

Reference: 2015.0209-L02

Date: September 27, 2016

Synergy Development Group
Attention: Ahmad Refaieh
PO Box 314
Casula NSW 2170

S&G Consultants Pty Limited
ABN 21 118 222 530

Dear Sir,

**RE: 21 ATKINSON STREET, LIVERPOOL
FLOOD ADVICE & IMPACT CALCULATIONS**

Unit 412, Building T1, 14-16
Lexington Drive, Bella Vista
NSW

This letter provides details on flooding affectation on the above sites and provides calculations for the impact assessment based on flood storage requirements.

The site is affected by flooding as advised by Council. Figure 1 below shows the affectation of the site being in Medium Risk Precinct.

The council has provided a set of controls that apply for sites affected by Medium Risk flooding which are detailed in this letter.

PO Box 7855
Baulkham Hills
NSW 2153

The architectural drawings prepared by Mosca Pserras Architects address these requirements (Table 3 of Liverpool DCP p.44) as follows:

1. Floor Level
 - a. The habitable and non-habitable floor levels are raised to RL 10.30m AHD achieving 500mm freeboard on top of the 100-yr flood level;
 - b. The general commercial floor levels are raised to RL 10.30 AHD achieving 500mm freeboard on top of the 100-yr flood level;
 - c. The lowest existing natural ground level across the site is above the 20-yr; and
 - d. A restriction will be placed on the land title as required by Council in item 15.
2. Building Components
 - a. All structures will be of flood compatible building components up to RL 10.30m AHD as required under item 3. This will be noted on the DA plans and documented on the CC plans.
3. Structural Soundness
 - a. The structural engineer for the project will have to design the structure to withstand the forces of floodwater, debris and buoyancy up to and including RL 10.30m AHD.

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Consulting Civil Engineers

SYDNEY

4. Flood Effects

- a. The Section 149 provided the flood level across the site in 100-yr ARI event at RL 9.80m AHD (refer Figure 2).

Based on the above and after review of the detailed survey plan for the site, the flood depth across the site is 100mm on average. The area of the sites affected by flooding is 1765m² (refer to attached Flood Storage Calculations). A total flood storage volume of 176.5m³ currently exists on site under existing conditions.

In the post development conditions, A compensatory storage of 176.5m³ is required within the site to ensure that the flooding elsewhere in the floodplain is not increased. We propose the storage area under the ground floor slab. The level is lowered to a maximum of 1000mm on the Eastern site facing Shepherd Street to provide additional storage. Reference is made to the stormwater drawings prepared by SGC for DA submission. The area proposed to be lowered to RL 9.30m AHD is marked on Figure 3 below. The ramps and the building slabs will be suspended over the reduced level of the flood compensatory area.

Area available for flood storage after development = 360m².

Average depth of cut = 0.4m.

Water ponding depth = 0.5m.

Flood compensatory storage provided = 180m³

5. Car Parking & Driveway Access

- a. The entrance of the driveway into the ground parking is at RL 14.30m AHD, which provides more than 150mm above the 100-yr flood level and complies with item 3; and
- b. Adequate warning systems, signage and exits shall be installed within the basement as required by item 7.

6. Evacuation

- a. Vertical evacuation within the building to the first floor level is achievable from within the buildings. The first floor level is above the PMF level of 14.30m AHD and provides for a safe refuge for residents and public access during extreme flood events; and
- b. The development is consistent with Council's strategy for the area.

7. Fencing

- a. Open type fencing will be used for the lower boundary. The architect will specify during detailed design stage;
- b. Open style fencing will not generally obstruct the flows; and
- c. Fencing shall be designed and constructed in such a manner to withstand the forces of floodwaters and to collapse in a controlled manner if overcome by floodwaters. This will be designed by the structural engineer.

