



# Geotech Report

Geotechnical Completion Report  
Halswell Commons Development – Stage 1, 1A, 1B

12 July 2016

Danne Mora Holdings Limited  
c/o Evolve Land Limited

Via email: greg@evolveland.nz

Attention: Greg Dewe

Dear Greg

**Geotechnical Completion Report – Halswell Commons Stage 1 Development  
(Lots 1 to 13, 15, 900, 1000 and 1001)**

This geotechnical completion report is submitted in accordance with Section 12.4.1 of the Christchurch City Council Infrastructure Design Standard.

**Introduction**

Danne Mora Holdings Limited is in the process of developing the Halswell Commons residential development in Halswell in southwest Christchurch, with Stage 1 of the development nearing completion. During the geotechnical investigation parts of Stage 1 were identified as being susceptible, to a limited degree, to the effects of seismically induced liquefaction.

The liquefaction risk at the site was assessed as being within acceptable levels that a Technical Category 2 (TC2) equivalent classification of the site was applicable. As such no site specific liquefaction mitigation measures were required for the site development.

The conditions of Aurecon's engagement are as per our agreement relating to geotechnical investigations to support subdivision consent, and are set out in our letter of engagement dated 15 June 2015.

**Geotechnical Investigations**

Aurecon has undertaken a multi-staged geotechnical site investigation across the wider 70ha Halswell Commons site between 2014 and 2015 along with a review of previous geotechnical assessments carried out in 2013. The types and density of investigations meet the intent of the MBIE Guidelines.

This investigation is described in the Aurecon Report *Meadowlands Development, Geotechnical Subdivision Report, Rev1* dated 24 November 2015 prepared for Danne Mora Holdings Limited (Aurecon, 2015).

**Liquefaction Hazard Assessment**

The report was issued following the publication of the Ministry of Business Innovation & Employment (MBIE), guidelines in December 2012, which define the Technical Category zoning and the liquefaction induced deformation limits for each Technical Category. The categories and corresponding criteria are summarised as follows:

- **Technical Category 1 (TC1)** – Future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances.
- **Technical Category 2 (TC2)** – Minor to moderate land damage from liquefaction is possible in future large earthquakes.
- **Technical Category 3 (TC3)** – Moderate to significant land damage from liquefaction is possible in future large earthquakes.

For the Canterbury region, the MBIE has released a new classification system for residential land on the flat in regard to liquefaction susceptibility. These are summarised below:

**Table 1: Liquefaction Deformation Limits and House Foundation Implications**

Technical Category	Index Liquefaction Deformation Limits				Likely Implication for House Foundations (subject to individual assessment)
	Vertical SLS	ULS	Lateral Spread SLS	ULS	
TC1	15mm	25mm	Nil	Nil	Standard NZS3604 type foundations with tied slabs are acceptable subject to shallow geotechnical investigation.
TC2	50mm	100mm	50mm	100mm	MBIE enhanced foundation solutions.
TC3	>50mm	>100mm	>50mm	>100mm	Site specific foundation solution.

A liquefaction hazard assessment was carried out as part of the site assessments has been carried out for the entire 70ha development as outlines in the geotechnical subdivision report (Aurecon, 2015).

The liquefaction analysis for Stage 1 was based on the boreholes and CPT testing carried out as part of the geotechnical investigations for the larger subdivision and observation of actual site performance during the recent major earthquake events. The geotechnical investigation information used to assess Stage 1 is part of a larger group of geotechnical information and only the tests that are relevant for this stage have been assessed. Consideration was given to information and data from outside the stage boundary when assessing geotechnical hazards and issues.

### Technical Category Classification

We have assessed the liquefaction hazard at the site. Based upon this assessment and observed site performance we believe:

- **Lots 1 to 13 and 15 fulfil the requirements of TC2 Classification.**
- **Lots 900, 1001 and 1001 are electrical kiosk, roading and balance lot areas; therefore no Technical Category Classification is applicable for these lots.**

A TC2 Classification effectively means that the MBIE believe that '*Minor to moderate land damage from liquefaction is possible in future significant earthquakes*'. House foundations and site specific geotechnical investigations are required in accordance with the MBIE (2012) guideline documents '*Repairing and rebuilding houses affected by the Canterbury earthquakes*' released in December 2012. This report is not intended to be used as a lot specific geotechnical report to support building consent application.

## References

Aurecon, 2015. *Meadowlands Development, Geotechnical Subdivision Report, Danne Mora Holdings Limited, Revision 1* - dated 24 November 2015. Aurecon New Zealand Limited, Christchurch, New Zealand.

