

WILLIAM JONES AND PARTNERS		Job No. E 20308.
Contract	SCHOOL WREATHING	Sheet No. 1
Section	SOAKAWAYS	Date
	SOAKAWAYS WERE BE DESIGNED FOR MAY. RUN OFF FOR ROOF AND HANDSOME DRIVE. 2" PROPERTIES TO STONE SOAKAWAY. IMPERMEABLE AREA = $11 \times 18 = 198 \text{ m}^2$ (2" PROPERTIES). REFER TO CALCULATIONS FOR SIZE OF SOAKAWAY. COMPUTER OUTPUT CONFIRMS SOAKAWAY <u>1500 mm DIA CONCRETE RINGS WITH</u> <u>AN OVERALL DEPTH OF 4970 mm BELOW</u> <u>INCOMING INVERT.</u> THE DEPTH CORRESPONDS WITH THE MINIMUM DEPTH REQUIRED TO ACHIEVE THE STIPED PERMEABILITY RATE.	Percolation Rate $4.86 \times 10^{-5} \text{ m/s}$ 0.0000486



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Project

SCHOOL LAKE SITE WREXHAM.

Job no.

E. 20308.

Calcs for

SOAKAWAYS.

Start page no./Revision

2.

Calcs by

RJM.

Calcs date

08/12/2016

Checked by

Checked date

Approved by

Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area

Liverpool — THIS LOCATION SIMILAR TO WREXHAM FOR DETERMINING R.

Impermeable area drained to the system

A = 200.0 m²

Return period

Period = 100 yr

Ratio 60 min to 2 day rainfall of 5 yr return period

r = 0.400

5-year return period rainfall of 60 minutes duration

M5_60min = 19.0 mm

Increase of rainfall intensity due to global warming

p_{climate} = 30 %

Soakaway details

Soakaway type

Concentric ring

Depth of pit (below incoming invert)

d = 4975 mm

Width of pit (square excavation assumed)

w = 1500 mm

Internal diameter of concrete ring

D_{ring} = 1300 mm

Thickness of concrete ring walls

T_{ring} = 100 mm

Percentage free volume

V_{free} = 30 %

Soil infiltration rate

f = 48.6 × 10⁻⁶ m/s

Wetted area of pit 50% full

a_{s50} = 2 × w × d = 14924938 mm²

Table equations

Inflow

I = M100 × A

Outflow

O = a_{s50} × f × D

Storage

S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
5	0.37	9.2	1.89	17.4	3.49	0.22	3.27
10	0.52	12.9	1.96	25.3	5.06	0.44	4.62
15	0.63	15.6	2.00	31.2	6.24	0.65	5.59
30	0.80	19.8	2.03	40.3	8.05	1.31	6.75
60	1.00	24.7	2.01	49.7	9.94	2.61	7.32
120	1.21	29.8	1.97	58.8	11.75	5.22	6.53
240	1.45	35.7	1.92	68.8	13.75	10.45	3.31
360	1.60	39.6	1.89	75.0	14.99	15.67	0.00
600	1.79	44.3	1.86	82.2	16.44	26.11	0.00
1440	2.24	55.3	1.77	98.1	19.63	62.67	0.00

Required storage volume

S_{req} = 7.32 m³

Soakaway storage volume

S_{act} = $\pi \times (D_{ring}^2 / 4) \times d + (d \times w^2 - (\pi \times ((D_{ring} + 2 \times T_{ring})^2 / 4) \times d)) \times V_{free}$
V_{free} = 7.32 m³

PASS - Soakaway storage volume

Time for emptying soakaway to half volume

t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 1hr 24min 9s

PASS - Soakaway discharge time less than or equal to 24 hours

Client: Oaks Homes Ltd

Job Title: School Lane, Southsea

Trial Pit	Depth (m)	Silt/Clay %	Sand %	Gravel %	Cobble %
2	0.7-1.0	27	43	30	0
4	0.3-0.80	16	29	50	5

In several of the pits solid sandstone bedrock was encountered, which prevented the pit from being excavated deeper.

