

BCIL Akarana Storage Pond Consenting

Barrhill Chertsey Irrigation Limited

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✦ Prepared for

Barrhill Chertsey Irrigation Limited

✦ November 2016



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Limitations:

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1.0 Introduction

Barrhill Chertsey Irrigation Limited (BCIL, the Applicant) holds resource consent CRC143165 for the take and diversion of water from the Rangitata Diversion Race (RDR) and Rakaia River for irrigation. BCIL are currently developing the final design plans for a storage pond which is to store water from the RDR.

BCIL are seeking to purchase a 40 ha parcel of land adjacent to the RDR near Highbank to construct a storage pond which will provide water to its shareholders. The land parcel is located between the RDR and Barkers Road in Methven. The approximately 1.6 million cubic metre storage pond will improve the operation efficiency and reliability of water supply to its shareholders/irrigators.

Pattle Delamore Partners Limited have been engaged by BCIL (the Applicant) to prepare the resource consent application for consents necessary to construct the proposed storage pond. More specifically, regional resource consent (from Environment Canterbury) is being sought for:

- ✧ Use of land to construct, use and maintain a storage pond, in particular for excavation, deposition and storage (damming) of water;
- ✧ Damming and diverting of water that is not on the bed of a river;
- ✧ Take and use of construction-phase dewatering water;
- ✧ Discharges of water:
 - Discharge of construction-phase stormwater to land; and
 - Discharge of seepage water to land.
- ✧ Discharge to air:
 - Fugitive dust to air from bulk earthworks; and
 - Discharge to air from internal combustion equipment.

District resource consent (Ashburton District Council) is being sought for:

- ✧ Establishment and use/operation of a new utility (storage pond) including associated earthworks;
- ✧ Soil disturbance; and
- ✧ Storage of hazardous substances (diesel) during construction.

The Applicant, BCIL, who will also be the consent holder, is seeking a consent duration of 35 years for the land use consent and the damming consent, a 35 year duration for the seepage water discharge consent, and a five year consent duration for the air and construction stormwater discharge consents.

This application for resource consent has been lodged on behalf of BCIL (the Applicant). A signed copy of the completed application form is found in Appendix F.

This document has been prepared to support the consent application and presents the assessment of environmental effects related to the proposed activities, and contains:

- ✧ Description of the proposed construction activities, and management measures during and post construction (Section 2);
- ✧ Summary of the activity status and consenting requirements (Section 3);
- ✧ Description of the existing environment (Section 4);
- ✧ An assessment of actual and potential effects on the environment arising from the proposal (Section 5);
- ✧ Statutory consideration for discharges as required by Sections 105 and 107 of the RMA (Section 6);
- ✧ Description of consultation undertaken (Section 7);
- ✧ Analysis of objectives and policies contained within relevant planning instruments, including regional plans and iwi management plans and Part II of the RMA (Sections 8 and 9); and
- ✧ Proposed consent conditions (Section 10).

2.0 Description of the Proposed Activity

2.1 Key Roles in the Development of the Akarana Storage Pond Proposal

The development of this storage pond involves several teams and for the purpose of clarity, this section identifies the roles with respect to the design and construction of the storage pond.

- ✧ Barrhill-Chertsey Irrigation Limited – Applicant (and consent holder)
- ✧ Damwatch Engineering Limited – Dam Designer
- ✧ Rooney Earthmoving Limited – Contractor
- ✧ Pattle Delamore Partners Limited – Preparation of Resource Consent Application

2.2 Background and Barrhill Chertsey Scheme Description

Barrhill Chertsey Irrigation Limited (BCIL) is a farmer-owned cooperative company, with nearly 200 farmer shareholders. BCIL and Electricity Ashburton

Limited are working together to develop an irrigation distribution system. BCIL has also partnered with the Rangitata Diversion Race Management Limited and TrustPower Limited to deliver water to the distribution system. (Note: the consent holder for this application is BCIL)

The current BCIL scheme includes five storage ponds located in Highbank, Methven, Ashburton Forks, Buccleugh and Mayfield. These ponds store water siphoned from the Rangitata Diversion Race (RDR). A maximum of 8 m³/s of water is pumped from the Rakaia River at the Highbank Power Station and into the RDR to supply the Methven and Highbank ponds, with the remainder of water used for a water swap with the Ashburton Lyndhurst Irrigation Scheme, and supplying the Mayfield, Buccleugh and Ashburton Forks ponds.

As part of the proposed works, a new storage pond (Akarana storage pond) will be constructed that will store water from the RDR, which derives its water from either the Rangitata River or water pumped from the Rakaia River. The pond will be located on a piece of land at 577 Barkers Road, Methven, as shown in Appendix A, Figures 1-2. The location of the existing Highbank, Methven, Ashburton Forks, Buccleugh and Mayfield ponds are shown in Figures 4-7 of Appendix A.

The Akarana pond will be filled by a siphon and/or pump that conveys water from the RDR at a maximum flow rate of 3 m³/s. The Akarana pond will supply water to BCIL scheme participants and irrigators through the existing system.

2.3 Site Location

The proposed Akarana storage pond will be located on a piece of land located at 577 Barkers Road, Methven. The Applicant is seeking to purchase an approximately 40 ha portion of this land which is bounded by the RDR and Barkers Road. The site location and boundary of the storage pond are shown in Appendix A, Figures 1 and 2.

The 577 Barkers Road land parcel's legal description is Lot 6 DP 1996. The land parcel is currently owned by Mark Alexander Callaghan and Helen Jane Callaghan. A copy of the land title and the resource consent for subdivision granted by the Ashburton District are provided in Appendix B. A copy of the Certificate of Incorporation for the Applicant, BCIL (Barrhill Chertsey Irrigation Limited), is also included in Appendix B.

Table 1 below shows the properties surrounding the proposed pond site:

Table 1: Surrounding Neighbours				
Owner	General Direction from Pond	Associated Address	Legal Description	Area
GR and DE King	South-west	465 Barkers Rd	Lot 1 DP10024	26 ha
DJ & SJ Wright	North-west	336 Darts Rd	RS 37578	129 ha
BA Callaghan DL Callaghan BA Callaghan Trustees Ltd	South-east (across Barkers Rd)	246 Vaughans Rd	Lot 1 DP18185	98 ha
RT Watson	South-east (across Barkers Rd)	147 Vaughans Rd	Lot 5 DP473541	95 ha

2.4 Existing Consents, Authorisations and Permissions

The Applicant holds Resource Consent CRC143165 for the take and use of water associated with the BCIL scheme, a copy of which is provided in Appendix E. The Applicant will shortly be seeking to have CRC143165 varied to include the storage of water in centralised ponds as an additional authorised use of water. Currently this consent authorises the use of water for on-farm storage, irrigation and electricity generation. Therefore the use of water for storage in the proposed Akarana pond will fall under that consent.

A review of the ECan GIS database found no resource consents are currently held for the land parcel on which the storage pond is proposed to be constructed. A summary of all regional resource consents held by BCIL is provided in Appendix H.

2.5 Pond Concept and Operation

BCIL is seeking to construct one storage pond (Akarana storage pond) which will hold approximately 1.6 million cubic metres of water when operating at the maximum storage level. The pond's embankments will be constructed of fluvioglacial outwash material excavated from the interior of the pond, which will be compacted in horizontal lifts to form a densely compacted embankment. A HDPE geomembrane liner will be used on the internal embankment slopes and extend 30 m into the pond invert.

The invert of the pond will be lined with a layer of compacted Loess/Silts, using materials recovered during the excavation of the pond footprint. The Loess/silt liner shall have a minimum thickness of 1.0 m.

The maximum embankment height above the natural (existing) ground level will be 10 m. Table 2 below summarises the key design dimensions of the proposed Akarana storage pond. At its maximum operating level, the proposed storage pond will have a freeboard of 1.5 m.

Table 2: Proposed Akarana Pond Dimensions					
Embankment crest level	Pond invert level	Maximum operating level ¹	Total storage volume ¹	Maximum embankment level above natural ground level	Water depth ¹
340.5 m RL	334.45 m RL (approx.)	339.0 m RL	1.6 million m ³	10 m	4.55 m (approx.)
Notes: 1. Storage volume and water depth at maximum operating level. Allows for 1.5 m freeboard. 2. Levels are reference to the Lyttelton Vertical Datum 1937					

2.5.1 Intake

The Akarana pond will be filled by a siphon and/or pump that conveys water from the RDR at a maximum rate of 3.0 m³/s. The design intent for the intake is to provide a structure similar to the BCI Methven Intake siphon (refer to Figure 8.1 in Damwatch preliminary Engineering Design report which is included in Appendix J). A pumping facility may be incorporated into the intake structure to lift the water from the RDR to the Pond. Erosion protection will be provided at the outlet of the intake into the pond to dissipate energy and prevent damage to the Pond liner. The intake details and the need for a pumping facility will be confirmed during detailed design.

2.5.2 Pond Outlet Conduit

From the Akarana storage pond, water will be distributed to shareholders via a proposed pipeline which will connect to the existing BCIL Methven storage pond pipeline. The water will be conveyed to the Methven pipeline via an outlet conduit, which is controlled by a hydraulic gate (Drawing BCI1612/30/21 and 103, refer to Appendix J) that will similarly be integrated into the pond's control system. The flow through this conduit will be restricted to 2 m³/s.

