRISTIAN COLLEGE
GOSFORD CAMPUS
NARARA CREEK ROAD, NARARA

PROPOSED JUNIOR SCHOOL BUILDING

MASTER PLAN
438-S04
SCALE 1 : 1000

PROJECT NUMBER	438
DATE	JANUARY 2015
DRAWN BY	IE
CHECKED BY	Checker

19/02/2015 10:01:50 AM



GENERAL NOTES

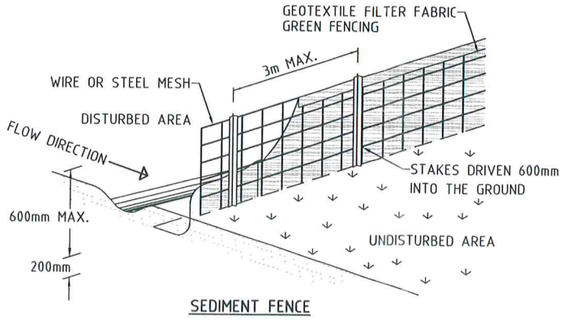
1. All excess excavated material to be removed from site.
2. Builder to landscape and revegitate the site immediately after building works construction.
3. All existing vegetation including trees (AS NOTED) to be cleared from site. Refer to landscape plan for details.
4. The developer is responsible for ongoing maintenance of erosion and siltation control measures.
5. It is the contractors responsibility to ensure that all works are carried out in strict accordance with the OCCUPATIONAL HEALTH AND SAFETY ACT.
6. All work is to be carried out in accordance with Councils specification for subdivision works and to the satisfaction of the director of development.
7. Council are to notified prior to the commencement of any works.
8. All public utilities are to be clearly identified in the field prior to any civil works. Council does not accept any responsibility for damage or relocation costs to public utilities during the construction of this development.
9. Permission to enter, construct works and discharge stormwater on adjoining properties shall be obtained and submitted to council prior to the commencement of any works.
10. All erosion and sediment control measures are to be carried out in accordance with Council's code of practice for erosion and sedimentation and must be implemented prior to the commencement of any building of civil works.
11. The rectification of all matters arising from insufficient information being shown on the submitted plans is to be carried out to the Engineer's satisfaction.
12. These plans are to be read in conjunction with the conditions stated in local Council's engineering plan approval correspondence.

SEDIMENT CONTROL NOTES

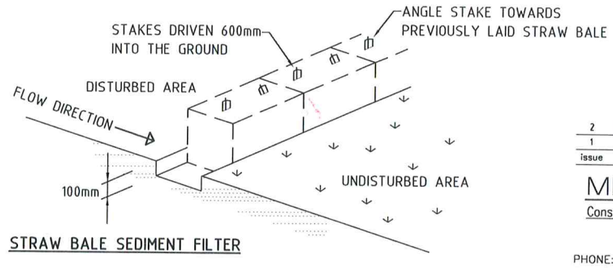
1. All sediment control devices are to be constructed, placed and maintained in accordance with 'Urban Erosion & Sediment Control', C.A.L.M. N.S.W.
2. All perimeter & siltation control measures are to be constructed as the first step in earthworks and/or cleaning.
3. All temporary earth berms, diversion & silt dam embankments are to be machine compated, seeded and mulched for temporary vegetation cover as soon as they have been formed.
4. All sediment trapping structures and devices are to be inspected after storms for structural damage or clogging. Trapped material is to be removed to a safe approved location.
5. All topsoil is to be stockpiled on site for re-use laway from trees and drainage lines! Measures shall be applied to prevent erosion of the stockpiles.
6. All cut and fill slopes are to be seeded and mulched within 10 days of completion of formation.
7. No disturbed area is to remain denuded longer than 14 days. Hydromulch or turf as required.
8. The area over all service lines not within road reserves is to be mulched and seeded or turfed where instructed within 14 days after backfill.
9. No more than 150 metres of trench is to be open at any one time.
10. All footpaths, berms and batters and site regrading area are to be topsoiled with minimum 100mm of selected site topsoil and grassed with seed.
11. Strips of turf are to be placed immediately behind the kerb of accessways 600mm wide minimum.
12. All landscaping measures including the establishment of grassing are to be completed prior to the final inspection. All erosion devices are to be maintained until the landscaping is completed and established.

