BEFORE THE HEARINGS PANEL
FOR PROPOSED PRIVATE PLAN CHANGE 31 TO THE WAIMAKARIRI DISTRICT PLAN

UNDER the Resource Management Act 1991 (RMA)

AND

IN THE MATTER of an Application by Rolleston Industrial Developments Limited for a private plan change to the Waimakariri District Plan pursuant to Part 2 of the Schedule 1 of the Resource Management Act 1991

STATEMENT OF EVIDENCE OF BEN WILKINS ON BEHALF OF THE CANTERBURY REGIONAL COUNCIL

21 JULY 2023

Canterbury Regional Council's Solicitor
PO Box 4341 CHRISTCHURCH 8140
DX WX11179
Tel +64 3 379 7622
Fax +64 379 2467

Solicitor: I F Edwards
(imogen.edwards@wynnwilliams.co.nz)

WYNN WILLIAMS

SUMMARY STATEMENT

1 My evidence describes the groundwater levels at the Plan Change 31 (**PC31**) area and the potential issues this could create for stormwater management. I also review the groundwater levels that the applicant has presented and the proposed stormwater design.

2 Groundwater levels are close to the surface across the PC31 area. The Canterbury Regional Council (**CRC**) monitors groundwater levels monthly at CRC monitoring well M35/0596, located within the boundaries of the PC31 area. The highest recorded groundwater level at this well is 0.12 metres below ground level, which was measured in March 2023. Two springs and a groundwater seep are also recorded within the PC31 area, further supporting the conclusion that groundwater levels are close to the surface.

3 The PC31 area is within the Eyre groundwater allocation zone, which is over allocated. It is my understanding that the stormwater designs do not currently have a pathway for obtaining resource consent if they intercept groundwater.

4 I consider that it is uncertain whether the proposed stormwater design will be able to gain consent because of the risk that groundwater will be intercepted.

5 The high groundwater levels constrain the designs of stormwater infrastructure and may result in reduced treatment capacity.

INTRODUCTION

6 My full name is Benjamin Smith Wilkins.

7 I am a Groundwater Scientist and have worked at Canterbury Regional Council (**CRC**) since January 2020.

8 I hold a Bachelor of Science in Geology from the University of Canterbury and a Master of Science in Geography (Distinction) from the University of Otago. I have over three years of experience working in the groundwater field.

9 My relevant experience includes investigating, monitoring and reporting on the quantity and quality of groundwater in Canterbury. I also provide groundwater related advice to the CRC consents team to assist with processing resource consents for a range of activities such as stormwater, aquifer tests, dewatering, stream depletion and wastewater discharges.

10 Whilst I acknowledge that this is not an Environment Court hearing, I confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving any oral evidence during this hearing. Except where I state that I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

11 Although I am employed by the CRC, I am conscious that in giving evidence in an expert capacity, my overriding duty is to the Hearing Panel.

SCOPE OF EVIDENCE

12 I have prepared this evidence on behalf of the CRC.

13 My evidence describes the groundwater conditions across the PC31 area. Specifically, my evidence addresses:

a. CRC's groundwater monitoring programme, with specific reference to the monitoring of groundwater levels across the PC31 area;

b. The depth to groundwater (i.e., the groundwater levels) across the PC31 area;

c. The Applicant's assessment of groundwater levels across the PC31 area; and

d. Potential issues related to stormwater management in relation to high groundwater levels.

14 In preparing my evidence I have reviewed the following documents:

a. PC31 – Application for Private Plan Change - Rolleston Industrial Developments Limited (the **Applicant**) dated June 2022;

b. PC31 – Appendix A – Assessment of Potential Loss of Productive Land;

c. PC31 – Appendix B – Geotechnical Assessment;

d. PC31 – Appendix D – Ecology Assessment;

e. PC31 – Appendix G – Infrastructure Assessment Parts 1 to 4;

f. The submission from CRC (#507);

g. Section 42A Report, including:

i. Appendix 2 - Table of Submissions;

ii. Appendix 6 – Three Waters Servicing Evidence of Mr Colin Roxburgh;

h. The Statement of Evidence of Mr Eoghan O'Neill dated 6 July 2023;

i. The Statement of Evidence of Mr Victor Mkurutsi Mthamo dated 6 July 2023;

j. The Statement of Evidence of Mr Chris Thompson dated 6 July 2023;

k. The Statement of Evidence of Carl Cedric Steffens dated 7 July 2023;

l. The Statement of Evidence of Mr Mark Taylor dated 7 July 2023 all on behalf of the Applicant; and

m. The Statement of Evidence by Dr Burrell on behalf of the Canterbury Regional Council regarding freshwater ecology dated 13 July 2023.

GROUNDWATER CONDITIONS

15 There are a number of waterbodies, including Ōhoka Stream, and naturally occurring springs in the PC31 area (being the land at 511, 531, 535 and 547 Mill Road and 290 and 344 Bradleys Road) (**Attachment 1**). I note that Dr Burrell has described the historic and current waterbodies within the PC31 area at paragraphs [19]-[20] of his evidence. I agree with that description and note that the PC31 area is a discharge zone for groundwater.

16 The discharge of groundwater provides flows to these waterbodies, through springs and seeps or through groundwater connection to streams. The springs and seep at the PC31 area are likely to occur because the groundwater is discharging to the land surface through preferential pathways. A groundwater connection to surface water bodies generally occurs when groundwater levels are higher than the elevation of the streambed.

17 The increase in flows and consistent base flows from groundwater results in ecological benefits for these surface water habitats.[1]

18 Groundwater also creates wetland habitats where springs and seeps occur in the PC31 area as described in Dr Burrell's evidence.[2]

19 The PC31 area is located within the Eyre Groundwater Allocation Zone, as defined in the Canterbury Land and Water Regional Plan.

20 The interpretation and assessment of groundwater levels across the PC31 area informs multiple technical assessments and design responses prepared by the Applicant. For the reasons addressed below, I do not consider that the Applicant has accurately and consistently assessed the groundwater levels across the PC31 area.

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1 The Statement of Evidence by Dr Burrell on behalf of the Canterbury Regional Council regarding freshwater ecology dated 13 July 2023, paragraph 30, page 8.

2 The Statement of Evidence by Dr Burrell on behalf of the Canterbury Regional Council regarding freshwater ecology dated 13 July 2023, paragraph 18, page 4.

Groundwater level monitoring

21 Groundwater levels are monitored monthly in the PC31 area (**Attachment 2**) by the CRC at well M35/0596.

22 M35/0596 is 2.90 metres deep. The water level at this well has been measured since 1977 (however, it was not measured between 1987 and 1998) and it is currently still part of the CRC's groundwater level monitoring network. There are 415 water level measurements recorded at this well, over a period of 34 years.

23 A key detail of this well is that it has a standup of 0.5 metres above ground level (**Attachment 3**). The well standup is an extension of the well above ground level. It prevents surface water from flowing into the well.

24 The water level is measured from the top of the standup. Therefore, the 0.5 metre standup height of the well above ground level must be subtracted to determine the highest water level in relation to the ground level (**Attachment 3**).

Assessment of groundwater levels

25 In my opinion, groundwater levels are often close to the surface across the PC31 area.

26 The highest groundwater level at M35/0596 is 0.12 metres below ground level (m bgl), recorded this year in March 2023 (**Attachment 4**).

27 The groundwater level in M35/0596 has been less than 0.5 m bgl in 23 months over the last 10 years (**Attachment 5**). The data provides a reliable indication that groundwater levels are close to the surface in the PC31 area.

28 Two springs and a groundwater seep have also been identified in the PC31 area, which also indicates that groundwater is close to the surface.

29 For comparison, I have reviewed recorded groundwater levels for nearby wells that have long records of groundwater level monitoring (**Attachment 2**). These support my interpretation that groundwater levels at the PC31 area are near the surface:

a. Well M35/0314, which is one kilometre northeast of the PC31 area has 133 water level measurements (from 1974 to 1987) and has a highest water level of 0.15 m bgl (recorded in June 1980).

b. Well M35/0351, which is 1.5 kilometres northwest of the PC31 area, has 23 water level measurements (from 1977 to 2011). The highest water level at this well is 0.26 m bgl (recorded in September 1978).

c. Well M35/0350, which is 1.5 kilometres west of the PC31 area, has 17 water level measurements (from 1977 to 1986). The highest water level is 0.04 m bgl (recorded in 1978).

d. Well M35/0601, which is 1.5 kilometres east of the PC31 area has 443 water level measurements (from 1973 to 2023). The highest water level is 0.19 m above ground level (recorded in August 2012).

30 In summary, recorded groundwater levels in the Canterbury Region Council monitoring well in the PC31 area (M35/0596), springs and seep indicate that groundwater levels are close to the surface. Additionally, the wells surrounding the PC31 area also provide strong evidence that this is an area with near surface groundwater levels.

APPLICANT'S EVIDENCE – GROUNDWATER LEVELS

31 I do not consider that the Applicant has accurately and consistently assessed the groundwater levels across the PC31 area, in large part due to the fact that the Applicant does not appear to have subtracted the standup of well M35/0596 from the groundwater level readings and has used a short time period to characterise groundwater levels at the PC31 area, which does not capture the variability of the area. Additionally, the most recent highest water level has not been reported. The reasons for my opinion and conclusions are explained further in the following paragraphs.

Assessment as to Loss of Productive Land – Mr Mthamo's evidence

32 In Appendix A – Assessment of Potential Loss of Productive Land[3] the standup of the well above ground level has not been subtracted and therefore a deeper highest groundwater level of 0.645 m bgl at M35/0596 is reported. This incorrect level is also referred to in the Statement of Evidence of Victor Mkurutsi Mthamo dated 6 July 2023.[4]

33 The implications of a higher groundwater level for this assessment are significant as it relates to the assessments of drainage, nutrient and contaminant losses, soil vulnerability as well as groundwater and surface water interactions.

Geotechnical Assessment – Mr Thompson's evidence

34 Appendix B – Geotechnical Assessment[5] provides information from the geotechnical investigation at the proposed PC31 area, which was carried out in 2021.

35 It involved drilling a number of test pits across the site and investigating groundwater levels at bore BH01, which was drilled in 2011 to assess the suitability of the area for a Vodafone tower.

36 Groundwater was measured between 0.9 and 1.5 m bgl in May 2021 in the test pits.[6] There are no details provided on how many times the bore was measured. I note that groundwater levels were low in 2021 compared to groundwater levels in the last 10 years at M35/0596 (**Attachment 5**).

37 I consider that the presented groundwater levels in the test pits and BH01 are not a reliable characterisation of the PC31 area as they were measured over a short period of time (one month) and are unlikely to have recorded the highest groundwater level that is likely to have occurred at the PC31 area.

38 The geotechnical assessment states that the groundwater level measurements are representative of the general area.[7] I do not agree

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3 Section 2.4. Groundwater Water, page 2.

4 Paragraph 30, 30.1 and 30.2, page 8.

5 Section 4, Page 2.

6 Section 6.2, Page 3.

7 Section 6.2, page 3.

that the groundwater levels in the test pits and BH01 are representative of the groundwater levels in the area. My evidence above (paragraphs 26 and 29) suggests groundwater is close to the surface in the PC31 area and nearby.

39 I have read the Statement of Evidence of Chris Thompson dated 6 July 2023 and the issues I have raised are still relevant and are not addressed in that evidence.

Infrastructure assessment – Mr O'Neill's evidence

Groundwater levels

40 The highest groundwater level presented in Appendix G - Infrastructure Assessment - Part 1 of 4[8] and Appendix G - Infrastructure Assessment - Part 3 of 4[9] is 0.14 m bgl at M35/0596 both of which are contained in the Application.

41 The Statement of Evidence by Eoghan O'Neill dated 6 July 2023[10] also reports the highest groundwater level as 0.14 m bgl.

42 The highest groundwater level of 0.14 m bgl is different to the highest groundwater level provided by Mr Mthamo (0.645 m bgl) and Mr Thompson (0.9 m bgl) for the reasons outlined in paragraphs 31, 32 and 37.

43 I note that the highest groundwater level in M35/0596 is now 0.12 m bgl, measured in March 2023.

44 The Statement of Evidence of Eoghan O'Neill – Stormwater and Wastewater[11] suggests that the groundwater level at M35/0596 may not be representative of the PC31 area because it is near a spring, which could increase the water level of M35/0596. However, within the PC31 area there is another spring, a groundwater seep, several waterways and Ōhoka Stream. This indicates that groundwater is near the surface across a significant portion of the PC31 area. In addition, near surface groundwater levels in the area surrounding PC31 support the conclusion

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8 Section 2.3, page 4.

9 Section 2.5, page 4.

10 Paragraph 17, page 4.

11 Paragraph 17, page 5.

that groundwater levels in M35/0596 are representative of the PC31 area.

45 I note that CRC991022 and CRC991827 currently authorise the take and use of groundwater for the irrigation of crops and pasture for grazing livestock. The location of CRC991022 and CRC991827 in relation to the PC31 area is shown in **Attachment 6**.

46 CRC991022 authorises the take of water from three bores, as follows:

a. Bore M35/9423, 250 millimetres diameter and 30 metres deep, at or about map reference NZMS 260 M35:7499-5929 at a maximum rate of 30 litres per second, with a volume not exceeding 2,484 cubic metres per day; and

b. Bore M35/3064, 150 millimetres diameter and 12.5 metres deep, at or about map reference NZMS 260 M35:7427-5977 at a maximum rate of 30 litres per second, with a volume not exceeding 2,484 cubic metres per day; and

c. Bore M35/3065, 150 millimetres diameter and 12.0 metres deep, at or about map reference NZMS 260 M35:7418-5975 at a maximum rate of 30 litres per second, with a volume not exceeding 2,484 cubic metres per day.

d. In accordance with clause (a), water shall only be taken at a combined maximum rate not exceeding 60 litres per second, with a combined volume not exceeding 4,968 cubic meters per day.

47 CRC991827 also authorises the take of water within the PC31 area from two bores that have takes subject to flows in Ōhoka Stream and the Kaiapoi River, as follows:

a. Bore M35/0326 , 200 millimetres diameter and 13.7 metres deep, at or about map reference NZMS 260 M35:7534-6036 shall not exceed 22.8 litres per second, with a daily volume not exceeding 1,806 cubic metres, and

b. Bore M35/0367, 600 millimetres diameter and 9.4 metres deep at or about map reference NZMS 260 M35:7490-6042 during the next 24 hours, shall not exceed 22.8 litres per second, with a daily volume not exceeding 1,806 cubic metres per day.

c. These two bores are considered stream depleting and therefore some of their volume is considered to be a surface water take from Ōhoka Stream and Kaiapoi River. When these two surface water bodies are below certain flow rates, the water takes allowed from M35/0326 and M35/0367 are reduced.

48 The bores in these two consents are considered to be shallow (less than 30 metres), meaning groundwater is predominantly extracted from shallow aquifers. Gravel deposits that form aquifers in Canterbury often have horizontal layers of silt and clay that can inhibit the vertical flows of groundwater. It is likely that there will be layers of clay or silt between shallow aquifers and the deeper bores that reduce vertical groundwater flow. Therefore, it is likely that deeper bores will cause less drawdown in shallower aquifers. Mr Steffens comes to the same conclusion in his Statement of Evidence dated 7 July.[12]

49 The volume of groundwater able to be taken from these shallow bores is significant. These shallow bores are potentially lowering groundwater levels in the PC31 area through the groundwater abstraction during the irrigation season.

50 I understand that PC31 will require a community water supply to service the development with a lower annual abstraction than the current consents (Appendix G - Infrastructure Assessment - Part 4 of 4).[13]

51 I also understand that the Applicant has proposed a groundwater take from a deeper aquifer to reduce the risk of water supply contamination.[14] Abstraction from a deeper aquifer will not have the same effect on groundwater levels in the shallow aquifer. This means that the change in land use associated with the proposed subdivision, where these shallow bores are no longer taking groundwater, may result in increased groundwater levels within the shallow aquifer.

Proposed stormwater design

52 In terms of the proposed stormwater attenuation design, I understand that it is anticipated stormwater will be attenuated and treated through

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12 The Statement of Evidence of Carl Cedric Steffens dated 7 July, paragraph 48, page 11 and 12

13 Section 3.1, page 5.

14 PC31 – Appendix G – Infrastructure Assessment Parts 1 to 4, Section 11, page 37.

fully lined rain gardens and bioscapes, so that groundwater cannot enter the stormwater system.[15]

53 For higher flows, the stormwater system will use detention basins to provide additional attenuation.[16] The detention basins will have a maximum depth of 0.2 metres below ground level.[17] As the highest groundwater level measured at the PC31 area is 0.12 m bgl it is possible that the detention basins intercept groundwater.

54 Although there is only a two centimetre difference in highest groundwater levels that I have reported (0.12 m bgl) and the evidence of Mr O'Neill (0.14 m bgl), I note that this difference in highest groundwater levels is significant for determining whether a potential of take of groundwater is above the permitted activity rate of 5 litres per second or 10 cubic metres per day volume.

55 The proposed stormwater detention basins are over an area of 52,195 m2[18]. A two centimetre increase in highest groundwater levels is significant over that area in determining if it is below the permitted activity rate and volume.

56 It is currently uncertain whether the current stormwater design would be able to be consented under the Canterbury Land and Water Regional Plan. This issue is addressed further in the evidence of Ms Mitten.

57 In order to gain consent, the constraints that near surface groundwater levels have on the stormwater design may result in reduced stormwater treatment effectiveness, negative ecological effects,[19] an increased area of land needed for stormwater management or increased groundwater levels downgradient of the PC31 area.

58 In my opinion the near surface groundwater levels in the PC31 area will likely result in stormwater infrastructure intercepting groundwater. However, the lowering of the water table is considered a consumptive take of water as the groundwater is not discharged back to the same aquifer.

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15 The Statement of Evidence of Eoghan O'Neill dated 6 July, paragraph 9.1, page 2.

16 The Statement of Evidence of Eoghan O'Neill dated 6 July, paragraph 8.2, page 2.

17 The Statement of Evidence of Eoghan O'Neill dated 6 July, paragraph 18, page 5.

18 The Statement of Evidence of Eoghan O'Neill dated 6 July, paragraph 31, page 9.

19 The Statement of Evidence by Dr Burrell on behalf of the Canterbury Regional Council regarding freshwater ecology dated 13 July 2023, paragraph 30, page 8.

CONCLUSION

59 There is a long record of groundwater levels at the PC31 area and in the surrounding area that indicate groundwater levels are close to the surface.

60 In my opinion, the stormwater infrastructure is likely to intercept groundwater. Because the groundwater is not discharged back to the same aquifer it is considered a take and use of groundwater.

61 The PC31 area is within the Eyre groundwater allocation zone, which is overallocated. It is my understanding that there is no consent pathway for a take of groundwater in an overallocated groundwater allocation zone because it is a prohibited activity in the LWRP.

62 The near surface groundwater levels are a significant constraint on stormwater management design and may result in reduced treatment capacity and negative ecological effects.

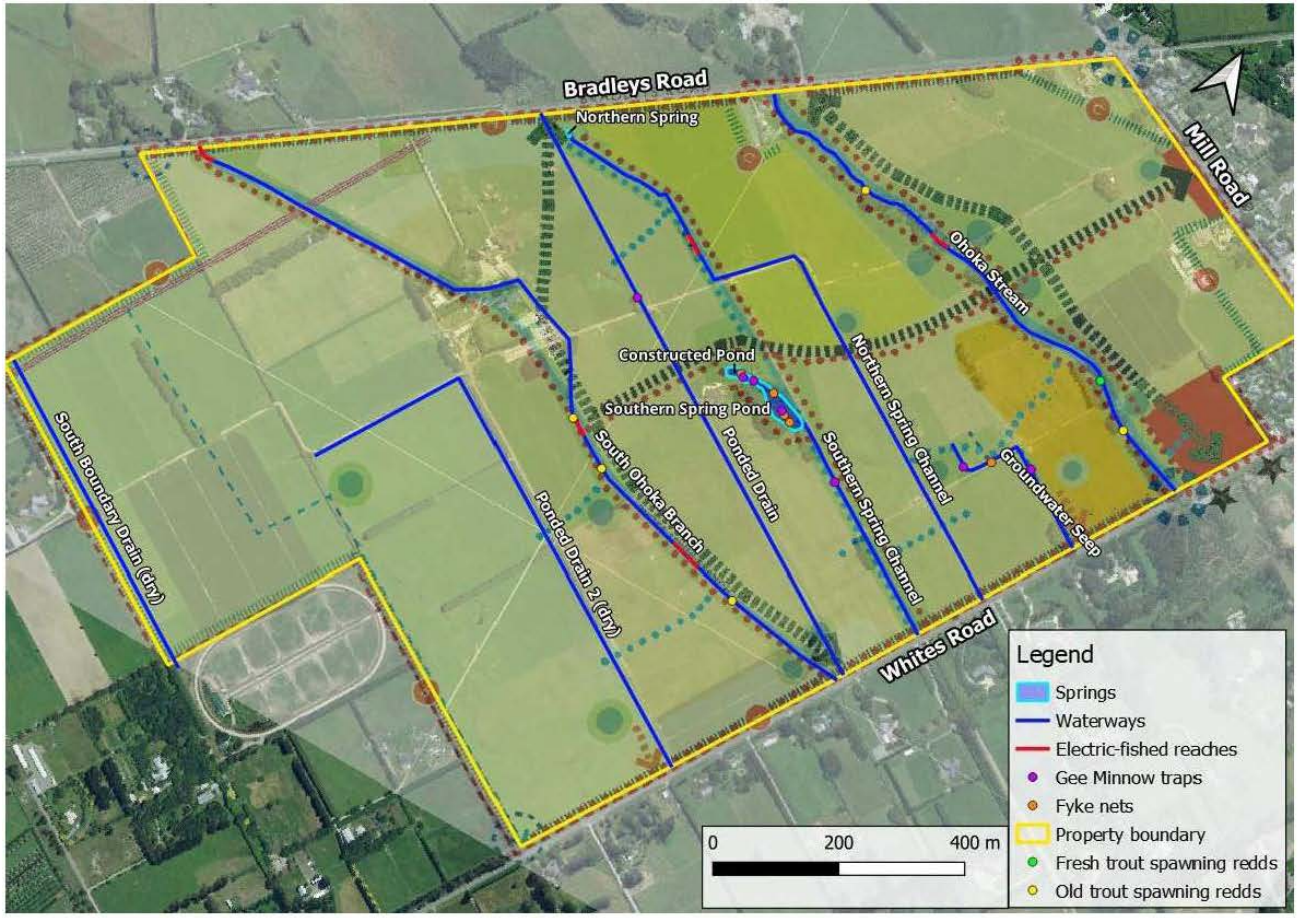
Ben Wilkins

21 July 2023

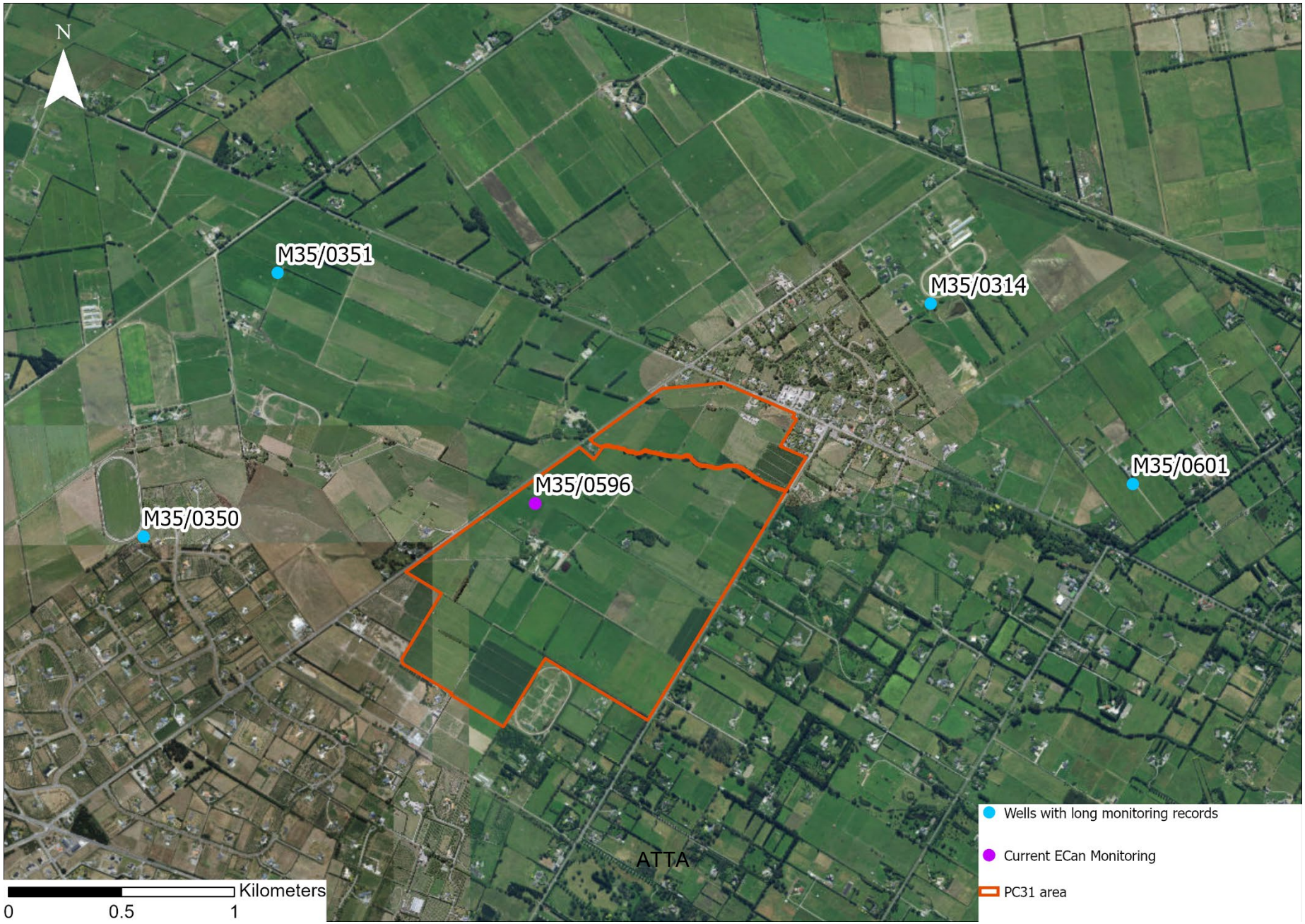
ATTACHMENT 1 – SITE MAP FROM TAYLOR EVIDENCE

ATTACHMENT 1: Site Map from Page 14 of