CENTRAL PLAINS
WATER

Central Plains Water Limited

Annual Ground and Surface Water Monitoring Report

2015/2016

	Name	Position on Project	Signature	Date
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1. Purpose

The purpose of this report is to present all monitoring data collected by CPWL between September 2015 and June 2016, and to provide an interpretation of background conditions and impacts arising from consented activities.

CPWL are required to measure a suite of parameters for river and stream water quality; Lake water quality; and groundwater quality and quantity and report the results in this Ground and Surface Water Monitoring Report for the Period 1 July to the following 30 June for each year. This report is required to include all the monitoring data and an interpretation of background conditions and impacts arising from the consented activities.

CPWL have developed a Ground and Surface Water Monitoring Plan (as required by Condition 18 of CRC165680), which is in two parts:

- Part I: of the GSWP includes an outline of CPWLs monitoring programme; and
- Part II: specifies (amongst other matters) trigger levels for monitored parameters.

The results from the monitoring programme are included in this report and are compared to applicable trigger levels.

2. Executive Summary

Alpine sourced CPWL irrigation water has been supplied to the Stage 1 Area for one season.

The effects of this on surface water and groundwater flows, levels and quality are being monitored at multiple locations within and downstream of the CPWL supply area.

A range of environmental trigger values are used by CPWL to draw attention to changes in the state of water flows, levels and quality in the Selwyn Waihora catchment that *may* be attributed to the operation of the CPWL scheme.

The difference in groundwater recharge between 2016 and 2015 as determined from a small number of bores in Stage 1 and Stage 2 suggests a possible positive effect is occurring as a result of the introduction of alpine irrigation water to the catchment and reduced abstraction of groundwater. Ongoing monitoring may allow confirmation of this in the future.

After two dry years with little groundwater recharge in the Lowland Central Plains area, it is not surprising that groundwater levels in the lowland monitoring bores did not exceed their respective trigger levels. We will have to wait for further years of alpine water use and the associated reduction in groundwater abstraction, in order to be able to determine if groundwater levels are rising and flows in the lowland streams are recovering due to the influence of the Scheme.

Some stream and lake water quality triggers were exceeded but results were found to be consistent with those from previous years (prior to the CPWL Scheme operating) and not attributable to effects of the CPWL Scheme.

E. coli was not detected in bores from within the operational Stage 1 area of the Scheme. Although elevated concentrations of nitrate were detected in some Stage 1 bores, they were found to be consistent with results or trends from previous years (prior to the CPWL Scheme operating) and not attributable to effects of the CPWL Scheme

In general the monitoring results from one year of Scheme operation are insufficient to detect and attribute any effects of the Scheme on water quality, particularly when compared against some existing elevated and increasing contaminant trends caused by historic land uses and practices whose effects are time-lagged over 10+ years. Some years of further water quality monitoring will be necessary, together with on-going assessment of CPW and other land use change patterns in the catchment, to determine any significant change to existing elevated nitrate concentrations and increasing trends, and whether any cause is attributable to CPW, to previous land use changes and/or to improving practices through time.

There were no examples identified between September 2015 and June 2016 of nitrate concentrations being above 11.3mg/L in any Stage 1 monitoring bore that was within 100m of any bore used for potable water.

With CPWL irrigation expected to commence operating in Sheffield in 2017 and Stage 2 in 2018, further monitoring of the effects of the scheme will become available and future Ground and Surface Water Monitoring Reports will be able to present this information.

3. Background

The CPWL Irrigation Scheme (the Scheme) is located in the Selwyn Waihora Zone, within the Selwyn District (Figure 1).

The Scheme is being developed in a staged manner. Once completely developed the Scheme will provide water to up to 60,000ha situated between the Rakaia and Waimakariri Rivers, the Foothills and State Highway 1.

The 23,000ha Stage 1 section of the Scheme was constructed during early 2014 – mid 2015, with first irrigation water supplied on 1 September 2015. Stage 2 and Sheffield areas are still in detailed design phases with construction forecast to commence in December 2016. Stage 2 will provide irrigation to 20,000ha and Sheffield around 4,000ha with first irrigation water forecast for September 2018 for Stage 2 and September 2017 for Sheffield (see Figure 2).

The limit/target for nitrogen losses in Selwyn Waihora is 5,044.4 tonnes/year by 2037. A total of 358 tonnes/year (7% of the total) has been allocated to CPWL to allow for the conversion of dryland to irrigated land. This allocation is in addition to the assessed dryland nitrogen baseline of 621 tonnes.

The regulatory environment planning framework has changed since CPWL's original Take and Use Water permit was granted in 2010.

The Selwyn Waihora Zone Implementation Plan (ZIP, and ZIP Addendum) was developed by the Selwyn Waihora Zone Committee as a result of a two-year collaborative process, which commenced in December 2011. The ZIP identified a number of priority outcomes sought for the Zone which is considered to be over-allocated in terms of consented groundwater takes and nitrogen contamination in groundwater.

Variation 1 to the Land and Water Plan was therefore developed based on recommendations in the Selwyn Waihora ZIP.

The original CPWT consent decision recognised the trade-off between benefits associated with increased baseflows in the lowland streams resulting from operation of the Scheme with the potential negative effects on land drainage and wastewater infrastructure in the lowland Central Plains area due to groundwater mounding.

While Variation 1 to the Land and Water Regional Plan has provided explicit recognition of the positive benefits associated with increased baseflows in lowland streams, it does not provide equivalent guidance in terms of thresholds for adverse effects on land drainage and wastewater infrastructure. It remained the task of CPWL to operate in accordance with the consent conditions to ensure appropriate management of environmental effects resulting from operation of the Scheme.

For a detailed summary of the background to CPWL and the Schemes' water use and nitrogen discharge consents please refer to Appendix 6.2: Central Plains Water Limited Annual Compliance Report 2015/2016 Irrigation Season; Section 4.

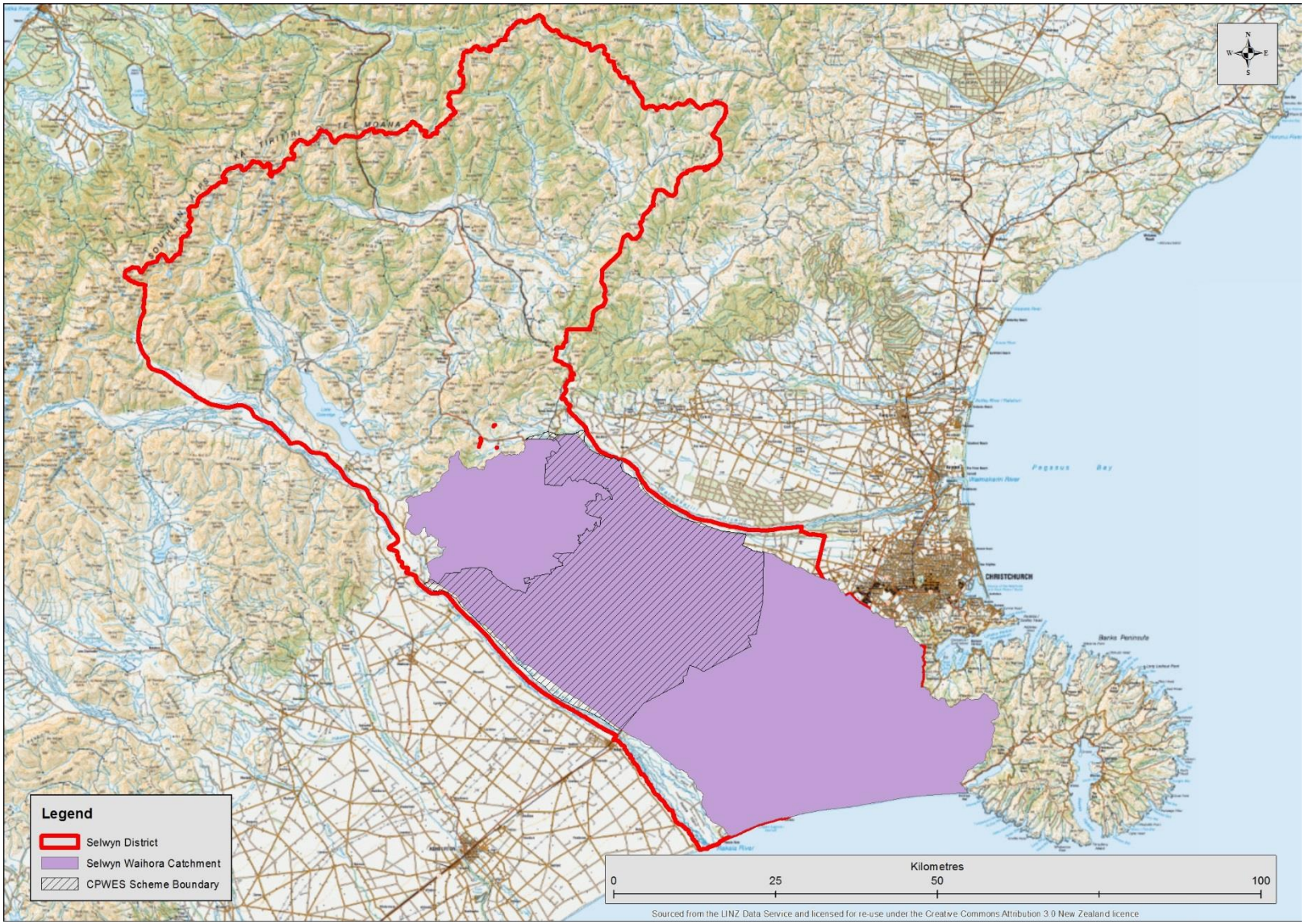

Figure 1. CPWL Scheme with the Selwyn Waihora Catchment

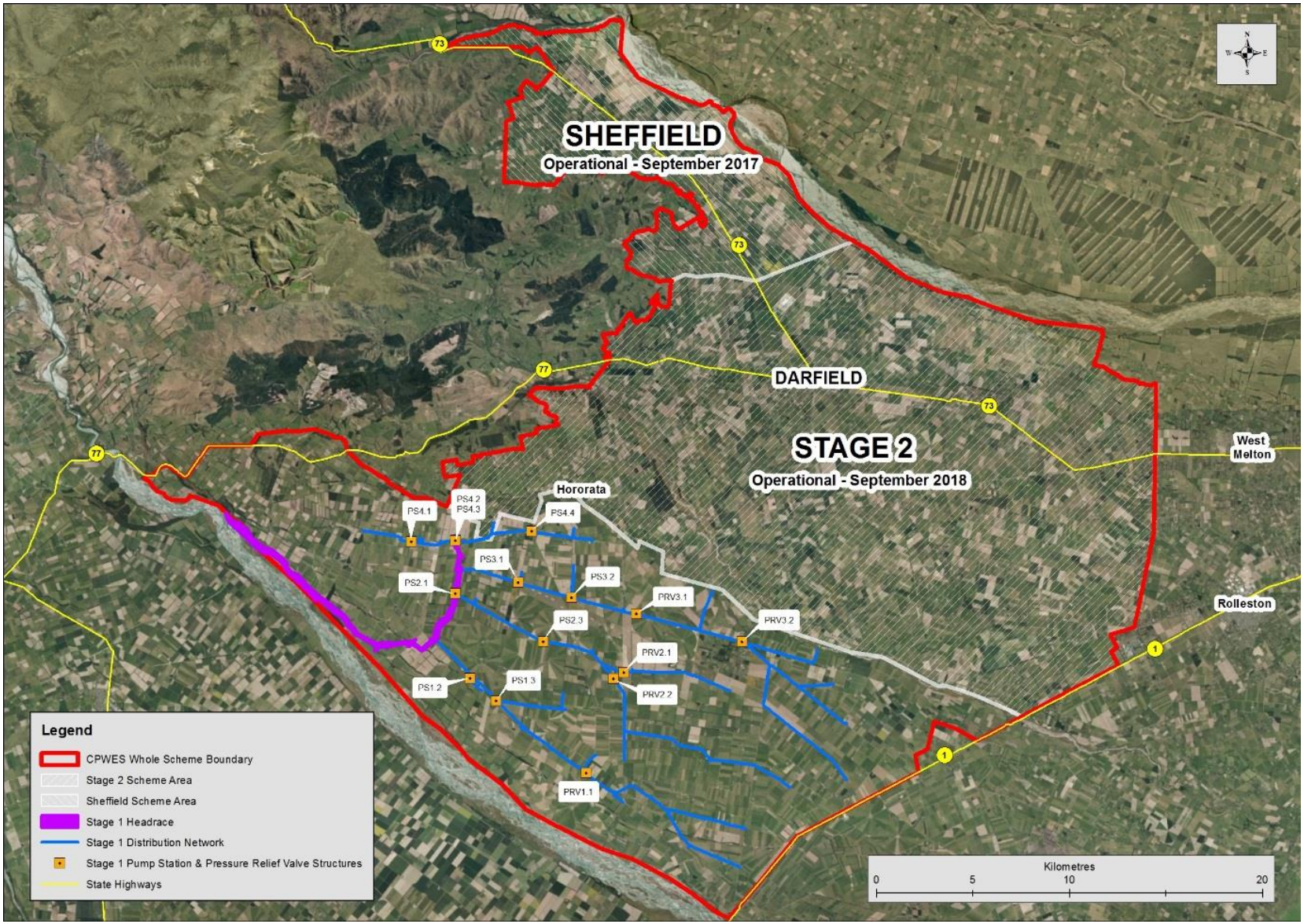

Figure 2. Scheme Overview showing Operational and Planned Stages

Water Use

During the 2015-16 irrigation season, Stage 1 farms introduced 91,092,984m^3 of alpine water into the catchment and abstracted 20,825,642m^3 of groundwater. On average Stage 1 farmers used 5,172m^3 of water per hectare. Please refer to Appendix 6.2 CPWL Annual Compliance Report 2015/2016 Irrigation Season for further details on the use of CPWL Scheme water for irrigation.

3.1. Scope of Water Monitoring Programme

River and Stream Water Quality

Full details of CPWL's surface water monitoring programme is contained in Part 1 of CPWL's Ground and Surface Water Monitoring Plan (available at http://www.cpwl.co.nz/environmental-management/ground-surface-water-monitoring-programme). Briefly, CPWL is required to monitor, on a monthly basis, surface water quality at 29 river and stream sites (Figure 3).

CRC165680 authorises CPWL to rely on data collected on Te Waihora/Lake Ellesmere, lowland streams, other rivers/streams or drains and the stockwater network by the Canterbury Regional Council or any other entity in lieu of establishing new monitoring sites. Instances where CPWL rely on data from ECan will be noted in this report.

Parameters to be analysed are: *Escherichia coli* (*E. coli)*, Turbidity, Nitrate + Nitrate-Nitrogen, Total Nitrogen, Total Ammoniacal Nitrogen, Dissolved Reactive Phosphorus, Total Phosphorus, Electrical Conductivity, Dissolved Oxygen, pH and temperature. CPWL has water quality triggers in place for Nitrate-Nitrogen (Annual Medians and Annual 95th Percentiles).

Commencement of the Surface Water Monitoring programme began alongside operation of Stage 1 of the Scheme in September 2015, therefore for this report there is a maximum of ten months of monitoring data.

Lake Water Quality

This report contains water quality data from ECan's monitoring of Te Waihora from September 2015 to June 2016. Water samples are analysed for a wide range of parameters but only those required by the Ground and Surface Water Plan (as per those listed under 'River and Stream Water Quality' above and Trophic Level Index (TLI_3) and Chlorophyll *a*) are included in this report. Figure 3 shows the five locations sampled by ECan. CPWL has water quality triggers in place for Trophic Level Index (TLI_3), Total Phosphorus, Total Nitrogen and Chlorophyll *a*.

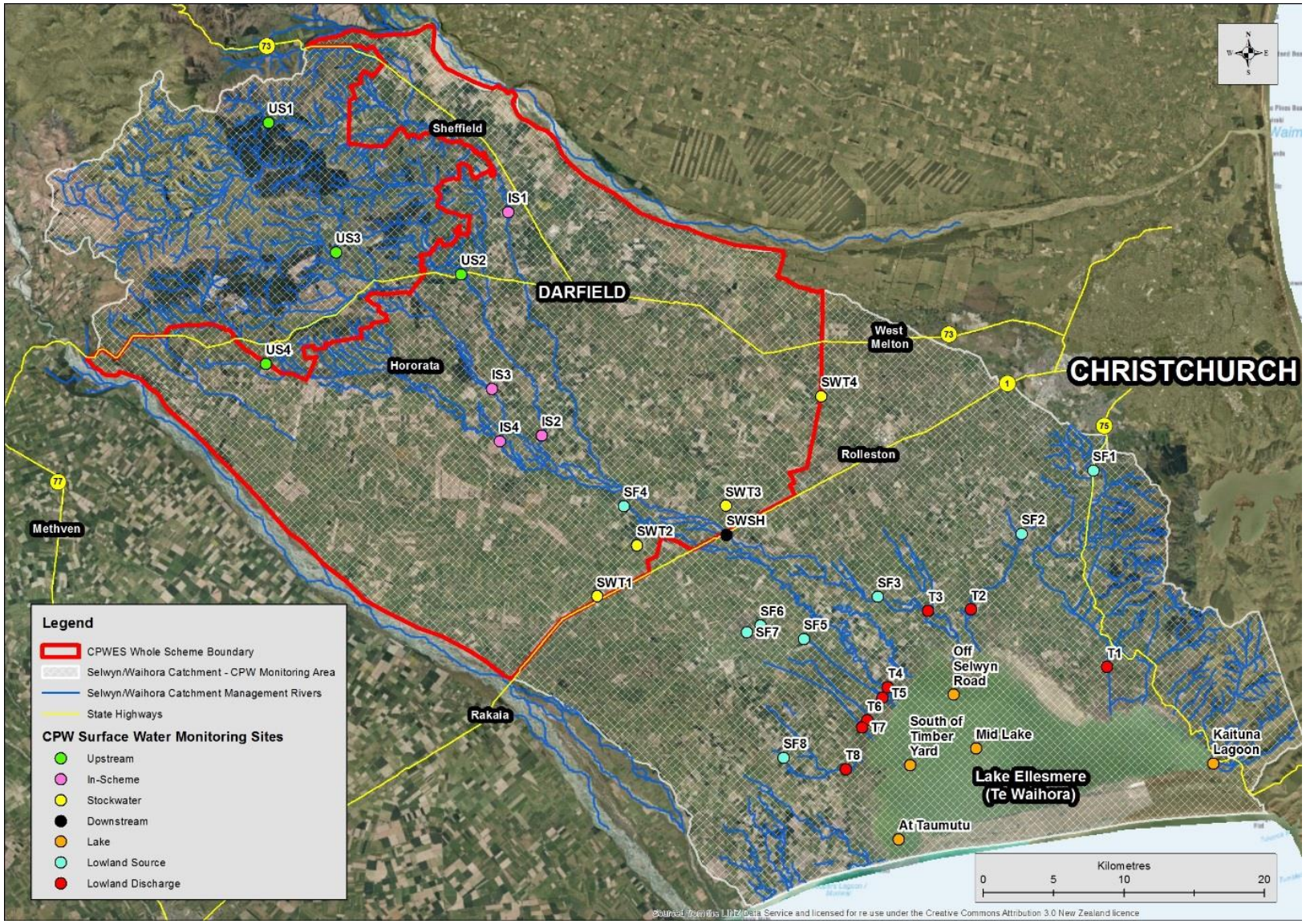

Figure 3. Surface Water Monitoring Sites

Ground Water Quality and Levels

Full details of the Groundwater Monitoring Programme are contained in Part 1 of CPWL's Ground and Surface Water Monitoring Plan (available at http://www.cpwl.co.nz/environmental-management/ground-surface-water-monitoring-programme).

Twenty monitoring bores have been installed by CPWL throughout the Scheme area (refer to Figure 4). Eight bores are located within Stage 1, ten in Stage 2 and two in the Sheffield area.

CRC165680 required two years of ground water monitoring data to be collected prior to the use of water. By 1 September 2015, CPWL had completed seven rounds of quarterly monitoring of our Stage 1 dedicated long-screen bores (Refer to Figure 5 for a comparison of a water supply bore to a dedicated long-screen monitoring bore). Long-screen monitoring bores enable samples to be taken from close to the groundwater's static water level (SWL). This contrasts with typical Canterbury water supply bores that can have relatively short (~2m long) screens located close to the bottom of the bore. Water samples taken from typical Canterbury water supply bores may be abstracted from some distance below the SWL. This difference is important because some groundwater contaminants, in particular nitrate, are most concentrated at the SWL and become decreasingly concentrated with depth, rather like cream in a bottle of milk. This means that samples taken from near to the SWL are more likely to accurately reflect nitrate concentrations affected by land surface recharge than samples collected from a bore screened 20m below the SWL. This difference is illustrated in Figure 5.

In order to have two years of monitoring data before the commencement of Stage 1 irrigation, the Stage 1 dedicated monitoring bores were located adjacent to existing water supply bores that had been monitored for at least two years prior to CPWL's first irrigation season. The water supply and long-screen bores were monitored concurrently for two years to establish a relationship between the two forms of monitoring that may be useful when comparing future results to the historic record.

The dedicated long-screen monitoring bores were installed in the Stage 2 area of the Scheme in the first half of 2015. These bores will have been monitored for more than two years prior to the commencement of Stage 2 irrigation in 2018. At the time of writing five monitoring rounds had been completed.

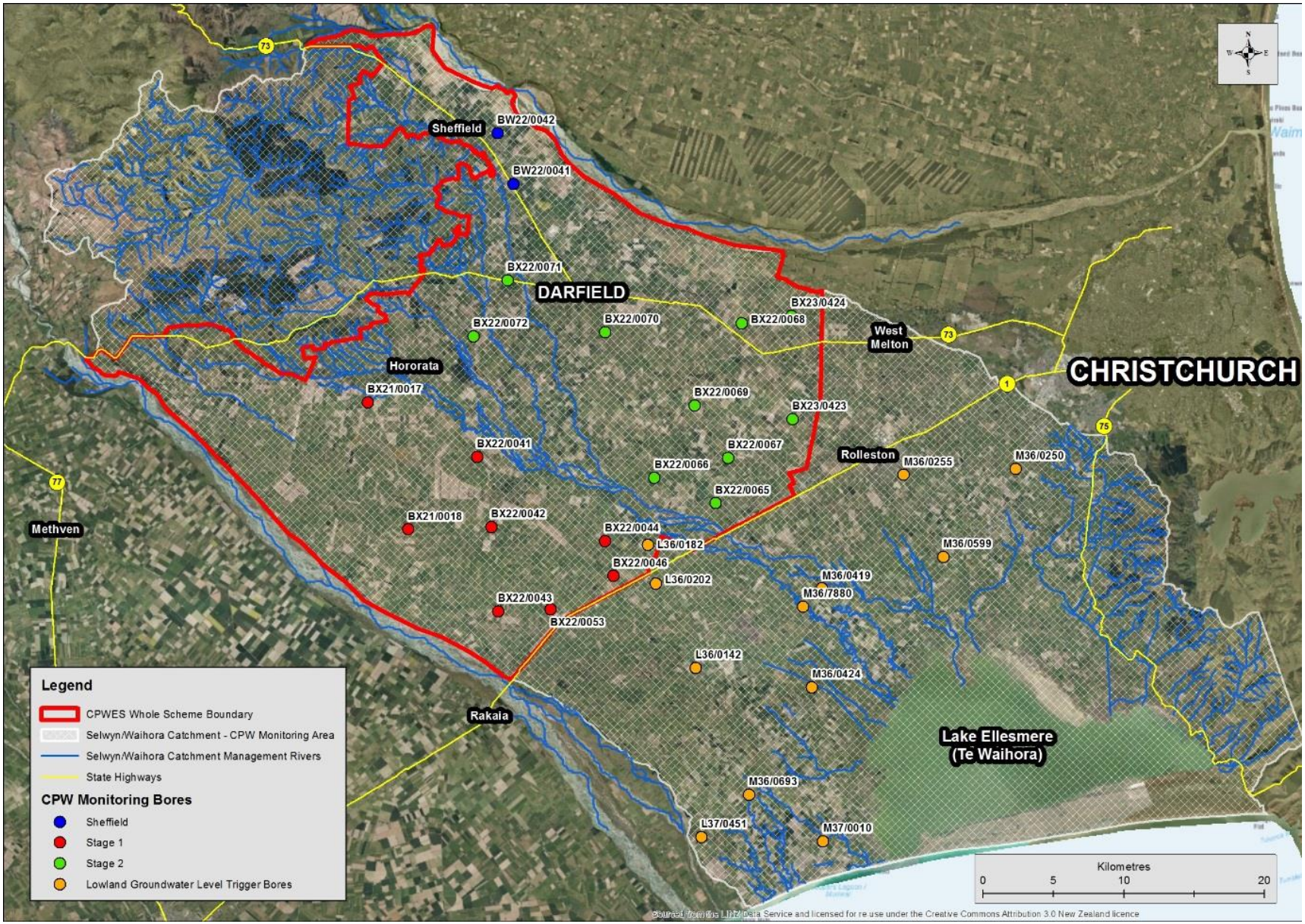

Figure 4. CPWL Groundwater Quality and Lowland Water Level Monitoring Sites

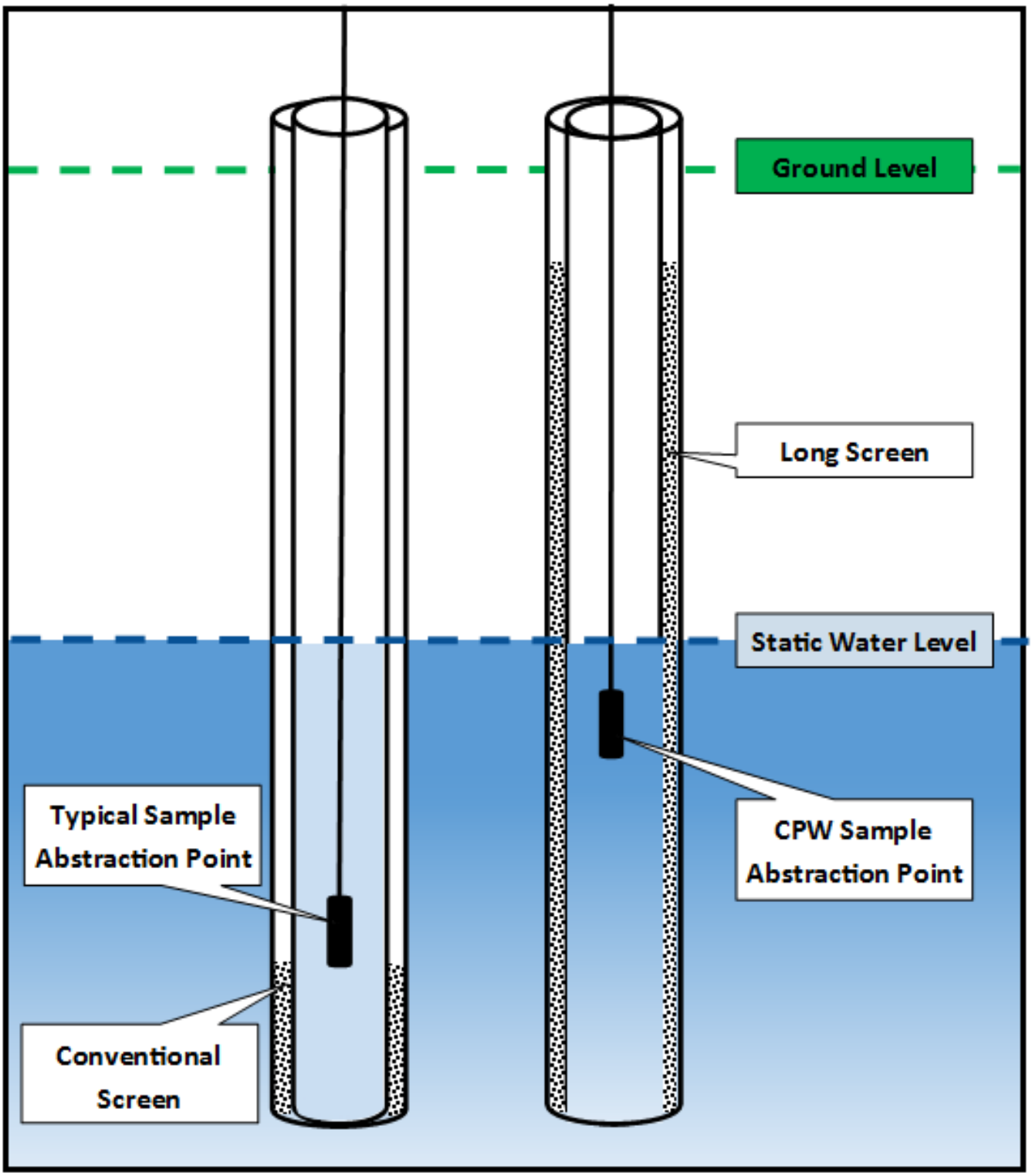

Figure 5. Comparison of a typical Canterbury water supply Water Supply Bore to a dedicated CPWL long-screen Monitoring Bore