LEGEND

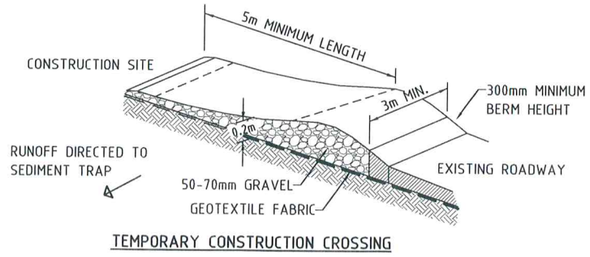
- SEDIMENT FENCE
- TEMPORARY CONSTRUCTION ACCESS/EXIT BLUE METAL SHAKER PAD
- STRAW BALE SEDIMENT FILTER
- EXISTING CONTOUR LEVELS
- OVERLAND FLOWPATH
- 450Ø CONTIGUOUS PILING x 8m LONG 6/N16 VERTICAL BARS, R10 TIES AT 500 FOUND AT RL 36.6 (ROCK)



SEDIMENT FENCE



STRAW BALE SEDIMENT FILTER



TEMPORARY CONSTRUCTION CROSSING

2	17.08.2015	general revisions
1	01.05.2015	preliminary
issue	date	comment

MICHAEL FITZGERALD
Consulting Engineers Pty Ltd ABN 73 075 676 854
Structural & Civil

PHONE: (02) 49613924
FAX: (02) 49613924
MOBILE: 0412 056934

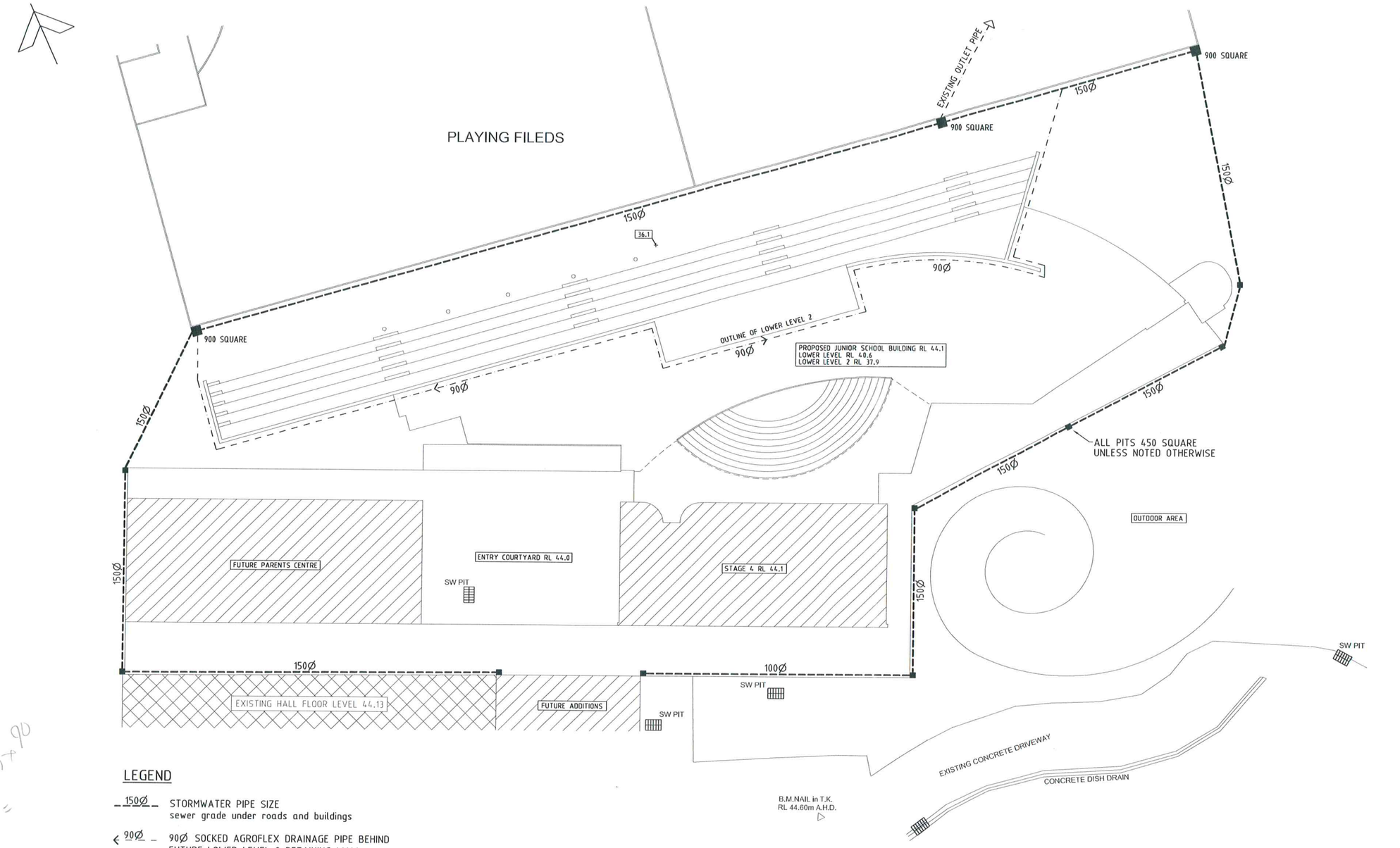
147 PARKWAY AVENUE
HAMILTON SOUTH.
N.S.W. 2303.