MBIE, 2012. *Repairing and rebuilding houses affected by the Canterbury earthquakes*. Ministry of Business, Innovation and Employment, Wellington, New Zealand.

## Limitations

We have prepared this report in accordance with the brief as provided. The contents of the report are for the sole use of the Client and no responsibility or liability will be accepted to any third party. Data or opinions contained within the report may not be used in other contexts or for any other purposes without our prior review and agreement.

The recommendations in this report are based on data collected at specific locations and by using suitable investigation techniques. Only a finite amount of information has been collected to meet the specific financial and technical requirements of the Client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it must be appreciated that actual conditions could vary from the assumed model.

Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

Subsurface conditions, such as groundwater levels, can change over time. This should be borne in mind, particularly if the report is used after a protracted delay.

This report is not to be reproduced either wholly or in part without our prior written permission.

This conclusions in this report draws on investigations, analysis and conclusions from various investigations stages and numerous reports. For specific details please refer to the above mentioned references or contact the writers.

If you have any queries regarding the content of this letter, please do not hesitate to contact the undersigned.

Yours sincerely



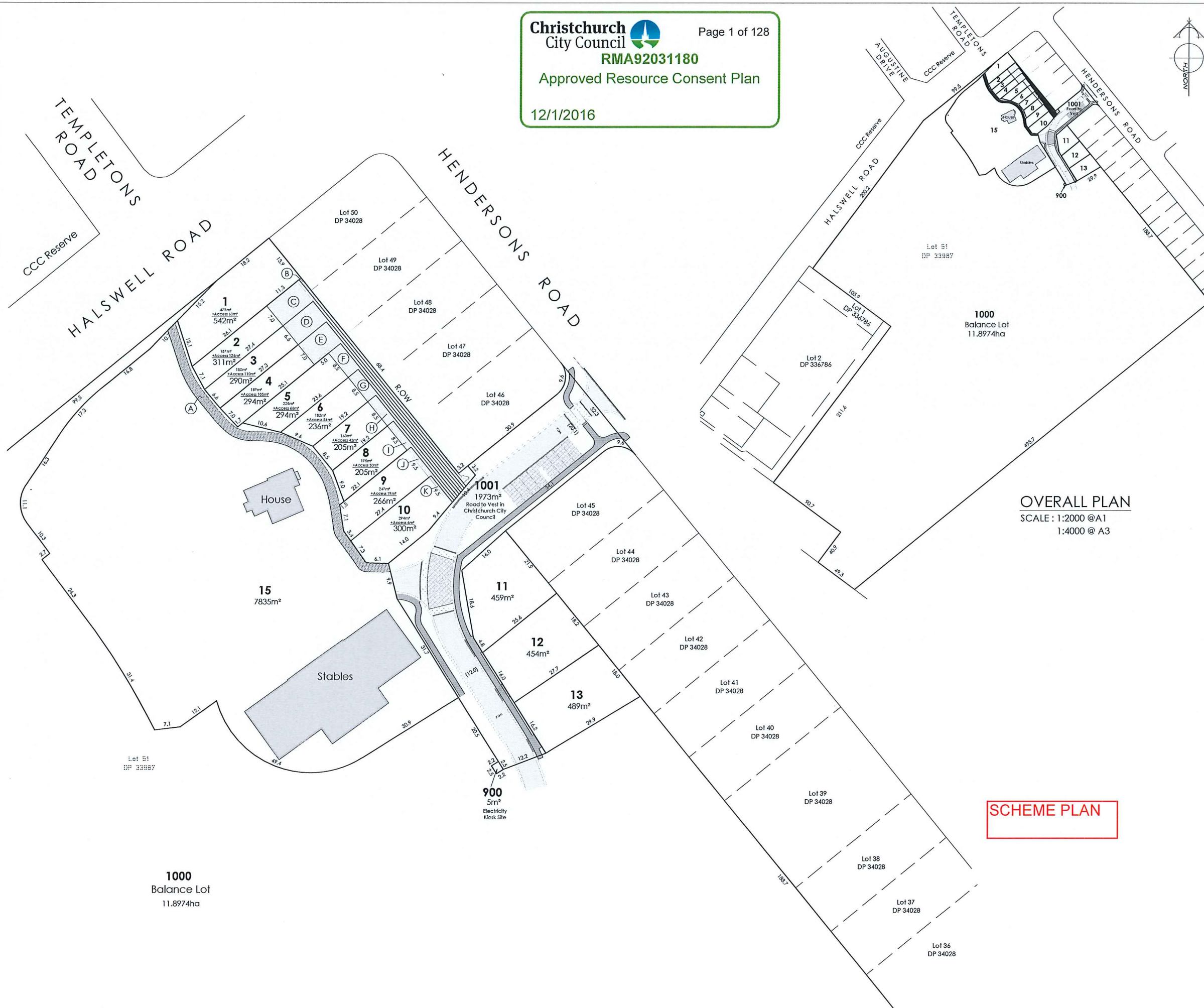
**Dr Jan Kupec**

*PhD MSc candIng MIPENZ CPEng IntPE MRSNZ | NZGS IGS ISSMGE NZSEE*

*Chartered Professional Geotechnical Engineer – Technical Director*

Inc: Halswell Commons Stage 1 Site Layout Plan





AMENDMENTS:		
AMENDMENT	DATE	DESCRIPTION
R1	7-8-15	BOUNDARIES UPDATED
R2	17-8-15	SUBDIVISION REDESIGN
R3	09-9-15	BOUNDARIES UPDATED
R4	11-9-15	LOT 900 ADDED
R5	24-9-15	LOTS 2, 3 & 4 AMENDED
R6	07-10-15	LOTS 1-7, 10, 11 & 13 AMENDED
R7	16-10-15	LOTS 1, 10, 15, 16, 900 & 1000 AMENDED
R8	20-11-15	LOTS 1-10, 15-16 AMENDED
R9	24-11-15	LOTS 9, 10, 15-16 & 1000 & 1001 AMENDED, ESMT ADDED
R10	01-12-15	ROAD LAYOUT SHEET ADDED

- NOTES:
- 1) Areas and dimensions are approximate & subject to final survey and deposit of plans.
  - 2) Service easements to be created as required.
  - 3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purpose.
  - 4) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.