Mr Taylor's Evidence, dated 7 July 2023.

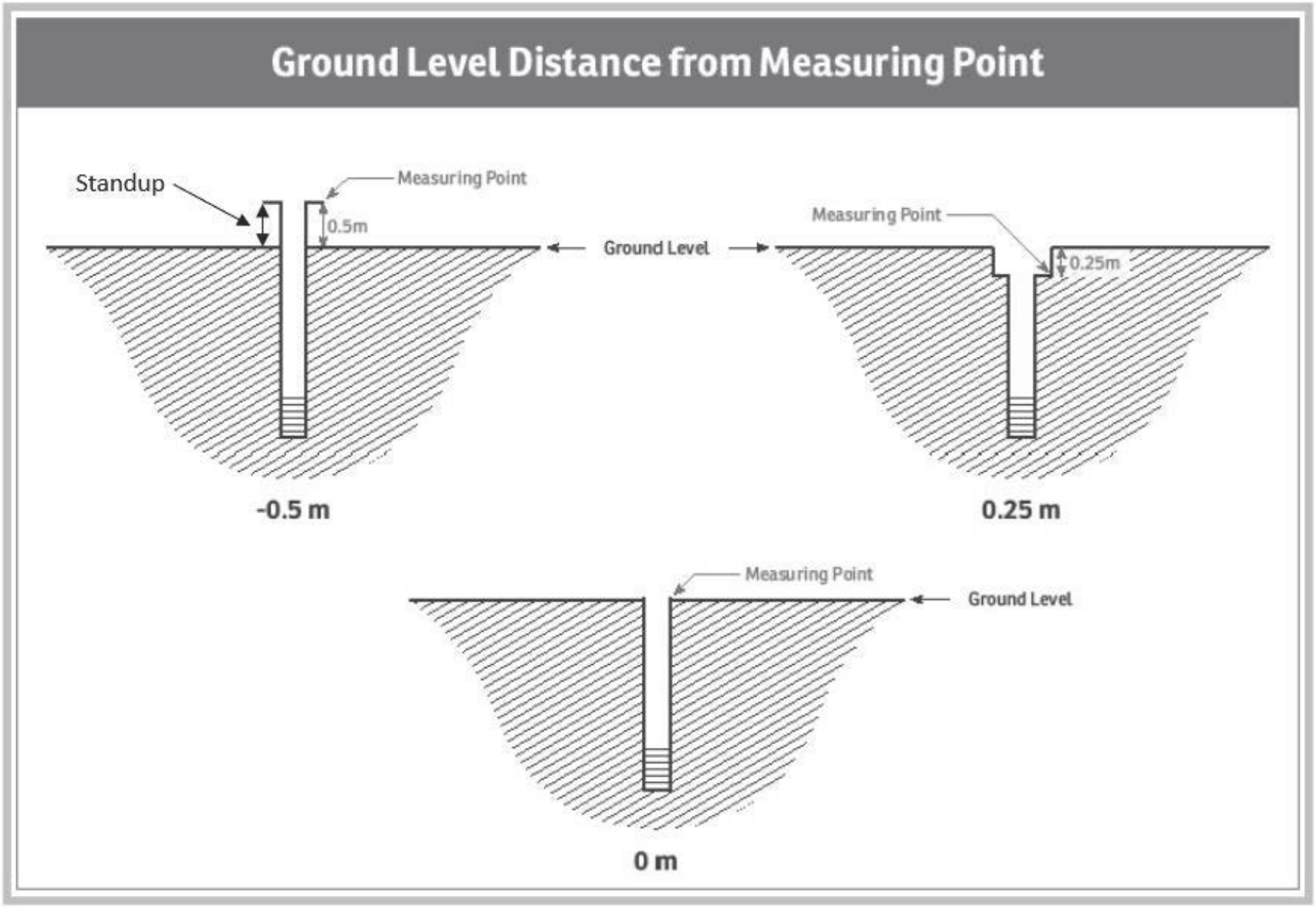
APPENDIX I. The outline development plan overlaid with waterways mentioned in the text (5th July c. 4:47 pm).



