

21 March 2019

171518 CDAA

Ku-ring-gai Council
818 Pacific Highway
Gordon NSW 2072

Attention: Adam Richardson

KU-RING-GAI HIGH SCHOOL

Response to Initial Assessment

Dear Adam,

This letter aims to respond to civil engineering matters raised within Ku-ring-gai Council's Initial Assessment of the Development Application for Ku-ring-gai High School (DA0586/18). The matters raised relate to the stormwater point of discharge and to the provision of a rainwater tank.

Existing and Proposed Stormwater Discharge

Through site investigation, review of historical documents and the survey conducted for the development, stormwater from the site is conveyed to the east and then north through to Ku-ring-gai Chase National Park via a 600mm diameter pipe. As a result, the point of discharge of the site would be to the existing outlet to the National Park. Refer to the attached historical drawings and survey in Appendix A showing the stormwater drainage network.

Rainwater Retention and Re-use

The original design included a combined rainwater and onsite stormwater detention (OSD) tank. Following the request to provide a rainwater reuse system in lieu of an OSD tank, a water balance calculation has been undertaken to determine the appropriate size of rainwater tank.

We have been advised by the hydraulic engineer that rainwater re-use will be for toilet flushing within the site. As the hall contains 11 toilet facilities, and assuming an average daily demand of 0.1kL/day/toilet, the re-use demand on the tank is equal to 1.1kL/day. Rainwater re-use has been modelled within the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) with the proposed rainwater tank. It was determined that the proposed effective volume of 60kL would allow for 99.29% of the re-use demand to be met.

In terms of water quality measures, the development also proposes Stormwater 360's Enviropod pit inserts in 4 surface inlet pits and 10 460mm Stormfilter cartridges downstream of the rainwater tank.

Refer to **Figure 1** for a schematic layout of the MUSIC model, **Figure 2** for the results of the model, and **Figure 3** for the rainwater tank node water balance. Revised stormwater design drawings are included as Appendix B.

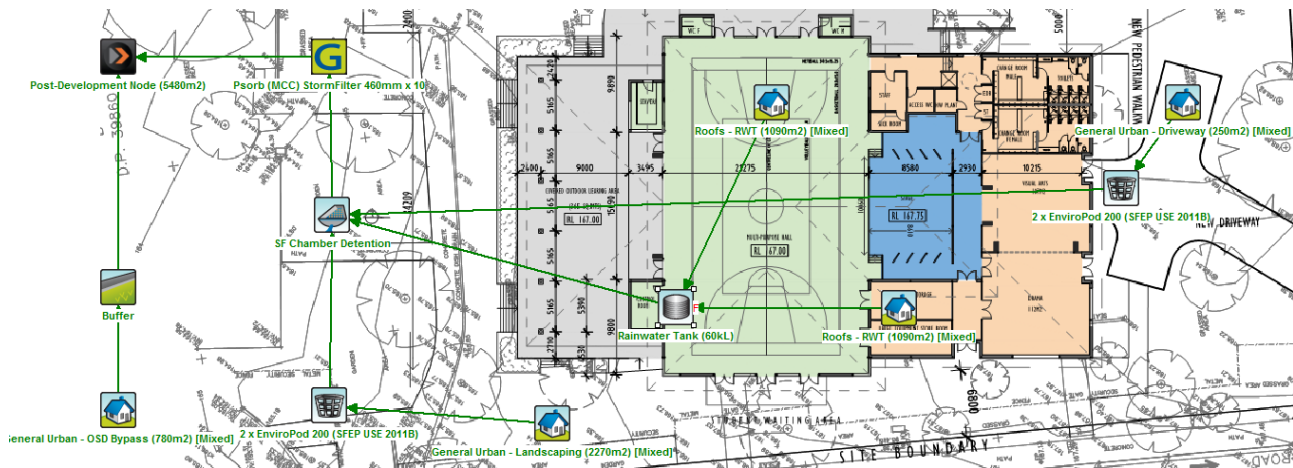


Figure 1: MUSIC Modelling Layout

Treatment Train Effectiveness - Post-Development Node (5480m2)			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.52	4.12	8.8
Total Suspended Solids (kg/yr)	505	66.1	86.9
Total Phosphorus (kg/yr)	1.17	0.357	69.4
Total Nitrogen (kg/yr)	12.9	5.82	54.8
Gross Pollutants (kg/yr)	115	9.23	92

Figure 2: Treatment Train Effectiveness

Node Water Balance - Rainwater Tank (60kL)					
	Flow (ML/yr)	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GP (kg/yr)
Flow In	2.42	127.37	0.36	6.99	57.38
ET Loss	0.00	0.00	0.00	0.00	0.00
Infiltration Loss	0.00	0.00	0.00	0.00	0.00
Low Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
High Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
Pipe Out	1.92	49.80	0.26	4.50	0.00
Weir Out	0.10	3.84	0.01	0.25	0.00
Transfer Function Out	0.00	0.00	0.00	0.00	0.00
Reuse Supplied	0.41	5.13	0.05	0.66	0.00
Reuse Requested	0.41	0.00	0.00	0.00	0.00
% Reuse Demand Met	99.29	0.00	0.00	0.00	0.00
% Load Reduction	16.56	57.89	23.27	32.03	100.00

Figure 3: Rainwater Tank Node Water Balance

Should you require anything further please contact the undersigned.