  - 5) This plan is subject to the granting of subdivision and/or resource consents and should be treated as a proposal until such time as the necessary consents have been granted by the relevant authorities.
  - 6) This plan has been prepared for the use of Danne Mora Holdings Limited only and no liability is accepted in relation to any other parties.

OVERALL PLAN  
SCALE: 1:2000 @A1  
1:4000 @A3

Proposed Memorandum of Easements

Nature	Servient Tenement		Dominant Tenement
	Lot No	Shown	
Right of way in foot	15	A	Lots 1-10
Right of way, rights to drain water & sewage & rights to convey gas, water, electricity, telecommunications & computer media	1	B	Lots 2-10
	2	C	Lots 1, 3-10
	3	D	Lots 1, 2, 4-10
	4	E	Lots 1, 3, 5-10
	5	F	Lots 1, 4, 6-10
	6	G	Lots 1, 5, 7-10
	7	H	Lots 1, 6, 8-10
	8	I	Lots 1, 7, 9 & 10
	9	J	Lots 1, 8 & 10
	10	K	Lots 1-9

TOTAL AREA: 13.3132ha (C.F.R. 13.3140ha)  
COMPRISED IN: C.F.R. 138/1447



116 Wrights Road P O Box 679 Christchurch 8140, New Zealand  
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:  
**Meadowlands Heritage Park Application Plan**

SHEET TITLE:  
**Proposed Subdivision of Lot 51 DP 33987**

DRAWING STATUS:  
**For Subdivision Consent**

SCALE: 1:500@A1 DATE: December 2015  
1:1000@A3

CAD FILE: J:\18431\SUBCON\Stage 2\Heritage Subcon\_R10.dwg REVISION:  
DRAWING No: SHEET No:  
**E.18431 1 OF 2 R10**

14 August 2017

Danne Mora Holdings Limited  
c/o Davie Lovell-Smith Ltd

Via email: Adam.Lill@dls.co.nz

Attention: Adam Lill

Dear Adam

**Geotechnical Completion Report – Halswell Commons Stage 1A & 1B Development  
(Lots 17 to 44, 61 to 66, 109, 117, 123, 1100, 2000, 2001 and 2006)**

## **1 Introduction**

Danne Mora Holdings Limited is in the process of developing the Halswell Commons residential development in Halswell in southwest Christchurch, with Stages 1A & 1B of the development nearing completion. During the geotechnical investigation parts of Stages 1A & 1B were identified as being susceptible to the effects of seismically induced liquefaction.

The liquefaction risk was assessed as being variable across the site. A geogrid reinforced gravel capping layer has been created across Lots 40 to 44 in order to increase the seismic resilience of these lots. With this capping layer implemented all lots with Stages 1A & 1B are now assessed as being within acceptable levels that a Technical Category 2 (TC2) equivalent classification is applicable across all Stage 1A & 1B residential lots.

The conditions of Aurecon's engagement are as per our agreement relating to geotechnical investigations to support subdivision consent, and are set out in our letter of engagement dated 15 June 2015.