CPWL does not carry out any specific groundwater monitoring in the Lowland Central Plains area but instead utilises data collected by Environment Canterbury (ECan). ECan operate an extensive groundwater level monitoring network in the Lowland Central Plains. GSWERP has established groundwater level trigger limits for a series of 12 bores within the ECan network (refer to Figure 4). The trigger limits will be used to provide advance warning of potential groundwater mounding. In order to provide sufficient warning of possible groundwater mounding the trigger limits are relatively conservative in that they have been set at a level which has been reached in the past. This may result in occasions where the triggers are reached following for example, high intensity rainfall events that lead to elevated groundwater levels, or for other reasons that are outside of CPWL's control.

Trigger Levels

With the exception of Nitrate in groundwater, CPWL's trigger levels are assessed against monthly or annual data. Irrigation of Stage 1 commenced in September 2015 meaning that ten months of monitoring data is available. For this report it will generally be assumed that statistics based on 10 months of data are acceptable to compare to annual trigger levels.

Trigger levels for Nitrate in groundwater are based on five-year annual averages. This means a comparison of monitoring results to the groundwater Nitrate trigger from five years' of CPWL activities cannot be made until September 2020 for Stage 1 and 2022 for Sheffield and 2023 for Stage 2, although it will still be useful to evaluate the results as the scheme commences its operations.

Until a sufficient amount of data has been collected to report against five-year annual averages, CPWL will highlight in the results section instances where new maximum Nitrate-N concentrations are detected and where Nitrate values exceed 7.65mg/L[1] for the Stage 1 area.

It is worth noting that there is a recognised lag effect of 10-30 years in the transport of nitrogen in the groundwater system. Therefore elevated and/or increasing Nitrate readings may continue to be measured in groundwater, lowland streams and Te Waihora for a period of time, from pre-scheme land use, irrespective of improving farm practices that would be expected to result in lower discharges of nutrients into the environment. Similarly it may take many years to detect increases in nitrate concentrations resulting from changed land use under CPWL, if this occurs.

Approximately half (47%) of the water samples taken from long-screen bores prior to the commencement of CPWL irrigation (Stage 1) or to date (Stage 2 and Sheffield), had Nitrate concentrations of more than 7.65mg/L.

Groundwater samples are analysed for pH, Electrical Conductivity, Dissolved Oxygen, Temperature, Alkalinity, Bromide, Chloride, Dissolved Reactive Phosphorus, Nitrate-Nitrogen, Total Nitrogen, Sulphate and *E. coli.* The static groundwater level is also measured at the time of sampling. CPWL has water quality triggers in place for Nitrate Nitrogen and *E. coli*.

Appendix 6.1 contains all trigger limits and trigger response processes from Part II of the Ground and Surface Water Plan.

[1] 7.65mg/L is the trigger level for Nitrate-N based on a five-year annual average concentration.

3.2. 2015/2016 Seasonal Climatic Influence

Rainfall

During the 2015-16 irrigation season 439.3mm of rainfall was recorded at NIWA's weather station 4702 located approximately 4km west of Hororata.

The 12 month annual rainfall total for the period ending 11 May 2016 was 705mm. This was the eighth lowest amount of rain recorded at the site since records began in 1981 (refer to Figure 6). In contrast, Rakaia River flow (and hence water availability) was relatively normal compared to the long-term average.

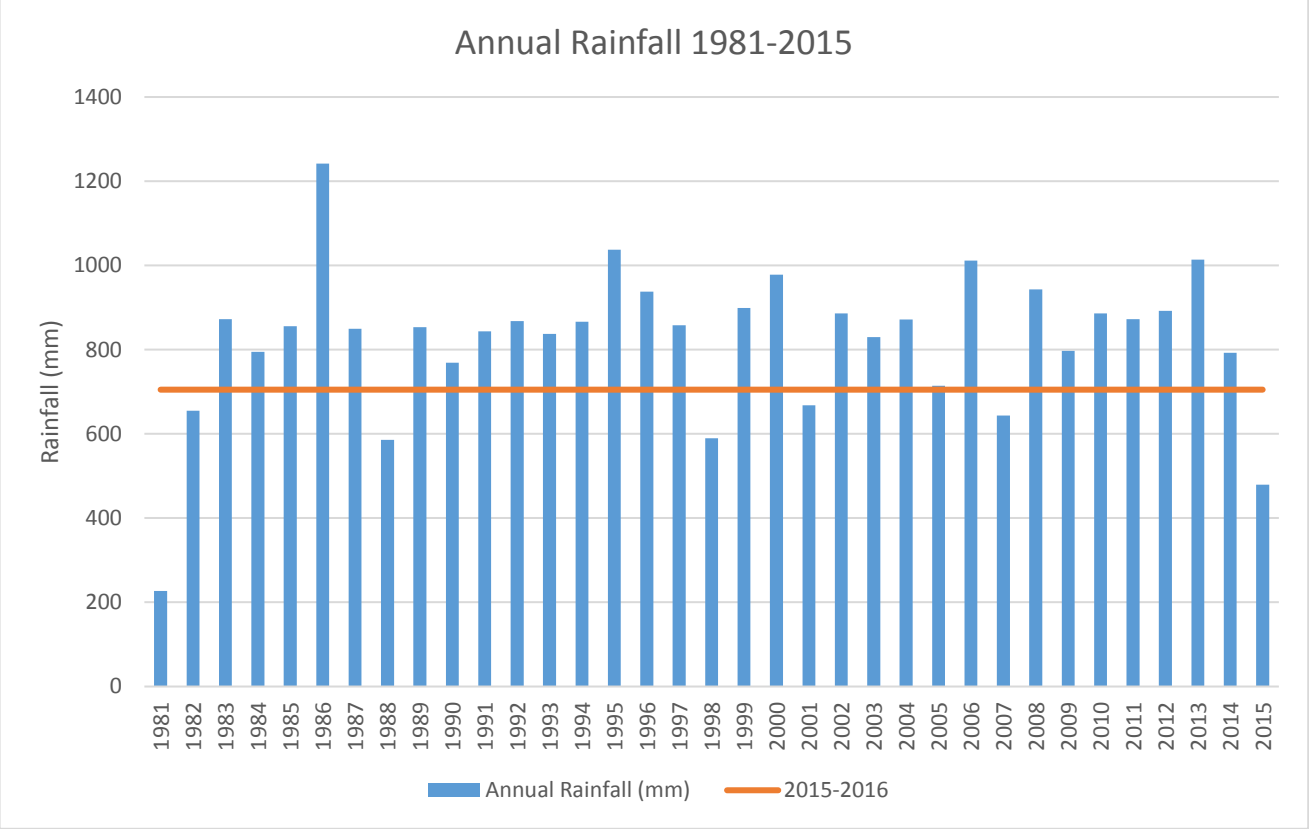

Figure 6. Rainfall record at NIWA's Weather Station 4702, Hororata
Source NIWA Clifo Database.

Rainfall and Soil Moisture Deficit data generated from NIWA's weather station (4702) for the 2015-16 irrigation season is shown in Figure 7 below. The soil at weather station 4072 site can be classified as being severely dry for 76 days and extremely dry for eight days during the CPWL irrigation season.

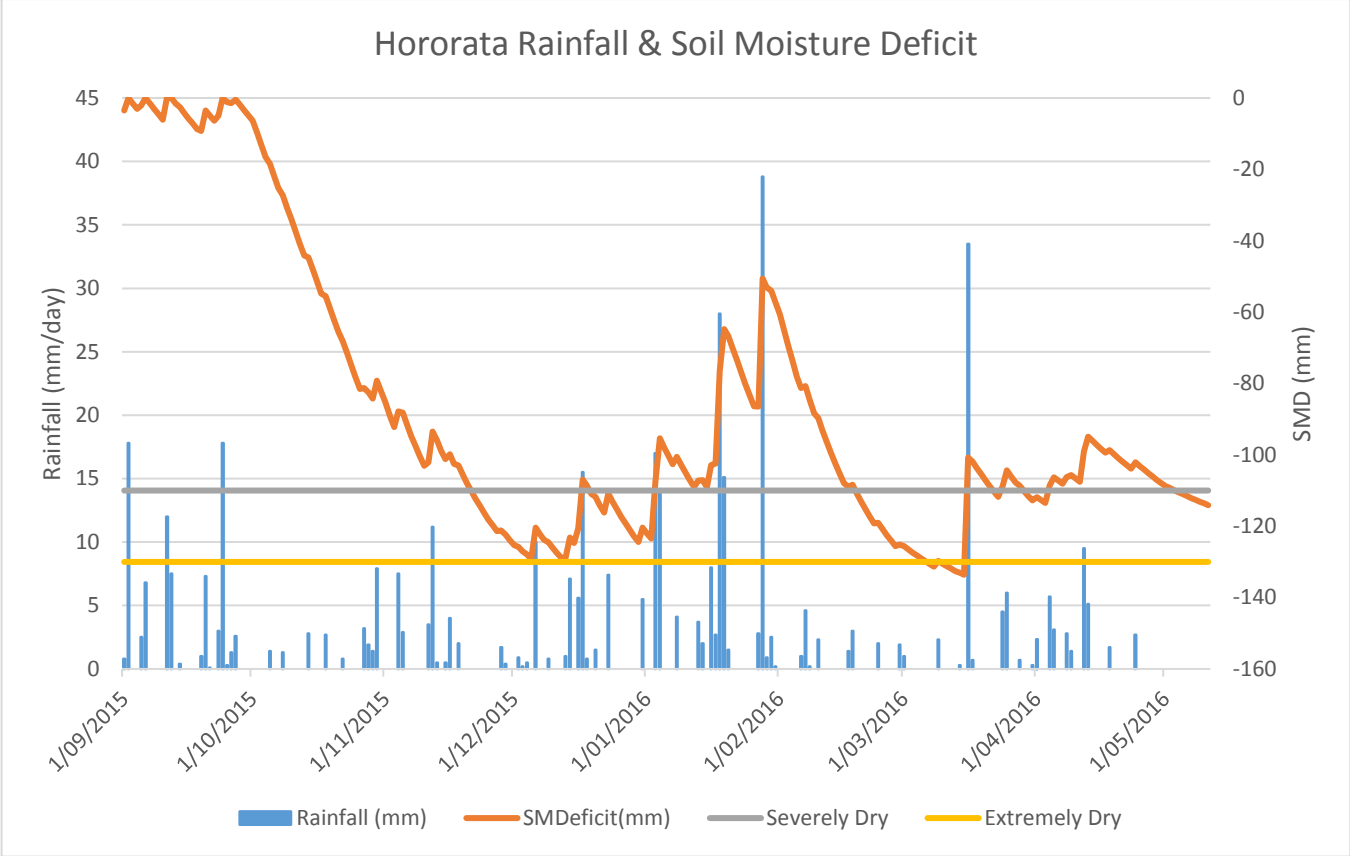

Figure 7. Rainfall and Soil Moisture Deficit Measured at NIWA's Monitoring Station in Hororata
Source NIWA Clifo Database.

4. Results & Interpretation

All monitoring data is listed, as required by CRC165680, in Appendices 6.3-6.6. The entire record of results from the Stage 1 long-screen groundwater quality monitoring bores has also been included as several references are made to pre-September 2015 results.

4.1. River and Stream Water Quality

CPWL has annual medians, and annual 95th percentile, trigger limits for Nitrate-N. CPWL has surface water samples analysed for Nitrate + Nitrite-N. Like ECan and the majority of Regional Councils in New Zealand, CPWL monitors oxidised nitrogen as Nitrite-Nitrate-Nitrogen. Nitrite is not directly measured because of its transient nature and the very low concentrations that are present in Canterbury Rivers. When discussing surface (including lake) water quality monitoring results in this report, Nitrate + Nitrite-Nitrogen will be referred to as either Nitrate-N or simply Nitrate.

CPWL River and Stream quality trigger levels are shown in Table 1 and the monitoring results are shown in Table 2 (NB: values depicted in red indicate trigger level exceedances. The number of samples collected, as reported in Table 2, is a reflection of flows in those waterways; samples can only be collected if the waterway is flowing. For example, the Selwyn River at SH1 was only flowing once throughout the monitoring period.

River Type	CPWL Surface Water Monitoring	
	Annual Median	Annual 95th Percentile
Spring-fed Plains	5.2	7.4
Hill-fed Lower	1.8	2.6

Table 1. Surface Water Quality Triggers for Nitrate in mg/L

Site	Nitrate Annual Median (mg/L)	Nitrate Annual 95th percentile (mg/L)	No. of samples
Hill-Fed Lower Sites			
Hawkins River In-scheme	**1.9**	2.1	2
Waianiwaniwa River In-scheme	n/a	n/a	0
Selwyn River In-scheme	0.5	0.5	1
Hororata River In-scheme	1.1	1.4	6
Selwyn @ SH1	**2.8**	**2.8**	1
Hawkins River Upstream	0.1	0.3	10
Waianiwaniwa River Upstream	0.5	1	3
Selwyn River Upstream	0.2	0.4	14
Hororata River Upstream	0.2	0.7	10
Spring-Fed Plains Sites			
Halswell River Source	3.7	4.4	10
LII Stream Source	4.9	5.2	10
Selwyn River Spring Source	**7.8**	**8.4**	10
Irwell River Source	2.2	2.8	2
Hanmer Road Drain Source	3.8	3.9	2
Boggy Creek Source	**6.4**	**8.5**	10
Doyleston Drain Source	n/a	n/a	0
Harts Creek Source	**9.2**	**9.3**	2
Halswell River Downstream	2.9	3.2	10
LII Stream Downstream	3.4	3.9	10
Selwyn River Downstream	**6.5**	6.8	14
Irwell River Downstream	0.03	2	5
Hanmer Road Drain Downstream	1.1	2.1	4
Boggy Creek Downstream	4.5	6.4	14
Doyleston Drain Downstream	0.2	1.3	14
Harts Creek Downstream	**6.7**	7.3	14

Table 2. Surface Water Quality Nitrate-N Annual Medians and 95th Percentiles

Both the annual median, and annual 95th percentile, trigger limits were exceeded at four monitoring sites, while three sites exceeded the annual median trigger level only. The trigger exceedances were from four waterways, the Hawkins River, Selwyn River, Boggy Creek and Harts Creek.

Results presented in Part II of CPWL Ground and Surface Water Monitoring Plan (http://www.cpwl.co.nz/wp-content/uploads/Part-2-section-2.pdf) also highlighted elevated nitrate readings from sites in the Hawkins River, Selwyn River, Boggy Creek and Harts Creek that would have exceeded CPWL's trigger limits when based on 2014 and/or 2010-15 data.

Hawkins River at the Deans Road location monitored by ECan had higher annual median and annual 95th percentile nitrate concentrations for 2013-14 and 2014-15 (and also the Deans Road site at 2015-16) compared to CPWL's Hawkins River instream site (located 3.5km downstream) during 2015-16 (see Figure 8). Harts Creek Downstream had higher nitrate results in 2013-14 and 2014-15 compared to 2015-16 (refer to Figure 9). Nitrate concentrations in Selwyn River at Coes Ford during 2015-16 were about the same as those from 2014-15, and have been showing a generally increasing trend over the last four years (see Figure 10).

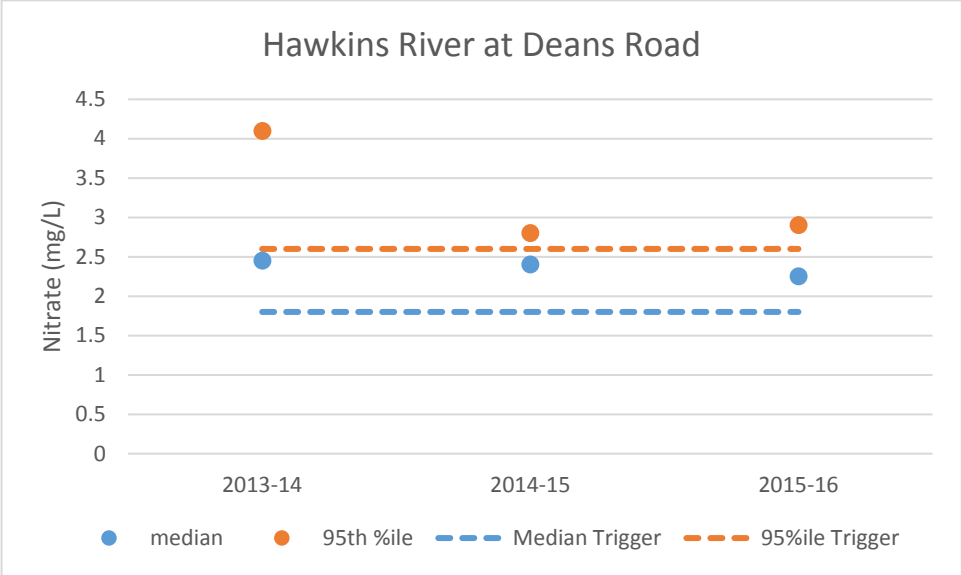

Figure 8. Hawkins River at Deans Road – Nitrate concentrations 2013-14 to 2015-16

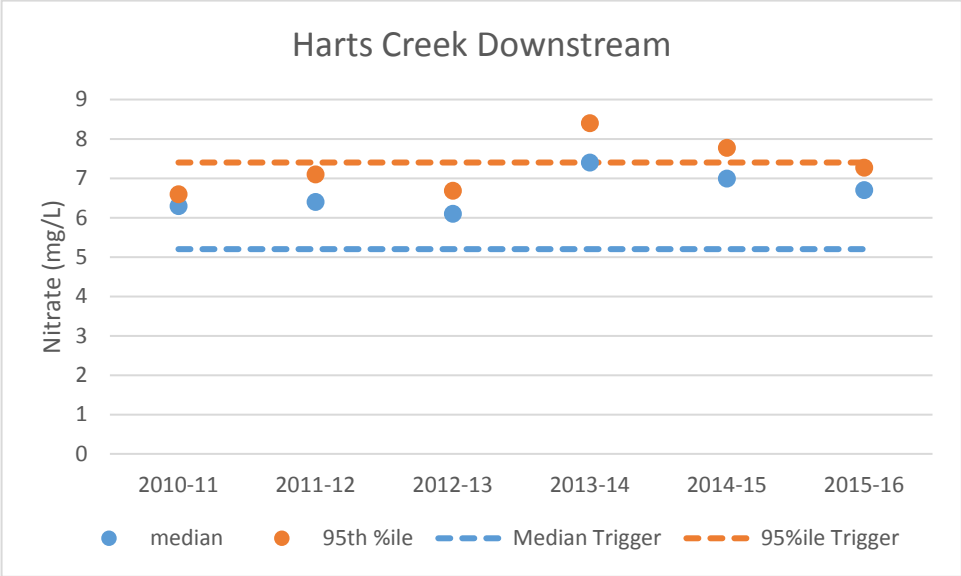

Figure 9. Harts Creek Downstream location – Nitrate concentrations 2010-11 to 2015-16

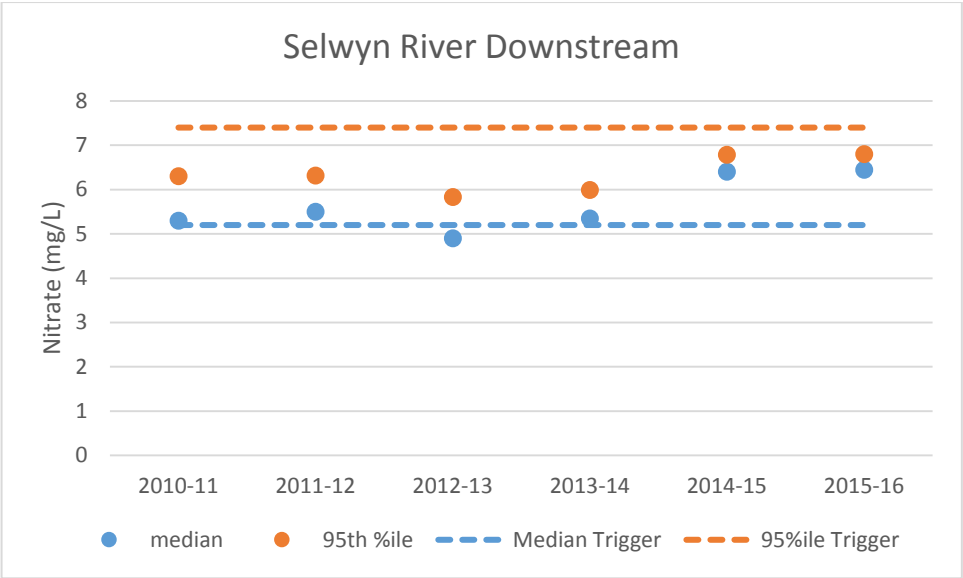

Figure 10. Selwyn River Downstream location – Nitrate concentrations 2010-11 to 2015-16

This comparison to previous monitoring data illustrates that elevated Nitrate concentrations have been prevalent in these waterways for some time, and as no significant change is evident in the 2015-16 results CPWL attributes the exceedance of surface water quality triggers to the elevated baseline levels.

4.2. Lake Water Quality

The trigger levels for Lake Water Quality are listed in Table 3. The trigger levels have been taken from the water quality limits contained in Table (l) of the Land and Water Regional Plan.

Monitoring Location	**Chlorophyll *a* (µg/L)[(b)]**	**Total Phosphorus (mg/L)[(b)]**	**Total Nitrogen (mg/L)[(b)]**	**TLI[(a)]**
Mid-Lake	74	0.1	3.4	6.6
Lake Margins	no trigger	no trigger	no trigger	6

(a) TLI assumed to be calculated as TLI3 (using TP, TN and chl a)

(b) As a maximum annual average determined from 12 (monthly) rounds of monitoring results.

Table 3. Lake Water Quality Triggers

The 10 month (Sept 2015 to June 2016) average for total phosphorus at the Mid Lake monitoring site was 0.22mgL^{-1}. The trigger limit is an annual average of no more than 0.1mg L^{-1} (see Table 4, NB: data in red exceeds the applicable trigger limit). The 12 month average (July 2015 to June 2016 i.e. including the period before scheme irrigation had commenced) was 0.20mg L^{-1}. This was the only lake water quality trigger level exceedance for an individual parameter during the reporting period.