project
PROPOSED JUNIOR SCHOOL BUILDING
ST PHILLIPS CHRISTIAN COLLEGE
NARARA CREEK ROAD, NARARA

architect
IAN EASTON

drawing
SEDIMENT AND EROSION CONTROL

date MAY 2015	scales 1:200	job no. 15-E186	
drawn L.TAPP	cad file 2015-025		
certified		drawing no. C2	issue 2



LEGEND

- 150Ø — STORMWATER PIPE SIZE
  sewer grade under roads and buildings
- 90Ø — 90Ø SOCKED AGROFLEX DRAINAGE PIPE BEHIND FUTURE LOWER LEVEL 2 RETAINING WALL
- ■ PRECAST CONCRETE DRAINAGE PIT - REFER SCHEDULE
  HEAVY DUTY GALVANISED GRATE COVERS IN TRAFFICABLE AREAS AND OVERLAND FLOWPATH
  LIGHT DUTY STAINLESS STEEL 'ACO HEELGUARD' COVERS TO ACCESSIBLE PEDESTRIAN AREAS.
- 21.5 — FINISHED SURFACE LEVELS
- ← — DIRECTION OF FALL TO FINISHED GROUND
- °DP — DOWNPIPE - REFER ARCHITECTS DRAWINGS FOR SETOUT
- °IO — INSPECTION OPENING
- °FW — FLOOR WASTE IN DECK SLAB

STORMWATER DRAINAGE NOTES

1. ALL STORMWATER DRAINAGE INSTALLATION WORKS TO COMPLY WITH NATIONAL PLUMBING AND DRAINAGE CODE AS 3500, THE BCA, NSW CODE OF PRACTICE 1999, COUNCIL CONSENT CONDITIONS AND THE STATUTORY AUTHORITY'S REQUIREMENTS.
2. ALL PITS TO BE PRECAST CONCRETE STEEL REINFORCED.
3. ALL PIPES TO BE 90Ø UPVC UNLESS NOTED OTHERWISE.
4. ALL PIPE SIZES SHOWN ARE ON (DIAMETER NOMINAL) EQUIVALENT PIPE SIZES FOR THE SELECTED PIPE MATERIALS TO COMPLY WITH TABLE 1.1 AND 1.3 OF AS3500.
5. 100Ø PIPES TO BE CLASS SN6 UPVC LAID AT MINIMUM GRADE 1 IN 100.
6. 150Ø PIPES TO BE CLASS SN4 UPVC LAID AT MINMUM GRADE 1 IN 100.
7. 90Ø SUBSOIL DRAINAGE CLASS SN6 SLOTTED HARD TUBE LAID AT MINIMUM GRADE 1 IN 200.
8. ARROWS INDICATE DIRECTION OF GRADE 1,100 MINIMUM.
9. ALL LEVELS APPROXIMATE ONLY CONFIRM ON SITE
10. FLOOR LEVELS SHOWN ARE FINISHED FLOOR LEVELS.
11. COVER AND GRATE LEVELS TO BE MODIFIED AS NECESSARY ON SITE TO MATCH SURROUNDING AND ENSURE DRAINAGE TO GRATES.
12. MINIMUM COVER TO STORMWATER PIPES SHALL BE AS FOLLOWS.
    TRAFFICABLE AREAS 450mm.
    LANDSCAPED 300mm
    PIPES TO BE CONCRETE ENCASED IF MINIMUM COVERS CANNOT BE OBTAINED IN TRAFFICABLE AREAS, REFER TO CLAUSE 3.8 AS 3500.3. ALTERNATIVELY USE UPVC SEWER GRADE PIPES UNDER ROADS AND BUILDINGS.
13. ALL LANDSCAPED AREAS PROVIDE DN90 SUBSOIL DRAINS (AGROFLEX OR SIMILAR) LAID AT MINIMUM GRADE 1 IN 200. PROVIDE GEOFABRIC FILTER SOCK TO ALL PIPES.
14. USE 90Ø UPVC PIPES FROM ALL DOWNPIPES. FOR LOCATIONS OF DOWNPIPES REFER TO ARCHITECTURAL DRAWINGS.
15. ALL OUTLET PIPES TO HAVE 150 x 100 RHS HEAVY DUTY PLASTIC KERB ADAPTORS.

MAINTENANCE PROGRAMME

1. ALL STORMWATER PITS TO BE CLEANED ON A REGULAR BASIS AT MINIMUM 1 MONTH INTERVALS.
2. FLUSH SYSTEM ANNUALLY.

issue	date	comment
2	17.08.2015	general revisions
1	01.05.2015	preliminary

MICHAEL FITZGERALD
Consulting Engineers Pty Ltd ABN 73 075 676 854
Structural & Civil

PHONE: (02) 49613924
FAX: (02) 49613924
MOBILE: 0412 056934

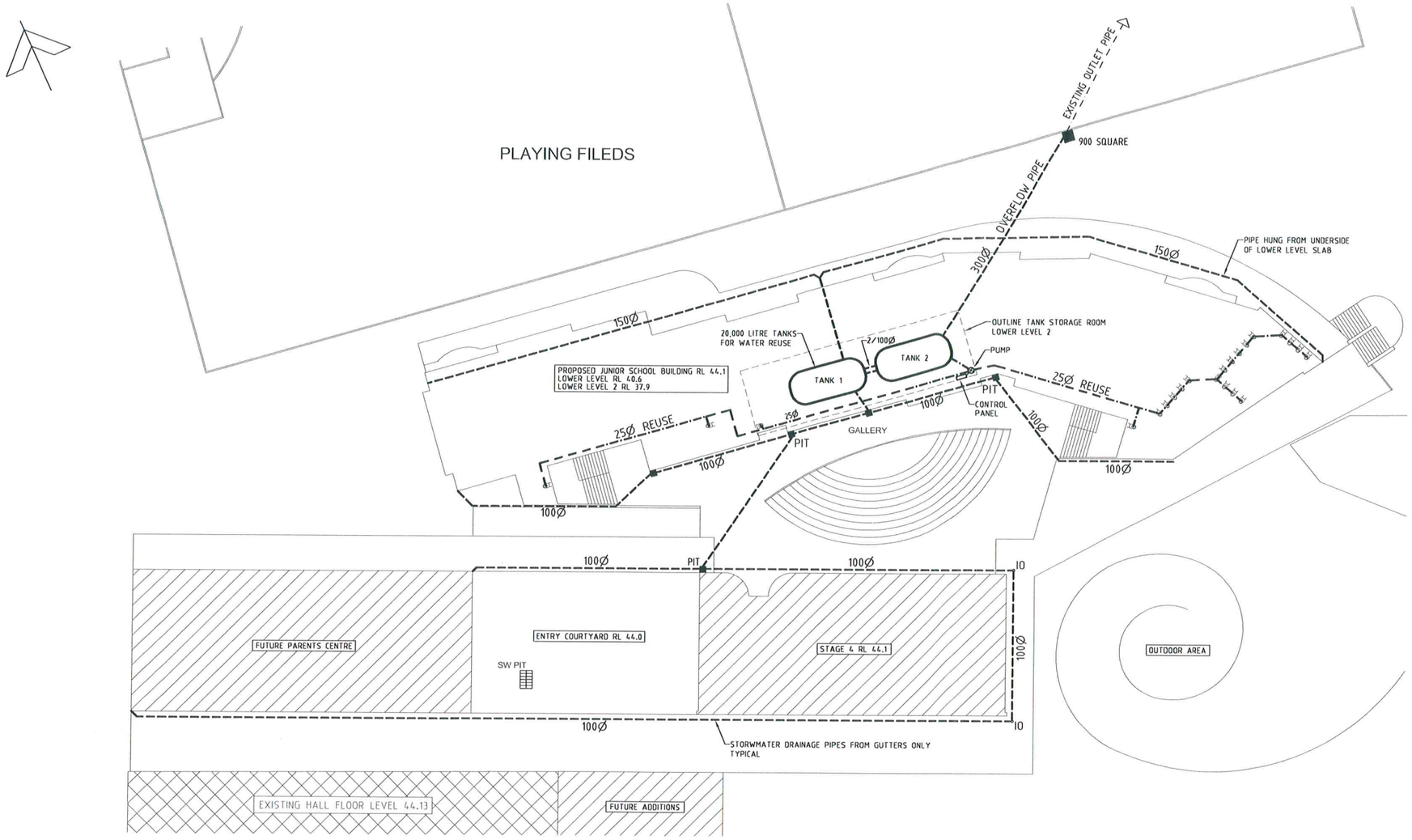
147 PARKWAY AVENUE
HAMILTON SOUTH.
N.S.W. 2303.