## **2 Geotechnical Investigations**

Aurecon has undertaken a multi-staged geotechnical site investigation across the wider 70ha Halswell Commons site between 2014 and 2015 along with a review of previous geotechnical assessments carried out in 2013. The types and density of investigations meet the intent of the MBIE Guidelines.

This investigation is described in the Aurecon Report *Meadowlands Development, Geotechnical Subdivision Report, Rev1* dated 24 November 2015 prepared for Danne Mora Holdings Limited (Aurecon, 2015).

## **3 Liquefaction Hazard Assessment**

The report was issued following the publication of the Ministry of Business Innovation & Employment (MBIE), guidelines in December 2012, which define the Technical Category zoning and the liquefaction induced deformation limits for each Technical Category. The categories and corresponding criteria are summarised as follows:

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- **Technical Category 3 (TC3)** – Moderate to significant land damage from liquefaction is possible in future large earthquakes.

For the Canterbury region, the MBIE has released a new classification system for residential land on the flat in regard to liquefaction susceptibility. These are summarised below:

**Table 1: Liquefaction Deformation Limits and House Foundation Implications**

Technical Category	Index Liquefaction Deformation Limits				Likely Implication for House Foundations (subject to individual assessment)
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TC2	50mm	100mm	50mm	100mm	MBIE enhanced foundation solutions.
TC3	>50mm	>100mm	>50mm	>100mm	Site specific foundation solution.

A liquefaction hazard assessment was carried out as part of the site assessments has been carried out for the entire 70ha development as outlines in the geotechnical subdivision report (Aurecon, 2015).

The liquefaction analysis for Stages 1A & 1B was based on the boreholes and CPT testing carried out as part of the geotechnical investigations for the larger subdivision and observation of actual site performance during the recent major earthquake events. The geotechnical investigation information used to assess Stages 1A & 1B is part of a larger group of geotechnical information and only the tests that are relevant for this stage have been assessed. Consideration was given to information and data from outside the stage boundary when assessing geotechnical hazards and issues.

Based upon this liquefaction assessment:

***Lots 17 to 39, 61, and 63 to 66***

The calculated liquefaction induced ground deformations were within the limits of a Technical Category 2 (TC2) classification.

***Lots 40 to 44***

Lots 40 to 44 in their natural form were identified as being non-compliant with the requirements of a TC2 classification based on liquefaction induced reconsolidation settlement criteria. The wider site is underlain by surficial silty-sandy soils. However, geotechnical testing around these lots indicates an increase in sand content which results in a theoretical increase reconsolidation settlement in this area exceed the TC2 classification limits.

#### **4 Liquefaction Risk Mitigation**

The following liquefaction hazard mitigation has been undertaken across the site:

***Lots 17 to 39, 61, and 63 to 66***

No additional liquefaction risk mitigation is required for these lots other than an enhanced TC2 type of foundation system.



## **Lots 40 to 44**

In order to ensure a TC2 classification across the entire site and provide additional seismic resilience to the development shallow ground improvement works have been undertaken across Lots 40 to 44. The ground improvement works have been based upon the concept of 2m thick capping layer option presented in Section 15 of the Ministry of Business, Innovation and Employment Guidance Document *Repairing and Rebuilding houses affected by the Canterbury earthquake sequence* (MBIE Guidelines). With this ground improvement implemented a TC2 foundation system can be used at these sites.

Due to the depth to groundwater at the site, the capping layer has been reduced to a thickness of 1.8m. To compensate for the reduction in thickness it has been formed with a composite of 1.5m of geogrid reinforced gravel and 0.3m of site won silty-sandy soils re-compacted as engineered fill. The top is covered with a nominal 200mm of topsoil.

This composite 1.8m thick engineered fill layer is considered to have as a minimum the same engineering properties of 2m of unreinforced capping layers presented in Section 15 of the MBIE Guidelines. Plans showing the location and a cross-section of this capping layer are appended to this report.

This geogrid reinforced gravel capping layer has been constructed under the supervision of the project Civil Engineer's, Davie Lovell-Smith Limited, as part of the bulk earthworks process carried out as part of the subdivision development. Aurecon has visited the capping layer construction at critical stages.