Yours faithfully,
TAYLOR THOMSON WHITTING (NSW) PTY LTD
in its capacity as trustee for the
TAYLOR THOMSON WHITTING NSW TRUST

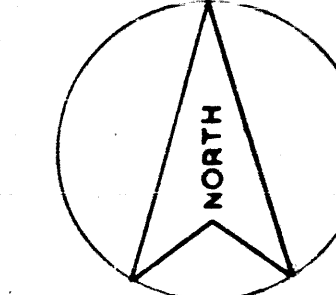
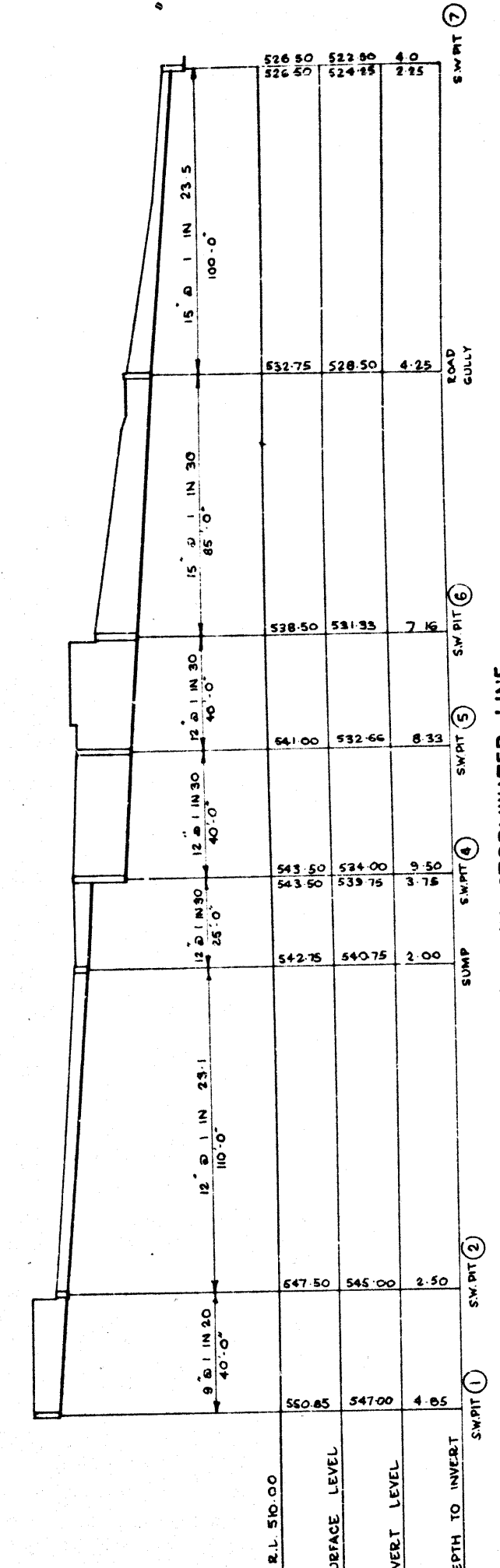
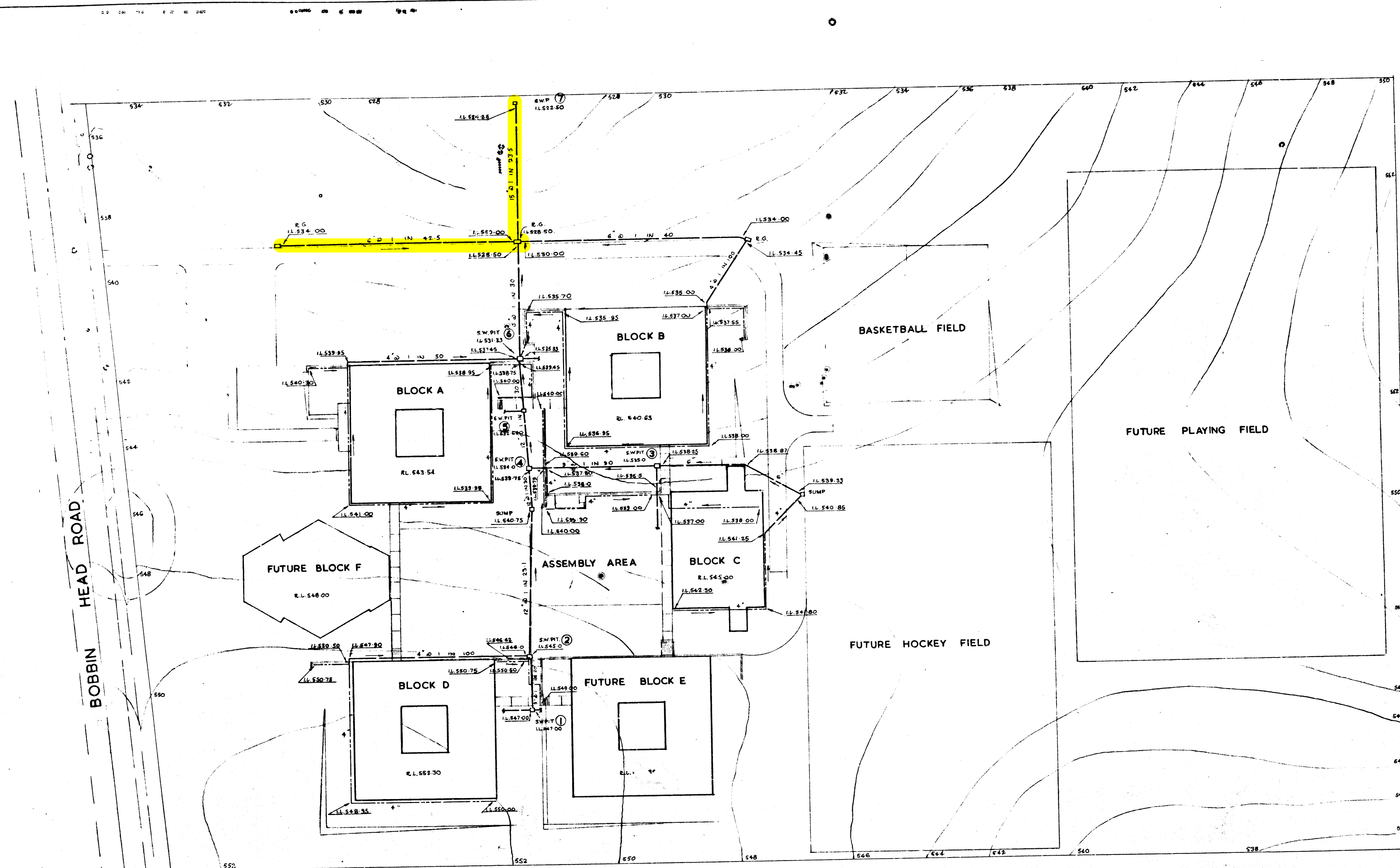


