Level 1 Geotechnical Inspection, Testing and Assessment Springbrook Stage 11A & 11B

11512/P/933

fgf Developments Pty Ltd

Construction Sciences

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Document History

Effective Date	Description of Revision	Prepared By	Reviewed By	Approved By
11/02/2022		Craig Wilson	Peter Gode	Peter Gode

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Introduction

Construction Sciences is the largest private provider of construction materials testing services across Australia. We have a total staff of over 600 staff in 48 permanent offices/laboratories.

We have provided QA testing services to some of the largest road and mining infrastructure projects in these states, as well as overseas.

Over the last 3 to 4 years, Construction Sciences has established more site laboratories for road, rail, mining, and other large infrastructure projects than any other company.

We benefit our clients with the following clear differentiators;

Staff Mobilisation: Construction Sciences' geographic expansion and mobility allow for teams to be available when required, and currently we have the lion's share of major projects in Australia.

Quality Management: Construction Sciences' purpose-built software, COMPLY provides our clients with confidence, by knowing project data is securely stored. COMPLY has a built-in secure audit trail and a fully tracked Quality system. We are also ISO9001 compliant and certified.

Client Relationships: We listen to your needs and respond with innovative solutions that are tailored for your business. We believe in building relationships with our staff and local community.

Safety: At Construction Sciences we embrace a 'safety' culture and it is a key consideration with every project. Currently we are over 2 years LTI (lost time injury) free.

Construction Sciences Pty Ltd was commissioned by **fgf Developments Pty Ltd** to provide Level 1 inspection and testing services for the placement of fill at the residential development:-

PROJECT: Springbrook Stage 11A & 11B

ADDRESS: Springbrook Avenue, Redlynch QLD 4870

The earthworks were carried out from 20/09/2021 to 6/10/2021

Lots 1101, 1103, 1104, 1107, 1108, 1109, 1110, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, and 1121 had fill placed during the earthworks.

Specification Requirements

Filling was carried out in accordance with AS3798-2007 *'Guidelines on earthworks for commercial and residential developments'* and with the project specification prepared for the project.

The specification requirements were that all fill was to be placed and compacted in layers to a density ratio of not less than 95% of the maximum density as determined by AS1289.5.7.1 (standard compaction).

Site Works

The Springbrook Stage 11A & 11B project was a large scale cut to fill operation with approximately 1548m^3 of fill placed.

Areas to be filled were stripped and proof rolled in accordance with the specification requirements.

The fill material generally comprised of Silty CLAY.

Compaction Control Testing

Compaction control tests were carried out at regular intervals throughout the placement of fill in accordance with the minimum test frequency recommendations included in AS3798-2007 *'Guidelines on earthworks for commercial and residential developments'.* All test results are included in the Appendix A. A summary of the test results is included as Table 1. A total of 7 field density tests were carried out throughout the earthworks. The average density ratio was 97.4 % with a standard deviation of **2.29** %.

Conclusion

It is considered that the placement of fill at, Springbrook Avenue, Redlynch QLD 4870 was carried out in a controlled manner and the fill was compacted to a density ratio not less than the specified requirement. It is concluded that the fill may be deemed to be *'controlled fill'* in accordance with AS2870 – 2011 *'Residential Slabs & Footings'.*

Craig Wilson
LABORATORY MANAGER
CONSTRUCTION SCIENCES

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Table 1-1 Summary of field density test results - **Springbrook Stage 11A & 11B**

Date	Location	Density ratio (1)
17/09/2021	Lot 1109 / GST	95.5
17/09/2021	Lot 1108 / GST	95.0
17/09/2021	Lot 1110 / GST	98.0
20/09/2021	Lot 1109 / Fill	101.5
20/09/2021	Lot 1108 / Fill	99.5
6/10/2021	Lot 1108 / Fill	97.5
6/10/2021	Lot 1109 / Fill	95.0

No. of tests:	7	**Mean:**	97.4 %	**Standard Dev:**	2.29%

Notes:

1. Standard laboratory compaction used, AS1289.5.7.1.

Appendix A – Field Density Test Results

Construction Sciences

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Laboratory: **Cairns Laboratory**
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Email: Cairns@constructionsciences.net