## **5 Technical Category Classification**

We have assessed the liquefaction hazard at the site as detailed in Aurecon's geotechnical investigation and assessment report (Aurecon, 2015). Based upon our geotechnical site investigations, the liquefaction hazard assessments and the implementation of a geogrid reinforced gravel capping layer (in Lot 40 to 44) we believe:

- **Lots 17 to 44, 61 and 63 to 66 fulfil the requirements of TC2 Classification,**
- **Lots 62, 117, 123, 1100, 2000, 2001 and 2006 are roading, power kiosk, and reserve areas, and an amalgamation lot; therefore no Technical Category Classification is applicable for these lots.**

A TC2 Classification effectively means that the MBIE believe that '*Minor to moderate land damage from liquefaction is possible in future significant earthquakes*'. House foundations and site specific geotechnical investigations are required in accordance with the MBIE (2012) guideline documents '*Repairing and rebuilding houses affected by the Canterbury earthquakes*' released in December 2012.

## **6 Foundation Recommendations**

The following foundation recommendations are made for residential houses to be built at the site:

### **Lots 17 to 39, 61 and 63 to 66 – Natural Ground**

With Lots 17 to 39, 61 and 63 to 66 enhanced TC2 foundation are required as outlined in Section 5 of the MBIE (2012) Guidelines. In accordance with the Guidelines standard shallow lot specific shallow geotechnical investigations will be required during the detailed house design to assess the lot specific ground conditions and bearing capacity values.



### ***Lots 40 to 44 – Capping Layer***

The following foundation recommendations are made for residential houses to be built on Lots 40 to 44:

Enhanced TC2 foundation are required as outlined in Section 5 of the MBIE Guidelines. In accordance with the Guidelines standard shallow lot specific shallow geotechnical investigations will be required during the detailed house design to assess the lot specific ground conditions and bearing capacity values. With the enhanced raft foundation options all topsoil and silty-sandy soil should be removed below the entire house footprint.

To provide the best seismic resilience houses should:

- Use light to mid weight cladding and roofing materials only.
- The structural form should be restricted to timber frame (or light weight cold-rolled steel equivalent).

Due to the presence of the geogrid reinforcement within the gravel, and the capping function that the geogrid reinforced gravel raft preforms, penetrations through the geogrid should be avoided. Houses build in these lots should not have basements protruding through the capping layer. Underfloor hydraulic services and conduits (wastewater, stormwater etc.), where possible should be designed in such a way that they do not penetrate through the geogrid reinforcement either and stay within the upper 800mm of the engineered fill layer (upper 1m when including the nominal 200mm thickness of topsoil).

In order to fully utilised the capping layer, and achieve the expected Technical Category 2 performance, all foundations will need to be set back a minimum of 1m from the boundary, and 1.5m from the northeastern boundary (with the neighbouring established houses). These setback distances are geotechnical requirements and do not supersede any planning rule.

## **7 References**

Aurecon, 2015. *Meadowlands Development, Geotechnical Subdivision Report, Danne Mora Holdings Limited, Revision 1* - dated 24 November 2015. Aurecon New Zealand Limited, Christchurch, New Zealand.

MBIE, 2012. *Repairing and rebuilding houses affected by the Canterbury earthquakes*. Ministry of Business, Innovation and Employment, Wellington, New Zealand.

## **8 Limitations**

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Yours faithfully

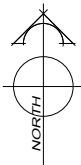


**Dr Jan Kupec**

*elect. sign*  
*PhD MSc candIng MIPENZ CPEng IntPE MRSNZ | NZGS IGS ISSMGE NZSEE*

*Chartered Professional Geotechnical Engineer – Technical Director*

Enc:      Halswell Commons Stages 1A & 1B Site Layout Plans  
             Geogrid Capping Layer Plan and Detail



AMENDMENTS :		
AMENDMENT	DATE	DESCRIPTION
R4	10.3.16	LOTS 2002- 2006 & AMALG. CONDITION ADDED
R5	22.4.16	LOTS 100 & 2000 & ROAD TREATMENT AMENDED
R6	29.4.16	LOTS 100,2000,2005&2006 AMEND.,2002-2004 R.
R7	18.5.16	LOT 2005 AMENDED
R8	24.6.16	ROWS SPILT, ESMTS ADDED, LOT 100 TO 1100
R9	8.07.16	LOTS 1100, 2006 & 2005 AMENDED
R10	2.08.16	CAR PARK LAYOUT AMENDED FOR LOTS 2001 & 2006

NOTES:

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- 4) This plan is subject to the granting of subdivision and/or resource consents and should be treated as a proposal until such time as the necessary consents have been granted by the relevant authorities.
- 5) This plan has been prepared for the use of Danne Mora Holdings Limited only and no liability is accepted in relation to any other parties.

PROPOSED AMALGAMATION CONDITION

Lot 2006 hereon be amalgamated with Lot 15 DP 499563 ( CFR741674 ) and one computer freehold register be issued.