Groundwater

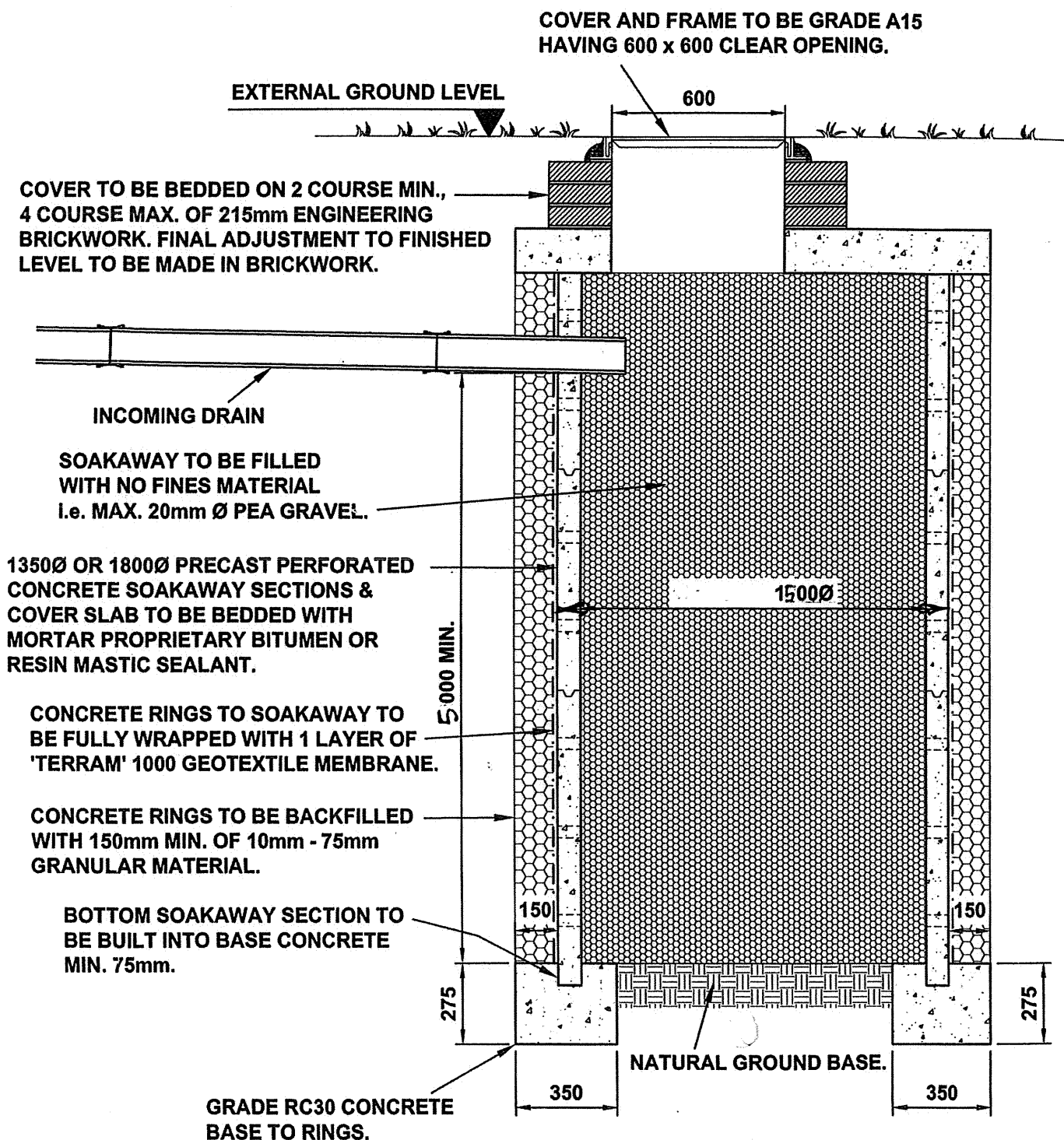
No groundwater was encountered in all of the pits.

Soakaway Results

Soakaway testing was undertaken in the previous investigation in PTP02. The pit was initially excavated to a depth of 2.60m, however, the water seepage into the ground was very slow and the test was abandoned after 10 minutes. Consequently, the trial pit was deepened to a depth of 4.00m and retested.

The location of the soakaway test pit is presented in Figure 2. The test results are summarised in the table below and the detailed analysis presented in Appendix E.

TP No.	Depth (m)	Test No.	Permeability m/sec
PTP02	2.60	1	-
	4.00	2	1.018×10^{-4}
	4.00	3	4.86×10^{-5}
	4.00	4	1.52×10^{-4}



SOAKAWAY DETAIL (perforated concrete rings)

1

GAS AND OTHER MAINS OR POWER SERVICES KNOWN TO EXIST ON OR
TO MAKE ALL NECESSARY ENQUIRIES PRIOR TO COMMENCEMENT OF WORK.

DAMAGE TO ALL SERVICES. DO NOT INTERFERE WITH THEIR OPERATION
/ATE OWNERS OR THE CONSULTING ENGINEER AS APPROPRIATE.
IEDIATELY REPORTED TO THE CONSULTING ENGINEER AND APPROPRIATE

