From: Grace Ockwell
To: [redacted]
Cc: Kristy Rusher
Subject: RE: Local Government Official Information request - 522182
Date: Tuesday, 10 November 2015 10:01:28 a.m.
Attachments: Rabbidge, Doug MWH Report 7 October 2015.pdf
image001.png
image002.jpg
image003.jpg
image004.jpg

Dear Mr Rabbidge,

Thank you for your email of 15 October 2015 requesting "1 The frequency of survey monitoring the above (Howard Street) slip. 2 The approx locations of the surveying points and piezometers 3 The amount of movement per monitoring period for the last 20 years "

Your request has been considered under the provisions of the Local Government Official Information and Meetings Act 1987 (LGOIMA) and I am attaching a copy of the report prepared by MWH dated 5 October 2015 which provides answers to your questions.

To answer your questions specifically:

1. Monitoring is currently conducted annually.
2. The map in the attached report identifies the current survey points. Piezometer measurements were discontinued many years ago.
3. Cumulative movement graphs from 1998 are shown in the attached report.

It may be helpful to seek interpretation of the data in the report from a professional engineer.

With kind regards,

Grace Ockwell
Governance Support Officer
Civic and Legal

Dunedin City Council
50 The Octagon, Dunedin; P O Box 5045, Moray Place, Dunedin 9058, New Zealand
Telephone: 03 477 4000
Email: grace.ockwell@dcc.govt.nz


Please consider the environment before printing this e-mail

From: Doug [redacted]
Sent: Thursday, 15 October 2015 12:45 p.m.
To: officialinformation@dcc.govt.nz
Subject: Local Government Official Information request - 522182

Doug has submitted a LGOIMA request - 522182.

Below are the details of the request

Request details:

HOWARD ST LAND SLIP - I request the following information. 1 The frequency of survey monitoring the above slip. 2 The approx locations of the surveying points and piezometers 3 The amount of movement per monitoring period for the last 20 years Thank you

File attachment
No file uploaded

Name
Doug Rabbidge

Email address
[redacted]

Mailing address
[redacted]

Contact phone number
[redacted]

TRANSMITTAL NOTICE

MWH New Zealand Limited
Level 3
John Wickliffe House
265 Princes Street
Dunedin 9016
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Telephone +64 3 477 0885
Facsimile +64 3 477 0616
Website www.mwhglobal.co.nz

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BUILDING A BETTER WORLD

To: Dunedin City Council

From: Jake Hawker

Date: 07 October 2015

Ref: 80508442

Attention: Neil Brown

Project: Landslide Monitoring 2015

☑ We enclose
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☑ Reports
☐ Specifications
☐ Disks
☐ Other

Quantity	Reference	Description
1x		Howard Street report

These items are sent:

☐ At your request
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☐ For your review

☐ For your action
☑ For your files
☐ For your information

☐ Other (specify)

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Dunedin City Council – Civil Defence
Landslide Monitoring 2015
Howard Street

The Howard Street landslip site is located on the south east hillside above Howard and Marion Streets in Macandrew Bay. Additional out-of-sequence monitoring of this site was carried out on 29 September 2015 as per of DCC's request; as a result of the rainfall event in June 2015.

1 Executive Summary

The survey results for the Howard Street landslip site show that there has been no significant movement over the past year.

The re-survey of the site is scheduled for June 2016.

2 General Information

The Howard Street landslip site has been monitored since May 1998. As in previous years RTK GPS was used to measure the positions of the marks. The estimated accuracy of the RTK survey is ±5mm (horizontal) and ±10mm (vertical).

The survey methodology was changed for this survey in 2014 to give us greater accuracy, all marks were observed for at least 30 minutes and was then processed in Trimble Business Centre.
Bench Mark (BM) X75 (AFF3) was fixed horizontally and Iron Rod (IR) II DP 15232 (C2A4 was held for the vertical, a check shot was carried out on Trig I No. 3 (A23K).

The monitoring frequency has historically been annual, but was increased in frequency to quarterly, briefly following the June 2013 movement. It is now surveyed annually again.

3 Extent of Movement

The observed displacements are in the range of 2-26mm for all marks since the previous survey. Most displacement vectors are at or close to the practical limit of accuracy for RTK GPS and our analysis indicates that these are unlikely to represent significant displacement.

Charts 1 and 2 and the deformation plans (attached) show the cumulative horizontal deformation at all marks since they were installed in 1997/98.

For the Howard Street site, movement of between 8-24mm in a north to north-westerly (downhill) direction has been observed at IS's 9 and 8. These marks located in the paddocks above Howard Street have historically been the most active portion of the landslip area. The general trend in this area is a downhill displacement at a rate of 3-4mm per year.

One location at IS54 shows horizontal displacement of 26mm, and vertical displacement of 36mm. However; satellite visibility in this location is not as good as the open paddocks to the east.

4 Rainfall Data

The rainfall event on 3 June 2015 delivered 127mm of rainfall in 24 hours. Subsequently, NIWA reported that Dunedin recorded more than three times the normal rainfall total for June (> 300% of June normal). Around Dunedin and further inland, soil moisture levels were wetter than normal for the time of year.

MWH

5 Conclusion

Despite the high-intensity rainfall event of 3 June 2015, little significant movement has occurred at any of the marks since they were last surveyed (February 2015).

The general trend of <30mm of movement per year in the area above Howard Street continues.

6 Recommendation

A combined resurvey of both sites is scheduled for mid-2016.

The following have been attached for your information:

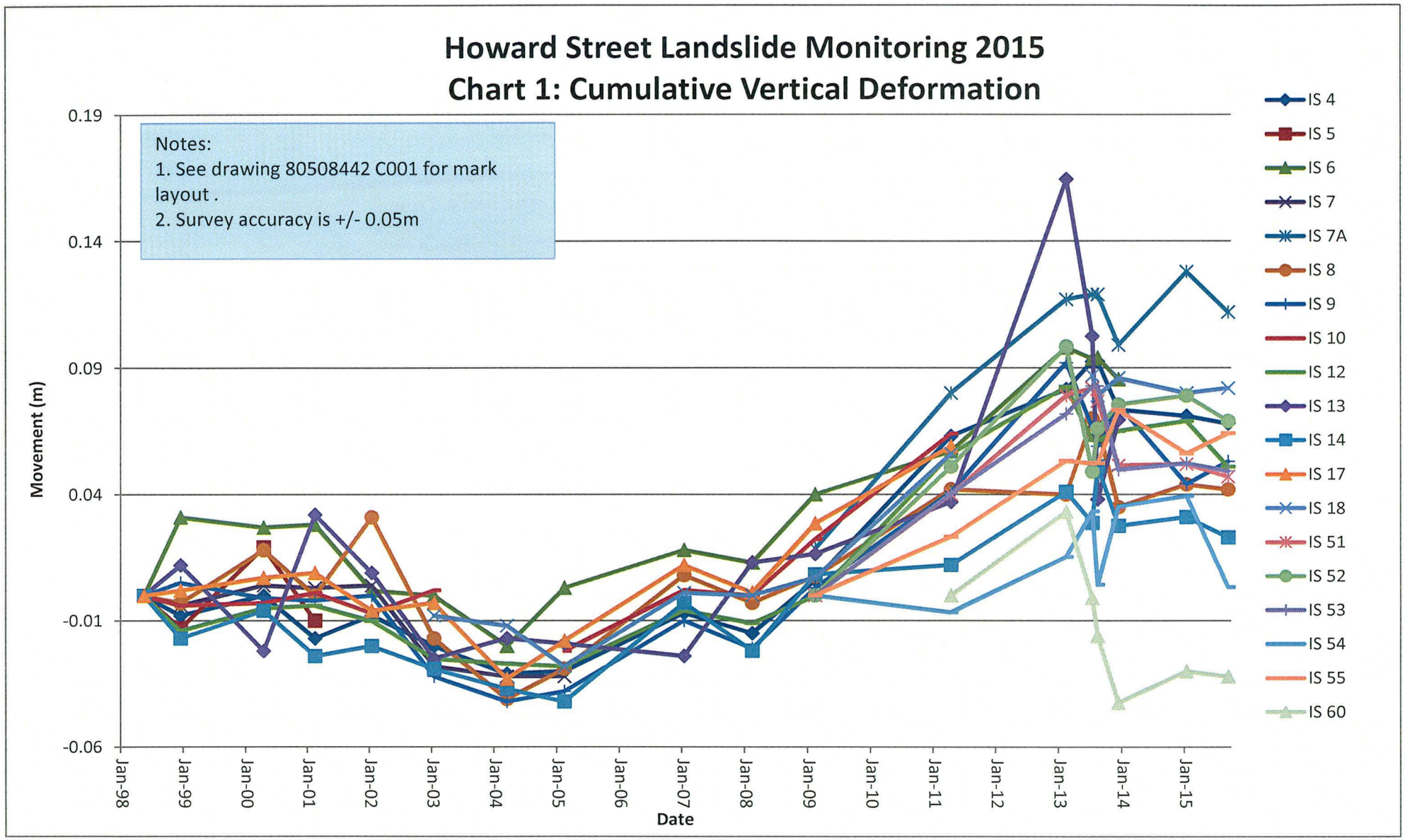
- **Monitoring Report Spreadsheets**: recording the cumulative horizontal deformation at the monitoring marks for both sites.
- **Chart 1 (Howard Street)**: showing cumulative vertical deformation over time.
- **Chart 2 (Howard Street)**: showing cumulative horizontal deformation over time.
- **Deformation Diagrams**: Plans of the landslip sites with vector arrows illustrating cumulative movement from the original surveys to present (February 2015).

Survey Data Dated 29/09/2015

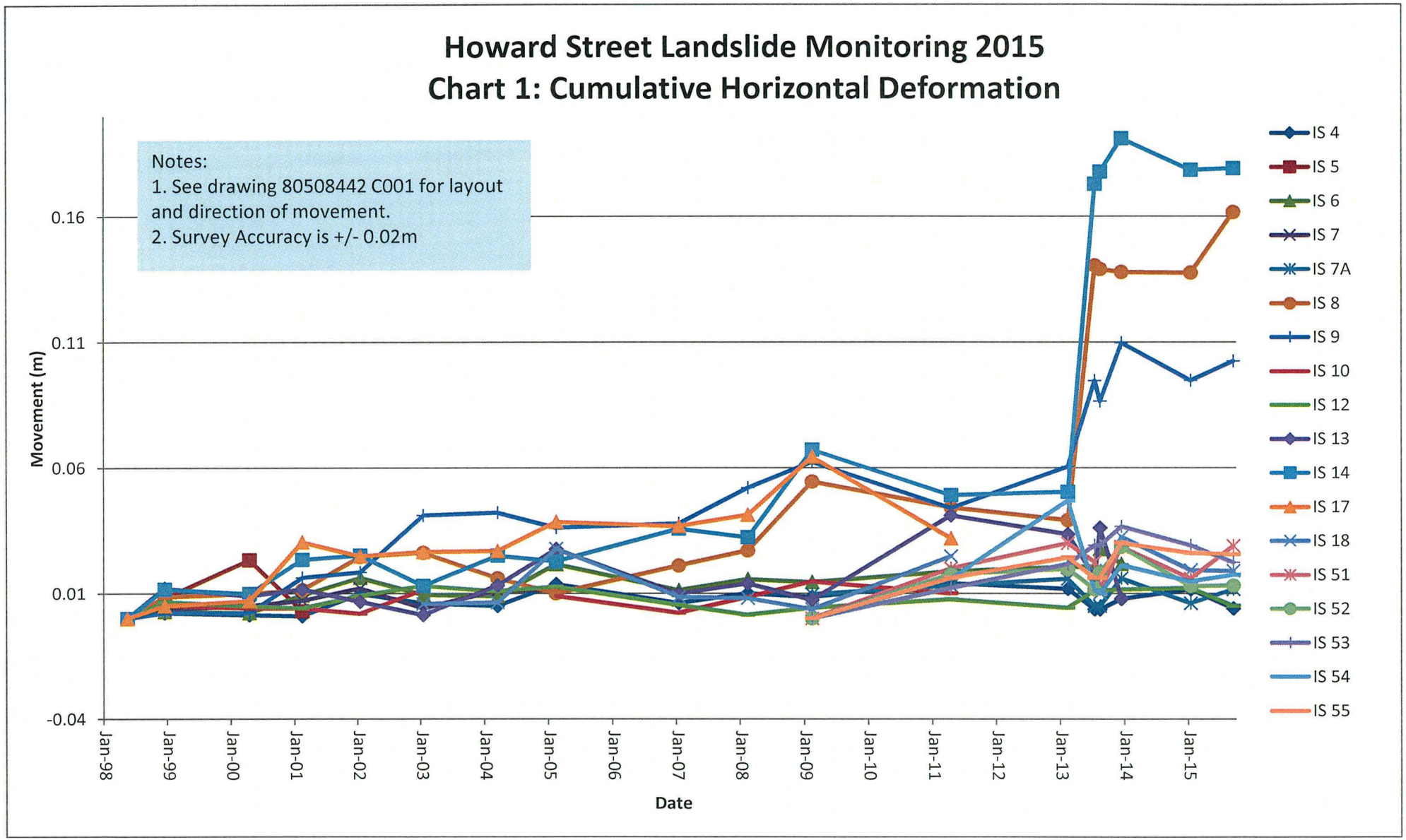
Additional survey

Point Number	Northing NZGD49	Easting NZGD49	Height	Code	Present to previous dN	dE	Azim.	Dist	dRL	Present to original (Data derived from original survey) dN	dE	Azim.	Dist	dRL
AFF3	700335.966	324526.998	6.990	BM X75	0.000	0.000	0.0000	0.000	-0.015					
A23K	698553.386	323584.272	8.402	I NO. 3	0.003	-0.005	300.9638	0.006	0.005					
C2A4	698815.751	324331.851	13.431	IR II	-0.009	-0.004	203.9625	0.010	0.000					
OUSD	698908.141	317721.865	25.900	OUSD	-0.004	0.004	135.0000	0.006	-0.020					
IS4	698161.926	323756.587	88.193	ISIV	-0.006	0.006	135.0000	0.008	-0.003	0.000	-0.004	270.0000	0.004	0.068
IS7A	698021.210	324014.466	168.589	ISVII	0.004	-0.005	308.6598	0.006	-0.016	0.010	-0.006	329.0362	0.012	0.112
IT8B	698363.300	324109.678	97.350	ITVIII	0.003	-0.024	277.1250	0.024	-0.002	0.039	-0.157	283.9503	0.162	0.042
IS9	698265.223	323937.631	87.579	ISIX	0.005	-0.006	309.8056	0.008	0.009	0.073	-0.072	315.3951	0.103	0.053
IS12	698564.103	323849.760	21.241	ISXII	0.007	0.001	8.1301	0.007	-0.018	-0.005	-0.001	191.3099	0.005	0.051
IS14	698385.010	323947.449	60.592	ISXIV	-0.001	-0.004	255.9638	0.004	-0.008	0.164	-0.072	336.2974	0.179	0.023
IS18	698489.744	323898.087	35.439	ISXVIII	0.001	-0.007	278.1301	0.007	0.002	0.019	0.000	0.0000	0.019	0.082
IS 51	698396.332	323856.050	43.553	IS 51	0.005	-0.012	292.6199	0.013	-0.005	0.012	-0.026	294.3625	0.029	0.047
IS 52	698388.193	323779.255	41.061	IS 52	0.004	-0.013	287.1027	0.014	-0.010	0.013	-0.003	344.6499	0.013	0.069
IS 53	698544.433	323694.691	8.713	IS 53	-0.010	-0.003	196.6992	0.010	-0.003	0.016	-0.015	317.2546	0.022	0.049
IS 54	698497.776	323955.609	33.124	IS 54	-0.021	-0.015	215.5377	0.026	-0.036	-0.006	-0.016	248.9625	0.017	0.003
IS 55	698629.993	323833.204	11.471	IS 55	0.002	0.001	26.5651	0.002	0.008	0.006	-0.025	283.4957	0.026	0.064
IS 60	698263.137	324011.808	88.883	IS 60	0.002	-0.005	291.8014	0.005	-0.002	0.081	-0.079	315.7117	0.114	-0.032

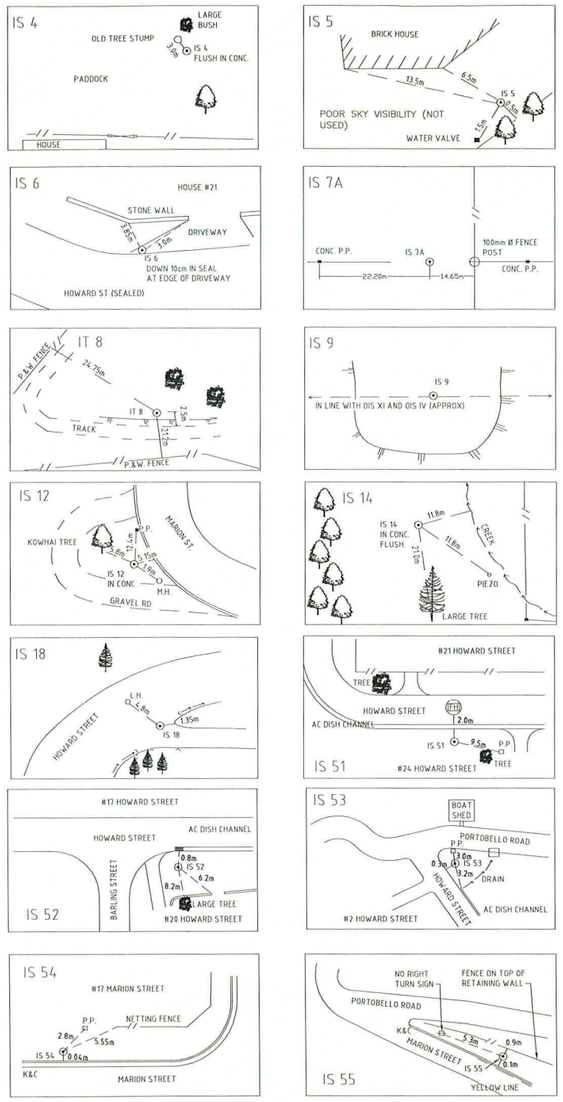
Howard Street Landslide Monitoring 2015
Chart 1: Cumulative Vertical Deformation



Howard Street Landslide Monitoring 2015
Chart 1: Cumulative Horizontal Deformation



DEFORMATION MARK DIAGRAMS



DEFORMATION REPRESENTATION SCALE 2:1

PLAN

SCALE 1 : 2000

SURVEY SCHEDULE

BASELINE SURVEY DATE MAY 1998
SURVEY 1 DECEMBER 1998
SURVEY 2 APRIL 2000
SURVEY 3 FEBUARY 2001
SURVEY 4 FEBUARY 2002
SURVEY 5 JANUARY 2003
SURVEY 6 MARCH 2004
SURVEY 7 FEBUARY 2005
SURVEY 8 JANUARY 2007
SURVEY 9 FEBUARY 2008
SURVEY 10 FEBUARY 2009
SURVEY 11 APRIL 2011
SURVEY 12 FEBRUARY 2013
SURVEY 13 FEBRUARY 2015
SURVEY 14 SEPTEMBER 2015

NOTES:

1. AERIAL PHOTOGRAPHY FLOWN IN 2006/2007
2. MOVEMENT SHOWN IS CUMMULATIVE DEFORMATION ARROWS ARE SHOWN AT 2:1
3. THE SURVEY IS UNDERTAKEN USING RTK GPS. PRIOR TO 2010 STATIC GPS WAS USED.
4. HORIZONTAL ACCURACY IS +/- 20mm
5. VERTICAL ACCURACY IS +/- 50mm

DATUMS

1. LEVELS ARE IN TERMS OF WORLD GEODETIC SYSTEM 1984 ORIGIN OF LEVELS IS OTAGO UNIVERSITY SURVEYING DEPT. OS/2
2. COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949 - A NORTH TAIERI CIRCUIT. ORIGIN OF COORDINATES IS OTAGO UNIVERSITY SURVEYING DEPT. OS/2

50 0 50 100m
SCALE 1:2000

NOT FOR CONSTRUCTION

REV	REVISIONS	DRAWN	CHECKED	APPROVED	DATE

	Name	Date
SURVEYED	JA HAWKER	09/15
DESIGNED	N/A	
DESIGN CHECK	AD ISSACS	10/15
DRAWN	JA HAWKER	10/15
DRAWING CHECK	AD ISSCAS	10/15
APPROVED	AJ QUIGLEY	10/15

MWH

DUNEDIN CITY COUNCIL
Kaunihera-a-rohe o Otepoti

DUNEDIN CITY COUNCIL - CIVIL DEFENCE
LANDSLIDE MONITORING

HOWARD STREET LANDSLIP
DEFORMATION PLAN 2015

Status Stamp: **FOR INFORMATION**
Date Stamp: **5/10/2015**
SCALES **(A1)** 1:2000

Drawing No.	Sheet No.	Rev.
80508442	C001	A

XREFS :

P:_2012 Onwards\Dunedin City Council\80000575 DCC Continuing Advice\80507670 DCC CD Landslip Monitoring 14_15\1505 Howard St\CAD

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ORIGINAL SIZE A1