project
PROPOSED JUNIOR SCHOOL BUILDING
ST PHILLIPS CHRISTIAN COLLEGE
NARARA CREEK ROAD, NARARA

architect
IAN EASTON

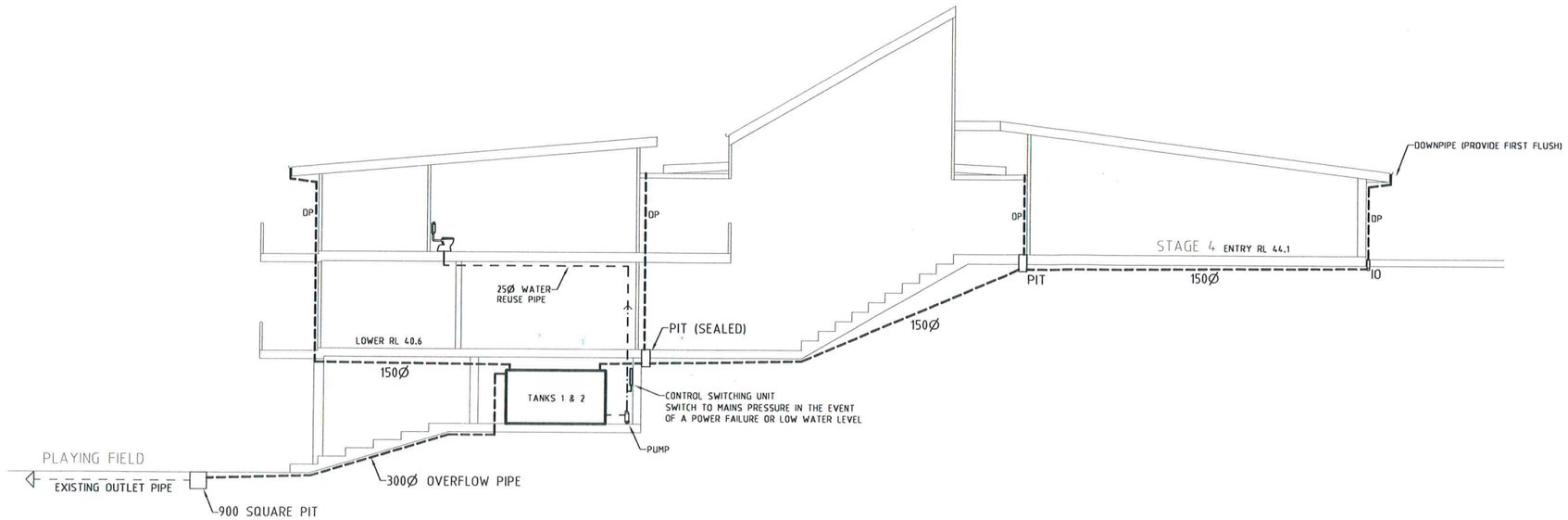
drawing
STORMWATER DRAINAGE - PAVED AREAS

date MAY 2015	scales 1:200	job no. 15-E186	
drawn L.TAPP	cad file 2015-025		
certified		drawing no. C3	issue 2