2.5.3 Control System

The inflow and outflow will be controlled via an automated control system, which will automatically measure the inflow, outflow and pond level. When the proposed pond reaches its full supply level of 339.0 m RL, an automated telemetric cut-off will be triggered, thereby ensuring no further water is diverted to the Akarana storage pond.

The flow of water from the RDR into the pond, will be managed by RDR Management Limited and integrated with their existing control system. Flows of stored pond water to the BCIL Methven Line, via the outlet conduit, will be managed by BCIL.

The automated control system will also incorporate safety features to prevent overfilling of the pond and facilitate closing of the intake in emergencies. For issues that need to be resolved quickly, such as a sensor failure or filling of the pond in excess of the maximum operating level, alarms will signal the pond operators. The control system will also control the flow rate from the RDR to the pond when the pond is empty in order to prevent erosion of the pond invert lining, which could occur with rapid inflow to the pond.

2.5.4 Emergency Spillway

The design of the Akarana pond includes an emergency spillway on the north-eastern pond embankment to prevent overtopping of the pond embankments. The crest of the emergency spillway has been positioned so that in the event of a 1 in 10,000 AEP rainfall event with a 24 hour critical duration, the pond is able to contain the rainfall. The spillway would only discharge pond water if the pond is overfilled by the Flow Control Structure. In the unlikely event of a control system malfunction and inflows raising the pond level to above the maximum operating level (339.0 m RL), an additional 0.5 m of surcharge is available before the emergency spillway begins to operate (at 339.5 m RL) and will prevent further reservoir surcharge or embankment overtopping. The spillway will be fully lined with geomembrane across the crest and the downstream face and toe area to protection against erosion.

2.6 Construction of the Storage Pond

Construction of the Akarana storage pond and the required civil infrastructure is proposed to commence as soon as possible upon obtaining resource consent, with a provisional starting date of December 2016. It is envisioned that the system will be commissioned within four to six months of construction commencing.

The specific details of the construction methods will be determined by the contractor, however the general sequence of the works is anticipated to be as follows:

- ✧ Set out site works;
- ✧ Strip topsoil to stockpile;
- ✧ Excavate and stockpile underlying loess/silts and fluvioglacial Outwash materials;
- ✧ Place, compact and shape fluvioglacial outwash materials to form the embankment;
- ✧ Upload, place and compact the loess/silt liner on pond invert;
- ✧ Place HDPE geomembrane liner on embankment slopes and 30 m into the pond invert;
- ✧ Upload topsoil and place on outside slopes of embankment, sow grass and cultivate;
- ✧ Construct civil works including the Flow Control Structure and Pond Outlet Conduit;
- ✧ Commission the works.

The construction of the pond will involve the excavation and deposition of onsite materials. The natural ground level at the site ranges from approximately 338 to 331 m RL, and the maximum excavation depth will be 330.0 m RL at the southern end of the pond (Damwatch Engineering, 2016). Therefore excavations may extend up to 8 m below ground level (bgl). However, given that the existing ground levels vary across the site, with ground levels being lowest at the southern end of the pond, actual excavation depths are expected to be less than 8 m bgl. Following discussions with Damwatch Engineering, it is anticipated that excavations may extend up to approximately 6 m bgl. Nonetheless, as a conservative approach, it has been assumed that for this application and the assessment of effects that the excavations may extend up to 8 m bgl.

In addition, diesel will be stored onsite during construction. It is anticipated that a 12,000 L fuel tank truck will be used for diesel storage.

2.7 Maintenance and Monitoring

In order to ensure that the Akarana storage pond is performing as designed, routine inspections and maintenance will be undertaken by BCIL. In conjunction with Damwatch Engineering, who are designing the proposed storage pond, BCIL will develop and implement an Operations Manual which will outline the inspection and maintenance procedures necessary to ensure the system is performing as designed. The inspection regime will be developed in accordance with the New Zealand Dam Safety Guidelines (NZSOLD, 2015).

Maintenance will primarily control vegetation on the embankment slopes, and repair any signs of erosion resulting from runoff from high intensity rainfall. The control of vegetation will include controlling gorse which will form part of the ongoing maintenance plan. The exterior of the pond embankments will be grassed, and regular mowing or grazing of these grassed areas will be undertaken. The pond's water level sensors will regularly undergo functional and calibration checks and the piezometers will be tested periodically. Any punctures or tears in the HDPE liner, or defects in the Loess/Silt liner of the pond invert, identified during inspections will be repaired.

Monitoring and surveillance equipment will be finalised during the detailed design of the pond, however will likely include:

- ✧ Standpipe piezometers on the crest of pond embankments;
- ✧ Survey marks on the crest of pond embankments;
- ✧ Pond and RDR water level sensors; and
- ✧ Pond and RDR water level staff gauges.

Routine visual inspections of the storage pond will be completed monthly. Special inspections will be undertaken at least annually when the pond level is low to inspect the condition of the pond lining and inspect seepage through embankments and in the vicinity of the intake and outlet structures. In addition, the New Zealand Dam Safety Guidelines suggest that further inspection of specific features of the dam occur after events such as rapid drawdown, extreme rainfall/major floods or earthquakes.

Intermediate inspections will be carried out annually by a suitably experienced engineer, to confirm the dam is functioning satisfactorily and identify any potential dam safety issues. Comprehensive Dam Safety Reviews (CDSR) will be undertaken by a suitably experienced engineer every five years.

3.0 Activity Status

A review of relevant regulations has been undertaken to determine the consenting requirements for the construction and use of the storage pond.

3.1 Regional Planning Rules

The proposed project is to construct and use a storage pond, designed to hold up to 1.6 million m³ of water at its maximum operating level, with water being diverted from the RDR. The Applicant already holds resource consent CRC143165. The take and use of water is authorised under CRC143165 and is not the subject of this application.

The proposed construction of the Akarana storage ponds involves earthworks, and other ancillary activities such as construction site discharges, dewatering and discharges of dust to air. A detailed planning rule analysis has been undertaken to consider the activities associated with this proposal, and this detailed analysis can be found in Appendix C of this report.

Appendix C includes a summary table of the activities, their associated regional planning rule, the anticipated activity status, and whether regional consent is required, and is reproduced as Table 3 below. The overall regional planning classification is **discretionary**.

Table 3: Regional Planning Classification for Activities Associated with the Installation of the Akarana Storage Pond**Land Use Activities****Relevant Regional Plans to Consider: Land and Water Regional Plan, and any Plan Changes**

Activity	LWRP		PC4		Overall Status	Consent Required Y/N
	Rule	Status	Rule	Status		
Excavation over the unconfined/semiconfined Aquifer	Rule 5.175/5.176	Restricted Discretionary	Rule 5.175/5.176	Restricted Discretionary	Restricted Discretionary	Y
Deposition over the unconfined/semiconfined Aquifer	Rule 5.177	Controlled	Rule 5.177	Controlled	Controlled	Y
Storage and use of hazardous substances (diesel)	Rule 5.179	Permitted	Rule 5.179	Permitted	Permitted	N

Diversion/Damming Activities**Relevant Regional Plans to Consider: Land and Water Regional Plan, and any Plan Changes****Damming activity¹ must also consider Natural Resources Regional Plan as LWRP damming rules are under appeal.**

Activity	LWRP		PC4		Overall Status	Consent Required Y/N
	Rule	Status	Rule	Status		
Site dewatering	Rule 5.119/5.120	Restricted Discretionary	Rule 5.119/5.120	Restricted Discretionary	Restricted Discretionary	Y
Damming of water & use of land to store water	Rule 5.154/5.155	Discretionary	Rule 5.154/5.155	Discretionary	Discretionary ¹	Y
	NRRP Rule WQN23	Restricted Discretionary	N/A	N/A		

Discharges to Land and Water**Relevant Regional Plans to Consider: Land and Water Regional Plan, and any Plan Changes**

Activity	LWRP		PC4		Overall Status	Consent Required Y/N
	Rule	Status	Rule	Status		
Discharge seepage water to land	Rule 5.98/5.100	Discretionary	Rule 5.98/5.100	Discretionary	Discretionary	Y
Discharge construction stormwater to land	Rule 5.96/5.97	Discretionary	Rule 5.94A/5.94C	Restricted Discretionary	Restricted Discretionary ²	Y

Discharges to Air**Relevant Regional Plans to Consider: Natural Resources Regional Plan and the Proposed Canterbury Air Regional Plan**

Activity	NRRP		Proposed CARP		Overall Status	Consent Required Y/N
	Rule	Status	Rule	Status		
Discharge of fugitive dust to air from bulk earthworks/handling	AQL42B/57	Discretionary	Rule 7.37/7.59 7.38/7.59	Discretionary	Discretionary	Y
Discharge to air from internal combustion equipment	Rule AQ25A/AQL27	Discretionary	Rule 7.26/7.27	Discretionary	Discretionary	Y
Discharge to air from transfer of petroleum products (refuelling)	Rule AQL39	Permitted	Rule 7.34	Permitted	Permitted	N

Notes:

1. PC4 Rules 5.154 and 5.154 are now operative. Overall classification as per PC4.
2. PC4 Rules 5.94A and 5.94C are now operative. Overall classification as per PC4 Rules 5.94A and 5.94C.

3.2 National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011

As per Section 5 of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011, the NES regulations apply to land on which a HAIL activity is occurring, has occurred, or is more likely than not to have occurred.

ECan's Listed Land User Register (LLUR) indicates that no Hazardous Activities and Industries List (HAIL) are known to occur or have occurred in the past on this site (i.e. the footprint of the proposed storage pond), although it is important to note that ECan's records may not necessarily be complete.

A Preliminary Site Investigation (PSI) has been completed by PDP, and found that a historical HAIL activity (Waste disposal to land (HAIL reference G5)) has been identified as being undertaken within the footprint of the proposed water storage pond. An Accidental Discovery Protocol has been prepared by PDP in the event that the waste materials are encountered during the excavation works for the new pond. The Protocol provides measures for the appropriate handling and disposal of any encountered waste.

Due to the presence of the identified HAIL activity within the proposed storage pond footprint a resource consent under the NES will be required from the ADC for the soil disturbance associated with the construction works for the pond. The type of consent required from the ADC is a **discretionary** activity. It is considered that the consent conditions would be limited to providing controls in order to appropriately handle and manage the disposal of any waste materials during the development works, which will be managed via the Accidental Discovery Protocol.

Table 4: Classification under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

Activity	Sub-clause	Status	Consent Required (Y/N)
Soil disturbance	Sub-clause 8(3)/11(1-2)	Discretionary	Y
Change in land use	Sub-clause 8(4)	Permitted	N

A copy of the PSI and ADP is included in Appendix I.

3.3 District Planning Rules

Resource consents from the Ashburton District Council (ADC) will also be required for the works under the Ashburton District Plan. A detailed planning rule assessment is included in Appendix C, and is summarised below in Table 5. The proposed activity involves the construction and use/operation of the Akarana storage pond, which the operative District Plan classifies as a utility. The establishment of a new utility (i.e. the storage pond), including the associated earthworks, and ongoing operation of the utility is classified as a **discretionary** activity under the District Plan, and therefore requires resource consent from ADC.

Additionally, the amount of diesel to be held onsite for use during construction exceeds that provided for as a permitted activity under the District Plan. The

storage of diesel during construction is classified as a **discretionary** activity and requires resource consent from ADC.

Table 5: District Planning Classification for Activities Associated with the Installation of the Akarana Storage Pond

Relevant Plan: Ashburton District Plan

Activity	Rule	Status	Consent Required (Y/N)
Establishment and use/operation of new utility (storage pond) ¹ including associated earthworks	Rule 14.7.1/14.7.4(d)	Discretionary	Y
Storage of hazardous substances (diesel)	Rule 16.7.1/16.7.3	Discretionary	Y
Construction noise	Rule 11.6.1	Permitted	N

Notes:

1. As per Note 1) in Section 14.7.5 of the operative Plan, Section 14 Rules take precedence over any other zone rules that may apply to utilities in the District Plan, unless specifically stated to the contrary. The Section 14 Rules therefore take precedence over Section 3 – Rural Zone Rules

3.4 Bundling Applications

Where applications require multiple resource consent applications, various resource consent applications may be bundled together under the different jurisdictions, in order to allow for the applications to be considered in a holistic way. For the purpose of this application, it is considered appropriate to bundle the ECan (Regional) and ADC (District) applications. As detailed above, the activity is considered to be a discretionary activity under the relevant planning framework from both the ADC and ECan. The overall classification is therefore **discretionary**.

3.5 Large Dam Building Consent

The Building (Dam Safety) Regulations 2008 requires building consents from the Regional Council for all large dams. The proposed storage pond will retain approximately 1,600,000 m³ of water when operating at maximum capacity and the maximum embankment height above the natural ground level is 10 m. It is therefore noted that a large dam building consent will be required from ECan, however that consent does not form part of this current application and will be sought separately.

4.0 Description of the Existing Environment

4.1 General Landscape and Land Use

The proposed Akarana storage pond will be located on a piece of land at 577 Barkers Road, Methven. The piece of land is bound by the RDR and Barkers Road, as shown Appendix A, Figures 1 and 2.

The site is generally flat and is intersected by the RDR, which flows from the south-west to the north-east. The Rakaia River is approximately 4 km north-east of the site, which flows in a south-easterly direction.

The site is located approximately 5 km north-east of the Methven township, and is located within a rural area in the Rural B zone as per the Ashburton District Plan. The RDR is located on the property, and as per the District Plan and Planning Maps (Map R39), the RDR's legal designation is Designation 83.¹ The site is surrounded by agricultural land uses, including paddocks, shelterbelts and trees, residential and agricultural buildings and roads. There are two smaller storage ponds located nearby as shown on Figure 4, Appendix A. These are the Methven and Highbank storage ponds, located approximately 200 m south-west and 1 km north-east from the site respectively. The general character and amenity of the surrounding landscape is therefore typical of rural landscapes in the Canterbury Plains.

The Rakaia River is located 4 km north-east of the site and is listed as an Outstanding Natural Landscape as per the District Plan.

4.2 Geology and Soils

The Akarana pond site is located in the far west of the Canterbury Plains. The site slopes to the south-east, with an approximate slope of 1:100. The natural ground elevation at the site varies from approximately 338 to 331 m RL (BCIL, 2016a, 2016b).

Soil maps from S-map Online (Landcare Research) identify that in area of the site, the soils are generally made up of 70% of soils belonging to the Templeton family, classified as typic immature pallic soils. The texture of these soils is described as a silty loam, and is well draining. The other 30% are comprised of pallic firm brown soils belonging to the Lismore family, which is similarly described as a well-drained, silty loam.

Surface geology maps for the Canterbury area (Forsyth *et al.*, 2008) show the site is underlain by recent fluvioglacial outwash sediments of the Late

¹ The District Plan notes that in relation to Lot 6 DP 1996 (577 Barkers Road), "the area/location of the designation is the area/location which is occupied by the Rangitata Diversion Race plus 6 meter access strips on each side of the race." The proposed activity does not occur within the legal designation.

Quaternary/Late Pleistocene age, and generally consist of poorly sorted silty gravels (Damwatch Engineering, 2016a)

Site-specific data is available from Damwatch Engineering's has produced a Geotechnical Investigation Report (Damwatch Engineering, 2016b), which includes results from twelve deep trial pits, four shallow pits, two sonic boreholes and laboratory testing for particle size distribution, compaction, pinhole dispersion and permeability tests. The general lithological sequence of the site was found to be topsoils to depths between 0.2 and 0.4 m bgl, loess/silts to depths between 0.64 and 1.3 m bgl, which were underlain by fluvioglacial outwash materials. A copy of the Geotechnical Investigation Report is provided in Appendix D.

4.2.1 Suitability of onsite materials

Test results indicate that the loess/silt material is suitable to line the pond invert (Damwatch Engineering, 2016a). Permeabilities were on the order of 10^{-9} m/s, and dispersivity testing found the material is not highly dispersive.

The fluvioglacial outwash materials were found to be free-draining with little fines content, and determined to be a suitable material to form stable embankments and support for the geomembrane liner system.

Topsoil was found to be unsuitable for the pond invert lining, and may only be reused as topsoil or a non-structural layer.

As per the Accidental Discovery Protocol, any excavated materials that contain waste materials, if encountered, will not be reused for the construction of the storage pond.

4.2.2 Listed Land User Register

A review of ECan's Listed Land User Register (LLUR) indicates that no Hazardous Activities and Industries List (HAIL) are known to occur or have occurred in the past on this site (i.e. footprint of the proposed storage pond), although it is acknowledged that ECan's records may not necessarily be complete. Aerial photographs from ECan's online GIS database show that the site is currently agricultural land and as per Map R39 of the District Plan (Ashburton District), the site is located in the Rural B zone.

As detailed in section 3.2 a Preliminary Site Investigation (PSI) has been completed by PDP, and found that a historical HAIL activity (Waste disposal to land (HAIL reference G5)) has been identified as being undertaken within the footprint of the proposed water storage pond. An Accidental Discovery Protocol (ADP) has been prepared by PDP in the event that the waste materials are encountered during the excavation works for the new pond. A copy of the PSI and ADP is included in Appendix I.

4.2.3 Fault Lines

The Preliminary Engineering Design Report (Damwatch Engineering, 2016a) includes an assessment of natural hazards, which notes there are ten active faults within 30 km of the pond site. The most significant area fault is noted to be the Mt Hutt (Peel) Fault, which is the second closest to the pond at 12.5 km. The fault is located along the mountain range south of Peel Forest to the northeast of Mt Alford and the Mt Hutt area. There are no historic earthquake ruptures along the Mt Hutt-Mt Peel Fault Zone. The Mt Hutt Fault has an estimate recurrence interval of 6,300-6,400 years (Damwatch Engineering, 2016a).

In addition, the Alpine Fault is located approximately 88 km to the north-west of the site. An unnamed inactive fault trace runs SW-NE approximately 2 km north-west of the proposed pond location. For further information refer to the Preliminary Engineering Design Report included in Appendix J, which includes a map (Figure 6.2) and summary table (Table 6.2) of faults near the pond site.

4.3 Groundwater

4.3.1 Depth to Groundwater

LWRP planning maps B-056 and B-064 indicate that the proposed Akarana Storage Pond is located over an unconfined/semi-confined aquifer. Groundwater information provided on the ECan online GIS database indicates that the depth to groundwater at the storage pond location is not more than 6 m bgl.

4.3.2 Geotechnical Investigation Report

As part of a Geotechnical Investigation Report conducted by Damwatch Engineering Limited, two boreholes were drilled to approximately 30 m bgl. The report indicates it was difficult to observe the local groundwater conditions as the use of water was required during sections of drilling. It noted water within borehole samples at two discrete depths (7.0 and 21.1 m bgl), however the water could be attributed to seepage from the RDR, located approximately 50 m north of where the borehole sample was taken (Damwatch, 2016b).

4.3.3 Bore groundwater level data

A review of the ECan GIS database found that there was one bore (K36/0265) located within the proposed storage pond site with groundwater level monitoring data, and a second bore (K36/0266) approximately 120 m east of the site. Both are shallow bores, with well depths of 10 m bgl or less.

For bore K36/0265, which is located at the eastern boundary of the site, water levels were recorded 1951-1968. For the majority of the time the well was dry, and when water was measured, levels were approximately 8.7 m bgl (331.9 m RL), with one reading of 2.68 m bgl. However, ECan have noted that the latter

reading (2.68 m bgl) is considerably different from all other measurements for this well, and therefore this reading was treated as an outlier and was not used for the estimation of the seasonal high groundwater table. The seasonal high water table at K36/0265 is estimated to be 8.7 m bgl (331.9 m RL).

Similarly for bore K36/0266, which is located 120 m east of the site, water levels were recorded 1951-1968. For approximately 60% of the measurements the well was dry, and for the vast majority of measurements (98%), the well was either dry or depths to groundwater were at least 8.5 m bgl. The LWRP defines the season high water table as “at the time the activity is established, the highest elevation that the water table has reached between the months of June and August inclusive.” Based on this definition, the seasonal high water table is approximated to be around 6.8 m bgl (327.3 m RL), which is the highest elevation measured at K36/0266 between the months of June and August (6.81 m bgl on 11 July 1952). It is noted that shallower depths were measured, however these did not occur between the months of June and August, the months upon which the seasonal high water table is defined as per the LWRP.

4.3.4 Piezometric contours

The ECan online GIS database piezometric contours layer indicates that groundwater levels vary from approximately 2 m bgl (336 m RL) at the western edge of the site adjacent to the RDR, to approximately 6 to 10.4 m bgl (325 m RL) along the eastern edge of the site (Damwatch Engineering, 2016a).

4.3.5 Summary

Based on the available data, there is the potential for groundwater to be encountered during excavations.

The groundwater level is highest at the western edge of the site, where the ECan piezometric contours indicate a groundwater level of approximately 336 m RL. Excavations in this area will extend to a depth of 333.4 m RL, and therefore groundwater may be encountered here. Furthermore, water may potentially be encountered during excavations along the western boundary of the site (adjacent to the RDR) associated with water seeping from the RDR. As such, site dewatering may be required during the works.

The maximum excavation depth for the pond is 330.0 m RL at the southern end of the site, and based on the piezometric contour of 325 m RL groundwater is not likely to be encountered (Damwatch Engineering, 2016a.)

The seasonal high groundwater table at bore K36/0265, located at the eastern edge of the site, is estimated to be approximately 331.9 m RL (8.7 m bgl), however it should be noted this is uncertain as it is based on data from 1951-1968 as more recent data was not available nearby the site. This well is 10 m deep, and for the majority of the monitoring record the well was dry.

4.3.6 Groundwater Bores and Users

A review of the ECan GIS database identified nine groundwater bores within a 2 km radius of the proposed pond location, as shown in Figure 3 of Appendix A. Of these nine bores, eight are for geotechnical investigations, and one is for water level observations. There were no community water supply and domestic water supply bores within 2 km, and no Community Drinking-water Protection zones intersect the proposed storage pond site.

4.4 Surface Waterways

The proposed damming works will not occur on any rivers, streams or waterways. The storage pond will hold water from the RDR, and is located adjacent to the race as shown in Figure 2 and Drawing BC11613/30/21 in Appendix A. The RDR receives water from the Rangitata River as well as water pumped from the Rakaia River, and discharges to the Rakaia River. The proposed pond is not located in the vicinity of either river. The pond is located adjacent to the RDR, approximately 4 km upstream of the RDR and Rakaia River confluence.

A review of the ECan online GIS database did not identify any surface water quality monitoring sites along the RDR. One monitoring station (SQ31024) is located at the confluence of the RDR and the Rakaia River, however no recent monitoring data are available. SQ31024 only has monitoring data for one date on 4 August 1980. Similarly, the ECan GIS database did not identify any water quality monitoring sites in the vicinity (≥ 5 km upstream) of the site for either the Rangitata or Rakaia Rivers.

4.4.1 Floodable Areas

As per the Ashburton District Plan Flood Maps (Map F02), the site is not located in a floodable area. Further information regarding flood hazards is detailed in Section 5.5.1.