NEMESIO BIASON
Associate

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Appendix A

Survey and Historical Drawings



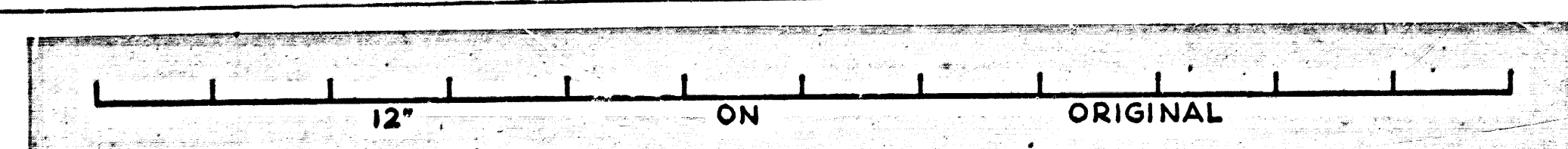
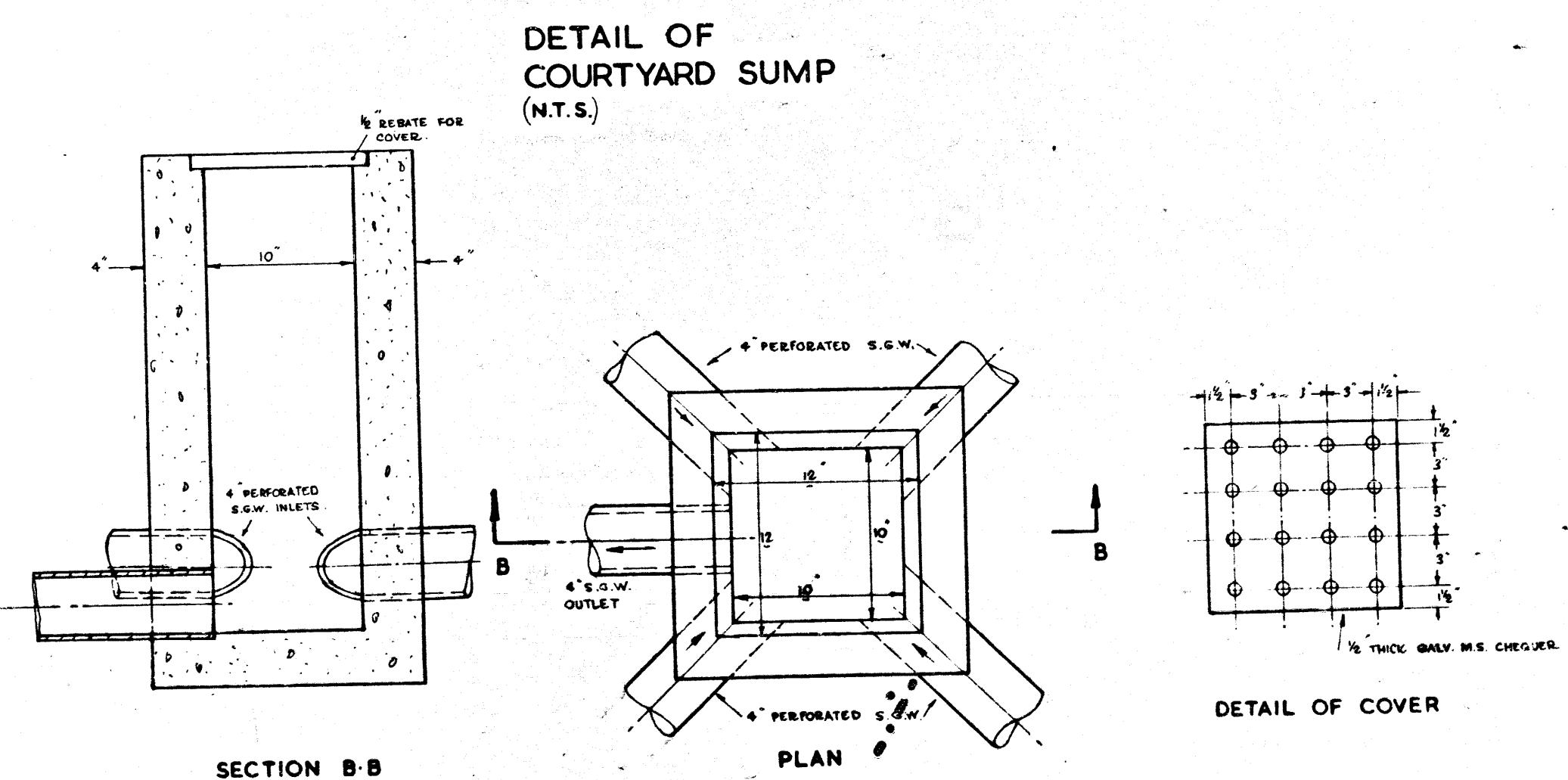
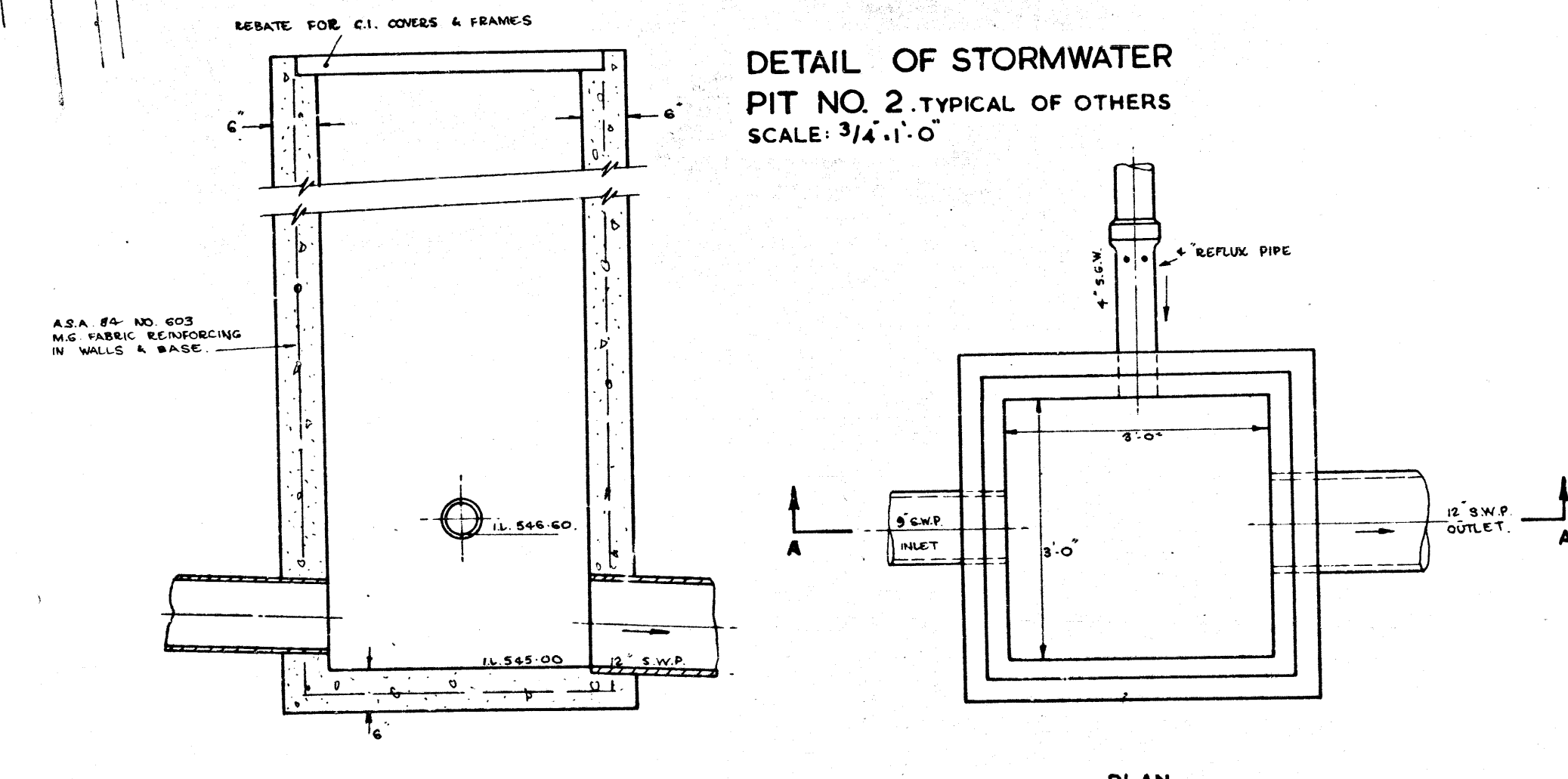
LEGEND
 STORMWATER DRAINAGE
 SUBSOIL DRAINAGE
 E.G. ROAD GULLY

