Median water table elevation in Christchurch and surrounding area after the 4 September 2010 Darfield Earthquake Version 2

S. van Ballegooy, S. C. Cox, C. Thurlow,
H. K. Rutter, T. Reynolds, G. Harrington,
J. Fraser, T. Smith

GNS Science Report 2014/18 **May 2014**

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Median water table elevation in Christchurch and surrounding area after the 4 September 2010 Darfield Earthquake

Version 2

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GNS Science Report 2014/18 May 2014

The following report is an update of the median water table elevation report for Christchurch and surrounding areas released in March 2013 (GNS Report 2013/01). The revision encompasses an extension of the period of groundwater monitoring (4 September 2010 to 30 November 2013) and new surfaces for improved definition of water table fluctuation.

BIBLIOGRAPHIC REFERENCE

S. van Ballegooy, S. C. Cox, C. Thurlow, H. K. Rutter, T. Reynolds, G. Harrington, J. Fraser, T. Smith, 2014. Median water table elevation in Christchurch and surrounding area after the 4 September 2010 Darfield Earthquake: Version 2. GNS Science Report 2014/18, 79 pages plus 8 appendices.

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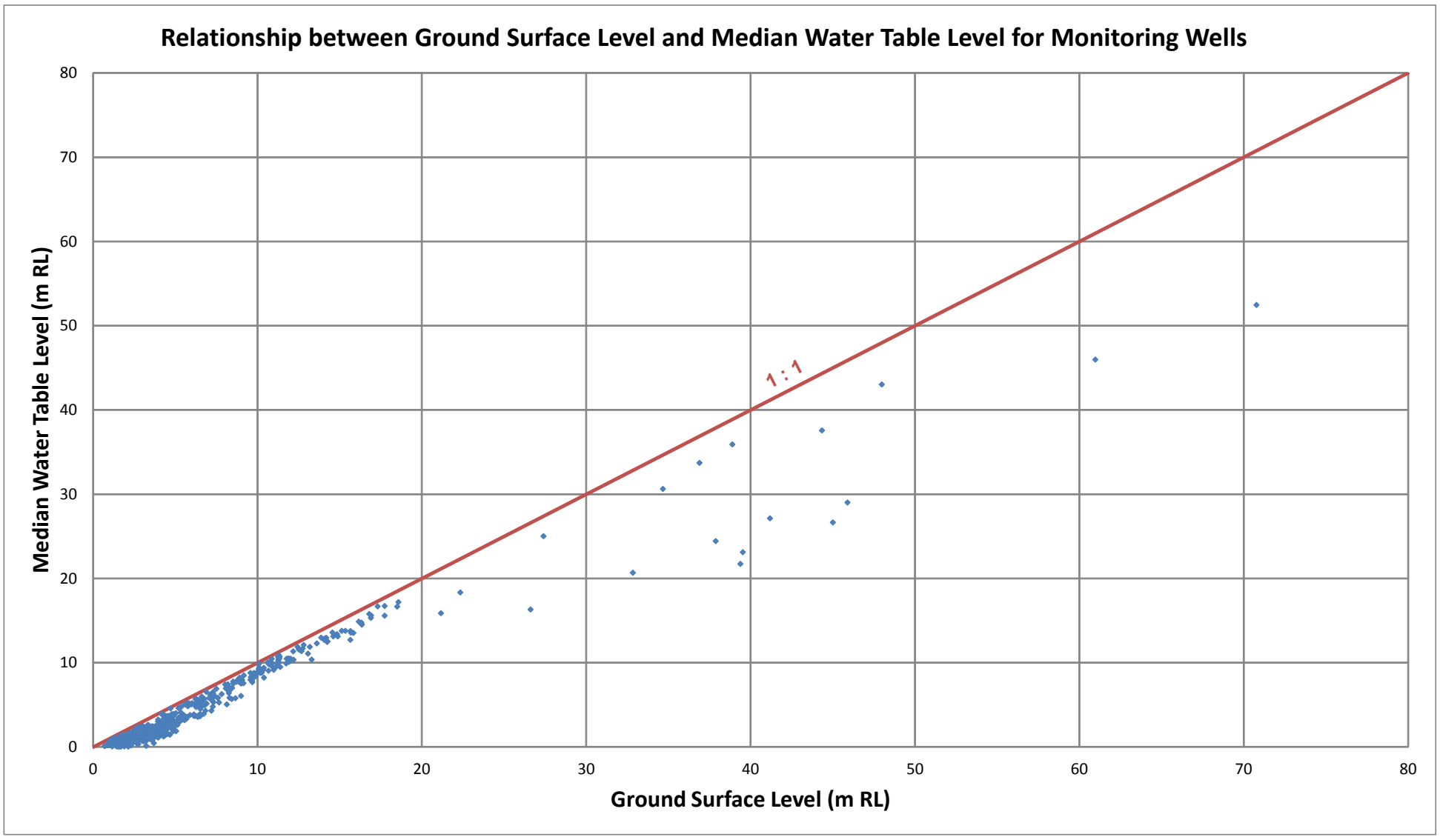
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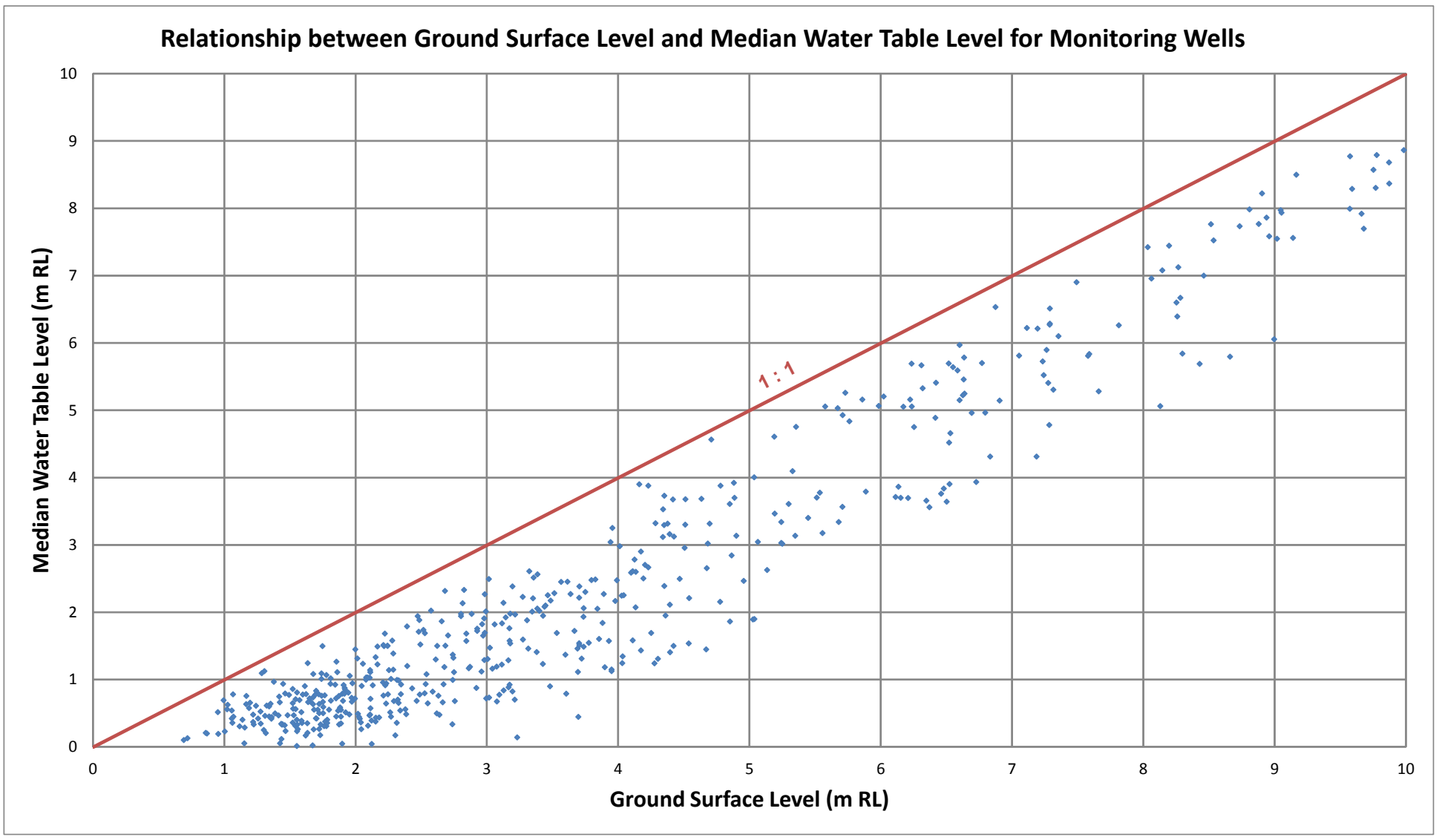
ISSN 1177-2425
ISBN 978-1-927278-41-3