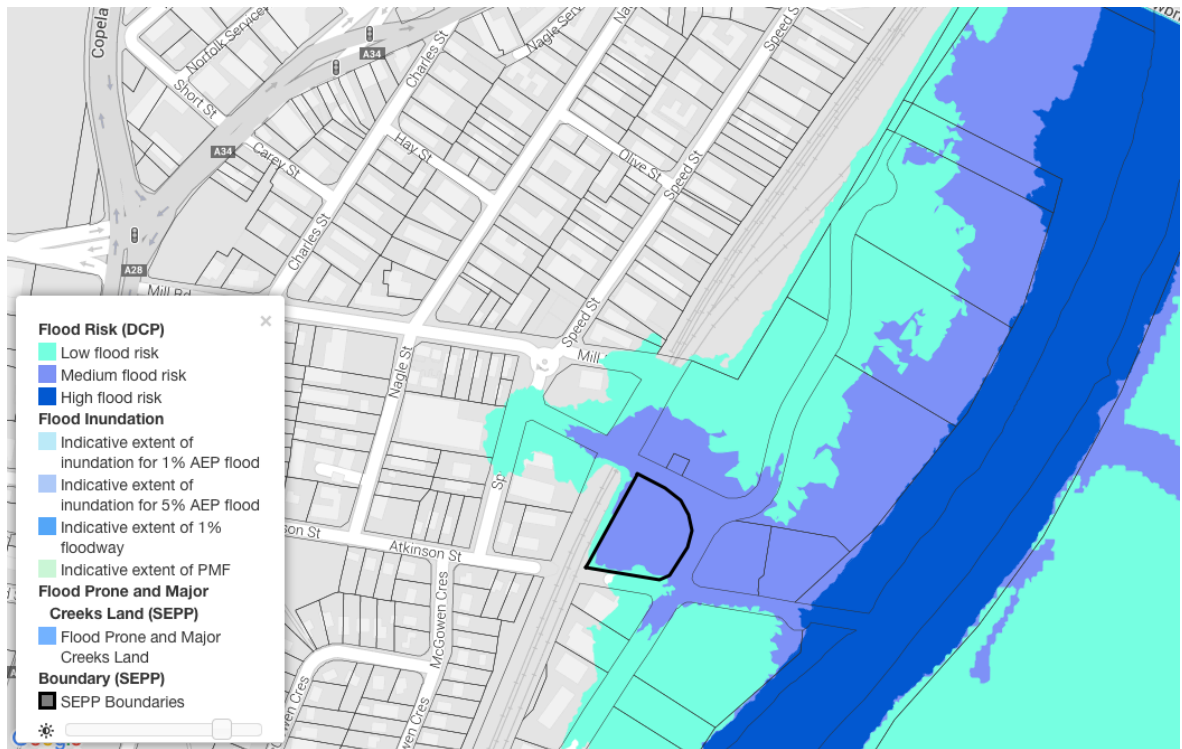


Fig1 Flood Extent Map & Flood Risk

**ANNEXURE TO SECTION 149(5)
CERTIFICATE**



Issue Date: 23/11/2015

Issue No: 2026806

File No: 2015/0030

Premises at Lot 101 DP 777404
Atkinson Street Liverpool

Further to the advice contained in the Section 149(2) Certificate and on the basis of the latest information available to the Council:

1. the maximum calculated level of the probable maximum flood (PMF) in the vicinity of your property in metres AHD is **11.8**.
2. the maximum calculated level of the 1% annual exceedance probability flood (previously referred to as the 1 in 100 year) in the vicinity of your property in metres AHD is **9.8**.
3. the maximum calculated level of the 2% annual exceedance probability flood (previously referred to as the 1 in 50 year) in the vicinity of your property in metres AHD is **9.3**.
4. the maximum calculated level of the 5% annual exceedance probability flood (previously referred to as the 1 in 20 year) in the vicinity of your property in metres AHD is **8.7**.

The Council does not possess accurate information on the natural surface levels of individual allotments or on constructed building levels, and these should be established by private survey to ascertain their relationship to the above flood levels.

Flood levels are obtained from **Georges River Floodplain Risk Management Study & Plan - July 2004**

Name of Assessor: **W. Siripala**

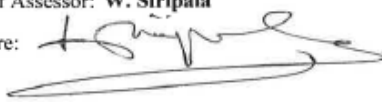
Signature: 