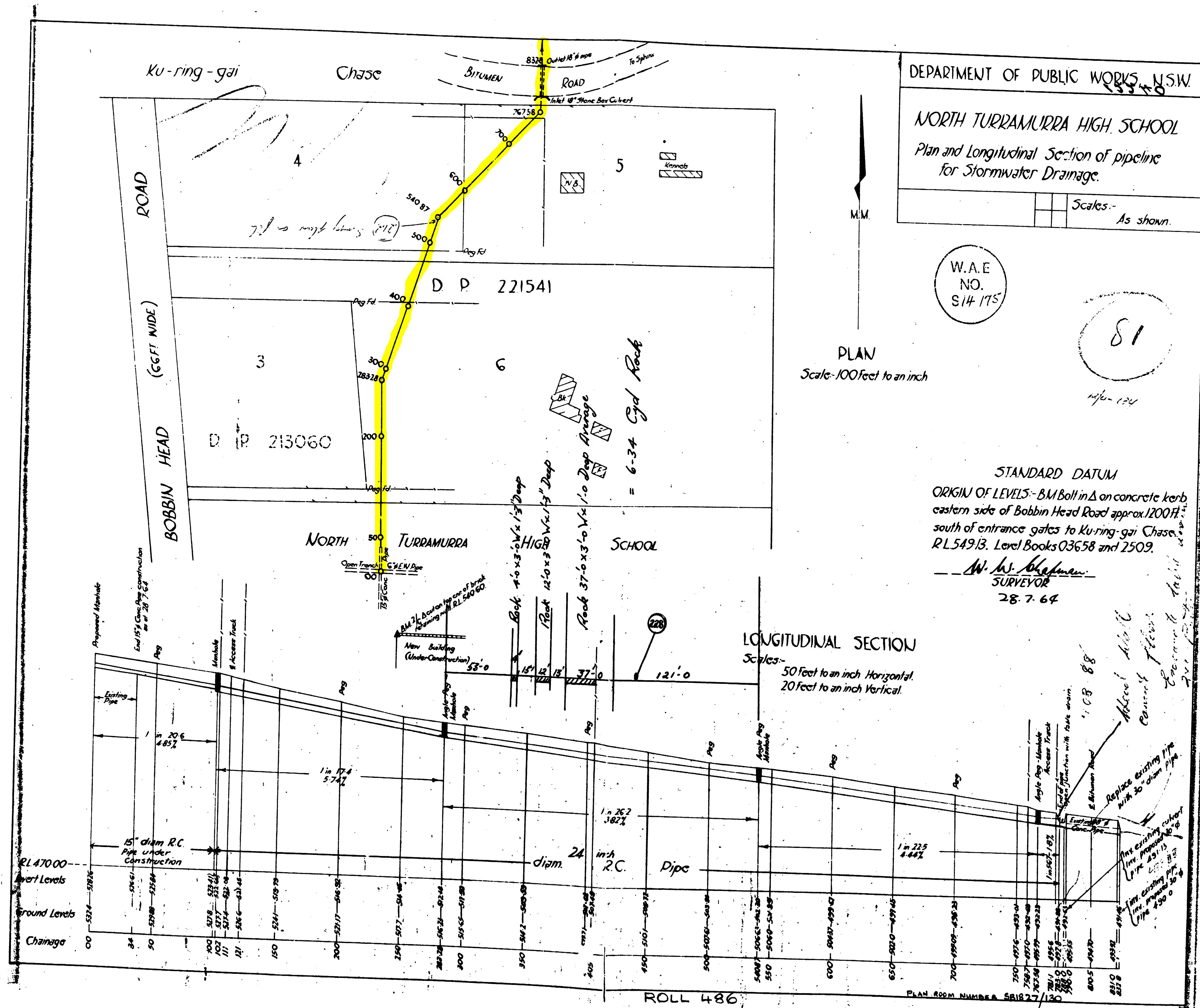
ERIC E. TAYLOR & ASSOCIATES
 CONSULTING WATER SUPPLY
 SEWERAGE & PUBLIC HEALTH
 ENGINEERS
 68 ALEXANDER ST. CROWS NEST
 NEW SOUTH WALES
 DEPARTMENT OF PUBLIC WORKS
 R.A. JOHNSON DIRECTOR