APPENDIX F: POST-DARFIELD EARTHQUAKE WATER TABLE SURFACES

Figure F.1	**Relationship between ground surface level and median water table elevation**
Figure F.2	**Median water table elevation (reduced level), using longer-term data, including river strings but excluding drawdown points, 2010-2013**
Figure F.3	**Median water table elevation (reduced level), using longer term data (2010-2013), including river strings and drawdown points (Preferred)**
Figure F.4	**Depth to median water table, 2010-2013 (Preferred)**
Figure F.5	**Difference between median and 15th percentile groundwater elevations**
Figure F.6	**15th percentile water table elevation (reduced level), including river strings and drawdown points**
Figure F.7	**Depth to 15th percentile water table**
Figure F.8	**Difference between 85th percentile and median groundwater elevations**
Figure F.9	**85th percentile water table elevation (reduced level), including river strings and drawdown points**
Figure F.10	**Depth to 85th percentile water table**
Figure F.11	**Difference of median water table surfaces: Version 2 (2014) minus Version1 (2013)**

Date: 9/02/2014 Time: 4:13:29 p.m.





Notes:

DRAWN	JEL	Feb.14
CHECKED		
APPROVED		

ARCFILE 52020-0200-GWM56

SCALE (AT A3 SIZE)

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CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT

Relationship between ground surface level and median water table level

FIGURE No. Figure F.1

Rev. 0

Kaiapoi & Northern Suburbs

LEGEND

Monitoring Wells

- EQC Monitoring Well ≥ 12 Data Readings
- CCC Monitoring Well
- ECan Monitoring Well

Other Analyses Data

- Coast
- Tidal
- Transitional
- Non Tidal

Level (m RL)

- < 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- > 10
- No Data
- Level Contour

Notes: Aerial Imagery supplied by New Zealand Aerial Mapping ltd (2012/02/24).
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A3 SCALE 1:60,000

0 1 2 3 4 (km)

Location Plan: Inset Map

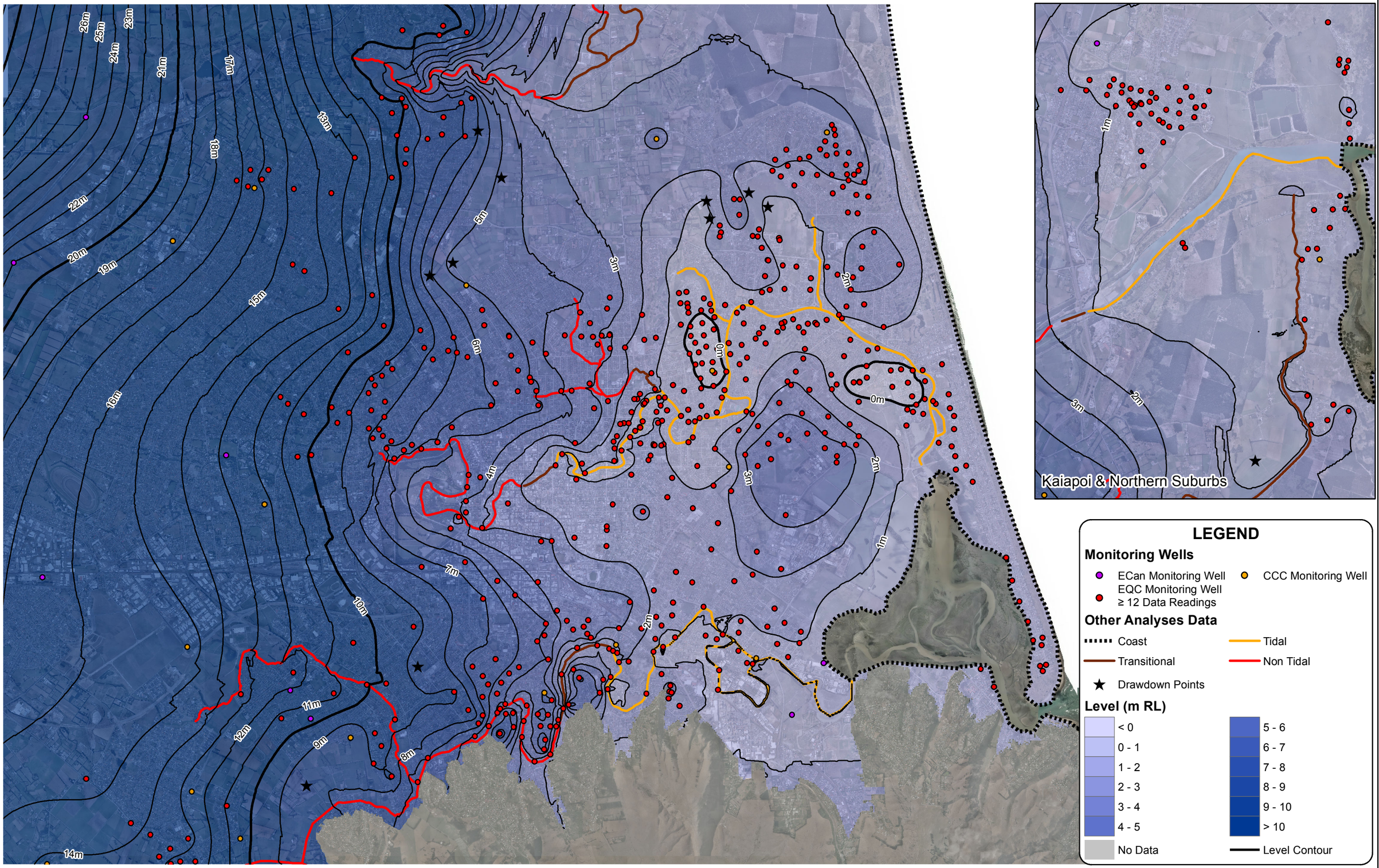
Tonkin & Taylor

DRAWN	JEL	Apr.14
CHECKED		
APPROVED		
ARCFILE	52020-0200-GWM59	
SCALE (AT A3 SIZE)	1:60,000	
Prepared by Tonkin & Taylor Ltd Ref:	52020-0200	

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
Median Water Table Reduced Level (Excluding Drawdown Points)

FIGURE No. Figure F.2 | Rev.

Date: 22/04/2014 Time: 1:23:22 p.m.