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/36779-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/933
Project:	210602 - Springbrook Stages 11A & 11B	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/18656
Component:	Field Densities	Client Reference/s:	MTR 1732
Area Description:	EX1/Lot 1108-1110 GST	Report Date / Page:	22/09/2021 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1

Sample Number	11512/S/95468	11512/S/95469	11512/S/95470	
ID / Client ID	-	-	-	
Lot Number	1109	1108	1110	
Date / Time Tested	17/09/2021	17/09/2021	17/09/2021	
Material Source	Onsite	Onsite	Onsite	
Material Type	Insitu Material	Insitu Material	Insitu Material	
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	
Depths: Test / Nom / Actual (mm)	125 / 150 / 150	125 / 150 / 150	125 / 150 / 150	
Standard or Modified	Standard	Standard	Standard	
Lot No.	1109	1108	1110	
Location	2m off S boundary	2m off S boundary	2m off S boundary	
RL	38.288	39.791	38.410	
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	
Sample Oversize (%)	0	0	0	
Compaction Sample Number	11512/S/95468	11512/S/95469	11512/S/95470	
Sample Description	Clayey SILT	Clayey SILT	Clayey SILT	
Moisture Test Results:				
Field Moisture Content (%)	16.1	15.2	12.7	
Adjusted / Moisture Variation (%)	0.5	2.5	0.0	
Optimum Moisture Content (%)	16.5	17.5	13.0	
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)	
Moisture Ratio (%)	**98.0**	**86.0**	**99.0**	
Density Test Results:				
Field Wet Density (t/m³)	1.94	1.94	2.06	
Adj/Peak Conv Wet Density (t/m³)	2.03	2.05	2.10	
Density Ratio Required (%)	95	95	95	
Hilf Density Ratio (%)	**95.5**	**95.0**	**98.0**	

Remarks

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 11512

Approved Signatory: Craig Wilson
Form ID: W5ASRep Rev 2

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/36791-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/933
Project:	210602 - Springbrook Stages 11A & 11B	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/18668
Component:	Field Densities	Client Reference/s:	20/09/2021 - TR1733
Area Description:	Springbrook Stages 11A & 11B	Report Date / Page:	23/09/2021 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1

Sample Number	11512/S/95490	11512/S/95491		
ID / Client ID	TR1733	TR1733		
Lot Number	1109	1108		
Date / Time Tested	20/09/2021	20/09/2021		
Material Source	Onsite	Onsite		
Material Type	General Fill	General Fill		
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b		
Depths: Test / Nom / Actual (mm)	175 / 200 / 200	175 / 200 / 200		
Standard or Modified	Standard	Standard		
	Lot 1109	Lot 1108		
	Centre of Lot	Centre of Lot		
	RL 39.3	RL 39.5		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Compaction Sample Number	11512/S/95490	11512/S/95491		
Sample Description	Red clay Silt	Red Clay Silt		
Moisture Test Results:				
Field Moisture Content (%)	11.0	9.1		
Adjusted / Moisture Variation (%)	4.5	4.5		
Optimum Moisture Content (%)	15.5	13.5		
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)		
Moisture Ratio (%)	**71.5**	**68.0**		
Density Test Results:				
Field Wet Density (t/m³)	2.02	2.02		
Adj/Peak Conv Wet Density (t/m³)	1.99	2.03		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	**101.5**	**99.5**		

Remarks

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/37178-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/933
Project:	210602 - Springbrook Stages 11A & 11B	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/18794
Component:	Field Densities	Client Reference/s:	6/10/2021 - TR1736
Area Description:	Lots 1109 & 1108	Report Date / Page:	11/10/2021 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1