Fig2 Flood Levels

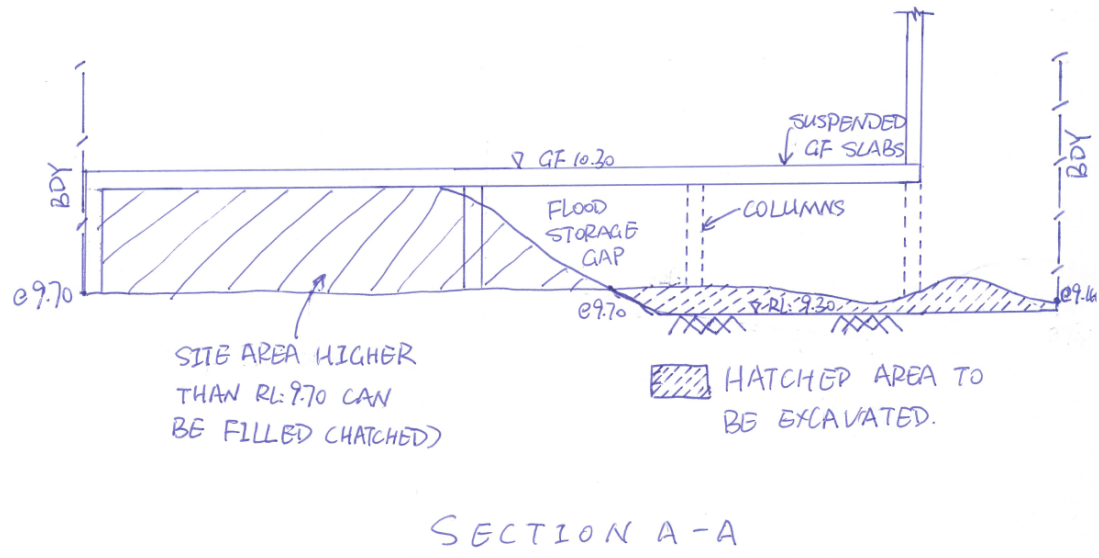


Fig3 Flood Storage Compensation Plan

Should you have any queries in relation to the above, please contact the undersigned.

Yours faithfully

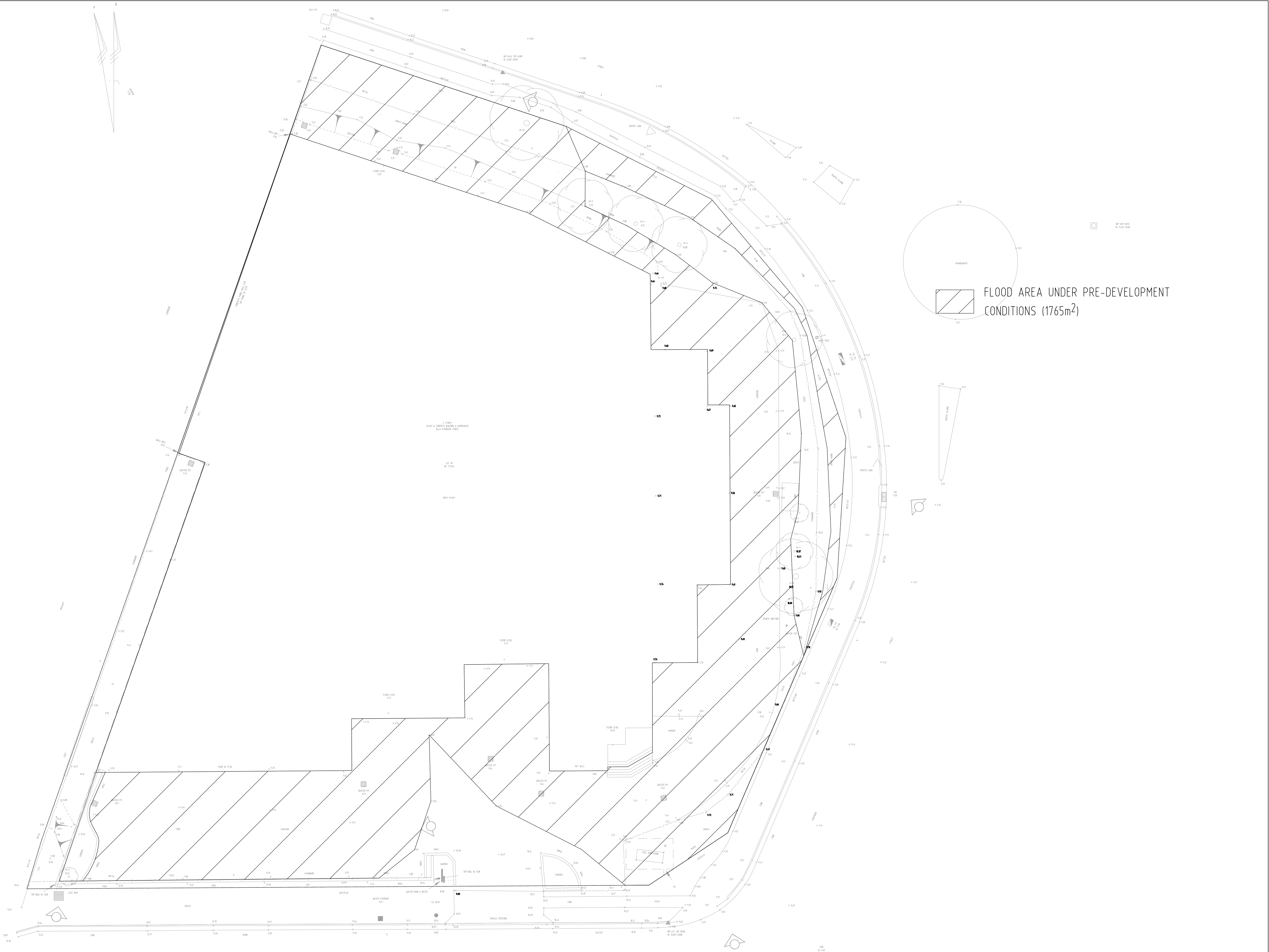
S&G CONSULTANTS PTY LIMITED



Sam Haddad

Director (Civil)