LEGEND

Monitoring Wells

- ECan Monitoring Well
- CCC Monitoring Well
- EQC Monitoring Well ≥ 12 Data Readings

Other Analyses Data

- Coast
- Tidal
- Transitional
- Non Tidal
- Drawdown Points

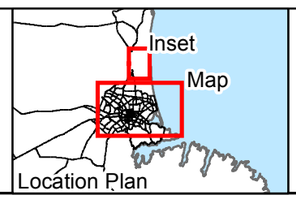
Level (m RL)

- < 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- > 10
- No Data
- Level Contour

Notes: Aerial Imagery supplied by New Zealand Aerial Mapping ltd (2012/02/24).
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A3 SCALE 1:60,000

0 1 2 3 4 (km)



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DRAWN	CXP	Apr.14
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APPROVED		

ARCFILE 52020-0200-GWM70

SCALE (AT A3 SIZE) 1:60,000

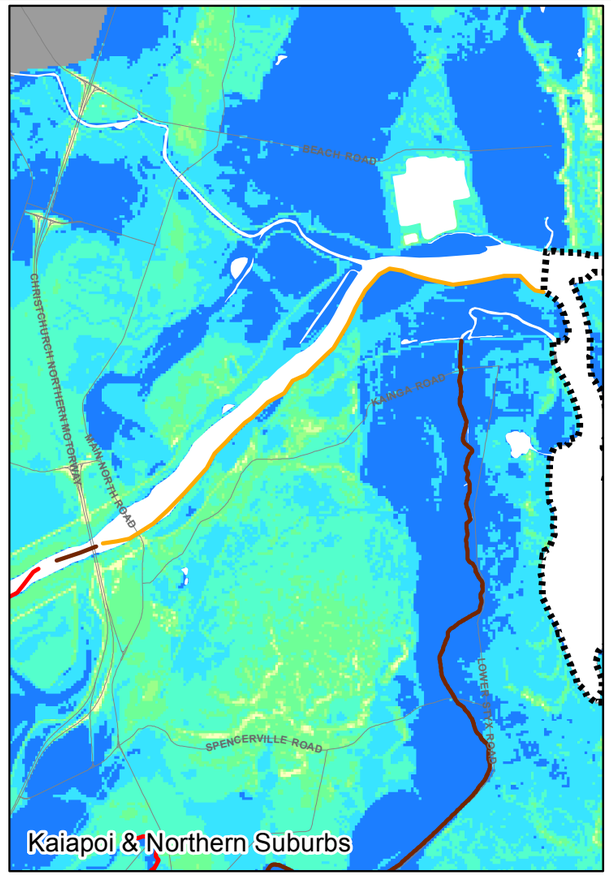
Prepared by Tonkin & Taylor Ltd
Ref: 52020-0200

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
Median Water Table Reduced Level

FIGURE No. Figure F.3

Rev.

Date: 22/04/2014 Time: 1:23:49 p.m.



LEGEND

Monitoring Wells

- EQC Monitoring Well ≥ 12 Data Readings
- CCC Monitoring Well
- ECan Monitoring Well

Other Analyses Data

- Coast
- Tidal
- Transitional
- Non Tidal
- Drawdown

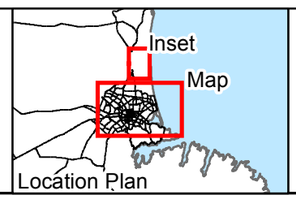
Depth (m BGL)

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- No Data

Notes: Road Database supplied by Terralink International Ltd.
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A3 SCALE 1:60,000

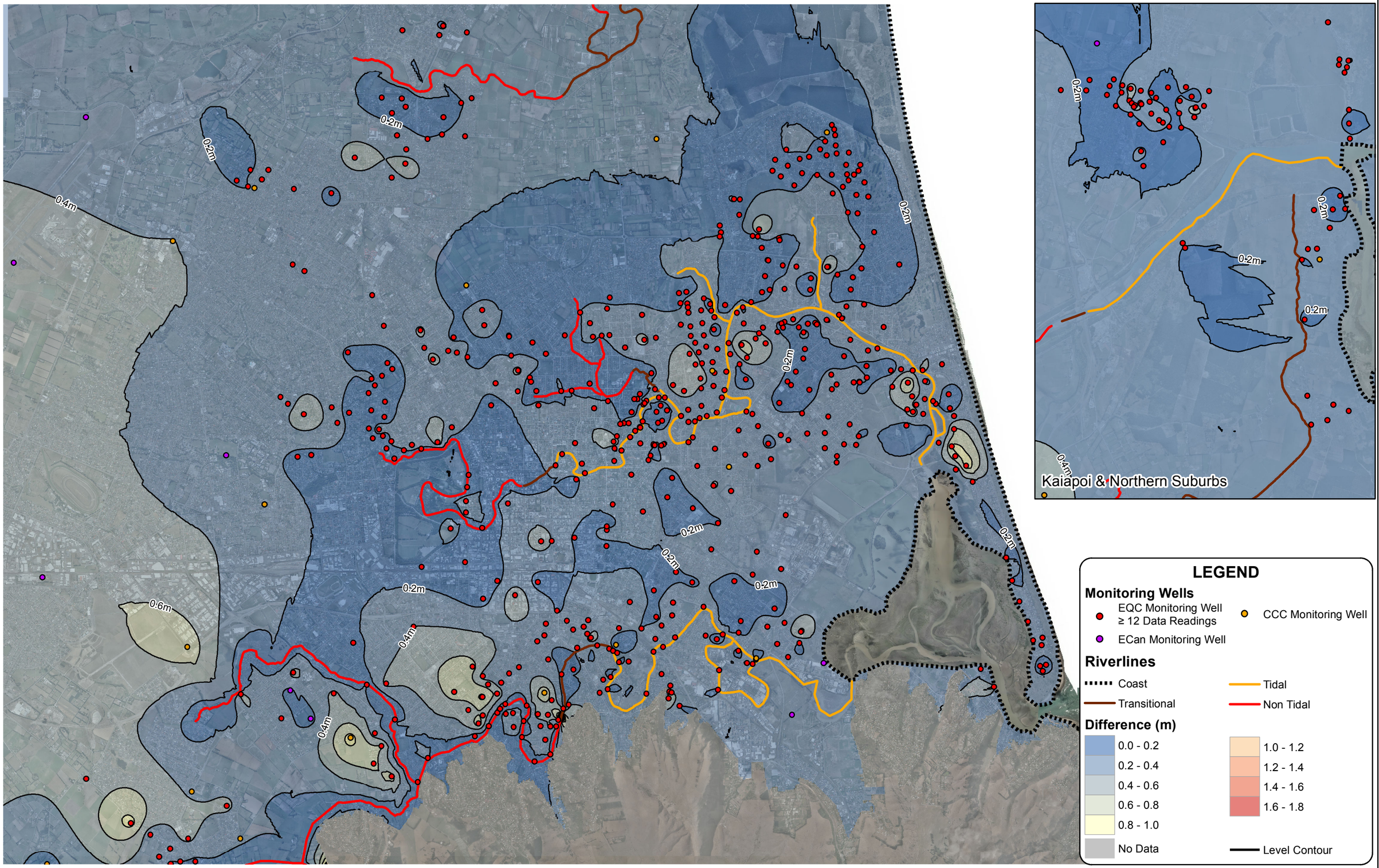
0 1 2 3 4 (km)