Sample Number	11512/S/96171	11512/S/96172		
ID / Client ID	TR1736	TR1736		
Lot Number	Lot 1108	Lot 1109		
Date / Time Tested	6/10/2021 08:41	6/10/2021 08:55		
Material Source	Onsite	Onsite		
Material Type	General Fill	General Fill		
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b		
Depths: Test / Nom / Actual (mm)	175 / 200 / 200	175 / 200 / 200		
Standard or Modified	Standard	Standard		
	Lot 1108	lot 1109		
	Centre of Lot	Centre of Lot		
	Finished Level	Finished Level		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Compaction Sample Number	11512/S/96171	11512/S/96172		
Sample Description	Crvely Sandy Clay Brown	Sandy Clay Dark Brown		
Moisture Test Results:				
Field Moisture Content (%)	-	-		
Adjusted / Moisture Variation (%)	2.0	1.5		
Optimum Moisture Content (%)	-	-		
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)		
Moisture Ratio (%)	**-**	**-**		
Density Test Results:				
Field Wet Density (t/m³)	2.08	1.99		
Adj/Peak Conv Wet Density (t/m³)	2.13	2.09		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	**97.5**	**95.0**		

Remarks

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Approved Signatory: Craig Wilson
Form ID: W5ASRep Rev 2

Appendix B – Allotment Fill Map

RECEIVED
By Meg Svendsen at 2:20 pm, Sep 07, 2021

ISSUED FOR CONSTRUCTION
FGF DEVELOPMENTS

TYPICAL SECTION - FRONT BATTER SET BACK
N.T.S.

TYPICAL SECTION - REAR BATTER SET BACK TO SHAWS ROAD
N.T.S.

RETAINING WALL LEVELS
N.T.S.

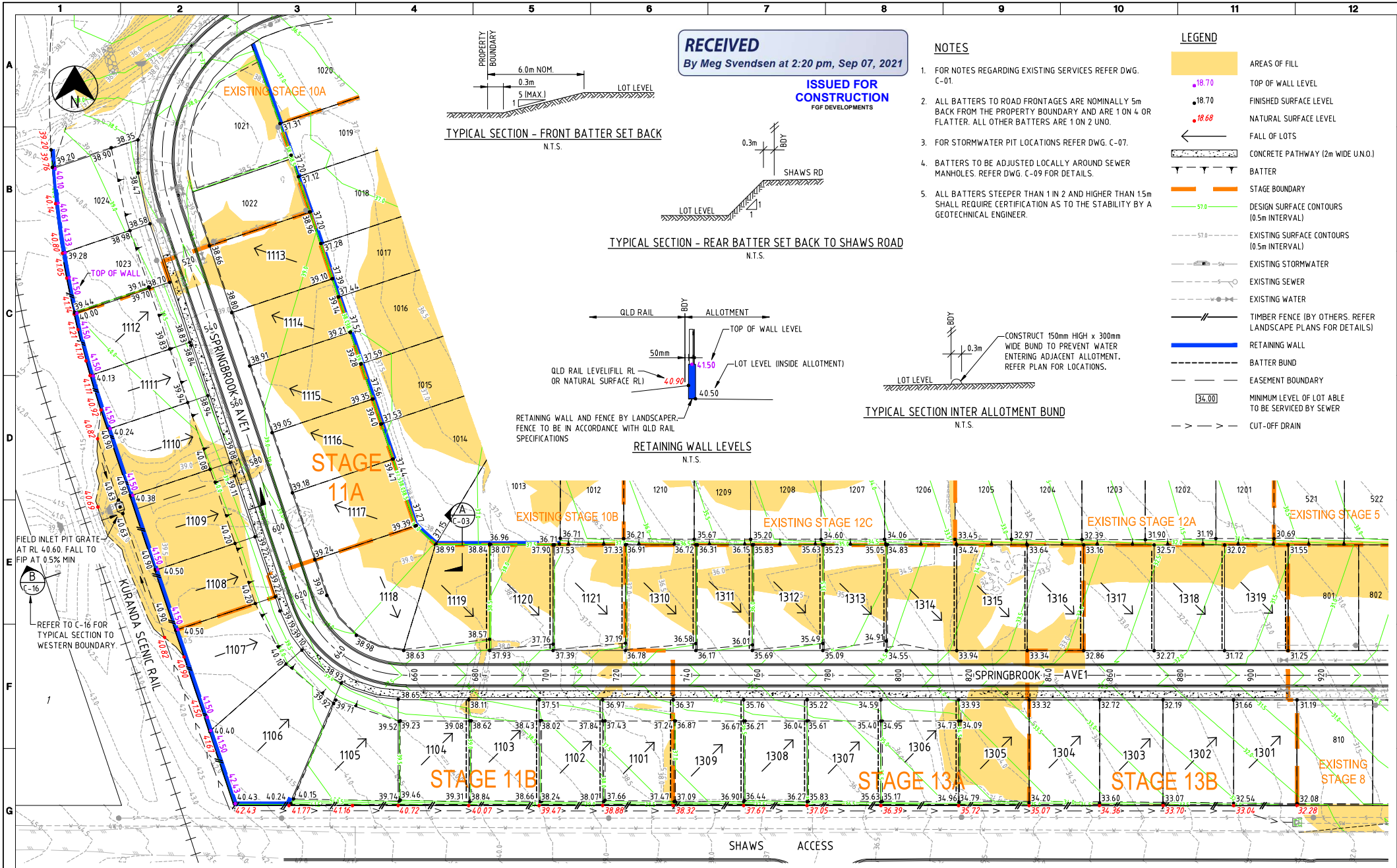
TYPICAL SECTION INTER ALLOTMENT BUND
N.T.S.