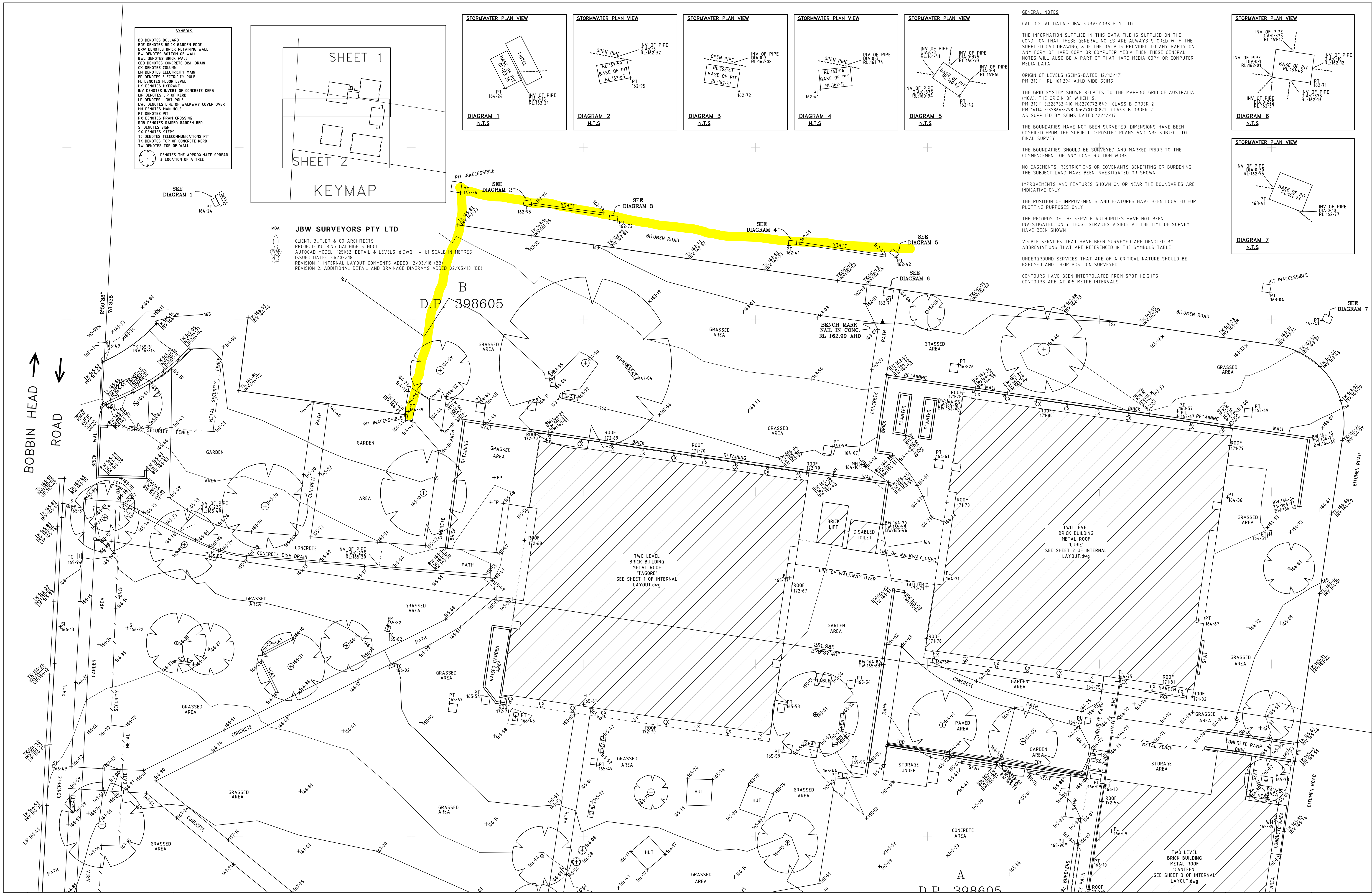
GOVERNMENT ARCHITECT
 DESIGN BY
 GOVERNMENT ARCHITECT
 M^{rs} CAULEY CONRAN &
 ASSOCIATES
 ARCHITECTS