DRAWN	JEL	Apr.14
CHECKED		
APPROVED		
ARCFILE	52020-0200-GWM71	
SCALE (AT A3 SIZE)	1:60,000	
PROJECT No.	52020-0200	
FIGURE No.	Figure F.4	Rev.

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
Depth to Median Water Table

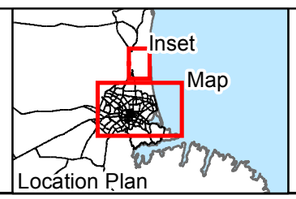
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A3 SCALE 1:60,000

0 1 2 3 4 (km)



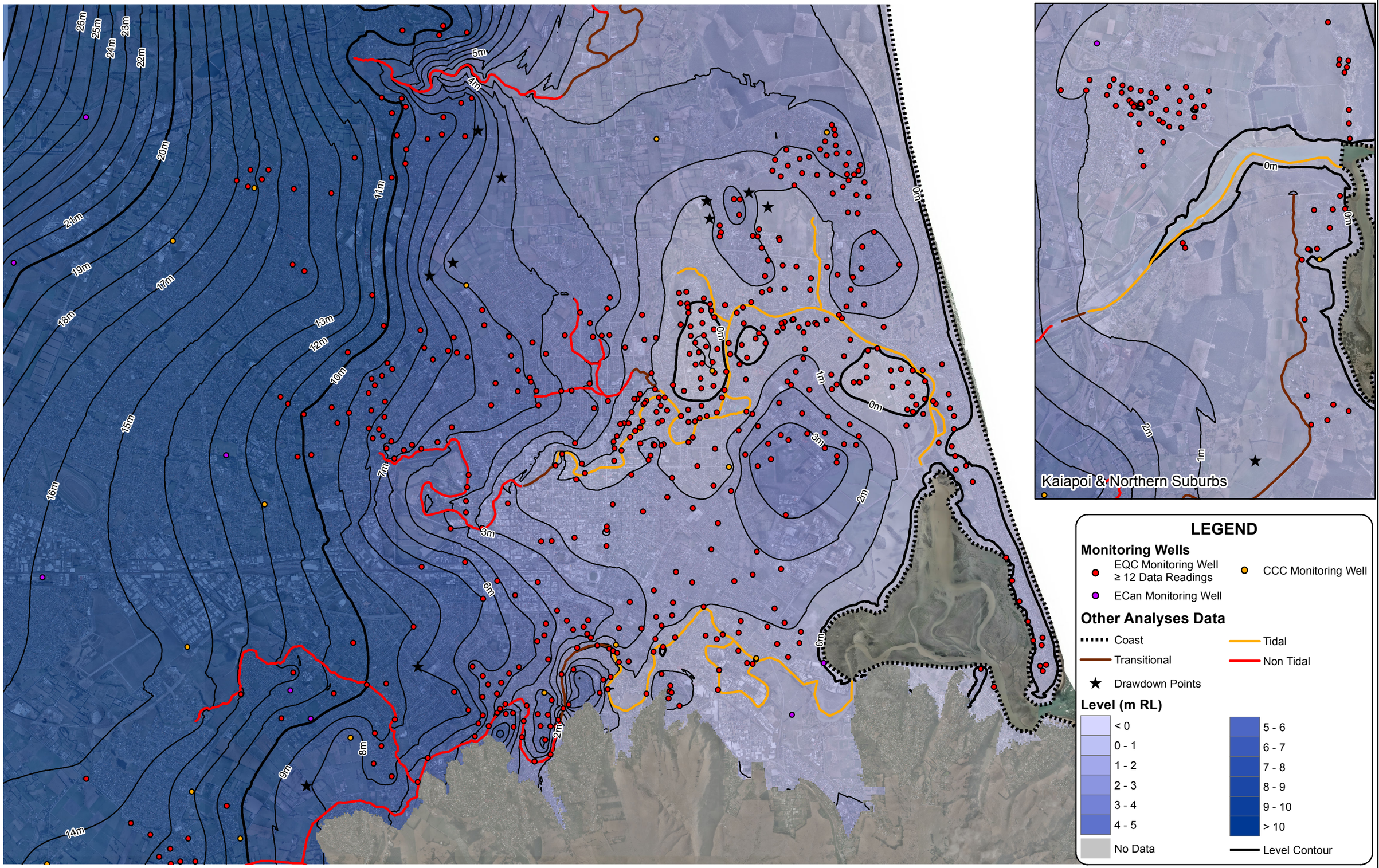
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DRAWN	JEL	Apr.14
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APPROVED		
ARCFILE	52020-0200-GWM86	
SCALE (AT A3 SIZE)	1:60,000	
Prepared by Tonkin & Taylor Ltd Ref:	52020-0200	