NOTES

1. FOR NOTES REGARDING EXISTING SERVICES REFER DWG. C-01.
2. ALL BATTERS TO ROAD FRONTAGES ARE NOMINALLY 5m BACK FROM THE PROPERTY BOUNDARY AND ARE 1 ON 4 OR FLATTER. ALL OTHER BATTERS ARE 1 ON 2 UNO.
3. FOR STORMWATER PIT LOCATIONS REFER DWG. C-07.
4. BATTERS TO BE ADJUSTED LOCALLY AROUND SEWER MANHOLES. REFER DWG. C-09 FOR DETAILS.
5. ALL BATTERS STEEPER THAN 1 IN 2 AND HIGHER THAN 1.5m SHALL REQUIRE CERTIFICATION AS TO THE STABILITY BY A GEOTECHNICAL ENGINEER.

LEGEND

- AREAS OF FILL
- 18.70 — TOP OF WALL LEVEL
- 18.70 — FINISHED SURFACE LEVEL
- 18.68 — NATURAL SURFACE LEVEL
- FALL OF LOTS
- CONCRETE PATHWAY (2m WIDE U.N.O.)
- BATTER
- STAGE BOUNDARY
- 57.0 — DESIGN SURFACE CONTOURS (0.5m INTERVAL)
- 57.0 — EXISTING SURFACE CONTOURS (0.5m INTERVAL)
- SW — EXISTING STORMWATER
- S — EXISTING SEWER
- W — EXISTING WATER
- TIMBER FENCE (BY OTHERS. REFER LANDSCAPE PLANS FOR DETAILS)
- RETAINING WALL
- BATTER BUND
- EASEMENT BOUNDARY
- 34.00 — MINIMUM LEVEL OF LOT ABLE TO BE SERVICED BY SEWER
- CUT-OFF DRAIN



1:500 — 0 10 20 30 40 50m — FULL SIZE ON A1

DATE: 04.08.2021@16:06:31 LOGIN NAME: PMashford
XREF: X-CF21310-DESIGN
LOCATION: I:\CFRA\Projects\CF21310\Deliverables\Drawings\Civil\Dwg\CF21310-C-02.dwg

No	DATE	DRAFTING CHECK	DESIGN REVIEW	REV'D P.MGR	APP'D P.DIR	AMENDMENT
G	10.02.21	PAM	RJB	RJC	DAH	RETAINING WALL REVISED ALONG RAIL

SPRINGBROOK

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CLIENT	EASTERLY PROJECTS		
PROJECT	SPRINGBROOK - STAGE 11 & 13		
DRAFTER SAB	DRAFTING CHECK PAM	REVIEWED PROJECT MANAGER R.J.CARMAN 24.10.09	APPROVED PROJECT DIRECTOR D.A.HILL 24.10.09
DESIGNED PAM	DESIGN REVIEW RJB		

TITLE: EARTHWORKS

SCALE	SKM PROJECT No	DRAWING No	AMDT
1:500(A1)	CF21310	CF21310-C-02	G