TURRAMURRA
 HIGH SCHOOL
 HYDRAULIC SERVICES
 SITE PLAN
 STORMWATER DRAINAGE

SCALE 1" = 40'-0"
 CONTRACT NO. 140/63
 DRAWING NO. 39
 NO. IN SET 52
 PLAN ROOM NO. 58/1827/39







DATE	REVISION	AUTH.
COUNCIL REF: SUB'D. APP.: ENGIN. APP.:		

JBW Surveyors Pty Ltd.

ACN 001149373

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Phone: (02) 9335 9700 Fax: (02) 9556 3100
www.jbwsurveyors.com.au

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PLAN SHOWING SELECTED DETAIL AND LEVELS OVER PART OF
LOTS A & B DP 398605
KU-RING-GAI HIGH SCHOOL

LOCALITY: NORTH TURRAMURRA

SCALE: 1:200	PLAN REF
DATUM: AHD	125032
DATE: 19/12/17	DETAIL & LEVELS
SHEET: 1 OF 2	REV 2
	DESIGNED: ADT
	DRAWN: BB



DATE	REVISION	AUTH.
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PLAN SHOWING SELECTED DETAIL AND LEVELS OVER PART OF
LOTS A & B DP 398605
KU-RING-GAI HIGH SCHOOL
LOCALITY: NORTH TURRAMURRA
LOCAL GOVERNMENT AREA: KU-RING-GAI

SCALE: 1:200
DATUM: AHD
DATE: 19/12/17
SHEET: 2 OF 2
PLAN REF: 125032
DETAIL & LEVELS
REV 2
DESIGNED: ADT
DRAWN: BB

Appendix B

Proposed Stormwater Design

NOT TO SCALE – IMAGE COURTESY OF NEARMAP

Electricity

Plot File Created: Mar 21, 2019 - 10:34am

This drawing is copyright and is the property of TAYLOR THOMSON WHITTING (NSW) Pty Ltd and must not be used without authorisation.
THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C01

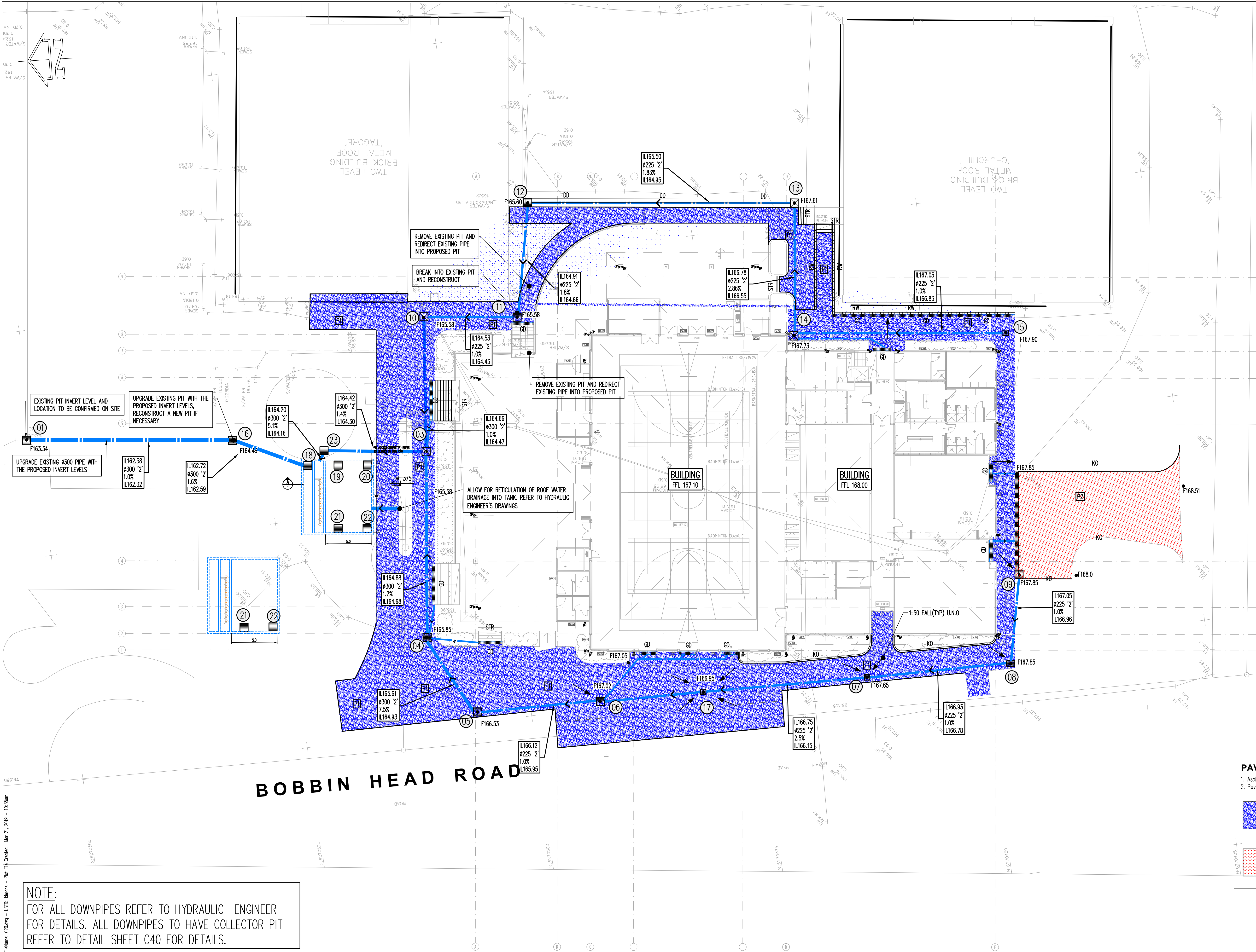
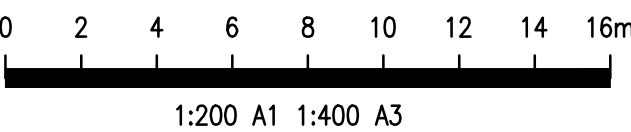
SITeworks LEGEND