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
Difference Between Median and the 15th Percentile Groundwater Elevation

FIGURE No. Figure F.5

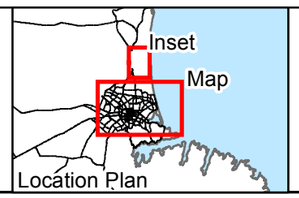
Rev.



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A3 SCALE 1:60,000

0 1 2 3 4 (km)



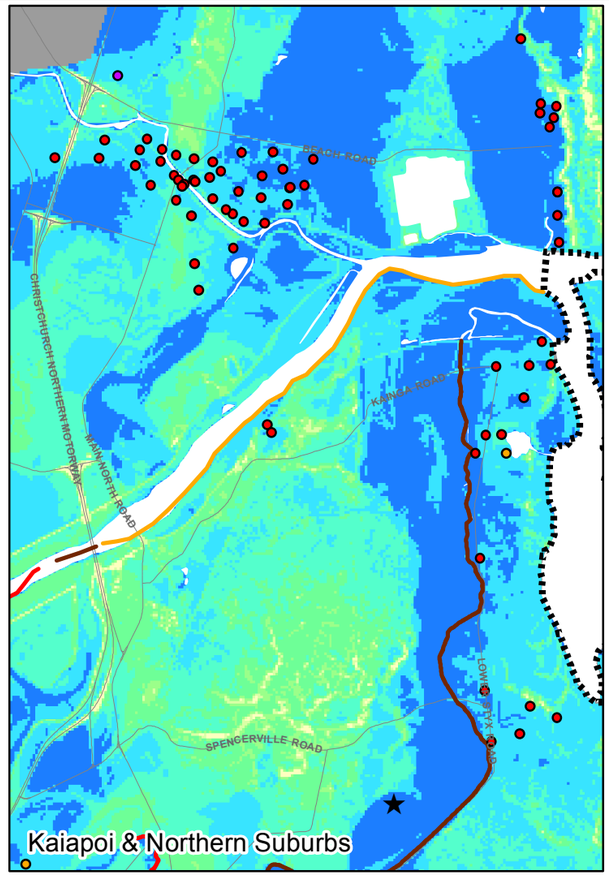
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CHECKED		
APPROVED		
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SCALE (AT A3 SIZE)	1:60,000	
Prepared by Tonkin & Taylor Ltd Ref:	52020-0200	

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT 15th Percentile Reduced Level

FIGURE No. Figure F.6

Rev.

Date: 22/04/2014 Time: 1:38:05 p.m.



LEGEND

Monitoring Wells

- EQC Monitoring Well ≥ 12 Data Readings
- CCC Monitoring Well
- ECan Monitoring Well

Other Analyses Data

- Coast
- Tidal
- Transitional
- Non Tidal
- Drawdown Points

Depth (m BGL)

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- No Data

Notes: Road Database supplied by Terralink International Ltd.
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A3 SCALE 1:60,000

0 1 2 3 4 (km)

Inset Map

Location Plan

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DRAWN	JEL	Apr.14
CHECKED		
APPROVED		

ARCFILE 52020-0200-GWM90

SCALE (AT A3 SIZE) 1:60,000

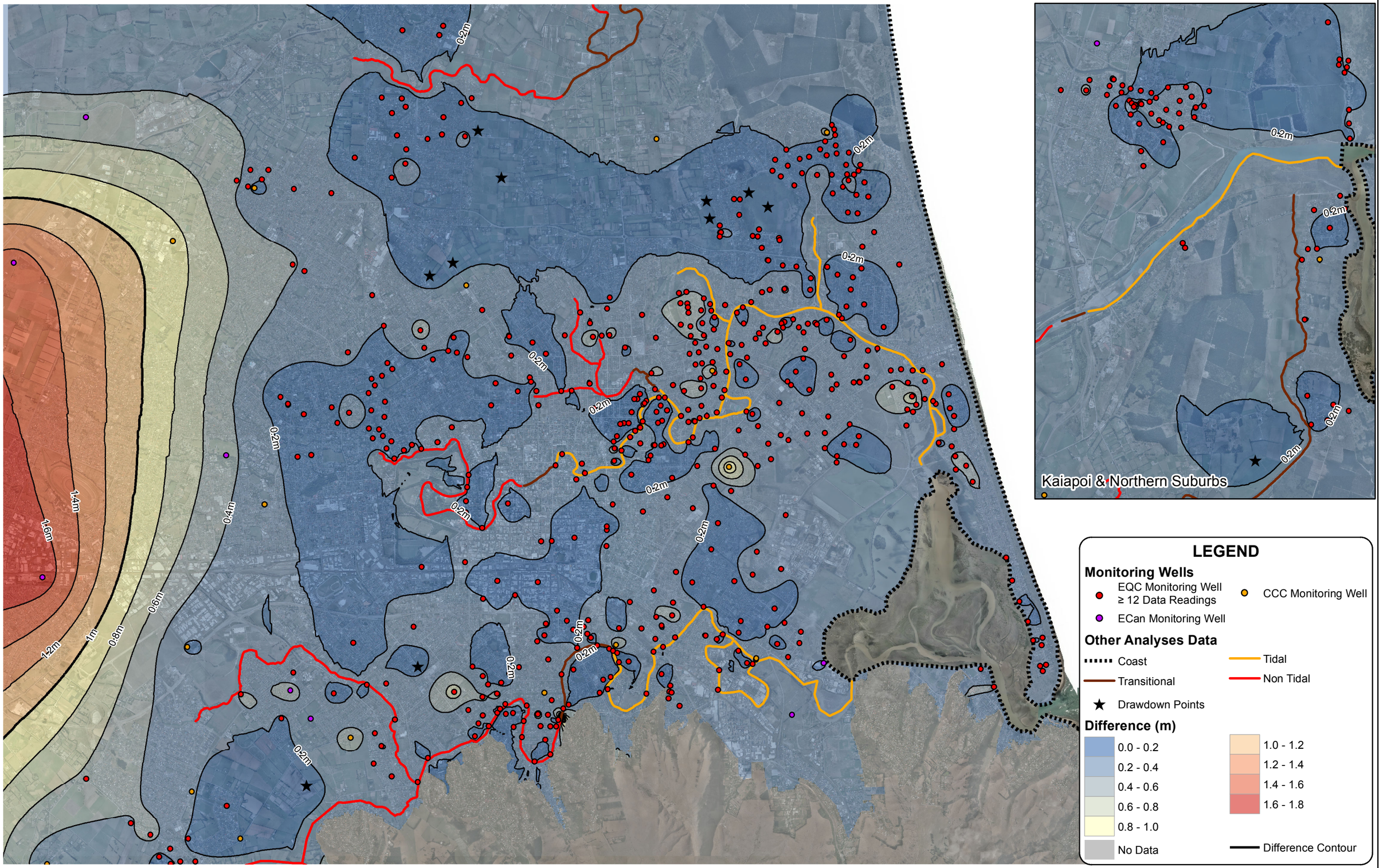
PROJECT No. 52020-0200

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
Depth to 15th Percentile Water Table

FIGURE No. Figure F.7

Rev.

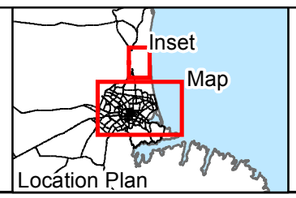
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A3 SCALE 1:60,000

0 1 2 3 4 (km)



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DRAWN	JEL	Apr.14
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APPROVED		
ARCFILE	52020-0200-GWM88	
SCALE (AT A3 SIZE)	1:60,000	
Prepared by Tonkin & Taylor Ltd Ref:	52020-0200	

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
Difference Between Median and the 85th Percentile Groundwater Elevation

FIGURE No. Figure F.8

Rev.

Date: 22/04/2014 Time: 1:40:43 p.m.

Kaiapoi & Northern Suburbs

LEGEND

Monitoring Wells

- EQC Monitoring Well ≥ 12 Data Readings
- CCC Monitoring Well
- ECan Monitoring Well

Other Analyses Data

- Coast
- Transitional
- Tidal
- Non Tidal
- Drawdown Points

Level (m RL)

- < 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- > 10
- No Data
- Level Contour

Notes: Aerial Imagery supplied by New Zealand Aerial Mapping ltd (2012/02/24).
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A3 SCALE 1:60,000

0 1 2 3 4 (km)