Proposed Memorandum of Easements

Nature	Servient Tenement		Dominant Tenement
	Lot No	Shown	
Right of way, rights to drain water & sewage & rights to convey sewage, water, electricity, telecommunications & computer media	17	A	Lots 18-21
	18	B	Lots 17, 19-21
	19	C	Lots 17, 18, 20&21
	20	D	Lots 17-19&21
	21	E	Lots 17-20
	23	F	Lots 24-27&29-31
	24	G	Lots 23,25-27&29-31
	25	H	Lots 23,24,26,27&29-31
	26	I	Lots 23-25,27&29-31
	27	J	Lots 23-26&29-31
	29	K	Lots 23-27,30&31
	30	L	Lots 23-27,29&31
	31	M	Lots 23-27,29&30



halswell commons

COMPRISED IN: C.F.R. 741676

TOTAL AREA: 11.8957ha



116 Wrights Road P O Box 679 Christchurch 8140. New Zealand  
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

Halswell Commons  
Stage 1A

SHEET TITLE:

Proposed Subdivision of  
Lot 1000 DP 499563  
( RMA 92031180 )

DRAWING STATUS

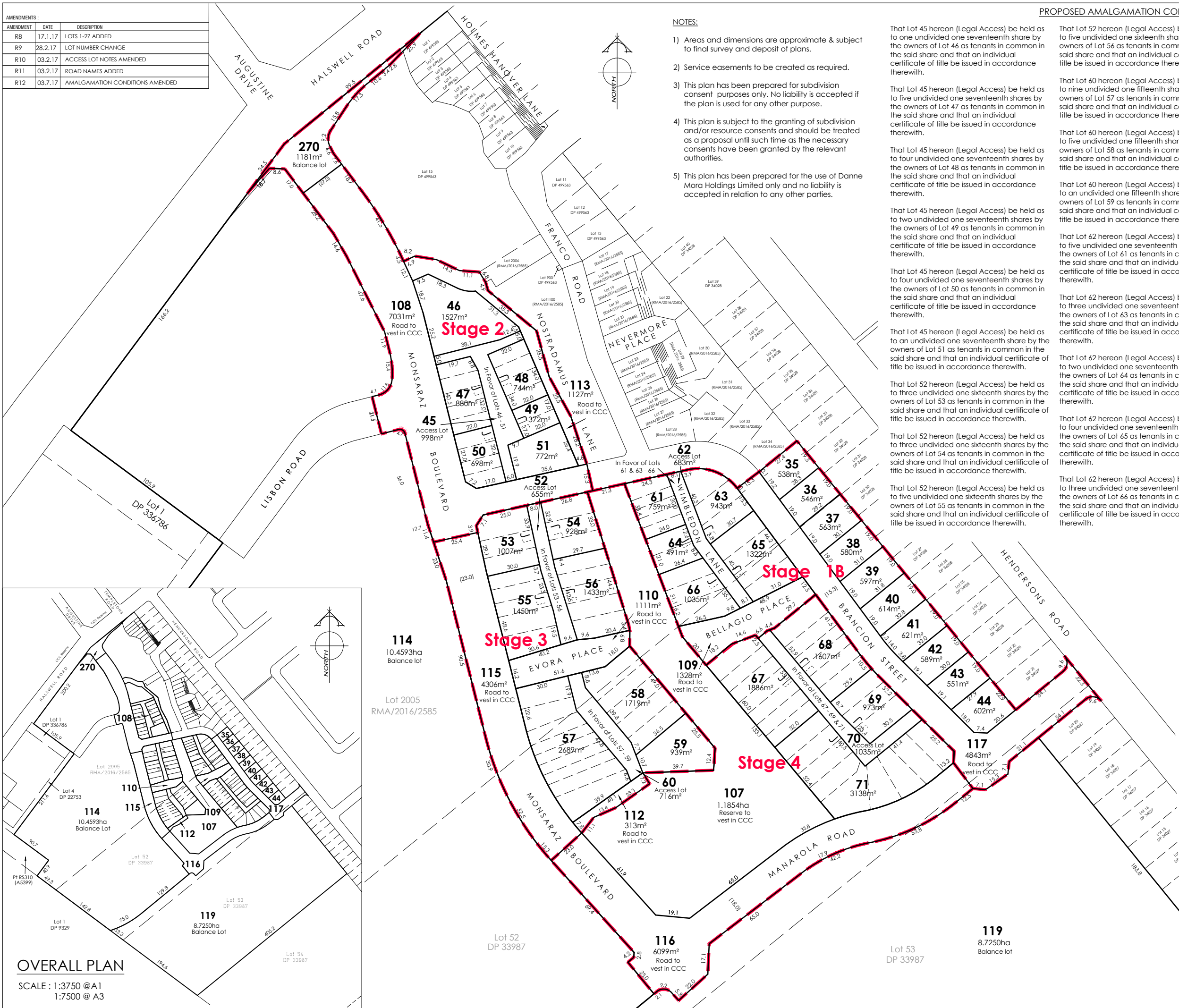
For Subdivision Consent

SCALE : 1:500@A1  
1:1000@A3 DATE : 19 August 2016

CAD FILE : J:\18857\Subcon\E18857\_STAGE 1A SUBCON\_R11 160819.dwg DRAWN : AA

DRAWING No : E.18857 SHEET No: 1 REVISION : R11

AMENDMENTS :		
AMENDMENT	DATE	DESCRIPTION
R8	17.1.17	LOTS 1-27 ADDED
R9	28.2.17	LOT NUMBER CHANGE
R10	03.2.17	ACCESS LOT NOTES AMENDED
R11	03.2.17	ROAD NAMES ADDED
R12	03.7.17	AMALGAMATION CONDITIONS AMENDED



halswell commons

COMPRISED IN: C.F.R's.13B/1447, 13B/1448 &13B/1449

TOTAL AREA: 26.8305ha



DAVIE LOVELL-SMITH

PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand  
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:

Halswell Commons

SHEET TITLE:

**Proposed Subdivision of  
Lot 2005 RMA/2016/2585  
Lots 52 & 53 DP 33987**

DRAWING STATUS

**For Subdivision Consent**

SCALE : 1:1000@A1  
1:2000@A3

DATE : July 2017

CAD FILE : J:\19005\Subcon\19005 Subcon R12.dwg

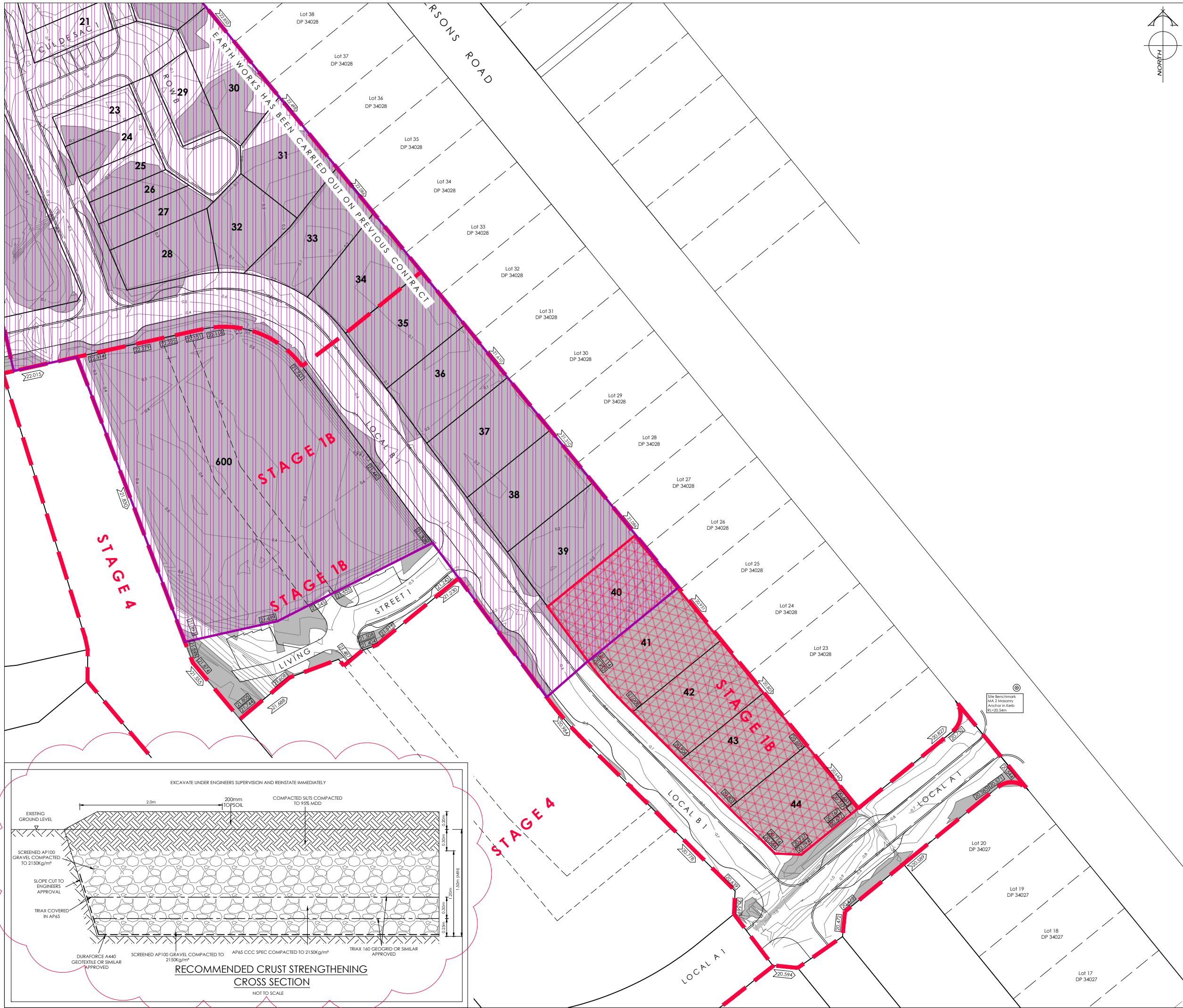
DRAWN : AMA

DRAWING No :  
**P19005**

SHEET No:  
**S01**

REVISION :  
**R12**





AMENDMENTS:		
AMENDMENT	DATE	DESCRIPTION
R1	04/10/2016	NOTES & DRAWING STATUS AMENDED
R2	19/01/2017	DESIGN CHANGES FOR CONSTRUCTION
R3	10/02/2017	CRUST STRENGTHENING DETAIL UPDATED

NOTES:

- ALL WORKS IN ACCORDANCE WITH CCC IDS AND CSS PARTS 1-7 CURRENT ISSUE.
- ORIGIN OF LEVELS  
BM. MA1 RL=23.08 LOCATED IN TOP OF KERB IN LINE WITH NEW SITE ENTRANCE ON HENDERSONS ROAD LEVELS IN TERMS OF CHRISTCHURCH DRAINAGE DATUM. POST JUNE EMERGENCY LEVELS.
- METAL DEPTHS TO BE CONFIRMED OR INCREASED BY ENGINEER FOLLOWING CHECKING OF SUBGRADE CBR STRENGTH ONCE EXCAVATED.
- ALL BERMS TO BE COVER WITH A MINIMUM OF 150mm SCREENED TOPSOIL GRASSED WITH CCC BERM MIX.
- EXISTING SERVICES HAVE BEEN DIGITISED FROM SERVICE AUTHORITY PLANS; COMPLETENESS AND ACCURACY ARE NOT GUARANTEED. ALL SERVICES TO BE FULLY SEARCHED & PILOTTED PRIOR TO TRENCHING.
- CONTOUR INTERVAL: MAJOR 1.0m MINOR 0.1m