- F22.20 Finished surface level
- Finished surface contour
- K&G Kerb and gutter
- KO Kerb only
- DD Dish drain
- FK Concrete edge strip
- Stormwater pit and line
- SW Existing stormwater line
- RW Retaining wall
- GDA Grated drain details

PAVEMENT LEGEND

- Asphaltic concrete shall conform to AS2150 and the specification
- Pavement based on geotechnical report by: Assetgeo ref:4864-R1

- 120mm Thickness concrete ($f'c=25MPa$) with expansion joints at max 6.0m centres and weakened plane joints at max 1.5m centres on 150mm Compacted cement stabilised subgrade
- 150mm Thickness concrete ($f'c=32MPa$) with SL82 fabric (40 top cover) with sawn control joints at max 6.0m centres and dowelled expansion joints at max 30m centres on 150mm Compacted 4% CBR min cement stabilised subgrade



NOTE:
FOR ALL DOWNPIPES REFER TO HYDRAULIC ENGINEER FOR DETAILS. ALL DOWNPIPES TO HAVE COLLECTOR PIT REFER TO DETAIL SHEET C40 FOR DETAILS.

P2	RESPONSE TO COUNCIL RFI	NB	KS	20.03.19
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Rev	Description	Eng	Draft	Date

Rev	Description	Eng	Draft	Date
Rev	Description	Eng	Draft	Date
Rev	Description	Eng	Draft	Date

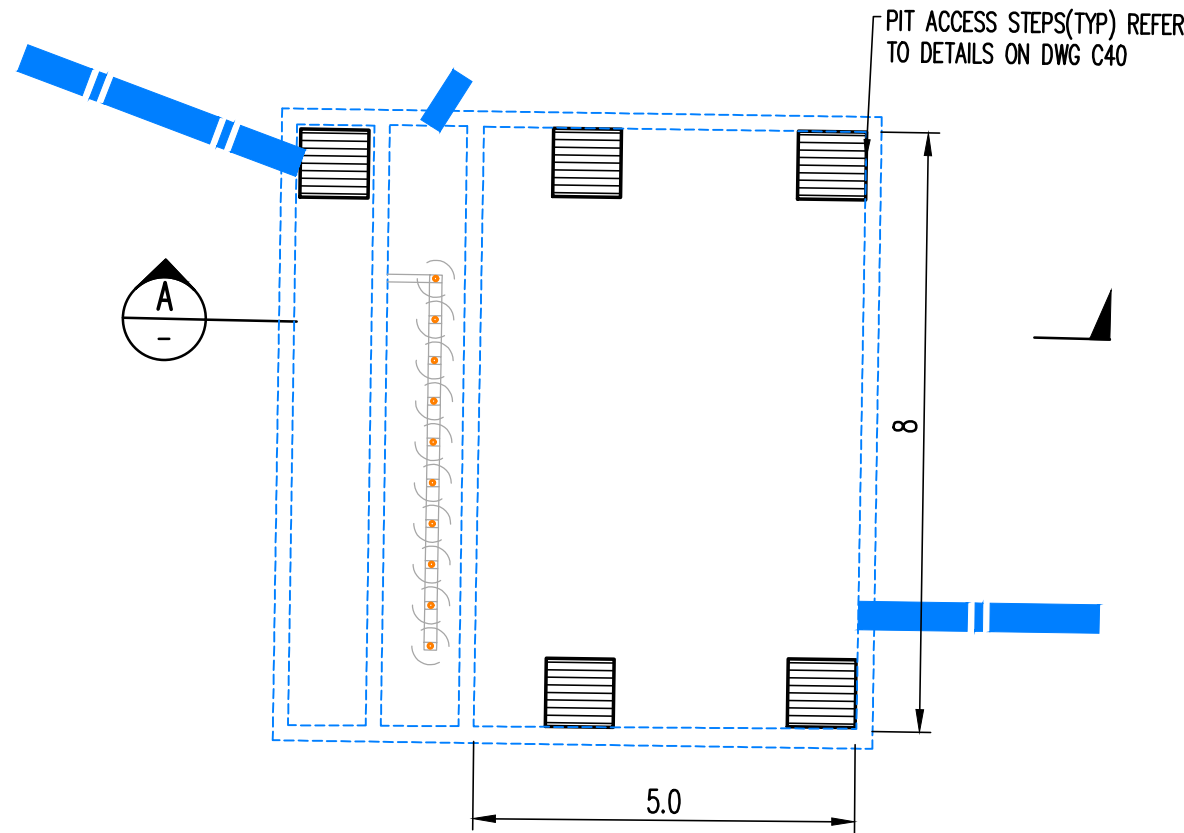
Architect
BUTLER & CO ARCHITECTS

Civil Engineer
TTW Taylor Thomson Whitting
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