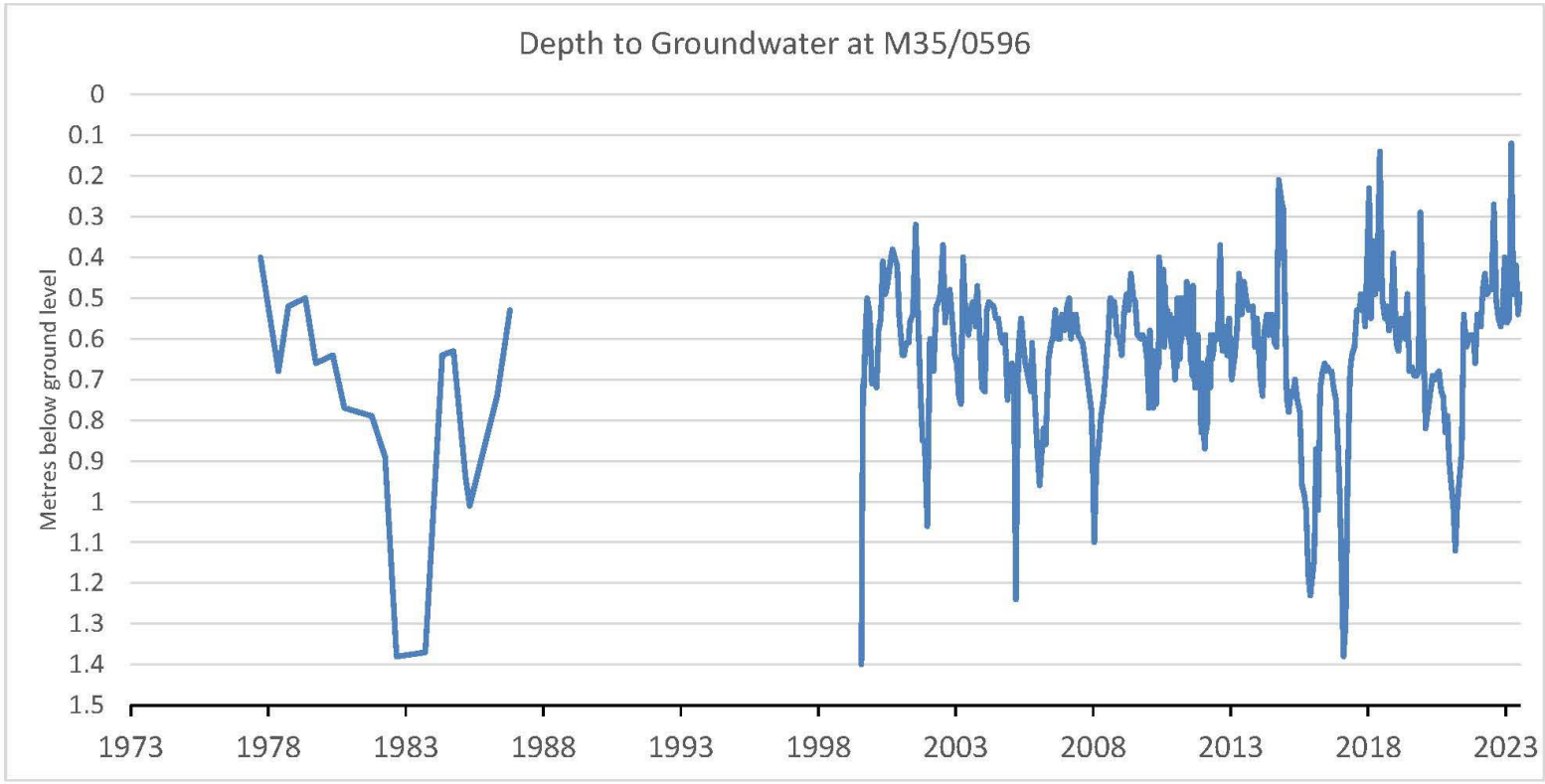
ATTACHMENT 2 – GROUNDWATER LEVEL MONITORING WELLS



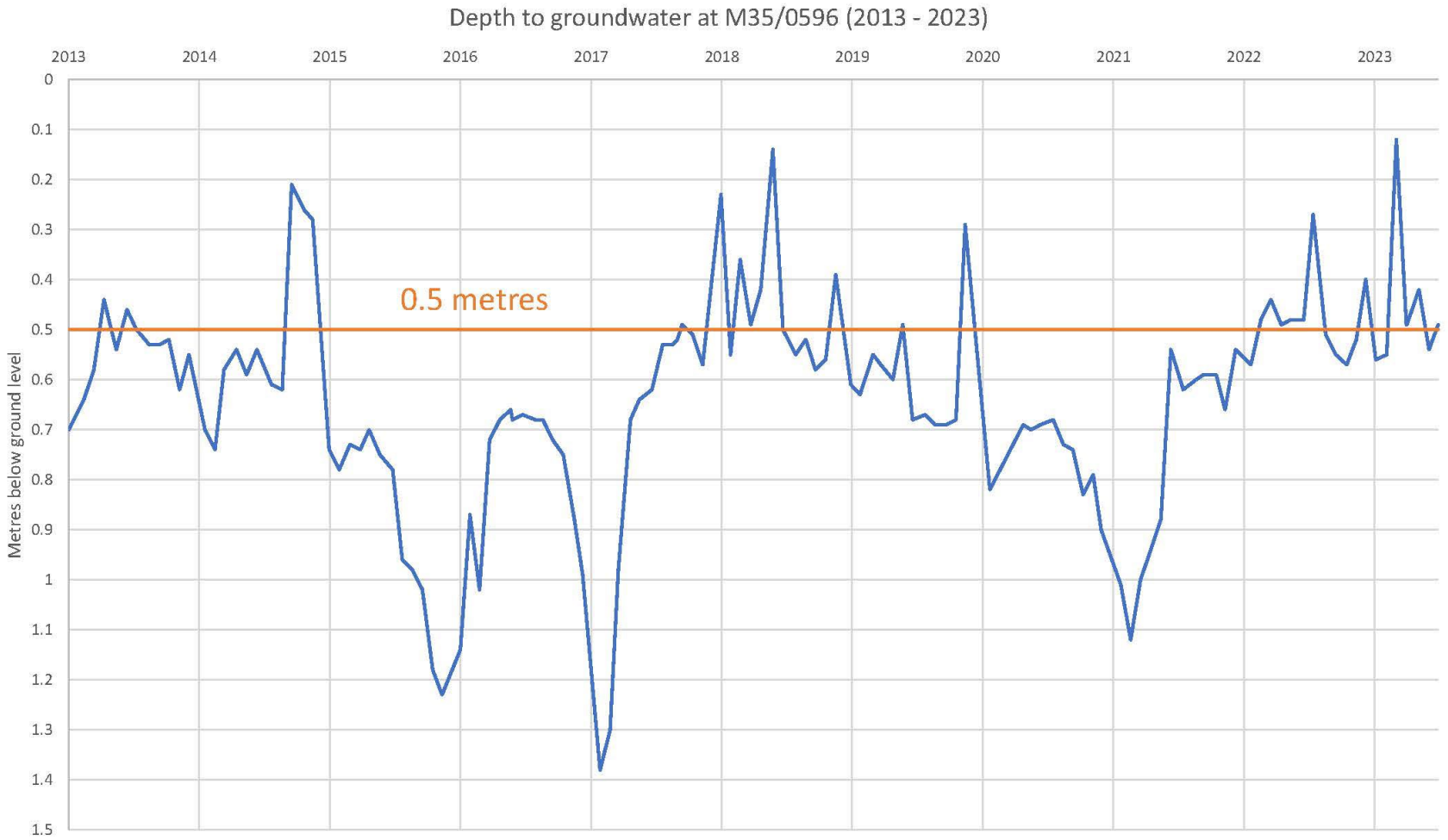
ATTACHMENT 3 – WELL STANDUP IMAGE



ATTACHMENT 4 – M35_0596 GROUNDWATER LEVEL RECORD



ATTACHMENT 5 – 10 YEAR GROUNDWATER LEVEL RECORD



ATTACHMENT 6 – IRRIGATED AREA