- ALL EARTHFILL WORKS TO COMPLY WITH NZS 4431:1989 RELEVANT CERTIFICATION REQUIRED AS PROOF.
- IF PEAT OR OTHER UNSUITABLE MATERIAL IS LOCATED IN THE SUBGRADE THE ENGINEER IS TO BE CONTACTED FOR INSTRUCTION.
- ESCMP TO BE IN PLACE PRIOR TO ANY EARTHWORKS.
- CONTRACTOR MUST READ ALL DISCHARGE CONSENTS PRIOR TO ANY EARTHWORKS.
- DRAWINGS TO BE DISTRIBUTED AND READ AS A COMPLETE SET. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION.

CONTOURS SHOWN ARE APPROXIMATELY CUT (-ve) AND FILL (+ve) AT 0.1m INTERVALS.

EXISTING LEVEL  
PROPOSED LEVEL

AREA REQUIRING GROUND IMPROVEMENT FOR TC3 COMPLIANCE. SEE SHEET E02.3 FOR DETAILS

EARTHWORKS ALREADY COMPLETED

CUT

ENGINEERED FILL

**HL**

**halswell commons**

	NAME	SIGNED	DATE
DESIGNED BY	ADAM LILL		
CHECKED BY	JAMIE VERSTAPPEN		

**DAVIE LOVELL-SMITH**  
PLANNING SURVEYING ENGINEERING

116 Wrights Road P O Box 679 Christchurch 8140. New Zealand  
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:  
**Halswell Commons  
Stage 1A - Stage 2**

SHEET TITLE:  
**Cut & Fill Plan  
RMA 201612585**

DRAWING STATUS:  
**For Construction**

SCALE: 1:500@A1 1:1000@A3 DATE: February 2017

CAD FILE: J:\19005\Eng\Design Drawings\1919005\_E02\_STAGE 1 & 2\_R3.dwg DRAWN: AMAA

DRAWING No.: **E.19005** SHEET No.: **E02.2** REVISION: **R3**