Te Waihora Site	Chlorophyll *a* (µg/L)	Total Phosphorus[A] (mg/L)	Total Nitrogen[A] (mg/L)	TLI_3
Mid Lake (2015-16)	70	**0.22**	2.31	**6.83**
Lake Margin Sites				
• Kaituna Lagoon (2015-16)	30	0.19	1.70	**6.35**
• Off Selwyn River Mouth (2015-16)	70	0.19	2.24	**6.76**
• South of Timber Yard (2015-16)	70	0.19	2.22	**6.75**
• Taumutu (2015-16)	60	0.20	2.13	**6.72**

A Annual Mean

Table 4. Lake Water Quality Monitoring Results 2015-16

ECan has monitored the Mid Lake location on at least a monthly basis since July 1993. During this time the mean annual Total Phosphorus level was 0.24mg L^{-1} (Figure 11).

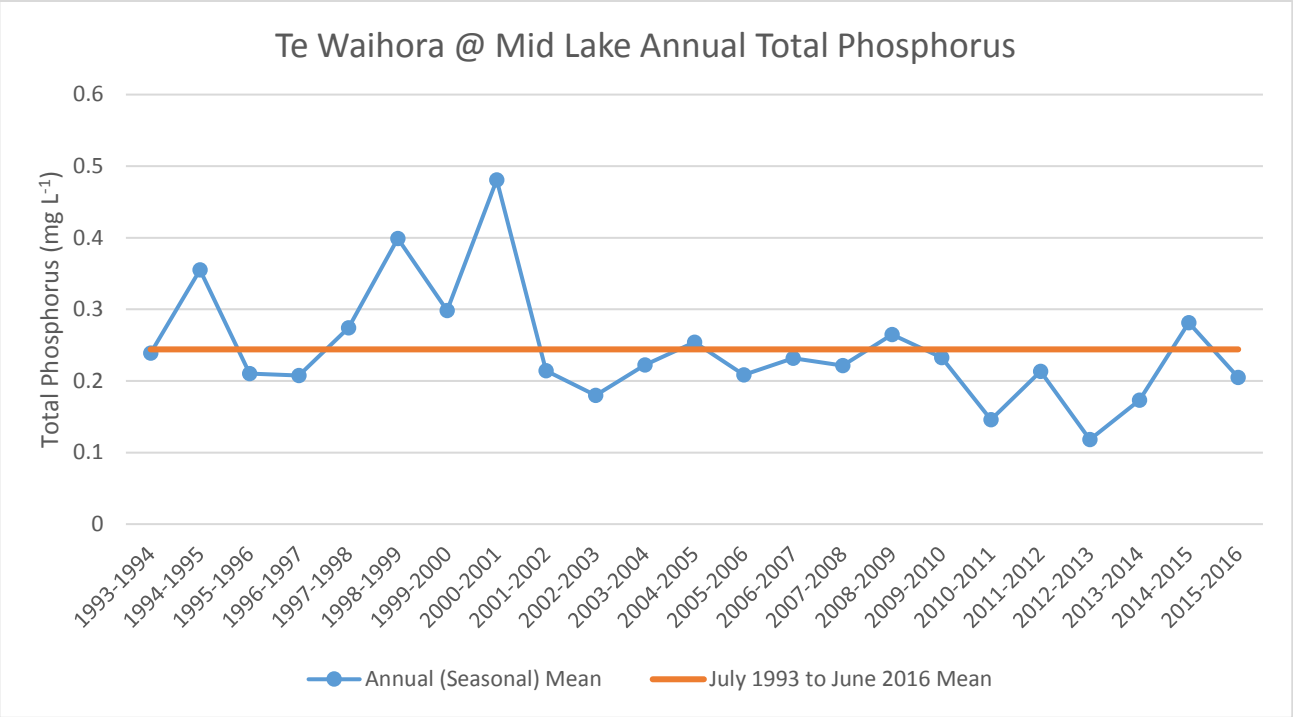

Figure 11. Total Phosphorus at Mid Lake in Te Waihora

Figure 11 suggests that although the result for Total Phosphorus at 'Mid Lake' for 2015-2016 exceeded the trigger level, the level is not inconsistent with previous year's results that ranged between 0.12mg/L and 0.48mg/L during 1993-94 and 2014-15 and as such CPWL attributes the exceedance of the phosphorus trigger at Mid Lake to elevated baseline levels.

The Trophic Level Index (TLI_3) triggers were exceeded for all lake water monitoring sites (see Table 4). The TLI_3 is an indicator of lake water quality specifically developed for New Zealand lakes. The index is derived from a number of water quality measures including total nitrogen, total phosphorus and chlorophyll *a* (found in algae).

A review of monitoring data from the Mid Lake monitoring site from 2013-14 and 2014-15 (see Table 5, NB: trigger exceedences are depicted in red) illustrates that Scheme irrigation in the Stage 1 area during 2015-16 has had no perceptible effect on trigger level exceedances.

Mid Lake, Te Waihora	Chlorophyll *a* (µg/L)	Total Phosphorus[A] (mg/L)	Total Nitrogen[A] (mg/L)	TLI_3
2015-16	70	**0.22**	2.31	**6.83**
2014-15	**119**	**0.3**	2.8	**7.2**
2013-14	**76**	**0.2**	2.2	**6.7**

Table 5. Site Mid Lake, Te Waihora Monitoring Results 2013-14, 2014-15 and 2015-16

The discharge of phosphate laden sediment to surface waters is not a significant issue for CPWL farms when compared to farms in the lowland areas surrounding Lake Ellesmere/Te Waihora. The discharge of Nitrogen is a more significant issue for CPWL Scheme farms. It is noted that whilst the lake Trophic Level Index was exceeded, the trigger level for total Nitrogen concentration was not.

4.3. Groundwater Quality

CPWL have trigger levels in place for *E. coli* and Nitrate-N (See Table 6). With only 10 months of groundwater monitoring results available post commencement of irrigation in Stage 1, it is not possible to assess the results against the trigger level for Nitrate-N (being a five-year annual average concentration of 7.65mg/L).

Contaminant	Measurement	Trigger
Nitrate-Nitrogen	5-year annual average concentration[(a)]	7.65 mg/L
E.coli	Median concentration[(b)]	<1 organism/100 millilitres

Table 6. Groundwater Quality Trigger Levels

(a) In shallow groundwater <50 metres below groundwater level

(b) Measured over the length of record

There are however several CPW monitoring bores across both Stage 1 and Stage 2 where Nitrate concentrations have been found to be consistently greater than 7.65mg/L (refer to Tables 7 and 9 and Figure 4).

In the Stage 1 area, there were no examples identified between September 2015 and June 2016 of Nitrate concentrations being found above 11.3mg/L in any CPWL monitoring bore that is located within 100m of a bore used for domestic supply.

4.3.1. Stage 1

E. coli

E. coli was not found in any Stage 1 bore water sampled between September 2015 and June 2016. There has only been a single occurrence of *E. coli* (27 MPN/100ml) being measured in a Stage 1 dedicated monitoring bore sample since March 2014 (n=77) and that was from a sample taken in March 2014.

Nitrate-Nitrogen

Annual Medians >7.65mg/L

There are four Stage 1 bores that had an average Nitrate concentration for the 2015-16 monitoring period of greater than 7.65mg/L (see blue shaded columns in Table 7). These sites also recorded mean Nitrate concentrations for the 2014-15 period of greater than 7.65mg/L.

Date	BX21/0017	BX21/0018	BX22/0041	BX22/0042	BX22/0043	BX22/0053	BX22/0044	BX22/0046
Jun-16	**9.2**	3.6	4.5	5.4	**13**	**9**	5.9	**12.2**
Mar-16	**8.5**	4.4	6.7	5.7	**13**	**9.8**	5	**12.3**
Dec-15	**9.1**	3.5	5.3	6.1	**13.1**	**8.5**	5.6	**12.4**
Sep-15	**8.5**	2.9	4.1	4.9	**14.3**	**8.3**	6	**12.5**
Jun-15	5.9	3.2	2.7	5.2	**14.6**	**10.5**	4.5	**12.6**
Mar-15	7.1	4	3.1	3.5	**10.9**	**11**	4.6	**12.8**
Dec-14	**7.9**	3.6	4.9	6.2	**13**	**8**	3.9	**12.4**
Sep-14	**10.2**	3.1	3.9	5.5	**10.2**	6.3	4.5	**13.2**
Jun-14	**11.2**	4.3	4.6	5.7	**9.9**		7.4	**14.4**
Mar-14	**7.8**	4.3	4.3	5.3	**13.6**		4.1	**12.9**
2015-16 Mean	**8.8**	3.6	5.2	5.5	**13.4**	**8.9**	5.6	**12.4**
2014-15 Mean	**7.8**	3.5	3.7	5.1	**12.2**	**9.0**	4.4	**12.8**
All Data Mean	**8.5**	3.7	4.4	5.4	**12.6**	**8.9**	5.2	**12.8**

Table 7. Stage 1 Bores Nitrate-N Status March 2014 to June 2016

Figure 12 shows the land use, and Figure 13 the irrigation type, of CPWL shareholder farmland located up-gradient of the monitoring bores that had mean annual Nitrate concentrations of greater than 7.65mg/L.

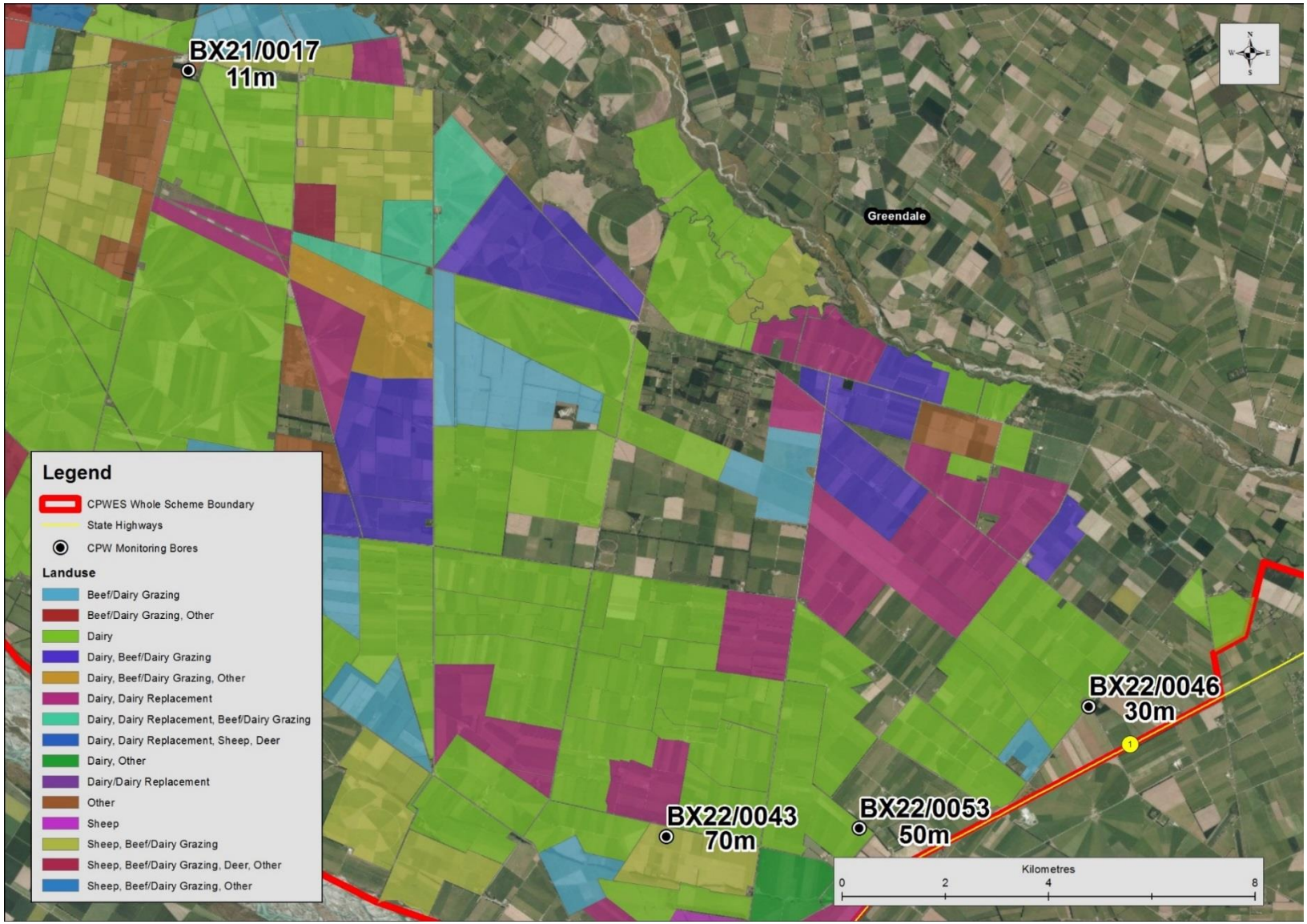

Figure 12. Shareholder Land Use Up-Gradient of the Stage 1 Elevated Nitrate-N Bores

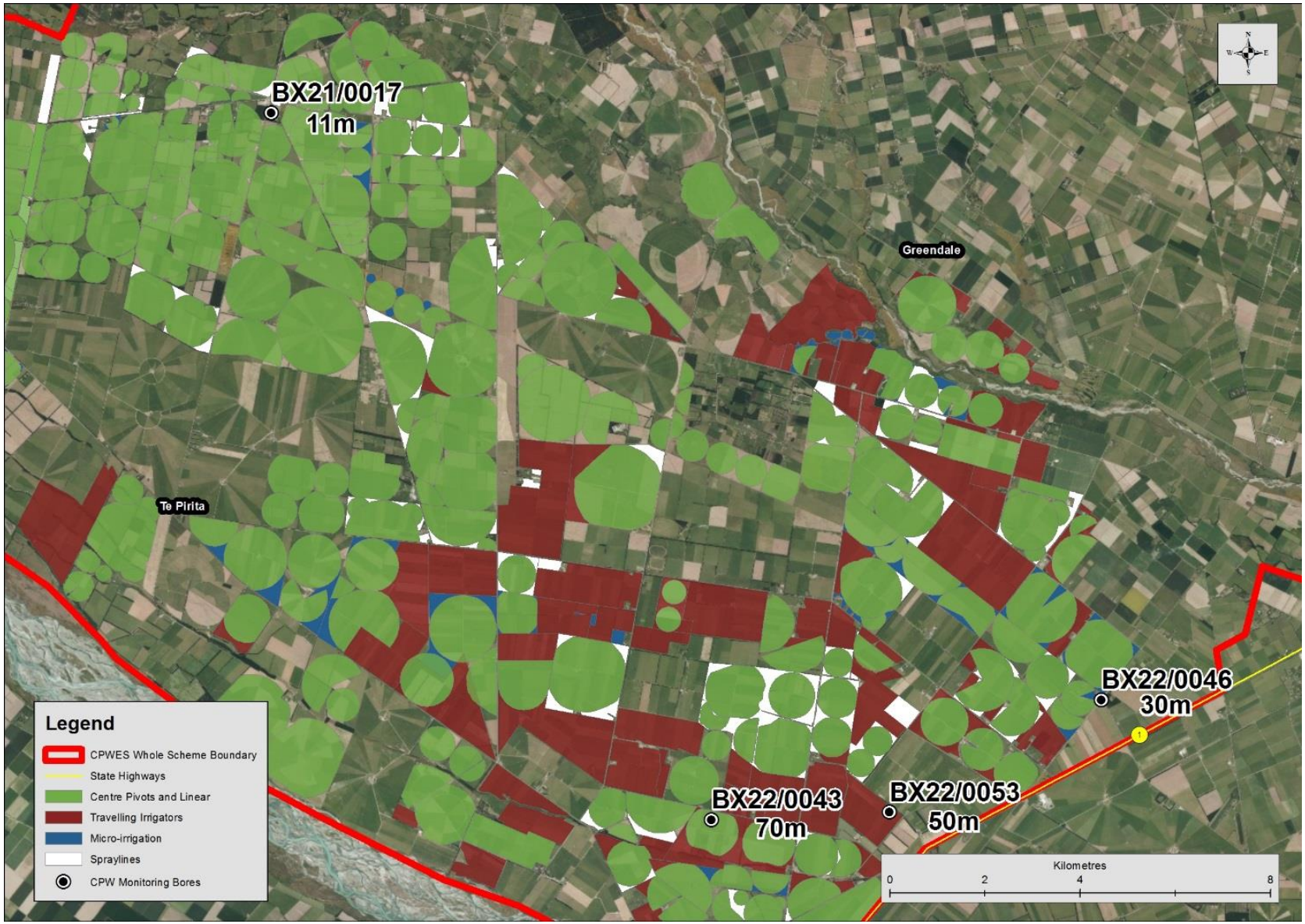

Figure 13. CPWL Shareholder Irrigation Types for Farms Up-Gradient of Stage 1 Elevated Nitrate-N Bores

Bores with new maximum Nitrate concentrations measured within the last 12 months

There were two instances where a Nitrate-N reading from a Stage 1 bore was found, during the 2015-16 monitoring year, to be at an all-time maximum. Both instances occurred in March 2016.

During the March 2016 monitoring round, bores BX21/0018 and BX22/0041 had Nitrate-N concentrations of 4.4mg L^{-1} and 6.7mg L^{-1} respectively (see Figure 15 for bore locations).

The Nitrate result from a sample taken from bore BX21/0018 in March 2016 at 4.4mg/L was the maximum measured from this bore to date and equal to the maximum concentration measured in L36/1157 (see Figure 14). Note: Bore L36/1157 is located approximately 10 metres west of BX21/0018. Figure 14 suggests that there is a trend of increasing Nitrate concentrations in this area, with the results from both L36/1157 and BX21/0018 between 2014 to June 2016 plotting in the vicinity of the trend line generated from ECan's monitoring of L36/1157 during 2010-12. There was an increase in dairy farming in the area up-gradient of BX21/0018 between 2010 and 2015 (i.e., before CPW was commissioned) and may have contributed to the increasing trend seen in Figure 14. However it is difficult to identify any effect from just one year of CPW (2015/16) operation against this background increasing trend. Further nitrate monitoring for some years will be necessary, together with an assessment of land use change patterns, to determine whether there is any significant change to the trend observed in Figure 14 in future and whether cause is attributable to land use change.

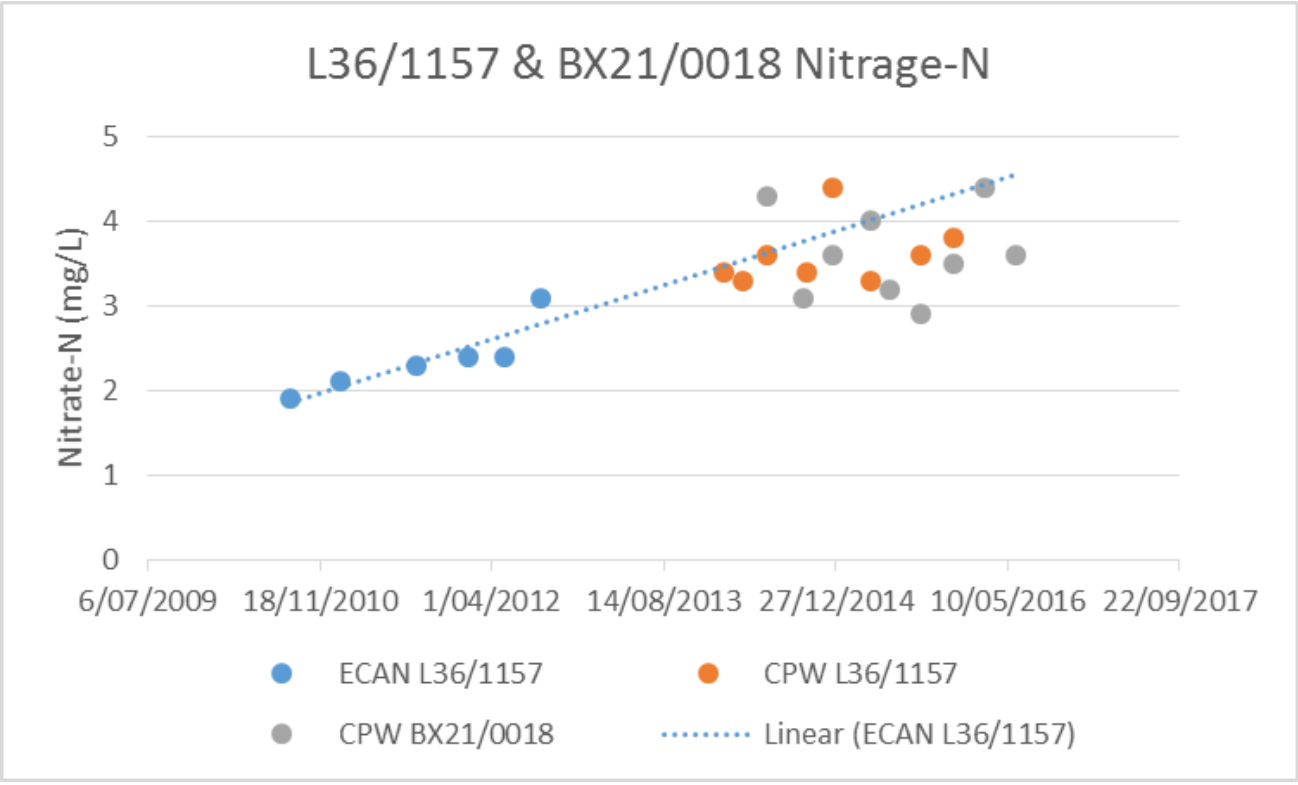

Figure 14. Nitrate Concentrations in L36/1157 & BX21/0018

Figure 15. Location of Stage 1 Bores that recorded Maximum Nitrate Concentrations within the last 12 months

Bore BX22/0041 also recorded a new maximum nitrate concentration (6.7mg/L) during the last 12 months of monitoring, from the March 2016 sample. Nitrate concentrations greater than 6.7mg/L have been measured from bore L36/0059, which is located approximately 10 metres from BX22/0041, when monitored by CPWL but never by ECan (see Figure 16).

Differences in results between adjacent typical Canterbury water supply and long-screen bore pairs are not uncommon for the reasons described previously (see in Section 4.3). L36/0057 is screened from 42.6 to 47.2 metres below ground level (mbgl) while BX22/0041 is screened from 10.12 to 40.1mbgl. Water is abstracted from long-screen monitoring bores from 1m below the static water level. In the case of BX22/0041, this meant water was abstracted from 20.88 to 24.81mbgl compared to 42.6 to 47.2mbgl for L36/0059. This greater than 20m vertical distance from point of abstraction is illustrated in Figure 5 and may account for the variation between Nitrate concentrations from the two bores (but does not explain the differences between CPWL and ECan monitoring results). L36/0059 had last been used as a water supply bore sometime prior to December of 2012 and ECan ceased monitoring water quality from this bore in November 2015. The difference between the CPW and ECan measurements from the same bore (orange compared to blue results in Figure 16) remains unexplained at this time.

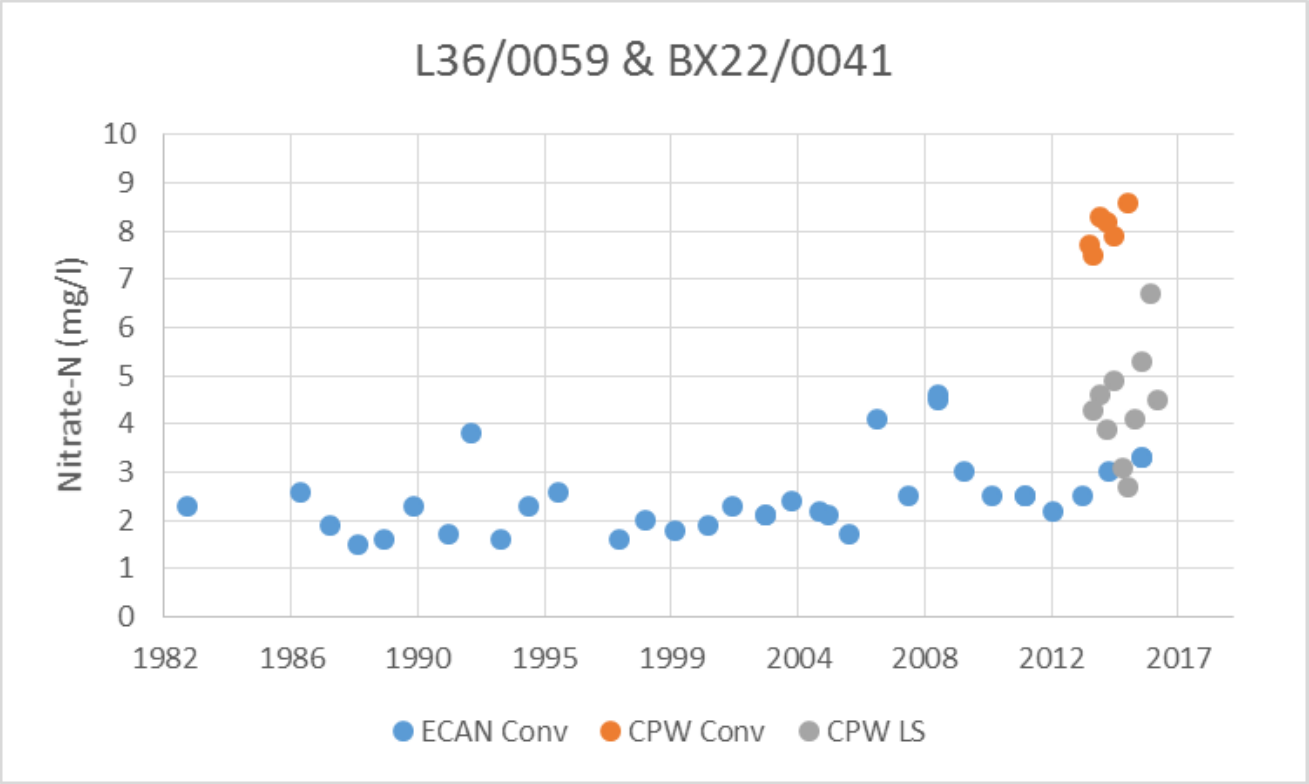

Figure 16. Nitrate Concentrations in L36/059 & BX22/0041

4.3.2. Sheffield

E. Coli

E. coli was detected at 6 MPN/100ml from Bore BW22/0042 during the June 2016 monitoring round. This is the only occurrence of *E. coli* being detected from a dedicated Sheffield monitoring bore sample since monitoring began in March 2014 (n=20). Occasional occurrences of *E. coli* in groundwater bores are not uncommon particularly during wet weather sampling. ECan's annual regional groundwater surveys from 2009 to 2015 detected *E. coli* in 3.7% to 12.5% of bores. There is also the possibility that positive *E. coli* readings may result from the sample collection and handling procedures.

Nitrate-Nitrogen

Nitrate levels measured in the two Sheffield monitoring bores between September 2015 and June 2016 were within the ranges previously measured and the four round 'annual' medians were both less than 7.65mg/L (refer to Figure 17).

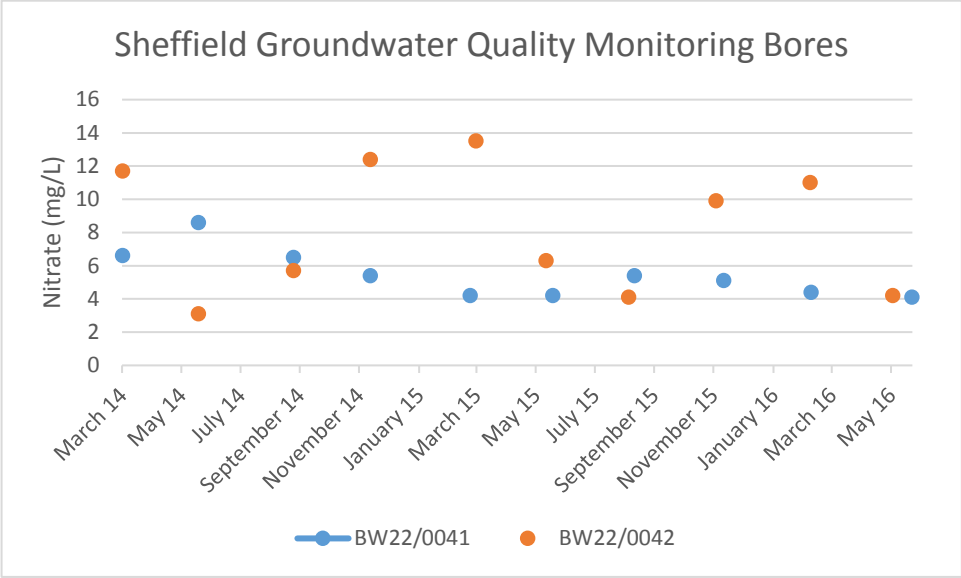

Figure 17. Nitrate Concentrations in CPWLs Sheffield Monitoring Bores

4.3.3. Stage 2

E. Coli

The detection of *E. coli* has been much more frequent in CPWL's Stage 2 monitoring bores with levels detected in 7 out of a total of 50 samples taken since June 2015. Results from the four Stage 2 bores that had samples test positive for *E. coli* are shown in Table 8 below. Figures 18 and 19 display the land use and irrigation type used by farms up-gradient of the groundwater that gave samples positive for *E. coli* in 2015-16.

Date	BX22/0065	BX22/0066	BX22/0067	BX22/0068
Jun-16	0	1	2	0
Mar-16	0	0	5	0
Dec-15	12	0	>201	2
Sep-15	0	0	0	1
Jun-15	0	0	0	0

Table 8. Stage 2 Bores in which Samples *E. Coli* were Detected (MPN/100ml).

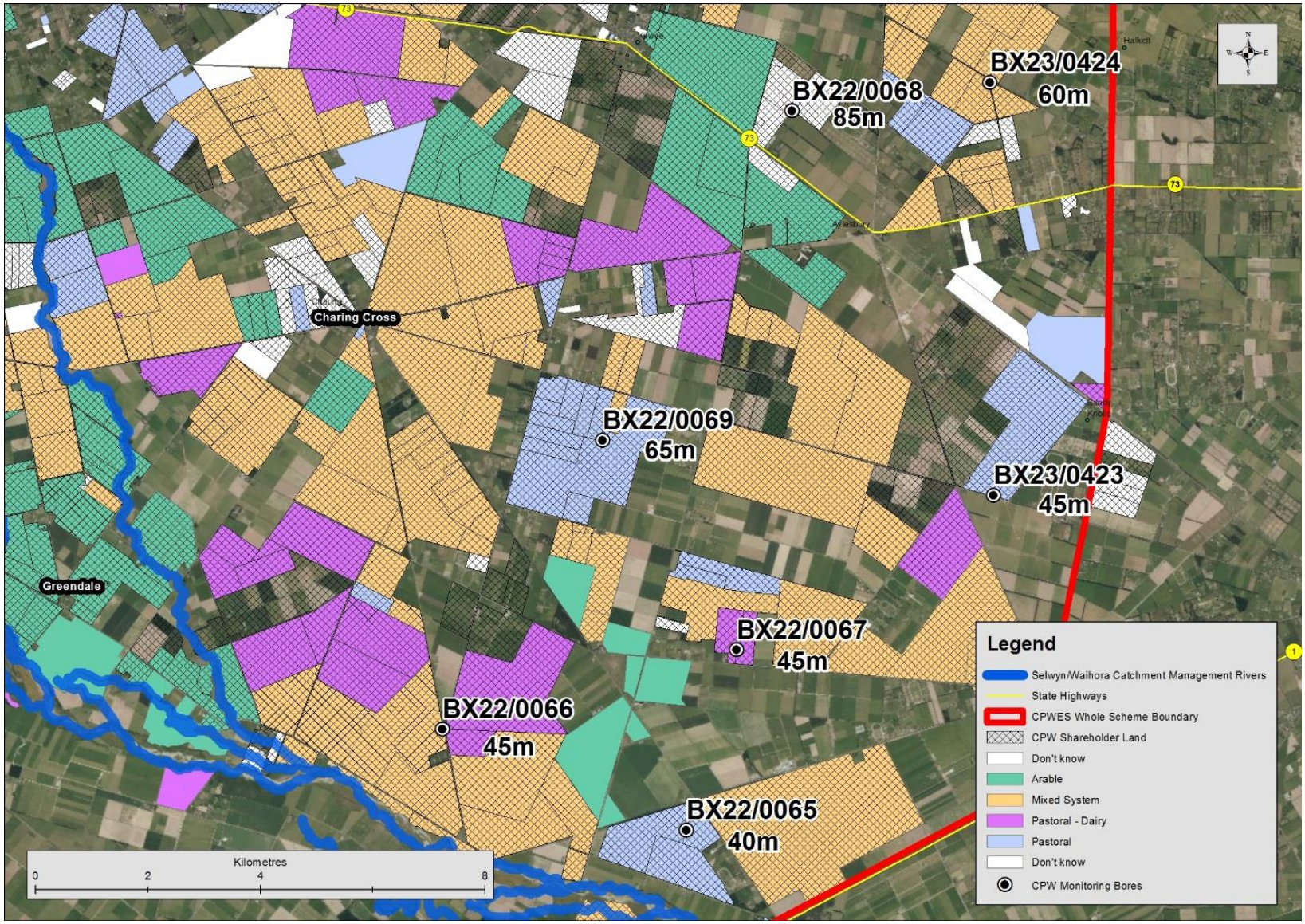

Figure 18. Land use of Stage 2 farms located up-gradient of *E. Coli p*ositive, and elevated Nitrate, bores

Figure 19. Irrigation status of Stage 2 farms located up-gradient of *E. coli* positive, and elevated Nitrate, bores

Only BX22/0067 has a median concentration of *E. coli* greater than zero and hence would constitute a trigger level exceedance had Stage 2 irrigation been in operation during the 2015-16 season.

Nitrate-Nitrogen

Six of the ten Stage 2 bores had a 12-month mean Nitrate concentration of greater than 7.65mg/L (Table 9 NB: individual results greater than 7.65mg/L are shown in red).

Date	BX22/0065	BX22/0066	BX22/0067	BX22/0069	BX23/0423	BX23/0424
Jun-16	**9.1**	**13.1**	**12.1**	**9.6**	**10.3**	**7.9**
Mar-16	**8.9**	**8.9**	**12.1**	**9.8**	5.5	**8.1**
Dec-15	**9.5**	6.2	**13**	**10.2**	**9.1**	**9**
Sep-15	**10.9**	4.9	**14.5**	**9.9**	**10.7**	**11**
Mean	9.6	8.3	12.9	9.9	8.9	9.0

Table 9. Stage 2 bores with annual median Nitrate concentration of greater than 7.65mg/L.

4.4. CPWL Scheme Area Groundwater Level Monitoring

The Central Plains area has now experienced two years of significantly lower than normal rainfall. Around 300mm of rainfall typically needs to fall between March and September in order to significantly raise groundwater levels.

CPWL reviewed groundwater level data from ten bores that are currently monitored by ECan on a monthly basis that are located inside, or within 900m of, the Scheme area. Five bores are in each of our Stage 1 and Stage 2 areas (see figure 20). The difference in groundwater levels between the 2015-16 seasonal low (that occurred in March, April or May 2016 depending on the individual bore), to the end of July 2016 was compared to the difference between the 2014-15 seasonal low (March to August 2015) to the month where the shallowest level was reached (June to October 2015), and the results are shown in Table 10. In the Stage 2 Area, four bores had less recovery in 2016 compared to 2015, and the calculation cannot be made for one bore that was dry in July 2016. In the Stage 1 area, three bores had greater recovery in 2016 compared to 2015, one bore recovered less and the calculation could not be made for one bore as groundwater level recovery couldn't be determined for 2015.

	Groundwater Recovery (2016 vs 2015)			Groundwater Recovery (2016 vs 2015)	
Stage 1 Bores	metres	2016 as a %age of 2015	Stage 2 Bores	metres	2016 as a %age of 2015
L36/0010	3.34m vs 4.44m	75%	L35/0154	7.04m vs >15.682m	less than 45%
L36/0124	2.12m vs 1.93m	110%	M35/1000	0.144m vs 1.015m	14%
L36/0202	Nil vs >2.17m	cannot be determined	M36/1926	5.63m vs 6.03m	93%
L36/1157	>12.35m vs 7.74m	> 160%	L35/0163	well dry vs 0.574m	cannot be determined
L36/1226	2.42m vs 1.38m	> 175%	L36/0064	4.87m 5.27m	92%

Table 10. Groundwater recharge 2016 (to end of July) vs 2015

One possible contributor to the observed difference in groundwater recovery between Stage 1 and 2 areas could be that during the 2015-16 irrigation season Stage 1 farms introduced over 91 million m^3 of alpine water into the catchment. Furthermore, CPWL irrigators abstracted 19 million fewer cubic metres of groundwater compared to the previous irrigation season. While it is not currently possible to be certain that the change in irrigation water source in the Stage 1 area is responsible for the differences in groundwater level recovery, ongoing monitoring may be able to confirm this in the future.

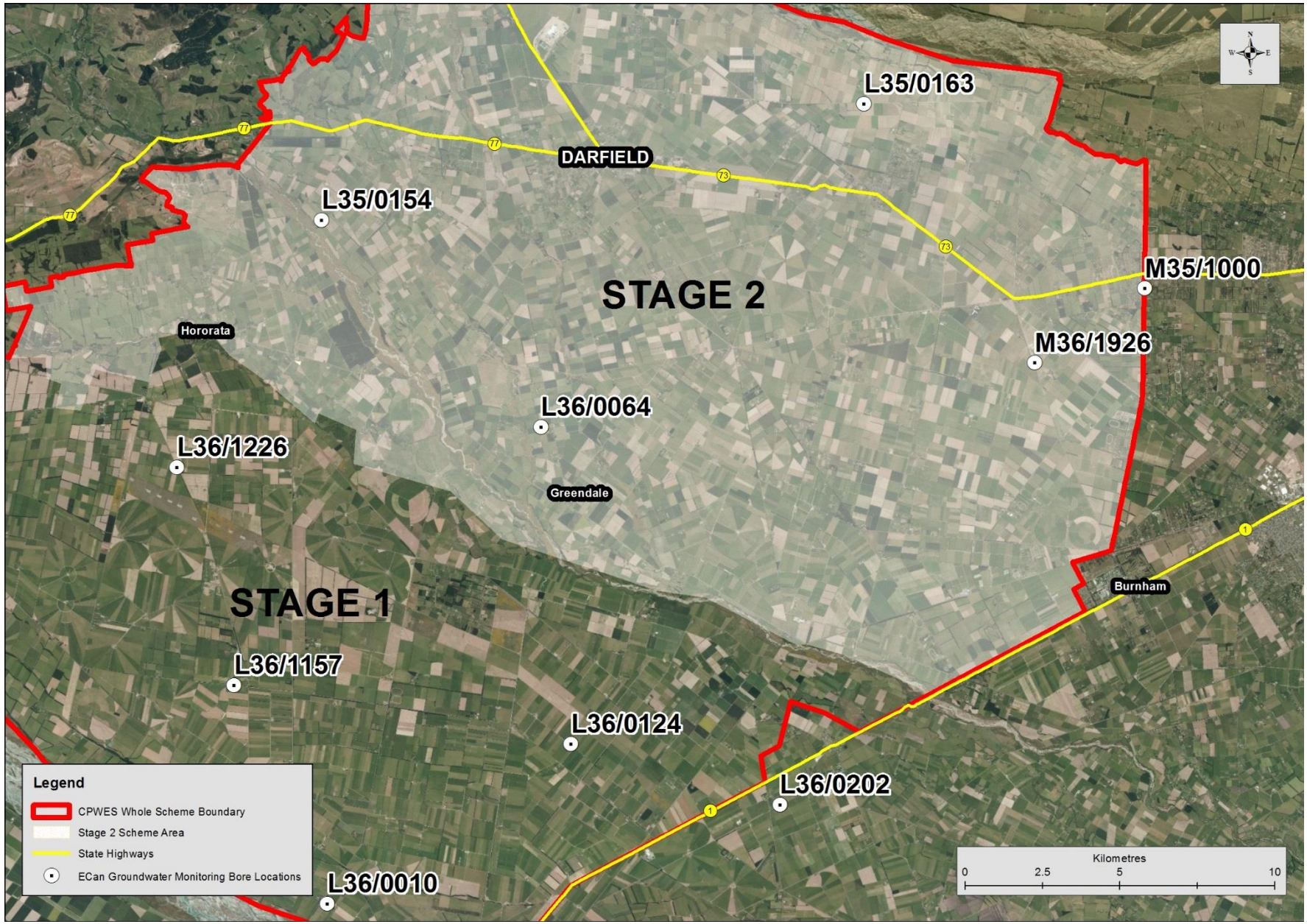

Figure 20. ECan's Groundwater Level Monitoring Bores located within/or near Stage 1 and Stage 2 of the CPWL Scheme

4.5. Lowland Groundwater Level Monitoring

The Lowland groundwater level triggers are set at the 95th percentile of the (at least 40 year) historical record.

Between September 2015 and June 2016, no Lowland groundwater level triggers were reached. The nearest any measured groundwater level reached to a CPWL trigger was at bore M36/7880 on 19 October 2015, where the groundwater level was 0.10m below the trigger level (Figure 21). NB: the levels referred to in Figure 21 are in metres above sea level (mASL).

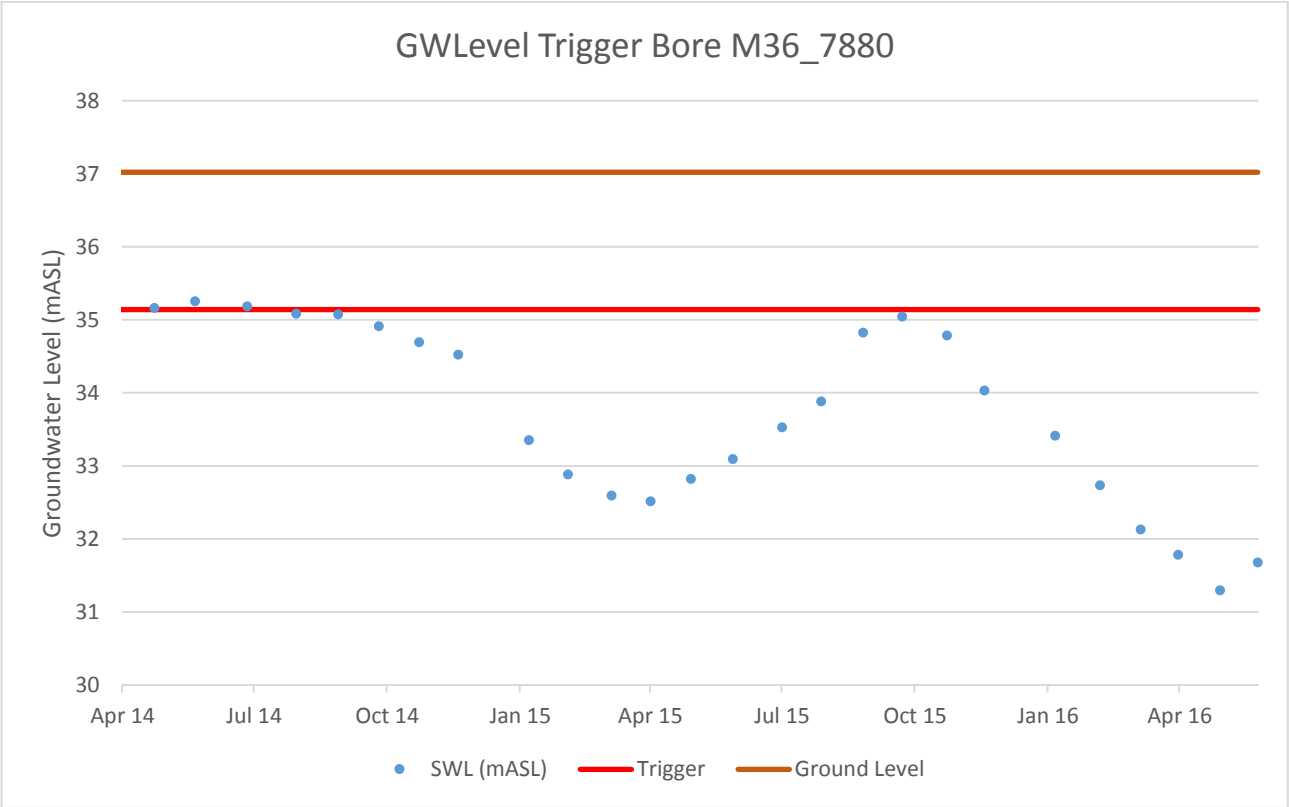

Figure 21. Groundwater Level at Lowland Trigger Bore M36/7880

The longer term groundwater record shown in Figure 22 highlights the frequency with which the trigger level would have been historically reached. This bore was found to be dry in April and May of 2006.

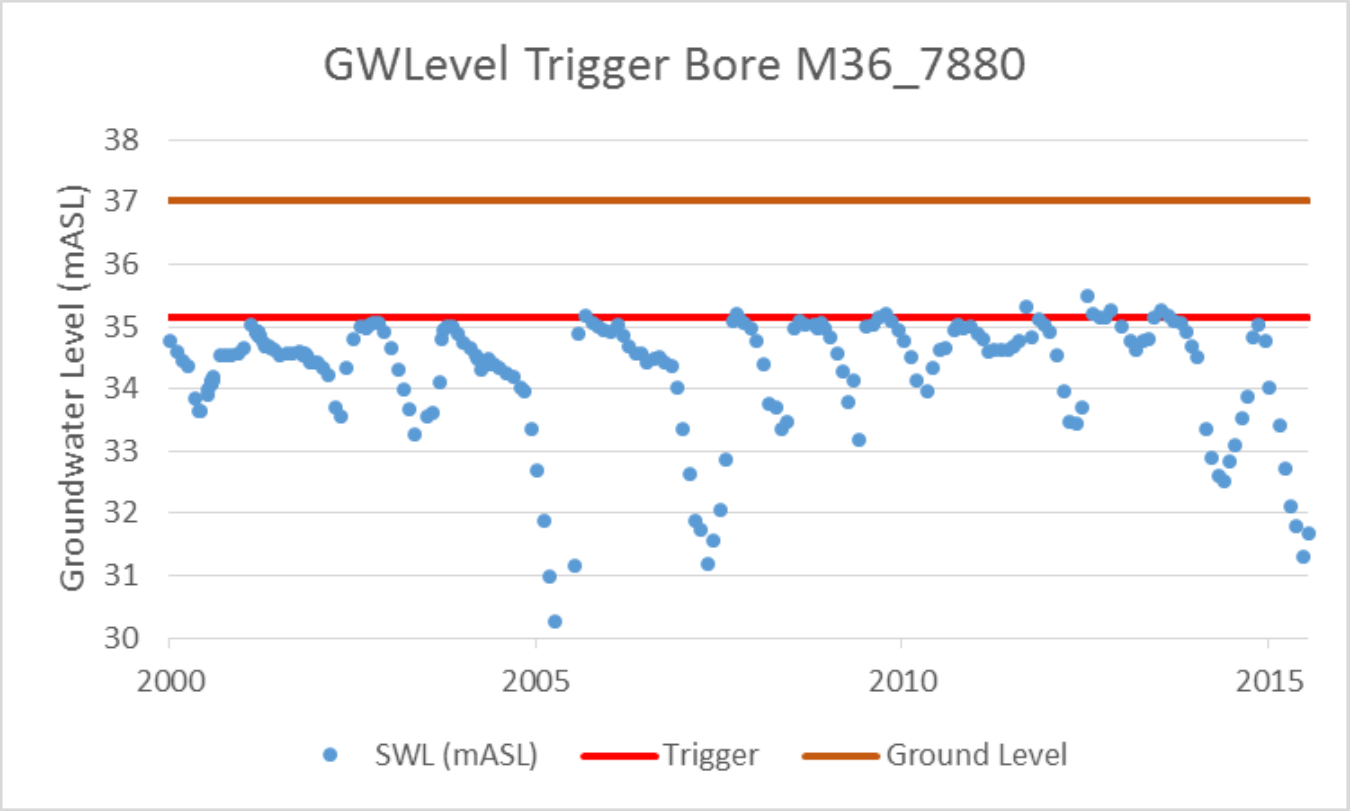

Figure 22. Groundwater Level at M36/7880 2000 to 2016

Due to the low groundwater levels in the Selwyn Waihora catchment at present and that only Stage 1 of the wider CPWL Scheme was operating in 2015-16, it is not surprising that no lowland groundwater level triggers were reached during the 2015-16 irrigation season.

5. Conclusion

Following the first year of operation of the Stage 1 area only, it is too early to identify what positive and/or negative effects the Scheme may be having in the Selwyn-Waihora catchment.

The difference in groundwater recharge between 2016 and 2015 as determined from a small number of bores in Stage 1 and Stage 2 suggests a possible positive effect is occurring as a result of the introduction of alpine irrigation water to the catchment and the reduced abstraction of groundwater. Ongoing monitoring may allow confirmation of this in the future.

After two dry years with little groundwater recharge in the area it is not surprising that lowland groundwater levels did not reach their respective triggers.

Some surface water and lake water quality trigger levels were exceeded but levels were found to be consistent with results from previous years (prior to the CPWL Scheme operating) and not attributable to effects of the Scheme.

E. coli was not found in bores from within the operational Stage 1 area of the Scheme and although elevated concentration of Nitrate were detected in some Stage 1 bores, they were found to be consistent with results or trends from previous years and not attributable to effects of the Scheme.

In general the monitoring results from one year of Scheme operation are insufficient to detect and attribute any effects of the Scheme on water quality, particularly when compared against some existing elevated and increasing contaminant trends caused by historic land uses and practices whose effects are time-lagged over 10+ years. Some years of further water quality monitoring will be necessary, together with on-going assessment of CPW and other land use change patterns in the catchment, to determine any significant change to existing elevated nitrate concentrations and increasing trends, and whether any cause is attributable to CPW, to previous land use changes and/or to improving practices through time.

Through management of the Farm Environment Plan requirements at the Scheme level, CPWL now has a more informed understanding of our Stage 1 farmers' management practices and what changes are planned for the future. This in turn, will enhance our ability to better interpret results from our ground and surface water monitoring programme.

6. Appendices

6.1. Ground and Surface Water Plan Part II – Trigger Limits and Trigger Response Processes

Table 11. Surface water quality triggers (Nitrate-N (mg/L)) for the CPWL monitoring programme

River Type	pLWRP Variation 1		CPWL surface water monitoring	
	Annual Median	Annual 95th percentile	Annual Median	Annual 95th percentile
Spring-fed plains	6.9	9.8	5.2	7.4
Hill-fed lower	2.4	3.5	1.8	2.6

Table 12. Water quality triggers for CPWL lake water quality monitoring

Monitoring Location	TLI[(a)]	Total Phosphorus (mg/L)[(b)]	Total Nitrogen (mg/L)[(b)]	Chlorophyll A (µg/L)[(b)]
Mid-Lake	6.6	0.1	3.4	74
Lake Margins	6	n/a	n/a	n/a

(a) TLI assumed to be calculated as TLI3 (using TP, TN and chl a)

(b) As a maximum annual average

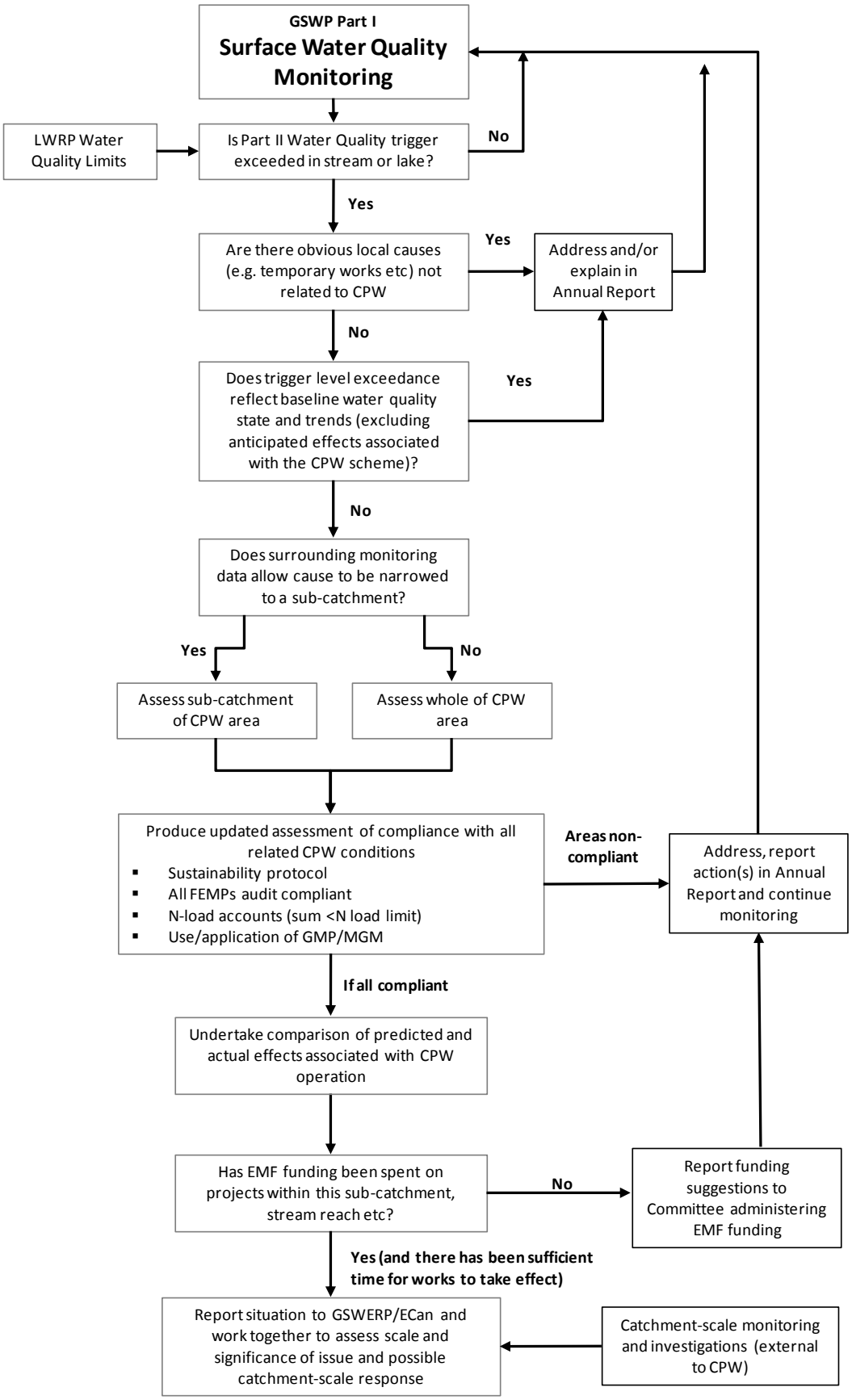

Figure 23. CPWL response to surface water quality trigger level exceedance
The CPWL response initiated following an exceedance of lake water quality triggers is consistent with that established for surface water quality monitoring.

Table 13. Groundwater quality triggers for the CPWL monitoring programme

Contaminant	Measurement	Trigger
Nitrate-Nitrogen	5-year annual average concentration[(a)]	7.65 mg/L
E.coli	Median concentration[(b)]	<1 organism/100 millilitres

(a) In shallow groundwater <50 metres below groundwater level

(b) Measured over the length of record

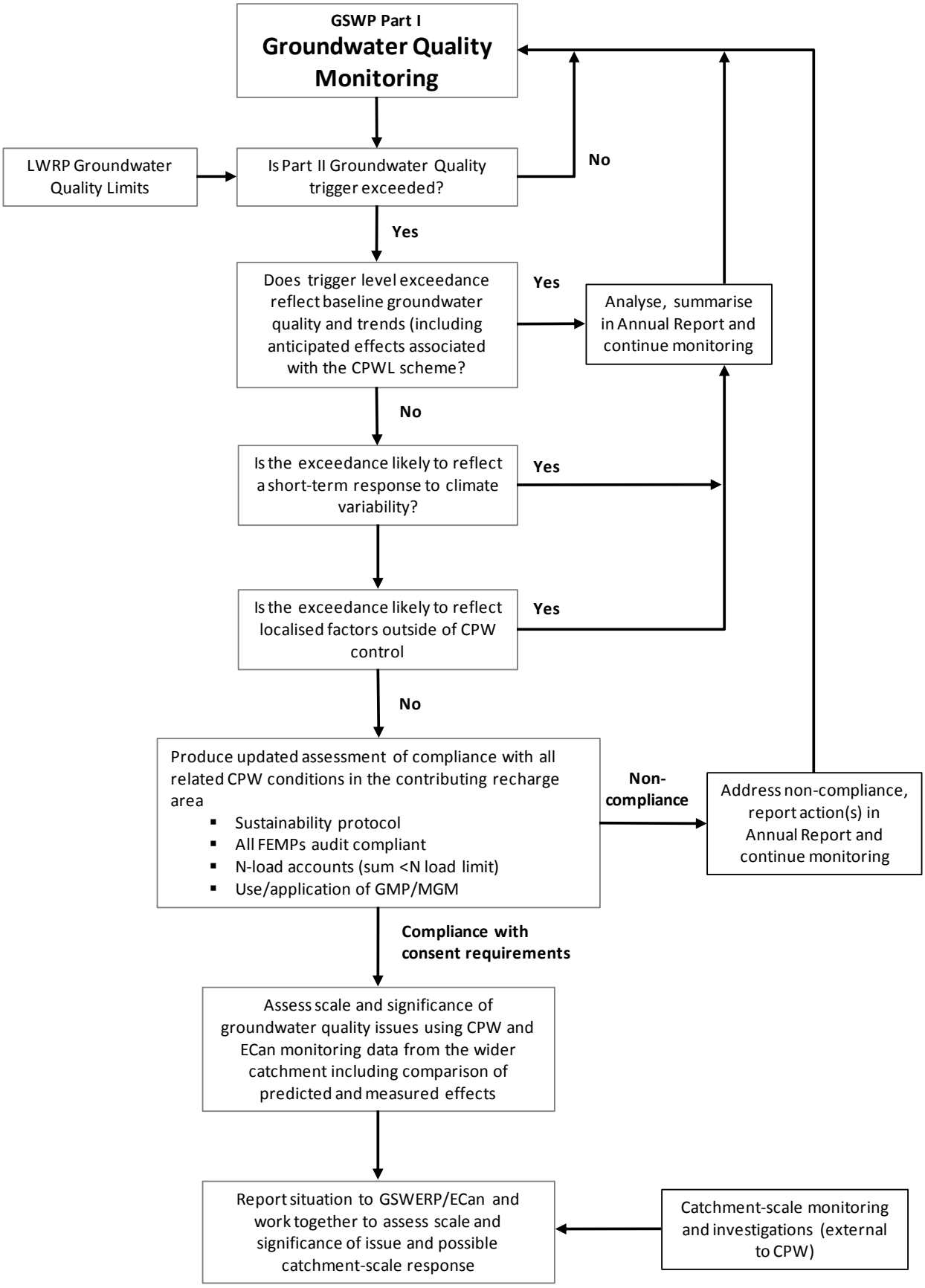

Figure 24. CPWL response to groundwater quality trigger level exceedance

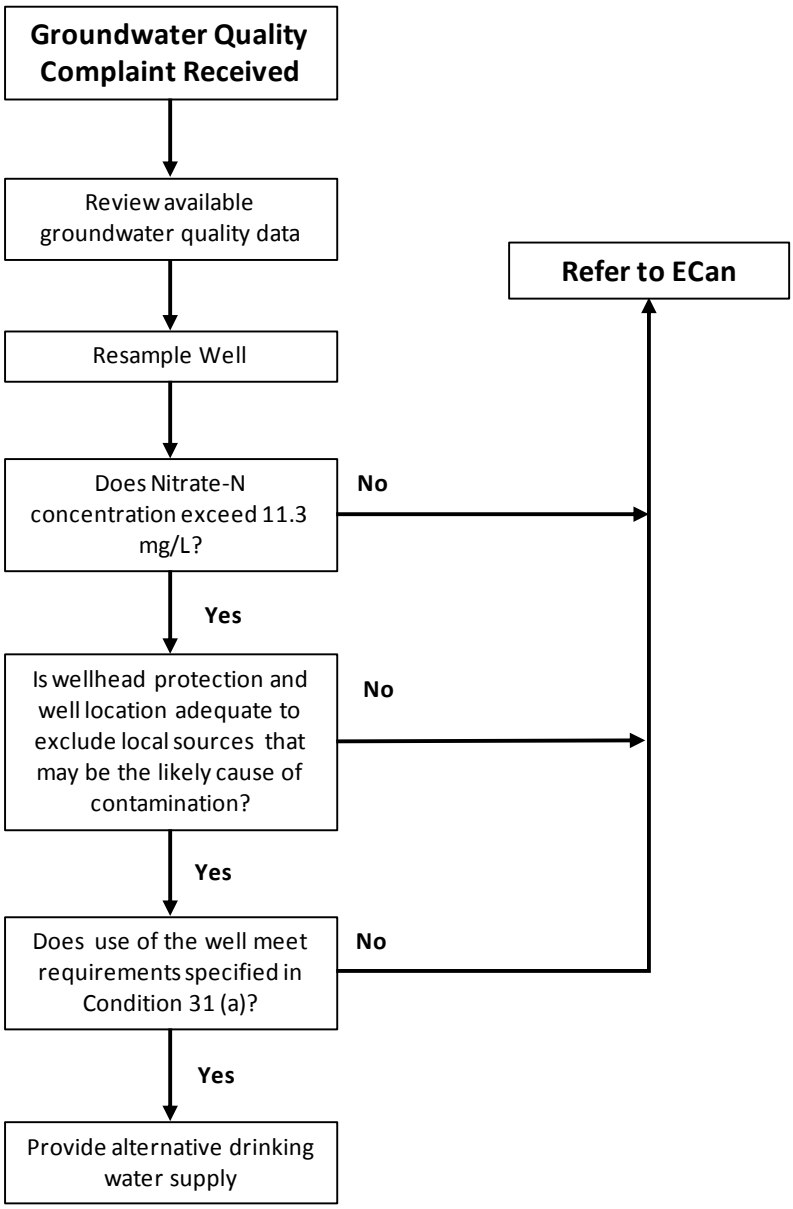

Figure 25. CPWL response to groundwater quality complaints

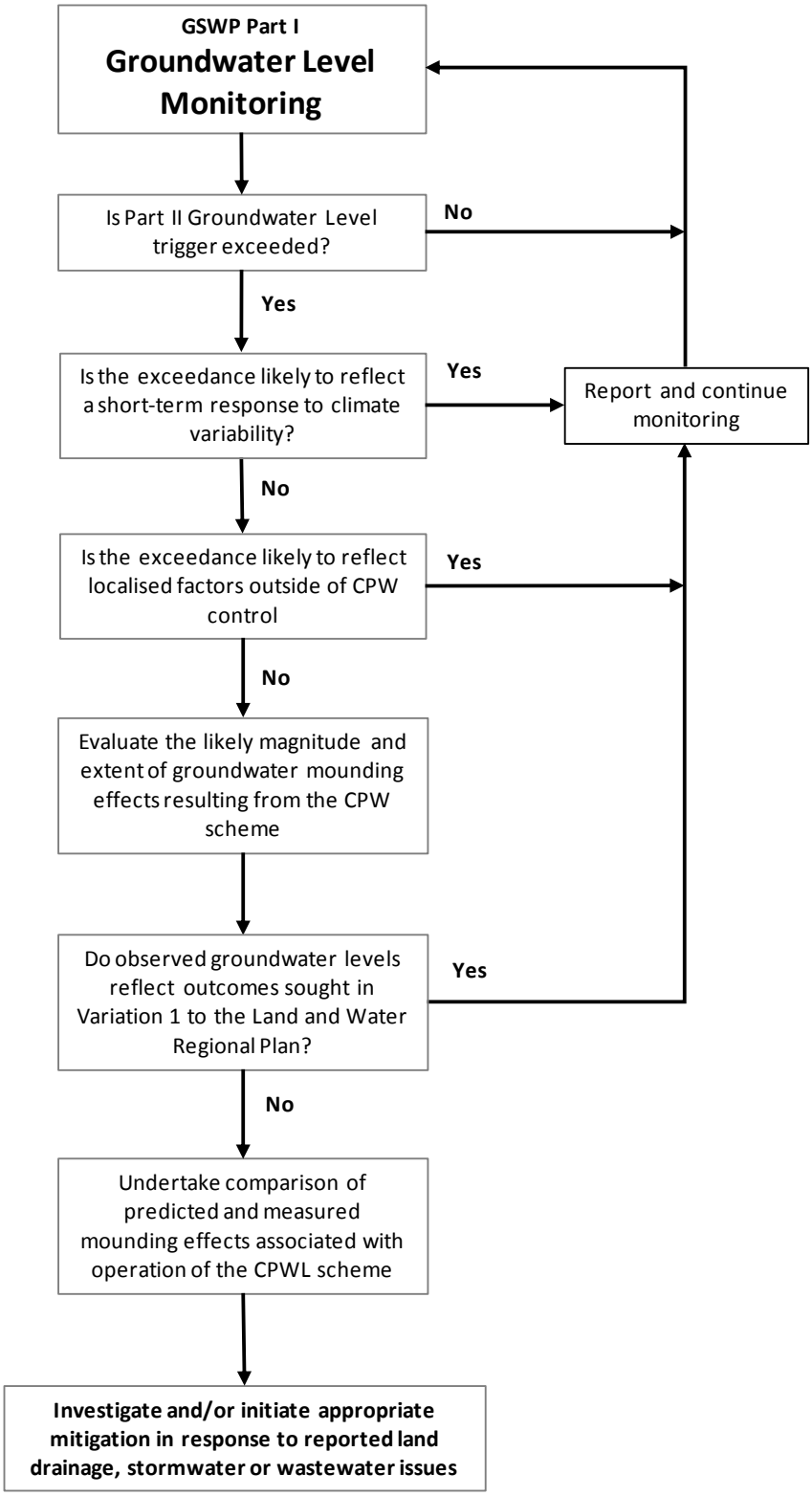

Figure 26. CPWL response to groundwater level trigger exceedance

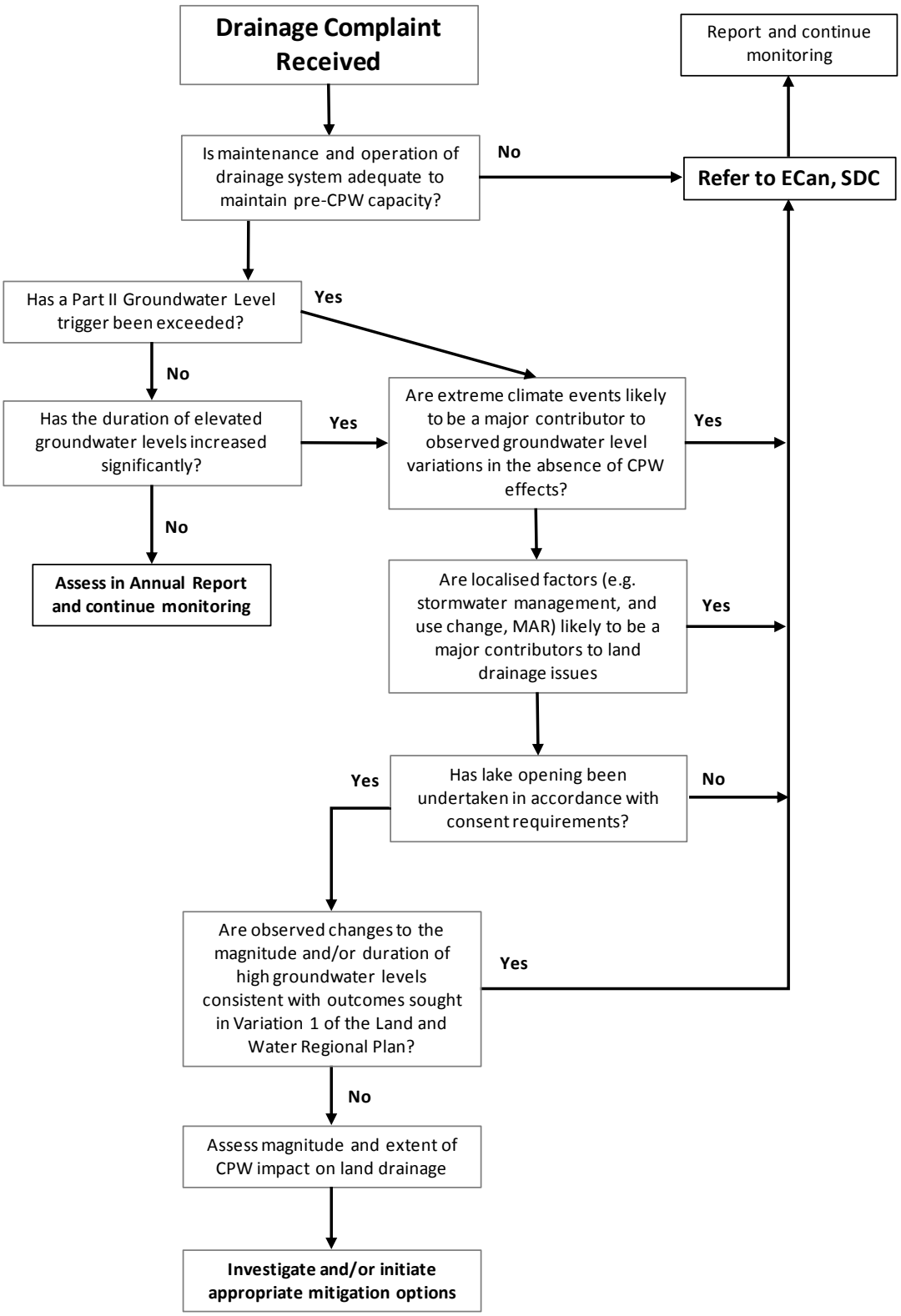

Figure 27. CPWL land drainage complaint response procedure

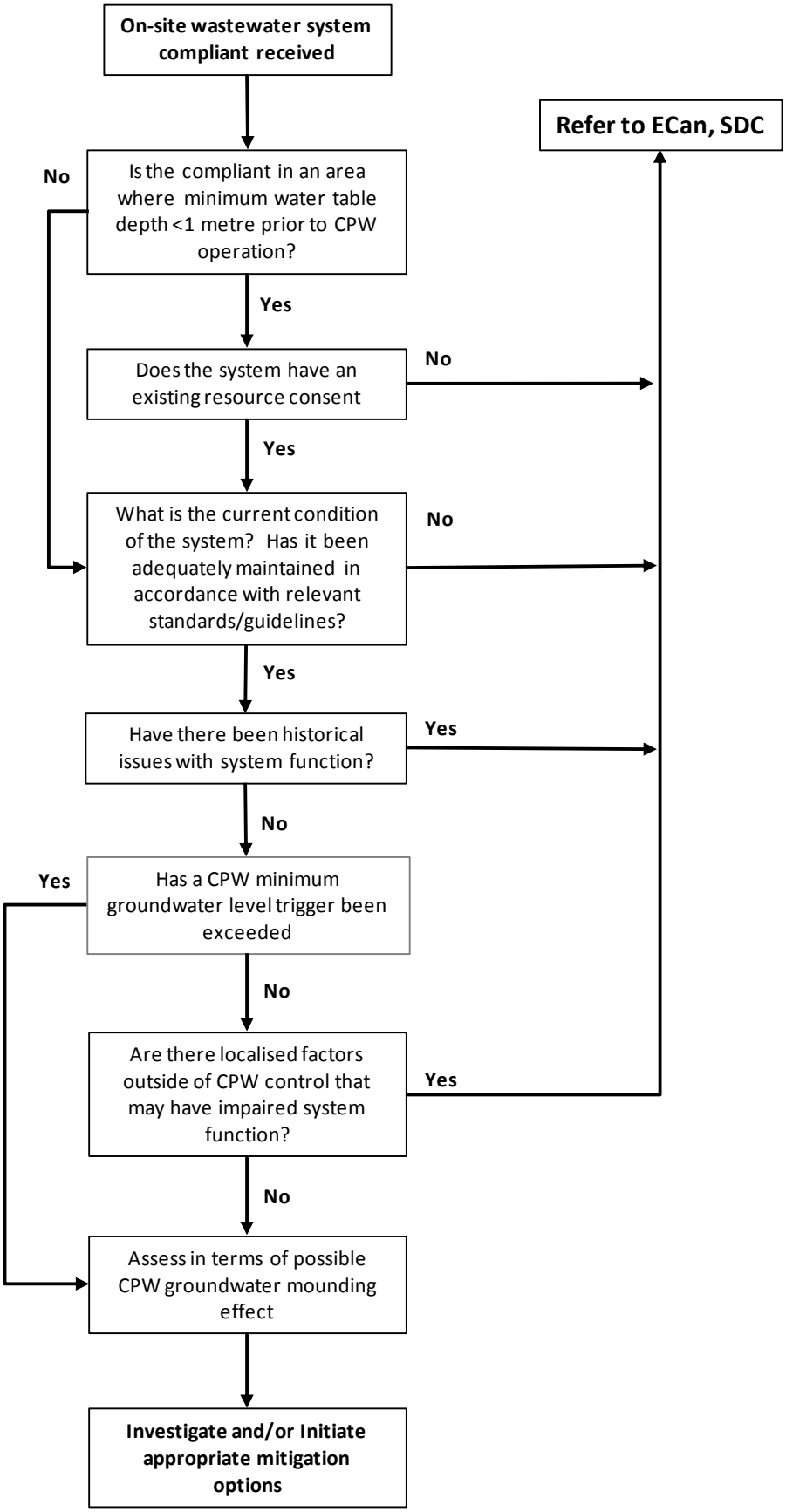

Figure 28. CPWL on-site wastewater complaint response procedure

6.2. Central Plains Water Ltd Annual Compliance Report 2015/2016 Irrigation Season

6.3. River and Stream Monitoring Data (ECan data shown blue)

US1	16/09/2015	28/10/2015	24/11/2015	15/12/2015	20/01/2016	18/02/2016	14/03/2016	20/04/2016	24/05/2016	14/06/2016
Bromide (mg/L)	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved Oxygen (% Sat.)	103.5	103.5	101.5	97.2	100.7	96.7	98.2	99.2	99.7	98.3
Dissolved Reactive Phosphorus (mg/L)	0.004	<0.004	0.004	0.006	0.006	0.006	0.004	0.008	0.007	0.005
Total Phosphorus (mg/L)	0.004	0.007	0.007	0.007	0.01	0.015	0.009	0.008	0.014	0.006
Electrical Conductivity (mS/m)	9.773	9.658	9.062	10.81	7.258	10.61	11.12	10	9.878	8.063
E. coli (MPN/100ml)	119	236	153	921	687	770	206	130	172	84
Total Ammoniacal-N (mg/L)	<0.01	0.012	<0.01	0.028	0.021	0.025	0.016	<0.010	0.011	<0.010
Nitrate + Nitrite-N (mg/L)	0.37	0.12	0.03	0.03	0.05	0.06	0.06	0.07	0.15	0.29
Total Nitrogen (mg/L)	0.44	0.28	0.14	0.13	0.22	0.26	0.18	0.2	0.34	0.41
pH	7.97	7.83	7.76	7.53	7.35	7.42	7.73	7.8	7.54	7.55
Temperature (DegC)	8.5	8.4	12.5	11.2	11.6	14.3	11.4	7.2	4.8	4.3
Turbidity (NTU)	.	0.7	0.9	0.7	2	0.8	0.6	<0.5	1.8	1.1
Flow (cumec)	0.251	0.045	0.054	0.026	0.404	0.061	0.023	0.049	0.090	0.190

US2	15/09/2015	22/10/2015	19/11/2015	14/12/2015	20/01/2016	18/02/2016	14/03/2016	20/04/2016	24/05/2016	14/06/2016
Bromide (mg/L)	0.05	dry	dry	dry	0.05	dry	dry	dry	dry	0.04
Dissolved Oxygen (% Sat.)	108.7	dry	dry	dry	94.1	dry	dry	dry	dry	98.6
Dissolved Reactive Phosphorus (mg/L)	0.012	dry	dry	dry	0.035	dry	dry	dry	dry	0.026
Total Phosphorus (mg/L)	0.028	dry	dry	dry	0.074	dry	dry	dry	dry	0.037
Electrical Conductivity (mS/m)	14.89	dry	dry	dry	21.84	dry	dry	dry	dry	23.08
E. coli (MPN/100ml)	91	dry	dry	dry	>2419	dry	dry	dry	dry	548
Total Ammoniacal-N (mg/L)	<0.010	dry	dry	dry	<0.010	dry	dry	dry	dry	<0.010
Nitrate + Nitrite-N (mg/L)	1.11	dry	dry	dry	0.06	dry	dry	dry	dry	0.48
Total Nitrogen (mg/L)	1.76	dry	dry	dry	0.7	dry	dry	dry	dry	1.18
pH	7.68	dry	dry	dry	7.24	dry	dry	dry	dry	7.61
Temperature (DegC)	9.5	dry	dry	dry	18.1	dry	dry	dry	dry	5.8
Turbidity (NTU)	.	dry	dry	dry	7.9	dry	dry	dry	0	5.3
Flow (cumec)	0.477	0.000	0.000	0.000	0.059	0.000	0.000	0.000	0.000	0.034

US3	14/09/15	15/09/15	12/10/15	27/10/15	9/11/15	19/11/15	10/12/15	14/12/15	19/01/16	19/02/16	10/03/16	20/04/16	18/05/16	16/06/16
Bromide (mg/L)	-	<0.05	-	<0.02	-	<0.02	-	<0.02	-	-	-	-	-	-
Dissolved Oxygen (% Sat.)	106.7	103.6	n/a	99.2	101.1	101	102.6	99.7	107.1	109.8	101.7	103.7	100.9	103.6
Dissolved Reactive Phosphorus (mg/L)	<0.001	<0.004	<0.001	<0.004	0.0015	<0.004	0.0015	<0.004	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.0010
Total Phosphorus (mg/L)	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.005	<0.004	<0.004	<0.004	<0.004	0.017
Electrical Conductivity (mS/m)	8.95	9.608	10.2	10.58	9.73	10.54	9.74	10.45	9.74	10.07	10.19	10.75	10.32	9.98
E. coli (MPN/100ml)	19	11	21	55	9	66	34	28	291	65	72	214	61	21
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
Nitrate + Nitrite-N (mg/L)	0.37	0.35	0.25	0.25	0.21	0.22	0.158	0.17	0.177	0.081	0.087	0.113	0.18	0.32
Total Nitrogen (mg/L)	0.45	0.44	0.29	0.33	0.27	0.3	0.192	0.26	0.31	0.138	0.132	0.148	0.24	0.32
pH	7.83	7.76	8.07	7.69	7.29	7.51	7.17	7.35	7.78	7.78	7.17	7.07	7.74	7.95
Temperature (DegC)	8.2	9.2	n/a	10.1	12.2	8.6	13.1	10.4	13.8	15.6	13.3	12.2	10.3	7.5
Turbidity (NTU)	0.88	.	0.23	<0.5	0.98	<0.5	0.17	<0.5	1.16	0.21	0.33	0.29	0.86	0.27
Flow (cumec)	3.926	3.270	1.786	1.350	1.251	1.374	0.841	0.831	2.545	1.121	0.654	0.079	1.070	1.720

US4	14/09/2015	20/10/2015	19/11/2015	14/12/2015	25/01/2016	18/02/2016	14/03/2016	20/04/2016	11/05/2016	14/06/2016
Bromide (mg/L)	<0.05	<0.02	<0.02	0.01	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Dissolved Oxygen (% Sat.)	107.2	100.9	99.9	96.9	92.4	94.4	94.6	95.6	98.8	101.8
Dissolved Reactive Phosphorus (mg/L)	0.006	0.01	<0.004	0.014	0.014	0.012	0.007	0.013	0.01	0.01
Total Phosphorus (mg/L)	0.009	0.012	<0.004	0.02	0.021	0.022	0.013	0.012	0.007	0.012
Electrical Conductivity (mS/m)	8.557	10.12	9.231	10.31	8.919	10.04	10.6	9.93	10.81	9.633
E. coli (MPN/100ml)	19	109	66	84	548	649	74	135	238	74
Total Ammoniacal-N (mg/L)	<0.010	<0.01	<0.01	<0.010	0.019	<0.010	<0.010	0.013	<0.010	<0.010
Nitrate + Nitrite-N (mg/L)	0.8	0.5	0.22	0.19	0.31	0.16	0.03	0.013	0.04	0.36
Total Nitrogen (mg/L)	1.04	0.7	0.3	0.38	0.53	0.35	0.19	0.35	0.18	0.56
pH	7.18	7.12	7.34	7.25	7.05	7.09	7.5	7.34	7.3	7.61
Temperature (DegC)	nm	11.6	9.5	11.9	16.1	16.3	12.9	9.9	13	7
Turbidity (NTU)	.	0.9	1.8	1.3	1.7	1.1	0.6	0.8	0.7	1.7
Flow (cumec)	0.752	0.113	0.194	0.053	0.152	0.088	0.036	0.102	0.050	0.169

IS1	16/09/2015	28/10/2015
Bromide (mg/L)	<0.05	<0.02
Dissolved Oxygen (% Sat.)	114.2	121.5
Dissolved Reactive Phosphorus (mg/L)	<0.004	<0.004
Total Phosphorus (mg/L)	0.005	0.006
Electrical Conductivity (mS/m)	11.82	11.98
E. coli (MPN/100ml)	41	36
Total Ammoniacal-N (mg/L)	<0.01	<0.01
Nitrate + Nitrite-N (mg/L)	2.1	1.68
Total Nitrogen (mg/L)	2.3	1.95
pH	7.97	7
Temperature (DegC)	10.9	9.9
Turbidity (NTU)	.	0.6
Flow (cumec)	0.844	0.073

IS3	15/09/2015
Bromide (mg/L)	<0.05
Dissolved Oxygen (% Sat.)	103.3
Dissolved Reactive Phosphorus (mg/L)	<0.004
Total Phosphorus (mg/L)	<0.004
Electrical Conductivity (mS/m)	9.724
E. coli (MPN/100ml)	4
Total Ammoniacal-N (mg/L)	<0.010
Nitrate + Nitrite-N (mg/L)	0.45
Total Nitrogen (mg/L)	0.57
pH	7.14
Temperature (DegC)	14.2
Turbidity (NTU)	.
Flow (cumec)	1.337

SF4	17/09/2015	28/10/2015
Bromide (mg/L)	<0.05	<0.02
Dissolved Oxygen (% Sat.)	95.5	124
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.004
Total Phosphorus (mg/L)	<0.004	0.017
Electrical Conductivity (mS/m)	16.57	12.78
E. coli (MPN/100ml)	201	770
Total Ammoniacal-N (mg/L)	<0.01	<0.01
Nitrate + Nitrite-N (mg/L)	2.9	1.5
Total Nitrogen (mg/L)	3	1.66
pH	7.16	6.99
Temperature (DegC)	10.8	11.1
Turbidity (NTU)	.	<0.5
Flow (cumec)	0.107	0.050

SF5	16/09/2015	21/10/2015	19/11/2015
Bromide (mg/L)	dry	0.04	0.04
Dissolved Oxygen (% Sat.)	dry	135.6	97.8
Dissolved Reactive Phosphorus (mg/L)	dry	0.012	0.049
Total Phosphorus (mg/L)	dry	0.02	0.071
Electrical Conductivity (mS/m)	dry	27.25	26.3
E. coli (MPN/100ml)	dry	687	2419
Total Ammoniacal-N (mg/L)	dry	0.014	0.027
Nitrate + Nitrite-N (mg/L)	dry	3.9	3.7
Total Nitrogen (mg/L)	dry	4.4	4.4
pH	dry	7.56	7.35
Temperature (DegC)	dry	14.6	17.4
Turbidity (NTU)	dry	1	3.9
Flow (cumec)	0.000	0.080	0.045

SF8	22/09/2015	21/10/2015
Bromide (mg/L)	0.08	0.06
Dissolved Oxygen (% Sat.)	90.7	73.7
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.004
Total Phosphorus (mg/L)	0.004	0.006
Electrical Conductivity (mS/m)	31.73	31.76
E. coli (MPN/100ml)	299	93
Total Ammoniacal-N (mg/L)	<0.01	0.032
Nitrate + Nitrite-N (mg/L)	9.3	9.1
Total Nitrogen (mg/L)	9.4	9.3
pH	*	6.75
Temperature (DegC)	12.4	11.8
Turbidity (NTU)	.	0.9
Flow (cumec)	0.020	0.002

IS4	14/09/2015	20/10/2015	19/11/2015	14/12/2015	25/01/2016	18/02/2016	14/03/2016	20/04/2016	11/05/2016	14/06/2016
Bromide (mg/L)	<0.05	<0.02	<0.02	<0.02	dry	<0.02	<0.02	dry	dry	dry
Dissolved Oxygen (% Sat.)	108.7	103.1	104.3	102.2	dry	100	96	dry	dry	dry
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.008	0.005	0.004	dry	0.006	0.006	dry	dry	dry
Total Phosphorus (mg/L)	<0.004	0.007	<0.004	<0.004	dry	0.006	0.01	dry	dry	dry
Electrical Conductivity (mS/m)	12.31	7.487	13.03	12.32	dry	12.08	12.25	dry	dry	dry
E. coli (MPN/100ml)	17	205	104	84	dry	387	517	dry	dry	dry
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	<0.010	dry	0.014	0.016	dry	dry	dry
Nitrate + Nitrite-N (mg/L)	1.43	1.14	1.14	1.13	dry	1.15	1.14	dry	dry	dry
Total Nitrogen (mg/L)	1.59	1.33	1.29	1.29	dry	1.29	1.28	dry	dry	dry
pH	7.29	7.63	7.46	7.32	dry	7.25	7.55	dry	dry	dry
Temperature (DegC)	11.6	22.1	11.2	12.2	dry	14.7	13.1	dry	dry	dry
Turbidity (NTU)	.	0.5	<0.5	<0.5	dry	0.5	1.3	dry	0	dry
Flow (cumec)	2.514	1.631	0.587	0.165	0.000	0.124	0.025	0.000	0.000	0.000

SWT1	14/09/2015	27/10/2015	23/11/2015	16/12/2015	25/01/2016	24/02/2016	30/03/2016	27/04/2016	11/05/2016	16/06/2016
Bromide (mg/L)	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved Oxygen (% Sat.)	104.8	103.3	102.2	100.5	101.7	102.4	nt	101.5	102.5	101.6
Dissolved Reactive Phosphorus (mg/L)	0.004	0.007	0.004	0.006	0.004	0.005	<0.004	0.004	0.004	<0.004
Total Phosphorus (mg/L)	0.013	0.013	0.009	0.007	0.013	0.027	0.004	0.027	<0.004	<0.004
Electrical Conductivity (mS/m)	6.586	*	6.031	6.063	6.08	5.509	6.119	6.408	6.47	6.078
E. coli (MPN/100ml)	488	2419	>2419	2419	1986	344	461	345	214	261
Total Ammoniacal-N (mg/L)	<0.01	<0.01	0.011	<0.010	0.013	<0.010	<0.01	<0.010	<0.010	<0.010
Nitrate + Nitrite-N (mg/L)	0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Total Nitrogen (mg/L)	<0.11	0.13	0.17	<0.10	0.12	<0.10	<0.10	<0.1	<0.1	0.12
pH	8.21	7.35	7.72	7.43	7.42	7.44	7.55	7.68	7.76	8.37
Temperature (DegC)	13.7	12.7	14.9	12.6	19.2	17.8	13	10.3	12.8	5.2
Turbidity (NTU)	.	8.2	13.2	29.9	10	18.5	6.4	5.8	5.4	15.8
Flow (cumec)	0.042	0.062	0.055	0.071	0.086	0.091	0.095	0.089	0.066	0.081

SWT2	14/09/2015	20/10/2015	23/11/2015	16/12/2015	25/01/2016	24/02/2016	30/03/2016	27/04/2016	11/05/2016	16/06/2016
Bromide (mg/L)	0.06	<0.02	<0.02	<0.02	dry	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved Oxygen (% Sat.)	99.8	103.1	117.4	98.6	dry	89.9	nt	98.8	99	93.6
Dissolved Reactive Phosphorus (mg/L)	0.032	0.038	0.011	0.014	dry	0.012	0.008	0.007	0.016	0.014
Total Phosphorus (mg/L)	0.109	0.167	0.062	0.04	dry	0.024	0.018	0.013	0.03	0.039
Electrical Conductivity (mS/m)	7.645	7.487	7.763	5.937	dry	5.473	5.857	6.269	6.302	5.931
E. coli (MPN/100ml)	199	1553	192	921	dry	194	411	127	231	2419
Total Ammoniacal-N (mg/L)	0.13	0.083	<0.01	<0.010	dry	<0.010	<0.010	<0.010	<0.01	0.082
Nitrate + Nitrite-N (mg/L)	0.21	0.21	0.013	<0.01	dry	<0.01	<0.01	<0.01	<0.01	<0.01
Total Nitrogen (mg/L)	0.75	1	0.54	0.22	dry	0.18	0.13	0.1	0.19	0.28
pH	7.52	7.63	7.21	7.15	dry	6.85	7.18	7.29	7.37	7.4
Temperature (DegC)	17.1	22.1	13.7	12.8	dry	18.4	13.2	9.9	13.8	4.2
Turbidity (NTU)	.	81	29.6	33.5	dry	7.2	4.4	5.9	5.9	28.6
Flow (cumec)	0.000	0.018	0.005	0.015	0.000	0.006	0.015	0.008	0.020	0.002

SWT3	14/09/2015	22/10/2015	23/11/2015	15/12/2015	25/01/2016	24/02/2016	30/03/2016	27/04/2016	11/05/2016	16/06/2016
Bromide (mg/L)	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved Oxygen (% Sat.)	107.4	101.8	101.1	98.2	100.6	94.5	nt	99.6	101.7	99.9
Dissolved Reactive Phosphorus (mg/L)	0.007	0.009	0.004	0.008	0.006	<0.004	0.004	0.008	0.006	0.004
Total Phosphorus (mg/L)	0.005	0.011	0.009	0.032	0.005	0.009	0.004	<0.004	0.005	<0.004
Electrical Conductivity (mS/m)	8.355	7.624	8.283	8.075	7.914	8.401	8.929	8.705	7.963	8.179
E. coli (MPN/100ml)	10	1046	285	921	435	816	345	26	219	19
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	<0.010	0.014	<0.010	0.014	<0.010	<0.01	0.019
Nitrate + Nitrite-N (mg/L)	0.033	0.06	0.07	0.15	0.05	0.03	0.16	0.35	0.37	0.24
Total Nitrogen (mg/L)	0.19	0.27	0.21	0.27	0.21	0.11	0.34	0.44	0.54	0.31
pH	.	.	7.74	7.28	7.39	7.35	7.51	7.55	7.81	7.54
Temperature (DegC)	15.2	11.5	12.4	13.9	19.6	16.8	12.5	9.7	15	5.1
Turbidity (NTU)	.	6.9	2.3	2.7	1.8	1.1	0.8	1	1.1	1.1
Flow (cumec)	0.013	0.022	0.010	0.008	0.003	0.023	0.008	0.036	0.007	0.008

SWT4	14/09/2015	16/09/2015	22/10/2015	23/11/2015	15/12/2015	25/01/2016	24/02/2016	17/03/2016	21/04/2016	25/05/2016
Bromide (mg/L)	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dissolved Oxygen (% Sat.)	107.4	101.9	102.6	101.3	100.6	96	95.9	99.4	98.4	100.5
Dissolved Reactive Phosphorus (mg/L)	0.007	0.004	0.005	<0.004	0.004	0.004	0.005	0.006	0.004	0.006
Total Phosphorus (mg/L)	0.005	0.006	0.009	0.009	0.009	0.006	0.006	0.014	<0.004	0.008
Electrical Conductivity (mS/m)	8.355	7.393	6.862	7.337	6.112	6.864	6.603	7.531	7.348	6.237
E. coli (MPN/100ml)	10	199	579	579	276	308	770	613	488	387
Total Ammoniacal-N (mg/L)	<0.01	<.01	<0.01	<0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate + Nitrite-N (mg/L)	0.033	0.018	0.05	0.02	0.01	<0.01	0.03	0.04	0.03	0.09
Total Nitrogen (mg/L)	0.19	0.11	0.15	0.11	<0.01	0.13	0.12	0.17	<0.10	0.18
pH	.	7.78	6.35	7.4	7.3	7.29	6.74	7.71	7.42	7.45
Temperature (DegC)	15.2	13.3	12	12.7	15.2	18	17	12.6	11.3	8.1
Turbidity (NTU)	.	.	7.8	10.7	18.4	3.7	8.1	5.5	6	24.3
Flow (cumec)	0.013	0.150	0.187	0.216	0.225	0.117	0.179	0.209	0.119	0.178

SF1	21/09/2015	22/10/2015	25/11/2015	15/12/2015	13/01/2016	17/02/2016	17/03/2016	21/04/2016	24/05/2016	15/06/2016
Bromide (mg/L)	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.05
Dissolved Oxygen (% Sat.)	92.3	126	101.5	128.6	85.2	79.6	108.9	109	93.7	95.8
Dissolved Reactive Phosphorus (mg/L)	0.016	0.061	0.016	0.02	0.016	0.018	0.022	0.02	0.027	0.019
Total Phosphorus (mg/L)	0.091	0.053	0.054	0.024	0.019	0.022	0.029	0.02	0.039	0.03
Electrical Conductivity (mS/m)	25.18	24.36	23.15	21.99	23.85	23.18	22.97	22.55	21.66	24.04
E. coli (MPN/100ml)	1414	135	387	435	816	727	1203	345	461	461
Total Ammoniacal-N (mg/L)	0.048	0.014	<0.01	<0.010	<0.010	<0.010	0.014	<0.010	0.036	0.048
Nitrate + Nitrite-N (mg/L)	3.6	4.6	4.2	3.7	4	3.7	3.6	3.7	3.4	4
Total Nitrogen (mg/L)	4.1	4.8	4.3	3.9	4.1	3.8	3.9	3.9	3.7	4.2
pH	7.14	7.78	7.64	6.51	7.26	*	7.96	8.13	7.41	8.53
Temperature (DegC)	10.7	15.7	15.6	17.9	14.5	16.4	13.3	13.8	11.4	11.1
Turbidity (NTU)	.	1.6	2.3	2.5	1.7	1.3	1.5	1.3	4.9	4.5
Flow (cumec)	0.796	0.485	0.406	0.360	0.348	0.341	0.350	0.343	0.431	0.387

SF2	21/09/2015	22/10/2015	25/11/2015	15/12/2015	13/01/2016	17/02/2016	17/03/2016	21/04/2016	24/05/2016	15/06/2016
Bromide (mg/L)	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.06	0.05
Dissolved Oxygen (% Sat.)	95.6	101.7	71.7	87.5	76.1	84.2	81.4	89	81.9	83.7
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.005	0.008	0.008	0.016	<0.004	0.006	0.008	0.009	0.008
Total Phosphorus (mg/L)	<0.004	0.007	0.008	0.005	0.019	0.004	0.006	0.006	0.009	0.007
Electrical Conductivity (mS/m)	25.38	26.02	25.34	25.67	26.3	24.9	25.52	24.6	24.59	24.85
E. coli (MPN/100ml)	2	49	127	186	91	59	75	59	65	55
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	<0.010	<0.010	0.012	<0.010	<0.010	0.014	<0.010
Nitrate + Nitrite-N (mg/L)	4.9	4.8	4.9	5.2	5.1	4.9	4.8	4.6	4.5	4.6
Total Nitrogen (mg/L)	5	4.9	5.1	5.3	5.2	5	4.8	4.7	4.6	4.6
pH	7.07	6.06	6.8	*	6.74	*	7.04	7.01	7.12	7.09
Temperature (DegC)	12.5	14.5	14.4	15.9	13.6	15.7	13.4	14.1	12.5	12.6
Turbidity (NTU)	.	0.6	0.7	0.7	0.6	<0.5	0.6	0.5	0.6	0.7
Flow (cumec)	0.076	0.073	0.063	0.061	0.066	0.073	0.073	0.060	0.062	0.074

SF3	17/09/2015	27/10/2015	19/11/2015	14/12/2015	27/01/2016	17/02/2016	17/03/2016	27/04/2016	24/05/2016	15/06/2016
Bromide (mg/L)	0.07	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.05
Dissolved Oxygen (% Sat.)	102.5	97	99.5	92.8	82.3	83.1	85.8	77.5	84.4	90.4
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.004	0.004	0.004	0.006	0.004	0.004	0.005	0.005	0.005
Total Phosphorus (mg/L)	<0.004	0.007	<0.004	0.006	0.006	0.004	0.007	<0.004	0.005	0.005
Electrical Conductivity (mS/m)	25.57	25.11	25.57	24.83	25.71	25.26	24.88	25.09	24.75	25.75
E. coli (MPN/100ml)	20	47	28	33	157	236	53	24	18	11
Total Ammoniacal-N (mg/L)	<0.01	0.01	<0.01	<0.010	<0.010	0.017	<0.010	<0.010	<0.010	<0.010
Nitrate + Nitrite-N (mg/L)	8.2	7.3	7.3	7.7	7.8	7.7	7.7	8	8	8.6
Total Nitrogen (mg/L)	8.2	7.5	7.5	7.8	7.8	7.9	7.7	8.1	8	8.6
pH	7.35	7.61	7.48	7.12	7.02	7	7.34	7.12	7.22	7.4
Temperature (DegC)	13.1	12.7	15.1	17.2	15.8	19.3	16.6	13	11.9	11
Turbidity (NTU)	.	<0.5	<0.5	<0.5	<.5	<0.5	<0.5	<0.5	<0.5	<0.5
Flow (cumec)	0.409	0.563	0.431	0.237	0.160	0.113	0.101	0.066	0.086	0.138

SF6	17/09/2015	21/10/2015	23/11/2015	16/12/2015	13/01/2016	18/02/2016	14/03/2016	20/04/2016	25/05/2016	16/06/2016
Bromide (mg/L)	0.06	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.04
Dissolved Oxygen (% Sat.)	37.3	105	103.5	84.2	82.3	86.3	84	102.7	89	104.4
Dissolved Reactive Phosphorus (mg/L)	0.005	0.006	<0.004	0.005	0.004	0.004	<0.004	0.009	0.015	0.004
Total Phosphorus (mg/L)	<0.004	0.005	<0.004	0.004	0.004	0.008	0.01	0.007	0.017	<0.004
Electrical Conductivity (mS/m)	32.93	33.28	31.14	31.57	29.95	29.74	28.35	30.09	35.68	33.69
E. coli (MPN/100ml)	236	120	53	201	249	291	548	33	29	33
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010	<0.010	<0.010	0.06	<0.010
Nitrate + Nitrite-N (mg/L)	6	5.1	6.2	6.7	8.5	8.2	8.5	5.4	3.9	6.5
Total Nitrogen (mg/L)	6.2	5.4	6.5	7	8.8	8.4	8.7	5.7	4.4	6.7
pH	6.99	*	6.7	6.64	6.61	7.02	6.99	7.47	7.33	7.48
Temperature (DegC)	10.8	17.6	15	12.5	14.4	17.7	16.7	13	9.3	9.7
Turbidity (NTU)	.	0.6	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	1	<0.5
Flow (cumec)	0.013	0.026	0.034	0.040	0.031	0.024	0.009	0.001	0.001	0.013

T1	21/09/2015	22/10/2015	25/11/2015	15/12/2015	13/01/2016	17/02/2016	17/03/2016	21/04/2016	24/05/2016	15/06/2016
Bromide (mg/L)	0.1	0.07	0.08	0.07	0.06	0.08	0.07	0.06	0.07	0.07
Dissolved Oxygen (% Sat.)	80.4	111	134.7	175.2	114.7	83.4	98.9	126.8	76.4	84
Dissolved Reactive Phosphorus (mg/L)	0.074	0.019	0.034	0.033	0.026	0.08	0.038	0.02	0.055	0.032
Total Phosphorus (mg/L)	0.25	0.025	0.046	0.043	0.033	0.089	0.047	0.022	0.079	0.04
Electrical Conductivity (mS/m)	27.85	27.9	27.87	25.71	25.82	29.12	27.52	26.43	29.35	28.91
E. coli (MPN/100ml)	>2419	210	91	86	147	146	184	82	866	138
Total Ammoniacal-N (mg/L)	0.06	0.016	<0.01	<0.010	<0.010	0.046	0.042	<0.010	0.017	0.068
Nitrate + Nitrite-N (mg/L)	2.9	3.2	2.42	2.59	2.5	2.11	2.9	3	2.8	3.2
Total Nitrogen (mg/L)	4.2	3.4	2.76	2.94	2.7	2.43	3.2	3.2	3.3	3.4
pH	6.98	8.22	*	*	8.71	7.26	7.66	8.69	7.26	9.89
Temperature (DegC)	10.2	15.7	19.5	19.7	17.9	21.3	14.4	13.6	10.5	9.3
Turbidity (NTU)	.	3.7	1.7	2.6	1.2	2.4	1.4	1.3	6	2.5
Flow (cumec)	2.023	1.045	0.549	0.564	0.448	0.620	0.883	0.829	0.820	0.856

T2	21/09/15	24/09/15	20/10/15	22/10/15	19/11/15	25/11/15	15/12/15	21/12/15	20/01/16	16/02/16	23/03/16	19/04/16	17/05/16	22/06/16
Bromide (mg/L)	0.08	-	-	0.06	-	0.05	0.06	-	-	-	-	-	-	-
Dissolved Oxygen (% Sat.)	100.8	99.5	116.6	127.1	126.1	94.9	121.1	81.3	86.7	71.8	74.8	79.5	80.2	89
Dissolved Reactive Phosphorus (mg/L)	0.018	0.0077	0.0063	0.007	0.0133	0.014	0.011	0.0053	0.021	0.0115	0.0148	0.0124	0.0124	0.0126
Total Phosphorus (mg/L)	0.038	0.013	0.008	0.009	0.02	0.017	0.019	0.009	0.028	0.018	0.018	0.021	0.017	0.021
Electrical Conductivity (mS/m)	30.03	24.1	22.42	25.73	22.73	23.87	23.84	22.8	22.55	12.3	20.94	21.92	22.38	21.96
E. coli (MPN/100ml)	>2419	133	77	236	82	82	160	91	15	150	184	411	613	141
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.024	<0.01	<0.01	0.01	0.01	0.018	0.011	0.012
Nitrate + Nitrite-N (mg/L)	4	3.3	3.5	3.9	3.5	3.5	3.4	3.4	3	3.2	3.2	3.7	3.4	3.4
Total Nitrogen (mg/L)	4.3	3.5	3.6	4.1	4	3.7	3.8	3.5	3.3	3.2	3.4	3.7	3.6	3.3
pH	7.18	7.43	7.79	6.69	8.48	7.28	7.69	7.31	7.23	6.99	7.25	6.97	7.17	7.55
Temperature (DegC)	11.4	12.3	12.9	14	14.6	16.4	17.9	15.7	15.8	16.1	14.8	12.1	11.1	12.3
Turbidity (NTU)	.	1.62	1.16	1.4	1.55	1.4	5.4	0.73	0.73	0.61	1.76	1.81	2.4	2.2
Flow (cumec)	3.016	2.592	1.688	1.861	1.305	1.094	1.108	1.320	1.406	1.195	0.760	1.425	1.466	2.109

T3	17/09/15	24/09/15	20/10/15	27/10/15	19/11/15	19/11/15	14/12/15	21/12/15	20/01/16	16/02/16	23/03/16	19/04/16	17/05/16	22/06/16
Bromide (mg/L)	0.08	-	-	0.05	-	0.06	0.06	0	0	0	0	0	0	0
Dissolved Oxygen (% Sat.)	112.1	106.7	96.6	98.4	96.4	99.5	97.3	93	82.5	91.6	79.1	69.8	83.1	91.1
Dissolved Reactive Phosphorus (mg/L)	0.005	0.0068	0.0072	0.013	0.0075	0.01	0.02	0.0076	0.169	0.0137	0.0184	0.0087	0.0097	0.021
Total Phosphorus (mg/L)	0.004	0.012	0.009	0.014	0.011	0.007	0.022	0.016	0.018	0.015	0.02	0.016	0.012	0.027
Electrical Conductivity (mS/m)	26.5	26.3	24.57	25.78	24.48	25.57	25.91	24.8	25.56	25.27	23.63	26.87	26	26.48
E. coli (MPN/100ml)	79	248	249	921	135	105	201	197	138	184	162	73	62	461
Total Ammoniacal-N (mg/L)	<0.01	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010
Nitrate + Nitrite-N (mg/L)	6.8	6.8	6.8	6.5	6.7	6.5	6.1	6.4	6	5.3	4	5.2	5	6.5
Total Nitrogen (mg/L)	7	6.5	7.2	6.8	6.1	6.8	6.4	6.3	6.3	4.8	3.9	4.9	4.8	5.6
pH	7.78	7.7	7.58	7.52	7.81	7.48	7.33	7.35	7.37	-	7.48	6.95	7.07	7.51
Temperature (DegC)	13.4	11.5	12.7	13.2	15	15.1	17.1	18.6	18.5	19.5	17.2	12.5	11.2	11.4
Turbidity (NTU)	.	0.56	0.51	0.7	0.23	<0.5	<0.5	1.94	0.24	0.2	0.18	0.16	0.3	0.59
Flow (cumec)	0.862	1.102	0.982	0.802	0.697	0.697	0.318	0.284	0.285	0.136	0.036	0.087	0.090	0.400

T4	17/09/2015	28/10/2015	24/11/2015	14/12/2015	25/01/2016	24/02/2016	30/03/2016	20/04/2016	25/05/2016	16/06/2016
Bromide (mg/L)	0.11	0.03	0.06	dry	dry	dry	dry	dry	dry	0.13
Dissolved Oxygen (% Sat.)	63.4	105	52.7	dry	dry	dry	dry	dry	dry	17.3
Dissolved Reactive Phosphorus (mg/L)	0.004	<0.004	0.018	dry	dry	dry	dry	dry	dry	0.087
Total Phosphorus (mg/L)	0.016	0.01	0.05	dry	dry	dry	dry	dry	dry	0.105
Electrical Conductivity (mS/m)	49	21.26	26.73	dry	dry	dry	dry	dry	dry	49.28
E. coli (MPN/100ml)	1733	41	816	dry	dry	dry	dry	dry	dry	32
Total Ammoniacal-N (mg/L)	<0.01	<0.010	0.045	dry	dry	dry	dry	dry	dry	<0.010
Nitrate + Nitrite-N (mg/L)	0.007	2.35	0.04	dry	dry	dry	dry	dry	dry	<0.01
Total Nitrogen (mg/L)	0.17	2.74	0.64	dry	dry	dry	dry	dry	dry	0.5
pH	7.21	7.25	*	dry	dry	dry	dry	dry	dry	6.87
Temperature (DegC)	12.2	12.3	14.5	dry	dry	dry	dry	dry	dry	8.3
Turbidity (NTU)	.	0.8	2.1	dry	dry	dry	dry	dry	0	13.6
Flow (cumec)	0.001	0.460	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002

T5	16/09/2015	21/10/2015	19/11/2015	14/12/2015	27/01/2016	24/02/2016	30/03/2016	20/04/2016	25/05/2016	14/06/2016
Bromide (mg/L)	0.09	0.04	0.05	dry	dry	dry	dry	dry	dry	0.1
Dissolved Oxygen (% Sat.)	116	108.2	96.6	dry	dry	dry	dry	dry	dry	83.1
Dissolved Reactive Phosphorus (mg/L)	0.004	0.008	0.006	dry	dry	dry	dry	dry	dry	0.032
Total Phosphorus (mg/L)	0.004	0.01	0.009	dry	dry	dry	dry	dry	dry	0.026
Electrical Conductivity (mS/m)	51.14	33.14	34.09	dry	dry	dry	dry	dry	dry	54.52
E. coli (MPN/100ml)	205	411	231	dry	dry	dry	dry	dry	dry	76
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	dry	dry	dry	dry	dry	dry	<0.010
Nitrate + Nitrite-N (mg/L)	0.003	2.32	1.07	dry	dry	dry	dry	dry	dry	1.08
Total Nitrogen (mg/L)	0.23	2.79	1.54	dry	dry	dry	dry	dry	dry	1.38
pH	8.31	6.15	7.68	dry	dry	dry	dry	dry	dry	7.58
Temperature (DegC)	14.2	14.8	12.6	dry	dry	dry	dry	dry	dry	8.5
Turbidity (NTU)	.	0.8	0.7	dry	dry	dry	dry	dry	0	<0.5
Flow (cumec)	0.050	0.078	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.005

T6	22/09/15	24/09/15	21/10/15	23/11/15	16/12/15	21/12/15	13/01/16	18/02/16	14/03/16	23/03/16	20/04/16	25/05/16	16/06/16	22/06/16
Bromide (mg/L)	0.09	-	0.05	0.04	0.04	-	0.04	0.04	0.04	-	0.04	0.06	0.06	-
Dissolved Oxygen (% Sat.)	96.7	113.3	91.6	108	93.8	76	93.6	87.9	59.3	46.4	42.1	74.4	90	86.6
Dissolved Reactive Phosphorus (mg/L)	0.02	0.0174	0.038	0.026	0.049	0.07	0.036	0.044	0.05	0.044	0.024	0.043	0.034	0.048
Total Phosphorus (mg/L)	0.047	0.033	0.047	0.036	0.057	0.104	0.046	0.054	0.09	0.052	0.036	0.065	0.044	0.067
Electrical Conductivity (mS/m)	42.89	40.1	35.19	34.43	32.35	31	33.39	33.29	34.08	31.54	33.62	44.98	41.66	38.8
E. coli (MPN/100ml)	2419	1986	816	1733	1553	1300	1986	2419	>2419	1553	980	435	206	727
Total Ammoniacal-N (mg/L)	0.019	0.015	0.029	0.016	0.047	0.067	<0.010	0.044	0.022	<0.010	0.016	0.15	0.059	0.049
Nitrate + Nitrite-N (mg/L)	1.73	1.61	2.7	4.6	4.6	4.3	5	5.1	1.4	1.36	1.35	5.1	6.1	6.9
Total Nitrogen (mg/L)	2.2	2.2	3.2	5	5.1	4.8	5.4	5.7	2	1.81	1.71	5.9	6.5	6.9
pH	6.36	7.92	6.01	6.03	7.46	7.39	7.3	7.36	7.25	7.14	6.99	7.24	7.61	7.58
Temperature (DegC)	8.4	11.2	16.7	17.9	14	18.4	16.6	20.4	16.6	16.3	13.2	10.4	8.4	11
Turbidity (NTU)	.	2.4	1.7	1.5	1.1	1.08	1.1	1	1.2	0.74	0.7	1.6	1.5	1.65
Flow (cumec)	0.197952	-	0.052272	0.052188	0.048	-	0.031	0.033	0.000	-	0.000	0.089	0.077	-

T7	21/09/15	24/09/15	27/10/15	24/11/15	14/12/15	21/12/15	27/01/16	24/02/16	23/03/16	30/03/16	20/04/16	25/05/16	16/06/16	22/06/16
Bromide (mg/L)	0.08	-	0.05	0.05	0.05	-	0.06	0.05	-	0.05	0.05	0.06	0.05	-
Dissolved Oxygen (% Sat.)	108.1	20.7	94.1	71.7	226.5	155	75	61.5	28.9	nt	65.8	72.1	99.6	91.8
Dissolved Reactive Phosphorus (mg/L)	0.018	0.0104	0.043	0.036	0.046	0.0125	0.1	0.022	0.035	0.025	0.023	0.109	0.023	0.032
Total Phosphorus (mg/L)	0.05	0.018	0.066	0.059	0.062	2.5	0.116	0.022	0.042	0.032	0.023	0.117	0.024	0.04
Electrical Conductivity (mS/m)	40.49	37.6	29.49	29.24	28.03	27	30.49	26.11	27.24	29.31	29.35	39	33.22	34.6
E. coli (MPN/100ml)	1553	167	>2419	1986	613	>2420	2419	2419	387	687	166	121	102	345
Total Ammoniacal-N (mg/L)	0.03	<0.01	0.126	0.06	<0.010	0.011	0.033	0.022	0.011	0.016	0.014	0.04	0.02	0.065
Nitrate + Nitrite-N (mg/L)	1.34	1.28	0.34	0.22	0.08	0.151	0.17	0.02	0.048	0.04	0.04	1.28	1.07	1.02
Total Nitrogen (mg/L)	2.1	1.72	1	0.72	0.5	0.53	0.83	0.33	0.4	0.31	0.23	1.96	1.33	1.39
pH	7.56	7.97	7.59	6.15	*	8.77	7.02	6.91	7.02	7	7.1	7.13	7.54	7.48
Temperature (DegC)	12.2	19	14.8	13.8	24.8	21	15.3	20.3	16.4	14.6	14.5	11.6	10.3	11.7
Turbidity (NTU)	.	1.87	8.7	4	1.2	1.28	0.8	<0.5	0.43	<0.5	<0.5	1.3	0.5	0.62
Flow (cumec)	0.21053	0.141	0.004	0.0025	0.003	0.004	0.005	0.003	0.004	0.004	0.003	0.039	0.038	0.040

T8	22/09/15	24/09/15	20/10/15	21/10/15	19/11/15	24/11/15	16/12/15	21/12/15	20/01/16	16/02/16	23/03/16	19/04/16	17/05/16	22/06/16
Bromide (mg/L)	0.07	-	-	0.04	-	0.04	0.04	-	-	-	-	-	-	-
Dissolved Oxygen (% Sat.)	94.1	90	89.4	92.6	89.4	87	92.6	87.8	83.9	86.4	84.9	82.3	82.2	85.1
Dissolved Reactive Phosphorus (mg/L)	0.006	0.0064	0.004	0.006	0.0084	0.008	0.009	0.0071	0.0103	0.0099	0.0081	0.0055	0.0055	0.0072
Total Phosphorus (mg/L)	0.009	0.008	0.007	0.006	0.009	0.009	0.009	0.013	0.01	0.014	0.006	0.012	0.009	0.013
Electrical Conductivity (mS/m)	26.95	24.8	23.36	24.65	22.4	23.69	22.7	21.7	21.84	21.9	20.36	22.16	22.4	23.42
E. coli MPN/100ml	387	210	185	579	210	727	613	517	770	1553	866	365	1120	328
Total Ammoniacal-N (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.013	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010
Nitrate + Nitrite-N (mg/L)	7	7.2	6.7	6.6	6.6	6.3	6.3	6.7	6.5	6.8	6.5	7.2	6.9	7.4
Total Nitrogen (mg/L)	7.1	7	7	6.7	6.4	6.4	6.3	5.9	5.7	5.9	6.1	6.6	6.5	6.1
pH	6.49	7.6	7.54	7.12	7.64	7.35	7.27	7.09	7.41	6.99	7.73	7.03	7.21	7.48
Temperature (DegC)	10.8	11.3	11	12.1	11.7	12.6	12.6	12.9	12.9	12.5	12.5	11.2	10.7	11.8
Turbidity (NTU)	.	1.62	0.98	0.9	0.81	0.8	1.2	1.6	2.6	1.79	1.51	1.08	2.7	5.4
Flow (cumec)	1.19570	1.266	1.008	0.88696	0.774	0.737	0.640	0.650	0.678	0.672	0.629	0.647	0.690	0.840

6.4. Lake Water Quality Monitoring Results (Ecan data)

Kaituna Lagoon	25/09/2015	15/10/2015	30/11/2015	18/12/2015	19/01/2016	23/02/2016	30/03/2016	20/04/2016	24/05/2016	23/06/2016
Ammoniacal-N (mg/L)	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	0.033	<0.010	0.108	0.026
Nitrate + Nitrite-N (mg/L)	0.072	0.031	<0.0010	<0.0010	<0.0010	0.0015	0.0027	0.0024	1.24	0.0111
Total Nitrogen (mg/L)	1.17	1.45	1.85	1.45	1.75	1.87	2.3	1.44	2.4	1.27
Chlorphyll A (mg/L)	0.033	0.037	0.049	0.016	0.05	0.029	0.05	0.022	0.0008	0.048
Dissolved Oxygen	85.9	91.3	108.2	97.4	88.7	109.3	107.8	116.7	83.3	92.4
Electrical Conductivity (mS/m)	613	582	1568	1256.1	1095	1419	1587.2	1443	2330	1051
E coli (MPN/100ml)	85	187	86	201	2100	801	173	278	3450	10
Dissolved Reactive Phosphorus (mg/L)	0.0024	0.0109	0.0099	0.0053	0.0039	0.0064	0.0137	0.0063	0.27	0.0077
Total Phosphorus (mg/L)	0.09	0.25	0.16	0.106	0.176	0.26	0.25	0.143	0.32	0.101
pH	7.7	8	8.23	8.1	8	nt	8.4	nt	8.4	8
Temperature (DegC)	10.8	17.5	15.9	19	17.6	23.7	17.5	17.8	10	10.8
Turbidity (NTU)	26	84	121	78	155	127	164	64	12.6	50

Off Selwyn River Mouth	25/09/2015	15/10/2015	30/11/2015	18/12/2015	19/01/2016	23/02/2016	30/03/2016	20/04/2016	24/05/2016	23/06/2016
Ammoniacal-N (mg/L)	<0.01	0.015	<0.01	<0.01	0.025	0.021	0.032	0.015	0.016	0.014
Nitrate + Nitrite-N (mg/L)	0.066	0.4	0.0156	0.0022	0.0034	0.0019	0.0029	0.0016	0.0028	0.079
Total Nitrogen (mg/L)	2	2.5	2.3	2.3	2.1	2.3	2.9	1.94	2.5	1.59
Chlorphyll A (mg/L)	0.078	0.106	0.081	0.054	0.077	0.059	0.069	0.053	0.059	0.061
Dissolved Oxygen	115.5	107.5	104.8	105.6	99.1	99.1	97.5	123	105.2	119.9
Electrical Conductivity (mS/m)	993.2	1277	1392	1415.6	1388	1453	1536.4	1337	1357	1219
E coli (MPN/100ml)	86	<10	31	98	<10	10	<10	<10	10	<10
Dissolved Reactive Phosphorus (mg/L)	0.0025	0.0096	0.0101	0.0054	0.013	0.0106	0.0191	0.0083	0.0088	0.0084
Total Phosphorus (mg/L)	0.1	0.2	0.19	0.23	0.159	0.21	0.32	0.161	0.27	0.091
pH	8.6	8.4	8.44	8.44	8.45	8.6	8.46	8.5	8.3	8.5
Temperature (DegC)	13.3	14.4	14.8	15.3	17.1	19.2	15.9	14.8	8.9	8.9
Turbidity (NTU)	69	127	149	180	151	151	270	108	260	28

Mid Lake	25/09/2015	15/10/2015	30/11/2015	18/12/2015	19/01/2016	23/02/2016	30/03/2016	20/04/2016	24/05/2016	23/06/2016
Ammoniacal-N (mg/L)	<0.01	0.015	<0.01	<0.01	0.035	0.022	0.026	0.02	0.048	0.017
Nitrate + Nitrite-N (mg/L)	<0.002	<0.002	<0.001	0.0021	0.0041	0.0029	0.0023	0.0015	0.0017	0.034
Total Nitrogen (mg/L)	1.81	2.1	2.2	2.5	2.6	2.6	2.6	2.2	2.9	1.6
Chlorphyll A (mg/L)	0.064	0.101	0.078	0.038	0.09	0.041	0.082	0.055	0.089	0.077
Dissolved Oxygen	95.6	100.1	97.3	101.6	95.1	92.5	93.1	101.1	95.5	122.2
Electrical Conductivity (mS/m)	1232.2	1613	1508	1518.7	1532	1567	1543.6	1416	1429	1243
E coli (MPN/100ml)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dissolved Reactive Phosphorus (mg/L)	0.0011	0.0096	0.0102	0.0058	0.0132	0.0107	0.0185	0.0086	0.0099	0.0085
Total Phosphorus (mg/L)	0.15	0.26	0.2	0.23	0.22	0.24	0.22	0.22	0.35	0.101
pH	8.4	8.4	8.26	8.37	8.32	8.4	8.39	8.2	8	8.55
Temperature (DegC)	10	14.4	15.1	15.4	16.7	19.3	15.6	13.3	8.4	8.1
Turbidity (NTU)	72	171	187	189	200	145	230	139	370	43

South of Timber Yard	25/09/2015	15/10/2015	30/11/2015	18/12/2015	19/01/2016	23/02/2016	30/03/2016	20/04/2016	24/05/2016	23/06/2016
Ammoniacal-N (mg/L)	<0.010	0.023	0.012	<0.010	0.029	0.019	0.032	0.017	0.06	0.022
Nitrate + Nitrite-N (mg/L)	<0.002	0.115	0.0022	0.0019	0.0072	0.0013	0.0026	0.0021	0.0039	0.27
Total Nitrogen (mg/L)	2	2.3	2.2	2.2	2.4	2.3	2.7	1.92	2.5	1.66
Chlorphyll A (mg/L)	0.081	0.129	0.073	0.041	0.081	0.051	0.078	0.061	0.054	0.055
Dissolved Oxygen	115	99.9	100.1	106.6	95.5	95.8	96.3	111	100.4	119
Electrical Conductivity (mS/m)	1164.4	1405	1375	1454.1	1537	1529	1455.1	1369	1405	1184
E coli (MPN/100ml)	<10	10	<10	<10	<10	<10	10	10	10	52
Dissolved Reactive Phosphorus (mg/L)	0.0021	0.0098	0.0107	0.0056	0.0111	0.0106	0.0187	0.0086	0.0098	0.0088
Total Phosphorus (mg/L)	0.12	0.192	0.188	0.199	0.19	0.24	0.25	0.192	0.26	0.096
pH	8.6	8.4	8.42	8.46	8.48	8.6	8.49	8.4	8.2	8.4
Temperature (DegC)	12	13.8	14.9	15.7	16.8	19.2	15.3	13.6	8.6	8.6
Turbidity (NTU)	79	189	184	155	177	152	250	128	250	39

Taumutu	25/09/2015	15/10/2015	30/11/2015	18/12/2015	19/01/2016	23/02/2016	30/03/2016	20/04/2016	24/05/2016	23/06/2016
Ammoniacal-N (mg/L)	<0.010	0.015	<0.010	<0.010	0.035	0.018	0.032	0.018	0.036	0.025
Nitrate + Nitrite-N (mg/L)	<0.002	0.002	<0.0010	0.0035	0.0039	0.0014	0.0028	0.002	0.0021	0.35
Total Nitrogen (mg/L)	1.69	2.2	2.2	2.1	2.5	2.1	2.4	1.97	2.5	1.67
Chlorphyll A (mg/L)	0.05	0.107	0.068	0.049	0.082	0.044	0.067	0.057	0.064	0.06
Dissolved Oxygen	103.9	100.8	98.6	101.5	98.3	91	99.1	110.6	100.3	122.7
Electrical Conductivity (mS/m)	1213.3	1571	1473	1526.9	1530	1347	1537.5	1265	1383	1138
E coli (MPN/100ml)	<10	<10	<10	<10	<10	<10	20	<10	<10	<10
Dissolved Reactive Phosphorus (mg/L)	0.0024	0.0097	0.0104	0.0057	0.014	0.0103	0.018	0.0081	0.009	0.0086
Total Phosphorus (mg/L)	0.082	0.26	0.22	0.23	0.22	0.189	0.23	0.189	0.26	0.09
pH	8.5	8.4	8.39	8.45	8.52	nt	8.44	8.4	8.13	8.4
Temperature (DegC)	11.2	13.7	14.1	15	16.7	19	15.3	13.7	8.3	8.4
Turbidity (NTU)	44	191	200	175	180	131	191	131	240	42

6.5. Groundwater Quality Monitoring Data

BX21/0017	27/03/2014	17/06/2014	23/09/2014	2/12/2014	30/03/2015	10/06/2015	3/09/2015	7/12/2015	9/03/2016	20/06/2016
Groundwater Level (mbgl)	9.71	8.7	9.49	9.85	9.88	9.775	9.22	9.445	9.435	9.495
Alkalinity (mg/L)	29	25	27	30	33	42	29	29	31	30
Bromide (mg/L)	0.02	0.07	0.04	0.07	0.03	0.03	0.04	0.04	0.03	0.03
Chloride (mg/L)	11.1	17.8	13.6	15.6	13.9	13.5	18.7	14.4	11.6	11.3
Dissolved Oxygen (% Sat.)	92.9	88.1	92.8	96.8	100.8	82.1	82.6	89.7	85.6	83.5
Dissolved Reactive Phosphorus (mg/L)	0.012	0.013	0.012	0.012	0.01	0.013	0.011	0.012	0.012	0.012
Electrical Conductivity (mS/m)	17.9	23.1	21.3	20	20	19.6	21.6	20.8	19.2	19.8
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	7.8	11.2	10.2	7.9	7.1	5.9	8.5	9.1	8.5	9.2
Total Nitrogen (mg/L)	7.7	11.2	10.8	7.9	7.6	6.2	8.6	9.1	8.6	9.2
pH	6.3	6.2	6.1	6.1	6.4	6.5	6.3	6.2	6.3	6.3
Sulphate (mg/L)	10	10.8	11.9	11.2	11.9	8.8	9.8	10.8	8.6	8.1
Temperature (DegC)	0	11.7	11.5	11.5	23.4	12.8	10.9	12	13.3	11.7

BX21/0018	12/06/2014	24/09/2014	17/12/2014	8/04/2015	3/06/2015	1/09/2015	3/12/2015	3/03/2016	1/06/2016
Groundwater Level (mbgl)	80.79	77.47	86.2	90.41	86.59	85.17	89.51	92.2	90.325
Alkalinity (mg/L)	56	47	42	45	56	44	42	45	45
Bromide (mg/L)	<0.05	<0.02	0.05	0.02	<0.02	0.02	<0.02	<0.02	<0.02
Chloride (mg/L)	11	8.3	8.9	9.8	9.5	7.9	8.7	9.6	8.6
Dissolved Oxygen (% Sat.)	102.6	120.1	117.9	112.9	102.3	107	120.4	96.9	98
Dissolved Reactive Phosphorus (mg/L)	0.012	0.01	0.009	0.008	0.012	0.008	0.01	0.008	0.008
Electrical Conductivity (mS/m)	20.1	15.5	14.6	16.4	18	14.3	15	16.8	16
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	4.3	3.1	3.6	4	3.2	2.9	3.5	4.4	3.6
Total Nitrogen (mg/L)	4.8	3.1	3.9	4	3.2	2.9	3.5	4.4	3.6
pH	7.8	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.8
Sulphate (mg/L)	7.2	4	3.5	3.7	5.4	2.9	3	4	3.7
Temperature (DegC)	11.5	11.4	11.5	15.9	10.2	6.8	19.7*	0	10.4

BX22/0041	28/03/2014	18/06/2014	16/09/2014	18/12/2014	7/04/2015	17/06/2015	8/09/2015	8/12/2015	9/03/2016	20/06/2016
Groundwater Level (mbgl)	21.13	19.88	20.51	20.17	22.81	23.81	21.515	20.94	21.055	22.595
Alkalinity (mg/L)	59	60	60	61	55	54	53	53	56	52
Bromide (mg/L)	<0.02	0.05	0.03	<0.05	0.02	0.02	0.02	0.02	0.03	0.02
Chloride (mg/L)	8.4	8.8	8.6	8.8	7.4	7.3	7.9	8.5	8.7	7.8
Dissolved Oxygen (% Sat.)	74	72	70.4	86	93.1	67.9	84.3	82.6	89.7	72.6
Dissolved Reactive Phosphorus (mg/L)	0.007	0.006	<0.004	0.004	0.006	0.004	0.004	0	0.004	<0.004
Electrical Conductivity (mS/m)	18.9	19.7	19.1	21	17.3	16.2	18.1	19.7	21.6	18.3
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	4.3	4.6	3.9	4.9	3.1	2.7	4.1	5.3	6.7	4.5
Total Nitrogen (mg/L)	4.6	5.2	4	5.2	3.2	2.8	4.4	5.3	6.7	4.5
pH	6.9	6.9	6.9	6.9	7	7	7	7	7	7
Sulphate (mg/L)	7.6	8.4	7.3	10.3	6.9	6.1	7.6	9.1	10.5	8.1
Temperature (DegC)	0	11.9	11.8	12	19.3	8.1	10.7	12.1	13.2	11.8