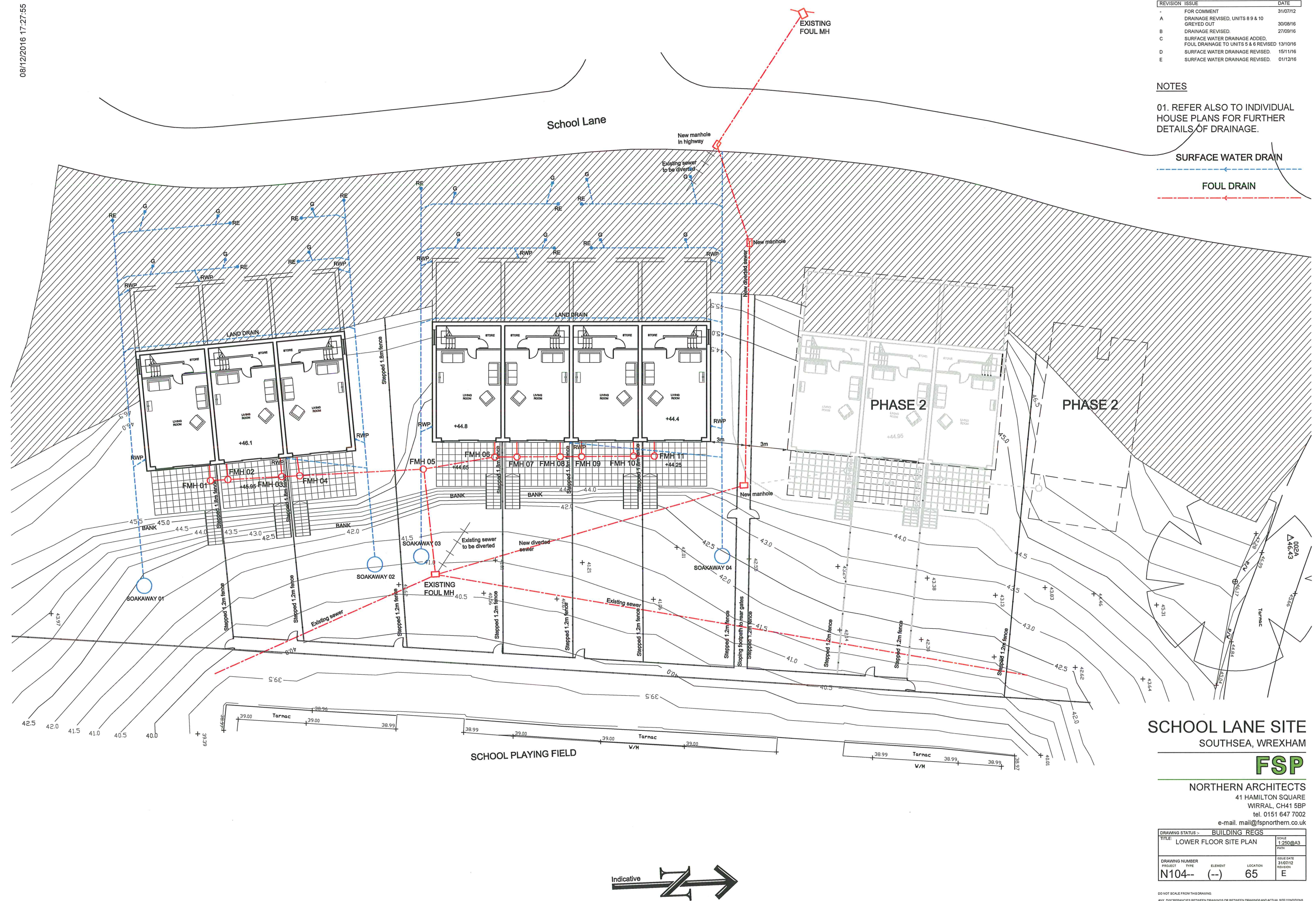
REVISION	ISSUE	DATE
-	FOR COMMENT	31/07/12
A	DRAINAGE REVISED, UNITS 9 9 & 10 GREYED OUT	30/08/16
B	DRAINAGE REVISED.	27/09/16
C	SURFACE WATER DRAINAGE ADDED, FOUL DRAINAGE TO UNITS 5 & 6 REVISED	13/10/16
D	SURFACE WATER DRAINAGE REVISED.	15/11/16
E	SURFACE WATER DRAINAGE REVISED.	01/12/16

NOTES

01. REFER ALSO TO INDIVIDUAL
HOUSE PLANS FOR FURTHER
DETAILS OF DRAINAGE.

SURFACE WATER DRAIN

FOUL DRAIN



SCHOOL LANE SITE

SOUTHSEA, WREXHAM

FSP

NORTHERN ARCHITECTS

41 HAMILTON SQUARE

WIRRAL, CH41 5BP

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DRAWING STATUS :-	BUILDING REGS
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TITLE:	LOWER FLOOR SITE PLAN	SCALE	1:250@A3
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	PAGE
	PATH

DRAWING NUMBER	ISSUE DATE
	31/07/12

PROJECT	TYPE	ELEMENT	LOCATION	3/10/72 REVISION
N104	()		65	E

N104--	(--)	65	E
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Figure 1. The study area and the location of the sampling stations.

DO NOT SCALE FROM THIS DRAWING.

ANY DISCREPANCIES BETWEEN DRAWINGS OR BETWEEN DRAWINGS AND THE ONE CONDITION SHOULD IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECTS.