

Derek Booth Consultancy t/a DBCON
Corner of Spa Road and Rotokawa Street
PO Box 1123
TAUPO 3351
info@dbcon.co.nz
Ph: 07 378 5067

Our Reference: 12855

SOIL TESTS AND SITE ASSESSMENT NZS 3604 Soil Capacity Testing and Site Suitability

Lot 3 Court, Hamilton.

SUMMARY

This site investigation was carried out for the purpose of assessing soil suitability for construction of a timber framed dwelling.

The soils tests have been carried out in accordance with NZS 3604, Section 3.

Due to the varying types of soil, strengths of soil and some peat located on site the foundations will need to be specifically designed to suit the site.

Foundations will likely need to be driven timber poles supporting an engineered concrete floor.

No foundation design has been included as part of this report.

LOCATION DETAILS

| | |
|--------------------|--------------------------|
| Owner/Agent: | Paradise Homes |
| Address: | Landmark Court, Hamilton |
| Contact: | DBCON |
| Legal Description: | Lot 3 DP |
| Local Authority: | Hamilton City Council |



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SITE ASSESSMENT AND SOIL INVESTIGATION

The site assessment and soil testing was carried out 14th June 2012.

The soil investigation was carried out to investigate the suitability of the soils for the construction of foundations for the proposed timber framed dwelling, and their compliance with the criteria of NZS 3604:2011. NZS 3604 requires the determination of "good ground" at the base of the foundations by demonstration of ultimate soil bearing capacity by the performance of specified cone Penetrometer tests and boreholes, plus the observation of site and soil conditions in the respect of site profile, buried services, fill etc.

The soil tests we carried out were

- Scala Penetrometer tests
- 50mm Hand Auger tests

The soil test results and locations are shown in the attached appendix A

SOIL PROPERTIES

The site is generally flat.

The soils were found to consist of topsoil overlying Silts and Sands.

The depth of topsoil and fill found in our boreholes was approximately 200 to 800mm deep.

Ground water was located in the boreholes at 400mm deep.

Four 50mm Auger holes were excavated at the locations shown in appendix A.

SCALA PENETROMETER TESTING

Scala Penetrometer tests were carried out at the locations as shown in appendix A, to a maximum depth of 3000mm.

The soil layers consist mainly of undisturbed ground giving Scala Penetrometer readings of 300kPa from a depth of 2200mm, and 150 kPa from 900mm. (excluding test location 3)

The results of the tests indicate that the soil strength below 2300mm is generally more than the minimum requirements of NZS 3604:2011 Section 3.3, and therefore the ground below 2300mm can be considered good ground pursuant to Section 3.1.

The strength of the soil increased with depth as all layers are well packed, and good bearing strength will be maintained (excluding test location 3).

SLOPE STABILITY

No slope stability is required for this site.

CONCLUSION

The site was assessed on 14th June 2012 and

1. Specified Scala Penetrometer tests were performed, and the test results;
For test locations 1, 2 & 4
 - a. for 0 to 2300mm are less than the requirements of NZS3604:2011 Section 3.3.6, of 300kPa Ultimate bearing pressure.
 - b. for 2300 to 3000mm are greater than the requirements of NZS3604:2011 Section 3.3.6, of 300kPa Ultimate bearing pressure.
 - c. for 900 to 2300mm are greater than 150kPa Ultimate bearing pressure
2. Peat was found in boreholes 2 and 3.

RECOMMENDATIONS

Due to the varying types of soil, strengths of soil and some peat located on site the foundations will need to be specifically designed to suit the site.

Foundations will likely need to be driven timber poles supporting an engineered concrete floor.

No foundation design has been included as part of this report.

EXCLUSIONS

Due to seasonal variations, the water table depth and therefore moisture contents may differ than that noted above and may affect construction techniques. Any prices sought for the construction will have to cater for the ground conditions at the time of construction or the proposed foundations modified to suit.

The scalas and boreholes represent a small proportion of the ground conditions on the site and may not be completely representative of the soils present.

Report Prepared By:



Date: 21 June 2012

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James Dunning
Engineering Technician

Report Peer Review By:

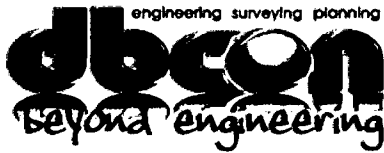


Date: 21 June 2012

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Derek J Booth
Chartered Professional Engineers
CPENG - 15472

APPENDIX A

Soil Test Results and Locations



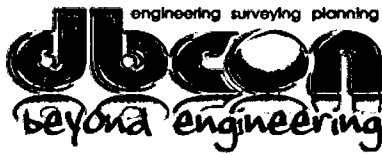
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 Phone: 07 3785067
 Fax: 07 3782800
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| | | | |
|---------------------------------|------------------------|----------|------------------|
| Project Lot 3 Landmark Court | | | Job ref 12855 |
| Drawing ref | calculations by jmd | revision | sheet no 1 |
| Element Test Location 1 | | | Date Jun-12 |

| Depth | Scala (blows/100mm) | Soil Description | Percolation Test | |
|-------|------------------------|---|---|-----------|
| | | | Time (min) | Drop (mm) |
| 100 | 0 | SILT (fill) light brown | 5 | |
| 200 | 2 | | 10 | |
| 300 | 2 | SAND creamy light brown | 15 | |
| 400 | 3 | | 20 | |
| 500 | 3 | | 25 | |
| 600 | 1 | SILT creamy light brown, with some brown streaks, wet | 30 | |
| 700 | 1 | | 35 | |
| 800 | 1 | | 40 | |
| 900 | 2 | SAND creamy light brown | 45 | |
| 1000 | 4 | | 50 | |
| 1100 | 4 | | 55 | |
| 1200 | 3 | | 60 | |
| 1300 | 3 | SILTY LOAM creamy light brown | | |
| 1400 | 3 | | | |
| 1500 | 3 | | | |
| 1600 | 3 | | Soakage rate (mm/hr) = 0 | |
| 1700 | 2 | | | |
| 1800 | 1 | | | |
| 1900 | 2 | End of borehole, too wet to extract | Average (less 1st 2 & last 2 results) 0 mm/5mins | |
| 2000 | 4 | | | |
| 2100 | 3 | | | |
| 2200 | 4 | | | |
| 2300 | 4 | | | |
| 2400 | 5 | | | |
| 2500 | 6 | | | |
| 2600 | 6 | | | |
| 2700 | 6 | | | |
| 2800 | 6 | | | |
| 2900 | 6 | | | |
| 3000 | 6 | | | |
| 3100 | | | | |
| 3200 | | | | |
| 3300 | | | | |
| 3400 | | | | |
| 3500 | | | | |

Notes:

- 1 Weather was overcast but warm
- 2 Ground water was detected at 400mm
- 3
- 4
- 5



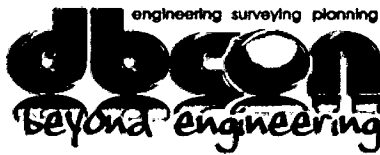
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| | | | |
|---------------------------------|------------------------|----------|------------------|
| Project Lot 3 Landmark Court | | | Job ref 12855 |
| Drawing ref | calculations by jmd | revision | sheet no 2 |
| Element Soil Test Location 2 | | | Date Jun-12 |

| Depth | Scala (blows/100mm) | Soil Description | Sample / Temperature | |
|-------|------------------------|---|----------------------|-----------|
| | | | Time (min) | Drop (mm) |
| 100 | 0 | SAND light brown | 5 | |
| 200 | 2 | | 10 | |
| 300 | 2 | | 15 | |
| 400 | 5 | | 20 | |
| 500 | 4 | | 25 | |
| 600 | 4 | SILTY LOAM creamy light brown | 30 | |
| 700 | 4 | | 35 | |
| 800 | 3 | | 40 | |
| 900 | 1 | | 45 | |
| 1000 | 2 | TOPSOIL / PEAT black, organic, wet | 50 | |
| 1100 | 2 | | 55 | |
| 1200 | 6 | SAND bluish grey,wet, becoming creamy light brown at 1300mm | 60 | |
| 1300 | 8 | | | |
| 1400 | 12 | | | |
| 1500 | 18 | | | |
| 1600 | | | SILT light brown | |
| 1700 | | | | |
| 1800 | | | | |
| 1900 | | | | |
| 2000 | | | | |
| 2100 | | | | |
| 2200 | | | | |
| 2300 | | | | |
| 2400 | | | | |
| 2500 | | | | |
| 2600 | | | | |
| 2700 | | | | |
| 2800 | | | | |
| 2900 | | | | |
| 3000 | | | | |
| 3100 | | | | |
| 3200 | | | | |
| 3300 | | | | |
| 3400 | | | | |
| 3500 | | | | |

Notes:

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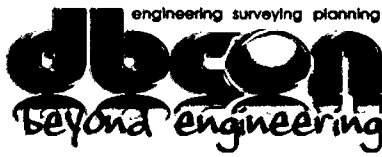
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|---------------------------------|------------------------|----------|------------------|
| Project Lot 3 Landmark Court | | | Job ref 12855 |
| Drawing ref | calculations by jmd | revision | sheet no 3 |
| Element Soil Test Location 3 | | | Date Jun-12 |

| Depth | Scala (blows/100mm) | Soil Description | Sample / Temperature | |
|-------|------------------------|------------------------------|----------------------|-----------|
| | | | Time (min) | Drop (mm) |
| 100 | 0 | SILT (fill) very soft | 5 | |
| 200 | | | 10 | |
| 300 | | | 15 | |
| 400 | | | 20 | |
| 500 | | | 25 | |
| 600 | 1 | SAND creamy light brown, wet | 30 | |
| 700 | | | 35 | |
| 800 | 1 | | 40 | |
| 900 | 1 | | 45 | |
| 1000 | 1 | | 50 | |
| 1100 | 3 | PEAT, black organic | 55 | |
| 1200 | 5 | | 60 | |
| 1300 | 4 | | | |
| 1400 | 3 | | | |
| 1500 | 2 | | | |
| 1600 | 2 | SAND light brown | | |
| 1700 | 3 | | | |
| 1800 | 2 | | | |
| 1900 | 2 | | | |
| 2000 | 1 | | | |
| 2100 | 2 | | | |
| 2200 | 2 | | | |
| 2300 | 2 | | | |
| 2400 | 2 | | | |
| 2500 | 2 | | | |
| 2600 | 1 | | | |
| 2700 | 2 | | | |
| 2800 | 1 | | | |
| 2900 | 1 | | | |
| 3000 | 1 | | | |
| 3100 | | | | |
| 3200 | | | | |
| 3300 | | | | |
| 3400 | | | | |
| 3500 | | | | |

Notes:

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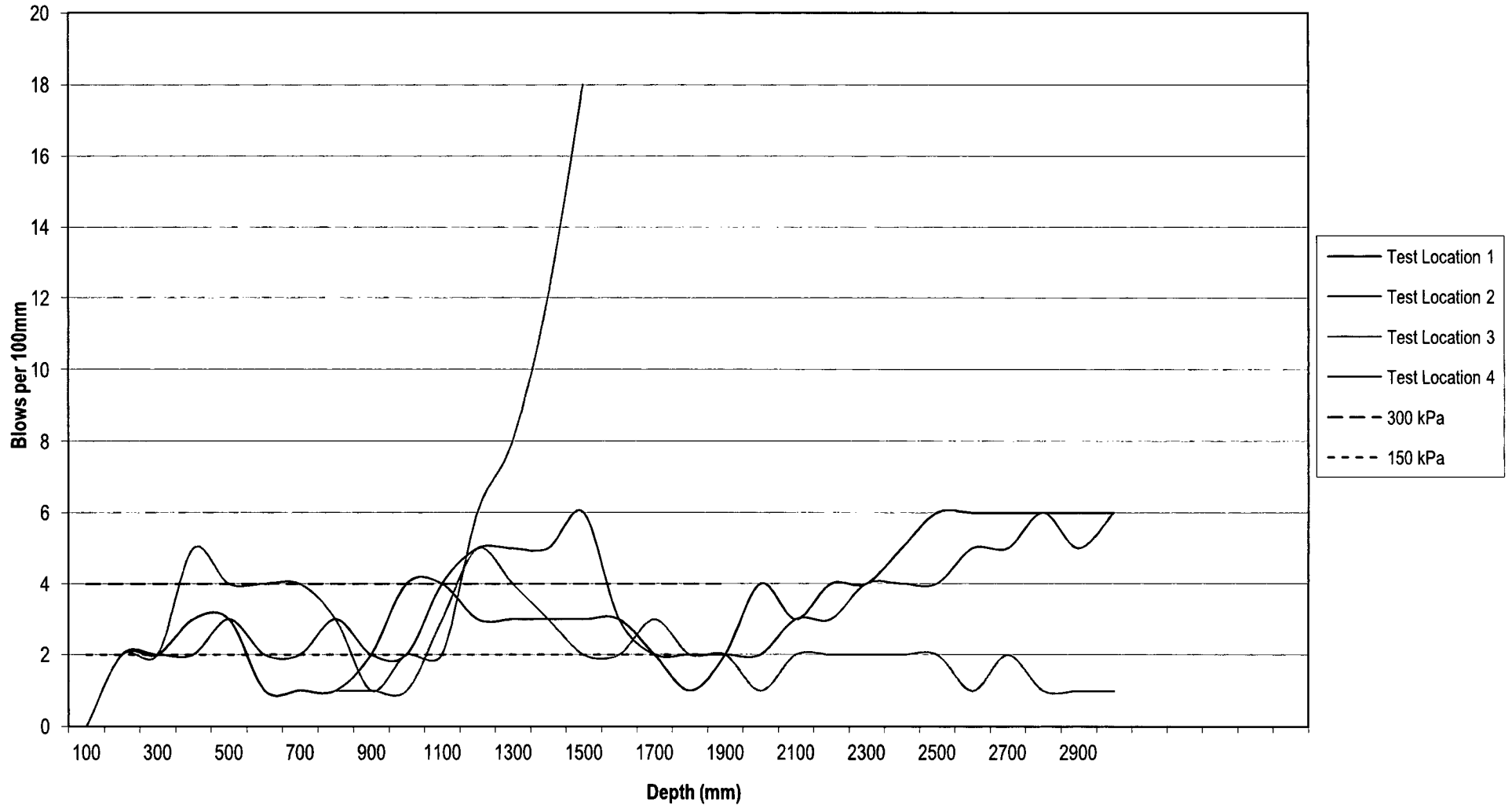
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| | | | |
|---------------------------------|------------------------|----------|------------------|
| Project Lot 3 Landmark Court | | | Job ref 12855 |
| Drawing ref | calculations by jmd | revision | sheet no 4 |
| Element Soil Test Location 4 | | | Date Jun-12 |

| Depth | Scala (blows/100mm) | Soil Description | Sample / Temperature | |
|-------|------------------------|---|----------------------|-----------|
| | | | Time (min) | Drop (mm) |
| 100 | 0 | TOPSOIL / FILL | 5 | |
| 200 | 2 | | 10 | |
| 300 | 2 | | 15 | |
| 400 | 2 | | 20 | |
| 500 | 3 | | 25 | |
| 600 | 2 | SAND creamy light brown, wet, becoming bluish grey with depth | 30 | |
| 700 | 2 | | 35 | |
| 800 | 3 | | 40 | |
| 900 | 2 | | 45 | |
| 1000 | 2 | | 50 | |
| 1100 | 4 | | 55 | |
| 1200 | 5 | | 60 | |
| 1300 | 5 | | | |
| 1400 | 5 | | | |
| 1500 | 6 | | | |
| 1600 | 3 | | | |
| 1700 | 2 | | | |
| 1800 | 2 | | | |
| 1900 | 2 | | | |
| 2000 | 2 | | | |
| 2100 | 3 | | | |
| 2200 | 3 | | | |
| 2300 | 4 | | | |
| 2400 | 4 | | | |
| 2500 | 4 | | | |
| 2600 | 5 | | | |
| 2700 | 5 | | | |
| 2800 | 6 | | | |
| 2900 | 5 | | | |
| 3000 | 6 | | | |
| 3100 | | | | |
| 3200 | | | | |
| 3300 | | | | |
| 3400 | | | | |
| 3500 | | | | |

| |
|--------------------------------------|
| Notes: |
| 1 Weather was overcast but warm |
| 2 Ground water was detected at 400mm |
| 3 |
| 4 |
| 5 |

Soil Investigation Results





APPENDIX B

Site Photos