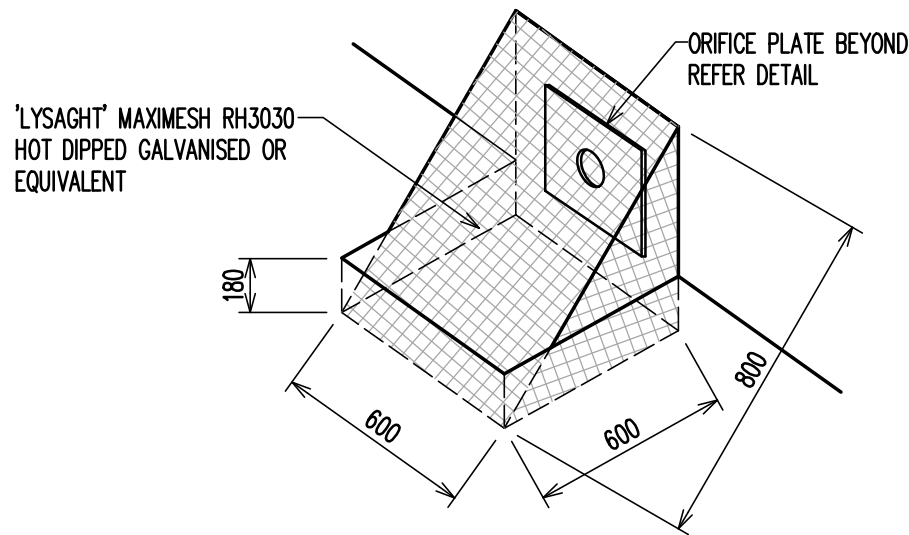
Project
KU-RING-GAI HIGH SCHOOL

Sheet Subject
SITeworks PLAN

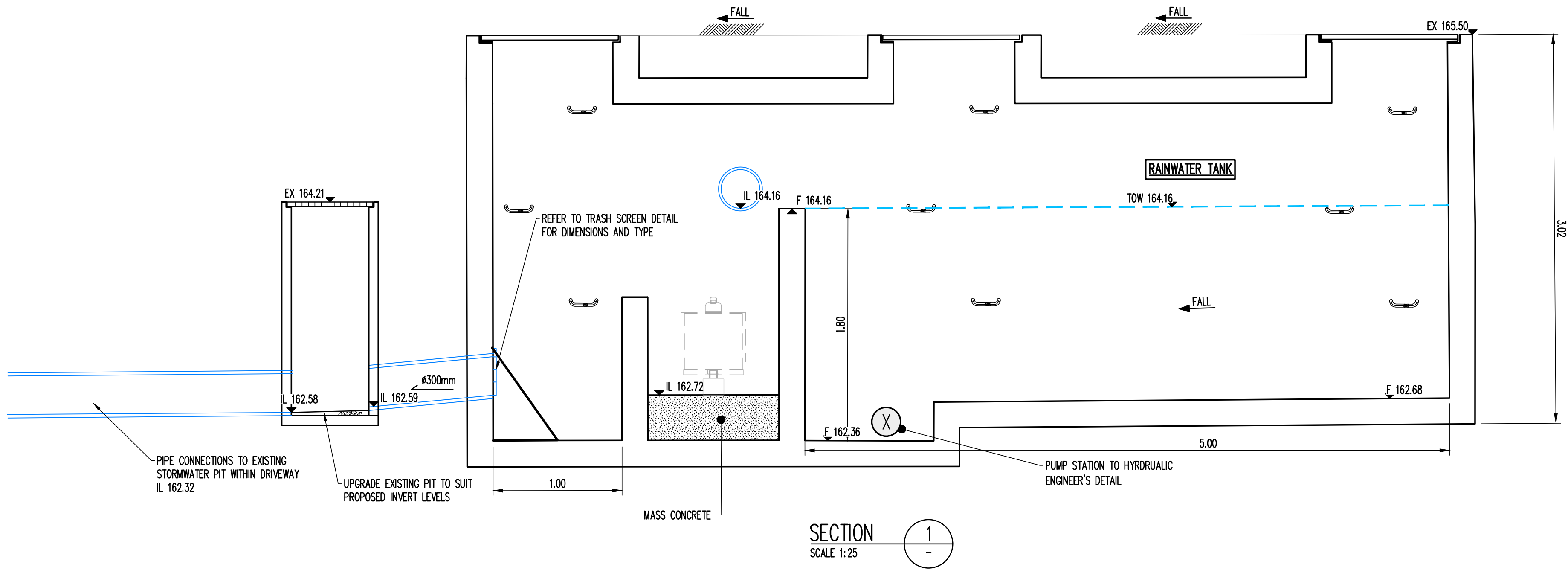
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Drawing No
C20
Revision
P1
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PLAN
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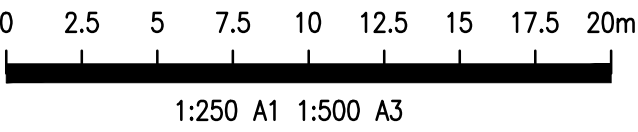


TRASH SCREEN DETAIL
NTS



SECTION
SCALE 1:25

NOTE: REFER TO STRUCTURAL
ENGINEER'S DRAWINGS FOR
STRUCTURAL DETAILS



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P1	ISSUE FOR DA	NB	RG	27.09.18				
Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft

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Civil Engineer
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612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
KU-RING-GAI HIGH SCHOOL

Sheet Subject
DETAILS SHEET

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