LEGEND

- 150Ø — STORMWATER PIPE SIZE sewer grade under roads and buildings
- ■ PRECAST CONCRETE DRAINAGE PIT - REFER SCHEDULE LIGHT DUTY STAINLESS STEEL 'ACO HEELGUARD' COVERS TO ACCESSIBLE PEDESTRIAN AREAS.
- 21.5 FINISHED SURFACE LEVELS
- ← DIRECTION OF FALL TO FINISHED GROUND
- °DP DOWNPIPE - PROVIDE FIRST FLUSH REFER ARCHITECTS DRAWINGS FOR SETOUT
- °IO INSPECTION OPENING



TYPICAL SECTION STORMWATER DRAINAGE REUSE
SCALE 1.100

issue	date	comment
2	17.08.2015	general revisions
1	01.05.2015	preliminary

MICHAEL FITZGERALD
Consulting Engineers Pty Ltd ABN 73 075 676 854
Structural & Civil
PHONE: (02) 49613924
FAX: (02) 49613924
MOBILE: 0412 056934
147 PARKWAY AVENUE
HAMILTON SOUTH.
N.S.W. 2303.

project
PROPOSED JUNIOR SCHOOL BUILDING
ST PHILLIPS CHRISTIAN COLLEGE
NARARA CREEK ROAD, NARARA

architect
IAN EASTON

drawing
STORMWATER DRAINAGE AND REUSE

date MAY 2015	scales 1.200	job no. 15-E186	
drawn L.TAPP	cad file 2015-025		
certified		drawing no. C4	issue 2

PLAYING FILEDS

STAGE 1 AT ENTRY AND LOWER LEVEL

CUT TO GRADE OF SEATING

CUT RL 37.6
STORE/AC PLANT

0.4m

2.7m

TEMPORARY CUT BATTER

LEVEL OVER

CUT RL 37.6

TOP OF BANK

BTM OF BANK

EXISTING LEVELS REMAIN

CUT RL 40.3

CUT RL 40.3
FOR PLANT ACCESS

7.5m

2.9m

CUT TO GRADE OF SEATING

EXISTING LEVELS REMAIN

EXISTING LEVELS REMAIN

TOP OF BANK

EXISTING LEVELS REMAIN

CUT/FILL RL 43.8

CUT/FILL RL 43.8

SW PIT

CUT RL 43.8

EXISTING HALL FLOOR LEVEL 44.13

SW PIT

SW PIT

SW PIT

SW PIT

SW PIT

BOUNDARY

EXISTING CONCRETE DRIVEWAY

B.M.NAIL in T.K.
RL 44.60m A.H.D.

B
C1

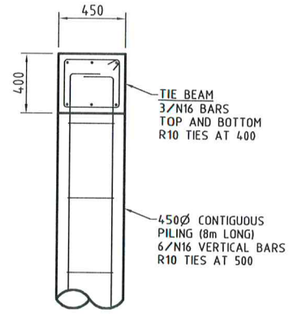
B
C1

LEGEND

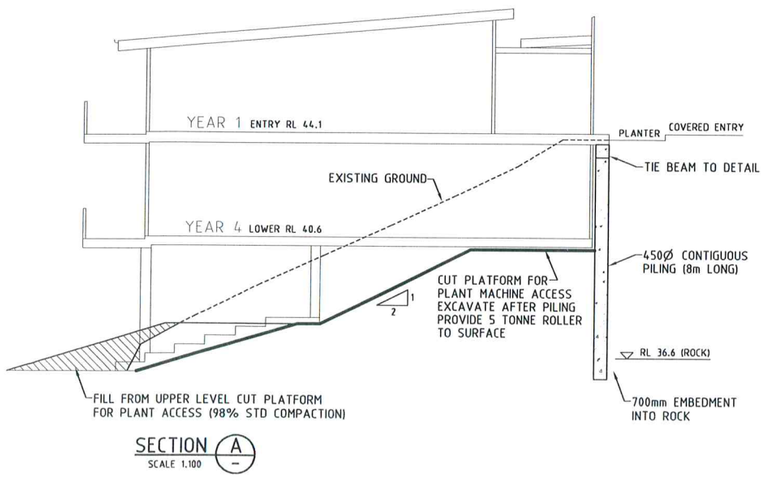
- 13.8 — FINISHED BULK EARTHWORKS LEVELS (+0/-30mm)
- 44 — EXISTING CONTOUR SURFACE LEVELS
- EXISTING BUILDING
- DIRECTION OF FALL TO FINISHED SURFACE FOR OVERLAND FLOW DURING CONSTRUCTION
- CUT BATTERS
- 450Ø CONTIGUOUS PILING x 8m LONG 6/N16 VERTICAL BARS, R10 TIES AT 500 FOUND AT RL 36.6 (ROCK)