MIEAust CPEng NPER-3 (2247040)



Issue internal sequence and revision history <table><tr><td>1-preliminary</td><td>2-development application</td><td>3-construction certificate</td><td>4-tender</td><td>5-construction</td><td>6-other</td></tr></table>				1-preliminary	2-development application	3-construction certificate	4-tender	5-construction	6-other	<table><tr><th colspan="4">Reference Coordination Drawing</th></tr><tr><th>Discipline</th><th>Drawing Title and Number</th><th>Date</th><th>Rev.</th></tr><tr><td>ARCH</td><td>AP 08</td><td>27.01.16</td><td>#</td></tr><tr><td>ARCH</td><td></td><td></td><td></td></tr><tr><td>STRUCT</td><td></td><td></td><td></td></tr><tr><td>MECH</td><td></td><td></td><td></td></tr><tr><td>ELEC</td><td></td><td></td><td></td></tr><tr><td>HYD</td><td></td><td></td><td></td></tr><tr><td>FIRE</td><td></td><td></td><td></td></tr><tr><td>LANDS</td><td></td><td></td><td></td></tr><tr><td>CIVIL</td><td></td><td></td><td></td></tr><tr><td>SURVEY</td><td>DET-001A</td><td>04.11.15</td><td>#</td></tr></table>	Reference Coordination Drawing				Discipline	Drawing Title and Number	Date	Rev.	ARCH	AP 08	27.01.16	#	ARCH				STRUCT				MECH				ELEC				HYD				FIRE				LANDS				CIVIL				SURVEY	DET-001A	04.11.15	#	ENGINEERS AUSTRALIA Chartered Professional Engineer MEMBER <table><tr><th colspan="2">QUALITY CONTROL</th></tr><tr><td>DRAWN</td><td>DATE</td></tr><tr><td>CHECKED</td><td>DATE</td></tr><tr><td>DESIGNED</td><td>DATE</td></tr><tr><td>VERIFIED</td><td>DATE</td></tr><tr><td>APPROVED</td><td>DATE</td></tr></table>	QUALITY CONTROL		DRAWN	DATE	CHECKED	DATE	DESIGNED	DATE	VERIFIED	DATE	APPROVED	DATE	WARNING: THE DESIGNS, DRAWINGS, SPECIFICATIONS AND THE COPYRIGHT HEREIN REMAIN THE SOLE INTELLECTUAL PROPERTY OF S&G CONSULTANTS PTY LTD AND MUST NOT BE USED, COPIED, ALTERED OR REPRODUCED WHOLLY OR IN PART IN ANY FORM WITHOUT THE WRITTEN CONSENT OF S&G CONSULTANTS PTY LTD	0m 2 4 6 8 10 SCALE 1:200 ON ORIGINAL SIZE	CLIENT SYNERGY DEVELOPMENT GROUP ARCHITECT mosca perras architects p 02 9601 3244 f 02 9601 6336 pc box 3353, liverpool westfield nsw 2170	CONSULTING ENGINEER S&G CONSULTANTS PTY LIMITED A.B.N. 21 118 222 530 Ste 412, Level 4, 14-16 LEXINGTON DRIVE BELLA VISTA, NSW 2153 T: +61 2 8883 4239 F: +61 2 9672 6977 Email: office@sgc.com.au Web: www.sgc.com.au	PROJECT PROPOSED MULTI-UNIT FLAT BUILDING 21 ATKINSON STREET, LIVERPOOL Grid - Datum A.H.D. Sheet 1 of 2 Scale (at original size) 1:400 @ A1	Drawing Status FOR APPROVAL NOT TO BE USED FOR CONSTRUCTION PURPOSES Drawing Title FLOOD STORAGE CALCULATIONS Project No 20150209 Drawing No - Revision No B
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4-tender

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Issue

Last revision title

by

Date

Status

16.08.2016

2

MECH

16.08.2016

2

ELEC

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2

HYD

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FIRE

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LANDS

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CIVIL

16.08.2016

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SURVEY

Reference Coordination Drawing

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CIVIL

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DETL-001A

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PROJECT

PROPOSED MULTI-UNIT FLAT BUILDING

21 ATKINSON STREET, LIVERPOOL

Grid

Datum

Sheet

Scale (at original size)

-

A.H.D.

2 of 2

1200 @ A1

Drawing Status

FOR APPROVAL

NOT TO BE USED FOR CONSTRUCTION PURPOSES

Drawing Title

FLOOD STORAGE CALCULATIONS

Project No

20150209

Drawing No

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Revision No

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