BX22/0042	31/03/2014	30/06/2014	10/09/2014	17/12/2014	1/04/2015	9/06/2015	2/09/2015	3/12/2015	3/03/2016	21/06/2016
Groundwater Level (mbgl)	45.74	41.42	40.91	44.55	47.04	47.085	47.265	47.815	48.195	47.59
Alkalinity (mg/L)	47	47	48	47	47	49	49	48	46	47
Bromide (mg/L)	0.03	0.07	0.04	0.05	0.02	0.03	0.03	0.03	0.03	0.03
Chloride (mg/L)	11.5	11.6	11.2	12.2	8	10	9.5	10.4	10	9.7
Dissolved Oxygen (% Sat.)	87.2	99.6	0	91	110.2	95.3	95	100	90.1	91.3
Dissolved Reactive Phosphorus (mg/L)	0.006	0.004	0.005	0.004	<0.004	0.006	0.004	0.005	<0.004	<0.004
Electrical Conductivity (mS/m)	18.7	19.1	19.1	19.7	16.1	18.4	18.2	19.2	18.7	18.5
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	5.3	5.7	5.5	6.2	3.5	5.2	4.9	6.1	5.7	5.4
Total Nitrogen (mg/L)	5.7	5.5	5.8	6.6	3.5	5.3	4.9	6.1	5.7	5.4
pH	7.2	7.1	7.1	7.2	7.4	7.3	7.3	7.2	7.3	7.3
Sulphate (mg/L)	5.5	5.4	5.9	5.6	5.2	5.6	6	5.6	5.6	5.9
Temperature (DegC)	0	11.7	11.6	11.8	19.5	14.3	11.6	0	12.9	11.6

BX22/0043	25/03/2014	1/07/2014	10/09/2014	17/12/2014	7/04/2015	16/06/2015	9/09/2015	8/12/2015	3/03/2016	20/06/2016
Groundwater Level (mbgl)	57.19	52.24	50.74	59.93	65.19	57.295	56.985	62.4	64.125	59.665
Alkalinity (mg/L)	54	81	67	53	52	58	59	51	54	59
Bromide (mg/L)	0.04	0.09	0.06	0.1	0.05	0.06	0.05	0.05	0.05	0.05
Chloride (mg/L)	22.6	12.8	14.1	21.4	18.6	23.3	22.8	21.2	21	21
Dissolved Oxygen (% Sat.)	101.8	101.6	0	97.6	107.1	99.9	94.5	100.1	110.6	101.7
Dissolved Reactive Phosphorus (mg/L)	0.006	0.004	0.007	0.007	0.006	0.008	0.008	<0.004	0.004	<0.004
Electrical Conductivity (mS/m)	32.8	31.8	29.5	31.1	27.4	34	34.5	31.1	31.5	32.3
E. coli (MPN/100ml)	27	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	13.6	9.9	10.2	13	10.9	14.6	14.3	13.1	13	13
Total Nitrogen (mg/L)	14.1	10.5	10.5	12.7	11.3	14.9	14.3	13.1	13	13
pH	7.6	7.8	7.7	7.8	7.5	7.7	7.7	7.7	7.7	7.6
Sulphate (mg/L)	14	16.5	15.1	13.5	8.4	15.2	15.4	11.5	11.6	11.3
Temperature (DegC)	0	11.6	11.5	11.6	21.7	10.1	10.6	12.6	13.5	11.4

BX22/0044	27/03/2014	19/06/2014	25/09/2014	2/12/2014	24/03/2015	9/06/2015	2/09/2015	10/12/2015	8/03/2016	21/06/2016
Groundwater Level (mbgl)	5.57	4.98	5.46	6.15	7.4	7.61	5.28	5.34	5.92	6.175
Alkalinity (mg/L)	49	47	46	47	53	59	44	45	49	51
Bromide (mg/L)	<0.02	0.05	0.02	0.05	0.02	0.02	0.03	0.03	0.02	0.03
Chloride (mg/L)	7.7	10.3	7.7	7.3	7.8	8.1	8.4	8.3	7.8	8.1
Dissolved Oxygen (% Sat.)	83.6	73.6	81.8	88.4	97.9	81.4	94.7	90.8	87	90.9
Dissolved Reactive Phosphorus (mg/L)	0.009	0.007	0.009	0.008	0.008	0.006	0.009	0.01	0.008	0.008
Electrical Conductivity (mS/m)	18.2	21.8	17.9	16.8	19.6	20.4	19	18.7	18.3	19.8
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	4.1	7.4	4.5	3.9	4.6	4.5	6	5.6	5	5.9
Total Nitrogen (mg/L)	4.6	8	4.6	3.7	4.7	4.8	6	5.7	5	5.9
pH	6.3	6.3	6.2	6.3	6.6	6.5	6.4	6.5	6.4	6.4
Sulphate (mg/L)	11.8	14.1	11.5	10.8	11.7	10.9	11.7	10.1	9.4	9.1
Temperature (DegC)	0	12.6	11.4	11.3	25-30	14	12.2	12.5	12.5	13

BX22/0046	24/03/2014	19/06/2014	17/09/2014	3/12/2014	31/03/2015	11/06/2015	3/09/2015	7/12/2015	2/03/2016	23/06/2016
Groundwater Level (mbgl)	9.35	7.53	7.87	9.58	12.415	12.68	12.62	12.89	12.97	12.715
Alkalinity (mg/L)	75	75	76	73	68	69	70	71	73	73
Bromide (mg/L)	0.04	0.07	0.06	0.08	0.05	0.05	0.05	0.05	0.04	0.05
Chloride (mg/L)	17.3	17.6	16.1	15.8	16	15.8	15.7	15.3	14.8	14.3
Dissolved Oxygen (% Sat.)	89.3	93.6	86.8	83	92.2	78.4	82.9	86.1	83.2	0
Dissolved Reactive Phosphorus (mg/L)	0.004	0.006	0.004	0.005	0.005	0.006	0.004	<0.004	0.004	<0.004
Electrical Conductivity (mS/m)	34.8	35.6	35.2	33.7	33.8	33.5	33.6	33.6	33	33.3
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	12.9	14.4	13.2	12.4	12.8	12.6	12.5	12.4	12.3	12.2
Total Nitrogen (mg/L)	13.3	15.2	13.3	12	12.3	12.6	12.5	12.4	12.3	12.2
pH	6.6	6.6	6.6	6.4	6.6	6.7	6.7	6.7	6.8	6.8
Sulphate (mg/L)	20.5	17.7	19.3	20.5	20.1	20.2	20	19.3	18.5	18.4
Temperature (DegC)	0	11.7^	12.2^	12	18.1	6.5	11.4	13.2	12.8	12.5

BX22/0053	23/09/2014	3/12/2014	31/03/2015	10/06/2015	10/09/2015	8/12/2015	10/03/2016	23/06/2016
Groundwater Level (mbgl)	33.56	39.04	44.983	43.275	40.99	44.365	45.995	44.285
Alkalinity (mg/L)	59	60	54	59	58	58	56	59
Bromide (mg/L)	0.04	0.07	0.04	0.05	0.03	0.04	0.04	0.03
Chloride (mg/L)	9.5	10.8	14.6	15.8	11.9	11.4	13.3	11.6
Dissolved Oxygen (% Sat.)	93	102	96.6	91.1	96.9	102.5	106	0
Dissolved Reactive Phosphorus (mg/L)	0.006	0.007	0.004	0.006	0.008	<0.004	0.004	<0.004
Electrical Conductivity (mS/m)	22.5	24.2	27.2	28	24.7	24.8	25.8	25.3
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	6.3	8	11	10.5	8.3	8.5	9.8	9
Total Nitrogen (mg/L)	6.8	8	11.1	10.6	8.3	8.5	9.8	9
pH	7.5	7.6	7.4	7.5	7.6	7.7	7.6	7.6
Sulphate (mg/L)	11.8	12.3	10.5	11.9	11.8	10.5	10.5	10.2
Temperature (DegC)	11.9	11.8	13.8	11	13.5	14.5	14.2	11.8

BW22/0041	31/03/2014	17/06/2014	23/09/2014	11/12/2014	24/03/2015	17/06/2015	9/09/2015	10/12/2015	9/03/2016	21/06/2016
Groundwater Level (mbgl)	7.31	5.18	6.98	7.42	8.105	7.34	6.19	7.18	7.31	7.88
Alkalinity (mg/L)	34	24	32	34	35	34	30	31	32	33
Bromide (mg/L)	<0.02	0.05	0.03	<0.05	<0.02	0.02	0.03	0.02	0.02	<0.02
Chloride (mg/L)	6.8	7.6	6.8	6.2	5.1	5.3	6	5.9	5.5	5.5
Dissolved Oxygen (% Sat.)	88.9	94.2	95.8	86	93.1	85.4	92.3	94.5	92.2	91.3
Dissolved Reactive Phosphorus (mg/L)	0.007	0.008	0.006	0.008	<0.004	0.008	0.011	0.006	0.006	0.007
Electrical Conductivity (mS/m)	16.8	17.9	16.7	15.7	14.3	13.8	14.8	14.7	14	13.7
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0	0
Nitrate-N (mg/L)	6.6	8.6	6.5	5.4	4.2	4.2	5.4	5.1	4.4	4.1
Total Nitrogen (mg/L)	7	9.1	6.8	5.5	4.3	4.5	5.4	5.2	4.5	4.1
pH	6.4	6.2	6.3	6.3	6.5	6.5	6.4	6.5	6.5	6.5
Sulphate (mg/L)	11.2	13.7	11.5	10.7	9.4	8.4	11	10.3	9.1	7.4
Temperature (DegC)	0	12.3	11.4	11.3	23.3	10.9	11.6	12.5	11.9	12

BW22/0042	31/03/2014	17/06/2014	23/09/2014	11/12/2014	30/03/2015	10/06/2015	3/09/2015	2/12/2015	8/03/2016	1/06/2016
Groundwater Level (mbgl)	20.64	13.81	18.51	20.32	21.467	21.29	18.46	21.625	23.515	21.26
Alkalinity (mg/L)	43	42	39	43	43	40	39	47	46	36
Bromide (mg/L)	0.04	0.05	0.04	<0.05	0.05	0.04	0.04	0.04	0.04	0.03
Chloride (mg/L)	15.4	6.8	11.1	16.5	16.9	11.5	8.4	13.9	14.2	7.3
Dissolved Oxygen (% Sat.)	82.1	87.6	86.9	81.9	92.7	95	85.1	93.5	83.6	91.3
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.007	0.004	0.005	<0.004	0.004	0.006	<0.004	<0.004	<0.004
Electrical Conductivity (mS/m)	30.1	19.3	25.6	31.9	32.6	23.7	20.2	27.8	27.5	16.5
E. coli (MPN/100ml)	0	0	0	0	0	0	0	0	0	6
Nitrate-N (mg/L)	11.7	3.1	5.7	12.4	13.5	6.3	4.1	9.9	11	4.2
Total Nitrogen (mg/L)	12.2	3.5	6.2	12.7	13.9	6.8	4.2	9.9	11	4.4
pH	6.7	6.2	6.3	6.7	6.9	6.4	6.3	6.8	6.9	6.5
Sulphate (mg/L)	30.5	25.9	41.4	30	31.7	31.5	28.2	25.8	22.1	12.7
Temperature (DegC)	0	11.9	11.7	11.9	-	10.4	11.1	13.5	12.3	7.7

BX22/0065	16/06/2015	7/09/2015	10/12/2015	2/03/2016	2/06/2016
Groundwater Level (mbgl)	13.005	8.75	13.05	16.695	16.69
Alkalinity (mg/L)	46	47	46	42	43
Bromide (mg/L)	0.06	0.06	0.06	0.04	0.05
Chloride (mg/L)	18.9	18.6	21.1	12.4	15
Dissolved Oxygen (% Sat.)	77.3	76.8	84.2	87.7	88.2
Dissolved Reactive Phosphorus (mg/L)	0.006	0.006	0.006	<0.004	<0.004
Electrical Conductivity (mS/m)	28.3	28.2	27.9	23.6	24.1
E. coli (MPN/100ml)	0	0	12	0	0
Nitrate-N (mg/L)	12	10.9	9.5	8.9	9.1
Total Nitrogen (mg/L)	12.2	10.9	9.7	8.9	9.1
pH	6.6	6.6	6.5	6.7	6.8
Sulphate (mg/L)	16	16.5	17.1	6.7	11.7
Temperature (DegC)	10.9	10.8	14.1	12.5	12.8

BX22/0066	11/06/2015	7/09/2015	2/12/2015	2/03/2016	2/06/2016
Groundwater Level (mbgl)	27.79	21.995	27.085	32.765	33.97
Alkalinity (mg/L)	46	39	44	45	25
Bromide (mg/L)	0.05	0.03	0.03	0.04	0.07
Chloride (mg/L)	14.8	9.5	10.7	16	17.1
Dissolved Oxygen (% Sat.)	75.7	83.6	77.9	82.4	93.2
Dissolved Reactive Phosphorus (mg/L)	0.008	0.006	0.006	<0.004	<0.004
Electrical Conductivity (mS/m)	25.3	17.6	20.3	24.6	30.6
E. coli (MPN/100ml)	0	0	0	0	1
Nitrate-N (mg/L)	10.1	4.9	6.2	8.9	13.1
Total Nitrogen (mg/L)	10.1	5	6.2	8.9	13.4
pH	6.5	6.6	6.7	6.8	6.7
Sulphate (mg/L)	13.3	11.3	12.5	12.6	35.6
Temperature (DegC)	11.7	10	14.8	12.9	12

BX22/0067	18/06/2015	8/09/2015	10/12/2015	10/03/2016	22/06/2016
Groundwater Level (mbgl)	32.86	31.47	36.98	38.85	37.79
Alkalinity (mg/L)	44	48	45	47	50
Bromide (mg/L)	0.08	0.09	0.11	0.09	0.1
Chloride (mg/L)	24.6	23.2	26.9	23.9	26
Dissolved Oxygen (% Sat.)	96.2	76	80.7	86.6	86.5
Dissolved Reactive Phosphorus (mg/L)	0.004	0.006	0.006	<0.004	<0.004
Electrical Conductivity (mS/m)	30	33.7	33.5	31.6	33.6
E. coli (MPN/100ml)	0	0	>201	5	2
Nitrate-N (mg/L)	12.7	14.5	13	12.1	13.1
Total Nitrogen (mg/L)	12.7	14.8	13.3	12.4	13.2
pH	6.7	6.5	6.3	6.3	6.8
Sulphate (mg/L)	13.4	17.6	19.8	17.1	18.1
Temperature (DegC)	9.6	17.2	13.2	13.3	12.6

BX22/0068	15/06/2015	2/09/2015	9/12/2015	8/03/2016	2/06/2016
Groundwater Level (mbgl)	61.355	61	66.525	67.735	65.145
Alkalinity (mg/L)	47	35	57	50	49
Bromide (mg/L)	0.03	0.07	0.03	0.03	0.03
Chloride (mg/L)	9.3	19.2	9.7	9.6	9.2
Dissolved Oxygen (% Sat.)	82.3	95	82.7	79.8	83
Dissolved Reactive Phosphorus (mg/L)	0.013	0.009	0.014	0.01	0.012
Electrical Conductivity (mS/m)	15	29.9	16.6	16.1	16.3
E. coli (MPN/100ml)	0	1	2	0	0
Nitrate-N (mg/L)	2.7	11.9	3.5	3.3	2.9
Total Nitrogen (mg/L)	2.7	12.4	5	3.4	3
pH	7.7	7	7.7	7.7	7.1
Sulphate (mg/L)	3	30.1	4.5	3.5	3.2
Temperature (DegC)	9	12.2	11.8	11.6	10.7

BX22/0069	11/06/2015	10/09/2015	9/12/2015	10/03/2016	22/06/2016
Groundwater Level (mbgl)	55.37	54.745	58.115	61.33	62.67
Alkalinity (mg/L)	33	34	34	32	32
Bromide (mg/L)	0.05	0.05	0.05	0.05	0.04
Chloride (mg/L)	13.1	12.8	12.8	12.6	12.8
Dissolved Oxygen (% Sat.)	97.4	105.1	98.9	102.6	88.4
Dissolved Reactive Phosphorus (mg/L)	0.006	0.006	0.004	<0.004	<0.004
Electrical Conductivity (mS/m)	20	20.1	20.4	19.6	19.5
E. coli (MPN/100ml)	0	0	0	0	0
Nitrate-N (mg/L)	9.9	9.9	10.2	9.8	9.6
Total Nitrogen (mg/L)	9.9	10	10.3	9.8	9.7
pH	7	7	7.1	7	7.1
Sulphate (mg/L)	3.8	3.9	3.7	3	3.1
Temperature (DegC)	10.4	15	12.8	12	11.5

BX22/0070	15/06/2015	7/09/2015	7/12/2015	7/03/2016	21/06/2016
Groundwater Level (mbgl)	86.76	88.87	93.865	96.44	95.535
Alkalinity (mg/L)	34	33	34	34	30
Bromide (mg/L)	0.04	0.04	0.04	0.04	0.04
Chloride (mg/L)	9.8	10	10.1	10.3	10.1
Dissolved Oxygen (% Sat.)	85.8	93.2	88.8	92.7	90.3
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.006	<0.004	<0.004	<0.004
Electrical Conductivity (mS/m)	17.2	17.2	17.3	17	17.3
E. coli (MPN/100ml)	0	0	0	0	0
Nitrate-N (mg/L)	7.5	7.5	7.6	7.7	7.6
Total Nitrogen (mg/L)	7.5	7.5	7.6	7.8	7.6
pH	6.8	6.8	6.9	6.8	6.8
Sulphate (mg/L)	4.7	4.4	4	3.7	5.7
Temperature (DegC)	7.6	10.2	12.2	-	11

BX22/0071	17/06/2015	7/09/2015	2/12/2015	7/03/2016	1/06/2016
Groundwater Level (mbgl)	71.015	69.89	57.36	67.94	69.715
Alkalinity (mg/L)	37	30	32	36	37
Bromide (mg/L)	0.02	0.02	<0.02	<0.02	0.02
Chloride (mg/L)	6.1	6.1	6.1	6.2	6.4
Dissolved Oxygen (% Sat.)	91	134.9	110.5	88.9	79.2
Dissolved Reactive Phosphorus (mg/L)	0.006	0.006	<0.004	<0.004	0.004
Electrical Conductivity (mS/m)	13.2	12.7	12.2	13.2	14.5
E. coli (MPN/100ml)	0	0	0	0	0
Nitrate-N (mg/L)	3.2	3.1	2.8	3.2	3.6
Total Nitrogen (mg/L)	3.3	3.1	2.8	3.3	3.6
pH	6.7	6.6	6.7	6.8	6.7
Sulphate (mg/L)	6.5	7.9	6.7	6.8	7.4
Temperature (DegC)	11.1	7.6	11.9	11.5	9.6

BX22/0072	18/06/2015	9/09/2015	7/12/2015	7/03/2016	20/06/2016
Groundwater Level (mbgl)	21.54	10.14	14.545	20.16	19.475
Alkalinity (mg/L)	45	39	41	46	45
Bromide (mg/L)	0.03	0.03	0.03	0.03	0.03
Chloride (mg/L)	9	10.1	8.9	8.9	8.8
Dissolved Oxygen (% Sat.)	63.2	94.9	88.1	82.8	67.4
Dissolved Reactive Phosphorus (mg/L)	0.004	0.006	<0.004	0.004	0.004
Electrical Conductivity (mS/m)	17.8	20.7	19.7	18.8	18.1
E. coli (MPN/100ml)	0	0	0	0	0
Nitrate-N (mg/L)	4.9	9	7.4	5.8	4.6
Total Nitrogen (mg/L)	5	9	7.4	5.9	4.7
pH	6.8	6.7	6.7	6.9	6.9
Sulphate (mg/L)	9.5	9.7	9.8	8.8	9.4
Temperature (DegC)	10.7	14.7	12.5	12.4	10.9

BX23/0423	11/06/2015	10/09/2015	9/12/2015	10/03/2016	22/06/2016
Groundwater Level (mbgl)	35.235	29.08	38.235	40.81	38.18
Alkalinity (mg/L)	36	34	38	39	35
Bromide (mg/L)	0.08	0.05	0.05	0.04	0.05
Chloride (mg/L)	17.9	12.5	12.6	9	12.1
Dissolved Oxygen (% Sat.)	87.4	100	104.2	104.3	94.4
Dissolved Reactive Phosphorus (mg/L)	0.005	0.004	0.004	<0.004	<0.004
Electrical Conductivity (mS/m)	29	24.1	22.9	17.9	23.3
E. coli (MPN/100ml)	0	0	0	0	0
Nitrate-N (mg/L)	13.9	10.7	9.1	5.5	10.3
Total Nitrogen (mg/L)	13.9	10.8	9.1	5.5	10.3
pH	6.7	6.7	6.8	7	6.9
Sulphate (mg/L)	19	18	16.2	11	14.6
Temperature (DegC)	8.4	19.3	13.3	13.8	12.5

BX23/0424	16/06/2015	8/09/2015	9/12/2015	8/03/2016	2/06/2016
Groundwater Level (mbgl)	46.67	46.375	48.5	51.11	51.7
Alkalinity (mg/L)	45	45	45	43	44
Bromide (mg/L)	0.07	0.07	0.06	0.05	0.05
Chloride (mg/L)	19.4	19	16.9	14.3	13.8
Dissolved Oxygen (% Sat.)	80.1	83.2	71.2	81.5	67.1
Dissolved Reactive Phosphorus (mg/L)	<0.004	0.004	<0.004	<0.004	<0.004
Electrical Conductivity (mS/m)	25.9	26.3	23.5	21.1	21.6
E. coli (MPN/100ml)	0	0	0	0	0
Nitrate-N (mg/L)	11.4	11	9	8.1	7.9
Total Nitrogen (mg/L)	10.5	11.2	9.1	8.1	8.3
pH	7.1	7.1	7.2	7.3	7.4
Sulphate (mg/L)	7.5	8.5	6.6	5.6	5.7
Temperature (DegC)	11	15.5	12.4	12.2	9.8

6.6. Lowland Groundwater Level Results (ECan Data)

L36/0142	Trigger	21/06/2016	25/05/2016	27/04/2016	31/03/2016	4/03/2016	3/02/2016	15/12/2015	19/11/2015	23/09/2015	
SWL (mASL)	≥46.01	40.54	39.189	38.75	38.259	38.026	38.97	39.17	40.46	42.26	
L36/0182	Trigger	22/06/2016	26/05/2016	1/04/2016	23/09/2015						
SWL (mASL)	≥82.26	80.471	80.138	80.53	81.72						
L36/0202	Trigger	21/06/2016	25/05/2016	27/04/2016	31/03/2016	4/03/2016	3/02/2016	15/12/2015	19/11/2015	20/10/2015	23/09/2015
SWL (mASL)	≥72.88	71.175	70.641	71.385	71.225	71.405	71.87	71.92	71.45	72.24	72.19
L37/0451	Trigger	21/06/2016	25/05/2016	27/04/2016	31/03/2016	4/03/2016	2/02/2016	14/12/2015	19/11/2015	20/10/2015	22/09/2015
SWL (mASL)	≥23.5	20.102	20.042	20.263	20.316	20.065	20.312	19.88	20.176	19.997	19.98
M36/0250	Trigger	19/06/2016	25/05/2016	27/04/2016	31/03/2016	3/03/2016	2/02/2016	19/11/2015	19/10/2015	22/09/2015	
SWL (mASL)	≥16.1	13.252	13.039	13.05	12.982	13.048	13.2	13.73	14.16	14.13	
M36/0255	Trigger	21/06/2016	26/05/2016	27/04/2016	1/04/2016	4/03/2016	4/02/2016	15/12/2015	20/11/2015	20/10/2015	22/09/2015
SWL (mASL)	≥36.25	32.726	31.336	31.42	30.76	29.9	31.44	30.17	31.16	32.53	33.73
M36/0419	Trigger	21/06/2016	26/05/2016	27/04/2016	1/04/2016	4/03/2016	2/02/2016	15/12/2015	19/11/2015	19/10/2015	22/09/2015
SWL (mASL)	≥33.5	30.571	30.026	30.18	30.43	30.94	31.59	31.86	32.28	32.66	32.47
M36/0424	Trigger	19/06/2016	24/05/2016	26/04/2016	31/03/2016	3/03/2016	2/02/2016	15/12/2015	20/11/2015	20/10/2015	22/09/2015
SWL (mASL)	≥21.02	20.091	18.727	18.614	18.526	18.57	19.27	19.199	19.8	20.325	20.817
M36/0599	Trigger	19/06/2016	24/05/2016	26/04/2016	31/03/2016	2/02/2016	19/11/2015	19/10/2015	22/09/2015		
SWL (mASL)	≥13.63	11.171	10.904	11.03	11.16	11.83	11.74	13.28	13.27		
M36/0693	Trigger	21/06/2016	25/05/2016	27/04/2016	1/04/2016	4/03/2016	19/11/2015	20/10/2015	22/09/2015		
SWL (mASL)	≥21.53	17.9	dry	dry	dry	dry	17.96	18.47	18.68		
M36/7880	Trigger	21/06/2016	26/05/2016	27/04/2016	1/04/2016	4/03/2016	2/02/2016	15/12/2015	19/11/2015	19/10/2015	22/09/2015
SWL (mASL)	≥35.14	31.674	31.295	31.78	32.125	32.73	33.41	34.03	34.78	35.04	34.82
M37/0010	Trigger	21/06/2016	25/05/2016	27/04/2016	1/04/2016	4/03/2016	2/02/2016	14/12/2015	20/11/2015	20/10/2015	22/09/2015
SWL (mASL)	≥6.21	5.592	5.566	5.41	5.315	5.193	5.42	5.27	5.42	5.6	5.76