NOTE

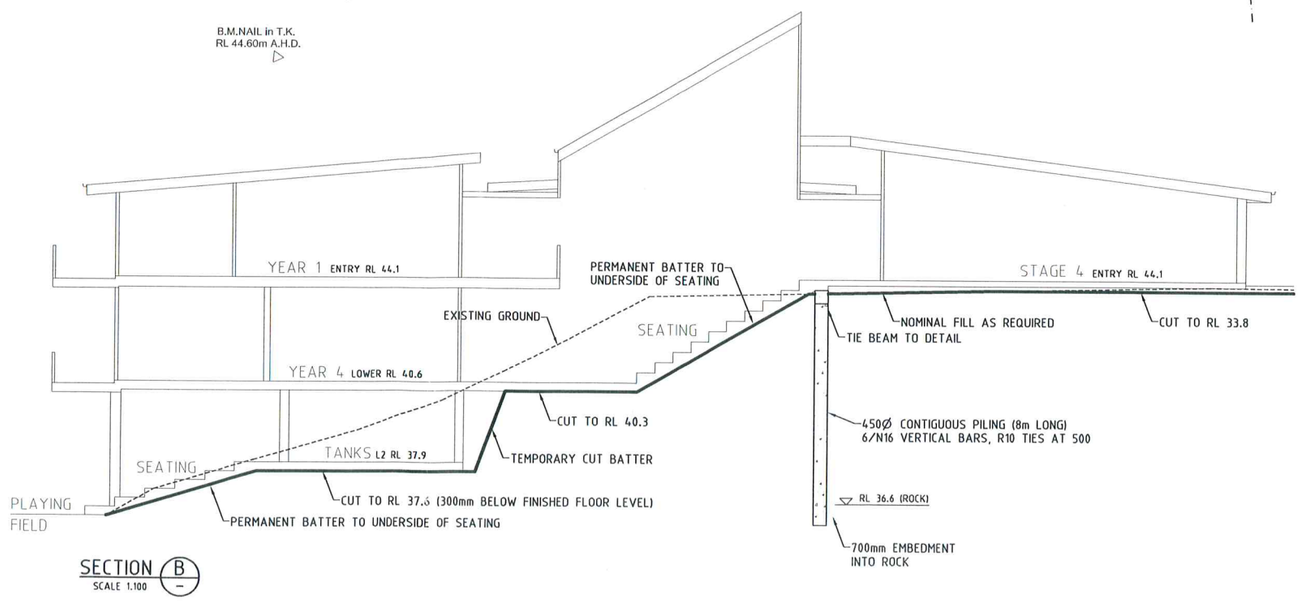
* ALL WORKS SHALL BE INSPECTED BY SUITABLY QUALIFIED GEOTECHNICAL ENGINEER TO LEVEL 1 SUPERVISION - AS3798-2007.



TYPICAL CONTIGUOUS WALL



SECTION A
SCALE 1.100



SECTION B
SCALE 1.100

issue	date	comment
2	17.08.2015	general revisions
1	01.05.2015	preliminary

MICHAEL FITZGERALD
Consulting Engineers Pty Ltd ABN 73 075 676 854
Structural & Civil

PHONE: (02) 49613924
FAX: (02) 49613924
MOBILE: 0412 056934

147 PARKWAY AVENUE
HAMILTON SOUTH.
N.S.W. 2303.

project
PROPOSED JUNIOR SCHOOL BUILDING
ST PHILLIPS CHRISTIAN COLLEGE
NARARA CREEK ROAD, NARARA

architect
IAN EASTON

drawing
BULK EARTHWORKS PLAN

date MAY 2015	scales 1:200,100	job no. 15-E186	
drawn L.TAPP	cad file 2015-025		
certified		drawing no. C1	issue 2