Inset Map

Location Plan

DRAWN	JEL	Apr.14
CHECKED		
APPROVED		

ARCFILE 52020-0200-GWM89

SCALE (AT A3 SIZE) 1:60,000

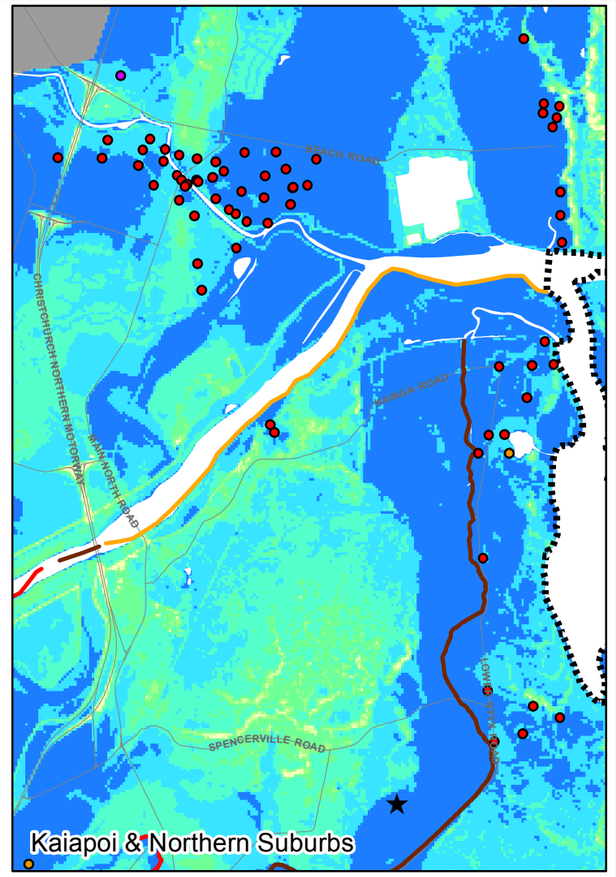
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Ref: 52020-0200

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
85th Percentile Reduced Level

FIGURE No. Figure F.9

Rev.

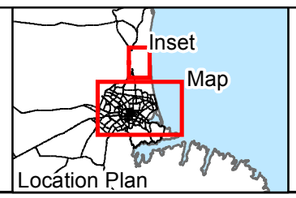
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A3 SCALE 1:60,000

0 1 2 3 4 (km)



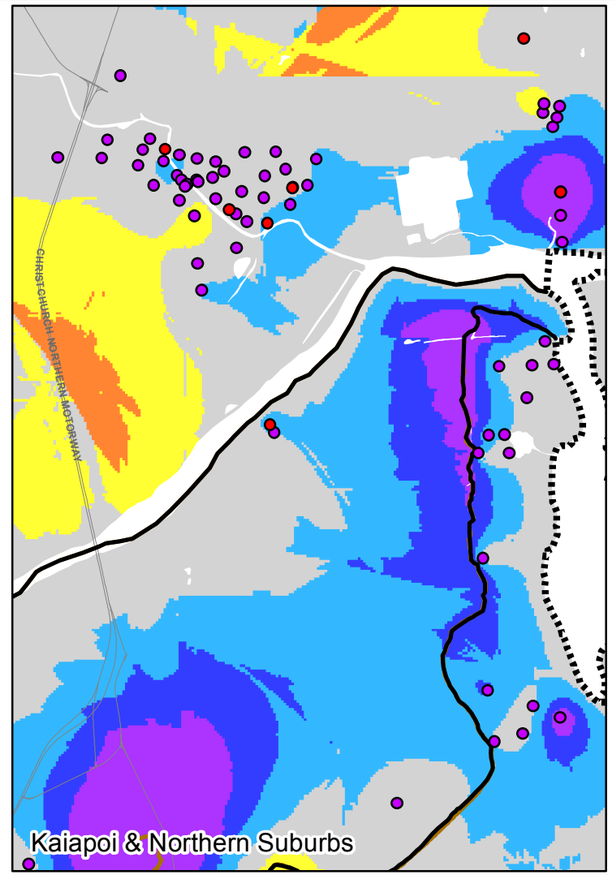
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DRAWN	JEL	Apr.14
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APPROVED		
ARCFILE	52020-0200-GWM91	
SCALE (AT A3 SIZE)	1:60,000	
PROJECT No.	52020-0200	

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT
Depth to 85th Percentile Water Table

FIGURE No. Figure F.10

Rev.



LEGEND

Monitoring Wells

- In V1 and V2
- In V1 only
- In V2 Only

Other Analyses Data

- Coast
- V1 River
- Drawdown Points
- V2 River Extensions

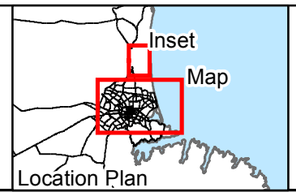
Change in Level (m)

Median (12+) V2 Higher	Median (12+) V2 Lower
> 0.5	0.1 - 0.3
0.5 - 0.3	0.3 - 0.5
0.3 - 0.1	> 0.5
Difference < 0.1m	No Data

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A3 SCALE 1:60,000

0 1 2 3 4 (km)



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DRAWN	JEL	May.14
CHECKED		
APPROVED		
ARCFILE	52020-0200-GWM100	
SCALE (AT A3 SIZE)	1:60,000	
PROJECT No.	52020-0200	

CHRISTCHURCH MEDIAN WATER TABLE ELEVATION REPORT

Difference between Median (12+) Version 2 (April 2014) and Median (9+) Version 1 (March 2013)

FIGURE No. Figure F.11

Rev.

Date: 16/05/2014 Time: 3:03:48 p.m.



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