University of Southern Queensland

Faculty of Health, Engineering & Sciences

Effects of sewage effluent on soil constraints in the Tamworth Region of New South Wales

A dissertation submitted by

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In fulfilment of the requirements of

ENG4111 and ENG4112 Research Project

Towards the degree of

Bachelor of Engineering (Honours) (Environmental)

Submitted October 2020

Abstract

The Tamworth Regional Council area has experienced many challenges during 2020 – drought, fires, floods, and an unprecedented global pandemic. Council staff and especially engineers have had to be at the forefront of addressing issues arising from the natural disasters and pandemic. Amid the crises water use has had huge political and social repercussions regarding acceptable outcomes within a changing climate.

Councils have for many years disposed of municipal effluent from their sewage treatment schemes in land-based disposal areas. The ability to grow agricultural crops from this effluent has only become viable as treatment systems have improved with the subsequent lowering of health and environmental risks.

Tamworth Regional Council has an effluent reuse farm utilizing pivot irrigation. Control areas can be sourced on soils outside the irrigation area to determine before and after condition of the soil. To be fully representative of the soils where sewage effluent has or has not been applied this study identified appropriate testing sites at the Tamworth Effluent Reuse Farm (TERF). The research involved classifying the study soils on the farm using the Australian Soil Classification (ASC), (Isbell & NCST, 2016). The quality and quantity of effluent applied to each of the soils was determined using data provided by Tamworth Regional Council in relation to ANZECC guidelines.

Irrigation data for each pivot showed insufficient effluent had been applied to push the salts through the profile. This was highlighted in a chemical analysis that had been performed for EPA compliance. To determine how the effluent was affecting the physical characteristics of the best and worst performing vertosol, sampling of irrigated and control soil was collected according to Australian guidelines. Testing was performed at a National Australian Testing Authority (NATA) registered laboratory. Physical soil tests were carried out in each identified horizon of excavated soil pits, as part of this report, and the results showed the irrigated soils are displaying signs of dispersion, compaction and reduced hydraulic conductivity.

To fully understand all the constraints and spatial covariates of interest further, an Electro Magnetic (EM) and gamma survey was conducted on the worst yielding pivots. Ground truthing of the spatial survey was then carried out with soil cores and constraint maps produced. Soils were found to have high dispersion, reduced permeability and increased salt levels compared to control areas, which are symptoms of salinity and sodicity caused by effluent irrigation at levels that significantly affect yield.

The findings revealed alternative spatial management of the irrigation and cropping regime will be required to ensure the sustainability of the TERF soils in the long term. The effluent, even at medium strength salt load, requires a leaching factor to be applied to ensure salts are pushed through the profile as even exceptionally good agricultural soils will be adversely affected if adequate leaching does not occur over time.

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Certification of Dissertation

I certify that the ideas, designs and experimental work, results, analyses and conclusions set out in this dissertation are entirely my own effort, except where otherwise indicated and acknowledged.

I further certify that the work is original and has not been previously submitted for assessment in any other course or institution, except where specifically stated.

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Acknowledgements

Initially, I acknowledge the incredible support of Professor John Mclean Bennett for accepting my proposal and having faith in my ability to stay the course and complete the task to the best of my ability. I have certainly been challenged and without your support this project would not have been possible. Thank you.

Sincere thanks to Doctor Stirling Roberton for guidance in pedometrics and proximal sensing and for assisting me to address the overall “Big Picture” of the research.

My appreciation goes to the University of Southern Queensland for the vigorous eight years of education that has bought me closer to achieving my engineering qualification.

To Tamworth Regional Council, for funding and supporting me throughout my years of studies and particularly during this rewarding research project.

A special thanks to Doctor Robert Banks for assistance ‘on the ground’ and for the numerous discussions on the phone.

Finally, I thank my wife Stephanie and my family for their wonderful love, support and patience over many years leading to this point.

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ACRONYMS	
Acronym	Meaning
ADWF	Average dry weather flows
ANZECC	Australian and New Zealand Environment and Conservation Council
BOD5	5-day Biological Oxygen Demand or biochemical oxygen
CFU	Colony Forming Units
DLWC	Department of Land and Water Conservation
DM	Dry matter
DPWS	Department of Public Works and Services
EC	Electrical conductivity (measured in dS/m)
ECe	Electrical conductivity of a saturated extract (measured)
ECEC	Effective cation exchange capacity
EIS	Environmental impact statement
EMR	Environmental management report
EPA	Environment Protection Authority
ESP	Exchangeable sodium percentage
ET	Evapotranspiration
Ks	Saturated hydraulic conductivity
NPV	Net present value
OWRU	Organic Waste Recycling Unit
SAR	Sodium adsorption ratio
STP	Sewage treatment plant
SW	Soil water
TERF	Tamworth Effluent Reuse Farm
TRC	Tamworth Regional Council
TDS	Total dissolved solids
UV	Ultraviolet
WHC	Water holding capacity
YHL	Yearly hydraulic loading

CHAPTER 1 – INTRODUCTION

Water security in Australia is becoming a critical issue. Recent fish kills in the Darling River in NSW (Davies, 2019), and empty major water storages are receiving national and international news coverage (Doyle, 2019). Consequently, industry and governments are requiring efficient water use become a top priority. Limited and/or single use of water and then disposal to the environment is not sustainable and is rapidly becoming politically unviable (Wright, 2019). Agricultural water use (Livestock and irrigation) is the largest user of water in Australia (ABS, 2019). The quality of water for agriculture does not have to be as good as for human consumption, so the requirement for lower quality water has led to various sewage effluent reuse schemes being adopted by some local councils in regional areas. Sewage effluent is often favoured for growing agricultural crops – for effluent is readily available in constant volumes whilst containing nutrients such as nitrogen and phosphorus required for crop growth (Toze, 2006; EPA, 2004).

Tamworth Regional Council (TRC) has been operating an effluent reuse scheme for 8 years (Tamworth Regional Council, 2020). The scheme was established to lessen the disposal of effluent to the Peel River which has reduced nutrients being added to the Murray Darling Catchment, minimising the possibility of eutrophication further downstream. Tamworth's reuse scheme has achieved beneficial reuse of the wastewater by increasing hay production for the agricultural industry and thus providing an additional income for TRC.

Notwithstanding the benefits of the effluent reuse – TRC and other Councils which operate effluent reuse schemes have certain responsibilities as stated in the *National Guidelines for Water Recycling Managing Health and Environmental Risks* (2006) which include:

- Protecting surface water and groundwater from runoff and leaching.
- Maintaining or improving the capacity of the soil to grow plants.
- Protecting the health of public and the surrounding environment.
- Operating and maintaining the effluent irrigation system to maintain or improve public amenity.

Sewage effluent can be used as an agricultural resource, but the use of sewage effluent has the potential to have a large effect on the receiving environment due to contaminants within the effluent (Hopcroft, 2014). The Tamworth Effluent Reuse Farm (TERF) currently receives wastewater produced by 40,000 people including some industrial and trade waste. There is potential for the receiving environment – agricultural soils, to be overwhelmed with contaminants. The soils on the TERF are being used by TRC to dispose of the effluent by relying on the natural filtration process of the soil (Balke, 2008). The filtration process acts by receiving and removing contaminants from the treated effluent at the same time growing agricultural cash crops. The TERF farm is irrigated by the centre pivot type method which allows for control soils to be identified from the corners of paddocks, which are often comparable soils that have not been irrigated.

PROJECT IDEA

Being employed by TRC and having an interest in how the TERF has been performing under the irrigation of effluent, especially in the drought conditions of 2018-2019, senior Council staff were approached and questioned on how the reuse farm was performing. Information gathered showed salinity of the topsoil was trending upwards especially in dry years. In-kind and financial assistance was offered by TRC to investigate and make recommendations for various future management options.

With my interest being piqued by the ethical decisions behind the management of the TERF, Professor John Bennett was approached as a possible supervisor, an expert in the field, to assist with finetuning a research project specification into an investigation of the TERFs suitability to receive effluent. In addition, Doctor Robert Banks who had been carrying out the soil monitoring of the TERF for the Environment Protection Authority (EPA) license, agreed to provide technical advice as an in-kind contribution.

1.1 PROJECT AIMS

The primary aim of this research is to Investigate how the effect of filtering Tamworth's sewage effluent using the various soils' physical and chemical characteristics, can be affected by the application of sewage effluent.

The secondary aims are to:

- Report on these effects, with respect to water quality, climate and soil constraints; and to
- Provide recommendations for spatial management into the future.

1.2 PROJECT OBJECTIVES

The objectives required to achieve this aim are as follows:

1. Classify soils according to the Australian Soil Classification (ASC).
2. Analyse soil data to establish which soil types are best able to receive and process the effluent in the Tamworth region.
3. Build on to contemporary research in relation to the effects of marginal quality and ameliorated water on agricultural soil constraints.
4. Compare irrigated and non-irrigated soils from the same area.
5. Show the effects on the soil constraints irrigated with reuse or marginal quality water.
6. Recommend spatial management into the future.

The project specification can be found in Appendix A

1.3 DISSERTATION OVERVIEW

1.3.1 Introduction

This chapter incorporates the Introduction and the Project Primary and Secondary Aims and Objectives.

1.3.2 Literature Review

This chapter details previous studies in the field, including effluent characteristics and how they relate to ANZECC guidelines.

1.3.3 Site Description

This chapter provides background regarding the region and land use history.

1.3.4 Methodology

This chapter outlines how the project primary and secondary aims and objectives will be met.

1.3.5 Sampling Experiments and Results

This chapter comprises a list of all field sampling completed and locations with a review of results of testing and comparison of irrigation and control areas.

1.3.6 Discussion

The discussion will address the primary and secondary aims drawing on the results to

1.3.7 Management

This chapter recommends possible future studies and spatial management of effluent disposal into the future.

1.3.8 Conclusions

The major findings of the study will be summarised in this chapter.

CHAPTER 2 – LITERATURE REVIEW

There are some recent studies on the effects on soils where marginal quality water has been used for irrigation. Bennett et al. (2016), investigated and reported on the effects irrigation of coal seam gas water had on a specific soil in Queensland, where water was used to irrigate a crop and compare a control area of the same soil and crop with good quality water. The study indicated the use of soil amendments, such as gypsum to ameliorate the sodicity and acid to ameliorate the alkalinity, the soil did not suffer severe consequences. Research demonstrated, with amendments, coal seam gas water could be used for irrigation, which is a great beneficial reuse outcome for these types of waste products.

Menezes et al. (2014), investigated the effects on two different soils' constraints when various combinations of sodicity and salinity were applied as irrigation water. Results of the study of Menezes et al., demonstrated some soils could accept high rates of salts with little detrimental effect to constraints depending on the sodicity to salinity ratio. Current research has many of the trials being performed on high salinity or sodic waters but has not included sewage effluent which can be highly variable in composition. This project will contribute to and build upon these studies by exploring how sewage effluent, which has a potentially high number of macro and micro-contaminants as well as salt load, will affect agricultural soil constraints in the Tamworth region.

A study of soil characteristics is basically a study of the soil's story. Deb and Shukla (2012) found soil properties can be influenced by internal factors as well as external factors. The internal factors are intrinsic to the soil and come from the soil's parent material, the location of the soil and climate effects which can take place over eons of time.

The internal factors of a soil can begin to be determined by classifying the soil as per the ASC. Classifying soil with a nationally agreed methods provides a means of organising and communicating knowledge about various type of soils that is clearly understood not just by scientists but also land managers (CSIRO, 2015).

External factors affect soils by changing them very quickly over extremely short time scales. External factors may be different land uses, irrigation regimes or even various water sources altering soil properties.

2.1 WATER QUALITY AND THE ENVIRONMENT

Bourrie (2019) stated that while irrigating, the soil factors to be considered are the limiting of alkalisation, degradation of the soil structure (sodicity), and the potential to leach excessive salts through to groundwater tables. Vyas and Jethoo (2015) noted characteristics of the applied water which should be considered are: salinity, exchangeable sodium percentage (ESP), SAR (Sodium Absorption Ratio), total dissolved solids, residual sodium content and toxic elements such as heavy metals. 'It entails that water quality has to be considered within a geodynamic context, which is no longer subtractive, but accumulative, due to salt concentration due to evaporation' (Bourrie, 2019).

Even though sewage effluent can contain beneficial resources such as nutrients and organic matter it also contains pollutants. Pollutants of concern can include pathogens and salts potentially detrimental to soils and plants that may also become a public health or environmental issue. Effluent if used on irrigation schemes needs to be classified so appropriate measures can be put in place to ensure the scheme is sustainable and poses no risks to the environment (Department of Environment and Conservation DEC [NSW], 2003).

Effluent strength guidelines are produced by DEC (NSW). The effluent suppled to the TERF can be rated in strength using Table 1.

Table 1: Table to rate the strength of sewage effluent (DEC, NSW, 2003)

	Strength (average concentration mg/L)[1]		
Constituent	**Low[2]**	**Medium**	**High**
Total nitrogen	<50	50–100	>100
Total phosphorus	<10	10–20	>20
BOD_5	<40	40–1,500	>1,500
TDS[3]	<600	600–1,000	>1,000–2,500
Other pollutants (e.g. metals, pesticides)	Effluent with more than five times[4] the ANZECC and ARMCANZ (2000) long-term water quality trigger values for irrigation waters must be considered high strength for the purpose of establishing a strength class for runoff and discharge controls and will require close examination to ensure soil is not contaminated.		
Grease and oil	Effluent with more than 1,500 mg/L of grease and oil must be considered high strength and irrigation rates and practices must be managed to ensure soil and vegetation is not damaged.		

Notes:
1. Average concentrations established from a minimum of 12 representative samples, collected at regular intervals over a year.
2. Effluent generated by municipal sewage treatment plants with secondary treatment will generally be considered to be low strength.
3. Refer to Section 3.7 for relationship of TDS to EC.
4. Criteria of five times the ANZECC and ARMCANZ (2000) long-term irrigation criteria have been selected as nominal criteria at which the level of those contaminants warrants a higher level of management of the reuse system for the following reasons. This criteria when applied to 1 ML/d of effluent irrigated over 100 hectares would take approximately 10 years for soil contaminant levels in the top 15 cm of soil to rise to near the soil contaminant criteria for Cadmium, Chromium and Zinc, which are the most sensitive heavy metal pollutants in this scenario. This criteria is also approximately half the value for Nickel, Mercury, Beryllium and Arsenic at which the effluent would be considered a liquid waste and would need to be managed and disposed of according to the DEC's *Environmental Guidelines for the Assessment, Classification and Management of Liquid and Non-Liquid Waste* (EPA 1999a).

Carrondo et al. (1978) reported heavy metals accumulate in sewage and are often not removed by sewage treatment processes. These metals have the potential to concentrate in effluent disposal areas and cause harm. The levels of the metals must be low enough not to accumulate in the receiving soil after long term disposal. DEC NSW (2003) provides a table to assess metal levels this is shown in Table 2.

Table 2: Trigger levels for metals for up to 100 years application (DEC NSW, 2003)

Metal	Total concentration (mg/L)	Comments
Aluminium	5.0	High toxicity in acid soils. Not a concern if pH of soil is above 6.5.
Arsenic	0.1	
Beryllium	0.1	
Cadmium	0.01	Higher toxicity in acid soils
Chromium VI	0.1	
Cobalt	0.05	
Copper	0.2	
Iron	0.2	
Lead	2	
Lithium	2.5	Citrus: 0.075 mg/L
Manganese	0.2	
Mercury	0.002	
Molybdenum	0.01	
Nickel	0.2	
Selenium	0.02	
Zinc	2.0	1 mg/L recommended for sandy soil below pH 6

Source: ANZECC and ARMCANZ (2000) (Refer to any current Australian Water Quality Guidelines as they are updated and endorsed for use in NSW).

Note: 1. Trigger values should only be used in conjunction with information on each individual element and the potential for offsite transport of contaminants (see ANZECC & ARMCANZ (2000) Volume 3, Section 9.2.5). See also short-term use trigger values (up to 20 years) and cumulative contaminant loading limit triggers in ANZECC and ARMCANZ (2000), Volume 1, Table 4.2.10.

Effluent when being used in an agricultural enterprise should also meet the guidelines on sustainability for agriculture as written by the DEST (State of the Environment Advisory Council, 1996) who asks primary producers to ensure:

- The supply of necessary inputs is sustainable.
- The quality of natural resources is not degraded.
- The environment is not irreversibly harmed/damaged.
- The welfare and options for future generations are not jeopardised by the production and consumption activities of the present generation.
- Yields and product quality are maintained or improved.

The Australian and New Zealand Environment and Conservation Council (ANZECC) has produced guidelines for Primary industries to ensure irrigation practices consider not just the productivity of the receiving farm, but adverse impacts on downstream water quality does not occur.

Therefore ANZECC (2000) has recommended guidelines and explanations for irrigators regarding specific characteristics of irrigation water outlined below:

2.1.1 pH

Acceptable pH for irrigation is generally recommended to be between 5.5 and 8.5 however problems can still become evident within this range. Alkaline water which has a pH above 8 can begin to cause the precipitation of calcium in the soils. This will reduce the amount of exchangeable calcium and thus will raise the soil sodicity. High alkaline water will often also leave calcium deposits as scale which can equipment. Acidic water below 6 will cause its own set of problems which affects plant growth and the corrosion of anything metal such as pipes or fittings.

Acidic water can have a detrimental effect on plant growth, particularly causing nutritional problems, while strongly acidic water (below pH 4) can contribute to soil acidification. (DPI, 2014).

2.1.2 Suspended Solids

High levels of suspended solids or non-filterable residue tend to obstruct sprinkler nozzles, coat leaf surfaces and clog soil pores. the recommended guideline limit is 30 mg/L.

2.1.3 Salinity and Sodium Adsorption Ratio

The salinity and sodium adsorption ratio (SAR) of effluent are very important parameters which can have a detrimental effect on plant health, as well as soil properties. Salinity can be expressed as total dissolved solids (TDS, mg/L), or by the surrogate measure of electrical conductivity (EC, dS/m). The effluent used for irrigation is 1.1 dS/m EC (647 mg/L TDS). At this salinity level, the growth of salt-sensitive pasture species (e.g. white clover – *Trifolium repens*) will be reduced. However, the growth of pasture species, such as perennial rye grass (*Lolium perenne*) and Lucerne *(Medicago sativa*) should not be noticeably affected. The salinity is classed as low strength according to Table 3 (see below) which is suitable for moderately sensitive crops.

Table 3: General irrigation water salinity ratings based on electrical conductivity

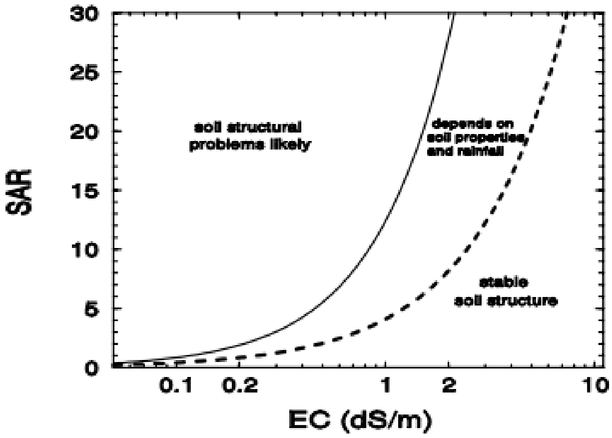
EC (dS/m)	Water salinity rating	Plant suitability
<0.65	Very low	Sensitive crops
0.65–1.3	Low	Moderately sensitive crops
1.3–2.9	Medium	Moderately tolerant crops
2.9–5.2	High	Tolerant crops
5.2–8.1	Very high	Very tolerant crops
>8.1	Extreme	Generally too saline

Source: Adapted from DNR (1997), cited in ANZECC and ARMCANZ (2000).

The sodium adsorption ratio (SAR) is a measure of the ratio of the concentrations of sodium to calcium and magnesium. When irrigation water with a high SAR is applied to soil, the sodium from the effluent is adsorbed to the soil particles in preference to calcium and magnesium. Sorbed sodium tends to disperse the soil particles causing the breakdown of soil structure. Dispersed soil particles block soil pores and the soil becomes impermeable to water and air. In this situation, plant roots find it increasingly difficult to penetrate the soil to gain adequate oxygen and water (Singer & Munns, 2006).

The SAR of the effluent can create a risk to soil structure and plant growth. However, recognising the impact of sodium on soil structure is dependent on a myriad of complex factors and cannot be readily predicted. Therefore, regular monitoring of soil dispersity is incorporated into the monitoring program for the irrigation scheme.

Figure 1 clearly shows the relationship between EC, SAR and soil structure as given by ANZECC. Soil dispersion is generally most likely to occur when the SAR is high combined with low EC. When the conditions are left off the solid trend line in Figure 1 soil amendments may be required such as lime or gypsum to offset degradation. Soils with a low Cation Exchange Capacity will generally be affected more quickly by sodicity.



Source: Adapted from DNR (1997), cited in ANZECC and ARMCANZ (2000).

Figure 1: Relationship between SAR and EC

Bennett & Raine. (2012) did further work on this and showed however this a that this threshold electrolyte concentration could vary very significantly among soils.

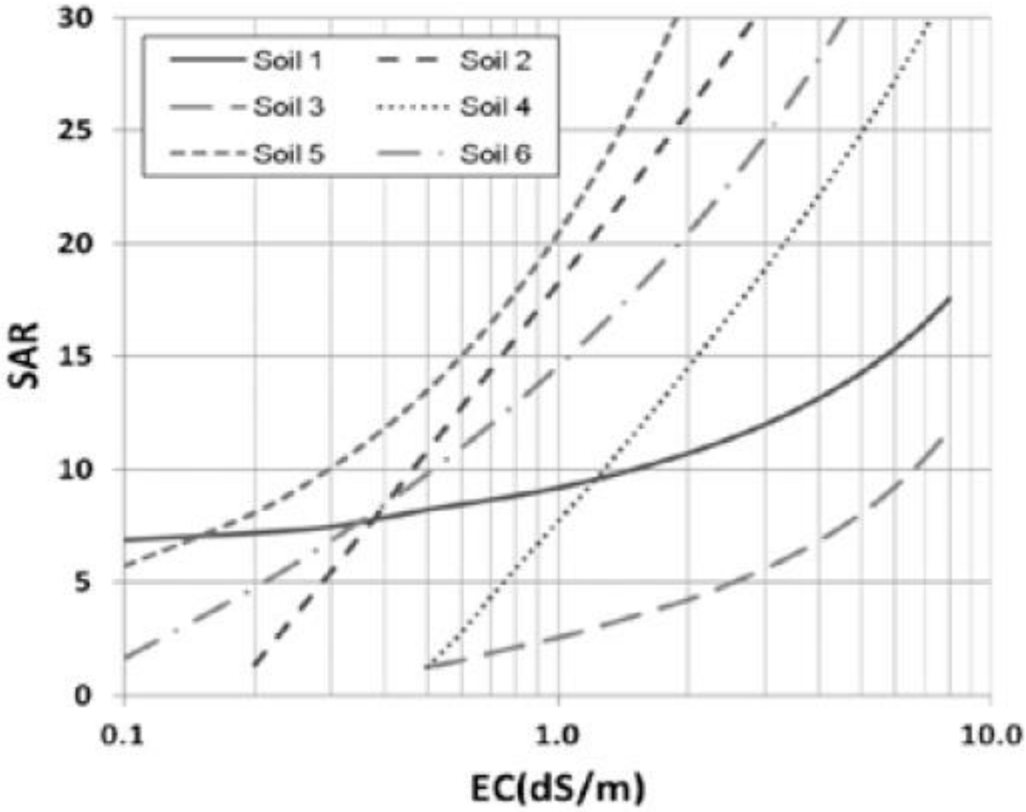


Figure 2: Selected soils threshold electrolyte concentration

For example, as shown above in Figure 2 the soil stability measure which in this case represented a 20% reduction in saturated hydraulic conductivity (0.8rKsat) at 1ds/m varied from 9 to 17 for Vertosol and from 3 to 20 for chromosols. The threshold electrolyte concentration is thus important to measure on each soil type with irrigated effluent as it can not be readily predicted.

The Electrochemical Stability Index (ESI) is used to determine the ratio between the (EC1:5 in dS/m) and ESP. In sodic soils ESP above 6% the (EC1:5 in dS/m) is divided by the ESP to give a number. The lower the salinity result the higher the instability with increasing sodium percentage. (Victoria Government department of Industry 2009)

According to NSW Agriculture, a tentative critical ESI value for Australian cotton soil is 0.05.

Nutrients Nitrogen (N) and phosphorus (P) applied in effluent above plant requirements have the potential to move into surrounding waterways and groundwaters, leading to eutrophication and a possible degradation of water resources.

2.1.4 Organic Matter

The addition of organic matter to soils is usually beneficial, promoting improved soil structure, chemistry, and biology. However, exceptionally large additions of organic matter can create anaerobic conditions at the soil surface, resulting in poor plant growth and unpleasant odours.

A surrogate measure of organic matter in effluent is the 5-day biochemical oxygen demand (BOD5) test.

2.1.5 Pathogens

Thermotolerant coliform bacteria are the traditional indicators of faecal contamination of water. Coliform bacteria (*Escherichia coli*) are naturally occurring and normally harmless inhabitants of the digestive tract. Coliform bacteria can, however, coexist in faecal matter with other bacteria, viruses, protozoa and helminths known as enteric pathogens. The presence of coliform bacteria in water indicates the water has potentially been contaminated with faecal pathogens. The level of thermotolerant coliforms in effluent is an important determinant of the type of reuse the effluent is suitable for and is specified in ANZECC et al. (1997) guidelines. The appropriate guideline for an effluent Irrigation Scheme is 1,000 cfu/100 mL (pasture and fodder).

2.1.6 Chlorides

Chloride is an element essential to plant growth. However, in excess, chloride can be toxic. Chloride damages plants in two ways. Firstly, through foliar injury to crops, and secondly, increased uptake by plants of cadmium from soil. The direct foliar absorption of chloride from sprinkler irrigation can cause damage to plants which are more sensitive. Chloride concentration in the range of 350-700 mg/L can cause leaf damage to cereal crops and pastures, such as lucerne, barley and maize.

Irrigation water with high chloride concentrations has the potential to increase the uptake of cadmium by plants due to increased mobility of cadmium in the soil. Irrigation water with chloride concentrations less than 350 mg/L presents little risk of increasing crop cadmium concentrations (ANZECC, 1999). Chloride concentrations should be monitored regularly.

2.1.7 Sodium

High levels of sodium in irrigation water can increase the likelihood of soil structure decline and direct sodium toxicity to the crops. The level where some damage to sensitive plants could occur >114mg/L. sodium levels of greater than 460 mg/L in irrigation water, are required to cause potential foliar injury to barley, maize, Lucerne, and sorghum.

2.1.8 Bicarbonates

Bicarbonate ion is a major contributor to alkalinity in irrigation waters and soil. Elevated levels of bicarbonate in irrigation waters can impact adversely on irrigation equipment, soil structure and crop foliage. Use of irrigation waters with high levels of bicarbonate can give rise to the precipitation of insoluble calcium and magnesium carbonate in the soil. Reduction in available calcium and magnesium effectively increases the SAR of the effluent which may increase the exchangeable sodium percentage (ESP) of irrigated soils and subsequently lead to a loss of soil structure. If bicarbonate is present at high concentrations, adjusted SAR calculations should be used to predict the potential impact on soil structure.

2.1.9 Boron

Boron (B) is required in small amounts, for the normal growth of all plants. However, when present in excess, boron is toxic to plants. Most effluent would normally contain relatively low concentrations of B, but where soil has a high native concentration, B toxicity must be avoided by monitoring closely. the desirable level of 0.5 mg/L for irrigation water. Acceptable B concentration for wheat and barley irrigation is 0.5-1.0 mg/L and for clover, oats and bluegrass is 2-4 mg/L.

2.2 EFFLUENT SALT LEVEL AND SAR

Sewage effluent contains a large amount of salts. These salts come from foods cooking and numerous familiar household products that contain sodium including laundry detergents (Patterson 1997). The SAR of sewage is evaluated because of this and results for SAR of sewage for selected Regional towns is shown in Figure 3.

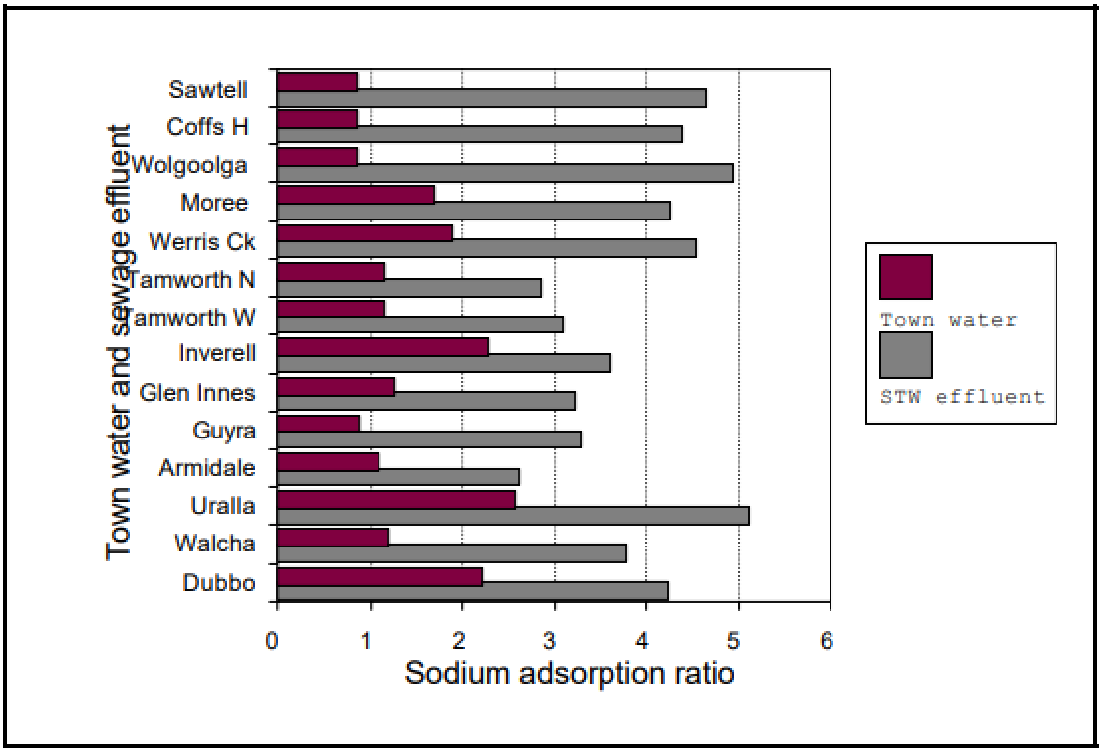


Figure 3: SAR of Sewage compared to water source various NSW regional towns (Patterson, 1997)

Therefore, when effluent is being used as an irrigation source this needs to be understood and an appropriate leaching factor applied.

The water balance is defined by a simple equation, being: $P + I = ET + R + D + \Delta S$ (Smith & Hancock 2018).

2.3 WATER QUALITY AND THE ENVIRONMENT

Several water balance models are available to determine the amount of water a crop may require. These models are for planning purposes and do not replace the need to schedule irrigation based on the actual weather.

As crops evaporate irrigation water salts dissolved in the effluent are left behind. If these salts are not taken up by the plants or flushed through the length of the root zone, the salt will increase and affect soil structure, crop growth and production. Additional irrigation will be required to flush the salts through the soil profile and maintain optimum soil conditions for crop growth.

California Department of Water resources, (California DWR, 2016) compares the dynamics of salt accumulation with sweeping dust in a room: 'Unless sufficient dust is picked up and taken out of the room at some point, it will continue to accumulate and redisperse ultimately making the room unfit for use.' The ‘room’ in this case is a 1000-hectare farm which is important to manage sustainability as it will be required to produce agricultural crops well into the future.

The Food and Agriculture Organization for the United Nations (FAO) provides tables and figures for the determination of leaching fraction required for saline waters. Table 4 lists the concentration factor for selected leaching fractions.

Table 4: Concentration factors for selected leaching fractions (FAO, 2020)

Leaching fraction LF	Concentration factor X
0.05	3.2
0.10	2.1
0.15	1.6
0.20	1.3
0.25	1.2
0.30	1.0
0.40	0.9
0.50	0.8
0.60	0.7
0.70	0.6
0.80	0.6

If the salinity of the irrigation water and crop requirements are known, Figure 4 can also be used to estimate leaching requirements.

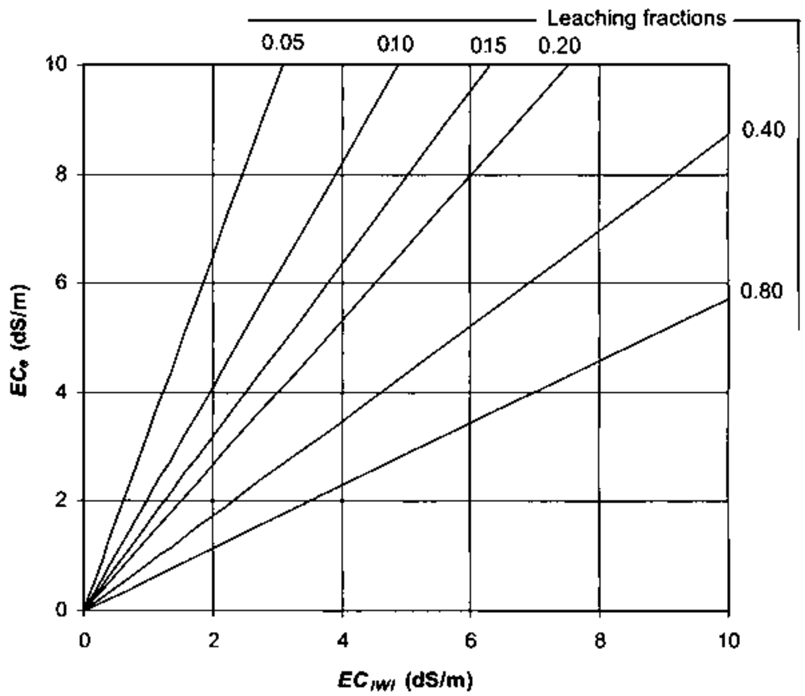


Figure 4: Assessment of leaching fraction in relation to salinity of irrigated water (FAO, 2020)

2.3.1 Soil survey and structural assessment

Soils are so important to society the actual collapse of civilizations has been linked to soil degradation. There are two types of soil degradation. Soil erosion where the actual soil is removed leading to the loss of nutrients and soil medium which holds moisture and in turn exposes the more infertile subsoil. The other type of degradation takes place ‘in situ’. Intrinsic breakdown of the soil can be monitored by checking the 3 important signs of soil health (Office of Environment and Heritage, 2011), (see Figure 5).

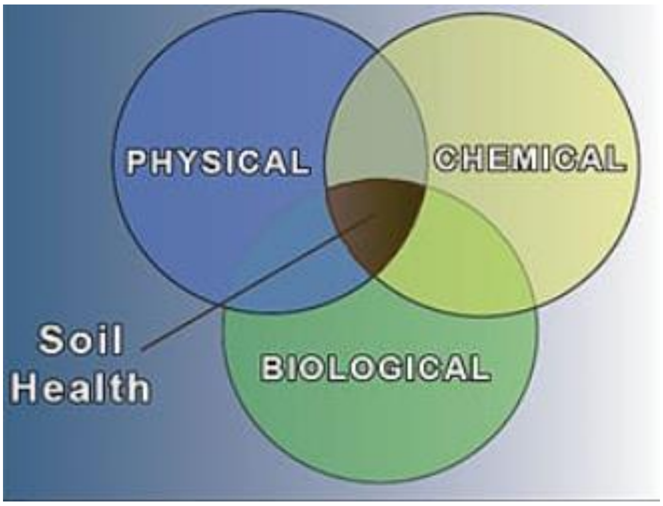


Figure 5: Venn Diagram soil health (Sherzi, 2016)

The soil water hydraulic conductivity of a soil is initially a function of internal factors which can be altered by external factors and it is a key measure in determining the flow of water through the soil medium. It is one of the key parameters allowing soil-water-plant interaction and thus affect the fertility of the soil. Figure 6 shows the different methods of determining soil hydraulic conductivity.

Soil structure is a term which describes how the soil is arranged. The arrangement consists of aggregates which have a large influence on internal pore spacing. The pore spacing allows the transfer of water and air through the soil and the roots of plants. When soil structure becomes degraded this can result in a “massive” structure with no peds forming but the soil forming a large mass. This will result in reduced soil pores and consequently reduced plant health (Cotching 2009).

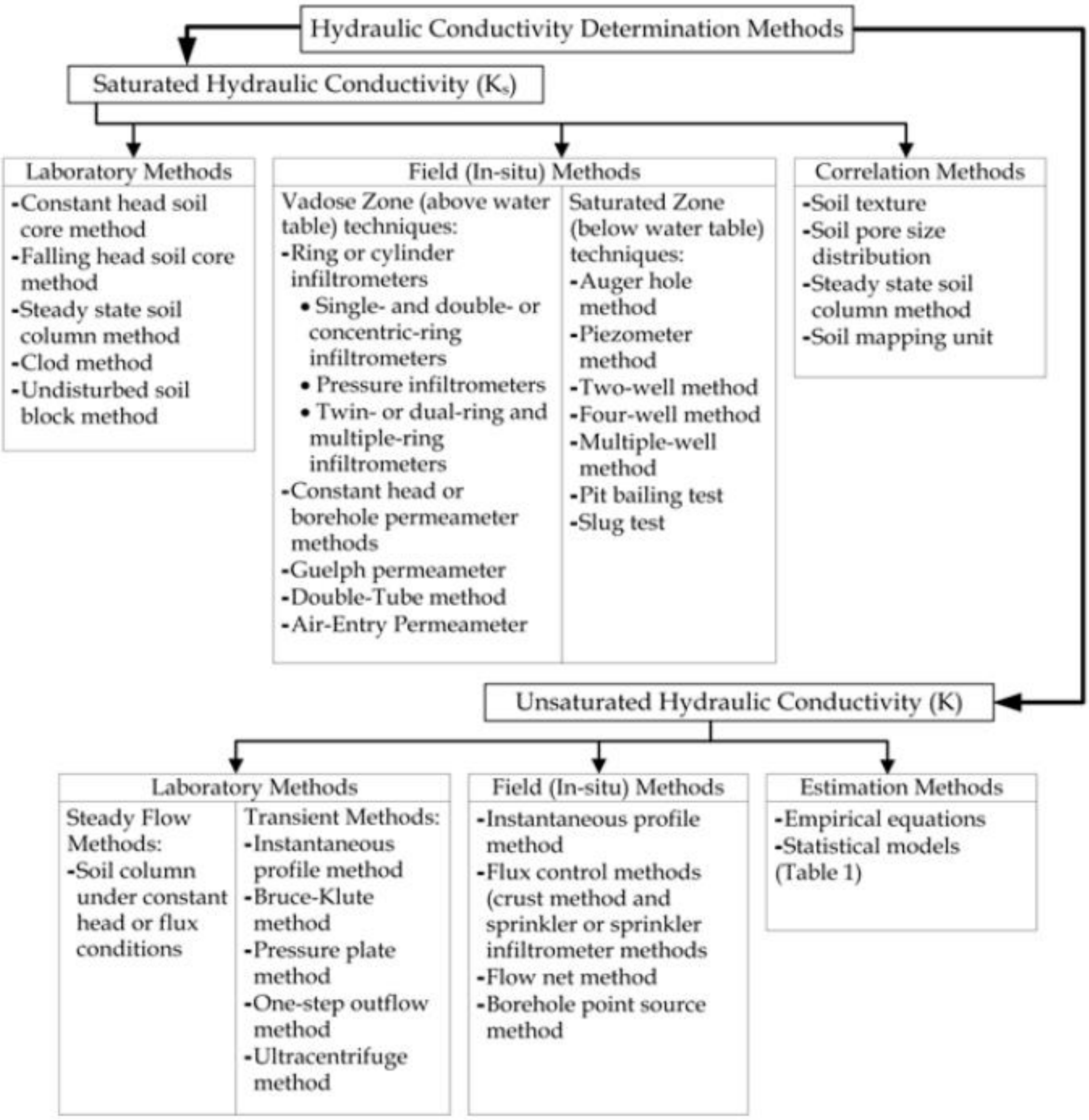


Figure 6: Methods of measuring Soil water Hydraulic conductivity (Deb and Shukla, 2019)

A visible method for classifying soil structure is shown in Figure 7. The higher the score the better the structure.

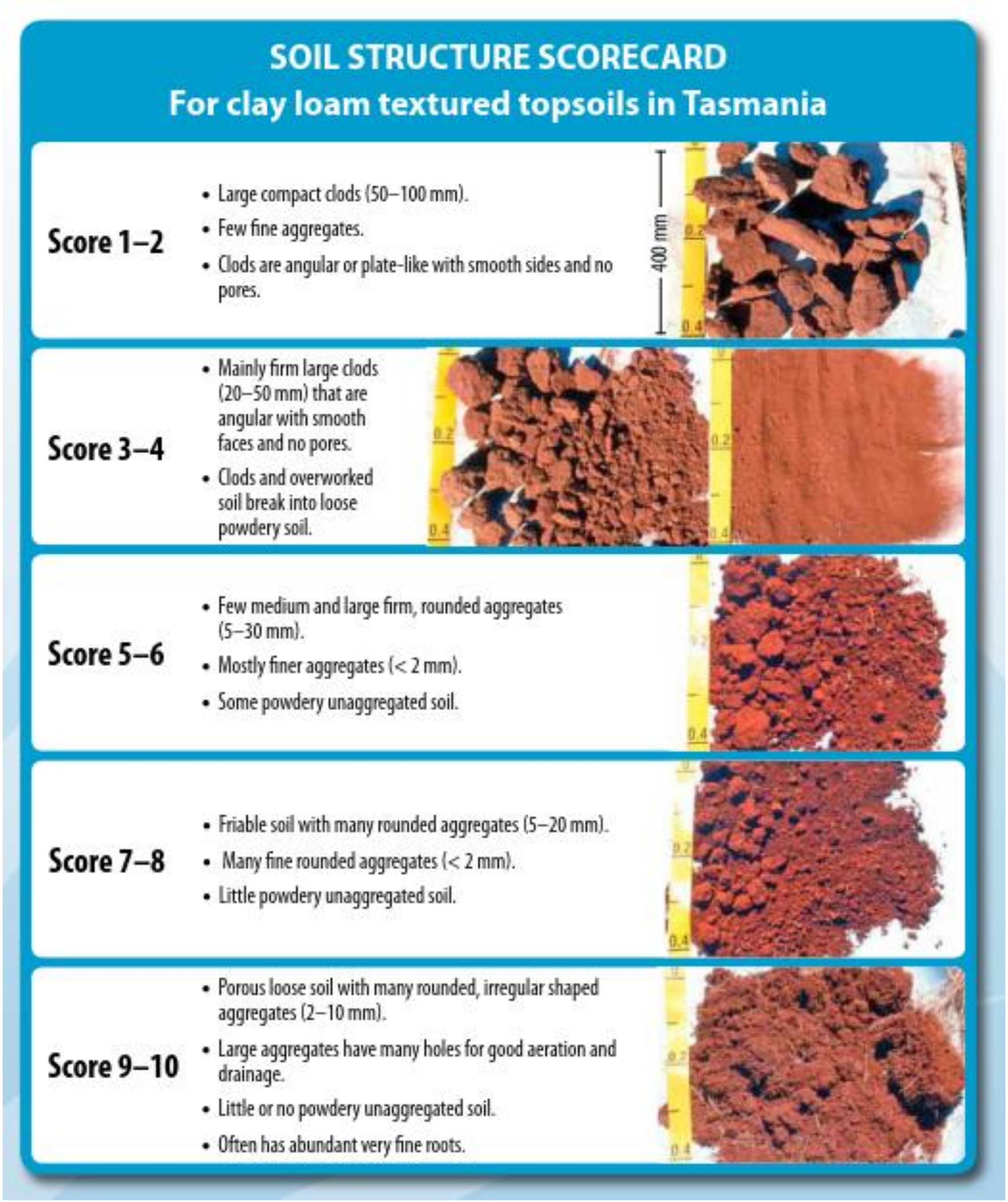


Figure 7: Soil structure rating (Cotching, 2009)

2.3.2 Spatially assessing soil properties

EM surveys work by transmitting current into the earth and recording the electromagnetic response. High conductivity zones will return a strong response whereas low conductive zones will transmit a low response. Figure 8 shows an indicative illustration of an EM survey device

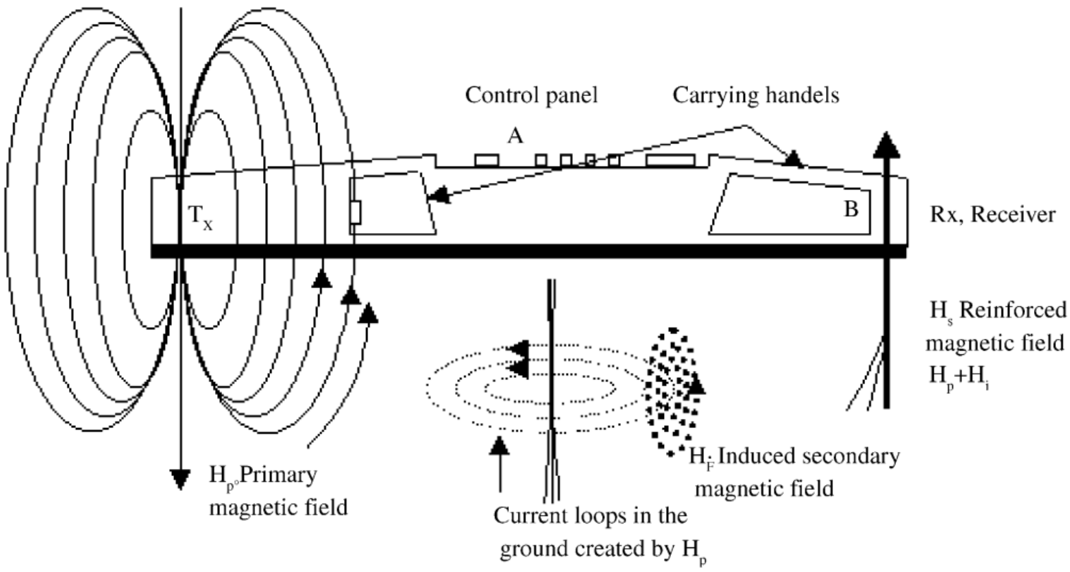


Figure 8: Diagram of an EM38 meter showing principles of operation (Lesch et al., 2005)

EM surveys can be related back to clay content moisture levels, bulk density, salt levels, sodicity, organic carbon and boron. (Lesch et al., 2005)

Gamma surveys take advantage of the fact soils are radioactive by nature. Current technology allows remote sensors to measure the radioactive gamma ray spectrum with the important elements for soil mapping are 40K (potassium), 238U (Uranium), 137Cs (Cesium), and 232Th (Thorium). The amount of these elements can be used to calibrate soil properties such as clay content, organic matter and particle size. (Loonstra & Egmond, 2009)

2.3.3 Lucerne

Lucerne has been the dominant crop at the reuse farm.

Lucerne is a perennial crop. It can live for up to 20 years however most crops will last around five years due to weeds insects and disease which take their toll. Lucerne has a deep taproot which can draw water from low depths and may effectively lower water tables thus reducing salinity (NSW Agriculture, 2003).

CHAPTER 3 – SITE DESCRIPTION

3.1 STUDY REGION LAND USE HISTORY

3.1.1 Aboriginal/Indigenous

Before white settlement, the current Tamworth area was home to the Kamilaroi people. The Kamilaroi people were semi-nomadic and spent their summers living along the riverbanks where they had access to ample supplies of fish mussels and crayfish supplemented with grass seeds cooked as small cakes or loaves. In colder months they moved inland and hunted kangaroos, wallabies, and other wildlife. The Kamilaroi were also adept at using fire to burn off parts of their territory to produce new growth which attracted the wildlife they hunted (O'Rourke, 1997). Recent evidence indicates early Aboriginal people conducted a grain-based agriculture, the impact of which is unknown at this time (Pascoe, 2014).

Kamilaroi people's effect on the soils of the area was thought to be minimal and they lived within the productive capacity of the land for what is believed to be 60 000 plus years (O'Rourke, 1997).

3.1.2 White Settlers

John Oxley as the first European to lay eyes on the present-day Peel River on 2 September 1818 is quoted as saying 'No place in the world can afford more advantages to the industrious settler than this extensive vale' (Oxley, 2018).

The Tamworth area appealed to European pastoralists as the woodland vegetation communities were primarily open and park-like due to Aboriginal firing practices. White settlement began with government land grants in the region in the 1820s (Milliss, 1980).

The Australian Agricultural Company (AAC) began in England in 1824 with the purpose of growing sheep for wool. The AAC played a major role in the early history of Tamworth, with the granting of 123,138 hectares in the Peel Valley in 1833 (Pemberton, 1986). The government granted land on the provision the AAC establish a town – which was proclaimed 'Tamworth' in 1836. The image below (Figure 9) shows the Tamworth region in 1902 with the AAC pastoral land the dominant feature (Milliss, 1980). The orange shape outline depicts the location of this study:

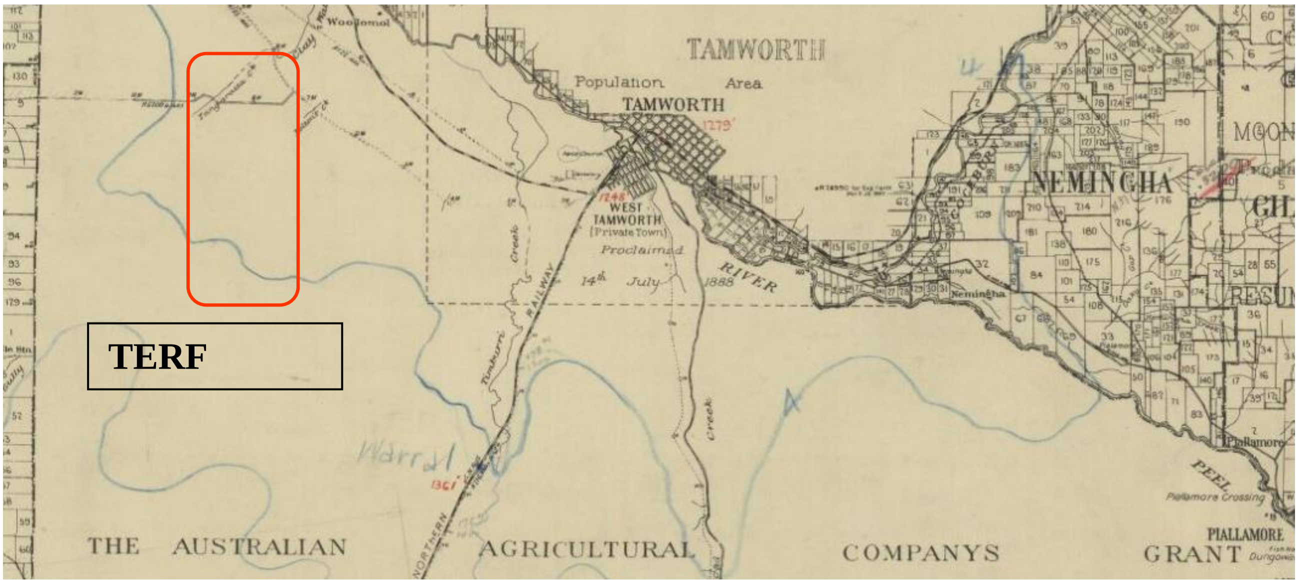


Figure 9: Early map of the Tamworth Region – circa 1902 (National library of Australia, 2020)

The AAC use of the land was mostly for large pastoral runs for sheep and wool growth. There was little intensification of land use.

In 1904 the Closer Settlement Act was introduced by the government to intensify land use and increase the development of land. The government was concerned large land holdings were not performing as they should with the prime agricultural land, and they believed they were missing out on taxes. The Australian agricultural area was thus resumed by the government and released in a ballot to people for development into smaller holdings which were individually owned (Milliss, 1980).

An updated map (see Figure 10), with the same orange outlined area as previously shown, as it appeared following government resumption in 1909, with the new blocks that have been subdivided off the Australian agricultural company under the Closer Settlement farms in the Peel River Estate (Milliss, 1980).

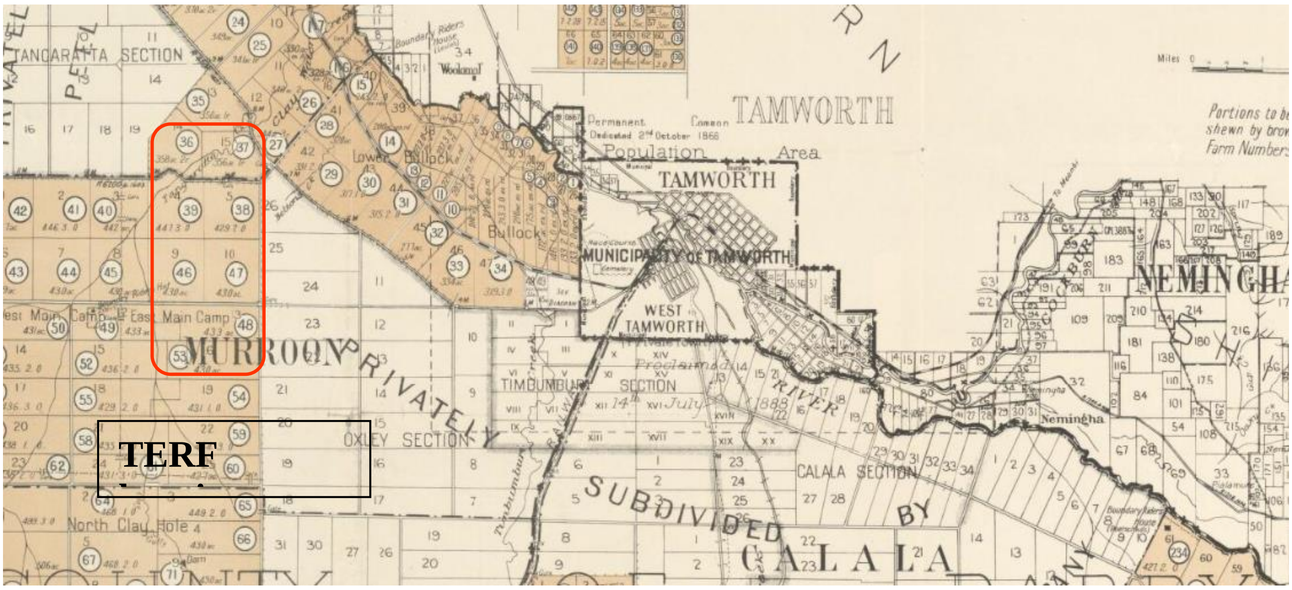


Figure 10: Early map of the Tamworth Region – circa 1909 (National library of Australia, 2020)

From 1909 to 2000 the orange outlined area now under study, was predominantly used for cropping of cereals in winter and sorghum in summer, and livestock grazing – which initially consisted of sheep, then in recent decades replaced with cattle. Over time the land was extensively cleared, with only isolated trees and occasional stands of timber found in the future TERF area. Scattered timber did exist however within the riparian zone of Clay Creek and along Bolton's Creek (Organic Waste Recycling Unit, 2000).

Soil fertility decline, indicated by depletion in organic matter and nitrate nitrogen, would have affected the orange outlined area under broad scale cropping and grazing widely practised during the 20th century. Fertility decline was observed from processes of loss such as removal of farm products, leaching and from other various forms of erosion (Campbell, 1998).

In the late 1990s to early 2000s Tamworth Regional Council was paying high load-based license fees for effluent disposal to the Peel River and with a number of serious blue green algal blooms in the Murray-Darling Basin a decision was made in collaboration with the NSW EPA to establish a reuse farm for disposal effluent to land. From 2010 to the end of 2011, the farm area was consolidated, and centre pivots added to distribute the effluent water. The reuse farm configuration is shown in the google map image contained in Figure 11 which shows a clear outline of the pivots (Google Maps, 2020).

Figure 11: Current image of TERF and Tamworth (Google Maps, 2020)

3.2 SOILS OF THE FARM

3.2.1 Geology

The NSW Government soil landscape mapping was used to determine the underlying geology of the soils located at the TERF (Banks, 2001). There are two main soil geological landscapes which cover the TERF – the Glenmore Soil Landscape which is in the northern portion of the site and the Duri Soil Landscape which is in the southern portion of the site (Banks, 2001).

> The Glenmore Soil Landscape which has dominant soil types of very deep, imperfectly drained black vertosols (black earths) with some very deep, imperfectly drained red and brown vertosols (red and brown clays) and minor occurrences of moderately deep, moderately well-drained red chromosols with underlying sedimentary bedrock outcrops. (Banks, 2001)

The underlying geology of the Glenmore landscape is shown in Figure 12.

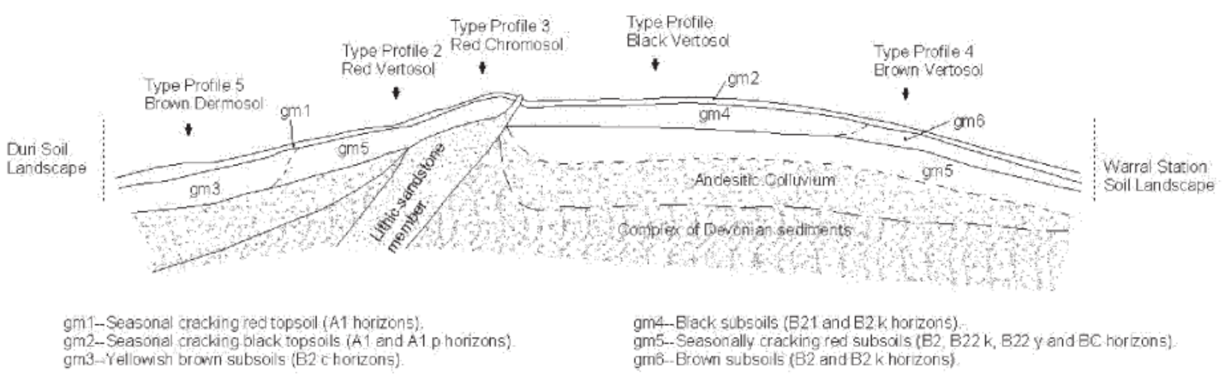


Figure 12: Underlying geology of the Glenmore landscape (Banks, 2001)

The Duri Soil Landscape consists of the dominant soil types of duplex soils such as moderately deep, moderately well-drained, red and brown chromosols (non-calcic brown soils; red-brown earths) with minor occurrences of shallow, very well-drained rudosols (lithosols), around rock outcrops and deep, imperfectly drained red vertosols (red clays) and deep to very deep, imperfectly drained red and brown chromosols (non-calcic brown soils) and possibly some sodosols (solodic soils) which occur along drainage lines and on sodic bedrock (Banks 2001). The underlying landscape of the Duri landscape is shown in Figure 13.

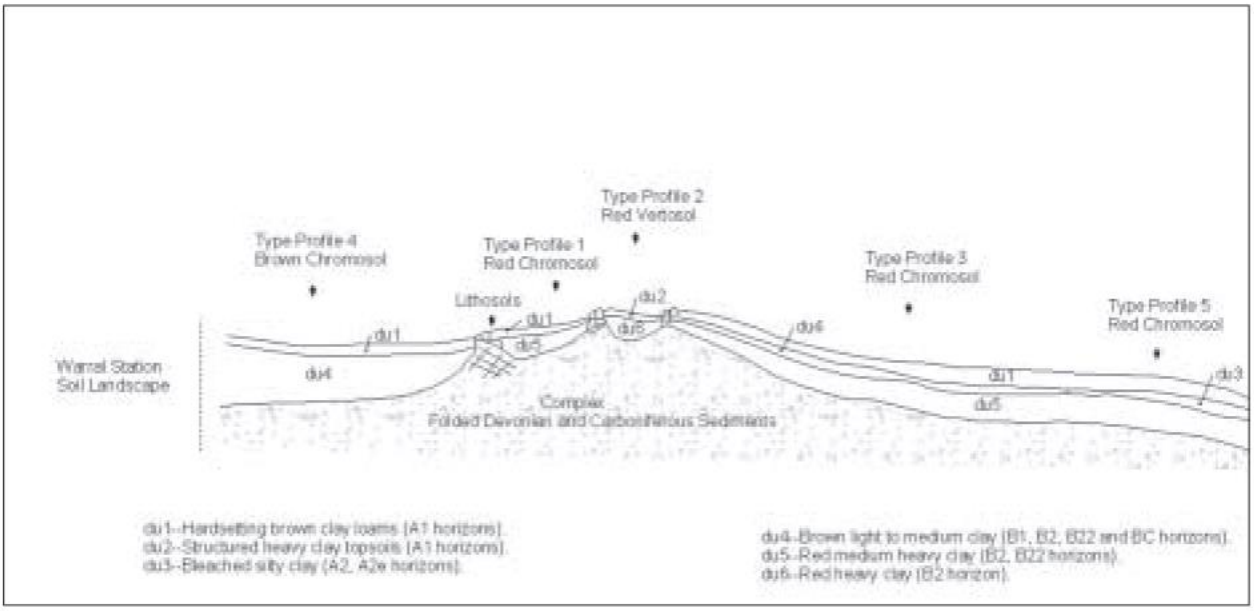


Figure 13: Underlying geology of the Duri landscape (Banks, 2001)

3.2.2 Soils

During the initial farm review phase, the soil types of the TERF were mapped and are shown below in Figure 14.

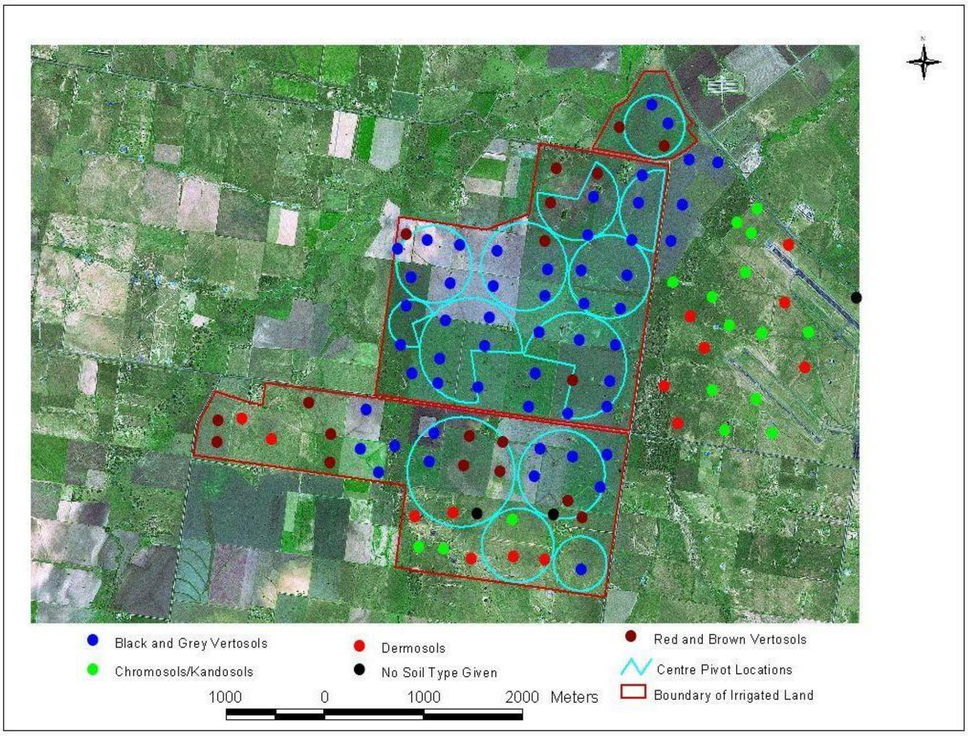


Figure 14: Soil map (Organic Waste Recycling Unit, 2000)

The site is dominated by black and grey vertosols with red and brown vertosols also present. There are some dermosols, kandosols and chromosols present in the southern area of the farm.

Vertosols are the most common soil type found at the reuse farm with black grey brown and red vertosols identified in the soil mapping plan.

The Australian Soil Classification (ASC) system (CSIRO; Isbell & NCST, as cited in Cameron, 2016) determines a soil is a vertosol if the following identifying characteristics are identified:

1. A clay field texture of 35% or more of clay throughout the solum except for thin, surface

   crusty horizons 0.03 m or less thick.

2. Open cracks (unless too moist) which at times and in most years – can be at least 5 mm wide and extend upward to the surface or to the base of any plough layer, self-mulching horizon, or thin, surface crusty horizon.

3. Have slick 'en' sides and/or lenticular peds at some depth in the solum.

3.2.3 Characteristics of Vertosol Soils (Young, as cited in Cameron, 2016)

1. Vertosols are extremely suited to zero tillage and response cropping with their large water holding capacity enabling successful rain fed cropping in areas of variable rainfall.

2. Vertosol soils in their virgin state are rich in plant nutrients and do not suffer acute deficiency in phosphorus like most other arable soils in Australia.

3. When managed effectively using zero tillage technology, which has now been widely adopted, these soils are well-structured and provide an ideal medium in which to grow crop plants.

4. Their capacity to shrink and swell confers an ability to store rainfall extractable by crop plants and recover from compaction without the need for cultivation.

5. The self-mulching surface soil and water storage capacity of the soil profile enables farmers growing rain fed (dryland) crops to plant up to two crops in a year because sufficient water should be stored in the soil (response or opportunity cropping).

6. Shrink/swell and seasonal cracking phenomena will lead to the development of good soil structure, but will present major problems to building foundations, earth dams and roads.

Additional soil types are found at the southern part of the reuse farm with Dermosols, Chromosols and Kandosols identified.

The dermosol order is characterised by soils with structured B2 horizons and lacking strong texture contrast between A and B horizons (Isbell, 1996).

Kandosols also lack strong texture contrast but have well developed B2 horizons in which for the major part is massive or only has a weak grade of structure. Kandosols have a minimum clay content in the B2 horizon exceeding 15% (Isbell, 1996).

The soil types at the site have been mapped and classified in accordance with the Australian Soil Classification (Isbell, 2002) as Vertosols, Dermosols and Kandosols which generally have properties as described in Table 5.

Table 5: Soils of the reuse area

Soil Type	General Characteristics	Comments
Vertosols	Cracking clays with shrink-swell properties. Cracks extend throughout the profile. Often heavy-clayed vertosols have extremely slow infiltration once saturated.	The cracking nature of these soils is often difficult to ascertain due to fine and puffy structure.
Dermosols	Well-structured subsoils, generally clayey, without a clear and abrupt textural contrast between topsoil and subsoils.	Often vertosols are classified as Dermosols as cracking can be difficult to ascertain.
Kandosols	Soils which lack a strong texture contrast between top and subsoil, with weak structured subsoil.	Differ from Dermosols in the lack of structure of the subsoil.

There are commonalities and differences between the soil types and observing these soil types in the landscape together is expected. All the soil classes present, lack a strong textural contrast between the top and subsoil, and they all have high clay contents. The differences between them are due largely to the structure of the sub-soils, with the vertosols and dermosols being structured and the kandosols being poorly structured or massive.

The boundaries between these groups of soils are often difficult to ascertain because subsoil structure can change by management practices. For example, well-structured sub-soils can degrade over time due to increased salinity and sodicity, and poorly structured subsoils can inhibit deep drainage. The risk of structural changes can be managed by the application of ameliorants such as gypsum, although some soils with naturally poorly structured subsoils will, in addition, need to have their irrigation carefully managed (Department of Primary Industries and Regional Development [WA], 2020).

3.3 CLIMATE

The climate data for Tamworth shows hot summers and cool winters with rainfall primarily occurring during the summer. The climate data has been sourced from the Bureau of Meteorology station at Tamworth Airport AWS 055325. Evaporation data was sourced from Tamworth Airport 055054. A summary of the temperature and rainfall climate data is presented in Figure 15.

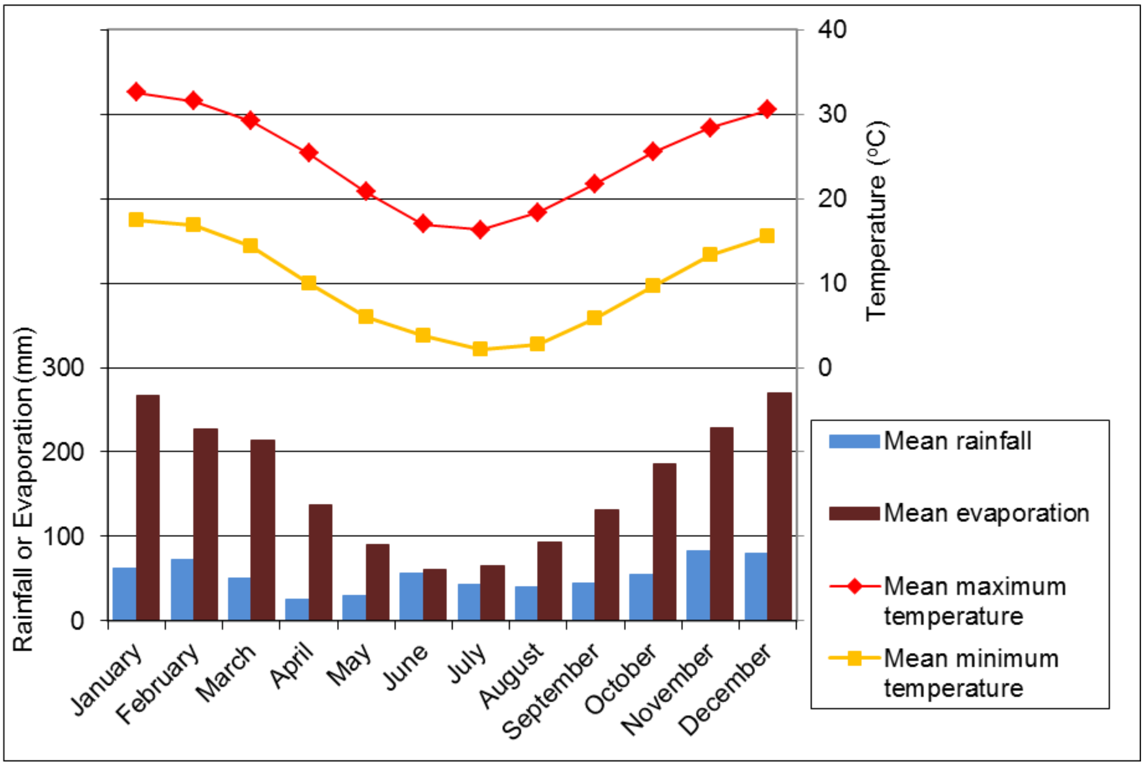


Figure 15: Climate Data for Tamworth Airport (Station No. 055325)

The mean annual rainfall is 642.0 mm ranging from 25.7 mm/month in April to 83.0 mm/month in December. The daily rainfall generally consists of showers with most days receiving 1mm or less and fewer than 22 days per year receiving 10mm or more rainfall. The number of rainy days per month generally peaks in June and December at approximately 9 days.

Evaporation is 1971 mm/year on average, with daily evaporation varying from 2 mm/day in winter to > 8 mm/day in summer. The mean monthly evaporation exceeds mean monthly rainfall in every month of the year by more than double except for June and July. The high level and imbalance of evaporation moisture needed to rainfall means there is good opportunity to use irrigation to supplement plant water requirements.

3.4 EFFLUENT SOURCE

Westdale Sewage Treatment Works (STW) is the source of the effluent wastewater disposed at the TERF. The Westdale STW treats all municipal and industrial trade waste sewage from the township of Tamworth. The effluent is tertiary treated and then pumped to the TERF where there is a large 1,500 ML storage lagoon ready for irrigation. Where Effluent is surplus to irrigation requirements the farm is bypassed and excess effluent is discharged into the Peel River under licence (Tamworth Regional Council 2020).

CHAPTER 4 – METHODOLOGY

Research into the effluent effects on the soil at the farm will incorporate a quantitative approach as defined by SAGE Publications Inc. (2003) – specifying the characteristic (target variable) of interest; identifying the collectivity to display the variable (people, institutions, places, events, and the like); and deciding how best to gather information from the collectivity. For example:

Phase 1: Develop a project; carry out initial site investigations; confirm supervisor and technical assistant. Confirm resource availability.

Phase 2: Complete literature review

Phase 3: Obtain all relevant farm data from irrigation applied chemistry of applied effluent. Results for the effluent will be obtained and statistical calculations performed to find the average and standard deviation of all parameters, thus enabling typical values to be determined. Results will be compared to the Australian irrigation guidelines to determine if the water is within specifications for the recommended crops grown as per ANZECC (2000) guidelines. Determine the amount of effluent applied to the selected soils: Review the irrigation records for each pivot to establish the amount of effluent applied to each sample area. Statistical analysis will be performed on the information collected which may be relevant – for some areas may have received a greater volume of effluent than others which could affect the results.

Phase 4: Review previous soil chemistry results conducted on each pivot during farm operation and determine each soil type's performance regarding spatial application under effluent irrigation. A site visit will be conducted with the property manager to verify site locations suitable for use in the study and to schedule in sampling so as not to unduly disrupt current farm operations. Identified sample areas may need to be adjusted to consider farm operational requirements. The selection of farm test sites must consider the technical requirement to enable a direct comparison between the irrigated and control soil which must be classified as the same soil type and be within proximity of each other.

Phase 5: Sample collection –numerous visits to the site will be required. All soil samples need to be collected within the allocated project timeframe. Soil types will be identified using Australian soil classification. Field tests will be authorised by farm management prior to the soils being collected and tested. Soil samples will be delivered to the laboratory and analysed for physical and chemical characteristics. Testing will be completed by the researcher, with qualified assistance where appropriate, on the full range of soil tests over identified horizons for physical tests and three specific depths for chemical tests.

Phase 6: Investigate the data and report. Observe the differences between soil types and areas with less effluent applied. Gather all the data together and determine trends in the data for interpretation – compile results and recommendations – formulate a management plan (including spatial data) and report all findings in a dissertation for completion of the project.

4.1 LIMITATIONS AND RISKS

2020 was the year of a global COVID-19 pandemic outbreak which resulted in a worldwide crisis. Response to the pandemic in Australia required many cross-border shutdowns and the introduction of tough social distancing rules. The new rules to minimize the spread of the pandemic caused major impediments in carrying out the study not just with restrictions regarding movement, but also the huge changes to the working environment and general anxiety caused by the crisis. Gaining customary access to university laboratories and resources was not possible so alternative measures and resources were required. NATA lab facilities were seconded in Tamworth, two trips were undertaken to Queensland to borrow necessary equipment and a high level of unprecedented remote communication by phone and email with supervisors.

COVID-19 resulted in the time available being a major constraint to completing the study in a timely manner. The due date for the final presentation of findings and conclusions is late October 2020, meant there was 34 weeks in total from the commencement of Semester 1 – to complete all necessary sampling, analysis, and review of the data.

Areas sampled can only be representative of the overall picture as the amount of time and resources for sampling is finite. To mitigate a moderate capacity for sampling, samples will be taken from each control and irrigated soil type from the selected pivots. Selected pivots are to be chosen to represent three major soil types of Black Vertosol, Red Vertosol and Brown Kandasol. Sampling by nature involves fieldwork so a risk assessment is provided (see Appendix B).

Another impediment was finance – with few funds available for educationally driven projects, much of the work was completed by the researcher with borrowed equipment and generous in-kind support to complete the sampling and analytical tasks.

Also, the TERF was within a full agricultural production phase meaning sampling and site visits were scheduled to minimize the impact on the farm's ability to function as required by the independent contractor.

4.2 ETHICS

The project undertaken on the Tamworth Regional Council's (TRC) property, which is privately managed by independent contractors, has some sensitivities around potentially adverse management findings. The property owner, TRC, will need to be kept informed to enable decisions to be made prior to the release of results to the public. The report could also be of valuable benefit to TRC as findings could impact management requirements for future independent contractors to ensure future sustainable management of their asset.

CHAPTER 5 – SAMPLING EXPERIMENTS AND RESULTS

5.1 BASELINE DATA

Analyses of eight years of effluent use at the TERF was obtained from Tamworth Regional Council (see Appendix C). The results for each characteristic have been averaged over the number of tests performed in Table 6. Sewage effluent by its nature can be highly variable in composition so the standard deviation from the average is also presented.

Table 6: Effluent Results for 2012-19 taken from holding dam (Tamworth Regional Council 2020)

Water Quality Parameter	Units	Testing Frequency	Count	Mean	S.D.
pH (units)	pH units	Weekly	408	8.8	0.6
Electrical Conductivity (EC)	dS/m	Weekly	408	1.09	0.09
Total Dissolved Solids (TDS)	mg/L	Weekly	408	647	77
Total Potassium (K)	mg/L	Weekly	408	40	5
Calcium	mg/L	Monthly	97	36	8.5
Magnesium	mg/L	Monthly	97	18	5
Sodium	mg/L	Monthly	97	150	19
SAR	-	Monthly	97	5.15	0.8
Chloride	mg/L	Monthly	97	162	19
Alkalinity	mg/L	Weekly	408	190	36
Total Nitrogen	mg/L	Weekly	408	3.3	1.9
Total Kjeldahl Nitrogen	mg/L	Monthly	97	2.6	3
Ammonia-N	mg/L	Weekly	408	0.6	0.9
Oxidised Nitrogen (NOx)	mg/L	Monthly	97	1.2	1.0
Nitrate-N	mg/L	Monthly	97	1.5	2.3
Nitrite-N	mg/L	Monthly	97	0.1	0.0
Total Phosphorus	mg/L	Weekly	406	1.94	1.33
Total Suspended Solids (TSS)	mg/L	Weekly	408	13	14
Biological Oxygen Demand (BOD)	mg/L	Weekly	408	5	3
Carbonaceous BOD (C-BOD)	mg/L	Weekly	408	3	1
Chemical Oxygen Demand (COD)	mg/L	Monthly	96	44	18
Thermo-tolerant Coliforms	CFU/100mL	Weekly	320	51	783
E. coli	CFU/100mL	Weekly	116	14	25
Oil and Grease	mg/L	Weekly	408	<5	2
Chlorophyll	µg/L	Weekly	404	31	43
Total Chlorine	mg/L	Weekly	23	0.04	0.03
Arsenic	mg/L	Monthly	97	0.002	0.0008
Boron	mg/L	Monthly	97	0.19	0.04
Cadmium	mg/L	Monthly	97	<0.0001	0.00002
Chromium	mg/L	Monthly	97	<0.001	0.0004
Copper	mg/L	Monthly	97	0.004	0.004
Lead	mg/L	Monthly	97	0.001	0.0007
Mercury	mg/L	Monthly	97	<0.0001	0
Nickel	mg/L	Monthly	97	0.004	0.001
Selenium	mg/L	Monthly	97	<0.01	0
Zinc	mg/L	Monthly	97	0.073	0.010
Pesticides	mg/L	Monthly	97	<PQL	0

NOTES: S.D. standard deviation PQL practical quantitation limit

Table 6 indicates the effluent suppled to the TERF is in the low strength category for Total Nitrogen, Total phosphorous and BOD.

The total dissolved solids of 647mg/l (see Table 1) however place the effluent into the medium strength category.

The effluent pumped to the TERF does not meet any of the trigger values for heavy metals see (table 2) and therefore heavy metal levels should not reach critical levels in the soils over the long term.

5.2 BENCHMARK SOIL DATA

During the investigation of the reuse farm, a full study was completed on the existing soil constraints in the proposed pivot areas, including four control areas to determine a baseline for future soil investigations (Soil futures, 2010). The sites were chosen based on the soil samples in the irrigated areas as shown in Figure 16. Coordinates of the sample locations are provided in Table 7.

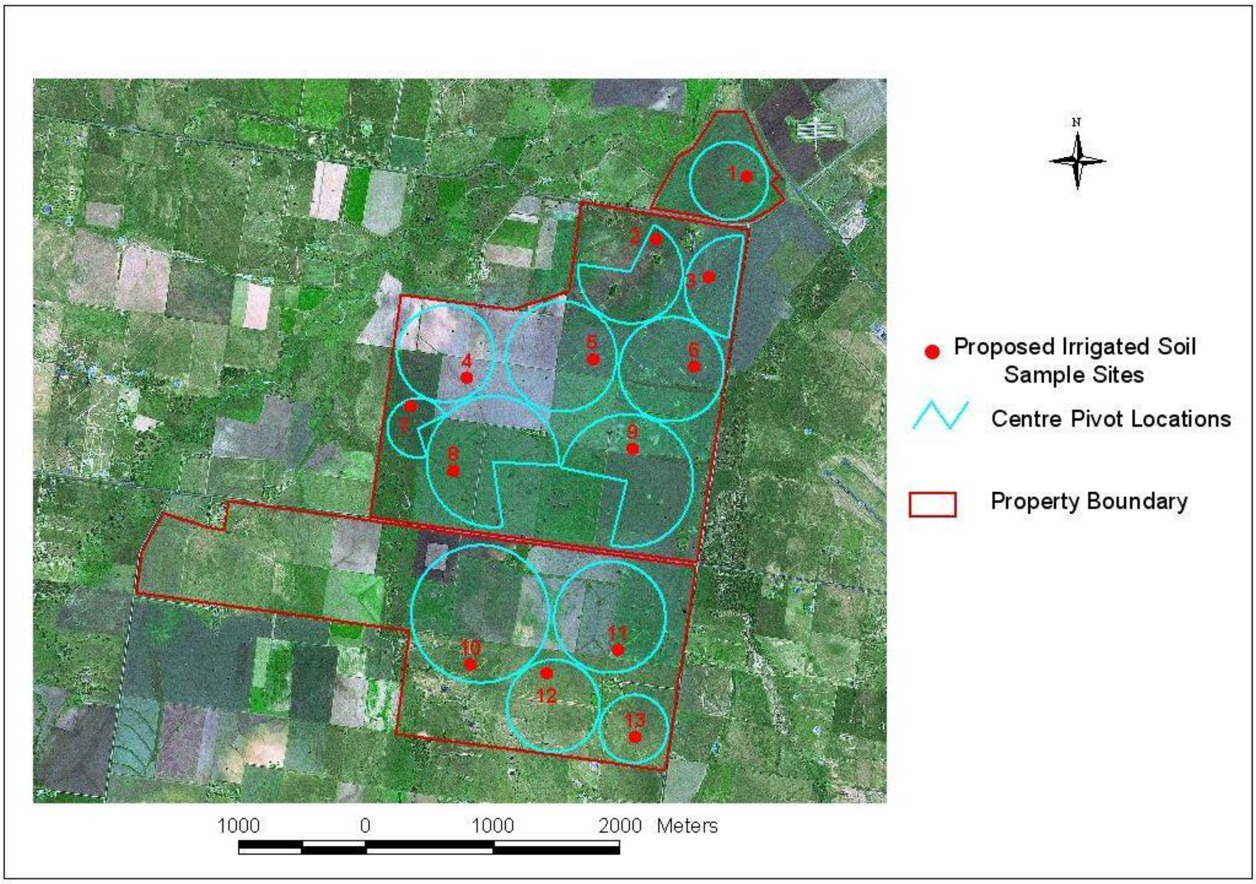


Figure 16: Irrigated sample points for yearly EPA monitoring

Table 7: Coordinates of EPA sampling points

Site No	Pivot	Soil type	Grid zone	MGA Easting	MGA Northing	Soil grouping
1	4	Black Vertosol	56	292619	6561710	Black and Grey Vertosols
2	5	Red Vertosol	56	291906	6561219	Red and Brown Vertosols
3	3	Black Vertosol	56	292317	6560926	Black and Grey Vertosols
4	7	Black Vertosol	56	290416	6560136	Black and Grey Vertosols
5	6	Black Vertosol	56	291405	6560274	Black and Grey Vertosols
6	2	Black Vertosol	56	292205	6560217	Black and Grey Vertosols
7	8	Black Vertosol	56	289974	6559913	Black and Grey Vertosols
8	9	Black Vertosol	56	290313	6559396	Black and Grey Vertosols
9	1	Black Vertosol	56	291717	6559575	Black and Grey Vertosols
10	13	Brown Dermosol	56	290444	6557878	Dermosols
11	10	Red Vertosol	56	291603	6557988	Red and Brown Vertosols
12	12	Brown Kandosol	56	291047	6557807	Chromosols/Kandosols
13	11	Grey Vertosol	56	291740	6557311	Black and Grey Vertosols

Four control sites were also identified at the beginning of the irrigation scheme and are located outside of the irrigated areas outlined in light blue as shown below in Figure 17. Coordinates are provided in Table 8 (see below).

Sites at each pivot have been sampled each year and the soil tested to monitor the soil's performance under irrigation. Reports have been provided by Tamworth Regional Council which can be used to assess the effect of the effluent on the soil chemistry.

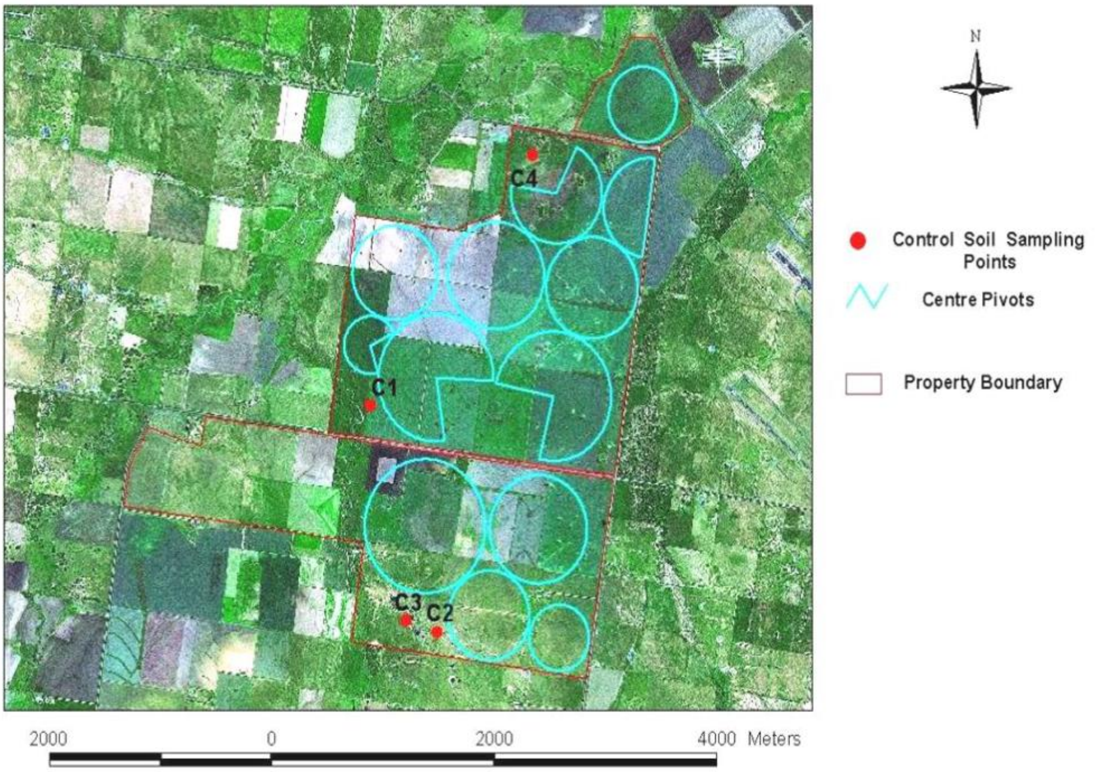


Figure 17: Location of the four control sites outside the irrigated areas

Table 8: Coordinates of the four control sites outside the irrigated areas

C1	**Black Vertosol**	**56**	**290033**	**6559249**	**Black and Grey Vertosols**
C2	**Brown Dermosol**	**56**	**290634**	**6557421**	**Dermosols**
C3	**Red Kandosol**	**56**	**290350**	**6557514**	**Chromosols/Kandosols**
C4	**Red Vertosol**	**56**	**291489**	**6561267**	**Red and Brown Vertosols**

The soils at each location have been sampled yearly at depths of 0-20cm 20-60cm and 60-120cm. The chemistry data obtained is provided to the EPA as a condition of the license by SoilFutures Consulting Pty Ltd (2020), (see Appendix E).

Soil chemistry results for 2019 from the single EPA points on the pivots were interpreted according to Hazelton and Murphy (2007); Abbott (1985); ARMCANZ (2000); EPA (2004); Melland et al. (2007) (PBI); Chapman et al. (2011) (OC); DNR (2007); (Chlorides) and Davis et al. (2015) (SAR).

5.2.1 Results obtained for soil data:

- Irrigated topsoils are neutral to moderately alkaline. With irrigated subsoils generally trend from slightly acidic to strongly alkaline at depth.
- pH ($CaCl_2$) confirms pattern for pH (H_2O).
- ECe (derived from $EC_{1:5}$), (Salinity) shows half of all irrigated topsoil's are slightly saline. Irrigated subsoils from 15 – 60 cm range from slightly-saline to moderately saline. Irrigated deep subsoils are variable in salinity.
- Total Chlorides (Cl) (Chloride Salinity) are in the upper range of the low concentration rating for topsoils, and mostly mid to upper range of low concentration rating for subsoils.
- Total Nitrogen (N) in irrigated topsoil is highly variable from efficient to moderate. All subsoils low to very low.
- Nitrate Nitrogen (NO_3) the topsoil ranges from deficient in NO_3 to moderate levels. Subsoils all deficient.
- Total Phosphorus (P) Topsoil total P low to moderate across all sites. Low to very low for all subsoils.
- Colwell Phosphorus (Avail P) shows all irrigated topsoils have low to medium levels of Colwell P. Subsoils have low to medium levels of Colwell P.
- Phosphorus Buffer Index (PBI, P Sorption Capacity) is generally low in all soils.
- Organic Carbon (TOC) in topsoils is moderate to high.
- Organic Carbon (TOC) shows all topsoils have moderate to high TOC. Subsoils have increasingly less Organic C with depth.

- Sodium Absorption Ratio (SAR) is highly variable for subsoils and topsoils.
- Cation Exchange Capacity (eCEC)in the topsoil is moderate to very high for all irrigated sites. CEC generally increasing with depth.
- Exchangeable Potassium (K) is moderate to very high for all topsoils and moderate to high for subsoils.
- Exchangeable Calcium (Ca) is high to very high in all irrigated soils.
- Exchangeable Magnesium (Mg) is high to very high for all irrigated soils.
- Exchangeable Sodium (Na), (Sodicity) is present in the irrigated topsoils which are sodic. Most subsoils are sodic.
- Exchangeable Aluminum (Al) shows no significant presence.
- Heavy metals were all at acceptable levels.
- Pesticide levels in all soils tested were below detection limits or within an acceptable range.

The characteristics from the soil chemistry data which are increasing under irrigation and may cause crop constraints are ESP%, electrical conductivity and chlorides.

5.2.2 Chloride

Chloride is required in sufficient amounts for plant growth and are supplied naturally to the soil via rainwater, dust and sea spray. With the industrialisation of farming, further amounts of Chloride have increasingly been added to agricultural soils due to irrigation, fertiliser applications (KCl) and air pollution. High levels of Chloride salts in soil can cause accumulation to toxic concentrations in plant tissue. Rayment & Bruce (1984) classify soil chloride concentrations as presented in Table 9.

Table 9: Rayment and Bruce – soil chloride rating

Concentration (mg/kg) Rating
<100 Very low
100-300 Low
300-600 Medium
600-2000 High
>2000 Very high

An obvious source of chloride at the irrigation scheme is municipal effluent and results indicate chloride concentrations range up to 189 mg/L. DNR (2007) went further to separate chloride the topsoil (0-10cm) from the subsoil, as presented in Table 10.

Table 10: Soil Chloride Rating (DNR, 2007)

Concentration (mg/kg) Rating
Low
<300 – Topsoil
<600 – Sub-soil
Medium
300-600 – Topsoil
600-1200 – Sub-soil
High
>600 – Topsoil
>1200 – Sub-soil

Soil salinity refers to the accumulation of water-soluble salt – mainly of sodium, but also of potassium, calcium and magnesium. These salts can severely affect plant growth and land use, and increase soil erosion (Hazelton and Murphy, 2007). Salinity is usually determined by measuring the electrical conductivity (EC) of the soil. The EC is converted to an effective EC (ECe) by factoring in the multiplier which is based on particle size distribution or texture of the soil (see Table 11).

Table 11: Soil texture factors for converting EC 1:5 soil water solution measurement to saturated extract

Soil Texture	Multiply EC 1:5 by the factor below to get EC_e
Sandy loam	11
Sandy clay loam	10
Clay loam	9
Light medium clay	8
Medium clay	7
Heavy clay	6

Source: Based on NSW Agriculture (2000).

Salinity ratings from Hazelton and Murphy (2007, adapted from Richards, 1954) are presented in Table 12.

Table 12: Salinity ratings based on ECe (adapted from Richards, 1954)

ECe (mS/cm) Rating
<2 Non-saline
2-4 Slightly saline
4-8 Moderately saline
8-16 Highly saline
>16 Extremely saline

Sodicity occurs when sodium levels in the soil lead to dispersion of the soil. Dispersive soils lose their structure and become problematic by preventing infiltration and deep drainage. Over time they cause surface crusting and are susceptible to severe erosion issues. Sodicity can be measured directly by calculating the exchangeable sodium percentage (ESP) which is a measure of the proportion of exchangeable sodium to the sum of all the significant exchangeable cations (calcium, magnesium and potassium). The categories of sodicity based on ESPs for soils in NSW were proposed by Pope and Abbot (1989) and are presented in Table 13.

Table 13: Sodicity ratings based on ESP (Pope and Abbot, 1989)

ESP Rating
0-5 Non-sodic
5-10 Marginally sodic to sodic
>10 Strongly sodic

The data for each of these analytes were compiled for the duration of the scheme and were presented in a table to view trends over the time.

5.2.3 Traffic Light System

The analysis of the soil chemistry data can be difficult with graphs and numbers not necessarily able to convey results succinctly. Wherret et al. (2010) discussed a traffic light system for data management which may be used to present soil data. The traffic light system is a simple tool that is easy to interpret and offers a visual ‘snapshot’ of the status of the soil. The traffic light method has been used in the analysis of key soil constraints for the EPA point in each pivot and shows the changes over the irrigation period in the EPA monitoring sites. The first characteristic examined is ESP (see Table 14).

5.2.4 Exchangeable Sodium Percentage (ESP – Sodicity)

Table 14: Comparison of key characteristics over the scheme

Pivot	Year	ESP %		
		0-15cm	15-60cm	60-120cm
1	2010	0.81	2.39	3.20
	2019	11.2	10.4	5.50
2	2010	0.81	2.28	4.72
	2019	7.27	7.94	4.49
3	2010	0.52	1.53	3.51
	2019	10.8	5.36	3.20
4	2010	0.95	2.12	4.64
	2019	9.97	6.70	3.55
5	2010	0.30	0.61	0.46
	2019	9.15	8.59	0.95
6	2010	0.98	1.27	2.92
	2019	10.7	6.83	2.48
7	2010	1.50	5.70	10.2
	2019	10.0	6.50	5.34
8	2010	1.21	6.04	5.89
	2019	7.36	5.43	7.42
9	2010	0.93	1.68	2.45
	2019	9.52	8.41	5.12
10	2010	1.08	3.25	7.03
	2019	11.2	7.06	8.20
11	2010	1.32	2.06	3.39
	2019	10.1	8.28	2.40
12	2010	1.32	2.52	7.27
	2019	12.5	12.3	NT
13	2010	0.67	1.32	1.25
	2019	11.3	11.5	6.05

Sodicity trended up between control and irrigated areas is shown in Figure 18.

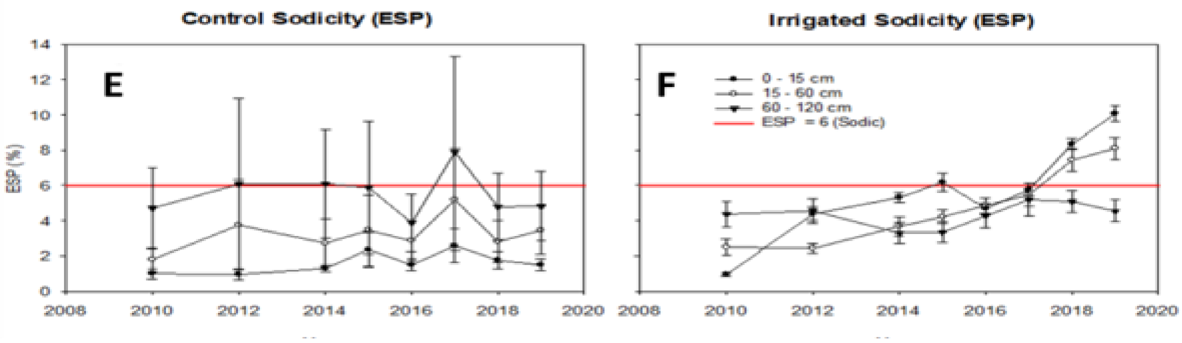


Figure 18: Sodicity (ESP) control areas verses irrigation areas

ESP has increased substantially since irrigation began in irrigated sites from 0 – 60 cm depth and these layers are now classified as sodic.

5.2.5 Salinity (ECe)

Table 15 shows the results for electrical conductivity and the changes from start of scheme to 2019.

Table 15: Traffic light table electrical conductivity

Pivot	Year	Electrical conductivity dS/m		
		0-15cm	15-60cm	60-120cm
1	2010	0.93	1.22	17.2
	2019	2.32	3.54	2.90
2	2010	0.52	1.45	1.62
	2019	2.09	2.15	2.78
3	2010	1.16	1.33	1.33
	2019	2.96	2.78	1.97
4	2010	0.58	1.16	1.51
	2019	1.74	1.51	1.68
5	2010	0.93	1.10	1.04
	2019	1.45	4.41	1.91
6	2010	0.70	0.64	2.84
	2019	2.20	2.96	2.09
7	2010	1.10	1.45	2.84
	2019	2.20	2.20	13.2
8	2010	0.75	5.22	12.9
	2019	1.68	2.38	2.09
9	2010	0.81	0.99	13.9
	2019	1.57	3.71	2.67
10	2010	0.46	1.28	1.62
	2019	2.20	3.07	1.86
11	2010	0.46	0.93	1.22
	2019	2.26	2.43	3.42
12	2010	0.46	1.22	3.42
	2019	1.86	3.65	NT
13	2010	0.81	0.58	0.52
	2019	1.74	2.26	2.44

Figure 19 shows all irrigated points compared against controls over the life of the irrigation scheme for electrical conductivity. ECe at irrigated sites has increased significantly for both topsoils and subsoils compared with control sites. Average irrigated topsoil salinity is above low-level salinity threshold.

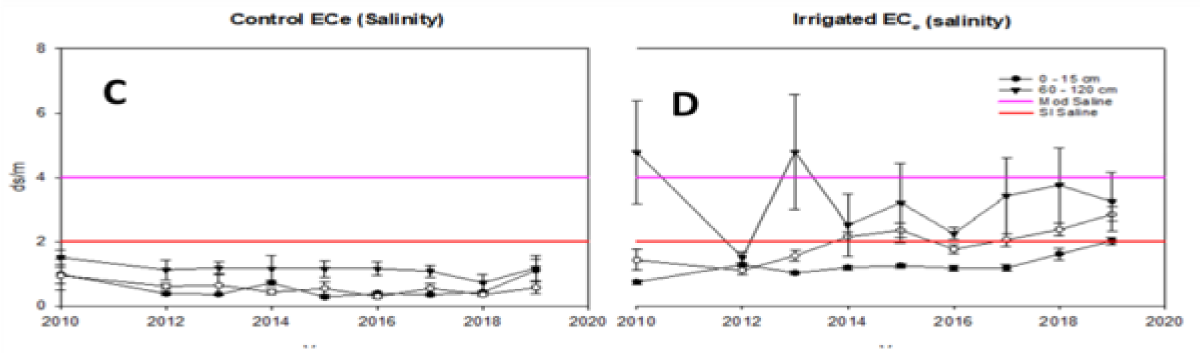


Figure 19: Points compared against controls over scheme for ECe

5.2.6 Chlorides

Table 16 shows comparisons of chloride from start of scheme to 2019.

Table 16: Comparisons of chloride from start of scheme to 2019

Pivot	Year	Chlorides mg/kg		
		0-15cm	15-60cm	60-120cm
1	2010	26.2	20.1	11.3
	2019	223	459	355
2	2010	12.2	13.0	11.7
	2019	148	249	400
3	2010	19.3	21.2	18.5
	2019	332	248	268
4	2010	16.3	22.8	20.1
	2019	201	476	159
5	2010	24.4	21.3	14.0
	2019	107	586	245
6	2010	19.4	17.5	15.4
	2019	201	408	232
7	2010	18.0	21.0	14.1
	2019	159	295	125
8	2010	16.0	15.8	18.7
	2019	115	290	129
9	2010	22.9	31.4	21.3
	2019	55.3	570	357
10	2010	12.6	22.0	16.7
	2019	219	528	160
11	2010	17.3	50.0	102
	2019	260	219	264
12	2010	12.6	53.0	279
	2019	184	544	NT
13	2010	18.9	16.2	14.6
	2019	144	240	425

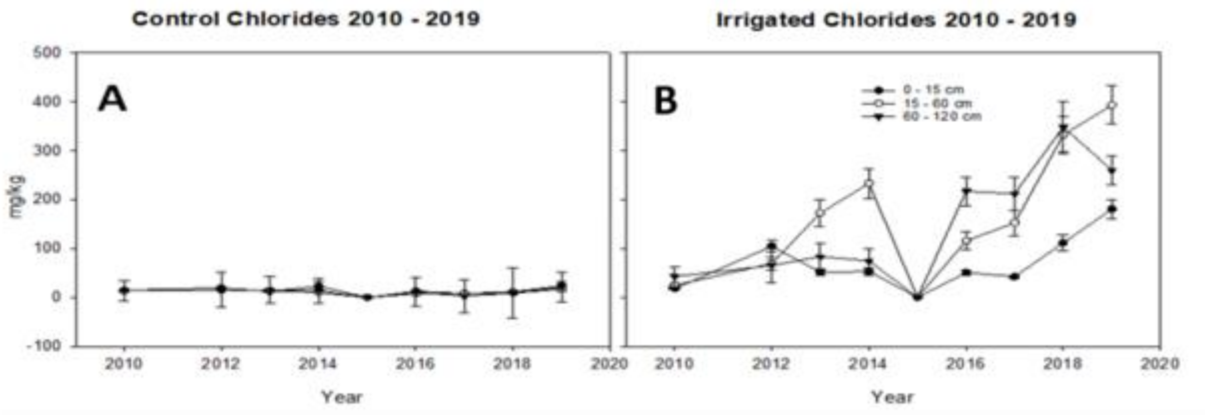


Figure 20: Irrigated chloride levels compared with control over life of the scheme

Figure 20 shows irrigated chloride levels compared with control over life of the scheme. Chlorides in the control sites have remained extremely low since the start of the scheme. The irrigated soils show increases for the topsoils, and substantial increases for all the subsoils.

Whilst the chloride level in the topsoils, generally remain below 300 mg/kg Chlorides have predominantly increased to greater than 300 mg/kg from the 15 to 120 cm portion of the solum but have not reached the medium level subsoil threshold of 600mg/kg.

5.2.7 Analysis of baseline data

All 2019 results for important characteristics are shown in Figure 21.

Questions to be answered after analysis of baseline data were:

- Was there a link between chemistry results and yield?
- Why were there variations in processing effluent between the black vertosol soils?
- Was the data spatially consistent across pivots or was it localised to EPA points?

Pivot	Depth	Chloride	Salinity	Sodicity	Overall
1 - black vertosol	0-20	Nil	Minor	Moderate	
	20-60	Minor	Minor	Moderate	Moderate
	60-120	Nil	Minor	Minor	
2 Black Vertosol	0-20	Nil	M□□r	M□□r	
	20-60	Nil	M□□r	M□□r	M□□r
	60-120	Nil	M□□r	Nil	
3 Black Vertosol	0-20	M□□r	M□□r	Moderate	
	20-60	Nil	M□□r	M□□r	Moderate
	60-120	Nil	M□□r	□□	
4 Black Vertosol	0-20	Nil	Nil	M□□r	
	20-60	Nil	Nil	M□□r	M□□r
	60-120	Nil	Nil	Nil	
5 Red Vertosol	0-20	Nil	Nil	M□□r	
	20-60	M□□r	Moderate	M□□r	Moderate
	60-120	Nil	Nil	Nil	
6 Black Vertosol	0-20	Nil	M□□r	Moderate	
	20-60	Nil	M□□r	M□□r	Moderate
	60-120	Nil	M□□r	Nil	
7 Black Vertosol	0-20	Nil	M□□r	Moderate	
	20-60	Nil	M□□r	M□□r	Major
	60-120	Nil	Major	M□□r	
8 Black Vertosol	0-20	Nil	Nil	M□□r	
	20-60	Nil	M□□r	M□□r	Minor
	60-120	Nil	M□□r	M□□r	
9 Black Vertosol	0-20	Nil	Nil	M□□r	
	20-60	M□□r	M□□r	M□□r	M□□r
	60-120	Nil	M□□r	M□□r	
10 Red Vertosol	0-20	Nil	M□□r	Moderate	
	20-60	M□□r	M□□r	M□□r	Moderate
	60-120	Nil	Nil	M□□r	
11 Grey Vertosol	0-20	Nil	M□□r	Moderate	
	20-60	Nil	M□□r	M□□r	Moderate
	60-120	Nil	M□□r	Nil	
12 Brown Kandosol	0-20	Nil	Nil	Moderate	
	20-60	Minor	M□□r	Moderate	Major
	60-120	Moderate	Moderate	Moderate	
13 Brown dermosol	0-20	Nil	Nil	Moderate	
	20-60	Nil	M□□r	Moderate	Moderate
	60-120	Nil	M□□r	M□□r	

Figure 21:Traffic light table identified constraints 2019 for each pivot

5.2.8 Effects of effluent on the reuse farms

To understand the effects the effluent was having on the reuse farms productivity a farm visit was utilised to obtain anecdotal feedback to inform this study. The first farm manager was contracted to operate the property and irrigation scheme from 2012 to 2017. Conditions at the time resulted in little to no documentation being retained from the period about productivity, operation, and maintenance of each pivot.

The second and present contractor provided verbal information and was reluctant to provide official farm operation data due to the proximity of the contract review process. Therefore, only anecdotal evidence is available to assess the performance of each pivot. The best yielding pivots were thought to be pivot's 2 and 4, with the worst performers being Pivot's 1, 5, 10, and 12.

Pivot 2 and 4 have also processed the effluent without as much rise in characteristics of concern at the EPA points.

Pivot 1 has performed the worst regarding characteristics of concern of the black vertosols.

With sampling pits a large undertaking to complete it was thought that by sampling and performing physical tests on the identified horizons on the best and worst performing black vertosol in the irrigated and control areas the findings will reveal how the black vertosol performs under effluent irrigation and potentially why there is an apparent difference between the same soil class will be uncovered.

5.3 SAMPLING PLAN

5.3.1 Sampling Objectives

An objective of the proposed sampling of the reuse farm was to examine why soil, with the same class of black vertosol, appears to perform differently under irrigation. Judgemental sampling was the approach chosen, as the proposed sample locations are based on the prior history of the site. The selected sampling points are close to where EPA samples have been gathered over the 8-year period.

Judgmental sampling proposed can also be used to:

- Provide insight into what levels of contaminants may be present in relation to effluent irrigation.
- Confirm the presence or level of contaminants at the 'best' and 'worst case' location.
- Provide screening information to assist the scoping of subsequent investigation phases.

(U.S. Environmental Protection Agency, 2002)

5.3.2 Quality of Results

To reduce the likelihood of laboratory and sampling errors affecting the results attained:

- Soil samples were analysed by East-West Laboratories, in Tamworth. The Laboratory is National Australian Testing Authority (NATA) accredited, and as such is accredited as being reliable, precise, and accurate for the analyses, which meets Government standards for reporting on soil chemistry (EPA, 2004).

- Soil sampling was carried out with the help of an experienced sampler and followed Australian standards. The data was analysed using appropriate and proven industry methods.
- Samples were collected from irrigated and non-irrigated areas of the same soil type to allow valid comparison and observe any changes.
- Calibration of all testing equipment was completed according to manufacturer's recommendations.

5.3.3 Soil Sampling

Preparing to collect soil samples requires rigorous planning to ensure samples are collected are using best practice, ensuring true statistical representativeness while most importantly maintaining safely for all involved to achieve the required results:

- A Covid-19 Safe Action Plan (see Appendix B) was implemented with each person visiting the site t informed of the requirements to remain Covid-19 safe.
- A Work Health and Safety plan (WHS) was also implemented which detailed:
  - an assessment of the on-site hazards,
  - measures to eliminate, isolate or minimise these hazards for the tasks proposed,
  - emergency response measures,
  - site-specific training needs,
  - protective equipment,
  - emergency response measures, and
  - site-specific training needs.
- The property where sampling was completed is owned by the TRC. Permission was both required from the TRC officer responsible for the farm and the contractor who was managing the farm as part of their lease.
- All underground and above ground services throughout the chosen sampling locations were checked and marked. Checks included power conduits and water pipes for pivots and other infrastructure such as telecommunications and gas to ensure services were not damaged during coring or pit excavation.
- Pits were excavated by suitably qualified and experienced operators of heavy machinery. Coring was completed by a competent soil sampler.
- The Sample Plan was reviewed so appropriate equipment as well as sampling bags were bought to site. Transport for all equipment and for samples – including cold storage transport to the laboratory and for taking the machinery to site had to be scheduled.

- Field testing equipment was calibrated where necessary including a GPS device.
- Arrangements were made for the proper disposal of all waste materials generated as part of the works.

5.3.4 Sample sites

The first test pit was excavated near the site known as Control 4 during reuse farm operation. Control samples are recommended with most sampling investigations. They are processed and sampled the same as all the samples of interest and should be from the same background site. They will confirm in this case for the TERF if the results of the testing are related to the site or sampling techniques. The control site is shown in Figure 22 and is in a non-farmed area on the TERF close to Pivot 5.

Figure 22: Control pit location

The next sample site was Pivot 4. Shown in Figure 23 are the locations of the full test pits which were dug close to the EPA monitoring point and as close as possible to this point outside the irrigated area. There were also four cores collected around the irrigated test pit and three cores collected around the non-irrigated test pit.

Figure 23: Pivot 4 sample pit and core locations

The next sample site was the Pivot 1 area. Shown in Figure 24 are the locations of the full test pits which were dug close to the EPA monitoring point, and close as possible to this point outside to the irrigated area. There were also four cores taken around the irrigated test pit and four cores taken around the non-irrigated test pit.

Figure 24: **Pivot 1 sample pit and core locations**

5.3.5 EM and Gamma Survey

Soil sampling and soil pits can only offer a small snapshot of the full farm soils. As part of this research investigation more spatial information would be required. An EM and gamma survey were attempted across all irrigated areas.

To complete the EM and Gamma study a survey vehicle was borrowed from the University of Southern Queensland (USQ) when border access (due to COVID-19 restrictions) was approved. The vehicle used for the precise coordinate survey EM and gamma survey is shown in Figure 25.

Figure 25: GPS EM and gamma survey vehicle

The precise GPS transmitter is located on the vehicle roof; the gamma sensor is located on the front; and an EM device is being dragged behind the vehicle. The GPS spatially maps the position of the transmitters on the earth accurate to within 2cm. The pivot survey was completed at a width of 25m by driving around at twenty kilometres per hour. Figure 26 shows the collected GPS coordinates from day 1 of the survey.

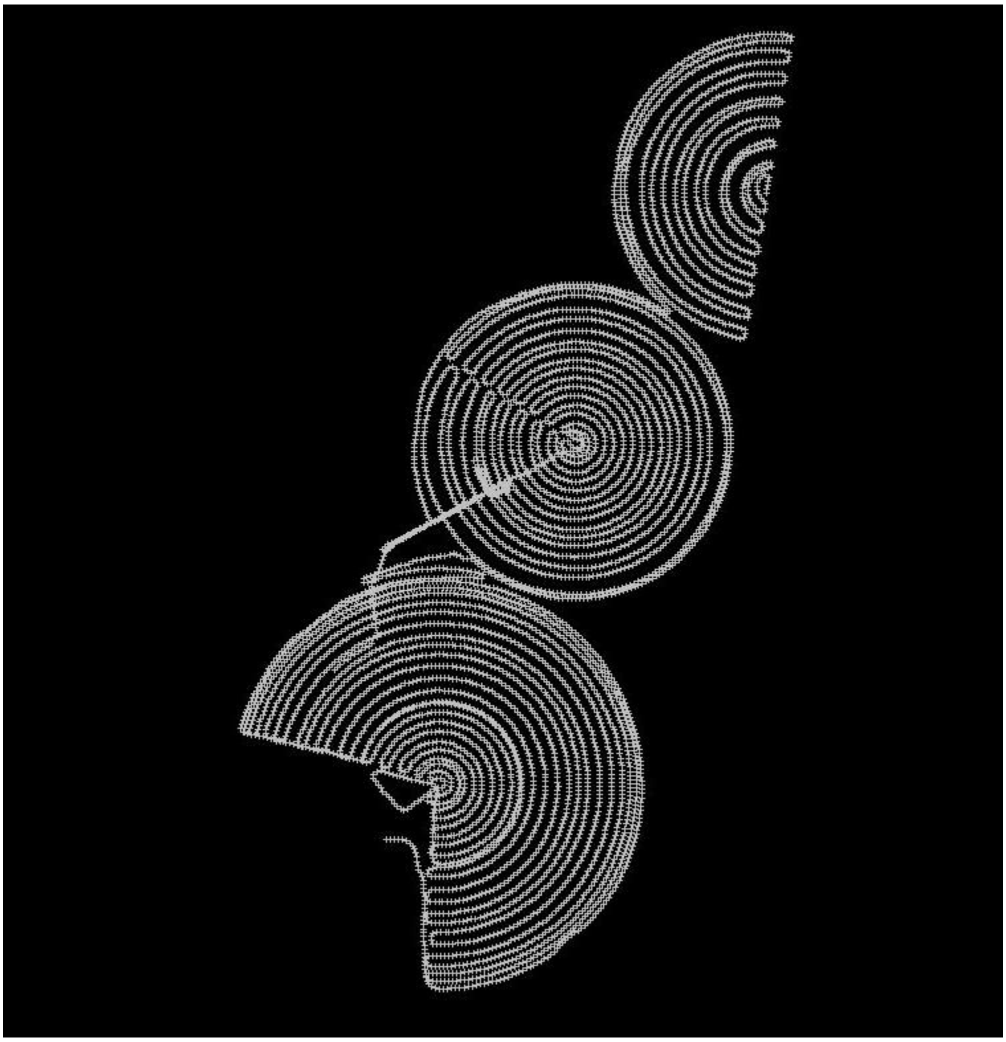


Figure 26: GPS location of field survey day 1

The spatial data for the irrigated areas were collected over a period of three days. Information was sent back to Doctor Roberton at USQ for processing. With time constraints and border lockdowns initial spatial maps were performed on just three pivots – Pivot 1, Pivot 5, and Pivot 12. These three pivots were representative of the worst performing pivots with respect to historical yield and chemistry data for the farm.

- Pivot 1 – Black Vertosol
- Pivot 5 – Red Vertosol
- Pivot 12 – Red Dermosol

After data was analysed the soil coring coordinates for truthing were determined and marked on a GIS map for sampling. Coring locations are shown in Figure 27.

Figure 27: Ground truthing cores for EM and Gamma survey

5.4 FIELD WORK

The first round of fieldwork completed were the test pits in Pivots 4 and 1 respectively.

The farm was visited and soil pits were dug with an excavator.

5.4.1 Control 1

Control 1 was classified as a red vertosol in earlier reports. The site had been planted with native trees and had not been farmed since the TERF has been in operation. An excavator was used to expose the profile which can be seen in Figure 28.

Figure 28: Profile of Red Sodosol at control pit

Map Reference: AMG grid reference 291489E, 6561267N, zone 56; recorded by Adrian Cameron on 28/05/2020.

Soil Type: Red Sodosol (ASC).

5.4.2 PIVOT 4

The profile of the irrigated pit in Pivot 4 is shown in Figure 29.

Figure 29: Pivot 4 irrigated inspection pit

Map Reference: AMG grid reference 292620E, 6561710N, zone 56; recorded by Adrian Cameron on 28/05/2020.

Soil Type: Black Vertosol (ASC)

Horizons were identified and samples were then collected from each horizon for physical and complimentary chemical testing. Figure 30 shows the vigorous reaction when acid was added to the calciferous material in the lower horizon of the pit.

Figure 30: Reaction of soil from lower horizons with acid

Figure 31 shows the profile of the inspection pit dug outside the irrigated area of Pivot 4.

Figure 31: Pivot 4 non-irrigated inspection pit

Pivot 4: Non-irrigated pit details

Map Reference: AMG grid reference 292750E, 6561618N, zone 56; recorded by Adrian Cameron on 28/5/2020.

5.4.3 PIVOT 1

The next sample site was in Pivot 1. Shown in Figure 32

Pivot 1 Irrigated Pit Details

Map Reference: AMG grid reference 291822E, 6559633N, zone 56; recorded by Adrian Cameron on 09/06/2020

Soil Type: Grey Vertosol (ASC).

Figure 32: Pivot 1 irrigated pit profile

Figure 33 shows the upper horizon of Pivot 1 irrigated pit. The topsoil of the irrigated pit was showing signs of sodicity issues with topsoil crusting and signs of compaction in the upper horizon layers.

Figure 33: Pivot 1 upper horizons

Figure 34 shows the soil profile of Pivot 1 outside the irrigated area. This Black Vertosol had not been cultivated since the TERF commenced. The soil had formed gilgais at the surface, and the topsoil was displaying self-mulching characteristics.

Figure 34: Inspection pit profile of Pivot 1 pit non-irrigated

Pivot 1 Non-Irrigated Pit Details

Map Reference: AMG grid reference 292025E, 6559787N, zone 56; recorded by Adrian Cameron on 09/06/2020

Soil Type: Black Vertosol (ASC),

Figure 35 shows the topsoil of the Black Vertosol outside the irrigated area soil.

Figure 35: Non-irrigated Pivot 1 inspection pit upper horizons

Soil cores were collected and Figure 36 shows cores ready to place in sample bags

Figure 36: Soil sample cores ready to be separated into bags

5.5 LAB TESTING

Testing is proposed to be completed on each identified horizon to maximum of 5 samples from each of 4 soil pits for the parameters shown in Table 17(Appendix G).

Table 17: Soil Physical tests completed on Pivots 1 and 4 irrigated pits

Parameters	Units
pH (H_2O)	pH Units
pH ($CaCl_2$)	pH Units
Conductivity (EC_e)	µS/cm
Exchangeable calcium	mg/kg
Exchangeable magnesium	mg/kg
Exchange potassium	mg/kg
Exchangeable sodium	mg/kg
Effective Cation Exchange Capacity (ECEC)	mg/kg
Exchangeable Sodium Percentage (ESP)	%
Organic carbon	%
Moisture content	%
Particle density	g/cm^3
Bulk density	g/cm^3
Saturated hydraulic conductivity	mm/hr
Water retention	%
Air filled porosity	%
Capillary porosity	%
Total porosity	%

Collected samples were transported to the laboratory for full analysis. Soils being prepped for testing at the laboratory are shown below in Figure 37.

Figure 37: Soils taken from Pivot 4 being prepped and tested at the NATA accredited laboratory

Figure 38 shows soil colour test being performed at the laboratory.

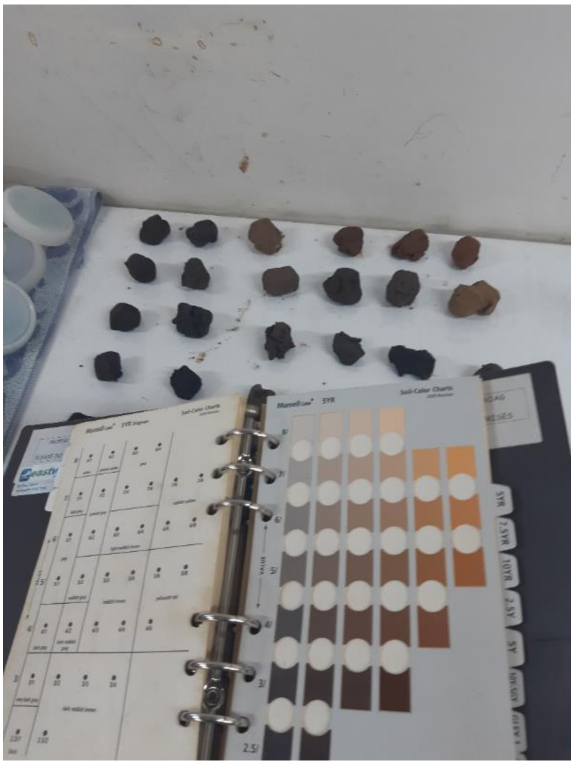


Figure 38: Colour tests being performed on textured soils from Pivot 1

Table 18 lists tests performed on soils cores,(Appendix F)

Table 18: Soils were tested for these parameters

pH	units
ECe	dS/m
CEC	cmol/kg
ESP	%
Chlorides	mg/kg

Pivot 1 had since the intial spatial survey been deeply ripped and spread with biosolids from the waste water treatment plant so testing would no longer correlate to the surveys recently conducted. Soil cores were only collected from Pivots 5 and 12. Twenty sample locations were cored in each pivot with two cores taken at each location so enough sample was collected for minimum requirment for testing. The first core was measued for bulk density which required oven drying at 105ºC. The second core at each location was air dried at 40ºC for chemical testing. Cores were collected at the following depths 0-10cm 10-20cm 40-50cm and 60-70cm.

Soils were measured at the laboratory for following characterstics using similar methods to those soils tested earlier in this investigation (see Table 19 and Appendix H):

Table 19: Parameters checked for EM and Gamma survey truthing

Test Parameter	Method Description	Units
pH (1:5 in H20)	Electrode	pH units
pH (1:5 in CaCl2)	Electrode	pH units
Electrical Conductivity	Electrode	dS/m
Exchangeable Potassium	NH4Cl/ICP	mg/kg
Exchangeable Calcium	NH4Cl/ICP	mg/kg
Exchangeable Magnesium	NH4Cl/ICP	mg/kg
Exchangeable Sodium	NH4Cl/ICP	mg/kg
Exchangeable Aluminium	KCl/ICP	mg/kg
ECEC	Calculation	cmol/kg
Exchangeable Potassium %	Calculation	%
Exchangeable Calcium %	Calculation	%
Exchangeable Magnesium %	Calculation	%
Exchangeable Sodium %	Calculation	%
Exchangeable Aluminium %	Calculation	%
Moisture Content (Oven Dry)	Oven-Dry	%
Dispersion Index	Field-ASWAT	N/A
Air Dry Moisture Content	Oven Dry	%
Bulk Density	Field	g/cm^3
Dispersion Index	Field-Loveday Pyle	Class

5.6 RESULTS

5.6.1 Chlorides

Table 20: Pivot 1, chlorides control, non-irrigated and irrigated

Chlorides mg/kg	0-15cm	15-60cm	60-120cm
Control point	10.7	13.2	6.48
Pivot 1 Non-Irrigated C1	24.0	19.4	17.2
Pivot 1 Non-Irrigated C2	18.0	15.2	8.74
Pivot 1 Non-Irrigated C3	25.8	10.5	7.41
Pivot 1 Non-Irrigated C4	13.2	6.47	7.63
Pivot 1 Irrigated C1	67.1	420	765
Pivot 1 Irrigated C2	36.3	304	528
Pivot 1 Irrigated C3	64.7	352	550
Pivot 1 Irrigated C4	56.7	328	694

Table 21: Pivot 4, chlorides control, non-irrigated and irrigated

Chlorides mg/kg	0-15cm	15-60cm	60-120cm
Control point	10.7	13.2	6.48
Pivot 4 Non-Irrigated C1	68.6	46.3	20.4
Pivot 4 Non-Irrigated C2	36.3	30.2	27.6
Pivot 4 Non-Irrigated C3	22.7	21.7	17.9
Pivot 4 Irrigated C1	104	703	166
Pivot 4 Irrigated C2	272	497	267
Pivot 4 Irrigated C3	64.1	519	350
Pivot 4 Irrigated C4	57.7	306	209

For the areas sampled the chloride levels as shown in Tables 20 and 21 are elevated in the irrigated areas. Both pivots are showing medium chloride levels in the subsoil. A level mildly toxic to plants. Indications that the chloride salt is moving down the profile under fallow and increased rainfall in 2020.

5.6.2 Salinity (ECe)

Table 22: Pivot 1, ECe control, non-irrigated and irrigated

ECe dS/m	0-15cm	15-60cm	60-120cm
Control point	0.43	0.69	1.35
Pivot 1 Non-Irrigated C1	1.05	1.20	1.16
Pivot 1 Non-Irrigated C2	0.60	0.83	1.35
Pivot 1 Non-Irrigated C3	0.68	0.75	1.05
Pivot 1 Non-Irrigated C4	1.13	0.60	1.28
Pivot 1 Irrigated C1	1.65	2.40	6.11
Pivot 1 Irrigated C2	1.05	3.68	4.82
Pivot 1 Irrigated C3	1.04	3.90	3.89
Pivot 1 Irrigated C4	1.20	3.90	5.03

Table 23: Pivot 4, ECe control, non-irrigated and irrigated

ECe dS/m	0-15cm	15-60cm	60-120cm
Control point	0.43	0.69	1.35
Pivot 4 Non-Irrigated C1	0.68	0.95	2.49
Pivot 4 Non-Irrigated C2	0.69	1.05	1.13
Pivot 4 Non-Irrigated C3	1.98	1.20	1.28
Pivot 4 Irrigated C1	1.8	6.45	1.95
Pivot 4 Irrigated C2	2.7	5.18	2.75
Pivot 4 Irrigated C3	2.06	4.05	22.1
Pivot 4 Irrigated C4	1.58	3.6	3.1

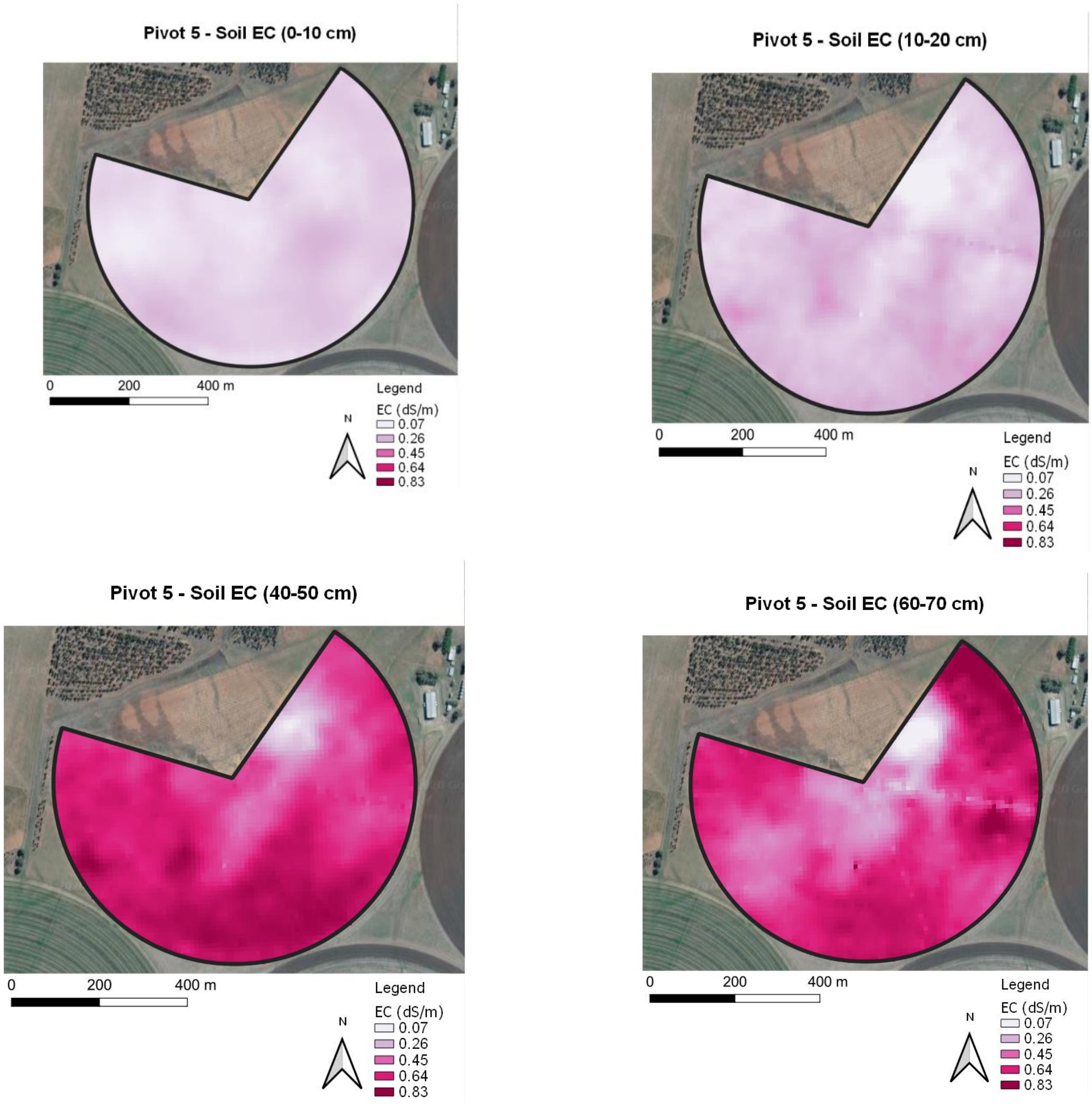


Figure 39: Pivot 5, spatial maps of EC over the depths of the solum

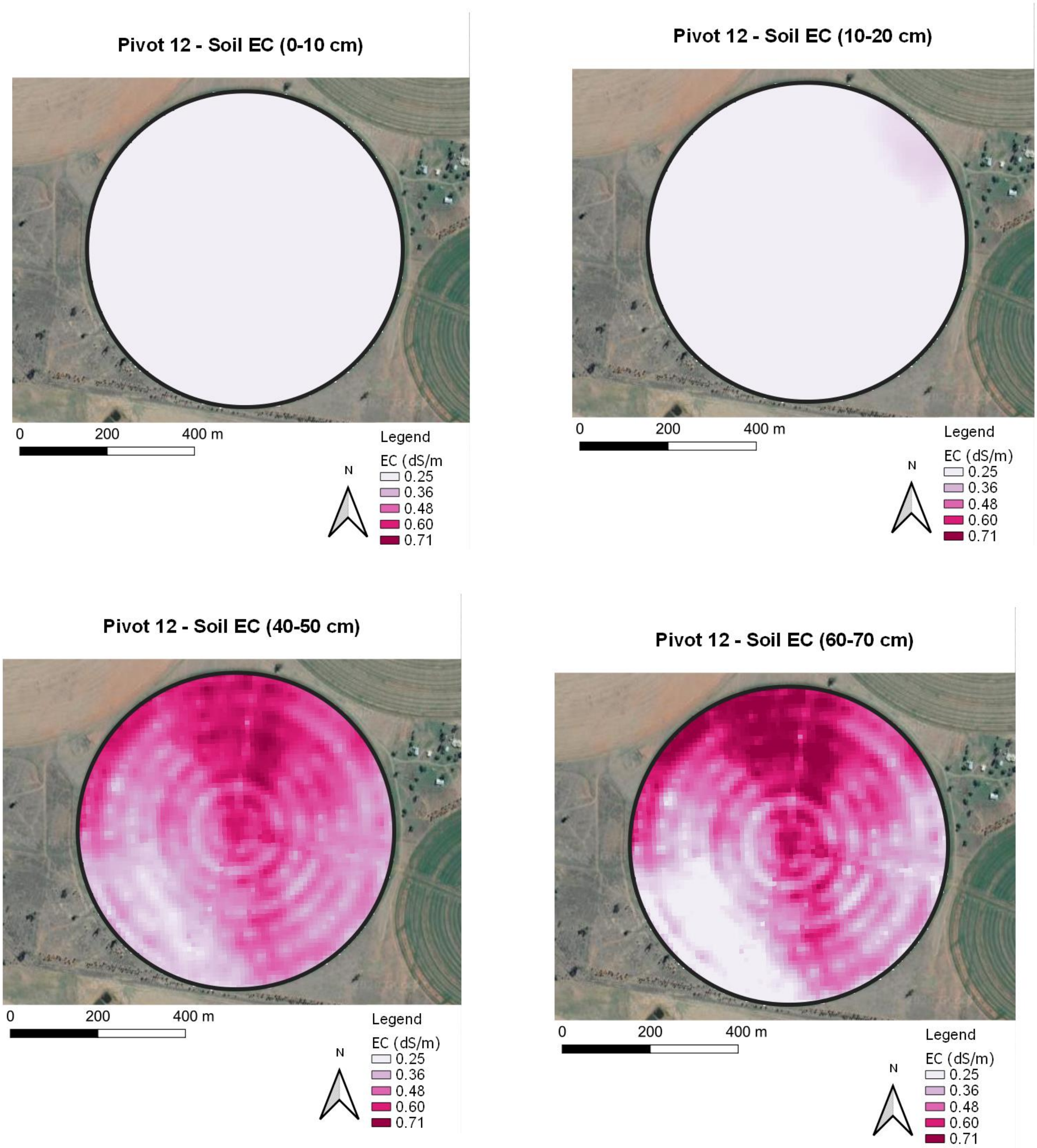


Figure 40: Pivot 12, spatial maps of EC over the depths of the solum

Soil samples and spatial maps are all showing increased salintiy in the irrigated areas. Highest increases are in the subsoil for the soil samples with highly saline levels. Spatial maps showing some areas classed as very saline. The levels of salinity are especially concerning and at levels recorded would be having an adverse effect on crop health.

5.6.3 Sodicity (ESP)

Table 24: Pivot 1, ESP control, non-irrigated and irrigated

ESP %	0-15cm	15-60cm	60-120cm
Control point	3.04	10.7	14.9
Pivot 1 Non-Irrigated C1	1.43	2.48	3.31
Pivot 1 Non-Irrigated C2	1.01	1.77	3.22
Pivot 1 Non-Irrigated C3	0.94	1.33	2.16
Pivot 1 Non-Irrigated C4	1.23	1.96	3.48
Pivot 1 Irrigated C1	9.19	7.63	5.32
Pivot 1 Irrigated C2	8.88	7.02	7.71
Pivot 1 Irrigated C3	4.38	8.44	5.61
Pivot 1 Irrigated C4	8.07	9.81	6.24

Table 25: Pivot 4, ESP control, non-irrigated and irrigated

ESP %	0-15cm	15-60cm	60-120cm
Control point	3.04	10.7	14.9
Pivot 4 Non-Irrigated C1	1.37	1.44	2.92
Pivot 4 Non-Irrigated C2	1.27	0.97	1.53
Pivot 4 Non-Irrigated C3	0.58	0.89	1.70
Pivot 4 Irrigated C1	8.91	5.24	4.40
Pivot 4 Irrigated C2	2.69	4.84	2.11
Pivot 4 Irrigated C3	9.03	7.74	4.46
Pivot 4 Irrigated C4	8.68	7.14	3.10

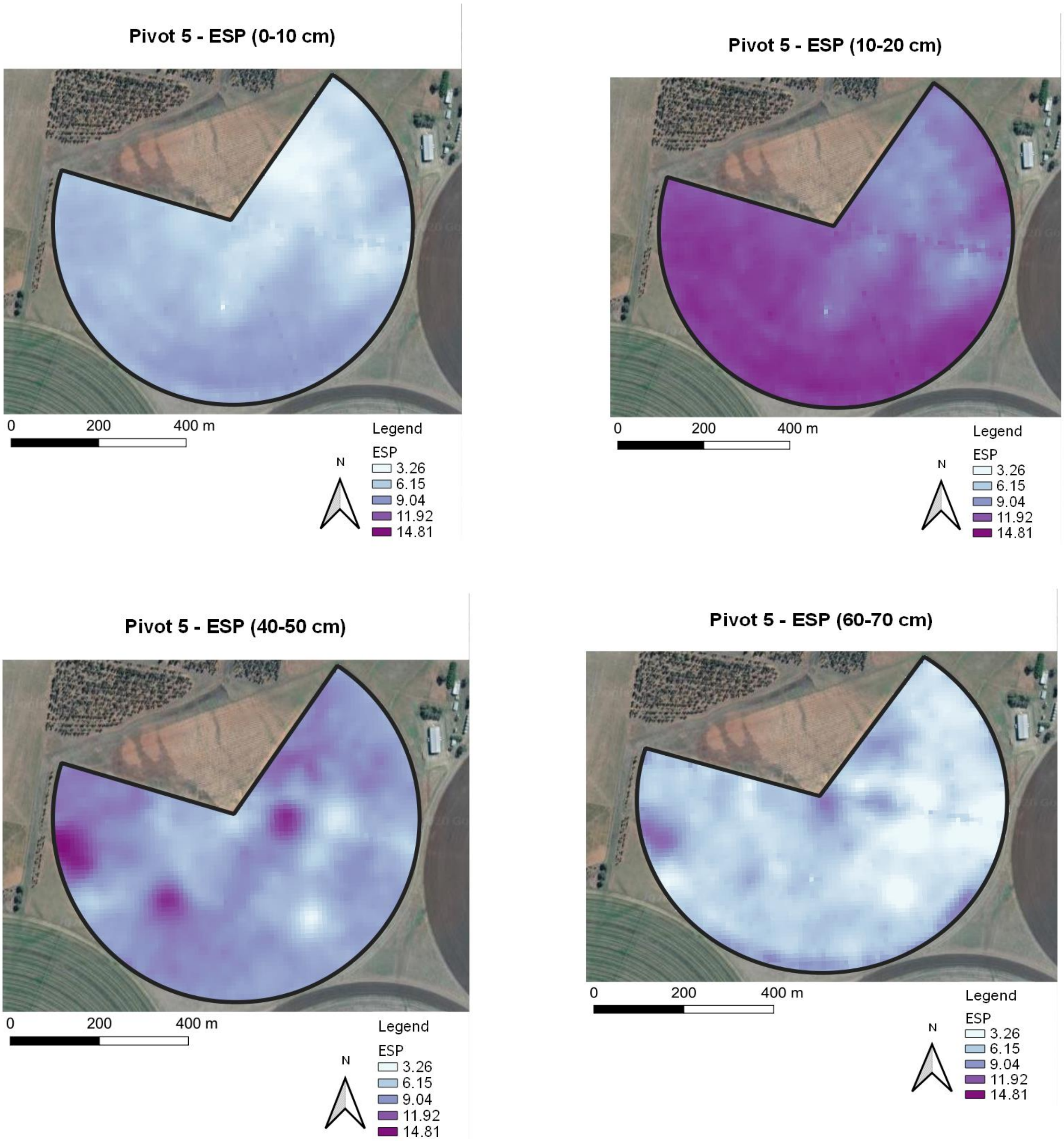


Figure 41: Pivot 5, spatial maps of Sodicity (ESP) over the depths of the solum

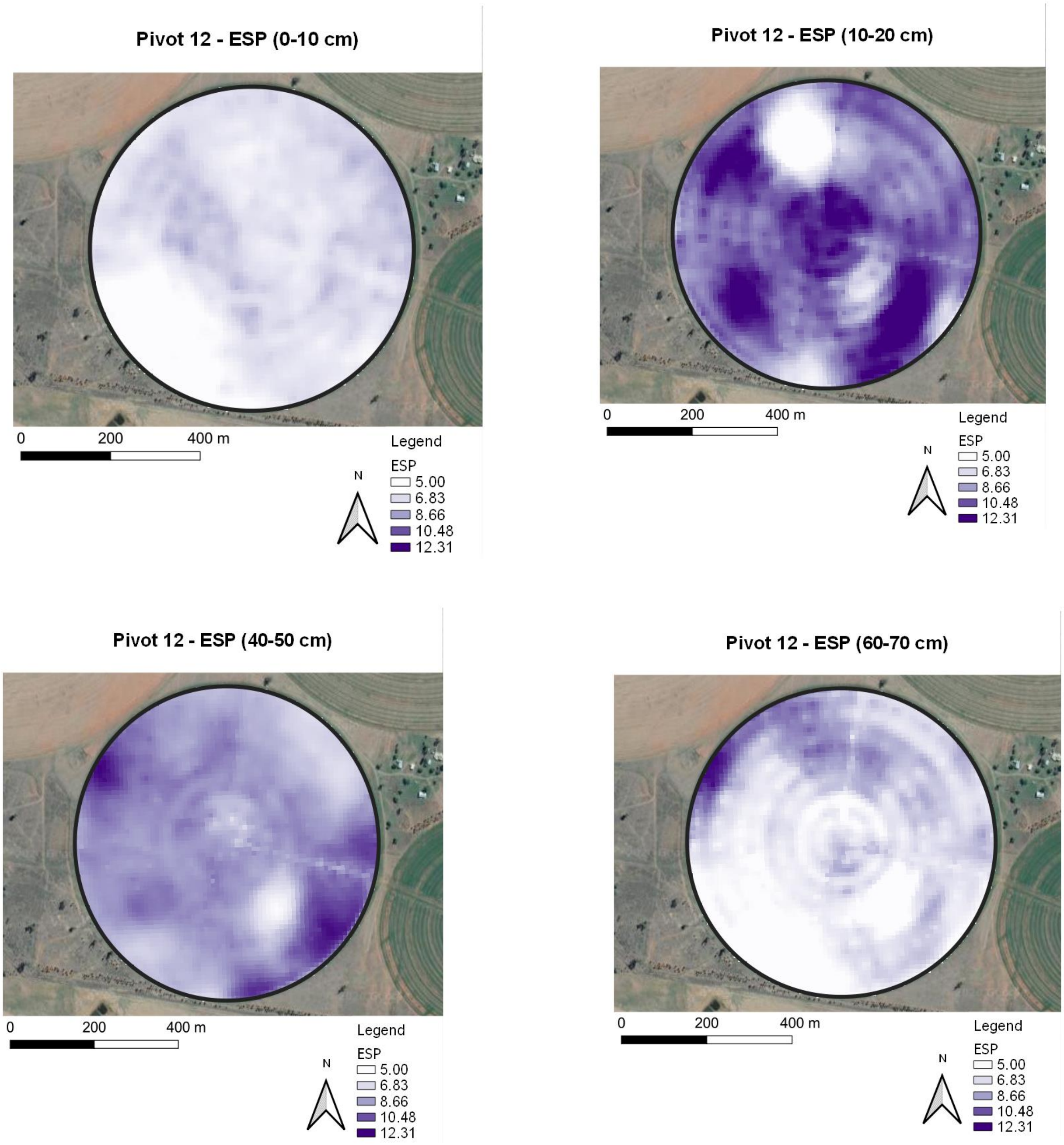


Figure 42: Pivot 12, spatial maps of sodicity (ESP) over the depths of the solum

Levels in the irrigated areas sodic to strongly sodic. Gypsum, and possibly lime, may be required to stabilise soil structure.

Control areas non sodic.

5.6.4 Dispersion

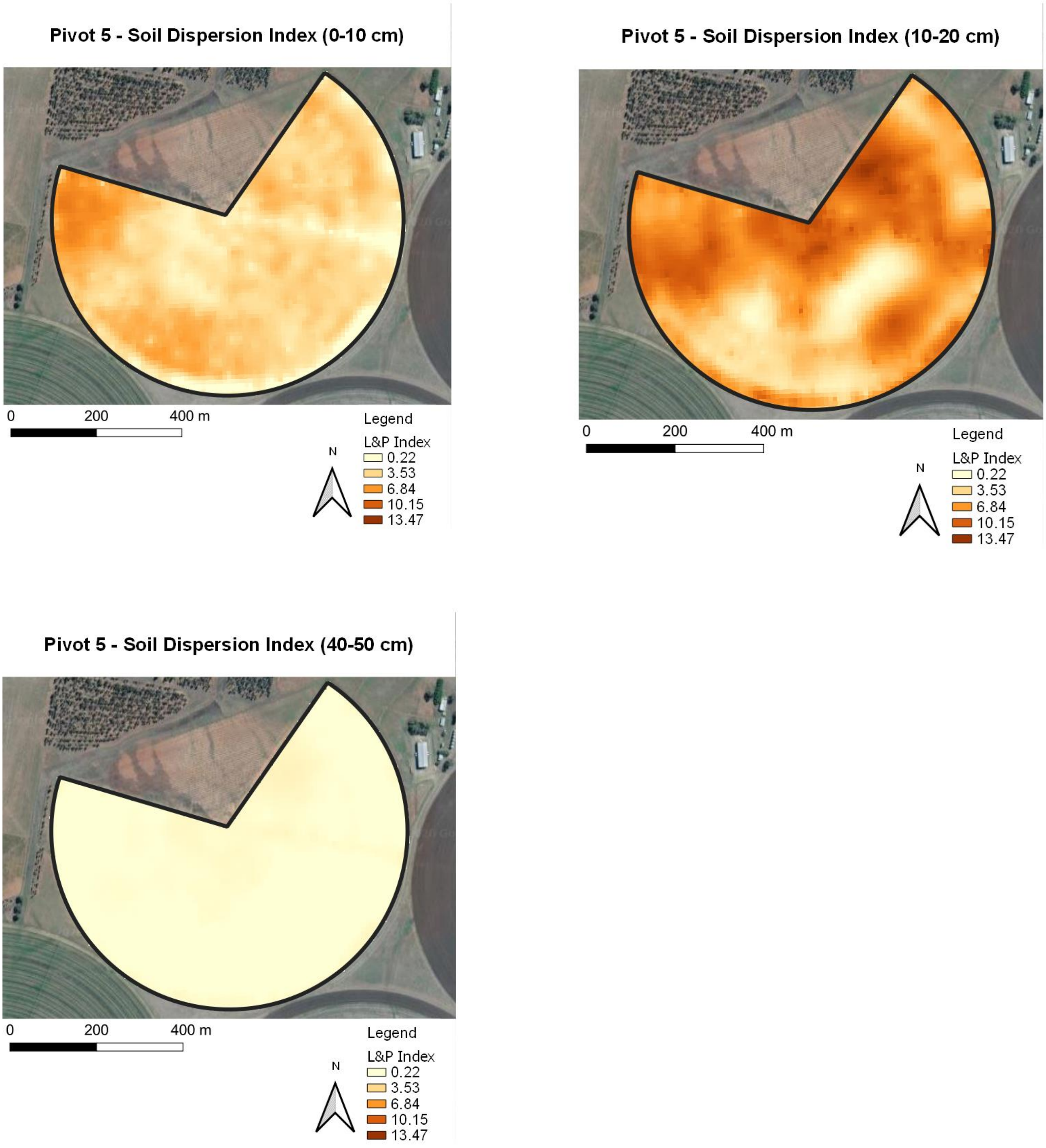


Figure 43: Pivot 5, spatial maps of dispersion over the depths of the solum

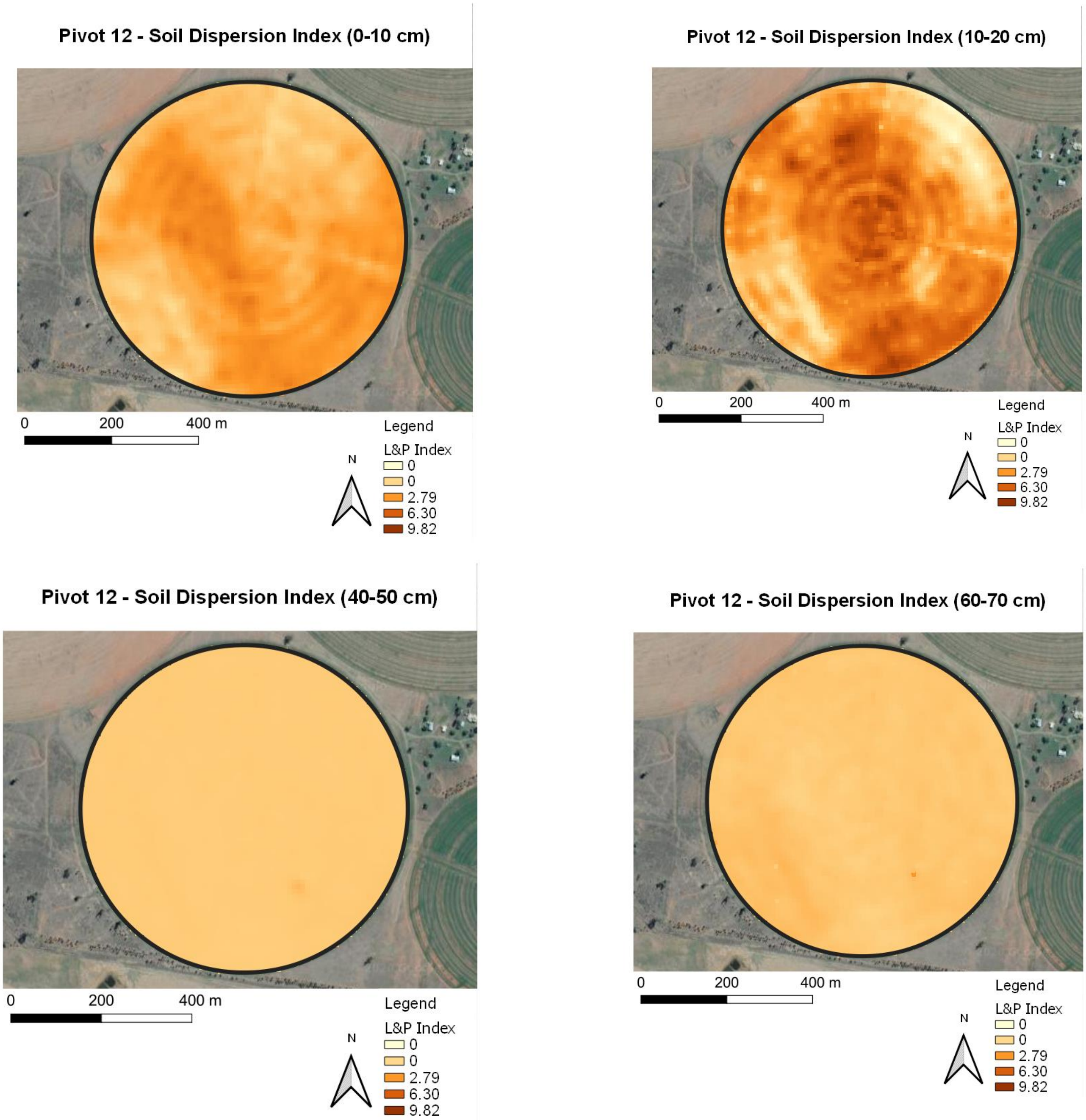


Figure 44: Pivot 12, spatial maps of dispersion over the depths of the solum

Spatial maps show both Pivots 5 and 12 in 10-20cm zone showing scores above 9. Spontaneously dispersive.

Soils with this result will have crusting and surface sealing. Soils must be protected from raindrop impact and input of soil organic matter is needed.

5.6.5 ELECTROCHEMICAL STABILITY INDEX

Pivot 1

Table 26: Pivot 1, Electrochemical Stability Index (ESI)

ESI	0-15cm	15-60cm	60-120cm
Pivot 1 Irrigated C1	0.024	0.042	N
Pivot 1 Irrigated C2	0.016	0.070	0.073
Pivot 1 Irrigated C3	N	0.061	N
Pivot 1 Irrigated C4	0.02	0.053	0.10

Pivot 4

Table 27: Pivot 4, Electrochemical Stability Index

ESI	0-15cm	15-60cm	60-120cm
Pivot 4 Irrigated C1	0.027	N	N
Pivot 4 Irrigated C2	N	N	N
Pivot 4 Irrigated C3	0.027	0.069	N
Pivot 4 Irrigated C4	0.024	0.067	N

Pivot 5

Table 28: Pivot 5, Electrochemical Stability Index

ESI	0-10cm	10-20cm	40-50cm	60-70cm
AC-5-1	0.027	0.020	0.093	0.16
AC-5-2	0.013	0.0091	0.055	0.11
AC-5-3	0.053	0.020	0.078	0.18
AC-5-4	0.035	0.021	0.099	0.083
AC-5-5	0.017	0.012	0.031	0.060
AC-5-6	0.027	0.025	0.097	0.16
AC-5-7	0.025	0.032	0.22	0.18
AC-5-8	0.037	0.031	0.14	0.29
AC-5-9	0.020	0.015	0.054	0.053
AC-5-10	0.020	0.012	0.064	0.12
AC-5-11	0.022	0.015	0.094	0.15
AC-5-12	0.0532	0.022	0.0214	0.029
AC-5-13	0.036	0.033	0.129	0.25
AC-5-14	0.024	0.021	0.092	0.17
AC-5-15	0.022	0.0077	0.039	0.043
AC-5-16	0.027	0.018	0.10	0.17
AC-5-17	0.018	0.019	0.062	0.027
AC-5-18	0.034	0.012	0.035	0.035
AC-5-19	0.011	0.0080	0.026	0.047
AC-5-20	0.019	0.022	0.12	0.15

Pivot 12

Table 29: Pivot 12, Electrochemical Stability Index

ESI	0-10cm	10-20cm	40-50cm	60-70cm
AC-12-1	0.013429752	0.014728682	0.053115424	0.08373591
AC-12-2	0.017621145	0.014035088	0.058434399	0.079746835
AC-12-3	0.025225225	0.014953271	0.037715517	0.065789474
AC-12-4	0.02907916	0.022088353	0.081807082	0.096052632
AC-12-5	0.022880215	0.038505096	0.075931232	0.063342318
AC-12-6	0.022099448	0.012962963	0.038938053	0.056574924
AC-12-7	0.031613977		0.078250863	0.078494624
AC-12-8	0.02484472	0.018867925	0.039669421	0.045454545
AC-12-9	0.030520646	0.026511135	0.071590909	0.07780083
AC-12-10	0.029490617	0.023076923	0.087954111	0.165178571
AC-12-11	0.03003003	0.012030075	0.03343465	0.033472803
AC-12-12	0.018518519	0.023529412	0.056629834	0.08908046
AC-12-13	0.020325203	0.014953271	0.03	0.051851852
AC-12-14	0.032608696	0.02398524	0.039942939	
AC-12-15	0.024163569	0.013064133	0.035128806	0.059304703
AC-12-16	0.03868472	0.017699115	0.08440367	0.149681529
AC-12-17	0.016853933	0.010655738	0.078512397	0.100364964
AC-12-18	0.020061728	0.017117117	0.058064516	0.074324324
AC-12-19	0.018735363	0.014084507	0.03963964	0.047678795
AC-12-20	0.012149533	0.011011011	0.027522936	0.038309115

ESI was only measured on irrigated soils as all control soils had an ESP of less than 6% and would not be expected to disperse.

Much of the topsoil is well below the recommended level of 0.05 and hence is showing dispersion.

ESI is calculated when ESP % was above 6 for all samples for Pivots 5 and 12 which were graphed against the respective dispersion (Loveday and Pyle) are shown in Figure 45. Dispersion can become evident when ESI is below 0.05.

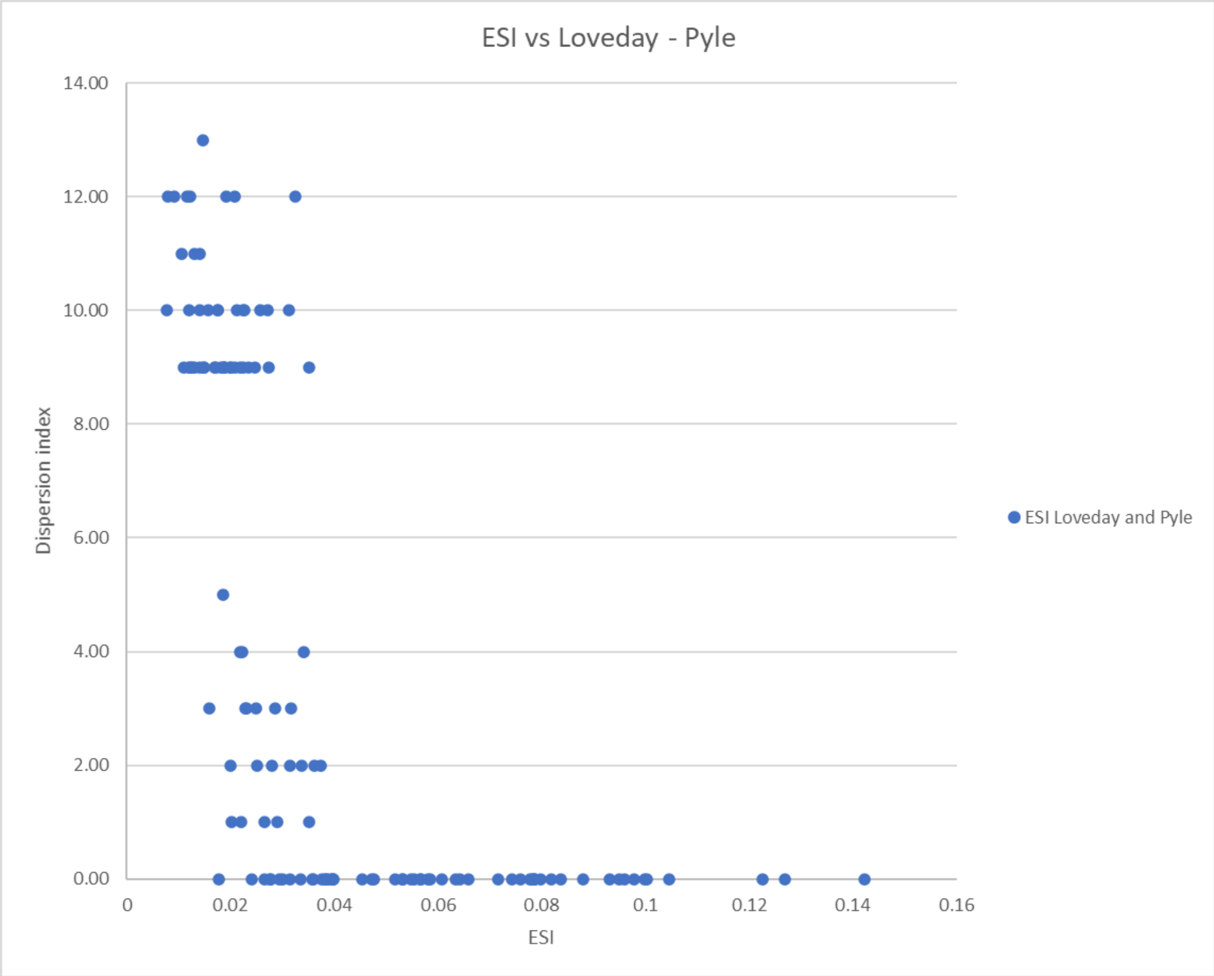


Figure 45: ESI graphed against dispersion (Loveday-Pyle) when ESP above 6

For interest, the ASWAT dispersion test was also performed on the cores. The graph of the ESI level vs the ASWAT dispersion is shown in Figure 46.

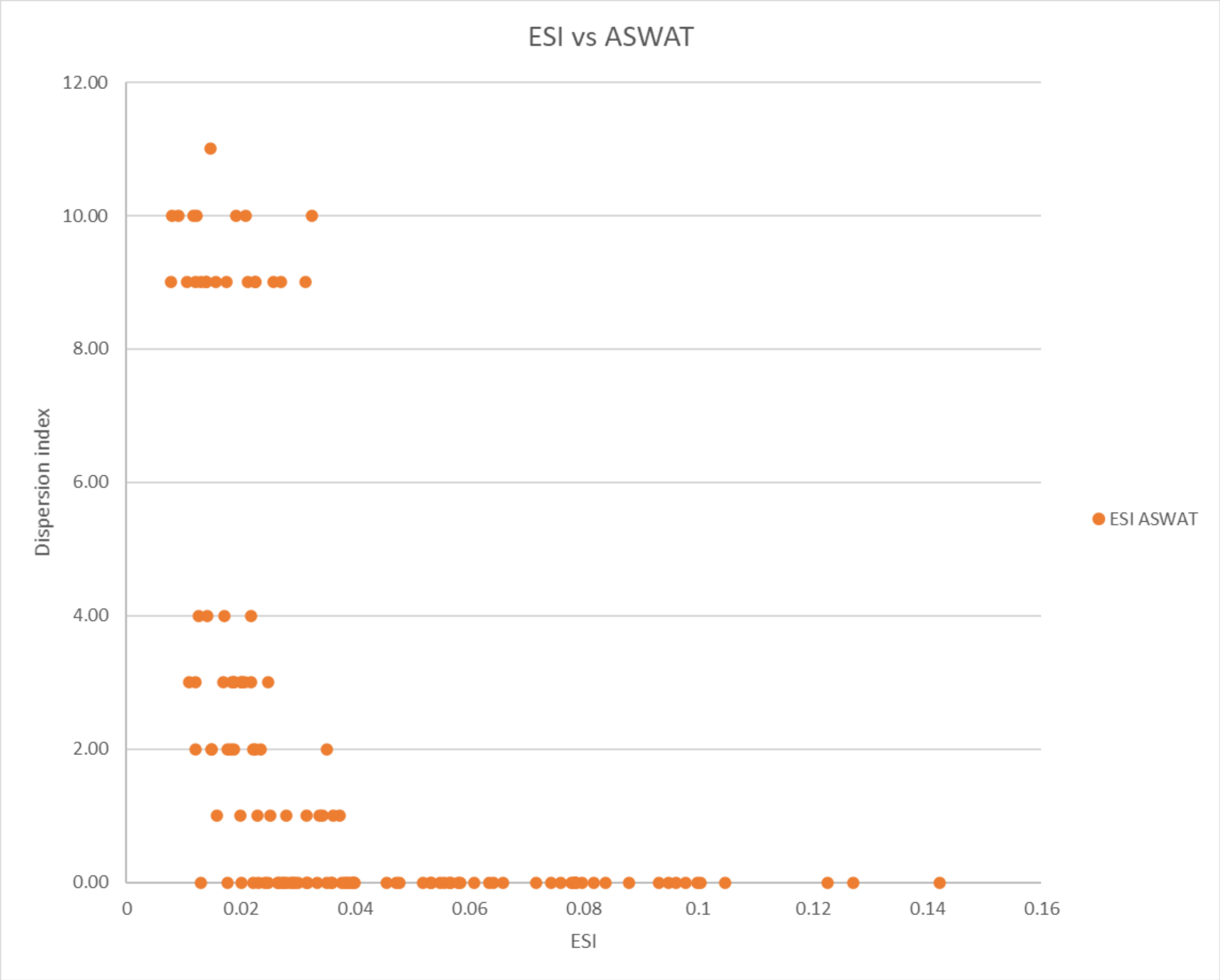


Figure 46: ESI graphed against dispersion (ASWAT) when ESP above 6

Similar trends can be seen for dispersion determined by the ASWAT method and ESI below 0.05

The tests show no soils have dispersed if the ESI result is above 0.05.

5.6.6 THRESHOLD ELECTROLYTE CONCENTRATION

These analyses were to take place at the USQ laboratory in August. Unfortunately, due to border closures access to the lab was not permitted.

It is regrettable this study could not be completed on the soils.

5.6.7 RESULTS OF PHYSICAL LAB TESTS

Results were assessed with the assistance of “Interpreting soil tests results” (Hazelton & Murphy, 2007).(Appendix G)

Table 30: Pivot 1 irrigated results

Test Parameter	Units	Pivot 1 Irrigated				
		0-15cm	15-50cm	50-100cm	100-130cm	130-150cm
Saturated Hydraulic Conductivity	mm/hr	67.4	59.1	470	383	387
Porosity Total	%	50.9	48.7	54.0	54.2	49.6
Porosity Capillary	%	39.2	42.7	39.7	40.4	39.3
Porosity Air Filled	%	11.7	5.9	14.4	13.8	10.3
Particle Density	g/cm^3	2.24	2.34	2.39	2.40	2.38
Water Retention	%	35.6	35.6	36.1	36.8	32.8
Moisture Content (Oven Dry)	%	55.4	55.3	56.4	58.1	48.7
Bulk Density	g/cm^3	1.1	1.2	1.1	1.1	1.2
Texture	Class	SC	MC	HC	HC	HC
Emerson Aggregate Test	Number	3b	3b	4	4	4
Gravel >2.0mm	%	<0.1	<0.1	0.2	3.0	5.6
Coarse Sand 0.2-2.0mm	%	38.2	6.1	7.7	8.3	13.0
Fine Sand 0.02-0.2mm	%	30.5	31.8	19.4	14.8	14.8
Silt 0.002-0.02mm	%	14.4	14.4	5.7	1.6	1.4
Clay <0.002mm	%	16.9	47.6	67.1	72.3	65.2

The hydraulic conductivity and air-filled porosity are acceptable with this soil at Pivot 1 under irrigation which is a little surprising as in the field it looked worse than the irrigated pit on Pivot 4. This may be explained somewhat by the lower clay content in the topsoil. The Emerson tests are showing dispersion with this soil.

Table 31: Pivot 1 non irrigated results

Test Parameter	Units	Pivot 1 Non-Irrigated				
		0-15cm	10-25cm	25-90cm	0-15cm	130-150cm
Saturated Hydraulic Conductivity	mm/hr	200	189	193	6.43	13.5
Porosity Total	%	54.0	49.1	53.0	48.8	45.5
Porosity Capillary	%	43.0	44.1	41.7	43.6	38.0
Porosity Air Filled	%	10.9	5.0	11.3	5.3	7.5
Particle Density	g/cm^3	2.39	2.36	2.34	2.35	2.38
Water Retention	%	39.1	36.7	37.9	36.3	29.2
Moisture Content (Oven Dry)	%	64.2	58.1	61.0	57.0	41.3
Bulk Density	g/cm^3	1.1	1.2	1.1	1.2	1.3
Texture	Class	LMC	LMC	LMC	LMC	LC
Emerson Aggregate Test	Number	5	5	5	4	4
Gravel >2.0mm	%	0.2	0.6	0.3	10.8	0.1
Coarse Sand 0.2-2.0mm	%	12.4	13.0	21.4	20.6	11.8
Fine Sand 0.02-0.2mm	%	28.5	28.8	23.7	21.4	28.5
Silt 0.002-0.02mm	%	15.6	13.4	12.7	5.7	22.2

Clay <0.002mm	%	43.4	44.3	41.8	41.5	37.4

Table 31 shows even with high clay content the hydraulic conductivity through the profile in the non-irrigated area of Pivot 1 is very high with no dispersion evident. The air-filled porosity is at good levels for cropping. The non-irrigated Pivot 1contained a genuinely nice soil to see exposed with a fresh smell, organic texture, and dark colours all very pleasing to the senses. The healthy condition of this soil displayed the recuperative potential of black vertosol soil, if not continually cultivated.

Pivot 4

Physical test results for the non-irrigated area of Pivot 4 are shown in Table 32.

Table 32: Physical test results for irrigated Pivot 4

Test Parameter	Units	Pivot 4 Irrigated				
		0-10cm	10-70cm	70-100cm	100-120cm	120-150cm
Saturated Hydraulic Conductivity	mm/hr	0.41	258	278	22.8	52.4
Porosity Total	%	39.9	49.6	51.8	47.0	52.8
Porosity Capillary	%	35.1	42.2	40.3	35.9	36.3
Porosity Air Filled	%	4.8	7.4	11.5	11.1	16.5
Particle Density	g/cm^3	2.16	2.18	2.28	2.45	2.33
Calcium Carbonate	%	-	-	-	-	-
Water Retention	%	27.0	38.4	36.6	27.6	33.0
Moisture Content (Oven Dry)	%	36.4	62.3	36.6	38.2	33.0
Bulk Density	g/cm^3	1.3	1.1	1.1	1.3	1.1
Total Calcium	mg/kg	-	-	-	-	-
Total Sulphate	mg/kg	-	-	-	-	-
Texture	Class	LC	LC	HC	LC	SCL
Emerson Aggregate Test	Number	3b	6	4	4	4
Gravel >2.0mm	%	0.3	<0.1	1.0	13.1	11.6
Coarse Sand 0.2-2.0mm	%	23.2	25.5	9.3	19.2	17.5
Fine Sand 0.02-0.2mm	%	25.4	27.3	18.5	25.9	27.9
Silt 0.002-0.02mm	%	14.3	12.3	3.7	8.3	14.4
Clay <0.002mm	%	36.8	34.9	67.6	33.5	28.6

Table 32 also shows very low hydraulic conductivity in the topsoil and a very low air-filled porosity. Most plants will cease to grow when the air porosity falls below 10% (Hazelton & Murphy, 2007). The Emerson tests also shows extremely high dispersibility in the topsoil. The high bulk density result of 1.3 may be as a result of compaction.

Table 33: Physical test results for non-irrigated Pivot 4

Test Parameter	Units	Pivot 4 Non-Irrigated				
		0-20cm	20-70cm	70-100cm	100-130cm	130-170cm
Saturated Hydraulic Conductivity	mm/hr	522	19.0	170	186	8.21
Porosity Total	%	51.7	52.0	48.9	48.0	43.3
Porosity Capillary	%	43.0	43.6	41.6	34.0	35.3
Porosity Air Filled	%	8.6	8.4	7.3	14.4	8.0
Particle Density	g/cm^3	2.28	2.50	2.15	2.50	2.47
Calcium Carbonate	%	-	-	-	-	52.0
Water Retention	%	39.1	19.0	37.8	26.2	25.2
Moisture Content (Oven Dry)	%	64.3	57.0	60.7	35.4	33.7
Bulk Density	g/cm^3	1.1	1.2	1.1	1.3	1.4
Total Calcium	mg/kg	-	-	-	-	207742
Total Sulphate	mg/kg	-	-	-	-	1366
Texture	Class	LC	LMC	HC	SL	SCL
Emerson Aggregate Test	Number	5	5	4	4	4
Gravel >2.0mm	%	0.5	0.2	0.8	27.0	4.2
Coarse Sand 0.2-2.0mm	%	23.4	23.0	14.2	37.7	6.8
Fine Sand 0.02-0.2mm	%	25.8	22.8	18.4	15.1	26.5
Silt 0.002-0.02mm	%	13.7	10.7	7.9	1.2	42.8
Clay <0.002mm	%	36.6	43.3	58.7	19.1	19.8

Table 33 shows that air filled porosity is better outside the irrigated pivot. Hydraulic conductivity is good.

Bulk density at good levels.

The results for Pivot 1 and 4 show the effluent application is having a negative impact on the spatial constraints.

Both pivots show a large difference in chemical and physical results in irrigated and non-irrigated areas. The irrigated areas are showing signs of more dispersion, lower hydraulic conductivity, and more compaction compared to the control.

Encouraging signs of rejuvenation are present on Pivot 1 likely attributable to a 12-month fallow due to yields decreasing over past years. The characteristics of the soil may have improved slightly as the salts are moving down through the profile with no crop to absorb all the moisture. Both pivots in the non-irrigated area nor cultivated are in extremely good condition. The non-irrigated soils at the TERF demonstrate the recuperative ability of a black vertosol soil and is encouraging that with different management practices positive outcomes could result.

5.7 OVERVIEW OF RESULTS

All irrigated soils are showing disturbing levels of key constraints. The spatial levels identified in Pivots 5 and 12 would be causing serious issues with crop health. There is high confidence that the effluent is causing these increased levels as there is no concomitant rise in the same characteristics in all areas sampled outside the reach of the irrigation waters.

The effluent however is only classified as medium strength and the soils are good agricultural soils which in previous years before transformation to the reuse farm had won yield competitions for various cereal crops at the Tamworth show over many years.

Even though the dissolved solids content of the effluent is not extreme it still requires careful management of irrigation to minimise damage to the soils. Management should include deep, slow, and long irrigation with a leaching factor to flush salts through the soil profile (SESL Australia, 2020).

To understand how much effluent had been applied compared to what recommended a water balance was performed

Mean weekly estimates of potential reference crop evapotranspiration (ETo) at Tamworth were derived from the BOM for the study period. Runoff (R) is limited in the flat spray irrigated paddocks and is aimed to be effectively 0. Drainage (D) needs to be controlled with residence time in the soil required to facilitate nutrient uptake but some leaching is required to prevent salt accumulation in the root zone; the minimum leaching requirement can be calculated from the effluent salinity and the crop's tolerance. Finally, the change in soil moisture content (ΔS) varies significantly over days or weeks; however, over the longer term ΔS is a less important term for calculating the balance.

The rate of plant water use is controlled by a range of meteorological parameters (temperature, humidity, radiation, wind) and characteristics of the in-situ crop cover. Plant water use can be estimated in different ways and in this study measurements of the various controlling parameters were used as inputs to a meteorological formula (the Penman formula) to estimate the potential rate of evaporation (Smith & Hancock, 2018).

Soil salinity tolerance (ECe) for an expected yield reduction of less than 10% is 2.2 dS/m for Lucerne and 3.6 dS/m for forage oats (DPI 2016). The minimum leaching requirement (MLR) is based on the effluent salinity (ECw) of 1.09 dS/m and the equation:

$$MLR = \frac{ECw}{(7.5 \times ECe - ECw)}$$

(Biwas & Higginson, 1998)

The net irrigation required is the moisture deficit converted to actual irrigation based on 80% application efficiency for spray irrigation (Calder, 1976) and a MLR of 7 % for Lucerne and 4% for forage oats. The two factors are combined to result in an efficiency multiplier (EF) of approx. 1.34 and 1.30, respectively.

MLR is the amount of irrigation required to keep the soil salinity at the desired level for Lucerne. To find the total irrigation required crop transpiration requirements are multiplied by 1.34.

5.7.1 VOLUMES OF EFFLUENT

Records of effluent pumped by each pivot between January 2012 to December 2019 were provided by Tamworth Council (see Appendix D). The total volume of irrigation at the TERF ranged from 2,156 ML/year to 3741 ML/year which is equivalent to 8.5 ML/day, though to 10 ML/day. This equates to a yearly application rate over the irrigated area from 500mm to 600mm (see Table 34). This amount of irrigation transfer results in around 2,000 tonnes of salt spread on the farm each year.

Table 34: Monthly Pivot Volumes TERF

Month			Effluent Transfer Volume (ML/month)						
	2019	2018	2017	2016	2015	2014	2013	2012	Average
Jan	627	634	260	336	273	703	687	249	516
Feb	530	422	515	665	565	377	213	80	421
Mar	272	398	275	15	225	236	320	285	253
Apr	251	227	252	0	64	195	294	255	192
May	67	142	208	477	85	121	204	151	182
Jun	131	117	2	3	34	65	33	50	54
Jul	42	236	20	1	17	133	30	49	66
Aug	462	170	144	13	90	104	210	185	172
Sep	473	265	492	9	196	241	286	441	300
Oct	155	174	38	10	330	416	468	385	247
Nov	348	368	303	318	98	587	342	391	344
Dec	383	342	305	309	527	148	564	385	371
ML/yr.	3741	3497	2813	2156	2503	3327	3651	2908	3118
ML/day	10.2	9.6	7..7	5.9	6.9	9.1	10	8	8.5

5.7.2 PIVOT WATER APPLICATION

Tamworth Regional Council provided water volumes irrigated onto each pivot. The amount of water calculated for the irrigation of Lucene using the water balance equation was graphed against actual water used to determine the percentage of irrigation water required for Lucerne including the leaching fraction required. Table 35 shows the amount of irrigation effluent supplied as a percentage of the calculated total required (including leaching factor) as needed for each pivot to successfully grow Lucerne and maintain salts at an acceptable level in the long term.

Table 35: Percentage of effluent supplied of the total needed for each pivot

Pivot		2012	2013	2014	2015	2016	2017	2018	2019	Total
1	% Irrigation required	70.51	68.86	53.85	54.73	65.72	48.83	42.74	30.33	68.90
2	% Irrigation required	67.58	57.6	48.16	50.15	54.02	36.07	13.54	20.36	43.44
3	% Irrigation required	74.34	77.84	52.16	61.83	61.19	42.66	18.56	32.12	52.59
4	% Irrigation required	59.09	44.7	25.36	16.18	21.77	59.4	37.27	43.93	38.46
5	% Irrigation required	74.33	67.9	45.51	36.56	22.65	68.02	9.18	0	40.52
6	% Irrigation required	22.11	21.63	18.17	31.15	27.23	16.98	52.60	46.03	29.49
7	% Irrigation required	24.38	29.62	29.49	14.14	16.07	8.59	19.62	44.27	23.27
8	% Irrigation required	23.45	25.65	38.24	11.72	11.14	0.00	0.00	0.00	13.78
9	% Irrigation required	30.62	53.39	53.13	57.74	52.00	70.83	42.99	24.20	48.11
10	% Irrigation required	25.34	22.18	31.72	26.97	22.16	47.86	47.66	45.63	33.69
11	% Irrigation required	67.96	51.79	36.00	55.64	29.12	9.33	22.47	38.24	38.82
12	% Irrigation required	83.17	67.72	40.28	57.81	43.68	23.19	22.81	43.14	47.73
13	% Irrigation required	55.56	48.02	45.37	55.54	53.23	53.48	37.33	18.09	45.83

As can be seen from Table 35 the actual irrigation provided is well below the required level, with adequate leaching of the salts, for each pivot.

The scheme is expecting the soils to transfer exceptionally large amounts of salt. This makes the leaching fraction of the irrigation an extremely important feature of the effluent disposal. The above irrigation results indicate salts will be accumulating in the soil profile

If irrigation management is not applied all the soils may eventually be unable to grow agricultural crops.

CHAPTER 6 – DISCUSSION

During the investigation, the following was completed:

- soil types at the TERF were identified using the Australian Soil Classification,
- chemistry of the effluent applied over the previous 8 years and how this compares to Australian irrigation guidelines, and
- determination of the amount of effluent applied.

Observing the effects that the application of effluent has had on the various soil's constraints compared to the control areas, has resulted in a measurement of paired sites and is a space for time substitution which can be considered a short term chronosequence, with reference sites representing time zero on or before effluent application. The method of using paired sites has been widespread to compare sites of pastured lands to cultivated lands (Blank, Fosberg & Piñeiro et al., as cited in Banks, 2018).

The effluent at the TERF is causing negative changes to these soil attributes in all soils.

- Chloride level
- Electrical conductivity
- Exchangeable sodium percentage
- Dispersion
- Hydraulic conductivity
- Bulk density

All these attributes when at high levels will cause constraints to crop growth and damage to soil structure with all inherent problems that will cause.

There is some variability in the different soils classes in response to the effluent application but it is hard with data gathered at these levels of constraints to form strong arguments that one soil is handling the effluent better than another,

With climate change in the Tamworth region leading to less rainfall and hotter days the TERF irrigation will become even harder to manage.

The primary aim of the research was to investigate how the effect of filtering Tamworth's sewage effluent using the various soils' physical and chemical characteristics, can be affected by the application of sewage effluent. The findings of the research were reached by addressing the secondary aims and objectives and reporting on the effects with respect to water quality, climate and soil constraints and by providing recommendations for spatial management into the future.

CHAPTER 7 – MANAGEMENT

Irrigation

The current farm operation could be improved and made more sustainable if the irrigation scheduling was modified to allow maximum crop uptake of water as well as applying additional water for leaching of salts on a regular basis. An alternative irrigation scheduling trial should be undertaken on some of the pivots. This trial could be used to assess whether changes to irrigation scheduling will facilitate the movement of salts beyond the upper subsoil, through longer irrigation run times. Pivots 5 and 12 would be suitable pivots for this trial.

Increasing the irrigation scheduling may require modifications to pivot tyre tracks to prevent bogging due to the inherent "stickiness" of wetted cracking clay soils. Gravel application in certain areas may be required.

Supplemental irrigation with river water

The possibility of flushing the soil profile with river water. This could be undertaken by periodically saturating the soil with river water, which contains a lower salt content, or by shandying the effluent with river water.

Amelioration actions are recommended urgently to prevent further degradation of soil health. Amelioration using gypsum often takes time to work and infiltrate the soil profile to the upper and lower sub-soil. Applications of gypsum for salinity, sodicity and chloride amelioration are required for Pivots 5 and 12 and should be prioritised.

Recommended gypsum applications are shown in the following maps contained in Figures 47 and 48.

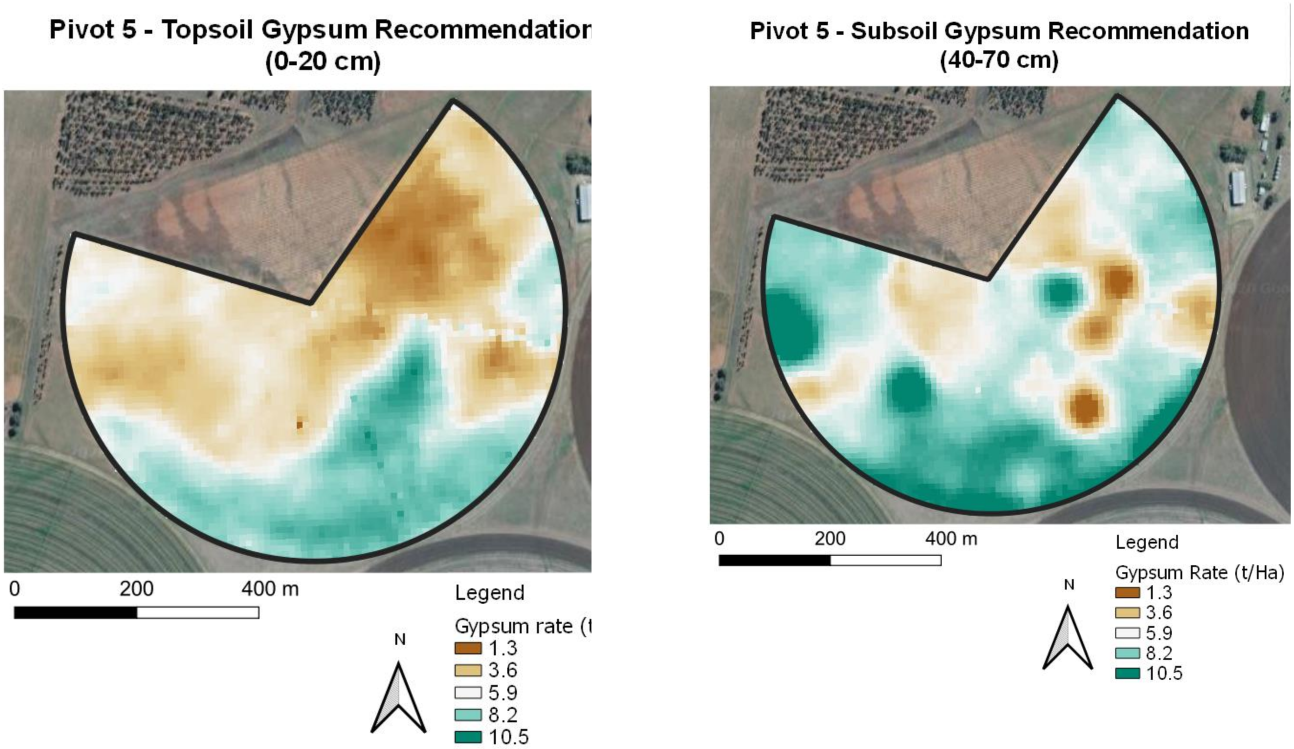


Figure 47: Pivot 5, gypsum recommendations

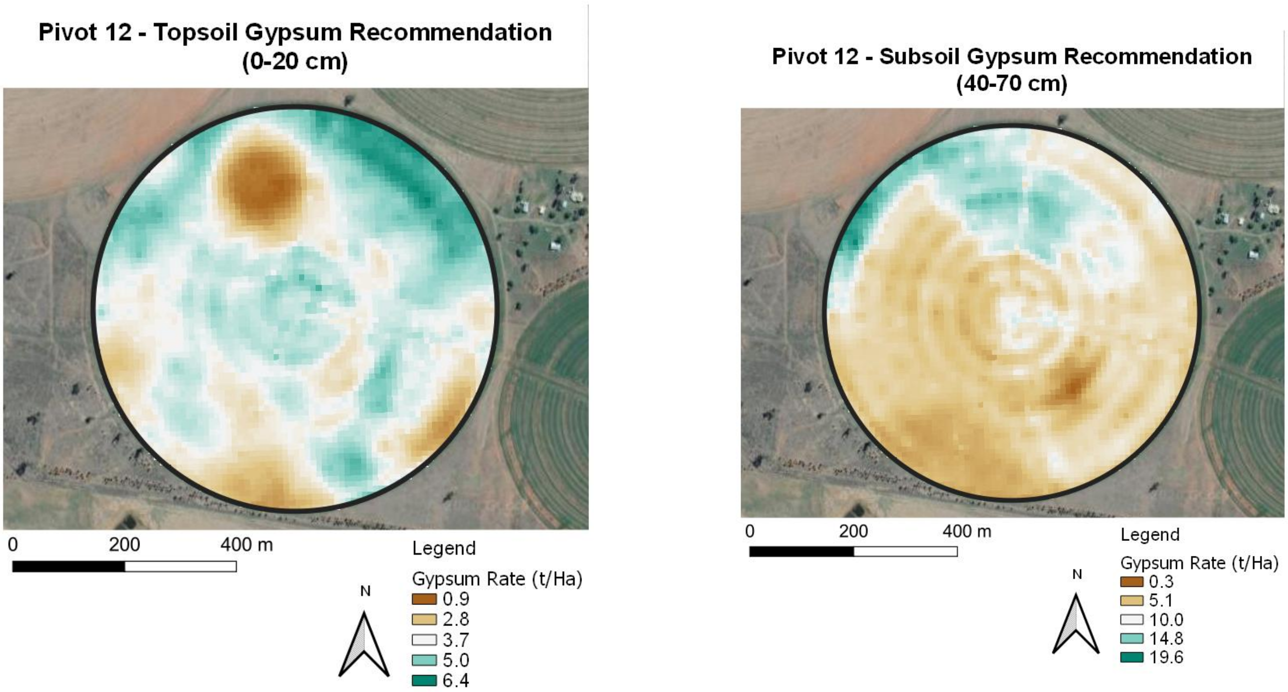


Figure 48: Pivot 12, gypsum recommendations

The previous spatial surveys have shown the value of completing truthing data for the whole farm. The rest of the original EM and Gamma survey should be truthed with results used to set new baseline and produce pivot management tables similar to the following.

Oliver et al. (2019) have used the combination of EM and gamma surveys to map six soil types in the Western Australia grain belt and then provided constraints and management information into an easy to read table for farmers. Easy to understand targeted information would assist in ensuring each different soil throughout a paddock could be managed using the most efficient method possible. The simple map system produced for Western Australia grain belt farmers is shown in Table 36.

Table 36: Typical WA soil types with soil constraints and management practices (Oliver et al., 2019)

Soil type	Soil description	Constraint	Management
Sands & Sandy Earth	Sandy texture throughout Sand grading to loam	Low pH, compaction, non-wetting, nutrient leaching	Liming, ripping, mouldboard, non-wetting agents, nutrient timing
Gravels	Ironstone gravel (>20%) within 15cm from surface, greater than 20cm thick.	Nutrient leaching, poor water holding capacity, non-wetting	Manage differently and care with deep ripping, nutrient timing
Duplex soils *	Sandy or loamy surface texture. Abrupt change to sandy clay loam or clay.	Low pH, compaction Shallow or deep duplex*, depth to duplex	Liming, ripping, spading, mouldboard, delving (depth dependant)
Gravelly duplex	Gravel over rock or clay at < 80cm	Low pH, Non-wetting Clay subsoil may have salinity or sodicity	Liming, nutrients Gypsum, OM amendment Care with management
Clay & Shallow loamy duplex	Loamy or clayey surface texture and clayey subsoil Loamy surface texture, abrupt change to clayey subsoil	Salinity, Sodicity, Boron	Gypsum, OM amendments, slotting, water harvesting

7.1 OTHER ACTIONS

- Reducing effluent salt volume (currently around 2,500 tonnes/year). The levels of salts may be able to be decreased through trade waste salt discharge limits for the city's large abattoirs. Alternative chemicals other than ferrous chloride for phosphorus removal at the wastewater plant could be sourced to reduce chloride levels.

- Council to nominate crops to be grown including deep-rooted perennial pastures, cotton, lucerne & various grains including barley, wheat & corn. Also, dictate specific crop rotation sequencing for each pivot to address known soil problems.

- Council to allocate effluent for irrigation leaching to drive salt down deeper into the soil profile where it does not have a negative impact on crop yield and soil properties.

- Council pays for up to 20% of the effluent to be applied if this effluent is required to achieve TERF sustainability KPIs.

7.2 PROPOSED CROPPING REGIME

- Two cropping regimes were proposed and developed by an agronomy consultant which considered local conditions, effluent quality, and soil characteristics.

- The cropping regime chosen for each pivot are specific to each pivot area – pivots have individual soil types, crop history and watering constraints.

- Current approvals for the TERF include two additional pivots with irrigation areas of 85 hectares. The two additional pivots could be built to allowed others to be fallowed when required

The shape and location of the two new pivots are shown below in Figure 50.

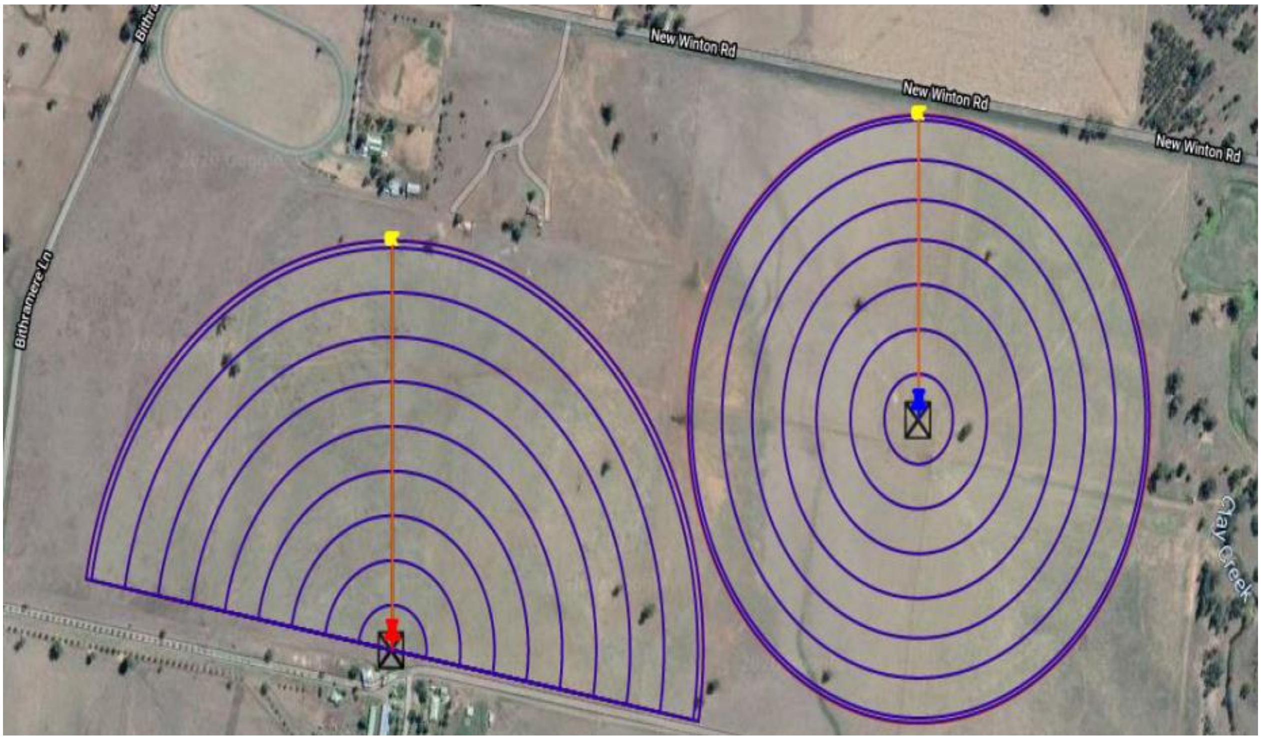


Figure 49: Shape and location of two additional pivots for the TERF

The location of the additional pivots on the reuse farm is shown in Figure 50.

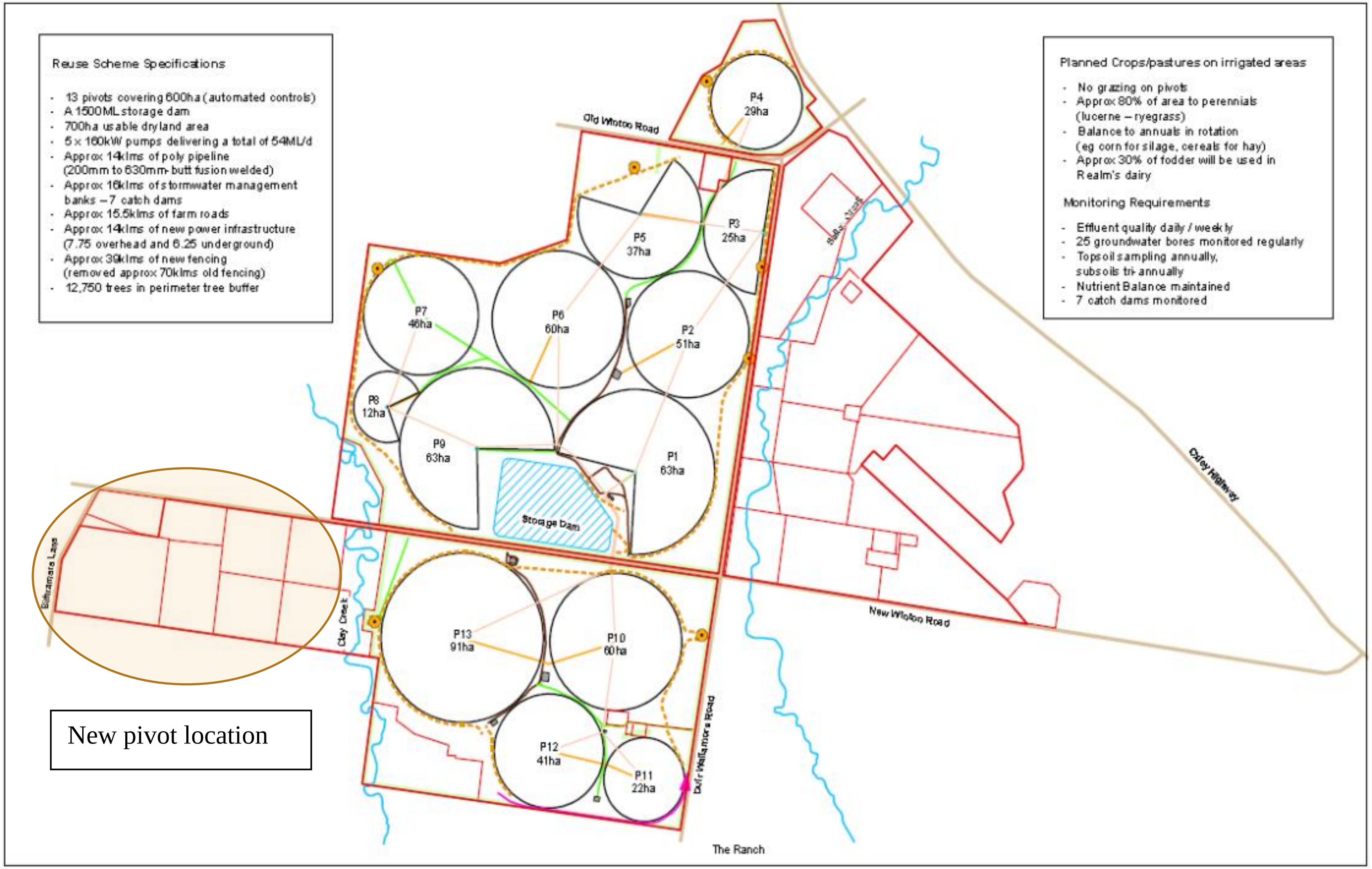


Figure 50: Shape outline of the additional pivot location at the TERF

Figures 51 and 52 show cropping Option 1 and Option 2, respectively.

Option 1 - Lucerne/Grain/Subtropical Grass Rotation

			Year 0		YEAR 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
		Area	2020-21	2021	2021-22	2022	2022-23	2023	2023-24	2024	2024-25	2025	2025-26	2026	2026-27	2027	2027-28	2028	2028-29	2029	2029-30	2030	2030-31	2031
Fields	RISK	ha	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Pivot 1	HIGH	65	Lucerne	Fallow	Fallow	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Canola	Fallow	Barley	Fallow	Fallow	Lucerne	Lucerne	Lucerne	Lucerne
Pivot 2	MED	53	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Wheat	Fallow	Fallow	Corn	Wheat	Fallow	Fallow	Corn	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass
Pivot 3	HIGH	25	Lucerne	Lucerne	Fallow	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Barley	Fallow	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Barley
Pivot 4	LOW	29	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Barley	Fallow	Fallow	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow
Pivot 5	HIGH	37	Lucerne	Lucerne	Fallow	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Wheat	Fallow	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne
Pivot 6	MED/H	59	Lucerne	Lucerne	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Fallow	Fallow	Barley	Fallow	Wheat	Fallow	Barley	ST Grass	ST Grass	ST Grass	ST Grass
Pivot 7	MED	46	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Fallow	Fallow	Canola	ST Grass	ST Grass	ST Grass	ST Grass
Pivot 8	LOW	12	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Wheat	Fallow	Fallow	Corn	Wheat	Fallow	Fallow	Corn	Fallow	Fallow	Fallow	Fallow	Barley	Fallow	Lucerne
Pivot 9	HIGH	66	Lucerne	Lucerne	Fallow	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne
Pivot 10	MED/H	60	Lucerne	Lucerne	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Wheat	Fallow	Fallow	Corn	Barley	Fallow	Wheat	Fallow	Canola	Fallow	Barley	ST Grass	ST Grass
Pivot 11	MED	22	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Barley	Fallow	Fallow	Fallow	Wheat	Fallow	Fallow
Pivot 12	HIGH	41	Lucerne	Lucerne	Fallow	Wheat	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Fallow	Barley
Pivot 13	LOW	92	Lucerne	Fallow	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Wheat	Fallow	Canola	Fallow	Wheat	Fallow	Canola	Fallow	Wheat	Fallow	Canola	Fallow	Barley
Pivot 14		43	Native	Native	Fallow	Wheat	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Fallow	Fallow	Canola	Fallow	Fallow	Fallow	Fallow	Fallow	Fallow
Pivot 15		40	Native	Native	Fallow	Wheat	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Fallow	Fallow	Canola	Fallow	Fallow	Fallow	Fallow	Fallow	Fallow

Figure 51: Alternative cropping option 1

Option 2 - Cotton/Grain/Subtropical Grass Rotation

			Year 0		YEAR 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
		Area	2020-21	2021	2021-22	2022	2022-23	2023	2023-24	2024	2024-25	2025	2025-26	2026	2026-27	2027	2027-28	2028	2028-29	2029	2029-30	2030	2030-31	2031
Fields	RISK	ha	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Pivot 1	HIGH	65	Lucerne	Fallow	Fallow	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Fallow	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Fallow	Wheat	Fallow	Fallow
Pivot 2	MED	53	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Wheat	Fallow	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow
Pivot 3	HIGH	25	Lucerne	Lucerne	Fallow	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Fallow	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Corn	Fallow	Cotton	Barley
Pivot 4	LOW	29	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Fallow	Cotton	Barley	Fallow	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Fallow
Pivot 5	HIGH	37	Lucerne	Lucerne	Fallow	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Fallow	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Fallow	Wheat	Fallow	Fallow
Pivot 6	MED/H	59	Lucerne	Lucerne	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Wheat	Fallow	Barley	Fallow	Canola	Fallow	Wheat	ST Grass	ST Grass	ST Grass	ST Grass
Pivot 7	MED	46	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Fallow
Pivot 8	LOW	12	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Fallow	Wheat	Fallow	Fallow	Corn	Wheat	Fallow	Fallow	Corn	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Fallow
Pivot 9	HIGH	66	Lucerne	Lucerne	Fallow	Fallow	Cotton	Fallow	Corn	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Barley
Pivot 10	MED/H	60	Lucerne	Lucerne	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Cotton	Wheat	Fallow	Fallow	Cotton	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Fallow	Barley
Pivot 11	MED	22	Lucerne	Lucerne	Lucerne	Lucerne	Lucerne	Fallow	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Corn	Barley	Fallow	Wheat	Fallow	Canola	Fallow	Barley
Pivot 12	HIGH	41	Lucerne	Lucerne	Fallow	Wheat	Fallow	Fallow	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Fallow	Barley	Fallow	Wheat	Fallow	Fallow	Cotton	Barley
Pivot 13	LOW	92	Lucerne	Fallow	Fallow	Canola	Fallow	Wheat	Fallow	Barley	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	ST Grass	Fallow	Fallow	Wheat	Fallow	Canola	Fallow	Barley
Pivot 14		43	Native	Native	Fallow	Wheat	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Cotton	Fallow	Corn	Fallow	Cotton	Fallow	Corn	Fallow	Fallow	Barley
Pivot 15		40	Native	Native	Fallow	Wheat	Fallow	Barley	Fallow	Canola	Fallow	Wheat	Fallow	Fallow	Cotton	Fallow	Corn	Fallow	Fallow	Wheat	Fallow	Canola	Fallow	Fallow

Figure 52: Alternative cropping option 2

CHAPTER 8 – CONCLUSIONS

The TERF has been processing the treated sewage effluent from Tamworth for 8 years. This sewage effluent is classified as medium strength due to dissolved salts. Owing to the salt content of the effluent it is important a leaching fraction is applied when irrigating to ensure salts are pushed through the soil profile out of the crop growing zone.

The appropriate leaching fraction has not been applied leading to the build-up of salts in the irrigated areas. There is strong confidence the effluent is causing the rise in salinity as all soil testing spatially and chemically performed in the non-irrigated areas is not showing the same concomitant rise in salt levels.

The spatial effects of increased salinity (EC) and sodicity (ESP) are increased dispersion reduced hydraulic conductivity and increased bulk density. The effect of all of these parameters reduces the soils' ability to grow plants. Increasing salinity and sodicity are not a crisis scenario but rather produce incremental rather than event-based effects and are often not noticed or acted upon until impacts are large and perhaps irreversible (DWR, 2016).

The black vertosol soil has been able to transfer and process the effluent without as much spatial and chemical changes as the lighter soils; however, on closer investigation – the spatial and chemical properties of the soil are also showing large effects.

There is the potential for recovery for the soils as the irrigated soils that have been fallowed or soils which are outside the irrigated areas are showing recuperative effects from traditional dryland farming which gives confidence the soils can 'bounce' back. Without irrigation management changes however the upward trends in characteristics of concern will continue with the soil potentially becoming so sodic it will be unable to support cropping.

The use of remediated water in large effluent irrigation schemes must be considered very carefully. Councils main objective is to dispose of effluent, utilising primary production however finding the balance between disposing of salt and nutrient loads and running a profitable farm has proven difficult.

Even with reasonable quality water, the best soils will suffer if careful irrigation management and leaching fractions are not employed.

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APPENDICES

APPENDIX A

ENG4111/4112 Research Project
Project Specification

For: Adrian Cameron

Title: Effects of sewage effluent on soil constraints in the Tamworth Region of New South Wales

Major: Environmental Engineering

Supervisor: Professor John McLean Bennett

Technical Advisor Doctor Robert Banks

Sponsorship: Tamworth Regional Council

Enrolment: ENG4111 – EXT S1, 2020
ENG4112 – EXT S2, 2020

Project Aim: Report on the effects of effluent application on soils in the Tamworth Region, with respect to water quality, climate and soil constraints. Provide recommendations for spatial management into the future

Programme: Version 1, March 2020

1. Review relevant literature.
2. Analyse chemistry data of the effluent applied over the last 8 years with respect to Australian irrigation guidelines and potential for irrigation related development of soil constraints.
3. Determine the amount of effluent that has been applied spatially for the various pivots and relate this to landscape mass balance.
4. Meet with farm operators and determine site history, including management (e.g. machinery adherence to controlled traffic, conservation tillage etc.), irrigation (quality and quantity), cropping (yield maps desirable), and any amendment (e.g. gypsum, lime, dolomite application).
5. Obtain benchmark data for initial site characterization and:
   a. Develop continuous map of the Australian soil classifications for the site.
   b. Develop initial soil constraint continuous maps for the site.
6. Using the available environmental spatial covariates, prepare a sampling strategy based upon irrigated and unirrigated land.
7. Sample collection against strategy
8. Analysis of samples for an agreed set of soil characteristics (limited by logistics and resources, but dependent on initial mapping, i.e. unknown at this point).
9. Synthesis of benchmark and current soil information to determine spatial change based upon irrigation.
10. Report on the effects of effluent application on the soils, including consideration of recommendations for spatial management into the future, with respect to water quality, climate, and soil constraints.

APPENDIX B – RISK ASSESSMENT

Risks for the project include injury risks but also risks for the project itself.
Personal risk was assessed using the USQ Risk Matrix shown below:

Eg 1. Enter Consequence

Eg 2. Enter Probability

Eg 3. Find Action

Probability	Consequence				
	Insignificant No Injury 0-$5K	Minor First Aid $5K-$50K	Moderate Med Treatment $50K-$100K	Major Serious Injuries $100K-$250K	Catastrophic Death More than $250K
Almost Certain 1 in 2	M	H	E	E	E
Likely 1 in 100	M	H	H	E	E
Possible 1 in 1000	L	M	H	H	H
Unlikely 1 in 10 000	L	L	M	M	M
Rare 1 in 1 000 000	L	L	L	L	L
Recommended Action Guide					
E=Extreme Risk – Task ***MUST NOT*** proceed					
H=High Risk – Special Procedures Required (See USQSafe)					
M=Moderate Risk – Risk Management Plan/Work Method Statement Required					
L=Low Risk – Use Routine Procedures					

Risk Matrix University of Southern Queensland (2019)

The personal risk was determined and the methods of reducing the risk were also determined and are shown in Table B1 below:

Table B1: Personal Risk Assessment

Project Phase	Risk	Risk Level	Control	Residual risk
Collection of samples in the field	Biological agents in the effluent	Moderate	Wear correct PPE when working around sewage effluent. This includes gloves lab coat safety boots and glasses.	Low
Collection of samples in the field	Sun exposure	Moderate	Wear correct PPE long sleeved shirts and trousers, sunscreen and hat. Work outside the hottest part of the day schedule sampling for cooler parts of the year.	Low
Collection of samples working in soil pits working in the lab	slips trips and falls	Moderate	Ensure work area is clear. All items are put away. Choose level areas.	Low
Collection of soils using coring machine	Struck by machinery	Moderate	Ensure experienced operator using machine. Keep all guards in place.	Low
Lab testing	Burns from oven	Moderate	Wear mitts when removing samples. Allow time to cool.	Low
Working on dissertation	Poor posture back strain	Moderate	Take regular breaks. Sit with correct posture. Stretch when required.	Low

Assessing the risks – the main actions are to take time and complete safely – wear all PPE and follow the expert’s advice. There can also be risks to the actual project. Many tasks will need to be concluded for the project to be completed successfully (see Table 2 below). In the Table the risks were assessed with possible controls. The project timeline is an important guide to follow to ensure the project is completed on time.

Table B2: Risks to the project

Project Phase	Risk	Risk Level	Control	Residual risk
Allocation of project and supervisor	No allocation of project delayed by a year	Moderate	Talk to supervisor – make sure project proposal is accepted and signed off. Start the process.	Low
Literature review process	Incomplete due to insufficient literature review to complete the study	Moderate	Start the review over the summer months to have a head start – confirm with supervisor planning is on target.	Low
Collection and testing of samples	Not completed and not organised	Moderate	Arrange bookings early – visit the site and complete investigations. Ensure the timeline is followed.	Low
Reporting of findings	Task incomplete – running out of time	Moderate	Persevere with project plan – make sure enough time is allocated.	Low
Writing up and presenting results	Unfinished – not allocating enough time	Moderate	Keep to project plan – take leave from work if necessary, to complete the task.	Low
During project	Unforeseen major situation	Moderate	Incidents can happen – inform supervisor and examiner. Complete what you can.	Low

Assessing the risks now at the dissertation stage we have certainly experienced a major unforeseen situation with COVID 19 pandemic throughout the year. Hence the following COVIC-19 Plan:

COVID -19 - Pre-screen induction process

Before entry to the reuse farm site for sampling this document is to be reviewed and signed by each team member.

Method of contact

When entry is required to site, phone contact should be used to provide details of time of arrival, sites to be accessed and work to be completed. Only if absolutely necessary should any farm staff member be required to be on location while the sampling is completed – social distancing rules must be adhered to at all times.

Social distancing

Social distancing means a minimum distance of 2m **MUST** be maintained between all sampling operators. Do not share equipment or shake hands or provide any paperwork for signing-in person. No sharing of food/limited food preparation at work.

Site access

Access to site should only be for the purpose of conducting the task required. Under no circumstances shall the sampling team be provided access to site offices, lunchrooms, or amenities. Alternative arrangements for amenities must be organised before commencement of tasks if required.

Hygiene methods

Follow all hygiene measures in terms of washing hands and using tissues to reduce the chance of spreading the virus (refer to Australian Government advice document attached).

Hand sanitiser and/or water made available onsite. Sanitisation to be utilised on arrival at the site and intermittently over the course of the workday.

Disinfect after tasks

After tasks have been completed, the samplers shall disinfect any equipment (handles, valves, doors etc) that may have been contacted using appropriate disinfectant. Work Vehicles to be cleaned and disinfected as a minimum daily procedure at the end of work.

Pre-Screen Checklist for workplace inductions regarding COVID-19

Name: ________________________________ **Contact Number:_________________**

Company: ________________________ **Date: ___________________________**

1. **Have you recently returned from overseas travel in the last 14 days?**

Yes ☐ (*Cannot be on site. Required to self-Isolate for 14 days from date of arrival into Australia in accordance with Government Requirements)*

No ☐ (Proceed to Question 2)

2. **Have you been in contact with a person confirmed sick with COVID-19?**

Yes ☐ (*Cannot be on site. Required to self-Isolate in accordance with Government Requirements)*

No ☐ (Proceed to Question 3)

3. **Have you had any of the following symptoms during the past 72 hrs: Fever, cough, runny nose, shortness of breath and/or other flu like symptoms?**

Yes ☐ (*Cannot attend site. All people attending site must not have symptoms of COVID -19*).

No ☐ Pre-screen *complete, sampling may proceed in accordance with site rules established for managing COVID-19.*

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)***

(Discharge to Effluent Re-Use Farm)

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22□12□2□11	1121□3		□□□	□2	□□□	□2	□2	□□□	2□□3	□□□□	□2	2□	□□	□□	2	1□1□	1□2	□□□3
2□□12□2□11	1121□□		□□□	2	□□3	2	2	□□□	2□□2	□1□	□2	3□	□□	□□	2	1□1□	13□	□□□2
3□□1□2□12	12□□□□		□□□	2	□3□	□2	□2	□	1□□□	□11	□2	32	□□	□□	2	1□1□	13□	□□□1
11□□1□2□12	12□□□3		□□□	□2	□□□	2	□2	3□□	1□□□	□2□	□2	3□	□□	□□	3	1□13	132	□□□□
1□□□1□2□12	12□□□□		□□□	2	□2□	2	□2	□□□	1□□□	□1□	2	32	□□	□□	□	1□1□	13□	□□□1
2□□□1□2□12	12□133		□□□	□	11□□	2	□2	□3	1□□□	□1□	□2	32	□□	□□	11	1□13	131	□□□2
31□□1□2□12	12□1□□		□□□	2	□□□	2	□2	□□□	1□□□	□1□	1	32	□□	□□	□	1□□□	133	□□□1
□□□2□2□12	12□21□		□3	□2	□□□	2	□2	□1	1□□1	□□□□	□2	2□	□□	□□	1	1□1□	13□	□□□3
1□□□2□2□12	12□2□□		□3	1	□□3	3	2	□□□	2	□2	1□	2□	□□	□□	□	1□□□	133	□□□1
22□□2□2□12	12□3□□		□□□	3	□23	3	3	□3	1□□2	□1□	□2	32	□□	□□	□	1□□□	132	□□□3
2□□□2□2□12	12□3□□		□□□	2	□33	2	2	□2	1□□□	□1	□2	2□	□□	□□	□	1□11	12□	□□□3
□□□3□2□12	12□3□□		□□□	2	□□□	2	2	□2	1□□1	□12	□1	3□	□□	□□	13	1□11	13□	□□□□
13□3□2□12	12□□□□		□□□	2	□3□	2	2	□□□	1□□	□1□	□2	2□	□□	□□	13	1□13	13□	□□□3
2□□□3□2□12	12□□□□		□□□	3	□□□	□	3	□□□2	1□□□	□□□□	2	2□	□□	□□	1□	1□13	13□	□□□3
2□□3□2□12	12□□□□		□□□	□	□33	3	3	□3	1□□□	□1□	□	3□	□□	□□	1□	1□11	1□1	□□□□
□□□□2□12	12□□□□		□□□	□	□□□	□	2	□2	1□□□	□11	□1	2□	□□	□□	21	1□□□	13□	□□□□
1□□□□2□12	12□□□□		□1	11□□	□□□	□	□	□□12	1□33	□□□□	2	3□	□□	□□	1□	1□□□	13□	□□□□
1□□□□2□12	12□□□□		□□□	□	□□2	□	2	3□□	1□21	□11	□2	3□	□□	□□	1□	1□□□	13□	□□□□
2□□□□2□12	12□□□□		□□□	□	□□□	□2	□2	3□□	1□□□	□□□3	□2	31	□□	□□	□	1□□□	13□	□□□□
1□□□2□12	12□□1□		□2	□	□□□	3	2	3□□	□□□□	□11	□2	32	□□	□□	1□	1□□□	13□	□□□3
□□□□2□12	12□□□□		□3	□□□	□2□	□2	□2	3□□	□□□□	□□□3	□2	3□	□□	□□	1□	1□□□	13□	□□□□
1□□□□2□12	12□□□□		□3	11	□□□	3	2	3□□	1□□□	□□□3	□	32	□□	□□	□1	1□□2	13□	NR
22□□□2□12	12□□2□		□□□	1□	□□□	2	3	3□□	1□11	□□□3	□2	33	□□	□□	33	1□□3	1□□	<0.1
2□□□□2□12	12□□□□		□3	□	□□□	□	3	□3	1□1□	□□3	□2	3□	□□	□□	33	1□□□	1□3	NR
□□□□2□12	12□□2□		□□□	2□2	□2□	3	2	3□□3	□□□□	□□□□	□2	33	□□	□□	□	□□□□	1□□	NR
12□□□2□12	12□□3□		□□□	11	□□□	□	3	□□□	1□□□	□□□	□2	32	□2	□□	3□	1□□1	13□	NR
1□□□□2□12	12□□□□		□□□	□□12	□□□	□2	□2	3□□	□□□□	□□□3	□2	32	□□	□□	1□	1□□1	1□3	NR

Location: *Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)*

(Discharge to Effluent Re-Use Farm)

R□d□□□□ □□□□□□□□ □□□ □□r□□□□□□□□

Weekly □□□□□□□□ □ □□□□□□□□□□□ □r□□□□□□□ □□□r□□□□□□ □□□□□□□□ □□□ □□r□□□□□□□□□

R□d□□□□ □□r□d□□□□ □□□□1□□□ □□□ □□r□□□□□□□□

Date Sampled	Sample No.	Date of Report	pH	Total Suspended Solids	Total Dissolved Solids	BOD	C-BOD	Total Nitrogen	Total Phosphorus	Ammonia	Thermotolerant Coliforms	Potassium	Oil and Grease	E.Coli	Chlorophyll	EC	Alkalinity	Total Chlorine
			□□ □□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□1□□□ □	□ □□□	□ □□□	□□□1□□□ □	□□□	□ □□□	□ □□□	□ □□□
2□□□□2□12	121□3□		□□□	□□□	□12	□	3	3□□	□□□□	□□11	□2	31	□□	□□	1□	1□□1	1□3	NR
□□□□2□12	121□□□		□□□	□2	□□□	□2	□2	3□□	□□□□	□□□□	□1	31	□□	□□	2	□□□□	1□3	NR
1□□□□2□12	12111□		□□□	2□1	□□□	3	2	3□□	1□□1	□□1□	□1	2□	□□	□□	□	1□□□	1□□	NR
1□□□□2□12	1211□□		□2	2	□□□	□	3	□	□□□□	□□2□	□2	3□	□□	□□	1	□□□□	13□	NR
2□□□□2□12	1212□□		□1	2	□□□	3	3	3□□	□□□□	□□11	□2	3□	□□	□□	2	1□□□	1□2	NR
1□□□2□12	1212□2		□2	□2	□□2	2	2	□□□	1□□□	□2	□2	31	□□	□□	3	□□□□	1□□	NR
□□□□2□12	1213□□		□□□	□2	□□□	□	2	□□□	□□□□1	□2□	□□	32	□□	□□	□	1□□□	1□□	NR
1□□□□2□12	1213□□		□2	3	□□□	2	□2	3□3	□□□□	□□1□	□2	33	□□	□□	3	□□□□	1□□	NR
22□□□2□12	1213□□		□2	□	□□□	3	3	□	□□□□	□□□□	□2	32	□□	□□	11	□□□□	1□□	NR
2□□□□2□12	121□3□		□□□	□	□□□	3	3	□□□	□□□□	□□□□	□2	33	□□	□□	□3	□□□□	1□2	NR
□□□□2□12	121□□□		□□□	□□□	□2□	□	□	3□3	1□□3	□□1	□2	2□	□□	□□	□2	□□□□	1□3	NR
12□□□2□12	121□2□		□□□	□	□2□	□	3	3□3	1□□□	□□□□	□1	33	□□	□□	1	□□□□	1□□	NR
1□□□□2□12	121□□2		□□□	3	□□□	3	3	□2	□□□□	□□1□	□1	33	□□	□□	1	□□□□	1□1	NR
2□□□□2□12	121□□□		□□□	3	□□□	3	3	3□□	1□□3	□□2□	1	32	□□	□□	1	□□□□	1□1	NR
3□1□2□12	121□□2		□□□	2	□□3	3	2	3□□	1□□3	□□13	2	3□	□□	□□	2	□□□□	1□□	NR
1□□1□2□12	121□1□		□2	2	□□□	2	2	□□1	□□□□	□□12	□2	3□	□□	□□	2	□□□□	13□	NR
1□□1□2□12	121□□3		□1	2	□□□	□	□	3□□	1□□□	□□□□	□1	3□	□□	□□	2	□□□□	13□	NR
23□1□2□12	121□□□		□2	□	□□□	2	□2	3□□	□□□□1	□□1	□2	3□	□□	□□	□	□□□□	13□	NR
31□1□2□12	121□□3		□3	□	□22	□	3	3□3	1□12	□□□□	□2	3□	□□	□□	12	□□□□	13□	NR
□□11□2□12	121□□□		□3	3	□□□	2	2	3□□	1□12	□□12	□	3□	□□	□□	□	□□□□	1□□	NR
1□□11□2□12	121□3□		□3	3	□32	3	2	2□□	□□□□	□□1□	□	3□	□□	□□	2	□□□□	13□	NR
21□11□2□12	121□□□		□3	2	□□□	□2	□2	3	1□1□	□□□□	□2	3□	□□	□□	□	1□□□	1□2	NR
2□□11□2□12	122□11		□1	□	□□□	□	3	3	1□3□	□□1□	2	□□	□□	□□	□	1□□□	1□□	NR
□□12□2□12	122□□1		□1	□	□□□	□	□	3□□	1□2□	□□1□	1□	3□	□□	□□	1□	1□□□	1□□	NR
12□12□2□12	1221□□		□□□	2	□1□	3	2	3□□	1□3□	□□□□	2	□2	□□	□□	□	1□□3	1□1	NR
1□□12□2□12	12213□		□1	□	□□2	□	□	2□2	1□2□	□□2□	3	□2	□□	□□	2□	1□□2	1□□	NR
2□□1□2□13	13□□□□		□□□	3	□□□	□	3	2□□	1□□□	□□□1	□□	3□	□□	□□	□	1□□1	1□□	NR
□□□1□2□13	13□□□□		□□□	1□	□2□	13	□	3□□	1□3□	□□3□	□	□1	□□	□□	1□□	1□□□	1□□	NR
1□□□1□2□13	13□133		□□□	1□	□□□	□	□	2□□	□□□3	□□2□	1	□□	□□	□□	□□	1□□3	1□□	NR
23□□1□2□13	13□1□□		□2	□	□□□	□	□	2□2	□□□1	□□□	1	□1	□□	□□	33	1□□□	1□3	NR
3□□□1□2□12	13□2□□		□3	□	□□□	12	□	□□□	1□3□	1□1□	22	□1	□□	□□	2□	1□□□	1□□	NR
□□□2□2□13	13□2□□		□□□	2□	□□□	□	□	2□□	1□1	□□3□	□2	□2	□□	□□	□□	1□□□	1□□	NR
12□□2□2□13	13□2□□		□3	1□	□□□	□	□	3	1□□2	□□11	□2	3□	□□	□□	3□	1□□□	1□□	NR
1□□□2□2□13	13□32□		□□□	2□	□□□	□	3	1□□	□□□2	□□□□1	□□	33	□□	□□	□□	1□□1	1□□	NR
2□□□2□2□13	13□3□3		□□□	3□	□32	□	□	1□□	□□□1	□□□□3	□2	□3	□□	□□	□□	1□□1	1□□	NR
□□□3□2□13	13□□3□		□□□	11	□□□	□	3	1□□□	□□□□	□□1□	□2	3□	□□	□□	1□□	□□□□	1□□	NR
13□□3□2□13	13□□□□		□□□	2□	□2□	□	□	3□1	□□□□	□□□□3	□2	3□	□□	□□	□□	□□□□	1□□	NR
2□□□3□2□13	13□□□1		□□□	33	□1□	□	□	1□□	□□□□	□□□□3	□2	3□	□□	□□	□□	□□□□	1□3	NR
2□□□3□2□13	13□□□1		□□□	2□	□□□	□	□	3□□	□□□□	□□1□	□2	3□	□□	□□	□2	□□□□	1□□	NR
3□□□□2□13	13□□3□		□□□	13	□2□	□	3	2	□□□2	□□□□3	□2	□1	□□	□□	2□	□□□□	1□□	NR
1□□□□2□13	13□□□□		□□□	21	□2□	□	3	2□2	□□□1	□□□□3	□2	3□	□□	□□	□□	□□□□	1□□	NR
1□□□□2□13	13□□13		□□□	11	□□□	3	2	2□2	□□□□	□□□□	□2	3□	□□	□□	1□	□□□□	1□□	NR
2□□□□2□13	13□□□1		□□□	32	□□2	□	2	3□□	□□□□	□□□□2□	□□	□2	□□	□□	□□	□□□□	1□□	NR
1□□□□2□13	13□□□□		□□□	11	□□2	3	2	2□1	□□□□	□□□□3	□1	3□	□□	□□	12	□□□□	1□□	NR
□□□□2□13	13□□□1		□□□	31	□□2	□	□	3□□	□□□	□□□□3	□1	3□	□□	□□	□□	□□□□	1□□	NR
1□□□□2□13	13□□□□		□□□	□	□□□	3	2	2□□	□□□□	□□□□3	□1	3□	□□	□□	13	1□□□	1□□	NR
22□□□2□13	13□□12		□□□	□	□□□	3	2	2□3	□□□3	□□□□	□2	3□	□□	□□	12	□□□□	1□□	NR
2□□□□2□13	13□□3□		□□□	□	□2□	□	3	2□□	1□2□	□□1□	□□	□□	□□	□□	1□	1□□□	1□2	NR
□□□□2□13	13□□□□		□3	2	□33	□	3	2□□	1□2□	□□□□	□	3□	□□	□□	3	□□□□	1□□	NR
12□□□2□13	131□2□		□1	3	□2□	3	2	3□□	1□32	□□1□	3	□□	□□	□□	□	□□□□	1□□	NR
1□□□□2□13	131□□□		□□□	3	□□□	3	2	3□□	1□3□	□32	□	31	□□	□□	□	□□□□	1□□	NR
2□□□□2□13	1311□2		□□□	3	□□3	□2	2	3□□	□□□1	□□3□	□1	3□	□□	□□	□	□□□□	1□3	NR
3□□□2□13	1311□□		□3	□	□□□	3	3	3□□	1□□□	□□□□	1□	31	1□	□□	□	□□□□	1□2	NR
□□□□2□13	1311□□		□2	□	□□□	3	□2	3□□	1□□□	□□□2	□	3□	□□	□□	□	□□□□	1□3	NR
1□□□□2□13	13121□		□1	2	□23	2	□2	3□□	1□□□	□□□□	□1	33	□□	□□	1	□□□□	1□3	NR
2□□□□2□13	1312□3	2□□□□2□13	□□□	3	□□□	3	□2	□2	1□□□	□□3□	1□	31	□□	□□	□	□□□□	1□1	NR
31□□□2□13	1312□□	□□□□2□13	□3	□	□□□	□	□	3□□	1□□3	□□□□3	1□□	3□	□□	□□	21	□□□□	1□2	NR
□□□□2□13	13132□	1□□□□2□13	□□□	□	3□□	□	3	3□3	1□□1	□□□□3	□1	3□	□□	□□	3□	□□□3	1□2	NR
1□□□□2□13	1313□□	2□□□□2□13	□□□	□	□□□	□	□	3□2	1□□□	□□1	□1	3□	□□	□□	3	□□□□	1□□	NR

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)***

(Discharge to Effluent Re-Use Farm)

R□d□□□□ □□□□□□□□ □□□□r□□□□□□□

□r□□□□□□ □□□r□□□□□□ □□□□□□□□ □□□□r□□□□□□□□

R□d□□□□ □□r□d□□□□ □□□□□1□□□ □□□□r□□□□□□□□

Weekly	□□□□□□□	□ □□□□□□□□□□

Date Sampled	Sample No.	Date of Report	pH	Total Suspended Solids	Total Dissolved Solids	BOD	C-BOD	Total Nitrogen	Total Phosphorus	Ammonia	Thermotolerant Coliforms	Potassium	Oil and Grease	E.Coli	Chlorophyll	EC	Alkalinity	Total Chlorine
			□□□□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□1□□□ □	□ □□□	□ □□□	□□□1□□□ □	□□□	□ □□□	□ □□□	□ □□□
2□□□2□13	1313□□	2□□□2□13	□2	□	□□□	□	□	□1	1□□	□1□	□□	3□	□□	□□	1	□□□	1□2	NR
2□□□2□13	131□3□		□1	2	□3□	3	2	□3	1□□	□23	□1	3□	□□	□□	1	□□□	1□□	NR
□□□2□13	131□□□		□1	3	□□□	□	2	3□	1□□	□2□	□1	3□	□□	□□	□	□□□	1□□	NR
12□□□2□13	131□1□	23□□□2□13	□2	3	□□□	□	3	3□	1□3	□1□	1	3□	□□	□□	□	□□□	1□3	NR
1□□□2□13	131□□□		□1	□2	□□□	2	2	3□	1□2	□□□	3	3□	□□	□□	2	□□□	1□2	NR
2□□□2□13	131□□□		□2	□	□□□	2	2	3□	1□1	□1□	□	3□	□□	□□	2	□□□	1□1	NR
3□1□2□13	131□2□		□2	3	□□□	3	2	3□	1□□	□□□	1	3□	□□	□□	□	□□□	1□3	NR
□□1□2□13	131□□□		□3	1□	□□□	□	□	3□	1□1	□□□3	□	3□	□□	□□	□3	□□□	1□2	NR
1□□1□2□13	131□□□		□□	□	□□□	3	2	□□	1□□	□12	□1	3□	□□	□□	□	1□□	1□2	NR
22□1□2□13	131□1□		□3	□	□□2	2	□2	3□3	1□□	□1	2	3□	□□	□□	2	□□□	1□□	NR
2□1□2□13	131□□□		□2	□	□□□	2	□2	3□	1□□	□□□	12	□3	□□	□□	□	1□□	1□□	NR
□□11□2□13	131□□□		□2	□	□1□	□	□2	3□	1□□	□12	□	3□	□□	□□	□	1□2	1□□	NR
13□11□2□13	131□□3		□□	1□	□1□	3	3	3□1	1□	□□□3	23	□□	□□	□□	1□	1□□	1□□	NR
2□11□2□13	131□□3		□□	□	□□□	3	2	2□	1□□	□□□3	3□	3□	□□	□□	3	1□3	1□□	NR
2□11□2□13	131□1□		□2	□	□2□	□	□	2□	1□□	□13	1	□2	□□	□□	3	1□3	1□□	NR
3□12□2□13	131□□□		□□	11	□□□	3	□2	2□	2□2	□□3	□	□2	□□	□□	1□	1□□	1□□	NR
1□12□2□13	132□1□		□□	□	□1□	□	□	2□	1□□	□2□	□□	□□	□□	□□	□	1□2	1□□	NR
1□12□2□13	132□□□		□□	□	□□□	2	□2	2□	1□□	□2	13	□2	□□	□□	□	1□2	1□□	NR
□□1□2□1□	1□□□2□		□2	1□	□□□	□	□	1□	1□□	□□□3	1	□2	□□	□□	□□	1□□	1□□	NR
1□□1□2□1□	1□□□□□		□3	1□	□□□	□	□	1□	1□□	□□□3	1□	□3	□	□□	□□	1□□	1□□	NR
21□1□2□1□	1□□12□		□3	1□	□□□	□	2	2□1	1□□	□□□3	□	□□	□□	□□	□□	1□□	1□□	NR
2□□1□2□1□	1□□1□2		□2	2□	□□□	□	□	2□	1□3	□31	□	□2	□□	□□	□□	1□□	1□□	NR
□□2□2□1□	1□□2□□		□□	□3	□□□	12	1□	2□	1□□	□□□3	31	□□	□□	□□	12□	1□12	1□□	NR
11□2□2□1□	1□□2□□		□	□1	□□□	11	□	□□	2□13	□1□	1□	□□	□□	□□	□□	1□1□	1□□	NR
1□□2□2□1□	1□□2□□		□□	21	□□□	□	□	3□	1□□	□□2	1□□	□□	1□	□□	□1	1□1□	1□□	NR
2□□2□2□1□	1□□32□		□□	32	□□□	□	□	3□3	1□□	□□□	□□	□3	□□	□□	□□	1□1□	2□□	NR
□□3□2□1□	1□□3□□		□1	□□	□□□	11	□	2□	2□□	□□□3	□	□□	□□	□□	122	1□1□	213	NR
11□3□2□1□	1□□□3□		□3	□□	□□□	1□	□	3□	1□3	□12	□2	□□	□□	□□	11□	1□1□	21□	NR
1□□3□2□1□	1□□□□□		□□	□□	□□□	□	□	3□	1□2	□□1	2	□□	□	□□	1□1	1□1□	21□	NR
2□□3□2□1□	1□□□1□		□□	□□	□□□	□	□	3□	1□3□	□□1	□2	□2	□□	□□	13□	1□1□	21□	NR
1□□□2□1□	1□□□□□		□□	□□	□□2	1□	□	□□	1□1□	□□□	□2	□3	□□	□□	11□	1□13	21□	NR
□□□□2□1□	1□□□2□		□3	1□	□□□	□	2	□□	1□3□	1□2□	□1	□3	□□	□□	□	1□11	22□	NR
1□□□□2□1□	1□□□□2		□1	□	3□2	3	3	2□	1□□	□3□	3	□1	□□	□□	□	1□11	23□	NR
23□□□2□1□	1□□□□□		□□	□	□□□	□	3	2□	1□	□2□	2	□2	□□	□□	□	1□1□	23□	NR
3□□□□2□1□	1□□□□□		□1	□	□□2	3	2	2□2	1□□	□1□	3	□3	□□	□□	□	1□1□	2□□	NR
□□□□2□1□	1□□□□□		□□	3	□□□	2	□2	2□	1□□	□□1	□	□□	1□	□□	□	1□1□	2□2	NR
13□□□2□1□	1□□□1□		□1	□	□2□	3	3	2□	1□2	□1□	□	□1	□□	□□	□	1□1□	2□□	NR
2□□□□2□1□	1□□□□1		□□	□	□□□	3	2	2□2	1□	□□1	□	□3	□□	□□	□	1□1□	2□2	NR
2□□□□2□1□	1□□□□□		□□	3	□2□	2	3	2□	1□3□	□1□	□2	□2	□□	□□	2	1□1□	23□	NR
3□□□2□1□	1□□□33	13□□□2□1□	□□	3	□2□	□2	□2	2□	1□3□	□1□	1	□2	□□	□□	□	1□1□	23□	NR
1□□□□2□1□	1□□□□□	1□□□□2□1□	□□	3	□□□	□2	□2	1□	1□33	□2□	□1	□2	□□	□□	3	1□1□	22□	NR
1□□□□2□1□	1□1□2□	3□□□□2□1□	□□	2	□□2	□2	□2	1□	1□22	□□□	□	□□	□□	□□	2	1□1□	22□	NR
2□□□□2□1□	1□1□□3	□□□□2□1□	□□	□2	□□□	□2	□2	1□	1□32	□□□	2	□3	□□	□□	2	1□1□	232	NR
2□□□2□1□	1□112□	□□□□2□1□	□□	2	□2□	2	□2	1□	1□1□	□□□	2	□1	□□	□□	2	1□13	23□	NR
□□□□2□1□	1□11□□	1□□□□2□1□	□□	2	□□□	□2	□2	1□	1□33	□□1	□1	3□	□□	□□	3	1□11	23□	NR
1□□□□2□1□	1□11□□	31□□□2□1□	□□	3	□□□	2	3	1□	1□2□	□□1	□1	3□	□□	□□	□	1□1□	23□	NR
22□□□2□1□	1□12□□	3□□□□2□1□	□□	3	□□2	2	□2	2□	1□2□	□□1	2	3□	□□	□□	□	1□1□	233	NR
2□□□□2□1□	1□12□2	□□□□2□1□	□□	2	□□□	□2	□2	1□	1□1□	□□1	2	□1	□□	□□	□	1□13	23□	NR
□□□□2□1□	1□131□	1□□□□2□1□	□□	3	□□2	□2	□	1□	1□31	□□1	□1	3□	□□	□□	□	1□12	23□	NR
12□□□2□1□	1□13□1	22□□□2□1□	□□	□	□□□	2	2	2□1	1□3□	□□1	□1	□3	□□	□□	□	1□13	232	NR
1□□□□2□1□	1□1□11	2□□□□2□1□	□□	3	□□□	3	3	2□2	1□2□	□□1	□1	□□	□□	□□	□	1□13	23□	NR
2□□□□2□1□	1□1□□1	□□□□2□1□	□□	3	□12	3	2	1□	1□1□	□□1	□	□□	□□	□□	□	1□11	233	NR
2□□□2□1□	1□1□□□	12□□□2□1□	□□	□	□□□	□	2	2□	1□3	□□1	2	□1	□□	□□	□	1□11	233	NR
□□□□2□1□	1□1□22	1□□□□2□1□	□□	□	□□2	3	3	2□	1□32	□□1	3	□2	□□	□□	1□	1□13	23□	NR
1□□□□2□1□	1□1□□□	2□□□□2□1□	□□	□	□□□	3	3	1□	1□31	□1	□	□□	□□	□□	□	1□12	23□	NR
23□□□2□1□	1□1□1□	□□1□2□1□	□□	□	□□□	2	□2	2□1	1□2□	□□1	□2	□□	□□	□□	□	1□12	23□	NR
3□□□□2□1□	1□1□□2	1□□1□2□1□	□□	3	□□2	2	2	1□	1□3□	□2	2	□□	□□	□□	□	1□1□	23□	NR

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)***

(Discharge to Effluent Re-Use Farm)

R□d□□□□ □□□□□□□□ □□□ □□r□□□□□□□□□

Weekly | □□□□□□□□ | □ □□□□□□□□□□□ | □r□□□□□□□□ □□□r□□□□□□□ □□□□□□□□□ □□□ □□r□□□□□□□□□

R□d□□□□ □□r□d□□□□ □□□□□1□□□ □□□□ □□r□□□□□□□□□

Date Sampled	Sample No.	Date of Report	pH	Total Suspended Solids	Total Dissolved Solids	BOD	C-BOD	Total Nitrogen	Total Phosphorus	Ammonia	Thermotolerant Coliforms	Potassium	Oil and Grease	E.Coli	Chlorophyll	EC	Alkalinity	Total Chlorine
			□□ □□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□□1□□□ □	□ □□□	□ □□□	□□□□1□□□ □	□□□□	□ □□□□	□ □□□	□ □□□
□□1 □□2□1□	1□1□□□	21□1□□2□1□	□□□	□	□□□	3	□2	1□□	1□□□	□□□1	□2	□□	□□	□□	□	1□1□	23□	NR
1□□1□□2□1□	1□1□32	23□1□□2□1□	□□□	□	□□□	2	□2	2□□	1□□1	□□□1	□1	□□	□□	□□	□	1□12	2□□	NR
21□1□□2□1□	1□1□□2	3□11□2□1□	□□□	□□	□□2	3	2	2□2	1□□□	□□2	□	□□	□□	□□	□	1□12	2□2	NR
2□□1□□2□1□	1□1□31	□□11□2□1□	□□□	□	□□□	3	□2	2□1	1□□□	□□3	□	□2	□□	□□	□	1□1□	2□□	NR
□□11□2□1□	1□1□□□	12□11□2□1□	□□□	□	□□□	3	□2	1□□	1□□2	□□1	□	□1	□□	□□	1□	1□1□	2□□	NR
11□11□2□1□	1□1□12	2□□11□2□1□	□□□	1□	□□□	□	3	1□□	1□□□	□□□1	13	□□	□□	□□	3□	1□1□	2□1	NR
1□□11□2□1□	1□1□□□	2□□11□2□1□	□2	1□	□□□	□	3	1□□	1□□1	□□□1	3	□□	1□	□□	□□	1□1□	2□□	NR
2□□11□2□1□	1□1□□□	3□12□2□1□	□□□	33	□□□	□	□	2□3	1□□2	□□□1	2□	□□	□□	□□	□□	1□1□	2□□	NR
2□12□2□1□	1□2□3□	1□□12□2□1□	□3	21	□□□	□	□	2□□	1□3□	□□1	□2	□□	□□	□□	□□	1□2□	2□□	NR
□□12□2□1□	1□2□□□	1□□12□2□1□	□3	11	□□□	□	□	2□3	1□1□	□□□	2	□1	□□	□□	22	1□1□	2□1	NR
1□□12□2□1□	1□21□□	□□□1□2□1□	□1	1□	□□□	□	3	1□□	1□□3	□□1	□	□□	□□	□□	□□	1□1□	2□2	NR
23□12□2□1□	1□22□□	12□□1□2□1□	□2	2□	□12	□	□	1□□	1□□	□□□2	□□	□□	□□	□□	□□	1□1□	2□2	NR
□□□1□2□1□	1□□□21	21□□1□2□1□	□1	□1	□□□	□	2	2□1	1□2□	□□□	□1	□□	□□	□□	□	1□1□	2□□	NR
1□□□1□2□1□	1□□1□2	2□□□1□2□1□	□□□	1□	□□□	3	□2	2□□	1□1□	□□□1	□□	□□	□□	□□	□□	1□1□	23□	NR
2□□□1□2□1□	1□□131	3□□□1□2□1□	□□□	1□	□□□	□	3	1□□	1□1□	□□□1	□2	□□	□□	□□	1□	1□13	23□	NR
2□□□1□2□1□	1□□1□□	2□□□1□2□1□	□□□	□	□□2	3	2	1□□	1□11	□□□1	□2	□□	□	□□	12	1□13	23□	NR
□□□2□2□1□	1□□23□	1□□□2□2□1□	□□□	23	□□□	□	□	2□□	1□□3	□□□1	□1	3□	□□	□□	3□	1□1□	23□	NR
1□□□2□2□1□	1□□2□□	1□□□2□2□1□	□□□	2□	□1□	□	□	2□□	1□□2	□□□1	□2	□□	□	□□	□□	1□1□	23□	NR
1□□□2□2□1□	1□□3□□	1□□□2□2□1□	□□□	3□	□□□	□	□	2□□	1□□□	□□□1	□2	□□	□□	□□	□□	1□13	23□	NR
2□□□2□2□1□	1□□3□3	□□□3□2□1□	□□□	3□	□□□	□	□	2□□	1□□2	□□□1	1□□□□	□□	□□	□□	□1	1□13	232	NR
3□□3□2□1□	1□□□1□	1□□□3□2□1□	□□□	1□	□□□	3	3	2□3	1□31	2□3	2	□3	□	□□	2□	1□1□	223	NR
1□□□3□2□1□	1□□□□□	1□□□3□2□1□	□□□	3□	□1□	□	□	2□2	1□3□	□□□1	□2	□□	□□	□□	□□	1□1□	221	NR
1□□□3□2□1□	1□□□2□	2□□□3□2□1□	□□□	3□	□□□	□	3	□□□	1□□2	□□□1	□2	□□	□	□□	□□	1□□□	212	NR
2□□□3□2□1□	1□□□□□	2□□□□2□1□	□□□	32	□□□	□	□	3□□	1□2□	□□□1	□2	□□	□□	□□	□□	1□□□	□□	NR
31□□3□2□1□	1□□□□□	13□□2□2□1□	□□□	23	□□□	1□	□	2□□	1□□2	□□□1	□2	□□	1□	□□	□3	1□□□	2□1	NR
□□□□□2□1□	1□□□1□	1□□□□□2□1□	□□□	1□	□□□	3	2	2□2	□□□□	□□□	□2	□1	□□	□□	2□	1□□□	1□□	NR
1□□□□2□1□	1□□□□1	23□□□□2□1□	□□□	23	□□□	□	□	2□3	1□□□	□□□1	□1	□□	□□	□□	3□	1□□□	1□□	NR
21□□□□2□1□	1□□□□1	1□□□□2□1□	□□□	□	□2□	3	3	2□1	1□□2	□□2	1□	□□	□□	□□	1□	1□□□	1□□	NR
2□□□□2□1□	1□□□□□	□□□□□2□1□	□□□	□	□□3	□	2	2□□	1□□□	□□□	□2	□□	□	□□	□	1□□2	1□2	NR
□□□□□2□1□	1□□□□□	2□□□□□2□1□	□3	13	□□2	□	□	1□□	1□3□	□□2	□2	□2	□□	□□	2□	1□□1	1□□	NR
13□□□□2□1□	1□□□□□	2□□□□□2□1□	□2	□	□32	□	3	2□□	1□3□	□□□	□	□□	□	□□	12	1□□2	1□□	NR
2□□□□□2□1□	1□□□□□	1□□□□2□1□	□□□	3	□□□	2	□2	3□1	1□□□	□□2	□2	□□	1□	□□	□	□□□□	1□□	NR
2□□□□□2□1□	1□□□□1□	□□□□□2□1□	□□□	□	□□□	3	□2	3□1	1□□□	□□□	□1	□3	□□	□□	□	1□□□	1□□	NR
2□□□□2□1□	1□□□□2	11□□□□2□1□	□□□	3	□3□	3	□2	3□3	2□1□	□□□	□2	□□	□□	□□	□	1□□□	1□3	NR
□□□□□2□1□	1□□□□□	1□□□□□2□1□	□3	□	□2□	2	□2	3□□	2□□	1	□2	□2	□□	□□	□	1□□1	1□□	NR
1□□□□□2□1□	1□1□□□	2□□□□□2□1□	□2	2	□□2	3	□2	3□□	2□□	□□□	□2	□□	□	□□	2	1□□□	1□□	NR
23□□□□2□1□	1□11□□	2□□□□2□1□	□1	3	□12	3	□2	3□□	2□□1	□□□	2	□2	□	□□	2	□□□□	1□1	NR
3□□□□□2□1□	1□11□□	□□□□□2□1□	□1	□	□□1	□	□2	3□□	2□□□	□□□	2	□□	□	□□	2	□□□□	1□□	NR
□□□□□2□1□	1□11□□	1□□□□□2□1□	□1	3	□□□	3	□2	3□□	2□□□	□□□	□2	3□	1□	□□	3	□□□□	1□3	NR
1□□□□□2□1□	1□123□	22□□□□2□1□	□□□	2	□□□	□	□2	3□3	2□□□	□□□	□1	□□	□□	□□	2	□□□□	1□1	NR
21□□□□2□1□	1□12□□	31□□□□2□1□	□□□	2	□12	3	□2	3□□	2□□1	□□□	□2	□□	□	□□	2	□□□2	1□1	NR
2□□□□□2□1□	1□13□□	□□□□□2□1□	□□□	3	□□□	2	□2	3□1	2□□2	□□3	3	3□	□	□□	2	□□□□	1□□	NR
□□□□□2□1□	1□13□□	12□□□□2□1□	□□□	3	□□□	□2	□2	3□□	2□□□	□□1	2	□1	□□	□□	3	□□□□	1□□	NR
11□□□□2□1□	1□1□1□	1□□□□□2□1□	□1	3	□□□	2	□2	3□3	2□□□	□□□	□1	3□	□	□□	□	□□□□	1□□	NR
1□□□□□2□1□	1□1□□1	2□□□□□2□1□	□1	2	□1□	2	□2	2□□	2□□2	□□3	□2	□□	12	□□	□	□□□□	1□□	NR
2□□□□□2□1□	1□1□□□	1□□□□2□1□	□□□	2	□□□	2	□2	3□2	2□□□	□□2	□	□□	□□	□□	3	□□□□	1□□	NR
1□□□□2□1□	1□1□□□	1□□□□□2□1□	□1	2	□□□	2	□2	3□□	2□□	□□3	3	□2	□□	□□	□	□□□□	1□□	NR
□□□□□2□1□	1□1□□□	1□□□□□2□1□	□1	3	□12	□2	□2	2□□	2□□□	□□1	1	3□	□□	□□	□	□□□□	1□□	NR
1□□□□□2□1□	1□1□□□	23□□□□2□1□	□1	□	□□□	2	□2	2□□	2□□□	□□□	1	□□	□□	□□	1□	□□□□	1□□	NR
22□□□□2□1□	1□1□□3	1□1□□2□1□	□2	3	□□□	2	□2	2□□	2□□3	□□3	□	3□	□□	□□	□	□□□□	1□□	NR
2□□□□□2□1□	1□1□32	□□1□□2□1□	□3	□	□□□	2	□2	2□□	2□□1	□□□	1	3□	□□	□□	□	1□□1	1□3	NR
□□1□□2□1□	1□1□□3	1□□1□□2□1□	□2	□	□□□	3	□2	2□□	2□□□	□□□	1□	3□	□□	□□	□	1□□□	1□□	NR
13□1□□2□1□	1□1□2□	22□1□□2□1□	□□□	□	□1□	3	□2	3□1	2□□□	□□3	□	□1	□□	□□	3□	1□□□	1□□	NR
2□□1□□2□1□	1□1□□□	2□□1□□2□1□	□3	□	□□□	3	□2	3□□	2□□	□□□	2	□2	□□	□□	□	1□□□	1□3	NR
2□□1□□2□1□	1□1□1□	□□11□2□1□	□1	□	□2□	3	□2	2□3	2□3□	□□□	2	□2	□□	□□	2	□□□□	1□□	NR
3□11□2□1□	1□1□□1	12□11□2□1□	□3	□2	□12	2	□2	2□□	2□3□	□□1	□1	□3	□□	□□	□1	1□□1	1□□	NR
1□□11□2□1□	1□2□□□	1□□11□2□1□	□3	3	□□□	2	□2	1□□	2□□□	□□□	□1	□3	□□	□□	□1	1□□2	1□□	NR

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)***

(Discharge to Effluent Re-Use Farm)

R□d□□□□ □□□□□□□ □□□□r□□□□□□□

□r□□□□□□□ □□□r□□□□□□ □□□□□□□□ □□□□r□□□□□□□□□

R□d□□□□ □□r□d□□□□ □□□□□1□□□ □□□□r□□□□□□□□

Weekly | □□□□□□□ | □ □□□□□□□□□□

Date Sampled	Sample No.	Date of Report	pH	Total Suspended Solids	Total Dissolved Solids	BOD	C-BOD	Total Nitrogen	Total Phosphorus	Ammonia	Thermotolerant Coliforms	Potassium	Oil and Grease	E.Coli	Chlorophyll	EC	Alkalinity	Total Chlorine
			□□□□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□1□□□ □	□ □□□	□ □□□	□□□1□□□ □	□□□	□ □□□	□ □□□	□ □□□
1□□11□2□1□	1□2□□□	2□□11□2□1□	□□□	□2	□□□	□2	□2	1□□	1□□□	□□□	□	□□	□□	□□	□1	1□□2	1□□	NR
2□□11□2□1□	1□2111	3□12□2□1□	□□□	□	□11	3	□2	2□□	2□□□	□2	□	□□	□□	□□	1□	1□□□	1□□	NR
1□12□2□1□	1□21□2	□□12□2□1□	□□□	□	□2□	□	2	2□□	2□□□	□2	□	□□	□□	□□	1□	1□□□	1□□	NR
□□12□2□1□	1□22□□	22□12□2□1□	□□□	11	□□□	□	3	2□□	2□□	□1	□1	□□	□□	□□	32	1□□□	1□2	NR
1□□12□2□1□	1□22□□	2□□12□2□1□	□3	1□	□11	□	□	1□□	2□1□	□□1	□	□□	□□	□□	□2	1□□□	1□3	NR
22□12□2□1□	1□2332	□□□1□2□1□	□□□	□	□2□	3	2	1□□	1□3□	□□1	□1	□□	□□	□□	1□	1□□□	1□□	NR
□□□1□2□1□	1□□□23	1□□□1□2□1□	□□□	□	□□□	2	□2	1□2	1□□□	□□1	□1	□□	□□	□□	1□	1□□□	1□□	NR
12□□1□2□1□	1□□□□□	21□□1□2□1□	□□□	□	□2□	3	2	1□1	1□□□	□□1	1	□□	□□	□□	1□	1□□□	1□□	NR
1□□□1□2□1□	1□□13□	2□□□1□2□1□	□□□	□	□□□	2	□2	1□3	1□□□	□2	□1	□□	□□	□□	□	1□□□	1□2	NR
2□□□1□2□1□	1□□1□□	3□□2□2□1□	□□□	□	□2□	3	2	1□2	1□□□	□□1	1	□□	□□	□□	22	1□□□	1□□	NR
2□□2□2□1□	1□□223	11□□2□2□1□	□□□	□	□22	2	□2	1□2	1□□2	□□1	1	□□	□□	□□	11	1□□□	1□□	NR
□□□2□2□1□	1□□2□□	□□□2□2□1□	□□□	□	□□1	3	□2	1□3	1□□2	□□1	1	□□	□□	□□	23	1□□□	1□□	NR
1□□□2□2□1□	1□□31□	2□□□2□2□1□	□□□	□	□□2	□	3	1□3	1□□□	□□1	□2	□□	□□	□□	33	1□□□	1□□	NR
23□□2□2□1□	1□□3□□	2□□3□2□1□	□□□	1□	□□□	□	□	1□□	1□□□	□□1	□2	□□	□□	□□	31	1□□□	1□□	NR
1□□3□2□1□	1□□□2□	1□□□3□2□1□	□□□	2□	□□□	□	□2	1□□	1□□□	□□1	□2	□□	□□	□□	□1	1□□□	1□□	NR
□□□3□2□1□	1□□□□□	1□□□3□2□1□	□2	1□	□□□	□	□	1□□	1□2□	□□1	□	□□	□□	□□	2□	1□1□	1□□	NR
1□□□3□2□1□	1□□□□□	2□□□3□2□1□	□1	22	□□□	□	□	1□□	1□3□	□□1	□	□□	□□	□□	3□	1□1□	2□□	NR
22□□3□2□1□	1□□□□□	□□□□□2□1□	□□□	1□	□□□	□	□	2□□	1□33	□□□	1□	□□	□□	□□	2□	1□21	21□	NR
2□□□3□2□1□	1□□□2□	□□□□□2□1□	□□□	1□	□□□	□	3	2□1	1□3□	□1	1□	□□	□□	□□	□2	1□2□	23□	NR
□□□□□2□1□	1□□□□□	1□□□□□2□1□	□□□	2□	□22	□	□	2□□	1□32	□3	□	□□	□□	□□	□□	1□2□	23□	NR
12□□□□2□1□	1□□□□□	2□□□□□2□1□	□□□	3□	□13	□	□	2□□	1□3□	□2	□1	□1	□□	□□	□□	1□2□	23□	NR
1□□□□□2□1□	1□□□1□	2□□□□□2□1□	□□□	3□	□□□	□	□	2□□	1□3□	□3	1□	□□□□	□□	□□	□□	1□2□	2□□	NR
2□□□□□2□1□	1□□□□□	□□□□□2□1□	□□□	2□	□□□	□	3	3□□	1□32	1□2	□	□□	□□	□□	□□	1□2□	2□□	NR
3□□□□2□1□	1□□□□□	1□□□□□2□1□	□□□	3□	□□□	12	□	3□□	1□□2	□□□	2□	□□	□□	□□	□□	1□21	2□□	□R
1□□□□□2□1□	1□□□□3	1□□□□□2□1□	□3	□	□2□	□	□	2□□	1□2□	1□□	21	□□	□□	□□	22	1□2□	2□2	NR
1□□□□□2□1□	1□□□□□	2□□□□□2□1□	□3	1□	□□□	□	3	2□□	1□1□	□□□	□	□□	□□	□	2□	1□1□	2□1	NR
2□□□□□2□1□	1□1□□1	1□□□□2□1□	□3	□	□□□	3	2	2□□	1□□□	□□□□	2	□□	□□	2	□	1□2□	2□□	NR
31□□□□2□1□	1□1□□□	1□□□□□2□1□	□□□	11	□2□	2	□2	2□□	□□□□	□3	1□	□□	□□	1□	1□	1□23	2□□	NR
□□□□□2□1□	1□11□3	2□□□□□2□1□	□2	□	□□□	3	□2	2□□	□□□□	□□1□	22□	□□	□□	22□	□	1□2□	2□3	NR
1□□□□□2□1□	1□11□2	21□□□□2□1□	□3	22	□□□	2	□2	3□□	□□□□	□1	3		□□	2	11	1□1□	23□	NR
1□□□□□2□1□	1□12□□	3□□□□□2□1□										□2						
21□□□□2□1□	1□12□□	2□□□□□2□1□	□□□	□	□12	2	□2	2□□	□□□2	□1	□	□□	□□	□	□	1□1□	23□	NR
2□□□□□2□1□	1□13□□	□□□□□2□1□	□□□	□□□	□□□	3	□2	2□□	□□□2	□□1	2	□2	□□	2	13	1□12	22□	NR
□□□□□2□1□	1□13□□	12□□□□2□1□	□3	□	□□2	2	□2	2□□	□□□□	□1	□1	□1	□□	□1	□	1□□□	22□	NR
12□□□□2□1□	1□1□1□	2□□□□□2□1□	□2	□	□□□	2	□2	3□1	1□□3	□1	□1	□1	□□	□1	□	1□13	222	NR
1□□□□□2□1□	1□1□□□	2□□□□□2□1□	□1	□	□□□	2	□2	3□□	1□□□	□1	□1	3□	□□	□1	2	1□11	21□	NR
2□□□□□2□1□	1□1□1□	3□□□□2□1□	□1	□	□□□	□	□2	3□1	1□1□	□□□	1	□2	□□	1	2	1□1□	22□	NR
2□□□□2□1□	1□1□□1	2□□□□2□1□	□1	□	□□□	3	□2	3□3	1□2□	□□□	1	□□	□□	1	□□	1□□□	22□	NR
□□□□□2□1□	1□1□1□	1□□□□□2□1□	□1	□	□3□	3	□2	3□□	1□3□	□□□	□1	□2	□□	□1	2	1□□□	223	NR
1□□□□□2□1□	1□1□□□	23□□□□2□1□	□□□	□	□□□	□	□2	3□□	1□3□	□□□	□1	□3	□□	□1	2	1□□□	232	NR
23□□□□2□1□	1□1□1□	2□□□□2□1□	□□□	□	□□2	□	□2	3□□	1□□□	□□□	2	3□	□□	2	2	1□□□	212	□R
3□□□□2□1□	1□1□□3	□□□□□2□1□	□	□	□12	□	□2	3□□	1□□1	□□□	□1	□2	□□	□1	□	1□□□	2□□	□R
□□□□□2□1□	1□1□21	1□□□□□2□1□	□	□	□□□	3	□2	3□□	1□3□	□□□	□1	3□	□□	□1	□	1□□□	211	□R
13□□□□2□1□	1□1□□□	21□□□□21□□	□□□	□	□□□	2	□2	3□3	1□2□	□□□	□1	□1	□□	□1	□	1□□□	221	□R
2□□□□□2□1□	1□1□□2	2□□□□□2□1□	□	3	□□□	□	□2	2□□	1□2□	□□□	□1	□1	□□	□1	□	1□□□	21□	□R
2□□□□□2□1□	1□2□□□	□□1□2□1□	□	2	□□2	□2	□2	2□□	1□2□	□□□	2	3□	□□	2	3	1□□□	212	□R
□□1□2□1□	1□2□□3	1□□1□2□1□	□1	□2	□□□	□2	□2	3□1	1□2□	□2	□1	□1	□□	□1	1	1□□□	2□□	□R
11□1□2□1□	1□2121	1□□1□2□1□	□1	□2	□□1	□2	□2	2□□	1□1□	□1	□1	3□	□□	□1	2	1□□□	2□□	□R
1□□1□2□1□	1□21□□	2□□1□2□1□	□1	□2	□31	□2	□2	2□□	1□2	□3	□1	□□	□□	□1	2	1□□2	21□	□R
2□□1□2□1□	1□2223	2□11□2□1□	□2	2	1□2□	□2	□2	2□3	1□1□	□□□	1	3□	□□	□1	3	1□□□	212	□R
1□11□2□1□	1□22□□	1□□11□2□1□	□2	3	□□□	□2	□2	1□□	1□1□	□□□	□□	3□	□□	□□	2	1□□□	22□	□R
□□11□2□1□	1□2332	1□□11□2□1□	□1	11	□□□	3	□2	1□□	1□22	□□□	2	□1	□□	2	□	1□1	223	□R
1□□11□2□1□	1□23□1	2□□11□2□1□	□□□	□	□2□	□	3	2□□	1□1□	□□1	1	□3	□□	1	□1	1□□□	21□	□R
22□11□2□1□	1□2□2□	3□□11□2□1□	□□□	□	□□□	3	2	2□3	1□32	□1	2	□2	□□	2	2□	1□□□	21□	□R
2□□11□2□1□	1□2□□2	13□12□2□1□	□2	□	□□2	□	3	2□□	1□3□	□□1	□1	□□	□□	□1	32	1□1□	21□	□R
□□12□2□1□	1□2□□□	1□□12□2□1□	□3	1□	□1□	□	3	1□□	1□3□	□1	□1	□□	□□	□1	□1	1□□□	22□	□R
13□12□2□1□	1□2□1□	22□12□2□1□	□3	□	□32	3	□2	1□□	1□2□	□□□	1	3□	□□	1	32	1□□□	23□	□R

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)***

(Discharge to Effluent Re-Use Farm)

R□d□□□□ □□□□□□□□ □□□□ □□r□□□□□□□□□

Weekly | □□□□□□□□ | □ □□□□□□□□□□□□

□r□□□□□□□□ □□□r□□□□□□□ □□□□□□□□□ □□□□ □□r□□□□□□□□□

R□d□□□□ □□□r□d□□□□ □□□□□1□□□ □□□□ □□r□□□□□□□□□

Date Sampled	Sample No.	Date of Report	pH	Total Suspended Solids	Total Dissolved Solids	BOD	C-BOD	Total Nitrogen	Total Phosphorus	Ammonia	Thermotolerant Coliforms	Potassium	Oil and Grease	E.Coli	Chlorophyll	EC	Alkalinity	Total Chlorine
			□□ □□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□□1 □□□ □	□ □□□	□ □□□	□□□□1 □□□ □	□□□	□ □□□	□ □□□	□ □□□
2□□12□2□1□	1□2□□□1	3□□1□2□1□	□□□	1□	□32	□2	□2	1□□	1□1□	□□□1	□1	□3	□□	□1	□	1□□□	21□	□R
3□□1□2□1□	1□□□□□	12□□1□2□1□	□□□	22	□3□	□	3	1□3	1□13	□□□1	1	□2	□□	1	23	1□□□	22□	□R
1□□□1□2□1□	1□□□□1	1□□□1□2□1□	□3	□	□1□	□	□	2□□	1□1□	□□□	□2	3□	□□	□2	2□	1□□□	223	□R
1□□□1□2□1□	1□□11□	2□□□1□2□1□	□□□	1□	□3□	□	□	1□□	1□12	□□□1	□2	3□	□□	□2	3□	1□□□	223	□R
2□□□1□2□1□	1□□1□1	2□2□2□1□	□3	1□	□11	□	□	2□□	1□2□	□□□	□2	□3	□□	□2	3□	1□□□	222	□R
31□□1□2□1□	1□□21□	□□□2□2□1□	□□□	2□	□31	□	□	1□□	1□22	□□□1	□2	□□	□□	□2	□□	1□□□	1□□	□R
□□□2□2□1□	1□□2□□	1□□□2□2□1□	□□□	1□	□□2	□	□	1□□	1□2□	□□□1	□1	□3	□□	□1	3□	1□□□	2□□	□R
1□□□2□2□1□	1□□31□	23□□2□2□1□	□□□	1□	□22	□	□	1□□	□□□2	□□□□	□2	□□	□□	□2	□□	1□□□	1□□	□R
21□□2□2□1□	1□□3□□	3□□3□2□1□	□□□	11	□2□	□	3	1□□	1□□3	□□1	□2	□□	□□	□2	32	1□□□	1□□	□R
2□□□2□2□1□	1□□□2□	□□□3□2□1□	□□□	13	□□□	□	3	1□□	□□□□	□□1	□2	3□	□□	□2	□1	1□□□	1□□	□R
□□□3□2□1□	1□□□□□	1□□□3□2□1□	□□□	□	□□□	2	□2	1□□	1□□□	□□1□	□1	□□	□□	□1	2□	1□□□	1□□	□R
1□□□3□2□1□	1□□□3□	2□□□3□2□1□	□□□	2□	□□□	□	□	2□□	1□□1	□□□□	□2	□□	□□	□2	□□	1□□□	1□□	□R
21□□3□2□1□	1□□□□3	3□□□□2□1□	□□□	□	□□2	3	□2	1□□	□□□□	□□□1	□2	□3	□□	□2	21	1□□□	1□□	□R
2□□□3□2□1□	1□□□3□	□□□□□2□1□	□2	3	□□□	□	□	2□□	1□□□	1□□	□1	□3	□□	□1	11	1□□□	1□□	□R
□□□□□2□1□	1□□□□□	12□□□□2□1□	□3	□	□□2	□	□	2□□	1□12	1□3	□1	□□	□□	□1	1□	1□□□	1□□	□R
11□□□□2□1□	1□□□□2	21□□□□2□1□	□3	□	□2□	3	2	1□□	□□□□	□□1	1	□1	□□	1	3□	1□□□	1□1	□R
1□□□□□2□1□	1□□□11	1□□□□□2□1□	□□□	2□	□□1	□	□	2□3	1□□□	□□□1	□2	□2	□□	□2	11□	1□11	1□3	□R
2□□□□□2□1□	1□□□□3	□□□□□2□1□	□□□	22	□3□	□	□	2□3	1□□□	□□□1	□1	3□	□□	□1	□□	1□11	1□2	□R
2□□□□2□1□	1□□□2□	1□□□□□2□1□	□□□	1□	□3□	□	□	1□□	1□□2	□□□1	□1	3□	□□	□1	□1	1□11	1□□	□R
□□□□□2□1□	1□□□□□	1□□□□□2□1□	□□□	13	□□□	□	3	1□□	1□□1	□□□1	□1	□2	□□	□1	□□	1□1□	1□□	□R
1□□□□□2□1□	1□1□2□	2□□□□□2□1□	□□□	1□	□□□	□	□	2□2	1□□□	□□□1	3	□1	□□	1	□□	1□1□	1□□	□R
2□□□□□2□1□	1□1□□□	31□□□□2□1□	□2	11	□22	□	2	3□3	1□11	□□□	□	□□	□□	□	□1	1□1	2□1	□R
3□□□□□2□1□	1□112□	13□□□□2□1□	□3	12	□□□	□	3	1□□	□□□2	□3	1□	□1	□□	1□	□□	1□1□	1□□	□R
□□□□□2□1□	1□11□□	1□□□□□2□1□	□2	1□	□□□	□	□	2□□	1□□□	□□1□	2	□1	□□	2	□□	1□1□	1□□	□R
13□□□□2□1□	1□1223	22□□□□2□1□	□□□	12	□□□	□	3	2□□	1□□□	□3	□2	□□	□□	□2	□□	1□1□	1□□	□R
2□□□□□2□1□	1□12□□	3□□□2□1□	□□□	□	□□□	3	□2	2□□	1□□1	□□□	1	3□	□□	1	13	1□11	1□□	□R
2□□□□□2□1□	1□13□□	11□□□□2□1□	□□□	1□	□□□	3	□2	2□□	1□□□	□□□	2	□1	□□	2	□	1□1□	1□3	□R
□□□□□2□1□	1□1□□□	1□□□□□2□1□	□□□	2	□□□	3	□2	2□□	□□□□	□□□	□1	3□	□□	□1	3	1□13	1□□	□R
12□□□□2□1□	1□1□□□	2□□□□□2□1□	□□□	3	□□□	2	□2	2□□	□□□1	□□□	□1	3□	□□	□□	□	1□1□	1□□	□R
1□□□□□2□1□	1□1□□□	2□□□□□2□1□	□□□	12	□□□	3	2	1□□	□□□□	□□□	□1	3□	□□	□1	1□	1□1□	1□□	□R
2□□□□□2□1□	1□1□□□	2□□□□2□1□	□□□	□	□□□	□	2	2□□	1□3□	1□□	1	3□	□□	1	□	1□1□	1□□	□R
2□□□2□1□	1□1□□□		□2	□	□□2	3	2	2□2	□□□□	□□□	□1	3□	□□	□1	□	1□1□	1□□	□R
□□□□□2□1□	1□1□1□	1□□□□□2□1□	□□□	□	□□□	□	3	2□□	1□□2	1□□	2	3□	□□	2	□	1□1□	2□□	□R
1□□□□□2□1□	1□1□□□	2□□□□□2□1□	□3	□	□□□	□	□	3□2	□□□□	1□□	2	□□	□□	2	3□	1□1□	1□□	□R
23□□□□2□1□	1□1□□□	31□□□□2□1□	□□□	12	□□3	□	3	□□1	□□□□	1□□	□	3□	□□	3	2□	1□13	1□□	□R
3□□□□□2□1□	1□1□□□	□□□□□2□1□	□3	13	□□3	□	□	□□□	□□□2	1□□	□	3□	□□	□	3□	1□1□	1□□	□R
□□□□□2□1□	1□1□□□	1□□□□□2□1□	□2	1□	□□□	□	3	□□□	1□□3	1□□	□	□1	□□	□	31	1□13	1□□	□R
13□□□□2□1□	1□1□□□	2□□□□□2□1□	□□1	1□	□□□	1□	3	□□1	1□31	1□□	□	□□	□□	□	2□	1□11	1□□	□R
2□□□□□2□1□	1□2□1□	3□1□□2□1□	□□□	1□	□□□	□	□	□□□	1□3□	1□3	□□	□□	□□	□□	□□	1□13	1□□	□R
2□□□□□2□1□	1□2□□□	13□1□□2□1□	□□□	1□	□□□	□	3	□□□	1□□3	□□□	□□	□1	□□	□□	□3	1□12	1□□	□R
2□□□□□2□1□	1□2□□□										□			□				
□□1□2□1□	1□213□	12□1□2□1□	□□□	□	□1□	3	□2	□□□	1□□□	□2	□1	□1	□□	□1	22	1□1□	1□3	□R
11□1□2□1□	1□21□1	1□□1□2□1□	□3	3	□□2	□	□2	3□3	1□□□	□□□	□1	3□	□□	□1	□	1□12	1□□	□R
1□□1□2□1□	1□22□□	2□□1□2□1□	□□□	□	□□□	□	□2	2□□	1□□3	1□□	□	3□	□□	□	3	1□13	1□□	□R
2□□1□2□1□	1□2311	3□11□2□1□	□□□	□	□□2	□	□2	3□3	1□□3	1□□	□	3□	□□	□	3	1□13	1□3	□R
1□11□2□1□	1□23□□	□□11□2□1□	□□□	□	12□□	□	3	3□□	1□□□	1□□	1	□1	□□	1	2	1□12	1□□	□R
□□11□2□1□	1□2□□□	2□□11□2□1□	□3	1□	□32	□	3	3□1	2□□□	□□1	3	□1	□□	3	33	1□□□	1□2	□R
1□□11□2□1□	1□2□□□	23□11□2□1□	□□□	12	□□□	□	2	2□□	2□□□	□□1	1	□□	□□	1	31	1□□□	1□3	□R
22□11□2□1□	1□2□1□	3□□11□2□1□	□□□	1□	□12	3	2	2□□	2□□□	□□□1	□	□2	□□	□	□□	1□□□	□	□R
2□□11□2□1□	1□2□□□	11□12□2□1□	□□□	2□	□□2	□	□	2□□	2□□2	□□□1	2	□2	□□	2	□□	1□□□	1□□	□R
□□12□2□1□	1□2□1□	13□12□2□1□	□□□	1□	□□□	□	□	2□3	2□1□	□□□1	□1	□3	□□	□1	□3	1□□□	1□2	□R
13□12□2□1□	1□2□□2	2□□12□2□1□	□□□	23	□□□	□	□	2□□	2□23	□□□1	□2	□□	□□	□2	□□	1□□□	1□2	□R
21□12□2□1□	1□2□□□	□□□1□2□1□	□□□	1□	□22	□	□	1□□	1□□□	□□1	□1	□3	□□	□1	31	1□□□	1□□	□R
□□□1□2□1□	1□□□3□	1□□□1□2□1□	□□□	2□	□□□	1□	□	3□□	1□□3	□□□1	□	□□	□□	□	1□□	1□□□	1□□	□R
1□□□1□2□1□	1□□□□□	22□□1□2□1□	□□□	2□	□□□	12	□	□□□	1□□□	□□1	2	□□	□□	2	□3	1□11	1□□	□R
1□□□1□2□1□	1□□133	2□□□1□2□1□	1□□1	□□	□2□	1□	1□	□□□	1□□2	□□□1	□2	□3	□□	□2	133	1□□□	1□□	□R
2□□□1□2□1□	1□□1□□	2□□2□2□1□	□□□	1□1	□□□	1□	11	3□□	1□□□	□2	2	□□	□□	2	1□□	1□12	1□3	□R

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)***

(Discharge to Effluent Re-Use Farm)

R□d □□□□□ □□□□□□□□ □□□ □□r□□□□□□□□

□r□□□□□□□ □□□r□□□□□□ □□□□□□□□ □□□ □□r□□□□□□□□

R□d □□□□□ □□r□d □□□□ □□□□1□□□ □□□ □□r□□□□□□□□

Weekly	□□□□□□□	□ □□□□□□□□□□

Date Sampled	Sample No.	Date of Report	pH	Total Suspended Solids	Total Dissolved Solids	BOD	C-BOD	Total Nitrogen	Total Phosphorus	Ammonia	Thermotolerant Coliforms	Potassium	Oil and Grease	E.Coli	Chlorophyll	EC	Alkalinity	Total Chlorine
			□□ □□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□□1□□□ □	□ □□□	□ □□□	□□□□1□□□ □	□□□	□ □□□	□ □□□	□ □□□
31□□1□2□1□	1□□222	□□□2□2□1□	1□□1	□□	□3□	1□	1□	3□□	1□32	□□□1	□2	□□	□□	□2	□□	1□1□	1□2	□R
□□□2□2□1□	1□□2□□	1□□□2□2□1□	1□□1	□□	□1□	1□	□	3□□□	11□□□	□□□1	□2	□□	□□	□2	123	1□1□	1□□	□R
1□□□2□2□1□	1□□312	21□□2□2□1□	1□□2	□□	□□□	1□	1□	2□3	1□□	□□□□	□2	□□	□□	□2	1□□	1□1□	1□□	□R
21□□2□2□1□	1□□3□□	2□□□2□2□1□	1□□2	□2	□□□	13	1□	3□□	1□1□	□□□1	□2	□□	□□	□2	□□	1□1□	1□□	□R
2□□□2□2□1□	1□□□□□	□□□3□2□1□	1□□□	□□	□□□	□	□	3□□	1□□□	□3	□1	□□	□□	□1	□□	1□1□	1□□	□R
□□□3□2□1□	1□□□□□	1□□□3□2□1□	1□□□	2□	□□□	□	□	2□□	1□1□	□□□1	□2	□□	□□	□2	□1	1□1□	1□□	□R
1□□□3□2□1□	1□□□2□	2□□□3□2□1□	1□□1	3□	□□□	1□	□	3□□	1□□□	□□□1	2	□□	□□	2	□□	1□1□	1□□	□R
21□□3□2□1□	1□□□□□	2□□□3□2□1□	1□□□	32	□3□	□	□	3□1	1□□2	□2	□2	□□	□□	□2	□1	1□2□	2□□	□R
2□□□3□2□1□	1□□□2□	□□□□2□1□	□□□	1□	□□2	11	□	2□□	1□□□	□□11	□1	□□	□	□1	□□	1□2□	2□□	□R
□□□□2□1□	1□□□□□	12□□□2□1□	□□□	2□	□□□	1□	□	3□□	2□□3	□□□1	□2	□□	□□	□2	122	1□21	21□	□R
11□□□2□1□	1□□□3□	23□□□2□1□	□□□	□□	□22	1□	12	3□1	3□11	□2	1□	□□	□□	1□	1□2	1□22	22□	□R
1□□□□2□1□	1□□□□□	2□□□□2□1□	□3	32	□□□	1□	11	□□□	2□□3	□3□	2	□□	□□	1□	2□2	1□2□	22□	□R
2□□□□2□1□	1□□□2□	□□□□2□1□	□□□	□2	□□□	1□	□	3□□	2□2□	□□□□	1□	□□	□□	1□	2□□	1□2□	22□	□R
1□□□2□1□	1□□□□□	□□□□2□1□	□□□	□□	□□□	13	□	□3	3□□1	□□□1	□□	□□	□□	□□	22□	1□22	223	□R
□□□□2□1□	1□□□□□	1□□□□2□1□	□2	2□	□□□	13	1□	□1	3□□1	□□□1	□	□□	□□	□	1□3	1□2□	21□	□R
1□□□□2□1□	1□□□□1	23□□□2□1□	□1	2□	□□□	13	□	□2	3□□□	□□□	2□	□2	□□	2□	1□□	1□21	21□	□R
22□□□2□1□	1□1□□□	2□□□□2□1□	□1	12	□□□	□	□	3□□	□□□□	□□□	2□	□□	□□	2□	□□	1□21	21□	□R
2□□□□2□1□	1□1□□2	□□□□2□1□	□□□	1□	□□□	□	3	3□□	□□□□	□□□	3□	□2	□□	3□	□□	1□21	213	□R
□□□□2□1□	1□1□□□	13□□□2□1□	□□□	□	□□□	□	2	3□□	□□□1	1□1	2□	□□	□□	1□	1□	1□1□	21□	□R
12□□□2□1□	1□11□□	1□□□□2□1□	□□□	□	□□□	□	□2	□2	□□□□	2□3	□□	3□	□□	□□	□	1□23	22□	□R
1□□□□2□1□	1□11□□	2□□□□2□1□	□□□	□	□□□	□	3	□□□	□□□□	2□□	11	□□	□□	11	3	1□2□	23□	□R
2□□□□2□1□	1□12□3	3□□□2□1□	□1	□	□□□	2	2	□3	□□□3	3□□	1□	3□	□□	1□	□	1□21	232	□R
3□□□2□1□	1□12□□	1□□□□2□1□	□2	□	□□□	□	2	□1	□□□□	2□□	3□	3□	□□	□1□	2	1□21	23□	□R
1□□□□2□1□	1□133□	1□□□□2□1□	□2	1□	□□□	□	2	□2	□□□2	2□□	11	3□	□□	11	3	1□21	23□	□R
1□□□□2□1□	1□13□2	23□□□2□1□	□1	□	□2□	□	2	□□□	□□□□	3□1	21	3□	□□	21	□	1□1□	23□	□R
2□□□□2□1□	1□1□33	31□□□2□1□	□2	1□	□1□	□	2	□□□	□□□□	2□□	21	3□	□□	21	1□	1□1□	231	□R
31□□□2□1□	1□1□□□	□□□□2□1□	□2	□	□□1	□	2	□2	□□12	1□□	□	3□	□□	□	□	1□1□	22□	□R
□□□□2□1□	1□1□1□	13□□□2□1□	□1	□	□□□	□	2	□□□	□□□3	2□□	1□□	3□	□□	1□□	3	1□1□	22□	□R
1□□□□2□1□	1□1□□□	21□□□2□1□	□1	□	□□□	□	□2	□3	□□1□	2□□	32	3□	□□	32	3	1□1□	2□1	□R
21□□□2□1□	1□1□1□	2□□□□2□1□	□1	□	□□□	□	3	□3	□□□□	2□□	11	33	□□	11	23	1□1□	232	□R
2□□□□2□1□	1□1□□□	□□□□2□1□	□1	3	□□□	□	□2	□□□	□□□3	3□1	12	3□	□□	12	□	1□21	23□	□R
□□□□2□1□	1□1□□3	12□□□2□1□	□□□	□	□□□	□	□2	□□□	□□□3	3□□	1□	3□	□□	1□	3	1□1□	233	□R
11□□□2□1□	1□1□□3	1□□□□2□1□	□□□	2	□□□	□	□2	□□□	□□22	□□2□	2	3□	□□	2	2	1□1□	23□	□R
1□□□□2□1□	1□1□□□	2□□□□2□1□	□1	3	□□2	□	□2	□□□	□□□□	□3	3□	3□	□□	3□	□	1□1□	232	□R
2□□□□2□1□	1□1□□□	□□1□2□1□	□1	□	□□□	□	□2	□□□	□3□	□3	1□	3□	□□	1□	□	1□1□	23□	□R
3□1□2□1□	1□1□□3	1□□1□2□1□	□□□	3	□□□	1□	□2	□3	□□□□	□□□	□	33	□□	□	□	1□21	23□	□R
1□□1□2□1□	1□1□□2	1□□1□2□1□	□1	□	□□□	□	□2	□2	□□□□	□□1	1□	3□	□□	1□	□	1□1□	233	□R
1□□1□2□1□	1□1□□□	2□□1□2□1□	□2	□	□1□	□	□2	□□□	□23	3□□	21	33	□□	21	□	1□1□	22□	□R
23□1□2□1□	1□2□3□	3□□1□2□1□	□□□	3	□□□	11	□2	□□□	□□□□	3□□	□	32	□□	3	□	1□1□	23□	□R
3□□1□2□1□	1□2□□1	1□□11□2□1□	□1	□	□□□	11	□2	□□□	□□11	3□1	11	□1	□□	11	□	1□1□	222	□R
□□11□2□1□	1□211□	1□□11□2□1□	□1	□	□3□	□	2	□□□	□3□	2□□	3□	□□	□□	3□	□	1□13	21□	□R
13□11□2□1□	1□21□□	21□11□2□1□	□2	1□	□□□	□	□2	□2	□3□	1□□	1	□□	□□	3□	□	1□1□	211	□R
2□□11□2□1□	1□22□□	21□11□2□1□	□1	1□	□2□	□	2	□3	□3□	1□□	2□	3□	□□	2□	□	1□1□	2□□	□R
2□□11□2□1□	1□22□□	□□12□2□1□	□3	□	□□□	□	3	□□□	□2□	□□□	33	3□	□□	33	□	1□1□	2□□	□R
□□12□2□1□	1□23□□	12□12□2□1□	□3	□	□□□	□	□2	□1	□□□□	□□□	12	3□	□□	12	□	1□1□	2□3	□R
11□12□2□1□	1□23□□	1□□12□2□1□	□□□	1□	□□□	□	3	□□□	□□1□	□2	1□	3□	□□	1□	1□	1□1□	2□□	□R
1□□12□2□1□	1□2□12	2□□12□2□1□	□□□	□	□□□	□	□	□□□	□□□□	□2□	□2	3□	□□	□2	2□	1□13	1□2	□R
3□□1□2□1□	1□□□2□	11□□1□2□1□	□2	2□	□□□	□	□	2□□	3□□□	□□□1	□	3□	□□	□	2□	1□1□	1□□	□R
□□□1□2□1□	1□□□□3	1□□□1□2□1□	□3	2□	□□□	□	□	2□□	3□3□	□□□1	□2	3□	□□	□2	□□	1□11	1□□	□R
1□□□1□2□1□	1□□11□	23□□1□2□1□	□□□	32	□3□	□	□	2□□	2□□□	□□□□	□1	3□	□□	□1	□2	1□11	1□□	□R
22□□1□2□1□	1□□1□□	31□□1□2□1□	□□□	23	□2□	11	1□	2□□	1□□□	□□□1	□2	□□	□□	□2	□□	1□□□	1□□	□R
2□□□1□2□1□	1□□2□□	□□□2□2□1□	□□□	2□	□□□	□	□	2□□	1□2□	□□□1	□2	□□	□□	□2	□□	1□12	1□□	□R
□□□2□2□1□	1□□2□□	1□□□2□2□1□	□□□	3□	□□3	11	11	3□□	1□3□	□□□1	□2	3□	□□	□2	12□	1□12	1□□	□R
12□□2□2□1□	1□□3□1	2□□□2□2□1□	□□□	□□	□□□	1□	1□	□□□	1□□□	□□□1	2	3□	□□	2	12□	1□12	1□□	□R
1□□□2□2□1□	1□□3□□	2□□□2□2□1□	□□□	3□	□2□	1□	13	3□□	□□□□	□□□1	□2	□□	□□	□2	22□	1□13	1□2	□R
2□□□2□2□1□	1□□□1□	□□□3□2□1□	1□	□□	□□1	2□	21	□□□	1□□□	□□□2	□2	□□	□□	□2	2□□	1□1□	1□□	□R
□□□3□2□1□	1□□□□3	1□□□3□2□1□	□□□	1□	□□3	12	1□	3□□	□□□2	□□□2	□1	□□	□□	□1	1□□	1□1□	1□□	□R

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / week)***

(Discharge to Effluent Re-Use Farm)

R□d□□□□ □□□□□□□□ □□□ □□r□□□□□□□□

□r□□□□□□□□ □□□r□□□□□□□ □□□□□□□□□ □□□ □□r□□□□□□□□□

R□d□□□□ □□r□d□□□□ □□□□□1□□□ □□□ □□r□□□□□□□□□

Weekly | □□□□□□□ | □ □□□□□□□□□□

Date Sampled	Sample No.	Date of Report	pH	Total Suspended Solids	Total Dissolved Solids	BOD	C-BOD	Total Nitrogen	Total Phosphorus	Ammonia	Thermotolerant Coliforms	Potassium	Oil and Grease	E.Coli	Chlorophyll	EC	Alkalinity	Total Chlorine
			□□ □□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□1□□□ □	□ □□□	□ □□□	□□□1□□□ □	□□□	□ □□□□	□ □□□	□ □□□
12□□3□2□1□	1□□□□□	2□□□3□2□1□	□□□	13	□□□	□	□	2□□	□□□□	□□□□	2	□2	□□	2	3□	1□1□	1□3	□R
1□□□3□2□1□	1□□□□3	2□□□3□2□1□	□□□	2□	□□□	1□	□	□□□	1□□□	□□12	1	□□	□□	1	□□	1□1□	1□□	□R
2□□□3□2□1□	1□□□□□	2□□□□2□1□	□□□	31	□□□	□	□	□□3	1□2□	□□□□	□□	3□	□□	□□	1□2	1□1□	1□□	□R
2□□□□2□1□	1□□□2□	11□□□2□1□	□□□	2□	□□1	□	□	□□2	1□□□	□□□□	2□	3□	□□	2□	1□1	1□12	1□2	□R
□□□□2□1□	1□□□□□	1□□□□2□1□	□□□	3□	□□□	12	11	□□□	1□11	□□□2	2	3□	□□	2	213	1□11	1□□	□R
1□□□□2□1□	1□□□2□	2□□□□2□1□	□□□	23	□□□	□	□	3□2	1□11	□□13	1□	□□	□□	1□	□□	1□1□	1□□	□R
23□□□2□1□	1□□□□□	1□□□2□1□	□□□	1□	□□2	□	□	1□2	□□□□	□□2□	□1	3□	□□	□1	1□	1□1□	1□1	□R
3□□□□2□1□	1□□□□□	□□□□2□1□	□□2	12	□22	□	□	2□□	1□2□	□□1□	1	3□	□	1	2□	1□11	1□2	□R
□□□□2□1□	1□□□3□	1□□□□2□1□	□□1	□	□22	□	3	2□□	1□32	□□2□	2□	3□	□□	2□	□	1□□□	1□□	□R
1□□□□2□1□	1□□□□□	21□□□2□1□	□□□	□	□3□	□	3	2□□	1□□□	□□□□	□1	3□	□□	□1	□	1□□□	1□□	□R
21□□□2□1□	1□□□1□	2□□□□2□1□	□□□	□	□32	3	3	2□□	2□1□	□□3□	1□	3□	□□	1□	3	1□1□	1□□	□R
2□□□□2□1□	1□□□□□	□□□□2□1□	□□□	□	□3□	3	3	2□□	2□□3	□□□1	11□	3□	□□	11□	□	1□12	1□□	□R
□□□□2□1□	1□□□□□	13□□□2□1□	□□□	□	□2□	3	2	2□□	2□□3	□□□1	2	3□	□□	2	□	1□1□	1□□	□R
11□□□2□1□	1□1□2□	1□□□□2□1□	□□3	□	□□□	2	2	2□□	2□□1	□□2	□1	□□	□□	□1	1	1□1□	1□□	□R
1□□□□2□1□	1□1□□□	2□□□□2□1□	□□2	□	□22	3	2	2□2	2□□□	□□3□	□1	3□	□□	□1	1□	1□13	1□1	□R
2□□□□2□1□	1□1132	□□□□2□1□	□□2	1□	□□□	□	3	2□□	2□□□	□□1□	□	□□	□□	□	22	1□11	1□3	□R
2□□□□2□1□	1□11□□	1□□□□2□1□	□□2	□	□□□	□	□	1□2	2□□□	□□□1	2	□1	□□	2	2□	1□1□	1□□	□R
□□□□2□1□	1□121□	1□□□□2□1□	□□3	□	□□□	3	3	2□1	2□□2	□□□1	2	3□	□□	2	□	1□1□	1□□	□R
1□□□□2□1□	1□12□3	2□□□□2□1□	□□2	3	□□□	3	□2	2□□	3□23	□□□1	□1□	3□	□□	□1□	□	1□1□	1□□	□R
23□□□2□1□	1□12□□	31□□□2□1□	□□2	□	□□2	2	□2	2□2	3□2□	□□1□	□	□1	□□	□	□	1□1□	1□□	□R
3□□□□2□1□	1□133□	□□□□2□1□	□□2	1□	□□2	3	2	2□3	3□□□	□□1□	□	3□	□□	□	□	1□13	1□□	□R
□□□□2□1□	1□13□□	1□□□□2□1□	□□2	1□	□□□	22	□□	2□1	3□□□	□□1□	2	3□	□□	2	□	1□1□	2□□	□R
13□□□2□1□	1□1□2□	21□□□2□1□	□□3	□	□□□	□2	□2	1□1	3□□□	□□2□	2	3□	□□	1	□	1□1□	2□□	□R
2□□□□2□1□	1□1□□□	2□□□□2□1□	□□3	□	□□□	3	2	2□1	3□□□	□□1	2	3□	□□	2	□	1□13	2□□	□R
2□□□□2□1□	1□1□1□	3□□□2□1□	□□3	□	□□2	3	□2	2□□	3□□□	□□2□	1	3□	□□	1	1□	1□1□	2□□	□R
3□□□2□1□	1□1□□□	11□□□2□1□	□□3	□	□□2	□	2	2□3	3□2□	□□2□	□	3□	□□	□	□	1□1□	2□□	□R
1□□□□2□1□	1□1□1□	1□□□□2□1□	□□3	□	□□□	□	2	3□□	3□□□	□□3	□	3□	□□	□	□	1□12	22□	□R
1□□□□2□1□	1□1□□□	3□□□□2□1□	□□3	□	□□2	3	2	3□2	3□□□	□□3□	11	3□	□□	11	□	1□1□	22□	□R
2□□□□2□1□	1□1□23	□□1□2□1□	□□2	□	□□□	3	□2	2□□	3□□□	□□1□	□	3□	□□	□	2	1□21	22□	□R
1□1□2□1□	1□1□□□	11□1□2□1□	□□2	11	□□2	3	□2	2□□	3□□3	□□1□	13	3□	□□	13	□	1□21	22□	□R
□□1□2□1□	1□1□2□	1□□1□2□1□	□□3	1□	□1□	□	2	□□□	□□□□	□□2	22	□1	□□	22	□	1□22	23□	□R
1□□1□2□1□	1□1□□□	23□1□2□1□	□□3	□	□□2	□2	□2	3□□	□□1□	□□1□	3□	3□	□□	3□	3	1□22	23□	□R
22□1□2□1□	1□1□2□	3□□1□2□1□	□□□	12	□□□	3	□2	2□□	□□□□	□□1□	21	□1	□□	21	1□	1□22	23□	□R
2□□1□2□1□	1□1□□□	□□11□2□1□	□□□	1□	□□□	□	3	2□□	□□□□	□□□1	2□	□□	□□	2□	□	1□22	23□	□R
□□11□2□1□	1□2□2□	13□11□2□1□	□□□	1□	□□□	3	□2	3□2	□□31	□□□1	3□	□□	□□	3□	□	1□22	23□	□R
12□11□2□1□	1□2□□□	2□□11□2□1□	□□□	12	□3□	□	3	2□□	□□1□	□□□1	□	□□	□□	□	1□	1□2□	23□	□R
1□□11□2□1□	1□212□	2□□11□2□1□	□□□	1□	□□□	□	3	2□2	3□□□	□□□1	2	□□	□□	2	□	1□2□	23□	□R
2□□11□2□1□	1□21□□	□□12□2□1□	□□□	12	□□□	3	□2	2□□	3□□3	□□2□	□□	□2	□□	□□	□	1□2□	231	□R
3□12□2□1□	1□221□	11□12□2□1□	□□□	22	□□□	3	2	2□□	3□□□	□□2□	3□	□□	□□	3□	1□	1□2□	23□	□R
1□□12□2□1□	1□22□3	1□□12□2□1□	□□□	1□	□□2	□	2	2□□	□□12	□□□1	1□	□□	□□	1□	13	1□33	2□□	□R
1□□12□2□1□	1□233□	2□□1□2□2□	□□□	1□	□□□	□	3	2□□	3□□□	□□□1	21	□□	□□	21	13	1□3□	2□2	□R
2□□1□2□2□	2□□□21	1□□□1□2□2□	□□□	3□	□□1	□	3	1□3	3□3□	□□□1	3□	□1	□□	3□	21	1□□□	2□2	□R
□□□1□2□2□	2□□□□□	1□□□1□2□2□	□□□	□□	□□2	□	□	2□□	2□□□	□□2□	1□	□□	□□	1□	□□	1□□□	2□1	□R
1□□□1□2□2□	2□□1□□	22□□1□2□2□	□□□	□1	□2□	□	□	3□□	2□□1	□□□1	□□	□□	□□	□□	□□	1□□□	2□□	□R
21□□1□2□2□	2□□1□□	3□□□1□2□2□	□□□	□□	□□□	□	□	3□1	2□□□	□□□	31□	□□	□□	31□	32	1□□□	2□□	□R
2□□□1□2□2□	2□□223	□□□2□2□2□	□□□	2□	□2□	□	□	1□□	1□□□	□□□□	3□	□□	□□	3□	3□	1□□□	2□□	□R
□□□2□2□2□	2□□2□□	12□□2□2□2□	□□3	3□	□32	□	□	3□□	1□□□	□□□□	1	□□	□□	1	□2	1□3□	2□□	□R
11□□2□2□2□	2□□321	2□□□2□2□2□	□□□	2□	□12	□	□	2□□	□□□□	□□□	□2	□□	□□	□2	□2	1□3□	22□	□R
																		□R
																		□R

Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / month)***

Monthly □□□□□□□□□r□□ □□r □ □□□□□□□□□□□r□□ □□r

Date Sampled	Sample No.	Date of Report	Arsenic	Cadmium	Chromium	Hexavalent Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc	Pesticides	Nitrite	Nitrate	TKN	Chloride	Calcium	Magnesium	Sodium	Boron	E.Coli	SAR	Nox	COD	Chlorine
			□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□□□1□□□ □	□ □□□□	□ □□□	□ □□□	□ □□□
□□□□2□11	11□□23		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□2□	□□	□□	□□	□□	□□	□□	□□	□□	23	*NR*
11□□□2□11	11□□□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	1□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	*NR*
1□□□□2□11	11□□□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	2□□1	□□	□□	□□	□□	□□	□□	□□	□□	□□	*NR*
2□□□□2□11	11□□□2		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	2□□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	*NR*
1□□□2□11	11□□□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	2□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	*NR*
□□□□2□11	11□□31		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	2□□	□□	1□3	2□	1□□	□□	□□	3□□□	1□□□	□2	*NR*
1□□□□2□11	11□□□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	2□□	□□	1□1	2□	1□□	□□	□□	3□□	13□□	3□	*NR*
21□□□2□11	11□□□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□□3	1□3□□	1□1	2□	1□□	□□	□□	3□□□	13□□3	32□□	*NR*
2□□□□2□11	111□31		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	1□13	1□2□□	□□	2□	1□1	□□	□□	3□32	12□□	2□□1	*NR*
□□□□2□11	111□□2		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□□	1□2□□	□3	2□	1□2	□□	□□	3□3□	12□□	3□□2	*NR*
12□□□2□11	11111□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□□	1□1	□1	2□	1□3	□□	□□	3□□2	12□□	31	*NR*
1□□□□2□11	1111□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	1□3	13□	□□	2□	1□□	□□	□□	3□□2	11□□	3□	*NR*
2□□□□2□11	111□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□□	1□3	□□	2□	1□2	□□	□□	3□32	12□□	3□	*NR*
2□□□2□11	111233		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□□	1□2	□□	2□	1□□	□□	□□	3□□1	11□□	□□	*NR*
1□□□□2□11	1112□□		2	□□□1	□1	□□	□	□1	□□□1	□	□1□	□	□□□□	□□1	11□□	□□1	1□3□□	□□	2□	1□□	□□	□□	□□	11□□	□□	*NR*
1□□□□2□11	11131□		1	□2	□1	□□	3	□1	□□□1	□	□1□	13	□□□□	□□13	1□□□□	□□□	1□2	□□	2□	1□3	□□	□□	3□□□	1□□□	2□	*NR*
2□□□□2□11	111□□2		□	□□□1	□1	□□	□	□1	□□□1	□	□1□	□	□□□□	□□□1	□□□□	□□□	13□□□	□□	23	1□□	□□	□□	3□□□	□□□□	2□	*NR*
1□□1□□2□11	111□22		2	□□□1	□1	□□	2□	□1	□□□1	□	□1□	231	□□□□	□□□1	3□□□	1□2	12□□1	□1	2□	13□	□□	□□	3□□□	3□□□	1□	*NR*
1□□11□2□11	111□□□		2	□□□1	□1	□□	□	□1	□□□1	□	□1□	3□	□□□□	□□□1	□□□	□□□	13□□□	□□	1□	13□	□□	□□	3□□□	□□□	32	□□□3
13□12□2□11	112□□□		2	□□□1	□1	□□	□	□1	□□□1	□	□1□	2□	□□□□	□□□1	□□□□	□□□□	12□□□	□□	2□	13□	□□	□□	3□□□	□□□□	1□3	□□□2
2□□1□2□12	12□133		2	□□□1	□1	□□	2	□1	□□□1	3	□1□	□	□□□□	□□1	□3	1□□	13□□□	□1	1□	1□1	□□	□□	□33	□□□	2□	□□□2
21□□2□2□12	12□3□□		2	□□□1	□1	□□	3	□1	□□□1	3	□1□	2□	□□□□	□□□□	3□□□	1□□	12□	□□	2□	1□3	□□	□□	□□1□	3□□□	2□	□□□3
2□□3□2□12	12□□□□		2	□2	□1	□□	3	□1	□□□1	3	□1□	□□	□□□□	□□□1	3□□	□□□	12□	□1	1□	12□	□□	□□	3□□□	3□□	2□□2	□□□□
2□□□□2□12	12□□□□		2	□□□1	□1	□□	2	□1	□□□1	3	□1□	□	□□□□	□□□1	2□3	1□3	12□	□□	1□	13□	□□	□□	□□1□	2□3	33	□□□□
22□□□2□12	12□□2□		2	□□□1	□1	□□	3	□1	□□□1	3	□1□	1	□□□□	□□□1	2□□	1□□	12□	□□	1□	33	□□	□□	□□□2	2□□	□□	*<0.1*
1□□□□2□12	12□□□□		□1	□□□1	□1	□□	1	□1	□□□1	2	□1□	□□	□□□□	□□□1	1□□	1□□	122	□□	1□	13□	□□	□□	□□□□	1□□	31	*NR*
2□□□□2□12	1212□□		2	□□□1	□1	□□	□1	□1	□□□1	3	□1□	1□	□□□□	□□□1	2□2	1□□	12□	□□	1□	1□□	□□	□□	□□□□	2□1□	3□□3	*NR*
2□□□□2□12	121□3□		2	□□□1	□1	□□	□1	□1	□□□1	3	□1□	□□	□□□□	□□□□	1□□□	□□1	13□	□□	1□	1□□	□□	□□	□□□□	1□□□	□□□□	*NR*
2□□□□2□12	121□□□		□1	□□□1	□1	□□	1	□1	□□□1	□	□1□	11	□□□□	□□□□	1□□1	2	12□	3□	12	12□	□□	□□	□□□□	1□□□	3□□□	*NR*
31□1□□2□12	121□□3		□1	□□□1	□1	□□	2	□1	□□□1	□	□1□	□	□□□□	□□□□	1□□□	1□□	1□1	3□	13	1□□	□□	□□	□□□□	1□□2	2□□1	*NR*
21□11□2□12	121□□□		□1	□□□1	□1	□□	1	□1	□□□1	3	□1□	□□	□□□□	□□□□	1□32	1□□	1□1	3□	1□	13□	□□	□□	□□□□	1□3□	3□□□	*NR*
1□□12□2□12	12213□		□1	□□□1	□1	□□	3	□1	□□□1	3	□1□	□□	□□□□	□□□□	□□2□	1□□	1□□	3□	13	1□□	□□	□□	□□□1	□33	1□□□	*NR*
23□□1□2□13	13□1□□		2	□□□1	□1	□□	2	□1	□□□1	□	□1□	□□	□□	□□13	□□2□	1□□	1□□□□	3□	12	1□□	□□	□□	□□□1	□□□1	32□2	*NR*
3□□□1□2□13	13□2□□		□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□R
1□□2□2□13	13□32□		2	□□□1	□1	□□	12	□1	□□□1	□	□1□	□□	□□□□	□□□1	□□□3	1□□	1□3□□	23□□	1□□□	133	□□	□□	□□□3	□□□3	□□	□R
2□□3□2□13	13□□□1		1	□□□1	1	□□	□	□1	□□□1	3	□1□	31	□□□□	□□□1	□□□1	3□□	1□□□□	2□□□	12□□	1□1	□□	□□	□□□□	□□□1	□	□R
2□□□□2□13	13□□□1	□□□□2□13	2	□□□1	□1	□□	1□	2	□□□1	□	□1□	□□	□□□□	□□□1	□□□1	3□□	1□□□□	3□□□	13□□	1□□	□□	□□	□2□	□□□1	121	□R
2□□□□2□13	13□□3□	□□□□2□13	2	□□□1	□1	□□	3	□1	□□□1	3	□1□	21	□□□□	□2	□□□□	2□□	1□1□□	33□□	12□2	1□□	□□	□□	□□□□	□□□□	□□	□R
2□□□□2□13	1311□2	□□□□2□13	□1	□□□1	□1	□□	3	□1	□□□1	□	□1□	2□	□□□□	□2	1□□□	2□□	1□□□□	32□1	12□□	11□	□□	□□	□3□	1□□□	□□	□R
2□□□□2□13	1312□3	1□□□2□13	□1	□□□1	□1	□□	□	□1	□□□1	□	□1□	1□□	□□□□	□□□1	1□□□	2□□	1□3□□	3□□3	13□□	131	□□	□□	□□□3	1□□□	□□	*NR*
2□□□□2□13	1313□□	2□□□□2□13	□1	□□□1	□1	□□	□	□1	□□□1	□	□1□	□□	□□□□	□□□1	2□□□	2□1	1□1□□	3□□3	13□□	13□	□□	□□	□22	2□□□	□□	*NR*
2□□□□2□13	131□□□	□□1□2□13	2	□□□1	□1	□□	11	□1	□□□1	□	□1□	3□2	□□□□	□□□1	2□22	1□3	1□□□□	3□□1	12□2	1□2	□□	□□	□22	2□22	3□	*NR*
1□□1□□2□13	131□□□	2□□1□□2□13	2	□□□1	□1	□□	□	1	□□□1	□	□1□	1□□	□□□□	□□□1	1□□□	3□□	1□□□□	3□□3	12□□	1□2	□□	□□	□□□□	1□□□	33	*NR*
2□□11□2□13	131□□3	□□12□2□13	2	□□□1	□1	□□	□	2	□□□1	□	□1□	2□□	□□□□	□□□1	1□□□	1□□	1□□□□	3□□□	12□□	12□	□□	□□	3□□□	1□□□	3□	*NR*
3□12□2□13	131□□□	1□□12□2□13	1	□□□1	□1	□□	12	2	□□□1	□	□1□	□□	□□□□	□□□1	1□1□	1□□	1□□2	□□□□	□□□	1□□	□□	□□	□□□1	1□1□	31	*NR*
1□□1□2□1□	1□□□□□	23□□1□2□1□	2	□□□1	□1	□□	3	1	□□□1	□	□1□	31	□□□□	□□□1	□□2□	1□3	1□3□□	3□□□	12□□	1□□	□□	□□	□□□□	□□2□	3□	*NR*
□□□2□2□1□	1□□2□□	23□□2□2□1□	2	□□□1	2	□□	□	2	□□□1	□	□1□	1□□	□□□□	□□□1	□□3□	2□□	1□2□□	□□□□	□3	1□□	□□	□□	□□□□	□□3□	□□	*NR*
□□□3□2□1□	1□□3□□	13□□3□2□1□	2	□□□1	2	□□	12	3	□□□1	□	□1□	□□	□□□□	□□□1	□□□1	2□□	1□□□□	□1□1	1□□□	1□□	□□	□□	□□2□	□□□1	□□	*NR*
1□□□2□1□	1□□□□□	1□□□□2□1□	1	□□□1	3	□□	□	1	□□□1	□	□1□	2□	□□□□	□□□1	□□1□	□□□	1□□□□	□□□1	1□□□	1□□	□□	□□	□□□□	□□1□	□□	*NR*
□□□□□2□1□	1□□□□□	1□□□□2□1□	2	□□□1	□1	□□	1□	2	□□□1	□	□1□	1□2	□□□□	□□□1	□□□1	1□□	1□□□□	□□□3	1□□□	1□2	□□	□□	□□□3	1□□□	□□	*NR*
3□□□2□1□	1□□□33	13□□□2□1□	1	□□□1	□1	□□	□	□1	□□□1	□	□1□	1□□	□□□□	□□□1	□□□	1□2	1□□□□	3□□□	22□□	1□□	□□	□□	□□□□	□□□	3□	*NR*
□□□□2□1□	1□11□□	1□□□□2□1□	1	□□□1	□1	□□	3	□1	□□□1	□	□1□	□□	□□□□	□□□1	□□□	1□3	1□□□□	□□□1	1□□□	1□2	□□	□□	□□□□	□□□	3□	*NR*
□□□□2□1□	1□131□□	1□□□□2□1□	2	□□□1	□1	□□	3	□1	□□□1	3	□1□	□□	□□□□	□□□1	□□□	1□1	1□1□□	□□□□	2□□□	1□□	□□	□□	□□□2	□□□	33	*NR*
2□□□2□1□	1□1□□□	1□□□□2□1□	1	□□□1	□1	□□	3	□1	□□□1	□	□1□	□□	□□□□	□□□1	□□□	1□2	1□□□□	□□□□	22□□	1□□	□□	□□	□□□□	□□□	33	*NR*
□□1□2□1□	1□1□□□	21□1□2□1□	□1	□□□1	□1	□□	3	3	□□□1	□	□1□	1□□	□□□□	□□□1	□□□	1□2	1□3□□	□1□□	2□□□	1□□	□□	□□	□22	□□□	3□	*NR*
1□11□2□1□	1□1□□□	2□11□2□1□	2	□□□1	□1	□□	□	1	□□□1	□	□1□	2□	□□□□	□□□1	□□1	1□□	1□□□□	□□□□	2□□□	21□	□□	□□	□□□□	□□1	□□	*NR*
2□12□2□1□	1□2□3□	1□12□2□1□	2	□□□1	□1	□□	3	□1	□□□1	□	□1□	22	□□□□	□□□1	□□□1	2□□	1□1□□	3□□□	2□□□	1□□	□□	□□	□□□2	□□□1	□□	*NR*
□□1□2□1□	1□□□21	21□□1□2□1□	2	□□□1	□1	□□	2	□1	□□□1	□	□1□	2□	□□□□	□□□1	□□□1	2□1	1□□□□	□□□□	2□□□	1□□	□□	□□	□□□□	□□□1	3□	*NR*
□□2□2□1□	1□□23□	1□□2□2□1□	2	□□□1	□1	□□	2	□1	□□□1	3	□1□	□□	□□□□	□□□1	□□□1	2□□	1□2□□	2□□□	1□□□	1□2	□□	□□	□□□□	□□□1	□□	*NR*
3□□3□2□1□	1□□□1□	1□□□3□2□1□	2	□□□1	□1	□□	□	□	□□□1	□	□1□	□	□□□□	□□□1	□□□1	2□3	1□□□□	3□□□	1□□□	1□□	□□	□□	□□11	□□□1	□1	*NR*
21□□□2□1□	1□□□□1	1□□□2□1□	□1	□□□1	□1	□□	1	□1	□□□1	2	□1□	□	□□□□	□□□1	□3	1□□	1□□□□	22□□	12□□	1□□	□□	□□	□□2□	□3	□3	*NR*
2□□□□2□1□	1□□□□□	1□□□2□1□	2	□□□1	□1	□□	3	□1	□□□1	□	□1□	23	□□□□	□□□1	1□□	2□1	1□□□□	32□1	13□□	1□2	□□	□□	□□2□	1□□	□□	*NR*
1□□□□2□1□	1□1□□□	2□□□□2□1□	1	□□□1	□1	□□	2	□1	□□□1	□	□1□	□2	□□□□	□□1	1□□	2□□	1□□□□	31□□	13□□	1□□	□□	□□	□□□□	1□1	□□	*NR*
1□□□□2□1□	1□123□	22□□□2□1□	1	□□□1	□1	□□	2	□1	□□□1	□	□1□	□3	□□□□	□□1	1□3	1□□	1□2□□	2□□□	1□□□	12□	□□	□□	□□□□	1□□	□□	*NR*

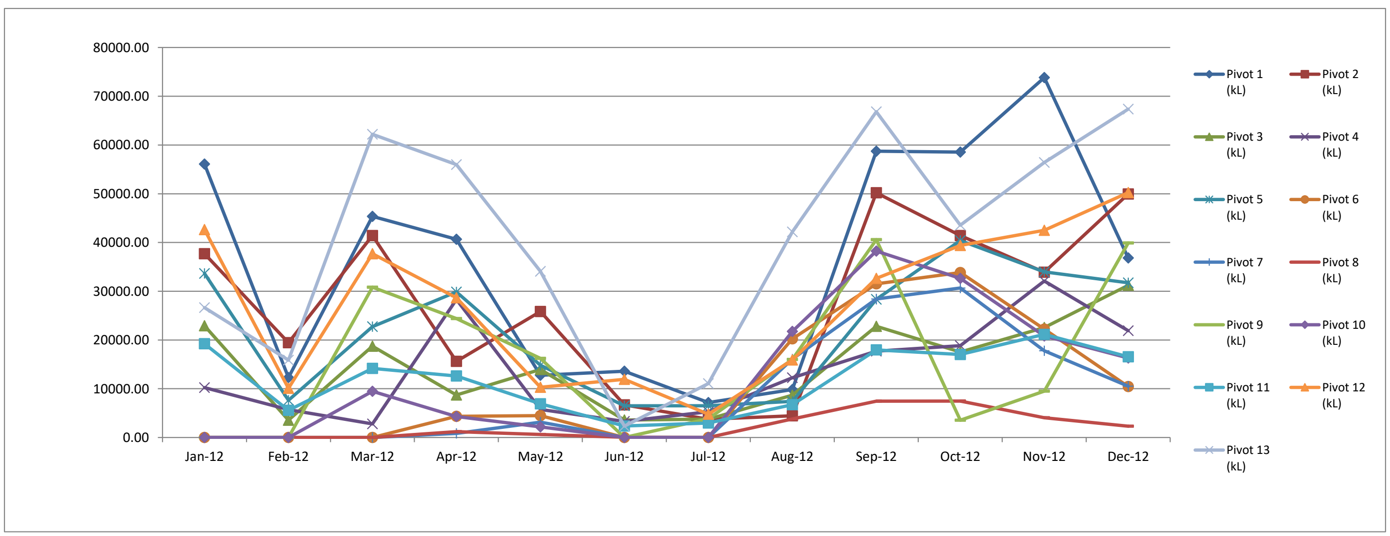
Location: ***Farm Dam Outlet (Licence Point 22) (Single 24 hour composite / month)***

Monthly | □□□□□□□□□r□□ □□□r | □ □□□□□□□□□□□□r□□ □□□r

Date Sampled	Sample No.	Date of Report	Arsenic	Cadmium	Chromium	Hexavalent Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc	Pesticides	Nitrite	Nitrate	TKN	Chloride	Calcium	Magnesium	Sodium	Boron	E.Coli	SAR	Nox	COD	Chlorine
			□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□	□ □□□1□□□ □	□ □□□□	□ □□□	□ □□□	□ □□□
11□□□2□1□	1□1□1□	1□□□□2□1□	2	□□□1	□1	□□	□	2	□□□1	□	□1□	□1	□□□□	□□1	1□□	2□2	1□2□□	32□□	1□□1	131	□□	□□	□□□□	1□1	□□	NR
□□□□2□1□	1□1□□□	□□□□2□1□	2	□□□1	□1	□□	3	□1	□□□1	□	□1□	2□□	□□□□	□□□1	1□□	1□□	1□□□□	33□□	1□□□	13□	□□	□□	□□□□	1□□	□□	NR
13□1□2□1□	1□1□2□	22□1□2□1□	1	□□□1	□1	□□	□	□1	□□□1	□	□1□	□3	□□□□	□□□1	1□2	1□□	1□□□□	31□□	1□□□	133	□□	□□	□□□□	1□2	□1	NR
1□□11□2□1□	1□2□□□	1□□11□2□1□	2	□□□1	1	□□	3	□1	□□□1	□	□1□	13□	□□□□	□□□1	□□□1	1□□	1□2□□	31□3	1□□□	132	□□	□□	□□□□	□□□1	□2	NR
□□12□2□1□	1□22□□	22□12□2□1□	1	□□□1	□1	□□	□	1	□□□1	□	□1□	2□	□□□□	□□□1	□□□	1□□	1□□□□	32□1	1□□□	1□□	□□	□□	□□2□	□□□	□□	NR
12□□1□2□1□	1□□□□□	21□□1□2□1□	□1	□□□1	□1	□□	2	□1	□□□1	3	□1□	1□	□□□□	□□□1	□□□1	1□1	1□□□□	3□□1	1□□3	1□1	□□	□□	□□3	□□□1	3□	NR
2□□2□2□1□	1□□223	11□□2□2□1□	1	□□□1	□1	□□	1	□1	□□□1	3	□1□	11□	□□□□	□□□1	□□□1	1□2	1□3□□	31□3	12□□	13□	□□	□□	□□2□	□□□1	33	NR
□□□3□2□1□	1□□□□□	1□□□3□2□1□	2	□□□1	□1	□□	1	□1	□□□1	3	□1□	11	□□□□	□□□1	□□□1	1□□	1□□□□	3□□□	1□□□	1□2	□□	□□	□□□	□□□1	□□	NR
12□□□□2□1□	1□□□□□	2□□□□2□1□	2	□□□1	□1	□□	□	2	□□□1	□	□1□	32	□□□□	□□□1	□□1	2□□	1□□□□	□2□□	22□□	1□□	□□	□□	□□3	□□1	□2	NR
3□□□2□1□	1□□□□□	1□□□□2□1□	2	□□□1	3	□□	□	2	□□□1	□	□1□	□□	□□□□	□□2	□□2	3□□	1□1□□	□□□□	2□□□	1□□	□□	□□	□□□	□□□	□□	NR
□□□□2□1□	1□11□3	2□□□□2□1□	□1	□□□1	□1	□□	3	□1	□□□1	□	□1□	11□	□□□□	□□□□1	1□□□	1□□	1□□	□□	23	1□□	□□1□	22□	□□□	1□□□	□□	NR
□□□□2□1□	1□13□□	12□□□□2□1□	□1	□□□1	□1	□□	3	□1	□□□1	□	□1□	11□	□□□□	□□1	1□2	1□□	1□□	32	2□	11□	□□1□	□1	3□□	1□3	2□	NR
2□□□□2□1□	1□1□□1	1□□□□2□1□	□1	□□□1	□1	□□	□	□1	□□□1	□	□1□	232	□□□□	□□1	1□□	1□□	1□□	□2	23	1□2	□□1□	1	□□□	1□□	2□	NR
□□□□2□1□	1□1□21	1□□□□2□1□	□1	□□□1	□1	□□	□	□1	□□□1	□	□1□	2□□	□□□□	□□□1	1□□	1□□	1□□	3□	21	1□□	□□1□	□1	□□□	1□□	3□	NR
□□1□2□1□	1□2□□3	1□□1□2□1□	□1	□□□1	□1	□□	2	□1	□□□1	□	□1□	22□	□□□□	□□□1	1□□	1□□	1□2	□□	2□	1□□	□□1□	□1	□□□	1□□	21	NR
1□11□2□1□	1□22□□	1□□11□2□1□	□1	□□□1	□1	□□	2	□1	□□□1	□	□1□	□□2	□□□□	□□□1	□□□1	1□□	1□1	3□	21	13□	□□1□	□□	□□□	□□□1	2□	NR
□□12□2□1□	1□2□□□	1□□12□2□1□	1	□□□1	□1	□□	□	1	□□□1	□	□1□	□□□	□□□□	□□□1	□□3	1□□	1□3	3□	22	13□	□□	□1	□□□	□□3	33	NR
3□□1□2□1□	1□□□□□	12□□1□2□1□	1	□□□1	□1	□□	□1	□1	□□□1	3	□1□	1□	□□□□	□□□1	□□□1	1□3	1□3	3□	1□	1□□	□□1□	1	□□□	□□□1	□□	NR
□□□2□2□1□	1□□2□□	1□□□2□2□1□	□1	□□□1	□1	□□	2	□1	□□□1	2	□1□	□	□□□□	□□□1	□□□1	1□□	1□□	3□	2□	1□2	□□23	□1	□□□	□□□1	3□	NR
□□□3□2□1□	1□□□□□	1□□□3□2□1□	3	□□□1	□1	□□	3	□1	□□□1	2	□1□	1□	□□□□	□□□□1	□□□□	1□□	1□□	3□□□	1□□□	1□1	□□31	□1	□□□	□□□□	23	NR
□□□□□□□□□	1□□□□3	3□□□□2□1□	□1	□□□1	□1	□□	□1	□1	□□□1	2	□1□	□	□□□□	□□□□1	□□□□	1□□	1□2	33	1□	1□1	□□2□	□2	□□3	□□□□	3□	NR
□□□□2□1□	1□□□□□	12□□□□2□1□	□1	□□□1	□1	□□	□1	□1	□□□1	3	□1□	□	□□□□	□□□1	□□□1	2□□	1□□	33	1□	1□□	□□1□	□1	□□1	□□□1	□3	NR
2□□□□2□1□	1□□□2□	1□□□□2□1□	□1	□□□1	□1	□□	1	□1	□□□1	2	□1□	□□	□□□□	□□□1	□□□1	1□□	1□□	3□	2□	1□□	□□1□	□1	□	□□□1	□2	NR
□□□□2□1□	1□11□□	1□□□□2□1□	□1	□□□1	□1	□□	□1	□1	□□□1	2	□1□	1□	□□□□	□□□□	□□1	2□□	1□□	3□	1□	1□□	□□1□	2	□□1	□□1□	□□	NR
□□□□2□1□	1□1□□□	1□□□□2□1□	1	□□□1	□1	□□	1	□1	□□□1	3	□1□	1□	□□□□	□□□1	□□□1	2□3	1□□	3□	1□	1□□	□□1□	□1	□□□	□□□1	3□	NR
□□□□2□1□	1□1□1□	1□□□□2□1□	□1	□□□1	□□	□1□	□1	□1	□□□1	3	□1□	13	□□□□	□□□1	□□1	2□□	1□2	3□	1□	1□2	□□1□	2	□□□	□□1	3□	NR
□□□□2□1□	1□1□□□	1□□□□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	□	□1□	□2	□□□□	□□2	1□1	3□2	1□□	□1	1□	1□□	□□21	□	□□1	1□□	□2	NR
□□1□2□1□	1□213□	12□1□2□1□	1	□□□1	□□	□1□	1□□	□1	□□□1	□	□1□	□□	□□□□	□□1	2□□	2□□	1□□	3□	1□□□	1□□	□□22	□1	□□□	2□1	3□	NR
□□11□2□1□	1□2□□□	2□□11□2□1□	□1	□□□1	□□	□1□	1□	□	□□□1	11	□1□	□□	□□□□	□□1	□□□	2□2	1□□	32	1□□□	1□□	□□21	3	□□□	□□□	□1	NR
□□12□2□1□	1□2□1□	13□12□2□1□	□1	□□□1	□□	□1□	11	□1	□□□1	3	□1□	21	□□□□	□□□1	□□□1	2□3	1□□	2□	1□	1□□	□□2□	□1	□□□	□□□1	□1	NR
1□□□1□2□1□	1□□□□□	22□□1□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	2	□1□	□	□□□□	□□□1	□□□1	□□□	1□1	2□	1□	1□□	□□21	2	□□□	□□□1	□□	NR
□□□2□2□1□	1□□2□□	1□□□2□2□1□	□1	□□□1	□□	□1□	□	□1	□□□1	3	□1□	□	□□□□	□□□1	□□□1	3□□□	1□3	2□	1□	1□□	□□3□	□2	□□□	□□□1	□□	NR
□□□□2□1□	1□□□□□	12□□□□2□1□	1	□□□1	□□	□1□	1	□1	□□□1	3	□1□	□	□□□□	□□□1	□□□1	3□□	2□□	2□	23	1□□	□□3□	□2	□□□	□□□1	□2	NR
2□□□□2□1□	1□□□2□	□□□□2□1□	□1	□□□1	□□	□1□	3	□1	□□□1	2	□1□	□	□□□□	□□□□1	□□11	3□□	2□□	2□□□	21	1□□	□□31	1□	□□□□	□□11	□□	NR
□□□□2□1□	1□□□□□	1□□□□2□1□	□1	□□□1	□□	□1□	1	□1	□□□1	2	□1□	□□	□□□□	□□□1	□□3	3□□	1□□	2□□□	1□	1□□	□□2□	□	□□□	□□3	□3	NR
□□□□2□1□	1□1□□□	13□□□□2□1□	□1	□□□1	□□	□1□	□1	□1	□□□1	3	□1□	□□	□□□□	□□1	□□3	3□□	1□□	2□□□	1□	1□□	□□2□	1□	□□□	□□□	□□	NR
1□□□□2□1□	1□133□	1□□□□2□1□	□1	□□□1	□□	□1□	2	□1	□□□1	□	□1□	12	□□□□	□□□	□□□	□□□	1□□	□□□1	22	1□□	□□2□	11	□□□	□□□	□□	NR
1□□□□2□1□	1□1□□□	21□□□□2□1□	□1	□□□1	□□	□1□	□1	□1	□□□1	□	□1□	□	□□□□	□□2	1□3	□□□	1□□	3□□□	1□	1□□	□□22	32	□□□	1□□	□1	NR
11□□□□2□1□	1□1□□3	1□□□□2□1□	□1	□□□1	□□	□1□	□	□1	□□□1	□	□1□	□□	□□□□	□□□□	1□□2	□□2	1□3	3□	2□	1□3	□□21	2	□□□	1□□□	32	NR
1□□1□2□1□	1□1□□2	1□□1□2□1□	□1	□□□1	□□	□1□	3	□1	□□□1	□	□1□	□	□□□□	□□3	1□□	□□□	1□3	□□□3	21	132	□□2	1□	□□2	2□2	3□	NR
13□11□2□1□	1□21□□	21□11□2□1□	2	□□□1	1	□□	□	1	□□□1	□	□1□	31	□□□□	□□3	3□1	3□□	1□1	3□	22	1□1	□□21	3□	□□□	3□□	2□	NR
11□12□2□1□	1□23□□	1□□12□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	□	□1□	1□	□□□□	□□2	2□□	2□□	1□□	3□	2□	1□2	□□21	1□	□□□	2□□	23	NR
□□□1□2□1□	1□□□□3	1□□□1□2□1□	2	□□□1	□□	□1□	2□	2	□□□1	□	□1□	□□	□□□□	□□□1	□□□	1□□	1□□	33	22	1□□	□□22	□2	□□□	□□□	3□	NR
12□□2□2□1□	1□□3□1	2□□□2□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	2	□1□	□□	□□□□	□□□1	□□□1	□□□	1□□	23	22	1□□	□□23	2	□□□	□□□1	□1	NR
1□□□3□2□1□	1□□□□3	2□□□3□2□1□	1	□□□1	□□	□1□	2	□1	□□□1	3	□1□	□□	□□□□	□□□1	□□□□	□□□	1□□	2□	1□	1□□	□□21	1	□□□	□□□□	□3	NR
□□□□2□1□	1□□□□□	1□□□□2□1□	1	□□□1	□□	□1□	2	□1	□□□1	1	□1□	1□	□□□□	□□□□1	□□□□	□□□	1□□	2□	2□	1□3	□□2□	2	□□□	□□□□	□□	NR
1□□□□2□1□	1□□□□□	21□□□□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	3	□1□	□	□□□□	□□11	□□3□	2□1	1□□	2□	2□	1□2	□□1□	□1	□□□	□□□□	□□	NR
11□□□□2□1□	1□1□2□	1□□□□2□1□	2	□□□1	□□	□1□	3	□1	□□□1	□	□1□	13	□□□□	□□□1	□□□	1□□	1□□	□3	2□	1□2	□□21	□1	□□1	□□□	□3	NR
□□□□2□1□	1□121□	1□□□□2□1□	1	□□□1	□□	□1□	3	□1	□□□1	3	□1□	13	□□□□	□□□1	□□□	1□3	1□2	32	1□	1□□	□□1□	2	□□□	□□□	□1□	NR
2□□□□2□1□	1□1□□□	2□□□□2□1□	□1	□□□1	□□	□1□	3	□1	□□□1	□	□1□	12	□□□□	□□□1	□□□	1□2	1□□	33	32	1□□	□□2□	2	□□□	□□□	3□	NR
1□□□□2□1□	1□1□1□	1□□□□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	□	□1□	2□	□□□□	□□□1	1□2	1□□	1□3	33	2□	1□3	□□2□	□	□□1	1□2	3□	NR
□□1□2□1□	1□1□2□	1□□1□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	□	□1□	2□	□□□□	□□□1	1□□	2□□	1□□	2□	2□	1□□	□□1□	22	□□3	1□□	3□	NR
12□11□2□1□	1□2□□□	2□□11□2□1□	1	□□□1	□□	□1□	□	□1	□□□1	□	□1□	1□	□□□□	□□□1	1□□	1□□	1□□	3□	31	1□□	□□2□	□	□□□	1	3□	NR
1□□12□2□1□	1□22□3	1□□12□2□1□	2	□□□1	□□	□1□	□	□1	□□□1	□	□1□	1□	□□□□	□□□1	□□□	1□□	1□□	32	3□	1□□	□□2□	1□	□□3	□□□	3□	NR
21□□1□2□2□	2□□1□□	3□□□1□2□2□	2	□□□1	□□	□1□	11	2	□□□1	□	□1□	22	□□□□	□□□1	□□□1	3□1	23□	3□	2□	23□	□□2□	31□	□□2	□□□1	□3	NR
11□□2□2□2□	2□□321	2□□□2□2□2□	2	□□□1	□□	□1□	3	□1	□□□1	3	□1□	□□	□□□□	□□□1	□□□1	2□□	22□	2□	23	1□□	□□2□	□2	□□□	□□□1	□□	NR
					□□								□□□□													NR
					□□								□□□□													NR
					□□								□□□□													NR

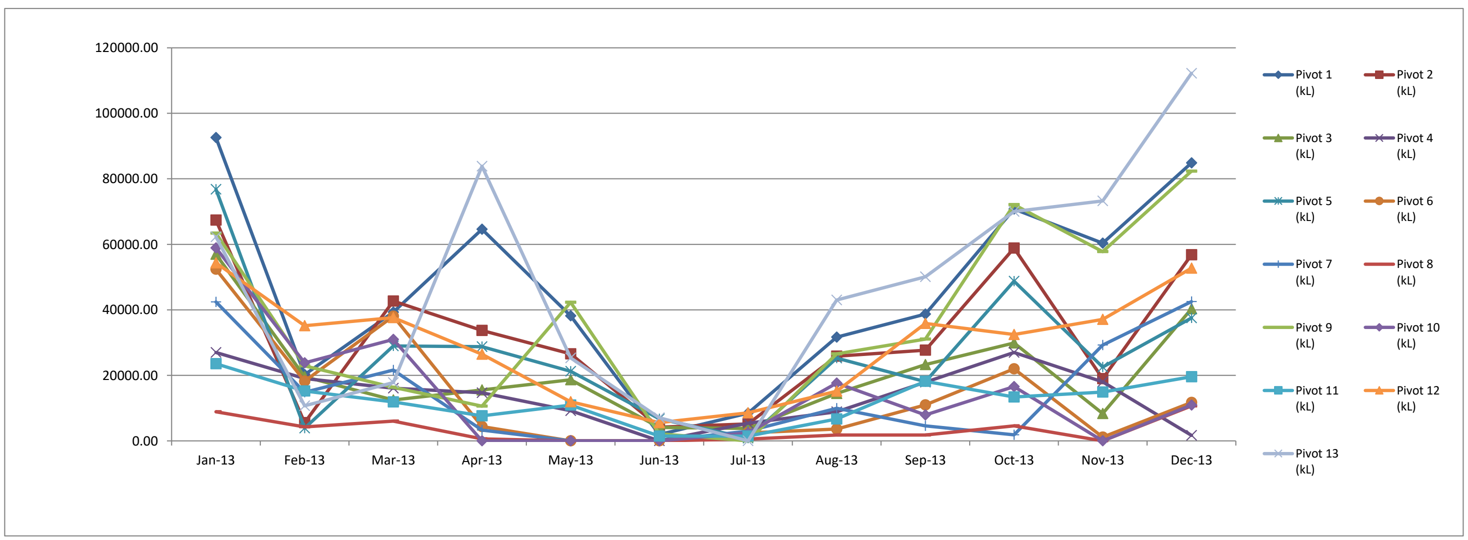
Pivot Flows 2012

	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	rainfall mm
Jan-12	56105.44	37683.51	22914.39	10241.69	33666.19	0.00	0.00	0.00	0.00	0.00	19218.61	42656.00	26647.39	**249133.22**	97.60
Feb-12	12286.60	19430.76	3561.21	5715.63	7613.05	0.00	0.00	0.00	0.00	0.00	5570.53	10099.36	15872.41	**80149.55**	257.60
Mar-12	45350.78	41413.98	18722.57	2787.60	22721.15	0.00	0.00	0.00	30824.04	9475.51	14176.72	37702.02	62198.10	**285372.47**	26.00
Apr-12	40642.72	15606.97	8729.28	28310.83	29839.18	4328.43	824.99	1184.01	24382.37	4291.69	12601.32	28678.32	55989.74	**255409.85**	29.00
May-12	12772.55	25831.47	13963.71	5747.50	14830.53	4473.61	3163.55	621.97	16246.50	2175.04	6926.12	10291.15	34100.43	**151144.13**	29.20
Jun-12	13582.24	6683.94	3594.62	3285.88	6499.36	0.00	0.19	25.62	0.04	0.00	2361.82	11914.62	2334.43	**50282.76**	53.80
Jul-12	7173.47	3744.33	3780.87	5290.59	6516.67	0.00	0.24	0.00	3841.32	0.00	2974.76	4782.87	11054.83	**49159.95**	91.80
Aug-12	9832.91	4455.55	8668.18	12274.25	7428.51	20255.28	16083.80	3818.19	16010.58	21746.90	6734.54	15889.80	42178.90	**185377.39**	11.20
Sep-12	58735.15	50197.04	22819.30	17723.60	28333.94	31531.11	28411.53	7461.94	40575.57	38238.06	17947.87	32637.60	66804.52	**441417.23**	26.80
Oct-12	58542.09	41414.17	17545.40	18846.62	40399.93	33843.30	30667.17	7468.32	3562.66	32636.70	17042.98	39378.34	43555.36	**384903.04**	13.00
Nov-12	73824.68	33885.86	22570.73	32097.47	33962.93	22226.62	17776.22	4060.99	9515.36	20827.89	21159.14	42518.60	56402.20	**390828.69**	36.20
Dec-12	36835.94	49951.65	31212.50	21895.56	31737.31	10446.76	10529.57	2321.88	39909.51	16298.26	16568.62	50223.47	67364.25	**385295.28**	96.80
Totals	**425684.57**	**330299.23**	**178082.76**	**164217.22**	**263548.75**	**127105.11**	**107457.26**	**26962.92**	**184867.95**	**145690.05**	**143283.03**	**326772.15**	**484502.56**	**2908473.56**	**0.77**
Irrigation depth m	0.68	0.65	0.71	0.57	0.71	0.21	0.23	0.22	0.29	0.24	0.65	0.80	0.53	0.48	
Rainfall depth m	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	
Total depth m	1.44	1.42	1.48	1.34	1.48	0.98	1.00	0.99	1.06	1.01	1.42	1.57	1.30	1.25	
Evapotranspiration	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	
	-0.04	-0.07	0.00	-0.15	0.00	-0.50	-0.48	-0.49	-0.42	-0.47	-0.06	0.08	-0.18	-0.23	
Evapotranspiration	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	**1.484126**	
Rainfall depth m	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	**0.769**	
Irrigation required m	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72		
Irrigation with EF factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96		
Irrigation provided	0.68	0.65	0.71	0.57	0.71	0.21	0.23	0.22	0.29	0.24	0.65	0.80	0.53		
Percentange %	70.51	67.58	74.34	59.09	74.33	22.11	24.38	23.45	30.62	25.34	67.96	83.17	55.56		



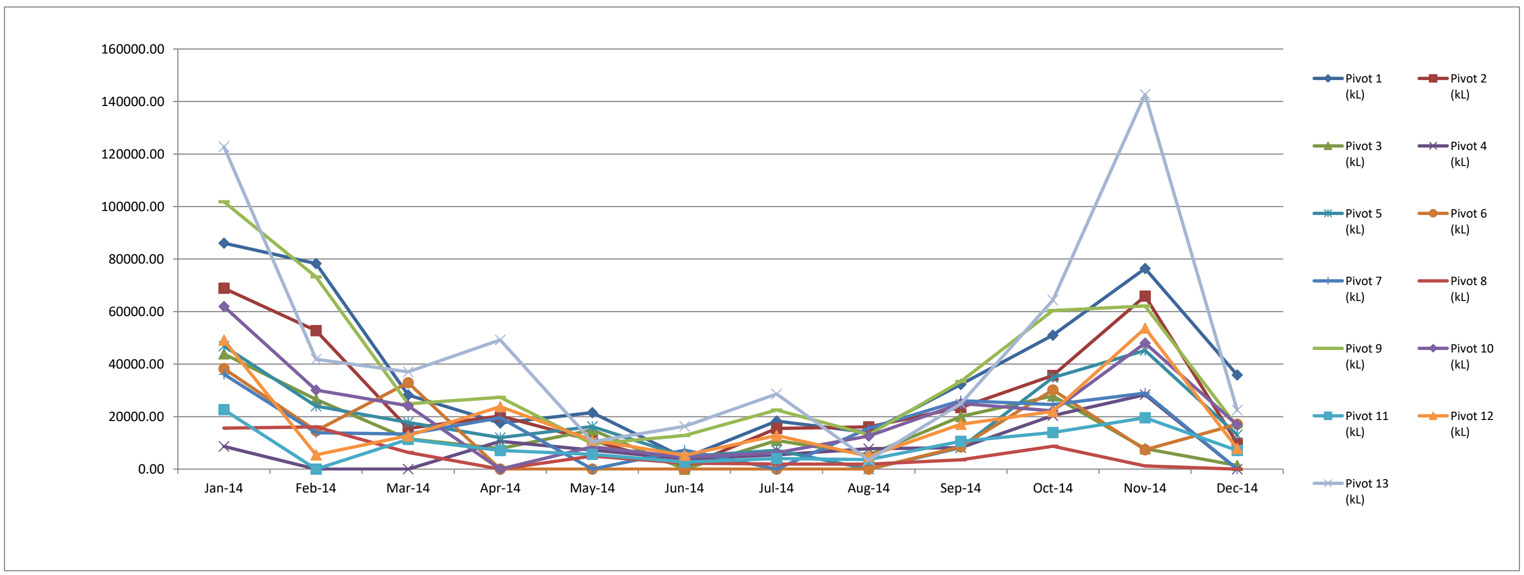
Pivot Flows 2013

	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	
Jan-13	92620.16	67374.06	56956.14	26993.45	76804.04	52381.71	42400.57	8862.25	63421.48	58932.02	23550.62	54352.92	62313.49	**686962.91**	
Feb-13	20206.01	5574.44	19569.28	19023.56	3913.70	18252.30	14856.73	4238.03	22908.48	23827.49	15247.31	35167.30	10694.33	**213478.96**	
Mar-13	39310.75	42697.23	12463.77	16093.08	29002.22	38077.93	21622.56	6039.17	16374.83	30985.12	11888.41	37622.86	17820.43	**319998.36**	
Apr-13	64586.75	33700.62	15520.64	14662.81	28789.00	4383.72	3276.18	593.46	10625.01	0.00	7651.87	26471.12	83862.92	**294124.10**	
															Rainfall
May-13	38149.05	26566.63	18684.21	9207.61	21260.90	0.00	0.00	0.00	42305.65	0.00	10938.74	11964.02	25340.03	**204416.84**	**mm**
Jun-13	1934.41	4191.25	4117.88	0.00	6755.44	0.00	0.00	0.00	2153.66	0.00	1494.53	5577.71	7035.97	**33260.85**	85.20
Jul-13	8450.26	5199.57	3800.52	5375.16	814.68	2450.11	2988.80	565.54	0.00	2457.33	1460.02	8550.70	0.00	**29508.54**	110.40
Aug-13	31670.51	25843.23	14477.51	8863.35	25265.24	3636.36	9951.15	1768.02	26536.22	17651.95	6664.73	15147.50	42995.03	**209823.28**	132.60
Sep-13	38686.78	27714.30	23293.14	17913.45	18080.24	11003.52	4575.07	1802.54	31072.95	7913.27	18155.07	35851.09	50120.09	**286181.51**	0.40
Oct-13	70763.19	58869.16	29892.81	26994.33	48724.77	21978.85	1848.48	4594.19	72110.34	16541.70	13385.10	32496.65	70049.57	**468249.14**	15.20
Nov-13	60342.65	18980.75	8347.94	18025.17	22534.73	1123.74	29238.52	0.00	57803.94	0.00	14890.50	37092.30	73228.50	**341608.74**	89.60
Dec-13	84860.43	56809.10	40304.60	1659.37	37502.37	11730.24	42508.71	10671.32	82355.05	10916.07	19551.12	52740.79	112217.23	**563826.40**	20.60
															11.00
Totals	**551580.95**	**373520.34**	**247428.44**	**164811.34**	**319447.33**	**165018.48**	**173266.77**	**39134.52**	**427667.61**	**169224.95**	**144878.02**	**353034.96**	**555677.59**	**3651439.63**	26.40
Irrigation depth m	0.88	0.73	0.99	0.57	0.86	0.28	0.38	0.33	0.68	0.28	0.66	0.86	0.61	**0.61**	28.20
Rainfall depth m	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	**0.65**	75.40
Total depth m	1.52	1.38	1.64	1.21	1.51	0.92	1.02	0.97	1.33	0.93	1.30	1.51	1.26	1.25	51.20
Evapotranspiration	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	
	-0.07	-0.22	0.04	-0.38	-0.09	-0.67	-0.57	-0.62	-0.27	-0.67	-0.29	-0.09	-0.34	-0.34	**0.65**
Evapotranspiration	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	**1.595103**	
Rainfall depth m	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65		
Irrigation required m	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Irrigation with EF factor	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27		
Irrigation provided	0.88	0.73	0.99	0.57	0.86	0.28	0.38	0.33	0.68	0.28	0.66	0.86	0.61		
Percentange %	68.86	57.60	77.84	44.70	67.90	21.63	29.62	25.65	53.39	22.18	51.79	67.72	48.02		



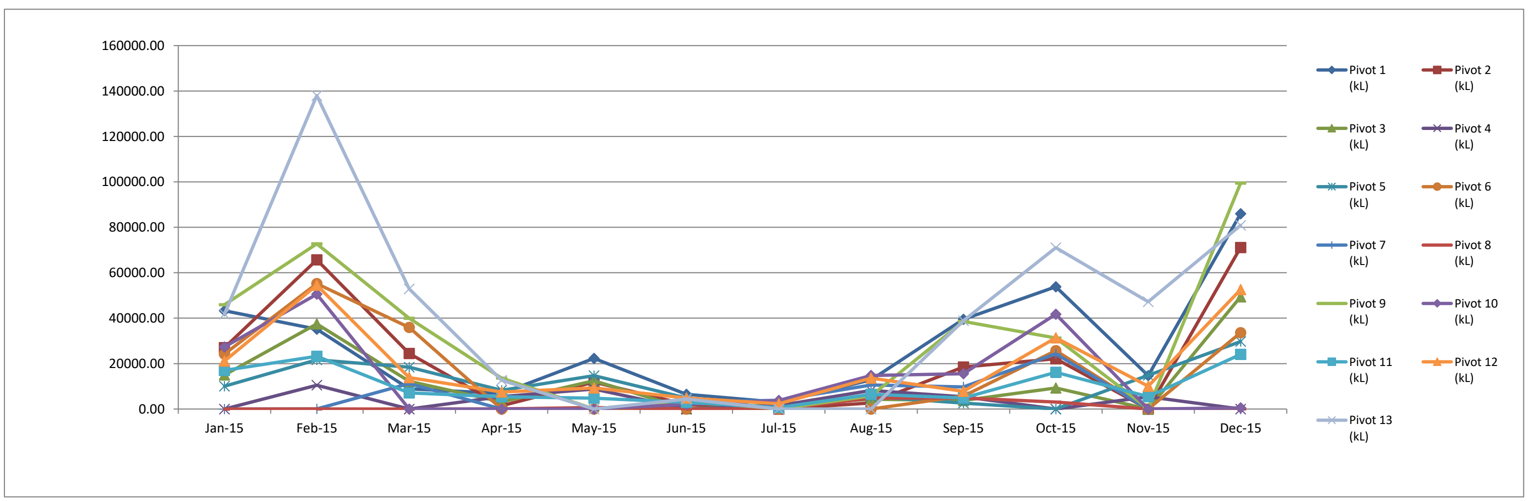
Pivot Flows 2014

	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	Rainfall mm
Jan-14	86063.80	68884.28	43892.17	8663.49	46872.58	38280.51	36141.38	15622.47	101831.80	61947.00	22634.48	49143.45	122821.98	**702799.39**	0.20
Feb-14	78257.19	52757.25	26528.04	0.00	24030.97	14615.81	13878.12	16075.17	73198.85	30083.10	0.00	5435.83	41805.51	**376665.84**	41.00
Mar-14	28196.15	15504.86	11525.08	0.00	17748.93	32925.65	13368.75	6340.77	24900.01	24130.87	11314.68	12733.92	37097.35	**235787.02**	88.00
Apr-14	17590.27	20219.53	7874.75	10601.20	11990.71	0.00	19574.34	39.67	27384.81	0.00	7109.64	23775.42	49209.00	**195369.34**	5.80
May-14	21517.71	10958.59	14948.16	7266.08	16196.50	0.00	0.00	4983.09	9622.98	8524.24	5639.02	11010.98	10468.21	**121135.56**	22.40
Jun-14	4257.47	819.55	0.00	3879.41	4822.12	0.00	7239.65	2259.89	12789.81	4527.23	2665.73	5268.09	16270.26	**64799.21**	44.20
Jul-14	18286.39	15519.72	10908.56	5417.37	7165.24	0.00	0.00	1967.55	22500.20	6255.59	4017.22	12776.39	28650.99	**133465.22**	23.00
Aug-14	13978.59	16099.59	5363.37	7787.99	0.00	0.00	15529.24	1912.30	13129.76	12602.41	3623.74	4898.69	3450.55	**104346.33**	62.60
Sep-14	32224.46	23496.28	20041.95	8176.73	8176.73	8527.15	26084.86	3550.90	33361.84	25005.26	10596.58	17079.64	24920.84	**241243.22**	15.80
Oct-14	51006.15	35663.71	27914.13	20362.13	34872.61	30136.05	24606.98	8726.35	60366.72	22165.21	13972.89	21986.79	64329.34	**416109.06**	19.20
Nov-14	76426.60	65877.25	7775.60	28336.44	45203.21	7386.49	28976.76	1236.84	62134.01	48006.84	19569.61	53662.70	142684.33	**587276.68**	32.40
Dec-14	35863.51	9856.28	1420.89	0.00	13055.92	17102.59	0.00	0.00	16220.20	16850.05	7094.21	7908.90	22489.62	**147862.17**	195.80
Totals	**463668.29**	**335656.89**	**178192.70**	**100490.84**	**230135.52**	**148974.25**	**185400.08**	**62715.00**	**457440.99**	**260097.80**	**108237.80**	**225680.80**	**564197.98**	**3326859.04**	**0.55**
Irrigation depth m	0.74	0.66	0.71	0.35	0.62	0.25	0.40	0.52	0.73	0.43	0.49	0.55	0.62	**0.55**	
Rainfall depth m	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	
Total depth m	1.50	1.43	1.48	1.12	1.39	1.02	1.17	1.29	1.50	1.20	1.26	1.32	1.39	1.32	
	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	
	-0.07	-0.14	-0.09	-0.45	-0.18	-0.55	-0.40	-0.28	-0.08	-0.37	-0.31	-0.25	-0.18	-0.25	
Evapotranspiration	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	**1.570272**	
Rainfall depth m	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	**0.5504**	
Irrigation required m	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.019872	
Irrigation with EF factor	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37		
Irrigation provided	0.74	0.66	0.71	0.35	0.62	0.25	0.40	0.52	0.73	0.43	0.49	0.55	0.62		
Percentange %	53.85	48.16	52.16	25.36	45.51	18.17	29.49	38.24	53.13	31.72	36.00	40.28	45.37		



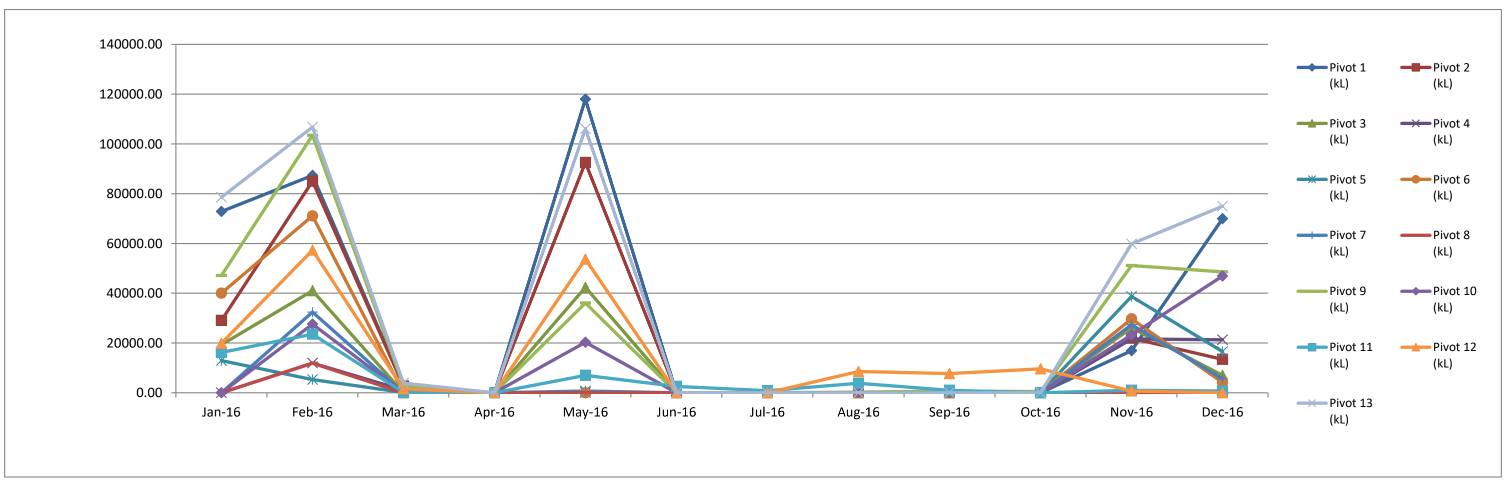
Pivot Flows 2015

	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	Rainfall mm
Jan-15	43301.12	27028.57	15011.63	0.00	10014.00	24257.69	0.00	0.00	45943.71	27308.96	17018.38	21118.32	41846.83	**272849.21**	90.40
Feb-15	35174.21	65660.48	37509.14	10471.40	21658.53	55183.97	41.17	24.22	72707.27	50533.00	23204.48	54542.96	137999.23	**564710.06**	22.60
Mar-15	8894.74	24493.26	12245.73	0.00	18433.57	35932.81	11242.16	0.00	39956.90	0.00	7117.76	13837.24	52870.90	**225025.07**	52.20
Apr-15	6846.00	1438.57	3130.84	5464.53	8277.03	0.00	0.00	74.57	13618.39	0.00	5387.75	7477.12	12650.38	**64365.18**	85.60
May-15	22258.70	11802.80	12452.49	8780.59	14666.75	0.00	0.00	704.57	39.18	0.00	4751.70	9253.99	0.00	**84710.77**	38.40
Jun-15	6450.97	2010.81	109.98	0.00	4838.17	0.00	3039.79	37.57	3505.80	2050.81	2910.15	4865.45	4406.62	**34226.12**	108.60
Jul-15	2988.84	0.00	1845.31	1519.98	0.00	0.00	3858.90	0.00	38.81	3747.18	645.18	2320.44	0.00	**16964.64**	33.80
Aug-15	12850.41	2657.89	4343.88	8217.48	5508.69	0.00	10577.54	4780.62	5767.59	14744.40	6517.62	13577.55	0.67	**89544.34**	53.80
Sep-15	39462.23	18451.16	3790.92	5415.75	2612.27	5740.65	9762.03	4861.13	38564.74	15535.63	4889.89	7804.84	38897.43	**195788.67**	23.60
Oct-15	53819.28	22134.79	9296.16	0.00	0.00	25692.01	24263.62	3061.68	31275.80	41737.72	16167.45	31326.85	71001.36	**329776.72**	50.00
Nov-15	14730.22	0.00	0.00	5404.41	14844.87	0.00	0.00	0.00	181.63	0.00	5477.95	10068.79	47202.53	**97910.40**	71.20
Dec-15	85959.98	71133.07	49427.58	0.00	29699.88	33560.96	0.00	28.05	99431.73	526.05	24043.62	52561.45	80897.28	**527269.65**	99.60
Totals	**332736.70**	**246811.40**	**149163.66**	**45274.14**	**130553.76**	**180368.09**	**62785.21**	**13572.41**	**351031.55**	**156183.75**	**118131.93**	**228755.00**	**487773.23**	**2503140.83**	**729.80**
Irrigation depth m	0.53	0.48	0.60	0.16	0.35	0.30	0.14	0.11	0.56	0.26	0.54	0.56	0.54	**0.42**	
Rainfall depth m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total depth	0.53	0.48	0.60	0.16	0.35	0.30	0.14	0.11	0.56	0.26	0.54	0.56	0.54	0.42	
	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	
	-0.92	-0.97	-0.85	-1.29	-1.10	-1.15	-1.31	-1.34	-0.89	-1.19	-0.91	-0.89	-0.91	-1.03	
Evapotranspiration	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	**1.45**	
Rainfall depth m	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	0.7298	**0.7298**	
Irrigation required m	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	0.7202	
Irrigation with EF factor	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	0.965068	
Irrigation provided	0.53	0.48	0.60	0.16	0.35	0.30	0.14	0.11	0.56	0.26	0.54	0.56	0.54		
Percentange %	54.73	50.15	61.83	16.18	36.56	31.15	14.14	11.72	57.74	26.97	55.64	57.81	55.54		



Pivot Flows 2016

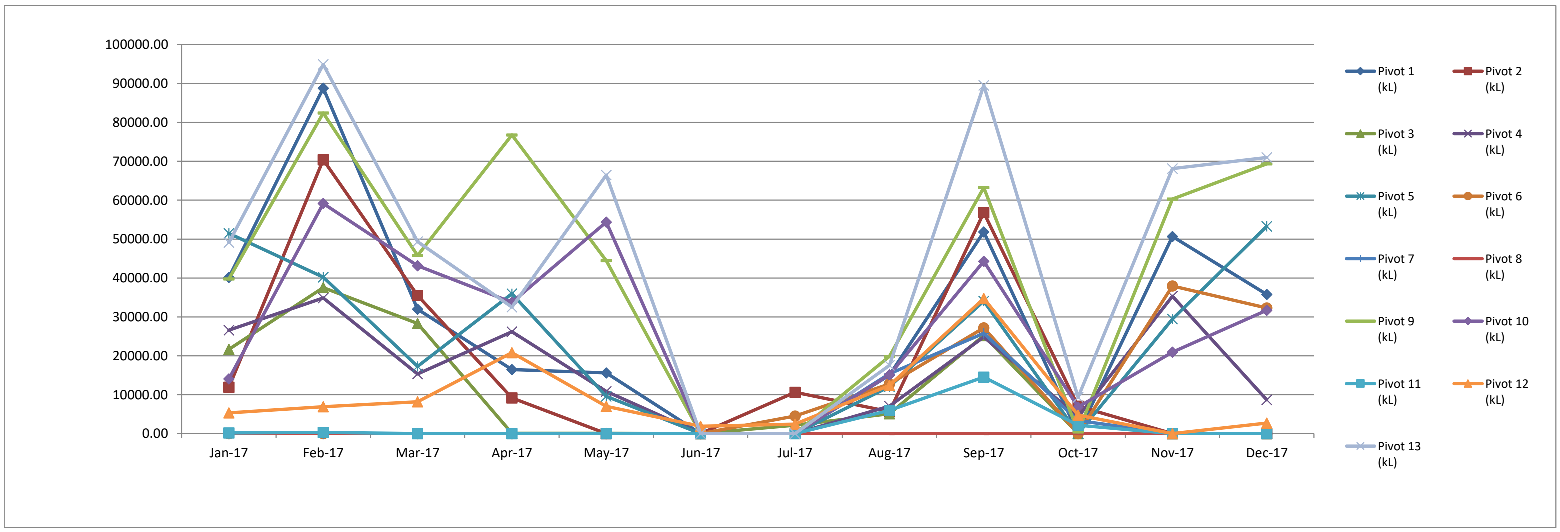
	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	Rainfall mm
Jan-16	72834.41	29090.91	19306.86	0.00	12982.99	40070.47	0.00	1.35	47111.34	0.00	16189.34	19863.63	78565.46	**336016.76**	99.60
Feb-16	87330.23	85000.69	41047.93	11957.08	5319.79	71111.53	32430.44	11866.46	103460.61	27603.72	23551.50	57295.56	106792.05	**664767.59**	0.80
Mar-16	2736.64	2715.61	0.00	1097.15	150.23	0.00	0.00	0.00	2989.15	0.00	178.71	1547.61	3920.62	**15335.72**	22.00
Apr-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	4.80
May-16	117948.20	92526.60	42379.35	87.95	705.94	30.73	111.78	0.00	36042.78	20297.79	7040.93	53685.15	106106.47	**476963.67**	60.80
Jun-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.95	0.00	2569.53	0.00	0.00	**2573.48**	169.00
Jul-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.54	0.00	851.07	0.00	0.00	**858.61**	28.60
Aug-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	299.59	0.00	3817.27	8528.67	0.00	**12645.53**	83.20
Sep-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	740.77	0.00	975.10	7727.55	0.00	**9443.42**	132.60
Oct-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	516.38	0.00	0.14	9656.10	0.00	**10172.62**	76.00
Nov-16	16896.83	21913.41	26076.41	21652.73	38724.49	29701.62	27405.76	0.00	51132.54	23271.62	980.75	712.53	59842.33	**318311.02**	11.60
Dec-16	69959.08	13413.73	7040.33	21273.71	16552.69	4199.94	5697.65	0.00	48614.91	46892.86	732.76	16.36	74980.66	**309374.68**	96.60
Totals	**367705.39**	**244660.95**	**135850.88**	**56068.62**	**74436.13**	**145114.29**	**65645.63**	**11867.81**	**290919.56**	**118065.99**	**56887.10**	**159033.16**	**430207.59**	**2156463.10**	**785.60**
Irrigation depth m	0.58	0.48	0.54	0.19	0.20	0.24	0.14	0.10	0.46	0.20	0.26	0.39	0.47	**0.36**	
Rainfall depth m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total depth m	0.58	0.48	0.54	0.19	0.20	0.24	0.14	0.10	0.46	0.20	0.26	0.39	0.47	0.36	
	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	
	-0.86	-0.97	-0.90	-1.25	-1.25	-1.21	-1.30	-1.35	-0.99	-1.25	-1.19	-1.06	-0.97	-1.09	
	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	1.448357	**1.448357**	
	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	0.7856	**0.7856**	
	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	0.662757	
Evapotranspiration	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	**1.448357**	
Rainfall depth m	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	**0.7856**	
Irrigation required m	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66		
Irrigation with EF factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89		
Irrigation provided	0.58	0.48	0.54	0.19	0.20	0.24	0.14	0.10	0.46	0.20	0.26	0.39	0.47		
Percentange %	65.72	54.02	61.19	21.77	22.65	27.23	16.07	11.14	52.00	22.16	29.12	43.68	53.23		



Pivot Flows 2017

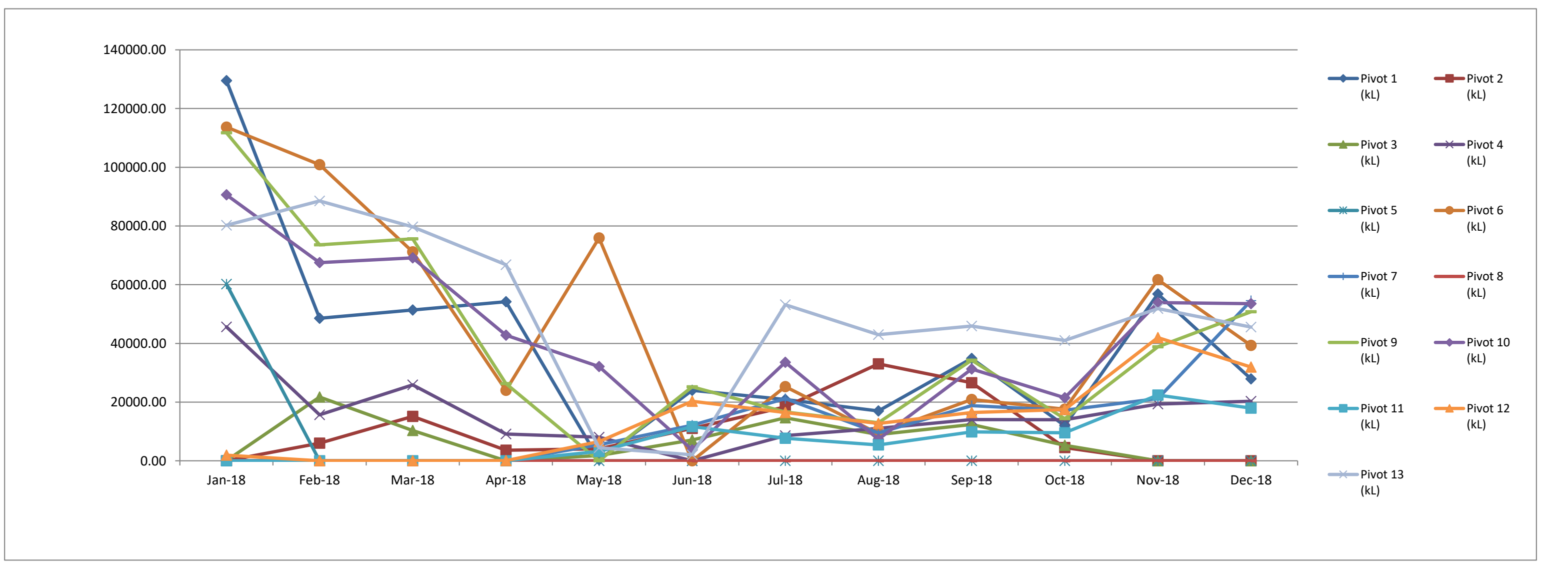
	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	Rainfall mm
Jan-17	40145.33	11906.57	21654.27	26591.92	51452.58	0.00	0.00	0.00	39740.65	14047.21	186.85	5328.94	49126.36	**260180.68**	125.40
Feb-17	88802.55	70375.20	37521.03	34867.03	40219.60	0.00	0.00	0.00	82404.39	59146.05	286.69	6921.50	94887.17	**515431.21**	18.60
Mar-17	31981.20	35486.77	28293.44	15305.60	17246.60	0.00	0.00	0.00	45752.69	43138.44	0.00	8177.40	49340.12	**274722.26**	124.20
Apr-17	16455.82	9167.32	58.30	26176.44	35944.17	0.00	0.00	0.00	76750.71	33727.10	0.00	20795.77	32508.71	**251584.34**	13.80
May-17	15608.18	0.00	53.91	10863.60	9573.40	0.00	0.00	0.00	44473.90	54362.69	0.00	7018.39	66443.67	**208382.64**	60.80
Jun-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	1878.74	0.00	**1878.97**	48.60
Jul-17	0.00	10628.86	2168.25	0.00	0.00	4498.89	0.00	0.00	0.51	0.00	0.00	2413.19	0.00	**19709.70**	19.80
Aug-17	14994.39	5656.39	5115.03	7053.98	12078.37	12751.38	15372.74	0.00	19864.73	15099.74	5953.78	12362.60	17561.11	**143864.24**	20.60
Sep-17	51814.00	56809.80	25174.49	24831.17	34057.29	27197.35	25775.41	0.00	63256.38	44288.66	14521.59	34720.69	89520.91	**491967.74**	10.00
Oct-17	11.65	7047.03	0.00	4266.76	0.00	0.00	3352.63	0.00	421.62	6827.45	2162.76	4721.63	9330.05	**38141.58**	89.80
Nov-17	50661.51	0.00	0.00	35312.19	29427.00	37934.07	0.00	0.00	60308.41	20931.86	0.00	0.00	68119.75	**302694.79**	64.40
Dec-17	35778.55	0.00	0.00	8650.38	53293.56	32291.03	0.00	0.00	69350.60	31703.45	0.00	2702.24	70968.70	**304738.51**	39.40
Totals	**346253.18**	**207077.94**	**120038.72**	**193919.07**	**283292.57**	**114672.72**	**44500.78**	**0.00**	**502324.59**	**323272.88**	**23111.67**	**107041.09**	**547806.55**	**2813296.66**	**635.40**
Irrigation depth m	0.55	0.41	0.48	0.67	0.77	0.19	0.10	0.00	0.80	0.54	0.11	0.26	0.60	**0.47**	
Rainfall depth m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total depth	0.55	0.41	0.48	0.67	0.77	0.19	0.10	0.00	0.80	0.54	0.11	0.26	0.60	0.47	
	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	
	-0.93	-1.07	-0.99	-0.81	-0.71	-1.28	-1.38	-1.47	-0.68	-0.94	-1.37	-1.21	-0.87	-1.01	

	Pivot 1	Pivot 2	Pivot 3	Pivot 4	Pivot 5	Pivot 6	Pivot 7	Pivot 8	Pivot 9	Pivot 10	Pivot 11	Pivot 12	Pivot 13
Evapotranspiration	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
Rainfall depth m	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Irrigation required m	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Irrigation with EF factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Irrigation provided	0.55	0.41	0.48	0.67	0.77	0.19	0.10	0.00	0.80	0.54	0.11	0.26	0.60
Percentange %	48.83	36.07	42.66	59.40	68.02	16.98	8.59	0.00	70.83	47.86	9.33	23.19	53.48



Pivot Flows 2018

	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	Rainfall mm
Jan-18	129511.02	0.00	84.99	45632.78	60204.97	113697.32	0.00	84.99	111753.64	90611.03	0.00	1917.34	80212.57	**633710.65**	22.00
Feb-18	48545.34	5997.43	21726.96	15687.29	0.26	100882.82	0.00	0.00	73573.21	67528.27	0.00	2.54	88529.41	**422473.53**	38.60
Mar-18	51362.53	15146.86	10342.04	25855.72	0.00	71173.32	0.00	0.00	75617.53	69130.35	0.00	8.50	79692.46	**398329.31**	6.00
Apr-18	54188.28	3631.24	0.00	9138.69	0.00	24002.75	0.00	0.00	26303.64	42818.80	0.00	48.96	66821.53	**226953.89**	13.00
May-18	348.54	4091.72	1825.41	8053.97	0.00	75921.40	5470.36	0.00	5.34	32086.64	3168.07	6535.41	4456.25	**141929.12**	1.60
Jun-18	24008.66	11036.65	7065.79	0.00	0.00	0.00	12122.42	0.00	25210.69	3720.70	11641.59	20266.08	2058.34	**117130.92**	11.40
Jul-18	20886.01	18396.60	14630.44	8600.88	0.00	25241.80	21183.24	0.00	16613.10	33574.93	7707.00	16447.84	53188.08	**236469.92**	9.00
Aug-18	16979.60	33021.72	8960.20	11053.65	0.26	9217.25	9467.65	0.00	12941.61	7352.01	5430.29	12732.55	42988.71	**170145.50**	29.40
Sep-18	34889.09	26602.31	12341.83	14046.64	0.00	20894.78	18783.78	0.00	34278.15	31294.08	9830.68	16430.55	45925.54	**265317.43**	47.40
Oct-18	11954.10	4481.69	5307.58	13962.31	0.00	17576.13	17230.68	0.00	14323.90	21503.38	9527.82	17478.34	41015.89	**174361.82**	63.60
Nov-18	56811.80	0.00	0.00	19342.33	0.00	61719.92	21212.78	0.00	38816.72	53882.13	22397.85	41973.02	51843.64	**368000.19**	85.00
Dec-18	27919.10	0.00	0.00	20271.97	0.00	39285.33	54527.38	0.00	50771.23	53520.29	17935.95	31956.25	45577.67	**341765.17**	51.60
Totals	**477404.07**	**122406.22**	**82285.24**	**191646.23**	**60205.49**	**559612.82**	**159998.29**	**84.99**	**480208.76**	**507022.61**	**87639.25**	**165797.38**	**602310.09**	**3496587.45**	**378.60**
Irrigation depth m	0.76	0.24	0.33	0.66	0.16	0.93	0.35	0.00	0.76	0.85	0.40	0.40	0.66	**0.58**	
Rainfall depth m	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total depth	0.76	0.24	0.33	0.66	0.16	0.93	0.35	0.00	0.76	0.85	0.40	0.41	0.66	0.58	
	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	
	-0.94	-1.46	-1.37	-1.04	-1.54	-0.77	-1.35	-1.70	-0.94	-0.86	-1.30	-1.30	-1.04	-1.12	
Evapotranspiration	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	**1.701813**	
Rainfall depth m	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38		
Irrigation required m	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32		
Irrigation with EF factor	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77		
Irrigation provided	0.76	0.24	0.33	0.66	0.16	0.93	0.35	0.00	0.76	0.85	0.40	0.40	0.66		
Percentange %	42.74	13.54	18.56	37.27	9.18	52.60	19.62	0.04	42.99	47.66	22.47	22.81	37.33		



Pivot Flows 2019

	Pivot 1 (kL)	Pivot 2 (kL)	Pivot 3 (kL)	Pivot 4 (kL)	Pivot 5 (kL)	Pivot 6 (kL)	Pivot 7 (kL)	Pivot 8 (kL)	Pivot 9 (kL)	Pivot 10 (kL)	Pivot 11 (kL)	Pivot 12 (kL)	Pivot 13 (kL)	Total Pivot Flow (kL)	Total rainfall mm
Jan-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**626938.68**	[illegible]
Feb-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**529532.75**	[illegible]
Mar-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**271543.87**	[illegible]
Apr-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**251027.99**	[illegible]
May-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**66539.20**	[illegible]
Jun-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**131160.34**	[illegible]
Jul-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**42089.72**	[illegible]
Aug-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**462429.95**	[illegible]
Sep-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**472970.28**	[illegible]
Oct-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**154825.57**	[illegible]
Nov-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**348484.58**	[illegible]
Dec-19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**383420.13**	[illegible]
Totals	**389689.77**	**211769.65**	**163795.58**	**259798.30**	**0.07**	**563250.03**	**415324.65**	**0.00**	**310952.76**	**558401.39**	**171568.38**	**360734.39**	**335678.09**	**3740963.06**	**263.60**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**0.62**	
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	Pivot 1	Pivot 2	Pivot 3	Pivot 4	Pivot 5	Pivot 6	Pivot 7	Pivot 8	Pivot 9	Pivot 10	Pivot 11	Pivot 12	Pivot 13
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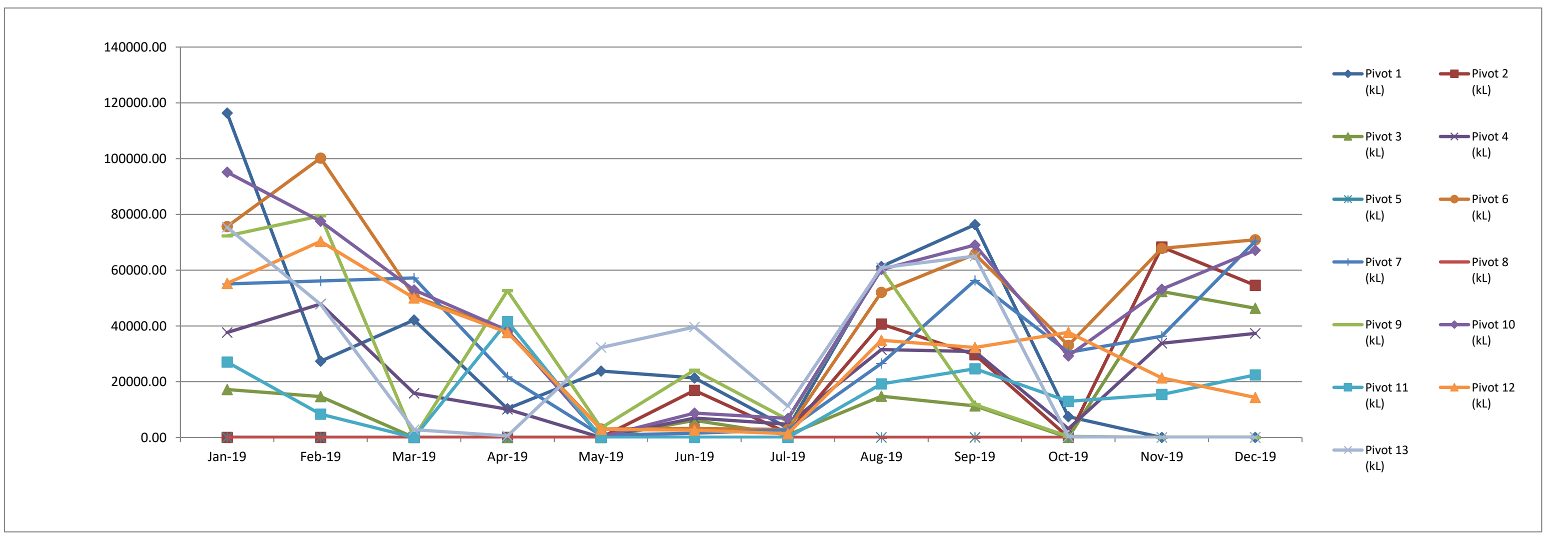

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□□□	□□□12□□□	12□□32□2□	□□□	□□2□	□□□□	□□□□	32□	2□□	□□□	□□□1	□□□	□□□	121	□□□3	□	□	□	□	22□	□□□□	2□□3	□□□	□□□□	□□□□	3□□□	21□1□	2□□□	□□□1	□□□1	□1□□	33□□	□□□□	□□□1	□□□1	1□□□	22□2
□□□	□□1□□□	12□□32□2□	□□□□	□□1□	□□□□	□□□1	121□	□□2	□□□	1□□	2□□□	□□□	□□□□	1□□2	3□□□	1□□□	1□□	2□□□	□□□	□2□□	□□3	□□1	□□□□	3□2□	21□□	□□2□	2□□□	□□□1	□□23	□□1□3	23□□	□□□□	□□□2	3□□1	2□□□	21□□
□□□	1□□□□□□	12□□32□2□	□□□□	□□2□	□□□□	□□□3	□31	□□□	3□□	1□□	1□□3	□□□	12□	□□□□	□	□	□	□	2□3	□□2□	133□	2□□	□□□□	□□□□	2□□□	11□1□	1□2□	□□□1	1□□2	□□□□	2□□1	2□□1	□□□2	□2□□	2□□□	1□□□
□□□	□□□12□□□	12□□32□2□	33□1	□□2□	□□□□	□□□1	2□□	□1□□	□□□	□1□2	□□1	□□□□	1□1	□□3□	□	□	□	□	23□	□□□□	2231	□□□	□□□□	□□□□	□□□□	1□□□□	2□□□	□□□1	□□□□	□□□□	2□□□	□□□□	□□□1	□2□□	2□1□	22□□
□1□	□□1□□□	12□□32□2□	1□□□□	□□2□	□□□□	□□□□	21□3	11□2	□□□	23□	1□□2	1□2	1□3	2□□□	1□□	□□□1	1□3	1□□3	□22	□□□□	□11	33□	1□2□	1□3□	3□□□	□□2□	1□□□	□□□1	3□2□	□2□□	1□□□	3□□□	□□□3	□1□1	□□□□	2□□□
□1□	1□□□□□□	12□□32□2□	□□□□	□□13	□□□□	□□3□	□□□	2□□	2□□	1□1	□□□	□□□	1□□	□□□2	□	□	□	□	1□□	□3□□	□□□2	1□□	□□□□	□□□1	21□□	□□□□	□□□3	□□□1	1□□2	□□□3	1□□2	2□□□	□□□3	2□□□	□□□□	13□3
□1□	□□□12□□□	12□□32□3□	□□□3	□□2□	□□□2	□□□2	□□□	3□□	□□□	□3□1	□□□	□□□	1□□	□□□□	□	□	□	□	21□	□□□□	1□□□	□2□	□□□1	□□□□	33□□	12□□□	2□2□	□□□1	1□11	□□□□	2□□□	□□□□	□□□1	□□□□	2□□□	23□3
□11	□□1□□□	12□□32□31	212□□	□□2□	□□□3	□□□2	13□□	□□1	□□□	221	2□□3	□□2	13□	1□□□	11□	□3□□	1□3	1□□□	□□□	□□□1	□1□	2□□	□□□3	1□3□	2□□□	□□□2	1□1□	□□□1	3□□□	□□□□	1□□□	3□□□	□□□2	3□□□	□□□□	2□□□
□11	1□□□□□□	12□□32□32	12□3	□□1□	□□1□	□□□□	□3□	□1□□	2□□	131	□□□	□□□	21□	□□□□	□	□	□	□	3□□	□□□□	11□□	2□□	1□1□	□□□2	□□□□	□□□□	1□2□	□□□1	1□□□	□□□3	1□□1	2□1□	□□□2	□□□□	□□□□	1□□□
□11	□□□12□□□	12□□32□33	□□□	□□2□	□□□3	□□□□	□□□	□1□□	1□□	□□□2	□□1	□□□	21□	□□□3	□	□	□	□	32□	□□□1	13□□	□□3	1□□□	□□□□	□□□2	11□2□	3□□□	□□□1	1□33	□□□2	1□□□	□□□□	□□□2	□2□□	□□1□	2□□□
□12	□□1□□□	12□□32□3□	1□1□□	□□2□	□□1□	□□□□	1□□2	□□□	□□□	3□□	1□□2	2□3	1□□	1□□□	□□	□1□□	1□□	2□1□	□3□	32□□	1□13	□3□	□□3□	3□□□	2□□□	□□□□	2□3□	□□□□	□□□□	□□□□	2□□□	□□□□	□□2□	□1□2	3□1□	2□□□
□12	1□□□□□□	12□□32□3□	1□2□□	□□33	□□12	□□□□	□32	□□1	□□□	1□□	□□□	□□□	21□	□□□□	□	□	□	□	33□	□□2□	1□□□	□□□	□□□□	□□□□	□□□□	1□□31	2□□□	□□□1	1□12	□□□□	21□□	3□3□	□□□1	□□□□	3□□□	2□□□
□12	□□□12□□□	12□□32□3□	□□□□□	□□□□	□□□□	□□□□	□□□	□1□□	□□□	1□3	□□□	□□□	1□2	□□3□	□	□	□	□	2□2	□□□□	2□□□	12□□	□□□2	□□□2	3□□□	21□2□	□□□□	□□□1	1□1□	□□□□	32□3	□□2□	□□□1	□□□□	1□□1	1□□□
□13	□□1□□□	12□□32□3□	□□□□	□□1□	□□1□	□□□□	1□3□	1□□□	□□□	2□□	1□□□	2□□	12□	1□□□	□□□□	□2□2	12□	1□□2	□□□	3□□□	□□□	□□□	□□□1	2□2□	1□□3	□□□□	1□□□	□□□1	□□□□	□2□□	22□□	□□□□	□□□2	2□□3	2□□□	2□□3
□13	1□□□□□□	12□□32□3□	1□2□□	□□1□	□□□□	□□□□	□□□	3□□	2□□	1□□	□□□	□□□	13□	□□□□	□	□	□	□	2□□	□□□□	11□□	21□	□□□□	□□□□	2□□□	□□□□	□□□3	□□□1	2□□2	□□□2	2□□2	2□□□	□□□2	3□□□	2□□1	2□□□
□13	□□□12□□□	12□□32□3□	1□2□□	□□2□	□□33	□□□□	□□1	□1□□	3□□	□□□□	□□□	□□□	1□□	□□□1	□	□	□	□	2□□	□□□□	1□□□	31□	□□□2	□□□□	3□□□	12□□□	1□3□	□□□1	1□2□	□2□□	23□□	2□□□	□□□1	□2□□	3□1□	12□□
□1	□□1□□□	12□□32□□□	1□□□	□□□□	□□□□	□□□□	111□	2□□	3□□	11□	1□□2	□□□	□□□3	1□3□	□□□□	□□□2	1□□□	□□21	□□□	□□□2	1113	□□□1	□□□□	1□2□	2□□□	□□2□	□□2□	□□□1	3□□□	□□3□	22□□	□□□2	□□□2	□□□□	3□22	2□□□
□1	1□□□□□□	12□□32□□1	1□□□	□□13	□□□□	□□2□	□1□	1□□	□□2	□3□□	□□□	□□□	1□□	□□□□	□	□	□	□	2□□	□33□	12□□	□□□3	□□□2	□□□3	3□□□	1□□□□	□□31	□□□1	1□□□	□□□□	22□□	□□□3	□□□2	□□□3	3□□□	1□□□
□1	□□□12□□□	12□□32□□2	1□□□	□□1□	□□□□	□□□□	□□□	1□□	□□□	□1□□	□□□	1□3	1□□	□□□2	□	□	□	□	1□1	□32□	11□□	11□	□□□□	□□□□	□1□□	□□□2	□□□□	□□□1	□□□3	□□□2	1□□□	□□□□	□□□1	□2□□	□□2□	1□□□
□2	□□1□□□	12□□32□□3	1□□□	□□□□	□□22	□□□3	1□□□	□□□	□□2	23□	23□□	□□□	□□□□	1□□□	2□□□	11□□	□□□□	□□1□	3□□	2□□□	□3□	2□□□	□□□3	□□□□	1□□□	□□□□	□□12	□□□1	□□□1	□1□□	22□□	□□□□	□□□□	1□□□	3□1□	33□3
□2	1□□□□□□	12□□32□□□	13□□	□□1□	□□□1	□□□□	□□□	2□2	3□2	1□2	1□□□	□□□	1□1	□□□□	□	□	□	□	2□□	□□33	□□□	1□□	□□11	□□□□	32□□	□□□□	□□□□	□□□□	1□□□	□2□2	1□□3	1□□□	□□11	3□□□	□□□3	3□□□
□2	□□□12□□□	12□□32□□□	11□□	□□1□	□□31	□□□□	□□□	1□□	2□2	□3□1	□□□	□□□	1□3	□□3□	□	□	□	□	1□□	□□2□	□□□	1□□	□□□3	□□□□	□□□1	□□□□	□□□□	□□□1	□□□2	□□□3	□□□	1□□□	□□□1	□3□□	□□33	2□□3
□3	□□1□□□	12□□32□□□	2□□□	□□□□	□□13	□□□□	132□	□□□	□□□	232	1□□□	2□2	□□□□	□□□□	□1□□	□3□1	2□□3	□□□□	1□2	2□□3	□□1	23□□	□□□□	□□□□	12□□	3□□□	□□1□	□□□1	2□□□	□□3□□	23□□	□□□3	□□□□	1□□3	3□2□	3□□□
□3	1□□□□□□	12□□32□□□	1□□□	□□□□	□□□3	□□13	□11	1□□	3□3	1□□	1□□□	□□□	1□□	□□□1	□	□	□	□	13□	□13□	□□□	□□□□	□□□	□□3□	2□□□	□□32	□□3□	□□□1	1□2□	□□2□□	2□□□	1□3□	□□□3	2□□□	2□□3	3□□□
□3	□□□12□□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□	□□
□□	□□1□□□	12□□32□□□	21□□	□□□□	□□33	□□□1	1221	□□2	□□□	21□	□□□3	3□□□	□□□□	1□31	11□□	3□□□	1□	□□3□	□□□	□□□	221	2□□1	12□2	1□23	2□□	1□□□	□□12	□□1□	1□□□□	□□□□	2□□□	1□□□	2□1□	□□3	1□□□	31□3
□□	1□□□□□□	12□□32□□□	1□□□	□□1□	□□□□	□□□3	□□□	□1□□	□□3	13□	12□3	□□□	1□□	□□3□	□	□	□	□	3□□	1□3□	13□□	□□□	□□□3	□□□□	□□2	11□2□	2□□3	□□□1	□□2□	3□□□	□□□□	11□□1	□□□3	23□□	□□□3	□□3□
□□	□□□12□□□	12□□32□□□	1□2	□□3□	□□□□	□□□□	□□□	□1□□	3□2	1□3	11□2	□□□	2□3	□□1□	□	□	□	□	3□□	21□□	1□□3	1□3□	□□□□	□□□□	1□□□	12□11	□□□1	□□□□	3□2□	3□□2	□□2□	1□□□□	□□31	2□□□	□□□□	□□□□

2013

Sample ID	Depth	Units	Chlorides	Electrical Conductivity	pH (H_2□□	pH ($CaCl_2$□	Total Nitrogen	NO_3□	NH□	Total Phosphorus	Phosphorus Ex	Phosphorus Ex	Phosphorus Buffer Index	Organic Carbon	Calcium Soluble	Magnesium Soluble	Sodium Soluble	Sodium Adsorption Ratio
Method Description			□r□□□	□□□ □□r□1	□□□□r□d□	□□□□r□d□	□□□d□□□	□□□□□□□□	2M□□□	□r□□□ □r□□□	□□□□ □□□	□r□□□1	□□□□ □□□	□□□□	□□□ □□r□	□□□ □□r□	□□□ □□r□	□□□□
Method Reference			R□□□□1	R□□□3□1	R□□□□1	R□□□□2	□□□□□□	□□□□□□	□□□□□□	□□□□□□	R□□□□1	R□□□□1	R□□□3	□□□□□□	R□□□1□□	R□□□1□□	R□□□1□□	□□□□
			mg/kg	dS/m	pH units	pH units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	-
001	0-15cm	130784-1	12□	□2□	□1□	□3□	12□□	2□3	1□□	2□□	3□□□	1□□□	123	2□1□	11□	1□1	2□□	□□3
001	15-60cm	130784-2	133	□2□	□1□	□□1	□□□	1□1	1□1	11□	1□□□	□□□	12□	1□□1	□	□	□	□
001	60-120cm	130784-3	3□□□	□1□	□□1	□□1	2□□	□□□□	1□3	□□□□	□□□	□□□	122	3□2□	□	□	□	□
002	0-15cm	130784-4	□3□□	□2□	□33	□□2	3□□3	□□□	1□2	311	1□□□	3□□	13□	1□□□	□3□□	12□□	23□	□□□□
002	15-60cm	130784-5	2□□	□□2	□□□□	□□□□	□□□	□□□	2□1	2□□	12□1	□□□	22□	1□31	□	□	□	□
002	60-120cm	130784-6	□□□□	□1□	□3□	□□1	3□□	1□□	□□□	2□□	1□□□	□□□	2□1	3□□□	□	□	□	□
003	0-15cm	130784-7	□□□□	□2□	□□□□	□11	1□□□	3□□	1□□	1□□	1□□□	3□2	12□	1□□□	□□□□	2□□1	21□	□33
003	15-60cm	130784-8	2□2	□3□	□32	□□2	□□□	3□□	1□□	11□	□□1	□□□	1□□	1□12	□	□	□	□
003	60-120cm	130784-9	1□2	□1□	□□□□	□□□□	1□2□	□□□	1□2	□2□□	□□□	□□□□	1□□	1□□□	□	□	□	□
004	0-15cm	130784-10	□□□□	□22	□□1	□31	1113	□□2	□□□	222	□□2	2□3	11□	1□□□	11□	□□2	1□3	3□33
004	15-60cm	130784-11	□1□□	□21	□□□□	□□□□	2□□2	□□□	1□□	□□2	11□3	□□□	11□	1□□3	□	□	□	□
004	60-120cm	130784-12	3□□□	2□□□	□□□□	□□□□	□2□	□□□	1□□	12□	□□□	1□□	11□	□□□1	□	□	□	□
005	0-15cm	130784-13	□1□□	□13	□□3	□□□□	11□1	□□□	2□□	211	3□□□	1□□□	12□	1□□3	□□□□	□□2	11□	2□□□
005	15-60cm	130784-14	□□□□	□1□	□□3	□□□□	□□□	1□□	2□1	□3□□	□□□	1□□	12□	□□□□	□	□	□	□
005	60-120cm	130784-15	□□□3	□23	□3□	□□□□	2□□	□□□	2□2	□3□□	□□□	□□□	13□	□□□□	□	□	□	□
006	0-15cm	130784-16	□2□□	□1□	□3□	□□1	□□□	□3	2□1	133	1□2	2□□	121	1□2□	3□□□	2□□□	22□	□33
006	15-60cm	130784-17	1□□	□2□	□□2	□□1	□□2	2□□	1□3	□□□□	□2	1□□	11□	□□□□	□	□	□	□
006	60-120cm	130784-18	2□□1	□21	□□□□	□□1	□2□	□□□	1□1	□□□□	□□1	□□□	11□	□□□□	□	□	□	□
007	0-15cm	130784-19	31□2	□1□	□32	□□1	1□□□	□□□	1□□	1□□	22□2	□□□	112	1□□□	□□3	1□□□	13□	3□□□
007	15-60cm	130784-20	□1□□	□1□	□□2	□1□	□□□	3□□	1□□	□2□□	□□□	□□□	11□	□□□3	□	□	□	□
007	60-120cm	130784-21	□2□□	2□□2	□□□□	□3□	1□□2	□□□	1□□	1□□	□□□	□□□	111	□□□2	□	□	□	□
008	0-15cm	130784-22	□□□□	□1□	□□□□	□13	12□2	□□1	1□□	2□□	3□□2	□□1	11□	1□□□	1□□	2□□□	223	□□□□
008	15-60cm	130784-23	1□□	□2□	□1□	□□□□	1□□□	1□□	1□□	□□□□	□3	□□□	1□3	□□□□	□	□	□	□
008	60-120cm	130784-24	□□□□	□23	□□2	□□□□	2□□	1□□	2□3	□□□□	□□1	□□□	131	□□□□	□	□	□	□
009	0-15cm	130784-25	3□□□	□1□	□□□□	□□□□	1□□□	3□□	2□□	1□□	2□□1	3□□	11□	1□□2	□1□□	□3□2	2□3	□32
009	15-60cm	130784-26	1□□	□2□	□□□□	□□□□	32□	2□3	1□2	□□□2	□□□	□□□	1□□	□□□□	□	□	□	□
009	60-120cm	130784-27	32□3	2□□□	□□3	□□3	112	□□□	□□□	□□□□	□□□	□□□	13□	□3□□	□	□	□	□
010	0-15cm	130784-28	2□□□	□1□	□□□□	□2□	2□1□	□□□	2□□	2□□	21□□	□□□	1□□	2□3□	1□□	22□1	1□□	3□□2
010	15-60cm	130784-29	1□□	□2□	□□□□	□□□□	□11	2□□	□□□	133	□□□	□□□	223	1□□□	□	□	□	□
010	60-120cm	130784-30	□□□□	□21	□2□	□□3	□□3	1□2	□□□	13□	□□□	□□□	□□□□	□□□1	□	□	□	□
011	0-15cm	130784-31	□1□□	□1□	□1□	□□1	12□□	11□□	2□3	2□□	3□□□	□□3	1□□	1□□□	□□□2	1□□□	1□3	□2□
011	15-60cm	130784-32	□3□□	□13	□□□□	□□□□	□□□	11□2	□□□	1□□	□□□	□□□	1□□	□□□□	□	□	□	□
011	60-120cm	130784-33	□□□2	□2□	□3□	□□□□	3□□	□□□	□□□	1□□	1□□□	□□□	1□□	□□□1	□	□	□	□
012	0-15cm	130784-34	3□□□	□1□	□□□□	□□3	□1□	□□□	2□□	333	21□□	2□2	13□	2□22	1□□□	13□□	1□□	□□□□
012	15-60cm	130784-35	3□1	□□□□	□□□□	□□□□	□2□	□□□	3□3	1□□	1□□□	□□□	1□1	□□□3	□	□	□	□
012	60-120cm	130784-36	3□□	□□1	□3□	□□□□	1132	1□□	□□□	11□	11□□	1□1	1□3	□□□□	□	□	□	□
013	0-15cm	130784-37	□□□□	□13	□33	□□□□	1□1□	3□□	2□□	2□□	1□□□	2□□	131	2□□2	1□□□	□□□	1□□	1□□1
013	15-60cm	130784-38	22□	□2□	□2□	□□□□	□□□	1□□	□□□□	113	□3	□□□	12□	□□□□	□	□	□	□
013	60-120cm	130784-39	□□□□	□1□	□3□	□□2	□□□	□□□	□□□□	□□□□	□□□	□□□	13□	1□32	□	□	□	□
C1	0-15cm	130784-40	13□2	□□□□	□□□□	□1□	11□□	□□1	2□□	1□□	21□□	□□3	12□	1□□3	□3□□	1□□□	2□□□	□□□2
C1	15-60cm	130784-41	1□□□	□□□□	□□□□	□□□□	□31	2□□	□□□□	1□□	11□3	□□□	11□	1□2□	□	□	□	□
C1	60-120cm	130784-42	1□□□	□22	□2□	□□2	□2□	□□□	□□□□	□□□2	□□□	□□□	112	1□□□	□	□	□	□
C2	0-15cm	130784-43	11□3	□□□□	□2□	□□□□	1□□□	□□□	2□□	2□□	2□□3	1□□	1□2	1□□□	□□□□	1□□□	1□□□	□□□□
C2	15-60cm	130784-44	1□□□	□□□□	□□□□	□□□□	□1□	1□□	□□□□	1□2	12□□	□□□□	1□□	□□□□	□	□	□	□
C2	60-120cm	130784-45	1□□□	□1□	□2□	□□1	2□3	2□2	3□1	□□□□	□3	3□□	13□	□31	□	□	□	□
C3	0-15cm	130784-46	13□□	□□□□	□2□	□□□□	1□□□	□□□	2□□	3□1	1□□□	3□□	1□3	1□□□	□2□2	21□2	1□□1	□□□□
C3	15-60cm	130784-47	1□□1	□□□□	□□2	□1□	11□□	□□□	□□□□	21□	12□□	□□□□	1□2	1□□□	□	□	□	□
C3	60-120cm	130784-48	1□□1	□1□	□32	□□□□	11□□	1□1	□□□□	231	□□□	□□□	12□	1□□□	□	□	□	□
C4	0-15cm	130784-49	11□□	□□□□	□□□□	□2□	□22	□□2	2□□	3□□	□1□□	3□□□	12□	1□□□	1□□□	1□□□	23□□	□□□1
C4	15-60cm	130784-50	23□□	□2□	□□□□	□□□□	□□□	1□1	□□□	1□□	1□□□	□□□	1□2	□□□2	□	□	□	□
C4	60-120cm	130784-51	21□□	□2□	□□□□	□□□□	□12	1□□	□□2	3□2	□□□	□□□	2□□	□2□	□	□	□	□

Sample ID	Depth	Units	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Ex Potassium %	Ex Calcium %	Ex Magnesium %	Ex Sodium %	Ex Aluminium %	ECEC	Ca/Mg Ratio	Dispersion
Method Description			□□□□□	□□□□□	□□□□□	□□□□□	□□□□□	□□□□□	□□□□□	□□□□□	□□□□□	□□□□□	□□□□	□□□□	□□□□	□□□□	□□□□	□□□□	□□□□	□□dr□□ □□□r
Method Reference			R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□	R□□□1□□1	R□□□1□□	R□□□1□□1								D□□□□2
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	%	%	%	%	meq/100g		%
001	0-15cm	130784-1	□23	□□□1	□□□	□□□	□3□	1□3□	2□□□	□□□□	2□3□	□□□□	3□□2	□□□□	21□□	□3□	□□□1	3□□□	3□1□	2□□□
001	15-60cm	130784-2	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	11□□
001	60-120cm	130784-3	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
002	0-15cm	130784-4	□□□	□3□□	3□1	□2□	□□□□	2□□□	31□□	3□1□	1□□□	□□□1	□23	□1□□	□□1	□□□□	□□□2	3□□□	1□□1	3□□□
002	15-60cm	130784-5	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□□□
002	60-120cm	130784-6	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	22□□
003	0-15cm	130784-7	□□□	□23□	□2□	□□□	□□□□	1□□3	2□□2	□□□3	2□□1	□□□1	2□□1	□1□□	1□□□	□□□□	□□□3	3□□□	3□□3	1□□□
003	15-60cm	130784-8	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	12□□
003	60-120cm	130784-9	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	12□□
004	0-15cm	130784-10	3□1	□□□□	□1□	2□□	1□2	□□3	2□□□	□□□□	1□2□	□□□1	2□□□	□□□1	1□□□	3□□□	□□□3	3□□□	□□□□	1□□□
004	15-60cm	130784-11	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
004	60-120cm	130784-12	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□1
005	0-15cm	130784-13	3□□	□□1□	□2□	2□3	□□□□	□□□□	2□□□	□□□□	1□1□	□□□1	2□□□	□□□□	2□□□	3□□□	□□□3	3□□□	3□□3	22□□
005	15-60cm	130784-14	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
005	60-120cm	130784-15	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
006	0-15cm	130784-16	3□□	□□□2	1□□1	□□3	□□□1	□□□□	2□□2	□3□	2□3□	□□□1	2□□1	□□□3	21□□	□1□	□□□2	3□□□	3□2□	23□3
006	15-60cm	130784-17	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□□□
006	60-120cm	130784-18	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□1
007	0-15cm	130784-19	□3□	□□□□	□□□	2□3	□□□□	1□13	2□□□	□3□	1□1□	□□□1	2□□□	□□□□	1□□□	2□□□	□□□2	3□□□	□□□□	1□□□
007	15-60cm	130784-20	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	13□□
007	60-120cm	130784-21	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□1
008	0-15cm	130784-22	□□3	□21□	1□2□	□23	□□□3	1□1□	31□1	□□□□	1□□□	□□□1	2□□3	□2□□	2□□1	□32	□□□2	□2□□	3□□3	11□1
008	15-60cm	130784-23	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□□□
008	60-120cm	130784-24	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
009	0-15cm	130784-25	□2□	□□□□	□1□	□3□	□□□□	1□□□	2□□□	□□3	1□□□	□□□1	3□□1	□□□□	2□□□	□11	□□□2	31□1	2□□□	1□□□
009	15-60cm	130784-26	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	11□□
009	60-120cm	130784-27	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□1
010	0-15cm	130784-28	□□□	□□□□	□1□	2□2	1□□□	2□□□	23□□	□3□	1□2□	□□□1	□□□□	□□□□	13□□	□□□2	□□□□	31□□	□□□□	13□□
010	15-60cm	130784-29	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□□□
010	60-120cm	130784-30	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□□□
011	0-15cm	130784-31	□□3	□□□□	□□□	2□3	□□□□	1□3□	23□□	□□3	1□□□	□□□1	□□□□	□□□□	1□2	3□□1	□□□2	31□□	□□□□	1□□3
011	15-60cm	130784-32	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
011	60-120cm	130784-33	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
012	0-15cm	130784-34	□□□	3□□3	□3□	3□□	□□□□	1□2	1□□□	□□□□	1□□□	□□□1	□□□□	□□□3	2□□□	□33	□□□□	2□□□	2□2□	23□3
012	15-60cm	130784-35	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□3
012	60-120cm	130784-36	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	13□□
013	0-15cm	130784-37	□□□	3□1□	□3□	3□□	□□□□	1□□□	1□□□	□□□□	1□□□	□□□1	□□□□	□□□1	22□□	□□□□	□□□3	2□□□	2□□□	23□3
013	15-60cm	130784-38	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□3
013	60-120cm	130784-39	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□□□
C1	0-15cm	130784-40	□□□	□□□□	11□□	□1□□	□□□□	1□2□	3□□2	□□□□	□□2□	□□□1	3□□□	□3□□	23□3	□□□□	□□□2	□1□□	3□1□	1□□3
C1	15-60cm	130784-41	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□2
C1	60-120cm	130784-42	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	12□1
C2	0-15cm	130784-43	2□□	2□□□	□□2	3□□□	□□□□	□□□3	13□□	3□□□	□1□	□□□□	3□□□	□□□□	2□□3	□□□□	□□□3	1□□□	3□□□	21□□
C2	15-60cm	130784-44	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	2□□□
C2	60-120cm	130784-45	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	11□1
C3	0-15cm	130784-46	23□	22□□	□1□	3□□□	□□□□	□□□□	11□□	3□□□	□□13	□□□1	3□□3	□3□□	22□3	□□□□	□□□□	1□□□	3□2□	11□1
C3	15-60cm	130784-47	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□□
C3	60-120cm	130784-48	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	1□□2
C4	0-15cm	130784-49	3□□	□□2	1□□	31□□	□1□□	□□□□	2□□1	1□3□	□1□	□□□□	1□□3	□□□1	2□□□	2□□□	□□□	□□□	1□□1	1□□□
C4	15-60cm	130784-50	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	11□1
C4	60-120cm	130784-51	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	31□□

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			Chlorides	Electrical Conductivity	pH (H$_2$□□	pH (CaCl$_2$□	Total Nitrogen	NO$_3$□	NH□□	Total Phosphorus	Phosphorus Ex	Phosphorus Ex	Phosphorus Buffer Index	Organic Carbon	Calcium Soluble	Magnesium Soluble	Sodium Soluble	Sodium Adsorption Ratio	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Ex Potassium %	Ex Calcium %	Ex Magnesium %	Ex Sodium %	Ex Aluminium %	ECEC	Ca/Mg Ratio	Dispersion
□□□ □□□□D	M□□□d□D□□r□□□□□		□r□□□	□□□□ □□r□1□□□	□□□r□d□	□□□r□d□	□□□□	□□□□□□□□□□□	2M□□□□	□□r□□□r□□□r□	□□□□□	□r□□□1	□□□□□	□□□□	□□□□ □□r□1	□□□□ □□r□1	□□□□ □□r□1	□□□	□□-□□	□□-□□	□□-□□	□□-□□	□□-□□	□□-□□	□□-□□	□□-□□	□□-□□	□□-□□	□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□dr□□ □□r
	M□□□d□R□□r□□□□		R□□□□1	R□□3□1	R□□□□1	R□□□□2	□□□□□□	□□□□□□	□□□□□□	□□□□□□	R□□□□1	R□□□□1	R□□□3	□□□□□□	R□□1□□1	R□□1□□1	R□□1□□1	□□□□	R□□1□□1	R□□1□□1	R□□1□□1	R□□1□□1	R□□1□□1	R□□1□□1	R□□1□□1	R□□1□□1	R□□1□□1	R□□1□□1								D□□□□2
	D□□□□	□□□□	mg/kg	dS/m	pH units	pH units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	%	%	%	%	meq/100g		%
1	□2□□□	1□□□□□□1	□□□2	□2□	□2	□□□2	1□□□	□□□	□□□	3□2	□□□□	31□2	13□	2□3	1□1	1□□	23□	2□□	□□□	□□□□	□□□	□1□	□□□□	1□□□	2□□□	□□□□	2□23	□□□1	□□2□	□□□□	22	□□□□	□□□2	3□□□	3□□3	23□1
1	2□□□□□□	1□□□□□□2	□□□2	□2□	□□□	□□□2	□□□	□□□	2□2□	1□3	□□□□	1□3□	1□3	1□□□	11□	32	□□□□	1□□	311	□□□□	1□3□	2□1	□□□2	□□□	□2□□	12	1□□□	□□□□	1□□1	□□□□	21□1	1□□□	□□□1	□□□□	3□□□	12□□
1	□□□12□□□	1□□□□□□3	□□□□	□2□	□2□	□□□□	□□3	1□□	3□□□	□1□□	□2□	□□□□	1□□	2□1□	□□□2	□□3	1□□	3□2	2□3	□3□□	132□	3□□	□□□	□□□2	3□□□	11	1□□□	□□□1	1□2□	□3□3	22□1	3□3□	□□□1	□□□1	3□33 □1	
2	□2□□□	1□□□□□□□	3□	□22	□1□	□□□	1□□1	□	2□□3	3□2	3□	□□□□	1□□	2□□□	1□2	12□	22□	2□□	□□2	□□□1	□□2	2□□	□□□3	2□□2	33□□	3□3□	1□1□	□□□1	□□□□	□2□□	□3	2□□□	□□□1	□□□□	□□□□	1□□□
2	2□□□□□□	1□□□□□□□	1□1	□3□	□□3	□□□□	□□□	2□1	3□□□	1□3	1□□1	1□□	223	1□3□	1□□	1□2	1□□	3□□	3□□	□□□□	32□	2□□	□□□□	□□□1	3□□□	2□□□	□□□	□□□1	2□□□	□□□□	□□1□	2□□2	□□□1	□□□3	1□□□	3□3
2	□□□12□□□	1□□□□□□□	□□□□	□2□	□□□□	□□□□	□□□	1□□	3□33	1□□	13□□	□□□□	2□□	1□□□	1□□	1□□□	□□□□	□□□	3□□	□□1□	□□□	3□□□	□□□□	□□□□	3□□1	3□□□	□□13	□□□1	2□1□	□□□□	□□□	□□3	□□□2	□□□1	1□□1	□□1
2□	□2□□□	1□□□□□□□	2□□□	□1□	□□□□	□□□□	12□□	□	3□□□	3□□	□□□□	12□□	1□□	1□1□	12□	1□□	1□□	1□□	□□2	23□□	□2□	1□□	□□□2	1□□□	11□□	3□□□	□□□□	□□□1	□□□	□□□□	2□□□	3□□□	□□□□	1□□□	3□2□	2□□3
2□	2□□□□□□	1□□□□□□□	2□□	□□□	□21	□□□2	□□□	1□□	3□□3	2□□	1□□□	2□□□	1□3	□□□	1□□	□1□1	1□□	2□3	21□	31□□	□□□	□□□2	□□□□	□□□□	1□	□□□□	□2□	□□□1	2□□□	□□	22□1	1□3□	□□□3	21□□	3□3□	□□□
3	□2□□□	1□□□□□□□	□□□□	□2	□□3	□□□1	1□□□	1□□□	3□□	2□3	2□1	□□□3	□1□□	1□□□	1□□	12□	22□	2□□	□13	□2□□	□□□	3□□	□□□□	1□□□	21□2	□32	1□□	□□□□	□□1	□□□□	2□□□	□□□	□□□2	3□□□	3□3□	22□2
3	2□□□□□□	1□□□□□□1□	3□□	□□□1	□1□	□□□□	□1□	1□□	3□□□	1□□	□□□□	1□1□	113	□□□3	1□1	3□3	22□	3□□	22□	□1□3	□□3	222	□□□1	□□□□	2□□□	□□3	□□□□	□□□□	1□□□	□□□1	21□□	2□□□	□□□1	3□	3□□□	□
3	□□□12□□□	1□□□□□□11	□□□□	□22	□2	□□□2	322	1□2	3□□□	□□□□	1□3	□□□□	12□	1□□	□2	□3□□	1□3	2□□	23□	□□□2	11□□	32□	□□□1	□□□1	3□	□□□□	1□2	□□□□	1□1□	□□	1□	2□□	□□□1	□□□□	□□□□	13□3
□	□2□□□	1□□□□□□12	□□□□	□21	□□□□	□□□□	1□□□	11□□	3□2□	1□□	2□□□	□□□□	11□	1□□□	1□□	13□	2□□	2□□	2□□	□□2□	□3□	□□□	□□□2	□□□□	2□□□	□1□	2□□□	□□□1	1□□1	□3□□	1□□3	□1□	□□□2	33□□	□□□1	13
□	2□□□□□□	1□□□□□□13	213	□2□	□□□1	□□□1	□□□	2□□	2□□1	□□□□	□□1□	1□□□	12□	□□□1	1□2	□□□□	2□□	3□1	1□3	□□□□	□□□	□2□	□□□□	□3□	2□□2	□33	1□□□	□□□1	1□□1	□□□3	1□□□	□□□	□□□2	3□□□	3□□□	2□
□	□□□12□□□	1□□□□□□1□	3□□□	2□□	□□□	□□□□	2□□	1□3	3□□□	1□□	1□□1	2□□□	12□	□□□	1□□2	2□□	1□□□	□□□	1□1	1□□22	1□13	□□□	□31	□□□□	□□□1	□□□□	□2□	□□□□	□□□3	□□□2	13□3	□□□2	□□□1	□3□3	□□□□	3□□□
□	□2□□□	1□□□□□□1□	□□□□	□31	□2	□□□□	1□□□	33□3	1□□1	3□□	11□	□1□□	122	1□□□	2□□	1□□	2□3	2□□	□□□	□□□□	□1□	3□1	□□□1	1□2□	2□	□□□□	1□□	□□□1	3□□3	□□□2	21□□	□□□□	□□□2	3□□□	3□2□	21□□
□	2□□□□□□	1□□□□□□1□	□□□□	□2□	□□□□	□□□2	□□1	1□1	□□12	□2□□	□□□□	1□2□	1□□	□□□□	131	32□□	1□□	1□□	1□□	□1□□	1□□3	21□	□□□	□□□□	3□□□	□□□□	□□□□	□□□1	1□□□	□□□□	1□□1	2□□□	□□□1	□□	□□□□	1□□□
□	□□□12□□□	1□□□□□□1□	□□□□	□23	□□□□	□□□□	□□3	1□1	3□□□	□1□□	□3□	1□3	1□□	□□□□	1□□	31□□	1□□	2	1□□	□2□2	12□□	2□3	□□□□	□□□□	3□□2	1□□1	1□□□	□□□1	1	□□□□	21□1	2□21	□□□1	□□□□	3□□□	2□
□	□2□□□	1□□□□□□1□	□3□□	□2	□□□□	□□□□	12□□	1□□1	3□□□	21□	2□□2	□□□□	11□	1□□1	1□3	1□□	2□□	2□□	□□□	□□□□	□□□	□□1	□□□1	1□23	22	□3□	1□□□	□□□1	3□□	□□	22□□	□3□	□□□2	32□□	2□□□	3□□□
□	2□□□□□□	1□□□□□□1□	2□3	□□□□	□□3	□□□□	□□3	2□3	2□3□	1□3	□□□1	1□□□	1□□	□□□2	23□	12□	□□□	□□□	1□□	□1□3	1□3□	□□□	□□□□	□□□3	3□□□	□□□3	2□1□	□□□□	1□□3	□3□3	2□□□	□13	□□□1	□2	3□□□	22□2
□	□□□12□□□	1□□□□□□2□	□3	□23	□13	□□□□	□□2	□□□	□2□	□□□3	□□□□	1□□2	1□3	□□□□	□□□□	1□□	2□□	2□□	1□□	□□1□	13□□	2□□	□□□1	□□□□	2□□1	11□□	1□□□	□□□□	1□□3	□□	2□□□	2□□□	□□□1	□2□1	2□□1	2□
□	□2□□□	1□□□□□□21	1□□	□2□	□2□	□□□2	13□2	□□□	2□□□	2□□	3□2	1□□□	11□	1□□□	□□□3	12□□	2□□	□	□1□	□□□□	□□□	3□3	□□□□	1□□□	23□□	□□31	1□□□	□□□1	3□2□	□2□□	1□□2	□□□	□□□2	32□□	3□□□	1□□□
□	2□□□□□□	1□□□□□□22	1□□	□2□	□□□□	□□□	□□□	□□□□	3□2□	□□□2	1□□□	1□2	1□3	□□□□	1□□	2□□□	1□□	3□□	1□□	□2□1	□□□□	1□□	□□□2	□□3□	31□3	□□□□	□□□□	□□□1	□□□□	□□□□	2□	1□□□	□□□1	□□□□	3□□□	1□□3
□	□□□12□□□	1□□□□□□23	31□□	□3□	□2	□□□2	3□1	1□□	3□□□	□□□□	□□□□	1□11	1□□	□□□□	□□□□	2□□□	3□2	□□□	1□3	□□□□	121□	□□□	□□□3	□□□□	3□□□	1□□1	2□□3	□□□□	□□□□	□□□□	2□□3	□□□□	□□□1	□□	3□□□	23□□
□	□2□□□	1□□□□□□2□	1□	□1□	□□□□	□□22	13□□	□□□	□1□	22□	1□□□	□□12	1□□	1□□1	22□	231	2□3	2□1	□□□	□□□□	1□□□	□□□	□□□□	1□1□	2□□3	□□3□	2□2	□□□1	2□□□	□□□□	2□□□	□□□	□□□1	□□□1	3□3□	1□□□
□	2□□□□□□	1□□□□□□2□	31□	□□□2	□□□□	□□□2	□□□	1□□	2□□□	11□	2□□□	□□□□	1□3	1□1□	1□□	□2	1□□	2□□	1□□	□□□□	13□□	2□□	□□□□	□□□□	□□□2	11□2	1□21	□□□1	□□□	□□□□	21□1	2□2□	□□□1	□3□2	3□□□	1□□□
□	□□□12□□□	1□□□□□□2□	2□□□	□21	□□□□	□□□2	2□□	1□3	3□□□	□2□□	□2□	□□□□	1□2	□□□□	□□□□	3□□□	□□□1	1□□	2□□	□□□□	1□3□	233	□□3□	□□□3	3□□2	1□□3	1□□1	□□□□	□□□□	□□□□	2□□3	1□□1	□□□1	□□□1	2□□□ □1	
□	□2□□□	1□□□□□□2□	□□□□	□1□	□□□1	□1□	1□3□	□□□	2□□□	2□1	2□1	□□□□	11□	1□□□	1□1	1□□	2□□	2□3	□13	□□11□	□□□3	□3□	□□□1	1□□□	2□□□	□□1□	1□□	□□□1	□□□□	□3□□	2□□□	□□□□	□□□2	32□2	2□□1	32
□	2□□□□□□	1□□□□□□2□	32□	□□□	□2□	□□3	□□□	1□□	2□2□	11□	3□1□	1□1□	11□	1□□□	1□3	□3□□	3□□	□□□	1□3	3□□2	1□□□	□1□	□□□1	□□3□	2□	□□□1	1□□	□□□1	1□2□	□□□3	2□□□	□□□	□□□2	3□□□	2□3□	21□□
□	□□□12□□□	1□□□□□□2□	22	□31	□31	□□3	11□	□□□	3□□□	□□	2□□□	□□□□	12□	□33	□□□□	31□□	2□1	□□□	1□□	□3□□	1□1□	□2□	□□□1	□□□	31□□	11□□	1□□□	□□□□	□□□□	□□□2	2□□□	□□□□	□□□1	□□□□	2□□□	2□
1□	□2□□□	1□□□□□□3□	2□□1	□1□	□□□	□□□□	2□□□	□2	3□3	3□□	13□□	2□□1	12□	2□3□	113	11□	232	2□□	□1□	3□□□	□1□	3□□	□□□□	1□□3	1□□3	□□31	1□□	□□□1	□□33	□□	1□□2	□□□2	□□□2	2□	□	1□□□
1□	2□□□□□□	1□□□□□□31	□□□	□□□□	□3□	□□□□	□□□	□□□	2□33	21□	□□□1	1□□□	21□	□□□1	1□□	□3□□	2□□	□□□	1□□	32□□	□3□	31□	□□□2	□□□□	1□	□□13	1□3□	□□□1	2	□□□□	2□□□	□□□□	□□□□	2□	2□□2	13□3
1□	□□□12□□□	1□□□□□□32	□□□□	□□□□	□1□	□□□□	3□□	□□□□	3□2□	1□2	3□□□	□□□□	223	□3□	□□□□	□3□□	□□□□	1□2	1□□	2□□□	□□□□	2□□□	□□□□	□□□3	12	□□□	□□11	□□□1	2□2□	□3□1	3□□1	□□□□	□□□3	1□□1	1□□□	□□3
11	□2□□□	1□□□□□□33	□□□□	□1□	□□□1	□□□□	13□□	3□□	1□□	2□2	33□□	1□□□	132	1□□□	1□1	113	2□□	2□□	3□3	□1□□	□□□□	2□□	□□□□	□□□□	2□□□	□□□□	1□2□	□□□1	3□□□	□□□□	1□□□	□□□□	□□□3	2□□□	□□□□	1□□□
11	2□□□□□□	1□□□□□□3□	123	□2□	□3□	□□3	□□□	□□□	1□□□	1□3	□□3	1□□	131	□□□1	13□	3□□□	1□3	2□□	2□□	□2□□	□□□1	11□	□□□	□□□□	31□3	□□□1	□□□	□□□1	1□□	□□□3	1□□□	1□2□	□□□2	3□	□□□2	21□□
11	□□□12□□□	1□□□□□□3□	1□□□	□2	□□□□	□□3	2□□	□□□□	□□□□	□□	3□□□	□□□□	13□	□□□□	1□2	13□	2□□	3□2	2□□	□□□□	1□13	33□	□□□1	□□□3	33□3	□□□□	1□□□	□□□1	1□□3	□□	1□□3	3□33	□□□1	□3□□	3□□□	□2□□
12	□2□□□	1□□□□□□3□	21□□	□1□	□2□	□□□1	1□□3	□2	3□□□	2□3	12	3□22	1□□	2□13	□□	□□□□	21□	□2	□□□	2□1□	□□□□	2□2	□□3□	1□□□	13□□	□□□□	1□□□	□□□□	□□3□	□□□□	2□□3	□□□□	□□□2	23□1	2□□□	2□□□
12	2□□□□□□	1□□□□□□3□	3□□	□□□□	□□□	□□□□	□22	1□□	□3□	□□	□1□	□□□□	1□1	□□□□	□□□□	3□□□	□□□	□□□	1□□	3□□□	12□1	□□3	□□□□	□□□□	1□□□	1□□□	2□□□	□□□1	1□□□	□□□□	3□	□□□	□□□2	3□□□	1□□	21□1
12	□□□12□□□	1□□□□□□3□	3□□	□□□1	□□□3	□□23	1□3	□□□	□□□□	2□□	3□□□	1□2□	12□	□3□	□1	□□□□	□□1	13□1	1□□	□1□□	2□□□	□□1	□□□□	□□□1	2□	1□□□	3□□□	□□□1	□□□□	□□□□	3□□□	□2□	□□□2	□□□□	1□□□	22□□
13	□2□□□	1□□□□□□3□	□□□□	□1□	□□□□	□1□	2□2□	1□□□	2□3	2□□	22□□	□□13	13□	2□3□	□□□□	3□3	2□□	□□□	□□□	3□3□	□2□	□□1	□□□□	1□□1	1□□□	□□□□	1□□2	□□□1	□□□	□□□□	21□2	□□□2	□□□3	2□□□	3□□□	3□□□
13	2□□□□□□	1□□□□□□□□	2□□	□□□□	□□□	□2□	□□□	3□2	2□□□	1□□	□□□□	1□□	1□□	□□□□	121	3□□□	33□	□□2	2□□	□1□□	□1□	□11	□□□□	□□□□	2□□□	□□□□	1□□□	□□□1	2□11	□□□□	2□□□	□□□□	□□□2	31	2□□3	2□□3
13	□□□12□□□	1□□□□□□□1	33	□1□	□□□□	□□□□	2□1	□3	2□2□	121	3□□□	□□□2	1□□	□□□□	□3	1□2	1□□	□1	2□□	□□□2	12□2	2□□	□□□□	□□□□	2□□□	1□□□	1□2□	□□□1	1□□□	□□□□	2□□2	3□□□	□□□1	□1□1	2□□□	3□□□
□1	□2□□□	1□□□□□□□2	□□3	□□□□	□□□□	□□□2	12□□	1□□□	2□□□	2□□	2□□□	11□□	11□	1□3	□□□□	2□□□	31□□	□□□	□□□	□□1□	112□	□2	□□□	1□2	2□□1	□□□	□□□	□□□1	3	□2□□	23□□	1	□□□1	□□□1	3□□□	1□□□
□1	2□□□□□□	1□□□□□□□3	13□2	□□□□	□□□□	□□□□	□□2	3□3□	2□□2	1□□	□□□□	1□□□	12□	1□3	□1	1□□□	□□	1□□	23□	□□□□	1122	1□□	□□□□	□□□1	2□□□	□□3□	□□□3	□□□1	1□□□	□3□□	23	1□□1	□□□1	□□□□	3□2	1□□2
□1	□□□12□□□	1□□□□□□□□	2□□□	□2□	□□□□	□□□1	□2□	□□□□□	2□□□	1□□	□□□□	3□□2	12□	□□□□	□□□□	1□□□	2□3	□2	31□	□□13	1□□3	□□□	□□□1	□□□1	3□□1	12□□	2□12	□□□□	1□□1	□1□3	23□2	3□□□	□□□1	□3□□	3□□□	21□2
□2	□2□□□	1□□□□□□□□	22□□	□1	□□□1	□□□□	21□□	21□2	3□□□	3□3	2□□□	□□□1	□□□□	2□□□	3□	1□□1	□1□1	1□2	3□□	313□	□□□	□1□□	□□□□	□□□□	1□□□	3□□□	□□22	□□□1	3□□□	□□□□	1□□2	1□□□	□□□3	2□□□	3□□□	22□2
□2	2□□□□□□	1□□□□□□□□	11□1	□□□□	□1□	□□□□	□1□	3□□	1□3□	211	11□□	1□3□	12□	□□□	3□□1	1□	33□□	1	1□□	□111	□□□2	□□□□	□□□□	□□□□	2□□□	□□□2	□□2□	□□□1	1□□□	□□□□	1□□□	1□12	□□□3	2□□□	□□□□	2□□3
□2	□□□12□□□	1□□□□□□□□	□□3	□□□□	□□22	□□□3	□□2	□□□	1□□1	1□□	3□□□	□□□□	21□	□□□□	3□□□	2□3	□□□2	1□1	2□□	□□□□	□□□	1□□	□□□□	□□□3	3□□□	□□□□	□□□1	□□□1	1□3□	□□□□	1□□1	2□12	□□□2	3□□3	□□□□	13□□
□3	□2□□□	1□□□□□□□□	1□□□	□1	□2□	□□□□	1□□□	3□□□	2□□□	311	11□□	3□2□	□□□1	1□□3	3□□2	1□□□	31□□	□□□	231	21□2	3□□	□□□2	□3□	□□□□	11	3□23	□□21	□□□□	3□□□	□3	21□□	1□□3	□□□3	1□	3□3□	□□□
□3	2□□□□□□	1□□□□□□□□	□□□□	□□□3	□□□3	□□□□	1□2□	□□□	2□2□	2□1	1□□3	1□□□	13□	□□□□	□□□□	1□□3	2□□2	□□□	13□	□3□□	□□2	□□□1	□□□□	□3□	21□□	□□1□	□3□	□□□1	1□2□	□□□□	21□□	1□22	□□□2	2□□□	3□□2	1□□□
□□	□2□□□	1□□□□□□□□	□□3	□□11	□□□	□□□□	1□□2	1□□□	1□□3	3□1	□1□□	2□□1	□□□1	1□□	2□□□	13□1	3□	1□1	□3□	□□□	221	31□1	□□2□	1□12	□□□□	1□□□	□□1□	□□□□	1□□1	□1	23□2	1□□	□□□□	□□□□	2□□3	11□□
□□	2□□□□□□	1□□□□□□□1	□□□□	□□□□	□□1□	□□13	□31	3□□	□□□□	1□□	□□□□	□□□3	2□□	□□□□	2□□1	1□□3	□□□3	2	2□□	2122	12□□	3□3	□□32	□□□3	1□□□	1□□□	1□□□	□□□□	2□□1	□□□□	□□□□	□□□	□□□2	23□2	1□□2	3□□2
□□	□□□12□□□	1□□□□□□□2	□□3□	□2□	□□3	□□□□	□□1	1□3	□□21	2□□	□□1□	□□□□	2□□	□□3□	1□□2	1□□□	□□□3	2□1	21□	2□12	1□□□	□1□	□2□	□□□□	12□1	12□□	3□□□	□□□□	1□□2	□1□□	□□□3	12□2	□□□1	2□□1	□□□□	□1□1

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			Chlorides	Electrical Conductivity	pH (H₂□□	pH (CaCl₂□	Total Nitrogen	NO₃□	NH□	Total Phosphorus	Phosphorus Ex	Phosphorus Ex	Phosphorus Buffer Index	Organic Carbon	Calcium Soluble	Magnesium Soluble	Sodium Soluble	Sodium Adsorption Ratio	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Ex Potassium %	Ex Calcium %	Ex Magnesium %	Ex Sodium %	Ex Aluminium %	ECEC	Ca/Mg Ratio	Dispersion
	M□□□□d D□□□r□□□□□		□r□□□	□□□□ □□r□1□□	□□□r□d□	□□□r□d□	□□□□	□□□□□□□□□□	2M□□□	□□r□□□r□□□r	□□□□□	□r□□□1	□□□□□	□□□□				□□□											□□□	□□□	□□□	□□□	□□□	□□□	□□□	□□r□□ □□r
	M□□□□d R□□□r□□□□		R□□□□□1	R□□□3□1	R□□□□□1	R□□□□□2	□□□□□□	□□□□□□	□□□□□□	□□□□□□	R□□□□□1	R□□□□□1	R□□□□3	□□□□□□	R□□□1□□1	R□□□1□□1	R□□□1□□1	□□□	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1	R□□□1□□1								D□□□□2
□□□ □□□□D	D□□□□	□□□□	mg/kg	dS/m	pH units	pH units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	%	%	%	%	meq/100g		%
1	□□1□□□	1□□3□1□1	□1□□	□□1□	□□2□	□□□□	11□□	2□□□	□2	2□□	1□□1	□□□	121	1□□□	1□□2	1□□□	□□□2	2□□	3□3	□□3□	1□1□	□3□	□□□□	1□□1	2□□□	□□□2	1□□□	□□□1	2□□2	□1□□	21□1	□□□□	□□□1	□□	3□□1	1□□3
1	1□□□□□□	1□□3□1□2	13□	□□3□	□□□□	□□□□	□□□	□□□□	2□□	11□	□□□2	□□□	121	1□1□	□□□1	1□□□	12□	3□□	2□□	□1□2	13□2	3□□	□□□□	□□□□	3□	11□□	1□□2	□□□1	1□□□	□2□3	22□□	3□□□	□□□1	□□□□	3□1□	□□1
1	□□□12□□□	1□□3□1□3	12□	□□32	□□2	□□□□	332	□□□□	□2	11□	1□□□	□□□□	11□	1□3□	1□□□	□□□□	12□	□	3□2	□□□□	1□2□	□3□	□□□□	□□□□	□3□□	11□□	1□□	□□□1	1□□1	□□□□	2□□□	3□2□	□□□1	□□□2	3□□□	3□2
2	□□1□□□	1□□3□1□□	13□	□□2□	□□□	□□□□	132□	3□□	□2	2□□	22□3	1	12□	1□□□	3□□□	32□□	13□	3□1	□2□	□3□3	3□□	□□□	□□□□	1□3□	31□□	2□□	2□3□	□□□1	3□□□	□3□□	□□□□	□□2□	□□□1	3□□1	12□□	11□1
2	1□□□□□□	1□□3□1□□	3□□	□□□2	□□23	□□□□	□□□	□□□□	□2	1□□	□□□1	□□□□	1□3	□□□□	1□□	1□□3	11□	2□□	321	□3□1	23□	2□□	□□□□	□□□2	□1□□	1□□□	1□21	□□□1	1□□□	□1□2	□□3□	2□□3	□□□1	□□□□	21	3□1
2	□□□12□□□	1□□3□1□□	2□2	□□2□	□□12	□□□□	□□1	□□□□	2□3	1□□	3□3□	1□□	213	2□□□	□□□□	13□2	11□□	□□3	323	□□1□	3□□	□□□2	□□□□	□□□3	3□□□	3□12	□□33	□□□1	1□□3	□□□	□□2□	□□□□	□□□1	□2□□	12□□	□□□
3	□□1□□□	1□□3□1□□	122	□□2	□□□□	□□□3	12□□	□□□	□2	1□□	1□□□	2□3	□□	1□□□	□□□□	□□□□	11□	2□□	3□□	□12□	□□□	□3□	□□□□	□□□□	2□□□	□□13	2□32	□□□1	2□□3	□1□1	1□□□	□□□□	□□□2	3□	3□□□	1□□□
3	1□□□□□□	1□□3□1□□	3□□	□□□3	□□1□	□□□□	□□□	1□1	2□□	11□	21	1□1	□□□□	□□□□	□□□□	1□□□	1□□	□□□	1□1	□2□2	□12	□□□	□□□□	□□□□	2□□□	□□□	2□11	□□□1	1□2□	□2□1	2□□□	□□□□	□□□2	3□□□	3□□□	□□□
3	□□□12□□□	1□□3□1□□	□□□	□□3□	□□□□	□□3□	3□1	□□□□	3□2	□1□□	□□□3	□□□□	11□	1□3	□3□1	1□□□	121	3□1	22□	□11□	113□	3□2	□□□□	□□□□	□□□□	□□□□	1□31	□□□1	1□12	□□□1	1□□2	2□□3	□□□1	□2	□□2□	□□1
□	□□1□□□	1□□3□1□1□	□1□□	□□1□	□□□□	□□2	□□1	□□□□	□□□	1□□	□□□□	2□□	□□□1	1□□1	1□□□	1□□□	□□	3□3	1□1	□□1□	□□□	3□□□	□□□□	□□□□	2□□1	□□33	1□□□	□□□1	1□3□	□□□□	1□□□	□□3□	□□□2	3□□□	□□2□	1□□□
□	1□□□□□□	1□□3□1□11	1□□	□□32	□□22	□□□□	□□1	□□□□	2□□	1□3	□□11	□□□	11□	1□□□	3□□□	22□□	1□□	□□□	21□	□□3□	1□3□	□□□	□□□□	□□□□	□3□2	□□□□	2□□2	□□□1	1□□2	□□□□	1□□□	□□□2	□□□1	□□□□	□□□□	□□3
□	□□□12□□□	1□□3□1□12	132	□□□□	□□32	□□□	2□□	□□□□	□2	13□	□□1□	□□□	12□	□□3□	□□□□	1□	3□1	□□□	1□□	□3□2	1□2□	□□1	□□□□	□□□	□1□□	□□□□	3□□□	□□□1	□□□1	□□□□	1□□□	□□□□	□□□1	□□□□	□□□□	3□2
□	□□1□□□	1□□3□1□13	1□□	□□22	□□□3	□□□2	□□□	□□□	□2	133	1□□2	1	□□□1	1□2	□3□2	□□□□	1□3	2□□	22□	□□□□	□□□	□□1	□□□□	□□□□	2□□□	□□□□	2□□3	□□□1	1□□2	□□□□	22	□□□□	□□□2	3□□□	3□1□	3□□
□	1□□□□□□	1□□3□1□1□	□□□	□□□3	□□□□	□□3□	□□□	□□□□	1□□□	□□□1	1□□□	□□□	12□	□□□3	□□□1	2□	1□□	3□□	1□□	□□33	123□	3□□	□□□□	□□□□	32□2	1□3	1□□□	□□□1	1□□3	□2□3	23	3□□□	□□□2	□□□□	3□1□	3□2
□	□□□12□□□	1□□3□1□1□	□□□□	□□21	□□□□	□□□	□□□	□□□□	□□□	□□□□	11□□	□□□□	12□	□□□□	12□1	□□□□	1□□	□□□	1□□	□□11	1□□□	3□3	□□□□	□3□	□□□1	12	1□□□	□□□1	□□□□	□□□1	22□3	2□□2	□□□1	□□□1	3□33	□1
□	□□1□□□	1□□3□1□1□	1□□□	□□1□	□□1	□□3□	□1□	2□□3	1□□□	1□2	1□□□	3□□	□□□3	1□2□	32□1	2□□□	□□□□	2□1	22□	□1□1	□□□	31□	□□□□	□□□□	2□□□	□□3□	1□3□	□□□1	1□□□	□3□2	21□1	3□□3	□□□2	3□□□	3□□□	□□□
□	1□□□□□□	1□□3□1□1□	33□□	□□2□	□□□1	□□□2	□□□	3□□2	□□□	1□1	1□□3	1□□	1□□	□□□	□□□□	23□□	□□□□	1□□	2□□	□□□□	11□□	1□□	□□□□	□□□□	33□□	□□2□	□□□	□□□1	1□□□	□□□□	21	1□□2	□□□1	□□	3□□1	□1
□	□□□12□□□	1□□3□1□1□	□1□□	□□31	□□□□	□□□1	□□□	□□□□	□3	13□	1□□□	2□□	11□	□□□□	□□1□	1□□2	□1□3	1□2	2□□	□3□2	□□2	1□□	□□□□	□□□□	3□□□	□□3□	□□□□	□□□1	1□□2	□□□□	1□□2	1□□2	□□□1	□□□2	□□□□	□1
□	□□1□□□	1□□3□1□1□	□3□□	□□22	□□□□	□□3□	12□□	□□3□	□3	1□□	21□2	1□2	□2□3	1□□□	1□□□	□□□1	12□	□□□	33□	□□□□	1□□□	□1□	□□□□	□□□□	2□	□□3□	2□22	□□□1	2□1□	□1	21□2	□□□2	□□□1	3□□□	3□3□	3□□
□	1□□□□□□	1□□3□1□2□	2□□	□□□□	□□13	□□□□	□□3	□□□	1□□□	□□□3	1□□1	□□□	122	□□□□	□□□2	2□□□	1□□	3□2	121	□□1□	1□□3	3□□	□□□□	□□31	2□□1	13□2	1□□□	□□□1	□□□	□□□□	2□□□	3□□□	□□□1	□□□1	2□2	□1
□	□□□12□□□	1□□3□1□21	□□□□	□□2□	□□3□	□□□	2□□	2□□□	□□1	□□□□	13□1	□□□	1□□	□□3□	11□2	□□3	122	□□□	21□	□□31□	2113	3□□	□□□□	□□□□	3□□□	1□□□	1□□□	□□□1	□□□□	□□□□	31□2	2□□□	□□□1	□□□□	2□□□	3□1
□	□□1□□□	1□□3□1□22	□2□□	□□32	□□□1	□□22	□□□	□□□1	3□□	1□□	1□□2	1	1□□	1□22	□1□□	1□□2	□□□□	2□□	22□	□□□□	□□□	□1□	□□□□	□□□□	2□□2	□□23	2□□□	□□□1	1□□2	□3□□	2□□□	□□□□	□□□2	31□□	2□□□	1□□□
□	1□□□□□□	1□□3□1□23	3□2	□□□□	□□2	□□□	3□□	3□□□	□□□3	□□□3	□□□□	□□□	122	□□□3	□□□□	2□□□	□□□1	□□□	1□□	□□□□3	1□13	□□□	□□□□	□□2□	3□□□	12□□	2□3□	□□□1	□□□□	□□□3	2□□□	□□□□	□□□1	□□□□	2□□3	3□2
□	□□□12□□□	1□□3□1□2□	□2□□	2□□□	□□□□	□□□□	11□	2□□□	□□□□	1□2	□□1□	□□□	121	□□1□	2□□1	□□□	□□1	2□□	1□□	1□□□□	1□□1	□□□	□□□□	□□2□	□□□□	13□3	2□13	□□□1	□□2□	□□□1	12□□	2□□2	□□□1	1□□□	□□□□	□□□
1□	□□1□□□	1□□3□1□2□	□3□□	□□23	□□2□	□□□□	1□□2	□□□□	□□□	31□	1□□□	□□□	13□	2□1	1□□□	□□□	23□	□□□	□□32	□2□2	□□2	□□2	□□□□	1□3□	2□□□	□□□2	1□□2	□□□1	3□□□	□□□2	13□2	□□□1	□□□2	3□□3	□□□□	□□□
1□	1□□□□□□	1□□3□1□2□	2□□	□□□□	□□1□	□□□□	□□□	3□□□	□□12	22□	□□□1	□□□	2□□	□□□□	□□□□	13□□	3□□	1□	1□□	□□□3	□□□	□3□	□□□□	□□□□	3□□3	□□□	1□□	□□□1	1□□3	□1□2	13□3	□□3□	□□□1	□3□□	□□□□	□□□
1□	□□□12□□□	1□□3□1□2□	133	□□2□	□□3□	□□□□	3□□	2□□3	□2	12□	1□1□	□□□□	21□	□□□□	□□□□	1□□□	3□□	□□□	1□□	□□□□	12□□	3□□	□□□□	□□□□	2□□□	1□□□	1□3	□□□1	1□1	□□	2□□□	3□1	□□□1	□□2	2□□2	□1
11	□□1□□□	1□□3□1□2□	2□□3	□□1□	□□□3	□□□□	1□□□	3	□2	2□□	11□□	2□1	12□	1□3□	□□□1	□□□1	1□3	2□□	22□	□□2□	□□□	322	□□□□	□□□□	2□□□	□□□2	1□□	□□□1	1□□3	□□□□	1□□□	□□3□	□□□2	32	□□□□	3□□
11	1□□□□□□	1□□3□1□2□	□□□□	□□1□	□□□□	□□□	□□□	2□□□	2□2□	1□2	11□□	1□1	112	□□□□	□□2□	□1□2	1□□	2□3	13□	□□□□	□2□	3□3	□□□□	□□3□	2□□□	2□□□	1□□□	□□□1	1□□□	□□3□	2□□□	□□□1	□□□2	33□1	3□□□	3□3
11	□□□12□□□	1□□3□1□3□	□□□□	□□2□	□□□□	□□□□	2□2	2□3□	2□2□	1□1	1□□□	□□□	122	□□□□	□□□□	□□□□	31□	1□□□	2□□	□□□□	112□	□□1	□□□□	□□□□	33□3	□□□1	2□□2	□□□1	1□□□	□1□□	2□□3	□2□□	□□□1	□□□□	3□□□	□□□
12	□□1□□□	1□□3□1□31	□□□□	□□2□	□□□□	□□2□	13□1	□□□2	□□□1	31□	13□3	□□□	1□□	1□□2	1□□	2□□	3□□	3	3□3	31□3	□□□	□3□	□□□□	□□□□	1□	□□21	2□33	□□□1	3□□□	□□□1	2□□□	□□□□	□□□2	2□□□	1□□□	2□□□
12	1□□□□□□	1□□3□1□32	□□□	□□□□	□□2	□□□1	□□□	□□□3	3□□□	2□1	□□□	□□□	23□	1□2□	□□□□	□□□3	□1□	11	2□3	□1□□	1□□1	□□□	□□□□	□□□□	3□□□	12	3□□□	□□□1	1□3□	□□□3	2□□□	□□□2	□□□1	□□□□	2□□□	□1
12	□□□12□□□	1□□3□1□33	32□	□□□1	□□□□	□	3□3	□□2□	□□13	13□	□□□1	□□□□	222	□□3□	□□□□	3□□□	□□22	13□2	2□□	□2□□	1□1□	□□3	□□□□	□□□2	31□□	1□□□	3□3□	□□□1	1□□2	□1□□	31	□□□□	□□□1	□1□3	1□□□	□□□
13	□□1□□□	1□□3□1□3□	□□□□	□□22	□□□	□□□□	1□□□	□□□□	□2	23□	12	□□□	1□3	1□□□	□□□□	□□□□	2□3	3□□	□□□	2□□□	□□□	□□□	□□□□	1□1□	1□□□	□□□□	2□12	□□□1	□□□□	□2□□	23□2	□	□□□2	23□□	2□□1	23□3
13	1□□□□□□	1□□3□1□3□	3□□	□3	□□□□	□□1□	□□□	2□□□	2□□□	213	□□□□	□□□□	21□	1□11	□□□2	33□3	32□	□□□	2□□	□2□□	□□□	3□□	□□□□	□□□3	21□2	□	1□□□	□□□1	2□3	□□□2	2□□3	□□2	□□□2	31□□	2□□□	□□3
13	□□□12□□□	1□□3□1□3□	1□2	□□3	□2	□□□□	3□□	□□□□	□2	1□□	□□□1	□□□□	221	□□□□	□□□□	2□	12□	2□□	2□□	□231	11□□	1□□	□□□□	□□□□	3□□2	□□22	□□□2	□□□1	1□□□	□□□3	1□□□	1□□□	□□□1	□□□□	3□□2	□□□
□1	□□1□□□	1□□3□1□3□	1□2	□□□□	□□□□	□□12	1□3□	□□□□	3□□	21□	22□□	□□□	121	1□□□	2□□□	2□□□	□□□□	1□□	3□1	□□□2	1112	□□□□	□□□□	□□□	2□□□	□2□□	□□□1	□□□1	2□23	□3□□	22□□	1□□2	□□□1	□□□□	3□22	□1
□1	1□□□□□□	1□□3□1□3□	1□□□	□□□□	□□□1	□□□3	□□□	2□3□	□2	12□	□□□3	□□□	233	1□21	1□□	13□	□2□1	1	2□□	□□11	121□	2□1	□□□□	□□□□	33□1	1□□2	□□□□	□□□1	1□□□	□3□□	22□□	1□□□	□□□1	□□□□	3□2□	1□□□
□1	□□□12□□□	1□□3□1□3□	1□□□	□□21	□□3□	□□□□	□□□	2□2□	□2	11□	□□□□	□□□	11□	1□1□	1□□□	□□□2	2□□	□3	2□□	□1□□	1211	33□	□□□□	□□□3	3□□□	1□□1	1□□3	□□□1	1□□□	□1□□	23□□	3□3□	□□□1	□2□□	3□□□	□1
□2	□□1□□□	1□□3□1□□□	□□□	□□□□	□□□□	□□□□	13□□	2□3□	□2	3□□	1□□□	□□□	□□□□	1□□2	□□12	□□□2	3□□□	1□□	2□□	2□22	□□□	□□□1	□□□□	□□□2	12□□	3□□□	□□2□	□□□1	□□1□	□3□1	21□2	1□□1	□□□3	1□□3	3□□□	2□□□
□2	1□□□□□□	1□□3□1□□1	1□□□	□□1□	□□□□	□□1□	□21	□□□□	3□33	2□□	□□13	□□□	1□□	□□□3	3□□1	12□1	□2□□	1□□	2□□	□2□1	□□□	□1	□□□□	□□□1	3□□□	□□□□	□□□	□□□1	1□22	□□□□	11□3	□□□□	□□□1	□2□1	□□□□	3□□
□2	□□□12□□□	1□□3□1□□2	1□□□	□□12	□□□1	□□□□	□□□	□□□□	□□□□	2□□	□□□□	□□□□	1□2	1□□□	3□□3	1□□□	□2□□	2□3	□□□3	□□□□	□□□	113	□□□□	□□2□	□2□□	3□□□	□□□□	□□□1	□□□2	□□	□□3□	1□□3	□□□1	□□□□	1□□□	□1
□3	□□1□□□	1□□3□1□□3	□□□□	□□□3	□□□□	□□□□	1□□□□	□□□	□□□□	2□3	□□□□	2	□1□□	1□1□	1□□□	□2	33□□	□□□	13□	2□□□□	□2□	□□□□	□□□□	□□3□	12□□	□□3□	□□2□	□□□1	1□□□	□1□□	2□□□	1□□1	□□□3	1□□□	2□□1	1□□□
□3	1□□□□□□	1□□3□1□□□	1□□□	□□□□	□□□1	□□□□	□23	□□□□	□□□□	2□□	1□□□	1□1	11□	□□□1	1□	1□	□□□□	1□2	1□1	3□□3	□□□□	□3□2	□□□□	□□3□	1□□□	□□□□	□□32	□□□1	1□□1	□2□□	2□	1□□	□□□3	21□2	3□□□	□1
□□	□□1□□□	1□□3□1□□□	□□□	□□□□	□□□□	□□1	□□□	3□□□	□□3□	3□□	□□□□	23□□	11□	1□□2	3□□□	□□3□	32□□	1□□	33□	□1□	1□□	□2□2	3□□□	□□□□	2□□□	1□□	□□2□	□□□□	1□	□1□3	2□□□	□□3□	□□□1	□□□□	1□□□	□□□1
□□	1□□□□□□	1□□3□1□□□	11□□	□□□□	□□□□	□□□□	□□□	1□22	□□□□	22□	2□□1	□□□	1□1	□□□□	3□□1	12□	1□1	2□1	1□□	11□□	1□□□	3□□□	1□□□	□□□1	□□□3	□□□□	1□□	□□□1	2□□□	3□□□	□3	□□□□	□□□□	1□□□	□□□□	□□1
□□	□□□12□□□	1□□3□1□□□	13□□	□□2□	□□□□	□□1□	□12	□□□2	□□□1	2□□	13□□	□□□□	22□	□2	31□2	□□	□□□2	□□□	1□□	23□1	1□□□	□□□	□□□□	□□□□	11□□	13□2	3□□	□□□1	1□□2	□□□□	□□□□	13□3	□□□2	2□□□	□□□	□1

2016

			Chlorides	Electrical Conductivity	pH (H_2O)	pH ($CaCl_2$)	Total Nitrogen	NO_3	NH_4	Total Phosphorus	Phosphorus Ex	Phosphorus Ex	Phosphorus Buffer Index	Organic Carbon	Calcium Soluble	Magnesium Soluble	Sodium Soluble	Sodium Adsorption Ratio	Potassium Ex	Calcium Ex	Magnesium Ex
	Method Description		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EW162274	Method Reference		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sample ID	Depth	Units	mg/kg	dS/m	pH units	pH units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	-	mg/kg	mg/kg	mg/kg
1	0-15cm	162274-1	61.5	0.21	6.86	5.74	1380	9.1	4.1	196	25.7	16.0	114	1.72	259	307	148	1.1	584	6687	1366
1	15-60cm	162274-2	40.9	0.21	7.38	6.21	589	2.4	4.2	67.4	12.1	<0.5	132	0.86	93.4	77.1	116	1.7	563	6493	1332
1	60-120cm	162274-3	173	0.31	8.11	6.77	406	3.3	3.3	91.2	2.0	<0.5	164	0.91	60.4	16.0	123	3.2	108	4522	814
2	0-15cm	162274-4	77.5	0.26	8.05	7.16	2030	7.00	3.1	277	32.5	7.9	147	2.31	107	93.7	139	1.9	958	7540	462
2	15-60cm	162274-5	53.0	0.26	8.22	7.40	551	2.9	3.3	131	9.1	<0.5	194	1.58	62.6	16.2	145	3.7	259	7412	414
2	60-120cm	162274-6	149	0.27	8.04	7.49	377	4.1	2.4	113	3.9	<0.5	193	1.33	81.6	14.5	30.3	0.7	261	6737	551
3	0-15cm	162274-7	35.8	0.14	7.66	6.72	1450	2.4	3.4	178	9.3	1.2	101	1.69	197	228	94.9	0.8	556	4960	926
3	15-60cm	162274-8	185	0.45	7.47	7.27	741	2.3	3.8	95	6.4	<0.5	145	1.12	86.1	36.2	219	4.2	256	7041	1474
3	60-120cm	162274-9	260	0.41	8.05	7.58	380	2.0	5.3	95.5	6.1	<0.5	154	0.41	59.0	17.4	193	4.9	267	7721	1674
4	0-15cm	162274-10	31.4	0.22	7.55	7.25	1205	14.4	5.1	192	19.0	6.1	91.2	1.43	79.0	74.2	132	2.0	280	5285	844
4	15-60cm	162274-11	187	0.25	8.35	7.56	540	4.5	3.7	84.1	4.1	<0.5	146	0.41	64.2	34.9	171	3.5	137	8320	1309
4	60-120cm	162274-12	74.0	0.37	8.60	7.85	345	5.1	3.8	94.2	<1	<0.5	136	0.2	266	333	397	2.9	152	7957	1475
6	0-15cm	162274-13	33.5	0.17	7.51	6.93	1420	21.6	2.6	156	18.3	1.2	106	1.54	239	277	171	1.4	476	5308	1193
6	15-60cm	162274-14	198	0.36	7.52	6.77	572	2.8	2.9	84.9	9.6	<0.5	110	0.95	61.1	28.9	212	4.6	475	5282	1188
6	60-120cm	162274-15	253	0.39	7.48	6.85	456	3.2	3.0	82.2	1.1	<0.5	108	0.89	53.1	12.6	204	5.8	189	7447	1541
7	0-15cm	162274-16	52.0	0.17	7.65	6.84	1130	6.2	2.3	177	26.3	5.1	104	1.34	193	194	145	1.4	226	7322	1455
7	15-60cm	162274-17	18.9	0.21	7.89	7.15	464	0.5	3.6	56.4	1.8	<0.5	137	0.77	52.5	20.2	125	3.1	109	6554	1085
7	60-120cm	162274-18	99.0	0.34	8.41	7.55	370	0.9	2.6	44.8	<1	<0.5	134	0.75	51.0	23.6	231	5.6	133	6981	1330
8	0-15cm	162274-19	56.0	0.26	8.00	7.39	1820	17.6	3.4	188	12.6	1.3	91.0	1.90	136	156	208	2.2	566	5906	1198
8	15-60cm	162274-20	146	0.33	8.02	7.36	632	2.1	2.9	94.8	2.1	0.8	110	0.99	57.6	70.8	167	2.7	167	6185	1447
8	60-120cm	162274-21	231	0.36	8.00	7.50	407	2.1	4.6	55.3	3.4	<0.5	99.3	0.77	34.3	21.6	205	5.5	164	5783	1927
9	0-15cm	162274-22	60.0	0.25	7.84	7.34	1600	35.4	4.0	203	9.0	5.4	93.8	1.76	117	157	248	2.7	571	4361	1174
9	15-60cm	162274-23	140	0.41	8.10	7.63	385	1.8	3.9	76.0	15.3	<0.5	175	0.21	55.0	25.5	261	6.1	121	6988	1668
9	60-120cm	162274-24	254	0.44	8.26	7.75	276	1.3	3.0	75.6	<1	0.5	154	0.13	47.2	15.2	245	6.8	159	6885	2125
10	0-15cm	162274-25	76.0	0.25	8.07	7.53	2540	9.9	3.0	379	19.4	0.6	142	2.52	110	136	199	2.3	741	5117	751
10	15-60cm	162274-26	96.0	0.33	8.25	7.63	712	1.7	2.6	155	9.0	<0.5	382	0.40	33.7	27.8	204	5	192	7013	711
10	60-120cm	162274-27	270	0.38	7.91	7.64	390	1.6	2.9	101	2.8	<0.5	456	0.18	81.2	26.1	85	1.8	171	6080	1135
11	0-15cm	162274-28	72.5	0.26	7.88	7.47	1395	9.2	2.8	298	52.2	14.2	183	1.66	62.4	44.5	154	2.9	480	5565	843
11	15-60cm	162274-29	43.5	0.16	7.92	7.44	680	4.7	4.3	141	22.3	0.9	141	0.95	124	129	128	1.5	193	5627	955
11	60-120cm	162274-30	98.5	0.3	8.34	7.65	489	3.3	3.3	126	7.3	<0.5	137	0.50	35.9	43.5	133	2.7	224	6646	1209
12	0-15cm	162274-31	14.0	0.13	7.97	7.38	1910	7.5	2.4	368	7.3	0.9	138	2.03	149	278	153	1.3	677	3568	1160
12	15-60cm	162274-32	120	0.34	7.96	7.38	648	1.4	2.3	192	11.0	<0.5	159	0.65	80.5	121	272	3.4	164	3897	1616
12	60-120cm	162274-33	415	0.7	8.10	7.70	412	0.8	2.3	153	19.6	<0.5	168	0.20	47.7	19.8	533	13.7	136	4839	1774
13	0-15cm	162274-34	43.0	0.11	7.87	7.36	1920	9.0	2.2	202	10.5	0.5	125	2.07	114	150	72.7	0.8	586	3586	924
13	15-60cm	162274-35	165	0.35	7.35	7.13	894	2.4	<2	279	26.9	<0.5	194	1.01	239	304	259	2.0	203	4193	1069
13	60-120cm	162274-36	331	0.39	7.70	7.21	547	1.1	5.0	178	11.6	<0.5	222	0.71	77.7	35.8	146	2.9	193	5222	1435
C1	0-15cm	162274-37	19.0	0.08	6.82	6.30	1100	2.1	5.4	139	50.0	13.7	108	1.43	50.5	48.3	23.7	0.4	416	1521	289
C1	15-60cm	162274-38	7.0	0.07	7.79	6.81	584	0.6	4.7	324	11.5	<0.5	255	0.37	53.4	211	73.4	0.7	349	1871	1688
C1	60-120cm	162274-39	9.0	0.27	8.64	7.83	413	0.6	5.1	202	13.5	<0.5	189	0.09	4.6	11.0	98.3	4.2	297	3719	1587
C2	0-15cm	162274-40	13.0	0.06	6.19	5.24	1960	3.4	4.6	330	15.5	3.8	70.7	2.48	87.7	139	26.6	0.3	329	2823	420
C2	15-60cm	162274-41	7.0	0.03	7.83	6.98	691	2.3	3.8	206	28.9	<0.5	117	0.86	28.7	35.0	24.2	0.6	145	5418	604
C2	60-120cm	162274-42	6.5	0.14	7.27	6.46	631	2.6	3.1	161	29.2	<0.5	141	0.40	21.5	15.0	35.0	1.1	139	8597	644
C3	0-15cm	162274-43	9.0	0.04	7.23	6.35	1225	6.5	3.6	208	11.6	6.2	105	1.52	25.7	31.0	13.0	0.3	389	5725	1174
C3	15-60cm	162274-44	13.0	0.05	7.33	6.38	766	1.6	2.7	120	20.3	<0.5	100	1.22	12.7	15.0	33.5	1.2	148	5364	1143
C4	0-15cm	162274-45	10.0	0.04	6.74	6.09	1395	4.0	3.4	376	15.3	2.8	74.2	2.18	56.3	83.5	8.44	0.1	342	2284	458
C4	15-60cm	162274-46	6.6	0.03	6.93	7.03	881	3.0	4.0	255	21.2	0.5	149	0.75	161	267	42.9	0.4	128	4529	864
C4	60-120cm	162274-47	18.0	0.19	7.76	6.97	605	4.2	3.9	95.0	14.8	0.9	94.4	1.06	85.8	81.4	108	1.6	189	6248	1368

			Sodium Ex	Aluminium Ex	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Ex Potassium %	Ex Calcium %	Ex Magnesium %	Ex Sodium %	Ex Aluminium %	ECEC	Ca/Mg Ratio	Dispersion
	Method Description		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EW162274	Method Reference		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								[illegible]
Sample ID	Depth	Units	mg/kg	mg/kg	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	%	%	%	%	meq/100g		%
1	0-15cm	162274-1	445	0.6	1.5	33.4	11.4	1.93	0.01	3.10	69.3	23.6	4.01	0.01	48.3	2.94	44.4
1	15-60cm	162274-2	437	<0.5	1.44	32.5	11.1	1.9	0.01	3.08	69.2	23.7	4.05	0.01	46.9	2.92	17.9
1	60-120cm	162274-3	167	0.6	0.28	22.6	6.78	0.73	0.01	0.91	74.4	22.3	2.39	0.02	30.4	3.33	21.4
2	0-15cm	162274-4	328	<0.5	2.46	37.7	3.85	1.43	0.01	5.41	83.0	8.47	3.14	0.01	45.4	9.79	27.6
2	15-60cm	162274-5	308	0.6	0.66	37.1	3.45	1.34	0.01	1.56	87.2	8.11	3.15	0.02	42.5	10.7	28.6
2	60-120cm	162274-6	96.2	1.1	0.67	33.7	4.59	0.42	0.01	1.70	85.5	11.7	1.06	0.03	39.4	7.34	19.2
3	0-15cm	162274-7	479	0.6	1.43	24.8	7.72	2.08	0.01	3.96	68.8	21.4	5.78	0.02	36.0	3.21	66.7
3	15-60cm	162274-8	490	0.6	0.66	35.2	12.3	2.13	0.01	1.31	70.0	24.4	4.24	0.01	50.3	2.87	23.3
3	60-120cm	162274-9	420	<0.5	0.68	38.6	14	1.83	0.01	1.24	70.1	25.3	3.32	0.01	55.1	2.77	18.8
4	0-15cm	162274-10	314	0.5	0.72	26.4	7.03	1.37	0.01	2.02	74.3	19.8	3.84	0.02	35.5	3.76	31.9
4	15-60cm	162274-11	551	0.5	0.35	41.6	10.9	2.4	0.01	0.64	75.3	19.7	4.34	0.01	55.3	3.81	27.6
4	60-120cm	162274-12	1101	0.5	0.39	39.8	12.3	4.79	0.01	0.68	69.5	21.5	8.36	0.01	57.3	3.24	31.3
6	0-15cm	162274-13	493	0.7	1.22	26.5	9.94	2.14	0.01	3.06	66.6	24.9	5.38	0.02	39.9	2.67	54.6
6	15-60cm	162274-14	478	<0.5	1.22	26.4	9.9	2.08	0.01	3.07	66.7	25.0	5.25	0.01	39.6	2.67	37.9
6	60-120cm	162274-15	462	0.7	0.48	37.2	12.8	2.01	0.01	0.92	70.8	24.4	3.82	0.01	52.6	2.9	21.9
7	0-15cm	162274-16	446	0.6	0.58	36.6	12.1	1.94	0.01	1.13	71.4	23.7	3.78	0.01	51.3	3.02	28.0
7	15-60cm	162274-17	351	<0.5	0.28	32.8	9.04	1.53	0.01	0.64	75.1	20.7	3.50	0.01	43.6	3.62	22.2
7	60-120cm	162274-18	664	0.6	0.34	34.9	11.1	2.89	0.01	0.69	70.9	22.5	5.87	0.01	49.2	3.15	21.0
8	0-15cm	162274-19	476	<0.5	1.45	29.5	9.98	2.07	0.01	3.37	68.6	23.2	4.81	0.01	43.0	2.96	26.1
8	15-60cm	162274-20	529	0.6	0.43	30.9	12.1	2.30	0.01	0.94	67.6	26.4	5.03	0.01	45.7	2.56	25.5
8	60-120cm	162274-21	395	<0.5	0.42	28.9	16.1	1.72	0.01	0.89	61.4	34.1	3.64	0.01	47.1	1.80	21.4
9	0-15cm	162274-22	522	1.5	1.46	21.8	9.78	2.27	0.02	4.14	61.7	27.7	6.42	0.05	35.3	2.23	52.6
9	15-60cm	162274-23	529	0.7	0.31	34.9	13.9	2.3	0.01	0.60	67.9	27.0	4.47	0.02	51.5	2.51	61.1
9	60-120cm	162274-24	518	0.6	0.41	34.4	17.7	2.25	0.01	0.74	62.8	32.3	4.11	0.01	54.8	1.94	6.7
10	0-15cm	162274-25	356	0.7	1.9	25.6	6.26	1.55	0.01	5.38	72.5	17.7	4.38	0.02	35.3	4.09	28.6
10	15-60cm	162274-26	485	1.1	0.49	35.1	5.93	2.11	0.01	1.13	80.4	13.6	4.84	0.03	43.6	5.92	25.0
10	60-120cm	162274-27	178	1.1	0.44	30.4	9.46	0.77	0.01	1.07	74.0	23.0	1.88	0.03	41.1	3.21	2.9
11	0-15cm	162274-28	296	0.8	1.23	27.8	7.03	1.29	0.01	3.29	74.4	18.8	3.44	0.02	37.4	3.96	19.2
11	15-60cm	162274-29	348	0.6	0.49	28.1	7.96	1.51	0.01	1.30	73.8	20.9	3.97	0.02	38.1	3.54	36.7
11	60-120cm	162274-30	620	0.6	0.57	33.2	10.1	2.70	0.01	1.23	71.3	21.6	5.79	0.01	46.6	3.30	40.7
12	0-15cm	162274-31	396	0.8	1.74	17.8	9.67	1.72	0.01	5.60	57.6	31.2	5.56	0.03	31.0	1.85	38.5
12	15-60cm	162274-32	705	<0.5	0.42	19.5	13.5	3.07	0.01	1.15	53.5	37.0	8.41	0.02	36.4	1.45	33.3
12	60-120cm	162274-33	788	<0.5	0.35	24.2	14.8	3.43	0.01	0.82	56.6	34.6	8.01	0.01	42.8	1.64	9.4
13	0-15cm	162274-34	388	<0.5	1.50	17.9	7.70	1.69	0.01	5.21	62.2	26.7	5.85	0.02	28.8	2.33	32.0
13	15-60cm	162274-35	544	<0.5	0.52	21.0	8.91	2.37	0.01	1.59	64.0	27.2	7.22	0.02	32.8	2.35	24.2
13	60-120cm	162274-36	282	<0.5	0.49	26.1	12.0	1.23	0.01	1.24	65.6	30.0	3.08	0.01	39.8	2.18	12.9
C1	0-15cm	162274-37	63.3	<0.5	1.07	7.61	2.41	0.28	0.01	9.39	66.9	21.2	2.42	0.05	11.4	3.16	35.7
C1	15-60cm	162274-38	376	<0.5	0.89	9.36	14.1	1.63	0.01	3.45	36.0	54.2	6.30	0.02	26.0	0.67	58.3
C1	60-120cm	162274-39	555	4.7	0.76	18.6	13.2	2.41	0.05	2.17	53.1	37.7	6.89	0.15	35.0	1.41	54.8
C2	0-15cm	162274-40	48.7	0.5	0.84	14.1	3.5	0.21	0.01	4.52	75.6	18.7	1.13	0.03	18.7	4.03	38.9
C2	15-60cm	162274-41	94.3	0.8	0.37	27.1	5.03	0.41	0.01	1.13	82.3	15.3	1.25	0.03	32.9	5.38	29.6
C2	60-120cm	162274-42	143	0.5	0.36	43.0	5.37	0.62	0.01	0.72	87.1	10.9	1.26	0.01	49.3	8.01	25.9
C3	0-15cm	162274-43	92.2	0.6	1.00	28.6	9.78	0.4	0.01	2.51	71.9	24.6	1.01	0.02	39.8	2.93	25.9
C3	15-60cm	162274-44	191	0.6	0.38	26.8	9.53	0.83	0.01	1.01	71.4	25.4	2.21	0.02	37.6	2.82	24.1
C4	0-15cm	162274-45	53.8	0.7	0.88	11.4	3.82	0.23	0.01	5.36	69.8	23.3	1.43	0.05	16.4	2.99	26.7
C4	15-60cm	162274-46	123	0.5	0.33	22.6	7.20	0.53	0.01	1.07	73.7	23.4	1.74	0.02	30.7	3.15	28.0
C4	60-120cm	162274-47	361	0.7	0.48	31.2	11.4	1.57	0.01	1.08	69.9	25.5	3.51	0.02	44.7	2.74	20.7

			Chlorides	Electrical Conductivity	pH (H_2[illegible]	pH ($CaCl_2$[illegible]	Total Nitrogen	NO_3	NH_4	Total Phosphorus	Phosphorus Ex	Phosphorus Ex	Phosphorus Buffer Index	Organic Carbon	Calcium Soluble	Magnesium Soluble	Sodium Soluble	Sodium Adsorption Ratio	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Ex Potassium %	Ex Calcium %	Ex Magnesium %	Ex Sodium %	Ex Aluminium %	ECEC	Ca/Mg Ratio	Dispersion
2017																																				
	Method Description		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2M[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EW173493	Method Reference		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								[illegible]
Sample ID	Depth	Units	*mg/kg*	*dS/m*	*pH units*	*pH units*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*%*	*mg/kg*	*mg/kg*	*mg/kg*	*-*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*mg/kg*	*meq/100g*	*meq/100g*	*meq/100g*	*meq/100g*	*meq/100g*	%	%	%	%	%	meq/100g		%
1	0-15cm	173493-1	41.2	0.18	7.52	6.85	1852	9.0	6.1	214	30.4	7.4	112	2.21	7.7	10.8	95.7	4.0	596	5822	1000	662	<1.0	1.53	29.1	8.33	2.88	0.01	3.65	69.5	19.9	6.88	0.03	41.9	3.49	20.0
1	15-60cm	173493-2	146	0.33	7.53	6.86	695	<0.5	4.4	72.7	11.1	1.4	148	0.85	13.8	4.8	190	9.5	287	7584	1169	562	<1.0	0.74	37.9	9.74	2.44	0.01	1.45	74.6	19.2	4.81	0.02	50.9	3.89	9.4
1	60-120cm	173493-3	258	0.36	8.28	7.59	471	<0.5	4.9	73.8	9.1	<1.0	200	1.18	16.1	7.4	167	7.2	265	9213	1464	464	<1.0	0.68	46.1	12.2	2.02	0.01	1.11	75.5	20.0	3.31	0.02	61	3.78	9.7
2	0-15cm	173493-4	38.4	0.23	8.25	7.47	2233	10.8	6.7	297	28.3	4.3	144	2.45	13.0	12.0	125	4.7	999	5827	473	405	<1.0	2.56	29.1	3.94	1.76	0.01	6.85	77.9	10.5	4.71	0.03	37.4	7.39	12.9
2	15-60cm	173493-5	151	0.42	8.28	7.54	1144	<0.5	2.7	190	15.0	1.1	244	1.24	14.9	4.2	277	14.2	373	9037	312	682	<1.0	0.96	45.2	2.6	2.97	0.01	1.85	87.4	5.03	5.73	0.02	51.7	17.4	17.1
2	60-120cm	173493-6	155	0.32	8.25	7.61	471	<0.5	3.8	117	10.4	1.1	161	1.62	51.2	8.5	91.0	2.8	175	7543	327	128	<1.0	0.45	37.7	2.73	0.56	0.01	1.08	91.0	6.57	1.34	0.03	41.5	13.8	12.5
3	0-15cm	173493-7	38.6	0.18	7.84	7.16	2619	15.5	4.7	242	31.0	5.0	105	2.73	7.9	10.5	92.6	3.9	698	4767	879	450	<1.0	1.79	23.8	7.33	1.96	0.01	5.13	68.3	21.0	5.60	0.03	34.9	3.25	12.0
3	15-60cm	173493-8	129	0.36	7.56	7.14	906	<0.5	4.4	94.8	14.0	2.0	124	1.20	19.0	5.3	193	8.8	246	6679	841	528	<1.0	0.63	33.4	7.01	2.30	0.01	1.46	77.1	16.2	5.30	0.03	43.3	4.77	14.3
3	60-120cm	173493-9	276	0.45	8.09	7.58	530	<0.5	2.7	64.9	8.8	<1	165	1.12	49.5	15.6	173	4.7	202	8485	866	281	<1.0	0.52	42.4	7.22	1.22	0.01	1.01	82.6	14.0	2.38	0.02	51.4	5.88	3.3
4	0-15cm	173493-10	56.1	0.18	7.57	7.03	1312	6.8	8.9	195	31.8	10.9	95.9	1.45	13.6	12.2	115	4.3	212	4969	680	326	<1.0	0.54	24.8	5.67	1.42	0.01	1.67	76.5	17.4	4.36	0.03	32.5	4.38	10.0
4	15-60cm	173493-11	26.0	0.22	8.74	7.84	562	<0.5	5.0	51.2	14.0	1.5	151	0.74	6.2	5.2	112	6.3	147	7801	872	592	<1.0	0.38	39.0	7.27	2.57	0.01	0.77	79.2	14.8	5.23	0.02	49.2	5.37	16.1
4	60-120cm	173493-12	79.7	0.43	8.77	7.92	363	<0.5	3.3	57.5	9.1	1.3	154	0.79	2.9	3.6	267	18.9	180	8262	1099	1201	<1.0	0.46	41.3	9.16	5.22	0.01	0.82	73.6	16.3	9.30	0.02	56.2	4.51	20.0
5	0-15cm	173493-13	46.4	0.13	6.86	6.22	1462	4.1	4.9	311	80.8	44.9	106	1.83	11.6	13.0	81.2	3.0	312	5572	924	318	<1.0	0.8	27.9	7.70	1.38	0.01	2.12	73.8	20.4	3.66	0.03	37.8	3.62	18.2
5	15-60cm	173493-14	26.5	0.22	7.98	7.61	592	<0.5	5.4	89.0	14.1	3.2	149	0.97	11.2	6.3	98.9	4.8	201	8050	924	274	<1.0	0.52	40.3	7.70	1.19	0.01	1.04	81.0	15.5	2.40	0.02	49.7	5.23	13.9
5	60-120cm	173493-15	88.9	0.24	8.37	7.78	1936	0.6	4.4	103	17.3	1.4	144	0.31	11.6	11.2	69.6	2.7	203	7963	1131	436	<1.0	0.52	39.8	9.43	1.9	0.01	1.01	77.1	18.2	3.67	0.02	51.7	4.22	8.8
6	0-15cm	173493-16	26.8	0.14	7.86	6.92	2114	7.2	3.3	183	21.0	3.6	108	2.13	10.1	14.5	83.3	3.0	557	4283	914	439	<1.0	1.43	21.4	7.62	1.91	0.01	4.41	66.1	23.5	5.89	0.03	32.4	2.81	25.0
6	15-60cm	173493-17	121	0.29	7.55	6.91	807	1.4	4.9	71.8	10.1	1.5	108	0.60	16.9	15.4	178	5.9	181	5717	989	527	<1.0	0.46	28.6	8.24	2.29	0.01	1.17	72.2	20.8	5.79	0.03	39.6	3.47	17.7
6	60-120cm	173493-18	284	0.42	8.11	7.62	540	<0.5	<2	76.1	8.6	1.8	106	0.50	21.1	9.5	230	8.7	205	8824	1241	516	<1.0	0.53	44.1	10.3	2.24	0.01	0.92	77.1	18.1	3.92	0.02	57.2	4.27	8.3
7	0-15cm	173493-19	47.2	0.21	7.67	7.30	1478	7.7	3.2	149	18.4	3.9	106	0.94	8.6	7.6	98.4	4.6	290	6817	782	428	<1.0	0.74	34.1	6.52	1.86	0.01	1.72	78.9	15.1	4.31	0.03	43.2	5.23	12.9
7	15-60cm	173493-20	52.5	0.18	7.94	7.28	748	2.3	3.8	68.1	12.2	1.3	106	0.53	175	164	168	1.7	190	7847	920	430	<1.0	0.49	39.2	7.67	1.87	0.01	0.99	79.6	15.6	3.79	0.02	49.3	5.12	15.6
7	60-120cm	173493-21	96.4	0.30	8.39	7.77	659	<0.5	2.4	60.3	12.4	1.8	110	0.68	14.8	9.5	172	6.9	218	8134	1059	712	<1.0	0.56	40.7	8.83	3.10	0.01	1.05	76.5	16.6	5.82	0.02	53.2	4.61	14.7
8	0-15cm	173493-22	47.9	0.21	8.04	7.53	2082	3.8	3.3	200	18.9	5.1	112	1.31	9.9	12.0	117	4.6	583	5995	1015	610	<1.0	1.49	30.0	8.46	2.65	0.01	3.51	70.4	19.9	6.23	0.03	42.6	3.54	23.3
8	15-60cm	173493-23	244	0.43	7.90	7.46	821	<0.5	4.8	72.7	10.1	3.7	129	0.60	22.0	9.7	252	9.4	227	7015	1359	670	<1.0	0.58	35.1	11.3	2.91	0.01	1.17	70.3	22.7	5.84	0.02	49.9	3.10	9.7
8	60-120cm	173493-24	203	0.38	8.05	7.72	419	<0.5	5.0	53.4	7.8	1.5	107	0.28	24.2	14.3	190	6.2	263	8170	1656	418	<1.0	0.67	40.9	13.8	1.82	0.01	1.18	71.5	24.1	3.18	0.02	57.2	2.96	14.3
9	0-15cm	173493-25	54.5	0.20	7.85	7.23	1946	12.3	3.2	197	17.4	2.8	106	1.41	9.9	14.2	182	6.6	573	3922	933	603	<1.0	1.47	19.6	7.78	2.62	0.01	4.67	62.3	24.7	8.33	0.04	31.5	2.52	17.9
9	15-60cm	173493-26	294	0.54	8.14	7.74	531	0.6	4.8	65.2	4.3	1.0	159	0.39	27.9	22.2	312	8.5	174	6388	1531	783	<1.0	0.45	31.9	12.8	3.40	0.01	0.92	65.8	26.3	7.01	0.02	48.6	2.50	17.1
9	60-120cm	173493-27	309	2.96	7.59	7.44	354	<0.5	2.7	44.5	4.5	1.2	150	0.13	2253	611	584	2.5	192	16100	1850	761	<1.0	0.49	80.5	15.4	3.31	0.01	0.49	80.7	15.5	3.32	0.01	99.7	5.22	13.3
10	0-15cm	173493-28	31.0	0.15	7.84	7.27	2407	7.9	3.1	325	19.2	3.3	123	2.16	8.1	13.4	98.0	3.7	827	2713	507	361	<1.0	2.12	13.6	4.23	1.57	0.01	9.87	63.1	19.7	7.30	0.05	21.5	3.21	14.3
10	15-60cm	173493-29	268	0.30	7.15	6.80	719	<0.5	3.3	105	3.8	1.2	224	0.25	47.2	22.7	73.1	1.8	375	3525	852	152	<1.0	0.96	17.6	7.10	0.66	0.01	3.65	66.9	26.9	2.51	0.04	26.4	2.48	4.7
10	60-120cm	173493-30	115	0.27	7.03	6.50	836	0.9	3.8	144	6.8	1.5	160	0.66	42.6	71.6	243	4.0	301	2918	569	598	<1.0	0.77	14.6	4.74	2.60	0.01	3.40	64.2	20.9	11.4	0.05	22.7	3.08	14.3
11	0-15cm	173493-31	24.8	0.21	7.90	7.42	1821	14.8	4.4	269	32.8	6.2	161	1.23	10.2	10.5	120	4.9	589	6590	750	505	<1.0	1.51	33.0	6.25	2.20	0.01	3.52	76.8	14.6	5.12	0.03	42.9	5.27	21.2
11	15-60cm	173493-32	61.0	0.26	8.12	7.61	831	2.2	6.2	112	9.1	1.3	200	0.53	10.7	3.5	136	7.9	305	8732	1010	458	<1.0	0.78	43.7	8.42	1.99	0.01	1.43	79.6	15.3	3.63	0.02	54.9	5.19	8.6
11	60-120cm	173493-33	111	0.31	8.48	7.85	557	1.3	8.3	82.8	8.1	<1	176	0.34	3.3	1.8	201	18.0	287	8039	1284	945	<1.0	0.74	40.2	10.7	4.11	0.01	1.32	72.1	19.2	7.37	0.02	55.8	3.76	16.2
12	0-15cm	173493-34	39.9	0.24	7.25	6.8	2584	25.7	4.9	383	30.6	5.9	129	2.01	13.6	20.7	146	4.4	786	3097	882	362	<1.0	2.02	15.5	7.35	1.57	0.01	7.62	58.6	27.8	5.95	0.04	26.4	2.11	6.5
12	15-60cm	173493-35	209	0.56	8.26	7.85	814	14.5	3.2	160	7.3	1.3	214	0.65	12.5	11.6	397	15.3	240	4716	1560	1063	<1.0	0.62	23.6	13.0	4.62	0.01	1.47	56.4	31.1	11.0	0.03	41.8	1.81	22.9
12	60-120cm	173493-36	510	0.83	8.28	7.94	394	2.8	<2	83.4	3.8	1.2	178	0.41	36.8	36.9	619	13.5	234	7188	2145	1487	<1.0	0.60	35.9	17.9	6.47	0.01	0.99	59.0	29.4	10.6	0.02	60.9	2.01	<1
13	0-15cm	173493-37	58.9	0.39	7.04	6.93	2643	17.4	2.1	389	32.8	8.1	129	2.20	24.9	10.5	153	5.4	848	4090	749	464	<1.0	2.17	20.5	6.24	2.02	0.01	7.04	66.2	20.2	6.53	0.04	30.9	3.28	19.2
13	15-60cm	173493-38	257	0.49	7.41	6.98	785	5.4	<2	210	10.9	1.4	171	0.62	61.6	28.5	280	6.2	237	5511	1060	756	<1.0	0.61	27.6	8.83	3.29	0.01	1.51	68.4	21.9	8.16	0.03	40.3	3.12	7.7
13	60-120cm	173493-39	272	0.41	8.05	7.75	613	3.3	2.1	144	7.1	1.0	215	0.51	53.3	25.2	110	2.6	333	8218	1230	244	<1.0	0.85	41.1	10.3	1.06	0.01	1.60	77.1	19.2	1.99	0.02	53.3	4.01	3.1
CWEST	0-15cm	173493-45	8.4	0.07	6.83	6.07	1500	6.1	5.1	96.3	43.6	20.6	116	1.35	9.0	9.5	36.6	1.6	617	6691	1098	122	<1.0	1.58	33.5	9.15	0.53	0.01	3.54	74.8	20.5	1.19	0.02	44.7	3.66	6.1
CWEST	15-60cm	173493-46	5.1	0.05	7.88	7.23	799	1.2	4.5	136	14.8	2.1	131	0.81	3.9	6.4	24.4	1.3	351	8293	1378	394	<1.0	0.90	41.5	11.5	1.71	0.01	1.62	74.6	20.7	3.08	0.02	55.6	3.61	5.7
CWEST	60-120cm	173493-47	2.2	0.19	8.14	7.61	631	1.0	5.0	86.5	9.1	1.4	123	0.68	9.7	9.1	103	4.5	318	8223	1501	487	<1.0	0.82	41.1	12.5	2.12	0.01	1.44	72.7	22.1	3.74	0.02	56.6	3.29	18.4
CCREST	0-15cm	173493-48	7.4	0.05	6.51	6.04	1974	1.7	2.8	162	19.7	4.0	89.4	1.72	3.0	6.0	19.0	1.1	448	2793	566	98	<1.0	1.15	14.0	4.72	0.43	0.01	5.67	68.9	23.3	2.10	0.05	20.3	2.96	11.5
CCREST	15-60cm	173493-49	5.0	0.13	7.63	7.37	688	0.8	<2	79.8	7.3	1.4	133	0.35	14.8	17.3	35.6	1.1	296	5179	660	166	<1.0	0.76	25.9	5.50	0.72	0.01	2.31	78.7	16.7	2.19	0.03	32.9	4.71	9.7
CCREST	60-120cm	173493-50	2.4	0.13	8.18	7.72	637	1.0	<2	136	8.8	1.2	199	0.33	6.8	3.7	49.3	3.1	261	8237	1019	157	<1.0	0.67	41.2	8.49	0.68	0.01	1.31	80.7	16.6	1.34	0.02	51.0	4.85	12.8
CSW	0-15cm	173493-40	7.4	0.04	7.50	6.66	1566	2.5	4.9	266	14.0	3.6	74.9	1.17	2.2	6.5	26.3	1.5	316	2232	503	64.2	<1.0	0.81	11.2	4.19	0.28	0.01	4.92	67.8	25.5	1.70	0.07	16.5	2.66	5.0
CSW	15-60cm	173493-41	9.7	0.07	7.06	6.70	900	2.0	4.5	212	10.6	2.6	112	0.64	6.1	10.4	31.0	1.3	183	3750	605	97.9	<1.0	0.47	18.8	5.04	0.43	0.01	1.90	75.9	20.4	1.72	0.04	24.7	3.72	7.7
CNWG	0-15cm	173493-42	9.1	0.04	5.20	4.36	1129	3.9	6.7	404	55.2	22.2	103	0.69	4.1	18.8	26.3	0.9	471	423	186	65.7	12.5	1.21	2.12	1.55	0.29	0.14	22.8	39.9	29.3	5.39	2.62	5.3	1.36	54.3
CNWG	15-60cm	173493-43	8.8	0.07	7.91	6.47	772	1.8	7.2	123	11.9	1.7	213	0.38	1.7	<1.0	52.0	6.4	299	1423	1160	645	<1.0	0.77	7.12	9.67	2.80	0.01	3.76	34.9	47.5	13.8	0.05	20.4	0.74	38.6
CNWG	60-120cm	173493-44	4.9	0.24	8.88	7.87	611	1.1	2.7	109	10.9	1.5	281	0.25	3.1	3.7	173	12.1	317	3710	1754	1785	<1.0	0.81	18.6	14.6	7.76	0.01	1.95	44.4	35.0	18.6	0.03	41.8	1.27	22.2

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			Chlorides	Electrical Conductivity	pH (H_2[illegible]	pH ($CaCl_2$[illegible]	Total Nitrogen	NO_3 [illegible]	NH_4 [illegible]	Total Phosphorus	Phosphorus Ex	Phosphorus Ex	Phosphorus Buffer Index	Organic Carbon	Calcium Soluble	Magnesium Soluble	Sodium Soluble	Sodium Adsorption Ratio	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Ex Potassium %	Ex Calcium %	Ex Magnesium %	Ex Sodium %	Ex Aluminium %	ECEC	Ca/Mg Ratio	Dispersion
	Method Description		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2M[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EW181790	Method Reference		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								[illegible]
Sample ID	Depth	Units	mg/kg	dS/m	pH units	pH units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	%	%	%	%	meq/100g		%
TAM1	0-15	181790-1	184	0.31	7.08	6.51	1415	10.0	3.7	262	36.5	3.5	98.1	1.53	20.8	22.2	199	5.6	459	4080	933	716	<1.0	1.18	20.4	7.78	3.11	0.01	3.62	62.8	23.9	9.59	0.03	32.5	2.62	40.0
TAM1	15-60	181790-2	507	0.55	7.74	7.42	689	1.2	3.7	120	21.8	1.2	127	0.59	109	36.6	317	5.7	251	6098	1475	637	<1.0	0.64	30.5	12.3	2.77	0.01	1.39	66.0	26.6	5.99	0.02	46.2	2.48	19.3
TAM1	60-120	181790-3	274	0.40	8.60	7.94	325	1.2	5.0	141	17.5	<1	77.8	0.46	18.8	9.45	262	10.2	147	6777	1397	605	<1.0	0.38	33.9	11.6	2.63	0.01	0.78	69.8	24.0	5.42	0.02	48.5	2.91	17.8
TAM2	0-15	181790-4	107	0.56	8.38	7.56	1680	6.2	2.5	307	37.1	4.1	106	1.35	124	139	240	2.7	764	4857	440	739	<1.0	1.96	24.3	3.67	3.21	0.01	5.91	73.3	11.1	9.70	0.03	33.1	6.62	34.3
TAM2	15-60	181790-5	353	0.46	8.29	7.72	942	1.5	2.3	206	22.4	<1	168	1.00	32.0	8.3	306	10.9	371	5488	423	617	<1.0	0.95	27.4	3.53	2.68	0.01	2.75	79.3	10.2	7.75	0.03	34.6	7.78	15.5
TAM2	60-120	181790-6	318	0.37	8.21	7.69	540	1.3	3.4	61.8	11.1	<1	180	0.52	90.5	24	110	2.3	429	6205	627	157	<1.0	1.10	31.0	5.23	0.68	0.01	2.89	81.6	13.7	1.79	0.03	38.0	5.94	6.1
TAM3	0-15	181790-7	130	0.42	7.28	6.80	1902	7.5	3.9	259	30.0	4.0	74.9	1.83	28.9	15.9	279	8.5	629	4544	876	639	<1.0	1.61	22.7	7.30	2.78	0.01	4.69	66.0	21.2	8.07	0.03	34.4	3.11	26.6
TAM3	15-60	181790-8	279	0.42	8.29	7.76	652	1.2	4.8	125	14.1	<1	138	0.61	46.8	14.8	273	7.7	163	7314	1222	603	<1.0	0.42	36.6	10.2	2.62	0.01	0.84	73.4	20.4	5.26	0.02	49.8	3.59	24.1
TAM3	60-120	181790-9	379	0.38	8.32	7.82	531	1.2	5.0	109	13.6	<1	140	0.26	45.3	21.5	174	4.4	167	7204	1549	353	<1.0	0.43	36	12.9	1.53	0.01	0.84	70.8	25.4	3.02	0.02	50.9	2.79	6.7
TAM4	0-15	181790-10	148	0.28	7.88	7.37	1418	6.4	3.2	312	27.2	5.2	70.5	1.19	19.1	13.5	189	6.5	263	4968	807	496	<1.0	0.67	24.8	6.73	2.16	0.01	1.96	72.2	19.5	6.27	0.03	34.4	3.69	25.8
TAM4	15-60	181790-11	174	0.25	7.65	7.06	941	1.9	3.9	129	17.3	<1	87.5	0.78	227	170	245	2.4	163	5996	1039	657	<1.0	0.42	30	8.66	2.86	0.01	1.00	71.5	20.7	6.81	0.03	41.9	3.46	19.3
TAM4	60-120	181790-12	164	0.31	8.64	7.83	416	1.1	7.0	150	6.0	<1	75.4	0.26	8.6	4.1	245	14.3	151	7674	1093	774	<1.0	0.39	38.4	9.11	3.37	0.01	0.76	74.9	17.8	6.57	0.02	51.2	4.21	18.7
TAM5	0-15	181790-13	71.7	0.20	7.48	6.72	1622	3.7	6.1	297	48.2	12.4	83	0.91	22.3	28.6	159	4.0	371	5365	1045	760	<1.0	0.95	26.8	8.71	3.30	0.01	2.39	67.4	21.9	8.30	0.03	39.8	3.08	27.7
TAM5	15-60	181790-14	280	0.31	7.49	7.03	826	1.4	4.8	114	14.6	1	87.3	0.77	35.9	11.3	179	5.7	194	5700	982	449	<1.0	0.50	28.5	8.18	1.95	0.01	1.27	72.8	20.9	4.99	0.03	39.1	3.48	9.9
TAM5	60-120	181790-15	212	0.29	8.10	7.64	820	<1	3.4	109	15.8	<1	57.6	0.51	35.0	12.8	141	4.4	106	5953	1169	272	<1.0	0.27	29.8	9.74	1.18	0.01	0.66	72.6	23.8	2.89	0.03	41.0	3.06	16.4
TAM6	0-15	181790-16	82.2	0.26	7.46	6.83	1618	15.2	4.1	210	25.6	3.2	74	1.12	27.8	27.2	204	5.2	336	4674	1029	620	<1.0	0.86	23.4	8.58	2.70	0.01	2.43	65.8	24.1	7.59	0.03	35.5	2.73	26.6
TAM6	15-60	181790-17	168	0.26	7.55	6.94	315	1.4	5.0	105	12.8	<1	92.9	0.90	20.8	13.4	180	6.1	211	5227	1206	599	<1.0	0.54	26.1	10.1	2.60	0.01	1.38	66.4	25.5	6.62	0.03	39.3	2.60	15.0
TAM6	60-120	181790-18	314	0.39	8.44	7.87	428	<1	4.1	131	9.4	<1	87.5	0.19	31.5	14.2	245	7.6	131	6940	1326	535	<1.0	0.34	34.7	11.1	2.33	0.01	0.69	71.7	22.8	4.80	0.02	48.4	3.14	17.8
TAM7	0-15	181790-19	226	0.34	7.71	7.22	1643	10.2	4.3	195	29.8	2.6	79	1.12	20.1	10.8	252	9.3	321	5401	835	655	<1.0	0.82	27.0	6.96	2.85	0.01	2.19	71.7	18.5	7.56	0.03	37.6	3.88	22.7
TAM7	15-60	181790-20	212	0.29	8.10	7.25	1005	1.9	3.9	104	19.4	<1	74	0.72	20.9	11.9	182	6.4	122	5701	920	515	<1.0	0.31	28.5	7.67	2.24	0.01	0.81	73.6	19.8	5.78	0.03	38.7	3.72	9.9
TAM7	60-120	181790-21	141	0.27	7.72	7.59	630	<1	3.7	93.4	15.8	<1	61.5	0.56	1061	182	630	4.2	139	8148	1107	815	<1.0	0.36	40.7	9.23	3.54	0.01	0.66	75.6	17.1	6.58	0.02	53.9	4.42	6.5
TAM8	0-15	181790-22	57.1	0.19	7.84	7.27	2021	5.5	6.1	228	19.6	2.0	74	1.69	17.4	21.9	151	4.4	565	4641	1119	673	<1.0	1.45	23.2	9.33	2.93	0.01	3.92	62.9	25.3	7.93	0.03	36.9	2.49	20.6
TAM8	15-60	181790-23	438	0.47	7.88	7.49	761	<1	4.6	102	9.4	<1	102	0.51	38.8	17.2	307	8.6	197	5217	1379	617	<1.0	0.51	26.1	11.5	2.68	0.01	1.24	64	28.2	6.58	0.03	40.8	2.27	22.0
TAM8	60-120	181790-24	481	0.92	7.75	7.59	468	<1	5.7	92.8	14.8	<1	41.7	0.41	725	259	269	1.9	173	8595	1952	392	<1.0	0.44	43.0	16.3	1.70	0.01	0.72	70	26.5	2.78	0.02	61.4	2.64	6.1
TAM9	0-15	181790-25	24.2	0.16	7.96	7.25	1860	5.6	2.5	223	16.3	1	82.7	1.34	203	238	219	1.9	603	3724	980	653	<1.0	1.55	18.6	8.17	2.84	0.01	4.96	59.7	26.2	9.10	0.04	31.2	2.28	29.0
TAM9	15-60	181790-26	638	0.66	8.00	7.68	630	1.5	6.6	95.1	18.6	<1	105	0.48	52.8	25.8	468	10.9	137	4801	1209	881	<1.0	0.35	24.0	10.1	3.83	0.01	0.92	62.7	26.3	10.0	0.03	38.3	2.38	15.3
TAM9	60-120	181790-27	441	2.96	7.67	7.57	337	<1	5.5	82.1	15.8	<1	125	0.31	2767	583	664	2.7	197	11800	1554	729	<1.0	0.51	59.0	13.0	3.17	0.01	0.67	78.0	17.1	4.19	0.01	75.6	4.56	5.7
TAM10	0-15	181790-28	52.8	0.19	7.95	7.29	2859	13.5	4.1	375	31.4	3.2	105	2.30	24.1	34.6	157	3.7	844	2827	591	456	<1.0	2.16	14.1	4.93	1.98	0.01	9.32	60.9	21.2	8.54	0.05	23.2	2.87	24.0
TAM10	15-60	181790-29	249	0.31	8.10	7.49	1047	3.7	5.4	219	22.9	<1	178	0.80	17.3	21.2	169	5.0	185	3659	430	632	<1.0	0.47	18.3	3.58	2.75	0.01	1.89	72.9	14.3	10.9	0.04	25.1	5.11	10.2
TAM10	60-120	181790-30	352	0.39	7.06	6.73	718	1.1	3.9	201	30.6	<1	209	0.56	41.4	19.6	198	5.3	181	3113	796	350	<1.0	0.46	15.6	6.63	1.52	0.01	1.92	64.3	27.4	6.29	0.05	24.2	2.35	9.5
TAM11	0-15	181790-31	160	0.23	7.49	6.92	2521	6.0	4.3	379	29.2	3.2	99.1	1.41	11	16.2	141	4.8	654	3477	706	659	<1.0	1.68	17.4	5.88	2.87	0.01	6.03	62.5	21.1	10.3	0.04	27.8	2.95	21.6
TAM11	15-60	181790-32	329	0.42	7.94	7.60	893	1.2	5.0	160	20.4	<1	177	0.85	26.8	11.4	257	8.8	229	6483	1105	577	<1.0	0.59	32.4	9.21	2.51	0.01	1.31	72.5	20.6	5.61	0.02	44.7	3.52	7.2
TAM11	60-120	181790-33	138	0.40	8.15	7.72	665	<1	3.9	105	14.1	<1	136	0.53	29.8	26.2	220	5.6	223	6037	1333	643	<1.0	0.57	30.2	11.1	2.80	0.01	1.28	67.6	24.9	6.26	0.02	44.7	2.72	14.9
TAM12	0-15	181790-34	138	0.25	7.34	6.82	2519	14.8	2.5	506	27.7	2.6	101	1.69	12.1	21.5	154	4.6	767	2961	905	509	<1.0	1.97	14.8	7.54	2.21	0.01	7.41	55.8	28.4	8.34	0.04	26.5	1.96	19.6
TAM12	15-60	181790-35	426	0.51	7.82	7.39	957	10.1	6.1	243	28.4	<1	130	0.47	19.5	15.3	365	12.0	202	3109	1455	913	<1.0	0.52	15.5	12.1	3.97	0.01	1.61	48.3	37.7	12.3	0.03	32.2	1.28	12.6
TAM12	60-120	181790-36	802	0.87	8.25	7.90	512	2.9	8.1	147	20.1	<1	121	0.24	55.7	43.3	614	11.9	163	5502	1958	1203	<1.0	0.42	27.5	16.3	5.23	0.01	0.84	55.6	33	10.6	0.02	49.5	1.69	5.6
TAM13	0-15	181790-37	70.9	0.23	7.32	6.84	2422	13.5	4.1	356	36.8	3.8	102	1.58	11.7	15.7	149	5.1	715	4272	753	521	<1.0	1.83	21.4	6.28	2.27	0.01	5.78	67.3	19.8	7.14	0.04	31.7	3.40	19.6
TAM13	15-60	181790-38	271	0.41	7.68	7.31	1069	5.1	4.6	203	17.6	<1	121	0.71	20.7	9.7	245	9.3	280	5611	870	732	<1.0	0.72	28.1	7.25	3.18	0.01	1.83	71.5	18.5	8.12	0.03	39.2	3.87	10.2
TAM13	60-120	181790-39	514	0.47	7.77	7.48	729	6.7	3.1	131	15.1	<1	129	0.63	86.8	24.6	223	4.7	262	5845	993	462	<1.0	0.67	29.2	8.28	2.01	0.01	1.67	72.7	20.6	5.00	0.03	40.2	3.53	10.8
C1	0-15	181790-40	14.7	0.06	6.56	6.07	1484	9.8	6.1	292	42.3	10.3	80.5	1.02	29.7	38.1	46.3	1.0	409	5259	1132	99.9	<1.0	1.05	26.3	9.43	0.43	0.01	2.82	70.6	25.3	1.17	0.03	37.2	2.79	5.8
C1	15-60	181790-41	8.5	0.09	7.89	7.28	837	3.3	4.6	72.5	20.9	<1	129	0.70	9.48	9.6	41.6	1.8	274	6347	1396	190	<1.0	0.7	31.7	11.6	0.83	0.01	1.56	70.7	25.9	1.84	0.02	44.9	2.73	7.2
C1	60-120	181790-42	23.2	0.21	8.48	7.85	612	1.1	3.4	107	12.1	<1	141	0.36	9.84	6.8	135	6.5	207	7829	1634	470	<1.0	0.53	39.1	13.6	2.04	0.01	0.96	70.7	24.6	3.69	0.02	55.3	2.87	8.1
C2	0-15	181790-43	12.7	0.06	6.10	5.70	2030	12.6	4.8	372	19.1	2.3	53.9	1.33	5.26	8.5	23.6	1.1	332	2513	476	42.3	<1.0	0.85	12.6	3.97	0.18	0.01	4.84	71.5	22.6	1.05	0.06	17.6	3.17	19.8
C2	15-60	181790-44	5.65	0.04	7.06	6.52	881	<1	2.5	251	22.7	<1	88.3	0.52	9.33	15.0	38.2	1.4	159	3543	637	96.2	<1.0	0.41	17.7	5.31	0.42	0.01	1.71	74.2	22.2	1.75	0.05	23.9	3.34	20.6
C2	60-120	181790-45	5.5	0.05	7.69	7.06	768	<1	2.3	172	18.1	<1	63.8	0.47	8.52	14.7	72.4	2.6	192	4994	944	220	<1.0	0.49	25.0	7.87	0.96	0.01	1.44	72.8	22.9	2.79	0.03	34.3	3.17	22.0
C3	0-15	181790-46	11.6	0.06	5.75	5.29	1961	12.5	5.7	313	18.6	1.3	48.7	1.17	2.00	2.9	23.4	1.9	253	1585	320	41.6	1.59	0.65	7.93	2.67	0.18	0.02	5.67	69.3	23.3	1.58	0.15	11.4	2.97	25.3
C3	15-60	181790-47	15.7	0.05	6.51	6.02	2003	7.4	3.2	221	17.8	<1	83.0	0.78	25.5	52.5	47.4	0.9	101	2938	638	61.9	<1.0	0.26	14.7	5.32	0.27	0.01	1.26	71.5	25.9	1.31	0.05	20.5	2.76	19.8
C3	60-120	181790-48	1.9	0.05	7.17	6.56	1092	1.2	4.3	206	19.4	<1	139	0.56	31.4	71.5	69.8	1.2	149	4237	1193	173	<1.0	0.38	21.2	9.94	0.75	0.01	1.18	65.6	30.8	2.33	0.03	32.3	2.13	21.0
C4	0-15	181790-49	7.3	0.06	5.09	4.51	1091	9.9	10.9	422	48.4	15.7	82.5	1.23	1.69	6.3	20.3	1.2	450	682	237	51.3	5.47	1.15	3.41	1.98	0.22	0.06	16.9	50.0	28.9	3.27	0.89	6.8	1.73	10.8
C4	15-60	181790-50	8.3	0.04	6.74	5.86	731	1.9	4.3	238	40.3	1.2	105	0.96	27.4	88.4	57.5	0.9	339	1258	763	213	<1.0	0.87	6.29	6.36	0.93	0.01	6.01	43.5	44.0	6.41	0.08	14.5	0.99	20.6
C4	60-120	181790-51	6.4	0.19	8.38	7.67	623	1.6	8.8	247	17.2	<1	158	0.36	15.7	59.1	269	5.1	368	1867	1431	591	<1.0	0.94	9.34	11.9	2.57	0.01	3.81	37.7	48.1	10.4	0.04	24.8	0.78	14.2

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			Chlorides	Electrical Conductivity	pH (H_2[illegible]	pH ($CaCl_2$[illegible]	Total Nitrogen	NO_3[illegible]	NH[illegible]	Total Phosphorus	Phosphorus Ex	Phosphorus Ex	Phosphorus Buffer Index	Organic Carbon	Calcium Soluble	Magnesium Soluble	Sodium Soluble	Sodium Adsorption Ratio
	Method Description		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2M[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EW191723	Method Reference		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sample ID	Depth	Units	mg/kg	dS/m	pH units	pH units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	-
TAM1	0-15	191723-13	201	0.30	7.96	7.28	2054	6.04	4.60	264	20.6	4.04	116	1.87	75.5	66.3	291	4.60
TAM1	15-60	191723-14	476	0.26	7.54	7.34	674	2.75	2.75	115	6.87	1.69	85.2	1.15	125	24	377	7.20
TAM1	60-120	191723-15	159	0.29	8.24	7.70	233	3.13	3.49	122	3.61	<1.0	97.6	0.42	26.1	5.66	169	6.90
TAM2	0-15	191723-16	107	0.25	8.33	7.52	1834	6.45	3.25	318	17.5	1.85	123	1.88	95.8	90.3	249	3.40
TAM2	15-60	191723-17	586	0.76	7.93	7.62	1017	3.28	8.83	232	6.21	<1.0	228	0.90	118	9.57	476	10.7
TAM2	60-120	191723-18	245	0.33	8.15	7.56	396	3.16	2.63	145	4.13	<1.0	199	0.28	94.9	13.9	49.8	1.20
TAM3	0-15	191723-19	332	0.51	7.46	7.08	1742	5.65	2.38	258	35.9	9.59	103	1.57	77.1	42.8	461	8.60
TAM3	15-60	191723-20	248	0.48	7.95	7.56	543	3.90	3.61	99.6	4.78	<1.0	160	0.68	54.7	8.95	309	9.20
TAM3	60-120	191723-21	268	0.34	8.32	7.80	253	3.07	4.11	77.9	3.10	<1.0	113	0.75	43.4	8.91	164	5.30
TAM4	0-15	191723-22	159	0.38	7.99	7.42	1403	4.29	4.32	214	25.7	5.47	87.8	1.37	78.4	45.7	319	5.80
TAM4	15-60	191723-23	295	0.38	7.81	7.48	724	2.72	<2.0	101	9.76	1.19	84.4	0.98	75.5	36.9	291	5.70
TAM4	60-120	191723-24	125	2.27	7.71	7.60	242	3.10	<2.0	110	4.65	1.49	80.9	0.44	1687	170	742	4.30
TAM5	0-15	191723-25	201	0.38	7.82	7.27	1652	6.62	5.84	301	45.8	17.7	97.8	1.56	96.3	71.9	343	5.10
TAM5	15-60	191723-26	408	0.51	7.69	7.17	830	1.40	3.09	146	19.9	4.51	87.0	1.23	91.8	25.1	317	6.60
TAM5	60-120	191723-27	232	0.36	7.92	7.56	399	1.68	<2.0	130	10.7	1.23	77.2	0.62	58.8	10.8	134	3.80
TAM6	0-15	191723-28	148	0.36	7.57	7.18	1708	7.04	5.23	161	25.4	4.25	93.8	1.38	61.3	41.6	262	5.10
TAM6	15-60	191723-29	249	0.37	7.27	7.20	899	3.93	2.16	155	16.8	1.74	94.9	1.05	60.9	35.7	317	6.50
TAM6	60-120	191723-30	400	0.48	7.98	7.65	319	1.40	<2.0	86.3	5.69	<1.0	96.8	0.61	68.7	14.5	266	6.80
TAM7	0-15	191723-31	115	0.29	7.86	7.22	1648	9.77	3.69	220	14.5	2.21	95.6	1.52	78.1	53.3	269	4.60
TAM7	15-60	191723-32	290	0.41	7.97	7.59	432	3.13	<2.0	85.3	6.35	<1.0	150	0.60	45.7	6.82	257	8.50
TAM7	60-120	191723-33	129	0.36	8.39	7.80	291	2.40	3.09	77.0	6.87	<1.0	154	0.45	27.1	16.6	298	9.00
TAM8	0-15	191723-34	55.3	0.27	8.29	7.55	1721	2.90	5.53	217	15.5	1.85	104	1.56	79.7	74.0	255	3.90
TAM8	15-60	191723-35	570	0.64	8.03	7.75	471	2.48	2.32	95.6	6.48	<1.0	165	0.66	71.6	20.6	476	11.1
TAM8	60-120	191723-36	357	0.46	8.23	7.94	178	2.69	5.53	86.4	5.04	<1.0	139	0.37	30.4	14.2	310	9.70
TAM9	0-15	191723-37	223	0.40	7.92	7.32	2426	4.43	6.89	316	34.8	8.71	101	1.97	68.9	64.7	394	6.40
TAM9	15-60	191723-38	459	0.61	8.10	7.74	512	3.66	3.86	137	11.2	1.12	117	0.80	47.6	17.9	491	13.0
TAM9	60-120	191723-39	355	0.50	8.24	7.79	112	2.81	4.93	85.7	5.00	<1.0	124	0.26	48.9	18.6	333	8.70
TAM10	0-15	191723-40	144	0.30	7.88	7.22	2569	3.28	6.29	444	32.0	3.70	109	2.40	36.1	37.0	298	6.50
TAM10	15-60	191723-41	240	0.39	7.45	6.93	862	1.40	3.75	246	20.6	<1.0	203	0.79	77.2	76.4	409	6.20
TAM10	60-120	191723-42	425	0.42	7.09	6.87	936	1.29	4.01	258	17.9	<1.0	207	1.00	76.6	22.6	222	5.00
TAM11	0-15	191723-43	219	0.38	7.95	7.29	1916	5.84	6.74	387	32.2	2.16	143	1.77	71.0	63.0	360	5.90
TAM11	15-60	191723-44	528	0.53	7.68	7.36	636	2.72	<2.0	151	8.70	<1.0	177	0.87	65.2	13.0	363	9.60
TAM11	60-120	191723-45	160	0.32	8.33	7.80	390	2.57	3.71	123	13.9	<1.0	134	0.60	46.4	40.8	302	6.10
TAM12	0-15	191723-46	184	0.32	7.79	7.21	2587	4.04	6.44	431	31.4	1.80	137	1.90	95.3	135	410	4.80
TAM12	15-60	191723-47	544	0.63	7.72	7.50	718	2.45	6.87	222	22.7	<1.0	152	0.65	41.9	21.4	561	14.5
TAM12	60-120	191723-48	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TAM13	0-15	191723-49	260	0.39	7.49	7.06	2461	20.0	4.17	389	23.2	3.29	161	1.86	52.9	47.2	356	6.80
TAM13	15-60	191723-50	219	0.42	8.09	7.68	642	3.84	5.53	227	18.8	<1.0	257	0.56	39.4	10.4	383	12.2
TAM13	60-120	191723-51	264	0.59	7.62	7.55	263	3.69	2.94	143	14.9	<1.0	171	0.39	300	44.3	178	2.30
C1	0-15	191723-1	25.8	0.10	6.60	6.26	1347	14.9	4.35	191	27.7	8.98	101	1.40	69.8	46.3	35.7	0.70
C1	15-60	191723-2	9.82	0.06	7.56	6.72	697	2.54	5.70	92.3	3.61	<1.0	103	0.97	72.7	58.7	49.6	0.80
C1	60-120	191723-3	10.5	0.19	8.40	7.71	498	1.68	3.49	93.2	3.61	<1.0	104	0.74	51.1	38.9	129	2.60
C2	0-15	191723-4	43.8	0.21	6.16	5.79	3414	50.1	37.5	399	31.4	9.06	76.4	1.89	80.9	60.6	46.5	0.80
C2	15-60	191723-5	27.3	0.05	6.56	5.53	625	1.29	<2.0	107	3.61	<1.0	78.5	0.42	164	201	84.3	0.80
C2	60-120	191723-6	32.3	0.08	7.74	6.89	514	4.34	<2.0	146	5.04	<1.0	93.8	0.39	110	143	95.9	1.10
C3	0-15	191723-7	17.1	0.19	6.14	5.76	1819	72.9	14.7	365	26.4	6.11	68.8	1.39	64.9	37.0	32.4	0.60
C3	15-60	191723-8	6.34	0.06	7.25	6.53	1151	1.53	4.60	190	12.8	<1.0	172	0.83	90.0	95.0	47.2	0.60
C3	60-120	191723-9	15.9	0.15	7.95	7.13	1309	3.28	<2.0	230	11.2	<1.0	226	0.94	56.2	38.8	62.7	1.30
C4	0-15	191723-10	7.50	0.07	5.35	4.40	1327	15.9	12.9	396	68.4	24.4	84.4	1.38	6.37	14.0	24.8	0.90
C4	15-60	191723-11	26.3	0.19	7.75	7.13	640	2.54	8.77	207	18.1	<1.0	212	0.34	84.6	194	258	2.60
C4	60-120	191723-12	26.9	0.39	8.78	7.77	223	1.59	9.87	333	11.6	1.10	243	0.30	79.6	196	530	5.40

			Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Potassium Ex	Calcium Ex	Magnesium Ex	Sodium Ex	Aluminium Ex	Ex Potassium %	Ex Calcium %	Ex Magnesium %	Ex Sodium %	Ex Aluminium %	ECEC	Ca/Mg Ratio	Dispersion
	Method Description		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EW191723	Method Reference		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								[illegible]
Sample ID	Depth	Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	meq/100g	meq/100g	meq/100g	meq/100g	meq/100g	%	%	%	%	%	meq/100g		%
TAM1	0-15	191723-13	737	4438	1112	850	<1.00	1.89	22.2	9.27	3.70	0.01	5.10	59.9	25.0	9.97	0.03	37.1	2.39	30.8
TAM1	15-60	191723-14	311	5936	1223	672	<1.00	0.80	29.7	10.2	2.92	0.01	1.83	68.1	23.4	6.70	0.03	43.6	2.91	16.1
TAM1	60-120	191723-15	308	7213	1449	414	<1.00	0.79	36.1	12.1	1.80	0.01	1.56	71.1	23.8	3.55	0.02	50.7	2.99	23.3
TAM2	0-15	191723-16	999	4095	636	657	<1.00	2.56	20.5	5.30	2.86	0.01	8.21	65.6	17.0	9.15	0.04	31.2	3.86	24.0
TAM2	15-60	191723-17	510	6905	532	871	<1.00	1.31	34.5	4.43	3.79	0.01	2.97	78.4	10.1	8.59	0.03	44.1	7.79	11.8
TAM2	60-120	191723-18	520	6145	733	83.8	<1.00	1.33	30.7	6.11	0.36	0.01	3.46	79.7	15.8	0.95	0.03	38.5	5.03	6.7
TAM3	0-15	191723-19	548	4569	988	908	<1.00	1.41	22.8	8.23	3.95	0.01	3.86	62.7	22.6	10.8	0.03	36.4	2.77	20.8
TAM3	15-60	191723-20	264	7217	1172	606	<1.00	0.68	36.1	9.77	2.63	0.01	1.38	73.4	19.9	5.36	0.02	49.2	3.69	14.3
TAM3	60-120	191723-21	198	6286	1222	320	<1.00	0.51	31.4	10.2	1.39	0.01	1.17	72.2	23.4	3.20	0.03	43.5	3.09	13.0
TAM4	0-15	191723-22	388	4380	887	775	<1.00	0.99	21.9	7.39	3.37	0.01	2.96	65.0	22.0	10.0	0.03	33.7	2.96	16.7
TAM4	15-60	191723-23	173	5948	1016	618	<1.00	0.44	29.7	8.47	2.69	0.01	1.07	71.9	20.5	6.50	0.03	41.3	3.51	21.9
TAM4	60-120	191723-24	198	9128	1020	709	<1.00	0.51	45.6	8.50	3.08	0.01	0.88	79.0	14.7	5.34	0.02	57.7	5.37	6.7
TAM5	0-15	191723-25	500	4734	1109	940	<1.00	1.28	23.7	9.24	4.09	0.01	3.35	61.8	24.1	10.7	0.03	38.3	2.56	30.8
TAM5	15-60	191723-26	253	5334	1069	611	<1.00	0.65	26.7	8.91	2.66	0.01	1.67	68.6	22.9	6.83	0.03	38.9	2.99	24.1
TAM5	60-120	191723-27	238	6703	1340	265	<1.00	0.61	33.5	11.2	1.15	0.01	1.31	72.1	24.0	2.48	0.02	46.5	3.00	14.3
TAM6	0-15	191723-28	486	5174	1155	663	<1.00	1.25	25.9	9.63	2.88	0.01	3.14	65.3	24.3	7.27	0.03	39.6	2.69	14.3
TAM6	15-60	191723-29	287	5234	1118	719	<1.00	0.74	26.2	9.32	3.13	0.01	1.87	66.5	23.7	7.94	0.03	39.4	2.81	16.1
TAM6	60-120	191723-30	189	6687	1283	482	<1.00	0.48	33.4	10.7	2.10	0.01	1.04	71.6	22.9	4.49	0.02	46.7	3.13	17.2
TAM7	0-15	191723-31	410	5383	907	649	<1.00	1.05	26.9	7.56	2.82	0.01	2.74	70.2	19.7	7.36	0.03	38.4	3.56	29.6
TAM7	15-60	191723-32	174	5923	1109	519	<1.00	0.45	29.6	9.24	2.26	0.01	1.07	71.2	22.2	5.43	0.03	41.6	3.20	17.2
TAM7	60-120	191723-33	198	6543	1373	824	<1.00	0.51	32.7	11.4	3.58	0.01	1.05	67.8	23.7	7.42	0.02	48.3	2.86	27.3
TAM8	0-15	191723-34	648	4905	1326	901	<1.00	1.66	24.5	11.1	3.92	0.01	4.04	59.6	26.8	9.52	0.03	41.2	2.22	25.9
TAM8	15-60	191723-35	191	5444	1677	881	<1.00	0.49	27.2	14.0	3.83	0.01	1.08	59.8	30.7	8.41	0.02	45.5	1.95	14.3
TAM8	60-120	191723-36	187	6069	2216	612	<1.00	0.48	30.3	18.5	2.66	0.01	0.92	58.4	35.5	5.12	0.02	52.0	1.64	16.1
TAM9	0-15	191723-37	646	3647	1093	842	<1.00	1.66	18.2	9.11	3.66	0.01	5.07	55.8	27.9	11.2	0.03	32.7	2.00	26.9
TAM9	15-60	191723-38	168	4407	1344	898	<1.00	0.43	22.0	11.2	3.90	0.01	1.15	58.6	29.8	10.4	0.03	37.6	1.97	25.8
TAM9	60-120	191723-39	139	5938	1698	592	<1.00	0.36	29.7	14.2	2.57	0.01	0.76	63.5	30.2	5.50	0.02	46.8	2.10	25.0
TAM10	0-15	191723-40	849	2246	594	538	<1.00	2.18	11.2	4.95	2.34	0.01	10.50	54.2	23.9	11.3	0.05	20.7	2.27	22.7
TAM10	15-60	191723-41	346	2672	759	617	<1.00	0.89	13.4	6.33	2.68	0.01	3.81	57.4	27.2	11.5	0.05	23.3	2.11	15.8
TAM10	60-120	191723-42	442	2680	871	323	<1.00	1.13	13.4	7.26	1.40	0.01	4.88	57.7	31.3	6.05	0.05	23.2	1.85	10.3
TAM11	0-15	191723-43	704	3956	876	835	<1.00	1.81	19.8	7.30	3.63	0.01	5.55	60.8	22.4	11.2	0.03	32.5	2.71	29.6
TAM11	15-60	191723-44	199	5632	1282	688	<1.00	0.51	28.2	10.7	2.99	0.01	1.20	66.5	25.2	7.06	0.03	42.4	2.64	18.5
TAM11	60-120	191723-45	207	5213	1433	792	<1.00	0.53	26.1	11.9	3.44	0.01	1.26	62.1	28.4	8.20	0.03	42.0	2.18	26.5
TAM12	0-15	191723-46	747	2647	961	758	<1.00	1.92	13.2	8.01	3.30	0.01	7.24	50.0	30.3	12.5	0.04	26.5	1.65	32.1
TAM12	15-60	191723-47	215	3326	1504	955	<1.00	0.55	16.6	12.5	4.15	0.01	1.63	49.1	37.0	12.3	0.03	33.9	1.33	20.6
TAM12	60-120	191723-48	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
TAM13	0-15	191723-49	970	3396	840	685	<1.00	2.49	17.0	7.00	2.98	0.01	8.44	57.6	23.8	10.1	0.04	29.5	2.43	30.8
TAM13	15-60	191723-50	495	6994	763	885	<1.00	1.27	35.0	6.36	3.85	0.01	2.73	75.3	13.7	8.28	0.02	46.5	5.50	22.7
TAM13	60-120	191723-51	306	6599	922	235	<1.00	0.78	33.0	7.68	1.02	0.01	1.85	77.6	18.1	2.40	0.03	42.5	4.29	2.94
C1	0-15	191723-1	359	5780	1253	116	<1.00	0.92	28.9	10.4	0.50	0.01	2.26	70.9	25.6	1.24	0.03	40.8	2.77	17.9
C1	15-60	191723-2	238	6378	1307	209	<1.00	0.61	31.9	10.9	0.91	0.01	1.38	72.0	24.6	2.05	0.03	44.3	2.93	10.0
C1	60-120	191723-3	288	7594	1454	424	<1.00	0.74	38.0	12.1	1.84	0.01	1.40	72.1	23.0	3.50	0.02	52.7	3.13	21.9
C2	0-15	191723-4	592	3050	706	36.8	<1.00	1.52	15.3	5.88	0.16	0.01	6.65	66.8	25.8	0.70	0.05	22.8	2.59	13.0
C2	15-60	191723-5	189	3593	1088	214	3.08	0.48	18.0	9.07	0.93	0.03	1.70	63.1	31.8	3.27	0.12	28.5	1.98	25.0
C2	60-120	191723-6	189	4465	1314	323	<1.00	0.48	22.3	11.0	1.40	0.01	1.38	63.5	31.1	3.99	0.03	35.2	2.04	9.68
C3	0-15	191723-7	287	2421	568	73.7	<1.00	0.74	12.1	4.73	0.32	0.01	4.11	67.6	26.4	1.79	0.06	17.9	2.56	21.4
C3	15-60	191723-8	173	5177	978	97.4	<1.00	0.44	25.9	8.15	0.42	0.01	1.27	74.1	23.3	1.21	0.03	34.9	3.18	21.2
C3	60-120	191723-9	189	7288	1013	142	<1.00	0.48	36.4	8.44	0.62	0.01	1.05	79.2	18.4	1.34	0.02	46.0	4.32	15.6
C4	0-15	191723-10	352	529	240	30.5	15.9	0.9	2.65	2.00	0.13	0.18	15.40	45.2	34.1	2.26	3.02	5.86	1.32	13.3
C4	15-60	191723-11	240	1855	1111	349	<1.00	0.62	9.28	9.26	1.52	0.01	2.98	44.9	44.8	7.34	0.05	20.7	1.00	28.9
C4	60-120	191723-12	247	4405	1559	961	<1.00	0.63	22.0	13.0	4.18	0.01	1.59	55.3	32.6	10.5	0.03	39.8	1.70	25.1

Client Sample ID:	Source/Depth:	pH (1:5 in H20) pH units	pH (1:5 in CaCl2) pH units	Chloride Soluble mg/kg	Electrical Conductivity dS/m	E.C.e dS/m	Exchangeable Potassium mg/kg	Exchangeable Calcium mg/kg	Exchangeable Magnesium mg/kg	Exchangeable Sodium mg/kg	Exchangeable Aluminium mg/kg	Exchangeable Potassium cmol/kg	Exchangeable Calcium cmol/kg	Exchangeable Magnesium cmol/kg	Exchangeable Sodium cmol/kg	Exchangeable Aluminium cmol/kg	ECEC cmol/kg	Ca/Mg Ratio cmol/kg	K/Mg Ratio cmol/kg	Exchangeable Potassium % %	Exchangeable Calcium % %	Exchangeable Magnesium % %	Exchangeable Sodium % %	Exchangeable Aluminium % %	Soil Colour (wet interior) Class	Texture Class
				2	0.01		10	20	10	10	1															
PIV 1 C1	**0-15**	7.94	7.21	67.1	0.22	1.65	449	3889	1027	679	<1.00	1.15	19.4	8.56	2.95	0.01	32.1	2.27	0.13	3.58	60.5	26.6	9.19	0.03	5YR/2.51	MC
PIV 1 C1	**15-60**	8.24	7.79	420	0.32	2.40	217	5282	1427	738	<1.00	0.56	26.4	11.9	3.21	0.01	42.1	2.22	0.05	1.32	62.8	28.3	7.63	0.03	7.5YR/33	MC
PIV 1 C1	**60-90**	8.19	7.84	765	0.71	6.11	218	5519	1761	554	<1.00	0.56	27.6	14.7	2.41	0.01	45.2	1.88	0.04	1.24	61.0	32.4	5.32	0.02	7.5YR/44	LMC
PIV 1 C2	**0-15**	7.93	6.96	36.3	0.14	1.05	273	3585	864	579	<1.00	0.70	17.9	7.20	2.52	0.01	28.4	2.49	0.10	2.47	63.2	25.4	8.88	0.04	5YR/31	MC
PIV 1 C2	**15-60**	8.30	7.80	304	0.49	3.68	260	6135	1201	718	<1.00	0.67	30.7	10.0	3.12	0.01	44.5	3.06	0.07	1.50	69.0	22.5	7.02	0.02	7.5YR/32	MC
PIV 1 C2	**60-120**	8.20	7.83	528	0.56	4.82	468	3662	910	521	<1.00	1.20	18.3	7.58	2.27	0.01	29.4	2.41	0.16	4.09	62.3	25.8	7.71	0.04	10YR/43	LMC
PIV 1 C3	**0-15**	8.09	7.30	64.7	0.18	1.04	247	6822	1383	488	<1.00	0.63	34.1	11.5	2.12	0.01	48.4	2.96	0.05	1.31	70.5	23.8	4.38	0.02	5YR/31	HC
PIV 1 C3	**15-60**	8.23	7.75	352	0.52	3.90	196	4028	1214	652	<1.00	0.50	20.1	10.1	2.83	0.01	33.6	1.99	0.05	1.50	59.9	30.1	8.44	0.03	10YR/43	MC
PIV 1 C3	**60-120**	8.26	7.90	550	0.67	3.89	224	6172	1567	608	<1.00	0.57	30.9	13.1	2.64	0.01	47.1	2.36	0.04	1.22	65.5	27.7	5.61	0.02	10YR/44	HC
PIV 1 C4	**0-15**	8.19	7.35	56.7	0.16	1.20	420	3518	960	539	<1.00	1.08	17.6	8.00	2.34	0.01	29.0	2.20	0.13	3.71	60.6	27.6	8.07	0.04	5YR/31	MC
PIV 1 C4	**15-60**	8.26	7.72	328	0.52	3.90	219	4118	1111	761	<1.00	0.56	20.6	9.26	3.31	0.01	33.7	2.22	0.06	1.66	61.0	27.4	9.81	0.03	7.5YR/32	MC
PIV 1 C4	**60-120**	8.11	7.78	694	0.67	5.03	185	4311	1391	515	<1.00	0.47	21.6	11.6	2.24	0.01	35.9	1.86	0.04	1.32	60.1	32.3	6.24	0.03	7.5YR/32	MC
PIV 1 P2 C1	**0-15**	8.16	7.65	24.0	0.14	1.05	346	6871	1018	146	<1.00	0.89	34.4	8.48	0.63	0.01	44.4	4.05	0.10	2.00	77.4	19.1	1.43	0.03	5YR/2.51	MC
PIV 1 P2 C1	**15-60**	8.46	7.91	19.4	0.16	1.20	266	7808	1235	293	<1.00	0.68	39.0	10.3	1.27	0.01	51.3	3.79	0.07	1.33	76.1	20.1	2.48	0.02	7.5YR/2.51	MC
PIV 1 P2 C1	**60-120**	8.69	7.99	17.2	0.20	1.16	200	7076	1225	363	<1.00	0.51	35.4	10.2	1.58	0.01	47.7	3.47	0.05	1.08	74.2	21.4	3.31	0.02	10YR/42	HC
PIV 1 P2 C2	**0-15**	7.31	6.86	18.0	0.08	0.60	328	6329	956	95.3	<1.00	0.84	31.6	7.97	0.41	0.01	40.9	3.97	0.11	2.06	77.4	19.5	1.01	0.03	5YT/2.51	MC
PIV 1 P2 C2	**15-60**	8.22	7.60	15.2	0.11	0.83	219	6368	1056	171	<1.00	0.56	31.8	8.80	0.74	0.01	42.0	3.62	0.06	1.34	75.9	21.0	1.77	0.03	5YR/2.51	MC
PIV 1 P2 C2	**60-120**	8.46	7.83	8.74	0.18	1.35	267	7757	1269	383	<1.00	0.68	38.8	10.6	1.67	0.01	51.7	3.67	0.06	1.32	75.0	20.4	3.22	0.02	5YR/2.51	MC
PIV 1 P2 C3	**0-15**	7.17	6.74	25.8	0.09	0.68	368	6225	942	87.2	<1.00	0.94	31.1	7.85	0.38	0.01	40.3	3.96	0.12	2.34	77.2	19.5	0.94	0.03	5YR/2.51	MC
PIV 1 P2 C3	**15-60**	8.10	7.52	10.5	0.10	0.75	249	7505	1091	146	<1.00	0.64	37.5	9.09	0.63	0.01	47.9	4.13	0.07	1.33	78.3	19.0	1.33	0.02	7.5YR/2.51	MC
PIV 1 P2 C3	**60-120**	8.63	7.93	7.41	0.14	1.05	197	7518	1070	239	<1.00	0.51	37.6	8.92	1.04	0.01	48.1	4.22	0.06	1.05	78.2	18.6	2.16	0.02	10YR/42	MC
PIV 1 P2 C4	**0-15**	7.68	7.30	13.2	0.15	1.13	321	6032	855	109	<1.00	0.82	30.2	7.13	0.47	0.01	38.6	4.23	0.12	2.13	78.1	18.5	1.23	0.03	7.5YR/2.51	MC
PIV 1 P2 C4	**15-60**	7.72	7.13	6.47	0.08	0.60	230	6459	973	189	<1.00	0.59	32.3	8.11	0.82	0.01	41.8	3.98	0.07	1.41	77.2	19.4	1.96	0.03	5YR/2.51	MC
PIV 1 P2 C4	**60-120**	8.46	7.87	7.63	0.17	1.28	232	6971	1134	372	<1.00	0.59	34.9	9.45	1.62	0.01	46.5	3.69	0.06	1.28	74.9	20.3	3.48	0.02	5YR/2.51	MC
P4 C1	**0-15**	8.15	7.43	104	0.24	1.80	467	5428	1092	842	<1.00	1.20	27.1	9.10	3.66	0.01	41.1	2.98	0.13	2.91	66.0	22.1	8.91	0.03	5YR/2.51	MC
P4 C1	**15-60**	8.01	7.72	703	0.75	6.45	317	7305	1420	625	<1.00	0.81	36.5	11.8	2.72	0.01	51.9	3.09	0.07	1.57	70.4	22.8	5.24	0.02	5YR/2.51	LMC
P4 C1	**60-120**	8.73	8.06	166	0.26	1.95	218	6478	1145	450	<1.00	0.56	32.4	9.54	1.96	0.01	44.5	3.39	0.06	1.26	72.9	21.5	4.40	0.02	7.5YR/42	MC
P4 C2	**0-15**	8.20	7.68	272	0.36	2.70	359	7056	1227	295	<1.00	0.92	35.3	10.2	1.28	0.01	47.7	3.45	0.09	1.93	73.9	21.4	2.69	0.02	7.5YR/32	MC
P4 C2	**15-60**	8.18	7.74	497	0.69	5.18	343	8470	1341	636	<1.00	0.88	42.4	11.2	2.77	0.01	57.2	3.79	0.08	1.54	74.1	19.5	4.84	0.02	5YR/32	MC
P4 C2	**60-120**	8.43	7.85	267	0.32	2.75	246	7131	1141	227	<1.00	0.63	35.7	9.51	0.99	0.01	46.8	3.75	0.07	1.35	76.2	20.3	2.11	0.02	10YR/44	LMC
P4 C3	**0-15**	8.07	7.26	64.1	0.24	2.06	604	4303	998	717	<1.00	1.55	21.5	8.32	3.12	0.01	34.5	2.59	0.19	4.49	62.3	24.1	9.03	0.03	5YR/31	LMC
P4 C3	**15-60**	7.78	7.27	519	0.54	4.05	278	5269	1193	714	<1.00	0.71	26.3	9.94	3.10	0.01	40.1	2.65	0.07	1.78	65.7	24.8	7.74	0.03	5YR/2.51	MC
P4 C3	**60-120**	7.78	7.59	350	2.57	22.1	332	10775	1348	709	<1.00	0.85	53.9	11.2	3.08	0.01	69.1	4.80	0.08	1.23	78.0	16.3	4.46	0.02	10YR/32	LMC
P4 C4	**0-15**	8.18	7.33	57.7	0.21	1.58	557	4912	1050	760	<1.00	1.43	24.6	8.75	3.30	0.01	38.1	2.81	0.16	3.75	64.5	23.0	8.68	0.03	7.5YR/31	MC
P4 C4	**15-60**	8.14	7.56	306	0.48	3.60	333	5909	1198	714	<1.00	0.85	29.5	9.98	3.10	0.01	43.5	2.96	0.09	1.96	67.9	23.0	7.14	0.03	7.5YR/31	MC
P4 C4	**60-120**	8.44	7.88	229	0.36	3.10	266	7199	1373	354	<1.00	0.68	36.0	11.4	1.54	0.01	49.7	3.15	0.06	1.37	72.5	23.0	3.10	0.02	10YR/43	LMC
NP4 C1	**0-15**	6.58	5.93	68.6	0.09	0.68	631	4189	821	93.7	<1.00	1.62	20.9	6.84	0.41	0.01	29.8	3.06	0.24	5.43	70.2	22.9	1.37	0.04	5YR/33	MC
NP4 C1	**15-60**	8.00	7.29	46.3	0.11	0.95	368	5661	1146	130	<1.00	0.94	28.3	9.55	0.57	0.01	39.4	2.96	0.10	2.40	71.9	24.3	1.44	0.03	10YR/43	LMC
NP4 C1	**60-120**	8.29	7.75	20.4	0.29	2.49	376	7590	1472	354	<1.00	0.96	38.0	12.3	1.54	0.01	52.7	3.09	0.08	1.83	72.0	23.3	2.92	0.02	10YR/34	LMC
NP4 C2	**0-15**	6.70	6.08	36.3	0.08	0.69	689	4773	854	96.7	<1.00	1.77	23.9	7.12	0.42	0.01	33.2	3.35	0.25	5.32	71.9	21.4	1.27	0.03	7.5YR/32	LMC
NP4 C2	**15-60**	8.28	7.70	30.2	0.14	1.05	421	7874	1239	114	<1.00	1.08	39.4	10.3	0.50	0.01	51.3	3.81	0.10	2.11	76.8	20.1	0.97	0.02	10YR/22	MC
NP4 C2	**60-120**	8.72	7.92	27.6	0.15	1.13	235	6443	1124	151	<1.00	0.60	32.2	9.37	0.66	0.01	42.9	3.44	0.06	1.41	75.2	21.9	1.53	0.03	10YR/46	MC
NP4 C3	**0-15**	7.59	7.18	22.7	0.23	1.98	1205	7148	854	62.1	<1.00	3.09	35.7	7.12	0.27	0.01	46.2	5.02	0.43	6.68	77.3	15.4	0.58	0.02	7.5YR/2.52	LMC
NP4 C3	**15-60**	8.39	7.76	21.7	0.14	1.20	948	8496	1089	112	<1.00	2.43	42.5	9.08	0.49	0.01	54.5	4.68	0.27	4.46	78.0	16.7	0.89	0.02	5YR/2.51	LMC
NP4 C3	**60-120**	8.59	7.91	17.9	0.17	1.28	484	7037	1147	183	<1.00	1.24	35.2	9.56	0.80	0.01	46.8	3.68	0.13	2.65	75.2	20.4	1.70	0.02	7.5YR/43	MC
Control 4 C4	**0-15**	5.04	4.45	10.7	0.05	0.43	267	572	123	34.5	19.6	0.68	2.86	1.03	0.15	0.22	4.94	2.79	0.67	13.9	57.9	20.8	3.04	4.41	5YR/46	SC
Control 4 C4	**15-60**	8.17	6.81	13.2	0.08	0.69	242	1441	1126	474	<1.00	0.62	7.21	9.38	2.06	0.01	19.3	0.77	0.07	3.22	37.4	48.7	10.7	0.06	7.5YR/46	LC
Control 4 C4	**60-120**	8.74	7.46	6.48	0.18	1.35	247	1522	1532	846	<1.00	0.63	7.61	12.8	3.68	0.01	24.7	0.60	0.05	2.56	30.8	51.7	14.9	0.04	5YR/44	MC

		Pivot 4 Irrigated				
		0-10	10-70	70-100	100-120	120-150
Saturated Hydraulic Conductivity	mm/hr	0.41	258	278	22.8	52.4
Porosity Total	%	39.9	49.6	51.8	47.0	52.8
Porosity Capillary	%	35.1	42.2	40.3	35.9	36.3
Porosity Air Filled	%	4.8	7.4	11.5	11.1	16.5
Particle Density	g/cm3	2.16	2.18	2.28	2.45	2.33
Calcium Carbonate	%					
Water Retention	%	27.0	38.4	36.6	27.6	33.0
Moisture Content (Oven Dry)	%	36.4	62.3	36.6	38.2	33.0
Bulk Density	g/cm3	1.3	1.1	1.1	1.3	1.1
Total Calcium	mg/kg					
Total Sulphate	mg/kg					
Texture	Class	LMC	LMC	LMC	LMC	LC
Emerson Aggregate Test	Number	3b	6	4	4	4
Gravel >2.0mm	%	0.3	<0.1	1.0	13.1	11.6
Coarse Sand 0.2-2.0mm	%	23.2	25.5	9.3	19.2	17.5
Fine Sand 0.02-0.2mm	%	25.4	27.3	18.5	25.9	27.9
Silt 0.002-0.02mm	%	14.3	12.3	3.7	8.3	14.4
Clay <0.002mm	%	36.8	34.9	67.6	33.5	28.6

		Pivot 4 Non-Irrigated				
		0-20	20-70	70-100	100-130	130-170
Saturated Hydraulic Conductivity	mm/hr	522	19.0	170	186	8.21
Porosity Total	%	51.7	52.0	48.9	48.0	43.3
Porosity Capillary	%	43.0	43.6	41.6	34.0	35.3
Porosity Air Filled	%	8.6	8.4	7.3	14.4	8.0
Particle Density	g/cm3	2.28	2.50	2.15	2.50	2.47
Calcium Carbonate	%					52.0
Water Retention	%	39.1	19.0	37.8	26.2	25.2
Moisture Content (Oven Dry)	%	64.3	57.0	60.7	35.4	33.7
Bulk Density	g/cm3	1.1	1.2	1.1	1.3	1.4
Total Calcium	mg/kg					207742
Total Sulphate	mg/kg					1366
Texture	Class	LMC	MC	MC	LC	SC
Emerson Aggregate Test	Number	5	5	4	4	4
Gravel >2.0mm	%	0.5	0.2	0.8	27.0	4.2
Coarse Sand 0.2-2.0mm	%	23.4	23.0	14.2	37.7	6.8
Fine Sand 0.02-0.2mm	%	25.8	22.8	18.4	15.1	26.5
Silt 0.002-0.02mm	%	13.7	10.7	7.9	1.2	42.8
Clay <0.002mm	%	36.6	43.3	58.7	19.1	19.8

		Pivot 1 Irrigated				
		0-15	15-50	50-100	100-130	130-150
Saturated Hydraulic Conductivity	mm/hr	67.4	59.1	470	383	387
Porosity Total	%	50.9	48.7	54.0	54.2	49.6
Porosity Capillary	%	39.2	42.7	39.7	40.4	39.3
Porosity Air Filled	%	11.7	5.9	14.4	13.8	10.3
Particle Density	g/cm3	2.24	2.34	2.39	2.40	2.38
Calcium Carbonate	%					
Water Retention	%	35.6	35.6	36.1	36.8	32.8
Moisture Content (Oven Dry)	%	55.4	55.3	56.4	58.1	48.7
Bulk Density	g/cm3	1.1	1.2	1.1	1.1	1.2
Total Calcium	mg/kg					
Total Sulphate	mg/kg					
Texture	Class	LC	LMC	LMC	LC	LMC
Emerson Aggregate Test	Number	3b	3b	4	4	4
Gravel >2.0mm	%	<0.1	<0.1	0.2	3.0	5.6
Coarse Sand 0.2-2.0mm	%	38.2	6.1	7.7	8.3	13.0
Fine Sand 0.02-0.2mm	%	30.5	31.8	19.4	14.8	14.8
Silt 0.002-0.02mm	%	14.4	14.4	5.7	1.6	1.4
Clay <0.002mm	%	16.9	47.6	67.1	72.3	65.2

		Pivot 1 Non-Irrigated				
		0-10	10-25	25-90	90-130	130-150
Saturated Hydraulic Conductivity	mm/hr	200	189	193	6.43	13.5
Porosity Total	%	54.0	49.1	53.0	48.8	45.5
Porosity Capillary	%	43.0	44.1	41.7	43.6	38.0
Porosity Air Filled	%	10.9	5.0	11.3	5.3	7.5
Particle Density	g/cm3	2.39	2.36	2.34	2.35	2.38
Calcium Carbonate	%					
Water Retention	%	39.1	36.7	37.9	36.3	29.2
Moisture Content (Oven Dry)	%	64.2	58.1	61.0	57.0	41.3
Bulk Density	g/cm3	1.1	1.2	1.1	1.2	1.3
Total Calcium	mg/kg					
Total Sulphate	mg/kg					
Texture	Class	LMC	LMC	LMC	LMC	MC
Emerson Aggregate Test	Number	5	5	5	4	4
Gravel >2.0mm	%	0.2	0.6	0.3	10.8	0.1
Coarse Sand 0.2-2.0mm	%	12.4	13.0	21.4	20.6	11.8
Fine Sand 0.02-0.2mm	%	28.5	28.8	23.7	21.4	28.5
Silt 0.002-0.02mm	%	15.6	13.4	12.7	5.7	22.2
Clay <0.002mm	%	43.4	44.3	41.8	41.5	37.4

Client Sample I	Source/Depth:	pH (1:5 in H20) pH units	pH (1:5 in CaCl2) pH units	Electrical Conductivity dS/m 0.01	Exchangeable Potassium mg/kg 10	Exchangeable Calcium mg/kg 20	Exchangeable Magnesium mg/kg 10	Exchangeable Sodium mg/kg 10	Exchangeable Aluminium mg/kg 1	Exchangeable Potassium cmol/kg	Exchangeable Calcium cmol/kg	Exchangeable Magnesium cmol/kg	Exchangeable Sodium cmol/kg	Exchangeable Aluminium cmol/kg	ECEC cmol/kg	Ca/Mg Ratio cmol/kg	K/Mg Ratio cmol/kg	Exchangeable Potassium % %	Exchangeable Calcium % %	Exchangeable Magnesium % %	Exchangeable Sodium % %	Exchangeable Aluminium % %	Moisture Content (Oven Dry) %	Dispersion Index N/A	Air Dry Moisture Content % 0.1	Bulk Density g/cm3 1	Dispersion Index Class
AC-5-1	**0-10cm**	8.12	7.36	0.17	625	4294	551	423	<1.00	1.60	21.5	4.59	1.84	0.01	29.5	4.68	0.35	5.43	72.7	15.6	6.23	0.04	28.8	0	16.1	1.23	9
AC-5-1	**10-20cm**	7.81	6.88	0.21	252	3849	493	618	<1.00	0.65	19.2	4.11	2.69	0.01	26.7	4.68	0.16	2.42	72.1	15.4	10.1	0.04	25.4	10	12.6	1.18	12
AC-5-1	**40-50cm**	5.92	5.66	0.60	220	4722	981	512	<1.00	0.56	23.6	8.18	2.23	0.01	34.6	2.89	0.07	1.63	68.3	23.6	6.44	0.03	32.4	0	18.2	1.22	0
AC-5-1	**60-70cm**	6.35	6.04	0.66	231	4967	1107	342	<1.00	0.59	24.8	9.23	1.49	0.01	36.2	2.69	0.06	1.64	68.7	25.5	4.11	0.03	32.5	0	20.5	1.21	0
AC-5-2	**0-10cm**	7.18	6.20	0.10	317	1815	514	251	<1.00	0.81	9.08	4.28	1.09	0.01	15.3	2.12	0.19	5.32	59.4	28.0	7.15	0.07	18.2	9	9.1	1.19	10
AC-5-2	**10-20cm**	6.97	5.80	0.12	116	1917	434	467	<1.00	0.30	9.59	3.62	2.03	0.01	15.5	2.65	0.08	1.91	61.7	23.3	13.1	0.07	14.3	10	5.8	1.28	12
AC-5-2	**40-50cm**	6.99	6.42	0.54	171	4455	987	767	<1.00	0.44	22.3	8.23	3.33	0.01	34.3	2.71	0.05	1.28	65.0	24.0	9.73	0.03	29.4	0	16.5	1.00	0
AC-5-2	**60-70cm**	7.27	6.97	0.61	189	4385	1003	409	<1.00	0.48	21.9	8.36	1.78	0.01	32.6	2.62	0.06	1.49	67.3	25.7	5.46	0.03	28.6	0	20.3	1.12	0
AC-5-3	**0-10cm**	8.16	7.49	0.20	809	5741	574	315	<1.00	2.07	28.7	4.78	1.37	0.01	36.9	6.00	0.43	5.61	77.7	12.9	3.71	0.03	25.5	0	14.0	1.13	9
AC-5-3	**10-20cm**	8.64	7.72	0.19	275	4819	271	627	<1.00	0.71	24.1	2.26	2.73	0.01	29.8	10.7	0.31	2.37	80.9	7.58	9.15	0.04	19.7	3	11.3	1.24	9
AC-5-3	**40-50cm**	7.80	7.33	0.76	322	5664	662	854	<1.00	0.83	28.3	5.52	3.71	0.01	38.4	5.13	0.15	2.15	73.8	14.4	9.67	0.03	29.1	0	19.5	1.10	0
AC-5-3	**60-70cm**	7.57	7.28	0.96	336	5694	894	451	<1.00	0.86	28.5	7.45	1.96	0.01	38.8	3.82	0.12	2.22	73.5	19.2	5.06	0.03	29.4	0	17.9	1.01	0
AC-5-4	**0-10cm**	7.80	7.17	0.26	332	3758	830	489	<1.00	0.85	18.8	6.92	2.13	0.01	28.7	2.72	0.12	2.97	65.5	24.1	7.41	0.04	24.8	2	11.8	1.18	9
AC-5-4	**10-20cm**	7.27	6.42	0.28	184	4520	947	1050	<1.00	0.47	22.6	7.89	4.57	0.01	35.5	2.86	0.06	1.33	63.6	22.2	12.8	0.03	30.1	3	18.8	1.20	4
AC-5-4	**40-50cm**	7.33	6.99	0.91	198	5318	1091	835	<1.00	0.51	26.6	9.09	3.63	0.01	39.8	2.92	0.06	1.27	66.8	22.8	9.11	0.03	26.7	0	15.9	1.16	0
AC-5-4	**60-70cm**	7.76	7.38	0.44	138	3646	723	314	<1.00	0.35	18.2	6.03	1.37	0.01	26.0	3.03	0.06	1.36	70.2	23.2	5.25	0.04	12.6	0	6.9	1.33	0
AC-5-5	**0-10cm**	7.70	6.79	0.12	414	2319	695	313	<1.00	1.06	11.6	5.79	1.36	0.01	19.8	2.00	0.18	5.36	58.5	29.2	6.87	0.06	22.7	9	11.4	1.25	10
AC-5-5	**10-20cm**	7.77	6.63	0.17	144	2525	656	679	<1.00	0.37	12.6	5.47	2.95	0.01	21.4	2.31	0.07	1.72	58.9	25.5	13.8	0.05	20.9	10	13.5	1.27	12
AC-5-5	**40-50cm**	7.64	7.15	0.46	197	3392	985	1006	<1.00	0.51	17.0	8.21	4.37	0.01	30.1	2.07	0.06	1.68	56.4	27.3	14.6	0.04	25.7	1	18.3	1.17	2
AC-5-5	**60-70cm**	8.16	7.69	0.62	220	4902	1430	962	<1.00	0.56	24.5	11.9	4.18	0.01	41.2	2.06	0.05	1.37	59.5	28.9	10.2	0.03	24.2	0	17.7	1.30	0
AC-5-6	**0-10cm**	7.82	7.22	0.19	670	5340	941	609	<1.00	1.72	26.7	7.84	2.65	0.01	38.9	3.40	0.22	4.41	68.6	20.1	6.80	0.03	33.3	1	30.1	0.87	2
AC-5-6	**10-20cm**	8.59	7.78	0.27	245	6102	709	1021	<1.00	0.63	30.5	5.91	4.44	0.01	41.5	5.16	0.11	1.51	73.5	14.2	10.7	0.03	27.1	1	25.5	0.92	2
AC-5-6	**40-50cm**	7.63	7.30	0.71	293	7311	1064	831	<1.00	0.75	36.6	8.87	3.61	0.01	49.8	4.12	0.08	1.51	73.4	17.8	7.26	0.02	29.7	0	19.0	1.07	0
AC-5-6	**60-70cm**	8.06	7.67	0.65	267	8094	1127	486	<1.00	0.68	40.5	9.39	2.11	0.01	52.7	4.31	0.07	1.30	76.8	17.8	4.01	0.02	27.5	0	17.6	1.27	0
AC-5-7	**0-10cm**	7.89	7.15	0.22	621	4156	883	638	<1.00	1.59	20.8	7.36	2.77	0.01	32.5	2.82	0.22	4.90	63.9	22.6	8.53	0.03	29.9	9	17.5	1.10	10
AC-5-7	**10-20cm**	7.97	7.38	0.38	292	5094	798	999	<1.00	0.75	25.5	6.65	4.34	0.01	37.2	3.83	0.11	2.01	68.4	17.9	11.7	0.03	25.3	10	13.2	1.17	12
AC-5-7	**40-50cm**	7.88	7.57	0.74	291	7521	1255	378	<1.00	0.75	37.6	10.5	1.64	0.01	50.5	3.60	0.07	1.48	74.5	20.7	3.26	0.02	26.7	0	20.3	1.21	0
AC-5-7	**60-70cm**	8.22	7.76	0.35	178	6546	856	179	<1.00	0.46	32.7	7.13	0.78	0.01	41.1	4.59	0.06	1.11	79.6	17.4	1.89	0.03	24.2	0	14.4	1.17	0
AC-5-8	**0-10cm**	8.66	7.53	0.18	607	4512	566	336	<1.00	1.56	22.6	4.72	1.46	0.01	30.3	4.78	0.33	5.14	74.4	15.6	4.82	0.04	24.8	1	17.5	1.10	2
AC-5-8	**10-20cm**	8.66	7.88	0.30	292	6845	404	934	<1.00	0.75	34.2	3.37	4.06	0.01	42.4	10.2	0.22	1.77	80.7	7.94	9.57	0.03	28.2	9	16.4	1.12	10
AC-5-8	**40-50cm**	7.92	7.59	0.91	321	8310	709	760	<1.00	0.82	41.6	5.91	3.30	0.01	51.6	7.03	0.14	1.60	80.5	11.5	6.40	0.02	20.6	0	11.1	1.31	0
AC-5-8	**60-70cm**	7.90	7.68	0.71	248	7877	756	263	<1.00	0.64	39.4	6.30	1.14	0.01	47.5	6.25	0.10	1.34	83.0	13.3	2.41	0.02	19.2	0	11.1	1.41	0
AC-5-9	**0-10cm**	7.24	6.61	0.17	357	2713	735	437	<1.00	0.92	13.6	6.13	1.90	0.01	22.5	2.21	0.15	4.07	60.2	27.2	8.44	0.05	19.9	0	5.1	1.09	1
AC-5-9	**10-20cm**	7.20	6.32	0.23	124	2338	586	657	<1.00	0.32	11.7	4.88	2.86	0.01	19.8	2.39	0.07	1.61	59.2	24.7	14.5	0.06	19.2	1	8.8	1.28	3
AC-5-9	**40-50cm**	6.37	6.17	0.73	145	4319	1034	1079	<1.00	0.37	21.6	8.62	4.69	0.01	35.3	2.51	0.04	1.05	61.2	24.4	13.3	0.03	19.5	0	11.2	1.41	0
AC-5-9	**60-70cm**	7.12	6.74	0.40	186	3234	796	435	<1.00	0.48	16.2	6.63	1.89	0.01	25.2	2.44	0.07	1.89	64.2	26.3	7.51	0.04	8.0	0	3.7	1.37	0
AC-5-10	**0-10cm**	7.53	6.72	0.18	457	4533	1052	737	<1.00	1.17	22.7	8.77	3.20	0.01	35.8	2.59	0.13	3.27	63.3	24.5	8.95	0.03	28.8	3	17.1	1.18	9
AC-5-10	**10-20cm**	7.69	6.69	0.16	183	4044	772	904	<1.00	0.47	20.2	6.43	3.93	0.01	31.1	3.14	0.07	1.51	65.1	20.7	12.7	0.04	22.8	4	16.3	1.30	9
AC-5-10	**40-50cm**	7.38	6.93	0.58	201	5594	1189	877	<1.00	0.52	28.0	9.91	3.81	0.01	42.2	2.82	0.05	1.22	66.3	23.5	9.03	0.03	28.0	0	17.9	1.18	0
AC-5-10	**60-70cm**	7.77	7.53	0.80	233	6454	1356	683	<1.00	0.60	32.3	11.3	2.97	0.01	47.1	2.86	0.05	1.27	68.4	24.0	6.30	0.02	25.6	0	15.8	1.25	0
AC-5-11	**0-10cm**	7.78	7.05	0.19	686	4314	742	626	<1.00	1.76	21.6	6.18	2.72	0.01	32.2	3.49	0.28	5.46	66.9	19.2	8.44	0.03	32.6	2	21.3	1.11	9
AC-5-11	**10-20cm**	7.71	6.74	0.20	323	4695	566	980	<1.00	0.83	23.5	4.72	4.26	0.01	33.3	4.98	0.18	2.49	70.5	14.2	12.8	0.03	24.9	9	20.4	1.13	10
AC-5-11	**40-50cm**	6.95	6.76	0.72	269	6101	986	745	<1.00	0.69	30.5	8.22	3.24	0.01	42.7	3.71	0.08	1.62	71.5	19.3	7.59	0.03	29.4	0	22.7	1.22	0
AC-5-11	**60-70cm**	7.16	6.86	0.69	297	6475	1172	452	<1.00	0.76	32.4	9.77	1.97	0.01	44.9	3.31	0.08	1.70	72.1	21.8	4.38	0.02	29.4	0	21.0	1.18	0
AC-5-12	**0-10cm**	7.82	7.34	0.16	812	3331	614	168	<1.00	2.08	16.7	5.12	0.73	0.01	24.6	3.26	0.41	8.47	67.7	20.8	2.97	0.05	17.9	0	8.0	1.29	1
AC-5-12	**10-20cm**	8.39	7.58	0.18	281	3806	373	457	<1.00	0.72	19.0	3.11	1.99	0.01	24.9	6.12	0.23	2.90	76.6	12.5	7.99	0.04	13.9	9	5.8	1.12	10
AC-5-12	**40-50cm**	7.80	7.08	0.27	229	3920	356	751	<1.00	0.59	19.6	2.97	3.27	0.01	26.4	6.61	0.20	2.22	74.2	11.2	12.4	0.04	14.7	4	9.3	1.23	9
AC-5-12	**60-70cm**	8.14	7.62	0.26	151	4213	348	542	<1.00	0.39	21.1	2.90	2.36	0.01	26.7	7.26	0.13	1.45	78.8	10.9	8.82	0.04	12.1	0	6.3	1.31	0
AC-5-13	**0-10cm**	7.95	7.35	0.26	1110	5821	746	680	<1.00	2.85	29.1	6.22	2.96	0.01	41.1	4.68	0.46	6.92	70.8	15.1	7.19	0.03	31.1	1	30.4	0.96	2
AC-5-13	**10-20cm**	8.43	7.82	0.34	320	7521	361	1071	<1.00	0.82	37.6	3.01	4.66	0.01	46.1	12.5	0.27	1.78	81.6	6.53	10.1	0.02	29.2	1	15.5	0.96	2
AC-5-13	**40-50cm**	7.91	7.58	0.73	262	7212	560	570	<1.00	0.67	36.1	4.67	2.48	0.01	43.9	7.73	0.14	1.53	82.2	10.6	5.65	0.03	24.9	0	13.9	1.20	0
AC-5-13	**60-70cm**	7.87	7.66	0.57	278	7322	720	230	<1.00	0.71	36.6	6.00	1.00	0.01	44.3	6.10	0.12	1.61	82.6	13.5	2.26	0.03	24.7	0	16.5	1.17	0
AC-5-14	**0-10cm**	7.51	6.79	0.15	911	3217	512	337	<1.00	2.34	16.1	4.27	1.47	0.01	24.2	3.77	0.55	9.67	66.6	17.7	6.06	0.05	24.7	3	15.9	1.04	9
AC-5-14	**10-20cm**	8.11	7.51	0.19	337	3657	362	503	<1.00	0.86	18.3	3.02	2.19	0.01	24.4	6.06	0.29	3.55	75.0	12.4	8.98	0.05	19.2	9	10.5	1.12	10
AC-5-14	**40-50cm**	8.18	7.74	0.40	317	6445	517	388	<1.00	0.81	32.2	4.31	1.69	0.01	39.0	7.48	0.19	2.08	82.5	11.0	4.32	0.03	22.7	0	15.4	1.25	0
AC-5-14	**60-70cm**	8.15	7.71	0.42	284	6244	586	205	<1.00	0.73	31.2	4.88	0.89	0.01	37.7	6.39	0.15	1.93	82.7	12.9	2.36	0.03	14.2	0	7.0	1.26	0
AC-5-15	**0-10cm**	8.02	7.39	0.14	291	2672	401	265	<1.00	0.75	13.4	3.34	1.15	0.01	18.6	4.00	0.22	4.01	71.8	18.0	6.19	0.06	16.6	9	11.4	1.25	10
AC-5-15	**10-20cm**	8.08	6.92	0.08	101	2894	313	458	<1.00	0.26	14.5	2.61	1.99	0.01	19.3	5.55	0.10	1.34	74.8	13.5	10.3	0.06	23.9	9	13.8	1.34	10
AC-5-15	**40-50cm**	7.00	6.65	0.32	141	4118	483	505	<1.00	0.36	20.6	4.03	2.20	0.01	27.2	5.12	0.09	1.33	75.7	14.8	8.08	0.04	29.6	0	21.2	1.36	0
AC-5-15	**60-70cm**	7.65	7.15	0.19	122	3243	354	204	<1.00	0.31	16.2	2.95	0.89	0.01	20.4	5.50	0.11	1.54	79.6	14.5	4.35	0.05	20.5	0	10.5	1.34	0
AC-5-16	**0-10cm**	7.74	7.17	0.21	684	4358	868	595	<1.00	1.75	21.8	7.23	2.59	0.01	33.4	3.01	0.24	5.25	65.3	21.7	7.75	0.03	16.6	9	11.4	1.25	10
AC-5-16	**10-20cm**	7.86	6.94	0.24	233	4369	610	932	<1.00	0.60	21.8	5.08	4.05	0.01	31.6	4.30	0.12	1.89	69.2	16.1	12.8	0.04	23.9	3	13.8	1.34	9
AC-5-16	**40-50cm**	7.19	7.00	0.91	295	5925	940	838	<1.00	0.76	29.6	7.83	3.64	0.01	41.9	3.78	0.10	1.81	70.8	18.7	8.70	0.03	29.6	0	21.2	1.36	0
AC-5-16	**60-70cm**	7.88	7.66	0.79	271	7582	940	493	<1.00	0.69	37.9	7.83	2.14	0.01	48.6	4.84	0.09	1.43	78.0	16.1	4.41	0.02	20.5	0	10.5	1.34	0
AC-5-17	**0-10cm**	7.51	6.77	0.13	409	2454	732	343	<1.00	1.05	12.3	6.10	1.49	0.01	20.9	2.01	0.17	5.01	58.6	29.2	7.13	0.05	23.8	2	13.4	1.11	9
AC-5-17	**10-20cm**	7.34	6.52	0.28	135	3336	894	961	<1.00	0.35	16.7	7.45	4.18	0.01	28.7	2.24	0.05	1.21	58.2	26.0	14.6	0.04	21.8	10	12.0	1.24	12
AC-5-17	**40-50cm**	7.49	6.96	0.32	162	2791	943	274	<1.00	0.42	14.0	7.86	1.19	0.01	23.4	1.78	0.05	1.77	59.6	33.5	5.08	0.05	27.6	0	17.6	1.21	0
AC-5-17	**60-70cm**	7.71	7.01	0.29	142	2460	738	501	<1.00	0.36	12.3	6.15	2.18	0.01	21.0	2.00	0.06	1.73	58.6	29.3	10.4	0.05	23.6	0	14.0	1.41	0
AC-5-18	**0-10cm**	8.08	7.50	0.16	353	3135	537	237	<1.00	0.91	15.7	4.48	1.03	0.01	22.1	3.50	0.20	4.10	70.9	20.3	4.66	0.05	17.6	0	6.2	1.31	1
AC-5-18	**10-20cm**	8.49	7.43	0.13	107	3266	325	540	<1.00	0.27	16.3	2.71	2.35	0.01	21.7	6.03	0.10	1.27	75.4	12.5	10.8	0.05	20.7	9	10.8	1.52	10
AC-5-18	**40-50cm**	7.82	7.29	0.49	114	3893	547	885	<1.00	0.29	19.5	4.56	3.85	0.01	28.2	4.27	0.06	1.04	69.1	16.2	13.7	0.04	19.6	0	7.7	1.45	0

Client Sample ID	Source/Depth:	pH (1:5 in H2O) pH units	pH (1:5 in CaCl2) pH units	Electrical Conductivity dS/m	Exchangeable Potassium mg/kg	Exchangeable Calcium mg/kg	Exchangeable Magnesium mg/kg	Exchangeable Sodium mg/kg	Exchangeable Aluminium mg/kg	Exchangeable Potassium cmol/kg	Exchangeable Calcium cmol/kg	Exchangeable Magnesium cmol/kg	Exchangeable Sodium cmol/kg	Exchangeable Aluminium cmol/kg	ECEC cmol/kg	Ca/Mg Ratio cmol/kg	K/Mg Ratio cmol/kg	Exchangeable Potassium % %	Exchangeable Calcium % %	Exchangeable Magnesium % %	Exchangeable Sodium % %	Exchangeable Aluminium % %	Moisture Content (Oven Dry) %	Dispersion Index N/A	Air Dry Moisture Content %	Bulk Density g/cm3	Dispersion Index Class
				0.01	10	20	10	10	1																0.1	1	
AC-5-18	60-70cm	7.74	7.36	0.29	124	3145	457	401	<1.00	0.32	15.7	3.81	1.74	0.01	21.6	4.13	0.08	1.47	72.8	17.6	8.07	0.05	19.7	0	10.4	1.48	0
AC-5-19	0-10cm	7.01	6.08	0.09	380	1547	542	255	<1.00	0.97	7.74	4.52	1.11	0.01	14.3	1.71	0.22	6.79	53.9	31.5	7.73	0.08	18.1	10	6.0	1.10	12
AC-5-19	10-20cm	6.51	5.36	0.11	126	1450	541	442	<1.00	0.32	7.25	4.51	1.92	0.01	14.0	1.61	0.07	2.31	51.7	32.2	13.7	0.08	16.3	10	6.0	1.19	12
AC-5-19	40-50cm	6.65	6.21	0.37	142	2346	1257	836	<1.00	0.36	11.7	10.5	3.63	0.01	26.2	1.12	0.03	1.39	44.7	40.0	13.9	0.04	22.1	0	12.6	1.30	0
AC-5-19	60-70cm	7.00	6.59	0.52	128	2390	1420	683	<1.00	0.33	12.0	11.8	2.97	0.01	27.1	1.01	0.03	1.21	44.1	43.7	11.0	0.04	18.6	0	17.1	1.32	0
AC-5-20	0-10cm	7.50	6.70	0.16	406	4309	1027	625	<1.00	1.04	21.5	8.56	2.72	0.01	33.9	2.52	0.12	3.07	63.6	25.3	8.02	0.03	21.1	1	10.4	1.27	2
AC-5-20	10-20cm	7.40	6.63	0.26	181	4905	978	1015	<1.00	0.46	24.5	8.15	4.41	0.01	37.6	3.01	0.06	1.24	65.3	21.7	11.7	0.03	25.3	2	19.4	1.21	4
AC-5-20	40-50cm	7.04	6.80	0.99	192	6041	1309	840	<1.00	0.49	30.2	10.9	3.65	0.01	45.3	2.77	0.05	1.09	66.7	24.1	8.07	0.02	24.0	0	19.9	0.99	0
AC-5-20	60-70cm	7.73	7.49	0.82	218	6459	1461	594	<1.00	0.56	32.3	12.2	2.58	0.01	47.6	2.65	0.05	1.17	67.8	25.6	5.42	0.02	26.3	0	17.7	1.18	0
AC-5-C-1	0-10cm	6.45	5.73	0.04	293	2661	721	94.5	<1.00	0.75	13.3	6.01	0.41	0.01	20.5	2.21	0.13	3.67	64.9	29.3	2.01	0.05	20.9	0	13.3	1.24	1
AC-5-C-1	10-20cm	6.88	6.09	0.03	109	2764	641	105	<1.00	0.28	13.8	5.34	0.46	0.01	19.9	2.59	0.05	1.40	69.4	26.8	2.29	0.06	20.4	2	10.7	1.28	4
AC-5-C-1	40-50cm	7.40	6.50	0.03	125	3051	1003	165	<1.00	0.32	15.3	8.36	0.72	0.01	24.7	1.83	0.04	1.30	61.9	33.9	2.91	0.05	31.8	2	25.1	1.20	4
AC-5-C-1	60-70cm	8.01	7.00	0.06	177	3955	1441	287	<1.00	0.45	19.8	12.0	1.25	0.01	33.5	1.65	0.04	1.35	59.0	35.8	3.73	0.03	34.7	0	19.4	1.26	0
AC-5-C-2	0-10cm	5.35	4.51	0.03	185	1591	526	65.7	25.5	0.47	7.96	4.38	0.29	0.28	13.4	1.81	0.11	3.54	59.4	32.8	2.13	2.12	16.8	1	5.9	1.31	2
AC-5-C-2	10-20cm	6.20	5.53	0.03	99.4	2248	755	76.9	<1.00	0.25	11.2	6.29	0.33	0.01	18.1	1.79	0.04	1.41	62.0	34.7	1.84	0.06	20.4	1	8.7	1.31	2
AC-5-C-2	40-50cm	7.63	6.84	0.05	148	2044	857	96.2	<1.00	0.38	10.2	7.14	0.42	0.01	18.2	1.43	0.05	2.09	56.2	39.3	2.30	0.06	17.9	0	8.3	1.17	0
AC-5-C-3	0-10cm	6.44	5.84	0.06	1482	3903	608	61.5	<1.00	3.80	19.5	5.07	0.27	0.01	28.7	3.85	0.75	13.3	68.1	17.7	0.93	0.04	29.7	0	15.0	1.15	1
AC-5-C-3	10-20cm	7.74	7.24	0.11	250	5505	769	81.5	<1.00	0.64	27.5	6.41	0.35	0.01	34.9	4.30	0.10	1.83	78.8	18.3	1.01	0.03	37.4	0	22.4	1.12	0
AC-5-C-3	40-50cm	8.21	7.78	0.15	252	7153	1167	137	<1.00	0.65	35.8	9.73	0.60	0.01	46.7	3.68	0.07	1.38	76.5	20.8	1.27	0.02	32.4	0	17.3	1.22	0
AC-5-C-3	60-70cm	8.28	7.76	0.15	243	5841	1300	201	<1.00	0.62	29.2	10.8	0.87	0.01	41.5	2.70	0.06	1.50	70.3	26.1	2.10	0.03	26.5	0	16.3	1.40	0
AC-12-1	0-10cm	7.37	6.75	0.13	589	2074	568	410	<1.00	1.51	10.4	4.73	1.78	0.01	18.4	2.19	0.32	8.20	56.3	25.7	9.68	0.06	15.1	11	7.2	1.26	13
AC-12-1	10-20cm	7.62	6.67	0.19	210	1986	512	503	<1.00	0.54	9.93	4.27	2.19	0.01	16.9	2.33	0.13	3.18	58.6	25.2	12.9	0.07	13.1	11	6.9	1.34	13
AC-12-1	40-50cm	7.38	6.90	0.52	161	2828	1007	573	<1.00	0.41	14.1	8.39	2.49	0.01	25.4	1.69	0.05	1.62	55.6	33.0	9.79	0.04	23.1	0	14.2	1.42	0
AC-12-1	60-70cm	7.52	7.25	0.52	181	2864	1147	371	<1.00	0.46	14.3	9.56	1.61	0.01	26.0	1.50	0.05	1.79	55.1	36.8	6.21	0.04	22.4	0	12.6	1.24	0
AC-12-2	0-10cm	7.71	6.80	0.12	726	2608	767	358	<1.00	1.86	13.0	6.39	1.56	0.01	22.9	2.04	0.29	8.14	57.0	28.0	6.81	0.05	18.9	2	9.3	1.13	10
AC-12-2	10-20cm	8.05	7.05	0.16	283	2588	755	593	<1.00	0.73	12.9	6.29	2.58	0.01	22.5	2.06	0.12	3.22	57.4	27.9	11.4	0.05	19.9	9	11.2	1.17	11
AC-12-2	40-50cm	8.36	7.84	0.53	184	3812	1238	685	<1.00	0.47	19.1	10.3	2.98	0.01	32.8	1.85	0.05	1.44	58.0	31.4	9.07	0.03	21.4	0	10.0	1.25	0
AC-12-2	60-70cm	8.34	7.90	0.63	237	4538	1429	695	<1.00	0.61	22.7	11.9	3.02	0.01	38.2	1.91	0.05	1.59	59.3	31.1	7.90	0.03	21.4	0	12.3	1.30	0
AC-12-3	0-10cm	7.81	6.99	0.14	766	2465	505	250	<1.00	1.96	12.3	4.21	1.09	0.01	19.6	2.93	0.47	10.0	62.9	21.5	5.55	0.06	21.0	1	6.6	1.16	9
AC-12-3	10-20cm	8.08	6.96	0.16	437	2439	533	491	<1.00	1.12	12.2	4.44	2.13	0.01	19.9	2.75	0.25	5.63	61.3	22.3	10.7	0.06	21.8	2	8.8	1.23	9
AC-12-3	40-50cm	7.90	7.20	0.35	198	2833	787	500	<1.00	0.51	14.2	6.56	2.17	0.01	23.4	2.16	0.08	2.17	60.5	28.0	9.28	0.05	23.0	0	9.8	1.27	0
AC-12-3	60-70cm	7.95	7.31	0.40	143	2619	937	317	<1.00	0.37	13.1	7.81	1.38	0.01	22.7	1.68	0.05	1.62	57.8	34.5	6.08	0.05	22.0	0	9.7	1.35	0
AC-12-4	0-10cm	8.22	7.43	0.18	582	3753	874	418	<1.00	1.49	18.8	7.28	1.82	0.01	29.4	2.58	0.20	5.08	63.9	24.8	6.19	0.04	22.7	0	8.8	1.00	1
AC-12-4	10-20cm	8.54	7.54	0.22	215	3787	976	703	<1.00	0.55	18.9	8.13	3.06	0.01	30.7	2.33	0.07	1.80	61.7	26.5	9.96	0.04	18.2	0	6.9	1.04	1
AC-12-4	40-50cm	8.27	7.80	0.67	195	4732	1440	742	<1.00	0.50	23.7	12.0	3.23	0.01	39.4	1.97	0.04	1.27	60.1	30.5	8.19	0.03	25.4	0	13.2	1.23	0
AC-12-4	60-70cm	8.25	7.86	0.73	187	5440	1699	792	<1.00	0.48	27.2	14.2	3.44	0.01	45.3	1.92	0.03	1.06	60.1	31.3	7.60	0.02	22.5	0	10.4	1.55	0
AC-12-5	0-10cm	8.07	7.25	0.17	496	3456	749	458	<1.00	1.27	17.3	6.24	1.99	0.01	26.8	2.77	0.20	4.75	64.5	23.3	7.43	0.04	20.1	1	10.4	1.26	3
AC-12-5	10-20cm	8.52	7.81	0.34	182	5175	883	751	<1.00	0.47	25.9	7.36	3.27	0.01	37.0	3.52	0.06	1.26	70.0	19.9	8.83	0.03	19.6	0	10.8	1.29	0
AC-12-5	40-50cm	8.33	7.82	0.53	190	5641	1336	688	<1.00	0.49	28.2	11.1	2.99	0.01	42.8	2.53	0.04	1.14	65.9	26.0	6.98	0.03	21.1	0	13.2	1.49	0
AC-12-5	60-70cm	8.49	7.92	0.47	163	5441	1428	729	<1.00	0.42	27.2	11.9	3.17	0.01	42.7	2.29	0.04	0.98	63.7	27.9	7.42	0.03	20.8	0	11.6	1.53	0
AC-12-6	0-10cm	7.44	6.74	0.12	745	1978	527	214	<1.00	1.91	9.89	4.39	0.93	0.01	17.1	2.25	0.43	11.1	57.7	25.6	5.43	0.06	18.7	3	10.2	1.19	5
AC-12-6	10-20cm	7.49	6.49	0.14	572	1894	530	428	<1.00	1.47	9.47	4.42	1.86	0.01	17.2	2.14	0.33	8.51	55.0	25.6	10.8	0.06	18.0	9	10.9	1.22	11
AC-12-6	40-50cm	6.93	6.59	0.44	154	2154	682	495	<1.00	0.39	10.8	5.68	2.15	0.01	19.0	1.90	0.07	2.08	56.6	29.9	11.3	0.06	24.1	0	15.4	1.15	0
AC-12-6	60-70cm	7.03	6.70	0.37	133	2230	760	287	<1.00	0.34	11.2	6.33	1.25	0.01	19.1	1.76	0.05	1.79	58.4	33.2	6.54	0.06	24.2	0	14.4	0.99	0
AC-12-7	0-10cm	7.97	7.39	0.19	638	3696	905	407	<1.00	1.64	18.5	7.54	1.77	0.01	29.4	2.45	0.22	5.56	62.8	25.6	6.01	0.04	21.9	0	10.0	1.16	3
AC-12-7	10-20cm	8.74	7.88	0.29	187	4519	1096	833	<1.00	0.48	22.6	9.13	3.62	0.01	35.8	2.47	0.05	1.34	63.0	25.5	10.1	0.03	20.8	0	9.4	1.40	3
AC-12-7	40-50cm	8.38	7.93	0.68	169	6047	1590	962	<1.00	0.43	30.2	13.3	4.18	0.01	48.1	2.28	0.03	0.90	62.8	27.5	8.69	0.02	23.4	0	13.0	1.42	0
AC-12-7	60-70cm	8.43	7.96	0.73	165	5756	1772	1037	<1.00	0.42	28.8	14.8	4.51	0.01	48.5	1.95	0.03	0.87	59.4	30.5	9.30	0.02	22.0	0	11.5	1.46	0
AC-12-8	0-10cm	7.91	7.25	0.16	734	3226	993	416	<1.00	1.88	16.1	8.28	1.81	0.01	28.1	1.95	0.23	6.70	57.4	29.4	6.44	0.04	20.9	0	6.8	0.99	3
AC-12-8	10-20cm	8.18	7.28	0.20	187	3550	1220	778	<1.00	0.48	17.8	10.2	3.38	0.01	31.8	1.75	0.05	1.51	55.8	32.0	10.6	0.03	20.7	2	8.0	1.31	9
AC-12-8	40-50cm	8.53	7.95	0.48	145	4120	1455	1052	<1.00	0.37	20.6	12.1	4.57	0.01	37.7	1.70	0.03	0.99	54.7	32.2	12.1	0.03	24.4	0	10.6	1.42	0
AC-12-8	60-70cm	8.67	8.00	0.55	142	5293	1466	1239	<1.00	0.36	26.5	12.2	5.39	0.01	44.4	2.17	0.03	0.82	59.5	27.5	12.1	0.03	24.8	0	15.3	1.47	0
AC-12-9	0-10cm	7.49	7.00	0.17	860	3917	1045	414	<1.00	2.21	19.6	8.71	1.80	0.01	32.3	2.25	0.25	6.82	60.6	27.0	5.57	0.03	22.3	1	10.3	1.14	3
AC-12-9	10-20cm	8.19	7.41	0.25	226	4043	1316	761	<1.00	0.58	20.2	11.0	3.31	0.01	35.1	1.84	0.05	1.65	57.6	31.3	9.43	0.03	21.8	0	12.2	1.26	1
AC-12-9	40-50cm	8.41	7.98	0.63	173	6685	1853	1095	<1.00	0.44	33.4	15.4	4.76	0.01	54.1	2.16	0.03	0.82	61.8	28.6	8.80	0.02	24.3	0	14.5	1.31	0
AC-12-9	60-70cm	8.39	7.94	0.75	182	6603	1999	1230	<1.00	0.47	33.0	16.7	5.35	0.01	55.5	1.98	0.03	0.84	59.5	30.0	9.64	0.02	24.7	0	14.4	1.36	0
AC-12-10	0-10cm	7.47	6.90	0.11	956	3719	722	241	<1.00	2.45	18.6	6.02	1.05	0.01	28.1	3.09	0.41	8.72	66.1	21.4	3.73	0.04	18.6	0	10.5	0.98	3
AC-12-10	10-20cm	8.12	7.28	0.21	211	4586	785	691	<1.00	0.54	22.9	6.54	3.00	0.01	33.0	3.51	0.08	1.64	69.4	19.8	9.10	0.03	20.9	0	13.9	1.11	3
AC-12-10	40-50cm	8.10	7.74	0.46	178	6429	1024	522	<1.00	0.46	32.1	8.53	2.27	0.01	43.4	3.77	0.05	1.05	74.0	19.7	5.23	0.03	20.6	0	14.5	1.17	0
AC-12-10	60-70cm	8.20	7.77	0.37	176	6871	1189	236	<1.00	0.45	34.4	9.91	1.03	0.01	45.8	3.47	0.05	0.99	75.1	21.7	2.24	0.02	18.9	0	12.5	1.46	0
AC-12-11	0-10cm	7.23	6.65	0.10	304	2159	596	131	<1.00	0.78	10.8	4.97	0.57	0.01	17.1	2.17	0.16	4.55	63.0	29.0	3.33	0.06	13.3	0	4.9	1.20	1
AC-12-11	10-20cm	7.34	6.43	0.16	137	2536	747	680	<1.00	0.35	12.7	6.23	2.96	0.01	22.2	2.04	0.06	1.58	57.1	28.0	13.3	0.05	8.9	2	3.3	1.50	9
AC-12-11	40-50cm	7.57	6.88	0.33	151	3583	1182	709	<1.00	0.39	17.9	9.85	3.08	0.01	31.2	1.82	0.04	1.24	57.3	31.5	9.87	0.04	20.5	0	10.3	1.46	0
AC-12-11	60-70cm	7.81	7.11	0.16	110	3050	1046	280	<1.00	0.28	15.3	8.72	1.22	0.01	25.5	1.75	0.03	1.11	59.9	34.2	4.78	0.04	18.7	0	9.4	1.43	0
AC-12-12	0-10cm	7.65	6.77	0.15	252	3247	944	502	<1.00	0.65	16.2	7.87	2.18	0.01	26.9	2.06	0.08	2.40	60.3	29.2	8.10	0.04	19.9	3	7.3	1.22	5
AC-12-12	10-20cm	7.14	6.44	0.24	148	3388	1061	684	<1.00	0.38	16.9	8.84	2.97	0.01	29.1	1.92	0.04	1.30	58.1	30.3	10.2	0.04	18.5	2	7.7	1.40	9
AC-12-12	40-50cm	7.72	7.13	0.41	130	4132	1365	581	<1.00	0.33	20.7	11.4	2.53	0.01	34.9	1.82	0.03	0.95	59.2	32.6	7.24	0.03	13.9	0	7.0	1.63	0
AC-12-12	60-70cm	8.48	7.91	0.31	124	5331	1257	311	<1.00	0.32	26.7	10.5	1.35	0.01	38.8	2.54	0.03	0.82	68.7	27.0	3.48	0.03	11.4	0	5.1	1.50	0
AC-12-13	0-10cm	7.38	6.51	0.10	846	1724	428	171	<1.00	2.17	8.62	3.57	0.74	0.01	15.1	2.42	0.61	14.4	57.0	23.6	4.92	0.07	14.7	3	6.4	1.16	10
AC-12-13	10-20cm	7.59	6.61	0.16	408	1799	442	380	<1.00	1.05	9.00	3.68	1.65	0.01	15.4	2.44	0.28	6.80	58.5	23.9	10.7	0.07	13.0	2	6.6	1.28	9
AC-12-13	40-50cm	7.56	6.82	0.36	260	2367	589	547	<1.00	0.67	11.8	4.91	2.38	0.01	19.8	2.41	0.14	3.37	59.8	24.8	12.0	0.06	14.0	0	7.3	0.94	0

Client Sample ID:	Source/Depth:	pH (1:5 in H20) pH units	pH (1:5 in CaCl2) pH units	Electrical Conductivity dS/m	Exchangeable Potassium mg/kg	Exchangeable Calcium mg/kg	Exchangeable Magnesium mg/kg	Exchangeable Sodium mg/kg	Exchangeable Aluminium mg/kg	Exchangeable Potassium cmol/kg	Exchangeable Calcium cmol/kg	Exchangeable Magnesium cmol/kg	Exchangeable Sodium cmol/kg	Exchangeable Aluminium cmol/kg	ECEC cmol/kg	Ca/Mg Ratio cmol/kg	K/Mg Ratio cmol/kg	Exchangeable Potassium % %	Exchangeable Calcium % %	Exchangeable Magnesium % %	Exchangeable Sodium % %	Exchangeable Aluminium % %	Moisture Content (Oven Dry) %	Dispersion Index N/A	Air Dry Moisture Content %	Bulk Density g/cm3	Dispersion Index Class
Client Sample ID:	**Source/Depth:**			0.01	10	20	10	10	1																0.1	1	
AC-12-13	**60-70cm**	7.42	6.94	0.35	292	2430	699	312	<1.00	0.75	12.2	5.83	1.36	0.01	20.1	2.09	0.13	3.73	60.5	29.0	6.75	0.06	18.8	0	12.1	1.53	0
AC-12-14	**0-10cm**	6.97	6.37	0.09	382	2404	605	118	<1.00	0.98	12.0	5.04	0.51	0.01	18.6	2.38	0.19	5.28	64.7	27.2	2.76	0.06	13.6	0	7.4	1.42	1
AC-12-14	**10-20cm**	7.35	6.44	0.13	146	4275	867	382	<1.00	0.37	21.4	7.23	1.66	0.01	30.6	2.96	0.05	1.22	69.7	23.6	5.42	0.04	19.3	2	11.4	1.18	5
AC-12-14	**40-50cm**	7.34	6.78	0.28	117	4286	1038	527	<1.00	0.30	21.4	8.65	2.29	0.01	32.7	2.48	0.03	0.92	65.6	26.5	7.01	0.03	19.8	0	12.2	1.31	0
AC-12-15	**0-10cm**	7.24	6.64	0.13	547	2587	645	258	<1.00	1.40	12.9	5.38	1.12	0.01	20.8	2.41	0.26	6.73	62.1	25.8	5.38	0.05	16.0	1	6.0	1.16	3
AC-12-15	**10-20cm**	7.63	6.61	0.11	145	2443	565	366	<1.00	0.37	12.2	4.71	1.59	0.01	18.9	2.59	0.08	1.97	64.6	24.9	8.42	0.06	12.2	0	4.1	1.50	9
AC-12-15	**40-50cm**	7.73	7.05	0.30	144	3919	887	588	<1.00	0.37	19.6	7.39	2.56	0.01	29.9	2.65	0.05	1.23	65.5	24.7	8.54	0.04	19.0	0	9.4	1.35	1
AC-12-15	**60-70cm**	7.94	7.36	0.29	171	4068	944	339	<1.00	0.44	20.3	7.87	1.47	0.01	30.1	2.59	0.06	1.46	67.5	26.1	4.89	0.04	20.5	2	10.8	1.48	5
AC-12-16	**0-10cm**	7.78	7.24	0.20	760	4229	727	366	<1.00	1.95	21.1	6.06	1.59	0.01	30.8	3.49	0.32	6.34	68.8	19.7	5.17	0.04	24.0	0	12.3	1.04	9
AC-12-16	**10-20cm**	8.36	7.33	0.16	195	4383	709	648	<1.00	0.50	21.9	5.91	2.82	0.01	31.2	3.71	0.08	1.61	70.3	19.0	9.04	0.04	23.5	0	13.2	1.12	0
AC-12-16	**40-50cm**	8.20	7.79	0.46	146	6442	1025	545	<1.00	0.37	32.2	8.54	2.37	0.01	43.5	3.77	0.04	0.86	74.0	19.6	5.45	0.03	25.6	1	18.7	1.30	2
AC-12-16	**60-70cm**	8.08	7.75	0.47	172	6044	1256	307	<1.00	0.44	30.2	10.5	1.33	0.01	42.5	2.89	0.04	1.04	71.2	24.6	3.14	0.03	23.1	3	15.4	1.28	5
AC-12-17	**0-10cm**	7.57	6.81	0.12	715	2533	687	357	<1.00	1.83	12.7	5.73	1.55	0.01	21.8	2.21	0.32	8.41	58.1	26.3	7.12	0.05	24.2	3	11.9	1.05	9
AC-12-17	**10-20cm**	7.56	6.48	0.13	419	2688	725	656	<1.00	1.07	13.4	6.04	2.85	0.01	23.4	2.22	0.18	4.59	57.4	25.8	12.2	0.05	18.3	9	10.1	1.16	11
AC-12-17	**40-50cm**	8.27	7.87	0.57	237	5979	1394	759	<1.00	0.61	29.9	11.6	3.30	0.01	45.4	2.57	0.05	1.34	65.8	25.6	7.26	0.02	22.4	0	13.9	1.25	0
AC-12-17	**60-70cm**	8.33	7.84	0.55	194	5933	1645	585	<1.00	0.50	29.7	13.7	2.54	0.01	46.4	2.16	0.04	1.07	63.9	29.5	5.48	0.02	20.7	0	13.3	1.38	0
AC-12-18	**0-10cm**	7.92	6.96	0.13	854	3279	696	389	<1.00	2.19	16.4	5.80	1.69	0.01	26.1	2.83	0.38	8.39	62.8	22.2	6.48	0.04	23.8	3	10.2	1.05	9
AC-12-18	**10-20cm**	8.51	7.49	0.19	286	3629	840	745	<1.00	0.73	18.1	7.00	3.24	0.01	29.1	2.59	0.10	2.52	62.3	24.0	11.1	0.04	22.6	4	13.2	1.20	9
AC-12-18	**40-50cm**	8.41	7.86	0.54	205	5001	1270	852	<1.00	0.53	25.0	10.6	3.70	0.01	39.8	2.36	0.05	1.32	62.8	26.6	9.30	0.03	20.7	0	12.0	1.28	0
AC-12-18	**60-70cm**	8.48	7.96	0.55	178	5584	1411	738	<1.00	0.46	27.9	11.8	3.21	0.01	43.4	2.37	0.04	1.05	64.4	27.1	7.40	0.03	20.1	0	12.5	1.39	0
AC-12-19	**0-10cm**	7.49	6.76	0.16	591	2019	454	331	<1.00	1.52	10.1	3.78	1.44	0.01	16.8	2.67	0.40	9.00	59.9	22.5	8.54	0.07	17.4	3	8.4	1.25	9
AC-12-19	**10-20cm**	7.57	6.73	0.20	277	1756	439	501	<1.00	0.71	8.78	3.66	2.18	0.01	15.3	2.40	0.19	4.63	57.2	23.9	14.2	0.07	16.5	4	8.1	1.21	9
AC-12-19	**40-50cm**	6.59	6.18	0.44	137	2334	699	511	<1.00	0.35	11.7	5.83	2.22	0.01	20.1	2.00	0.06	1.75	58.1	29.0	11.1	0.06	21.9	0	13.0	1.19	0
AC-12-19	**60-70cm**	6.49	6.13	0.38	121	2356	746	365	<1.00	0.31	11.8	6.22	1.59	0.01	19.9	1.89	0.05	1.56	59.2	31.2	7.97	0.06	21.9	0	13.4	1.40	0
AC-12-20	**0-10cm**	7.09	6.35	0.13	700	2058	508	448	<1.00	1.79	10.3	4.23	1.95	0.01	18.3	2.43	0.42	9.82	56.3	23.2	10.7	0.06	18.7	3	9.9	1.27	9
AC-12-20	**10-20cm**	6.69	5.86	0.11	360	1785	434	344	<1.00	0.92	8.93	3.62	1.50	0.01	15.0	2.47	0.26	6.17	59.6	24.2	9.99	0.07	15.7	3	6.2	1.26	9
AC-12-20	**40-50cm**	7.39	6.77	0.30	357	2427	615	514	<1.00	0.92	12.1	5.13	2.23	0.01	20.4	2.37	0.18	4.48	59.4	25.1	10.9	0.05	25.1	0	12.8	1.24	0
AC-12-20	**60-70cm**	7.35	6.92	0.29	196	2569	666	356	<1.00	0.50	12.8	5.55	1.55	0.01	20.5	2.31	0.09	2.46	62.8	27.1	7.57	0.05	16.9	0	6.5	1.52	0
Control 1-12	**0-10cm**	6.45	5.77	0.05	573	2001	472	52.5	<1.00	1.47	10.0	3.93	0.23	0.01	15.6	2.54	0.37	9.39	63.9	25.1	1.46	0.07	25.1	1	13.5	1.27	4
Control 1-12	**10-20cm**	6.67	6.31	0.06	481	2469	620	83.9	<1.00	1.23	12.3	5.17	0.36	0.01	19.1	2.39	0.24	6.45	64.6	27.0	1.91	0.06	28.1	0	16.2	1.12	0
Control 1-12	**40-50cm**	7.05	6.44	0.03	174	2382	683	52.3	<1.00	0.45	11.9	5.69	0.23	0.01	18.3	2.09	0.08	2.44	65.1	31.1	1.24	0.06	28.8	0	15.9	1.33	0
Control 1-12	**60-70cm**	7.17	6.38	0.03	123	2271	733	105	<1.00	0.32	11.4	6.11	0.46	0.01	18.2	1.86	0.05	1.73	62.2	33.5	2.50	0.06	29.9	0	18.7	1.47	0
Control 2-12	**0-10cm**	6.52	6.11	0.06	230	3341	685	44.2	<1.00	0.59	16.7	5.71	0.19	0.01	23.2	2.93	0.10	2.54	72.0	24.6	0.83	0.05	18.0	0	6.2	1.21	1
Control 2-12	**10-20cm**	7.18	6.46	0.05	144	5209	1007	114	<1.00	0.37	26.0	8.39	0.50	0.01	35.3	3.10	0.04	1.05	73.8	23.8	1.40	0.03	21.0	0	11.7	1.34	0
Control 2-12	**40-50cm**	7.78	7.05	0.05	104	5318	996	178	<1.00	0.27	26.6	8.30	0.77	0.01	35.9	3.20	0.03	0.74	74.0	23.1	2.15	0.03	22.7	0	12.4	1.44	0
Control 2-12	**60-70cm**	8.42	7.81	0.15	111	8911	1276	218	<1.00	0.28	44.6	10.6	0.95	0.01	56.4	4.19	0.03	0.50	79.0	18.8	1.68	0.02	15.8	0	8.2	1.62	0
Control 3-12	**0-10cm**	7.26	6.90	0.13	417	5468	1045	66.8	<1.00	1.07	27.3	8.71	0.29	0.01	37.4	3.14	0.12	2.86	73.1	23.3	0.78	0.03	26.0	0	14.5	1.25	0
Control 3-12	**10-20cm**	8.00	7.43	0.09	215	5778	1100	28.8	<1.00	0.55	28.9	9.17	0.13	0.01	38.7	3.15	0.06	1.42	74.6	23.7	0.32	0.03	21.4	0	11.5	1.22	0
Control 3-12	**40-50cm**	8.29	7.50	0.08	179	4526	1334	261	<1.00	0.46	22.6	11.1	1.13	0.01	35.4	2.04	0.04	1.30	64.0	31.4	3.21	0.03	30.1	0	17.4	1.36	0
Control 3-12	**60-70cm**	8.59	7.91	0.20	162	4408	1386	368	<1.00	0.42	22.0	11.6	1.60	0.01	35.6	1.91	0.04	1.17	61.9	32.4	4.49	0.03	27.5	0	16.9	1.41	0