4.5 Air Environment

As per the proposed Canterbury Air Regional Plan, the site is not located in a Canterbury Air Shed, and similarly is not located in or nearby a Canterbury Regional Airshed as per the New Zealand Gazette as at 11 June 2015. As such, the proposed pond site is not within a polluted airshed, and the air quality is expected to generally be good. However, the landscape surrounding the pond is predominantly rural, and therefore it is expected that some wind-dispersed dust (fugitive dust) routinely occurs as a result of typical farm operations.

Hourly wind data (1999 – 2004) was obtained from two weather stations (17610 and 36645) within 15 km of the site from the National Institute of Water and Atmospheric Research (NIWA) virtual climate database (Cliflo). From this data it was determined that the prevailing wind is from the North with an average wind

speed of 4.81 m/s and 2.66 m/s respectively. From this data it was calculated that 78 % of the time (based on an average from both weather stations) of the time the wind speed is within the range 0.0 – 5.0 m/s. Figure 8A and 8C, Appendix A shows the wind roses, which depicts the surface wind speed and direction the wind blows to.

Airborne dust may be generated as a result of wind-blown dust from exposed surfaces and stockpiles. Fine material stockpiles can be subject to dust pick-up at winds in excess of 5 m/s.²

4.6 Vegetation

The proposed pond will be located on land that is currently farmland. These areas are currently divided into paddocks which are either used for grazing livestock or for cropping. There is no significant native vegetation on the site.

The proposed pond is not located within a conservation site, Outstanding Natural Landscape, riparian area, or Area of Significant Conservation Value. As per the ADC District Planning Maps, the site is not located within any Geoconservation Sites or Areas, nor within an Area of Significant Nature Conservation Value. There are no protected trees or group of trees on the site as per the District Planning maps.

4.7 Heritage and Archaeological Sites

There are no known Heritage Sites on or in the immediate vicinity the proposed pond, as per the District Planning Maps. There are no known archaeological sites on or in the immediate vicinity of the pond, as per the NZ Archaeological Association digital site recording scheme database Archsite (www.archsite.org.nz).

5.0 Assessment of Effects on the Environment

This Section provides an assessment of environmental effects anticipated from the construction and ongoing use of the proposed Akarana storage pond. The reader is reminded that resource consent CRC143165 has already been granted for the take and use of water and CRC162882 authorises the use of land for farming.

This current application only seeks to authorise the damming of water (not on a river bed) associated with the proposed pond, and the associated construction-related activities.

Sections 5.1 to 5.6 consider the potential effects of the damming and use of land for the storage pond. The chief issue with respect to damming and use of land

² MfE, Good practice guide for assessing and managing the environmental effects of dust emissions, p36

for storage is the potential effects arising from a dam failure or breach. Another important consideration is the quality of water stored within the storage pond.

Section 5.7 to 5.11 considers the potential effects associated with the construction of the storage pond.

Section 5.12 provides a list of the mitigation measures recommended as part of the assessment of effects.

5.1 Positive Effects from Damming and Use of Land for Storage Pond

The purpose of providing the Akarana Storage is to provide storage that will augment the existing takes. Providing significant storage will enable the stored water to be used for irrigation when flow restrictions are in place. This improves the reliability of supply to BCIL's shareholders. By providing a more reliable source of supply, it is anticipated to provide economic benefits to the shareholders and the local community.

5.2 Effects on Downstream People, Property and the Environment

The downstream impact of a floodwave resulting from the hypothetical breach of the proposed Akarana storage pond has been assessed by Damwatch Engineering (2016c). The results from the assessment have been used to evaluate the Potential Impact Classification (PIC) of the dam according to NZSOLD (2015) Dam Safety Guidelines.

The PIC of a dam reflects the potential impact a hypothetical dam failure could have on downstream people, property and the environment. The PIC is used to ensure that appropriate criteria are used in the design and safety evaluation of a dam, and that an appropriate level of care is reflected in operational procedures.

The likelihood of failure of a properly engineered, constructed and maintained dam, such as the BCIL Akarana storage pond is **very low**. However the consequences of a hypothetical failure and the uncontrolled release of the stored reservoir contents must be considered as part of the assessment of potential effects.

The methodology adopted for the dam-break flood hazard assessment is consistent with the comprehensive level of assessment outlined in the NZSOLD (2015) Dam Safety Guidelines. A copy of the Potential Impact Classification report can be found in Appendix J.

The consequence assessment was undertaken to consider the potential impacts of a hypothetical breach of the proposed pond on downstream people, residential houses, critical or major infrastructure, natural environment and community recovery time. The assessment includes maximum flood depths maps for various dam breach scenarios, and a table with maximum flood depth-

velocities for each property; these maps and tables are provided in the Potential Impact Classification report in Appendix J.

Population at risk (PAR) is defined in the NZSOLD guidelines as *“the number of people who would be directly exposed to inundation greater than 0.5 m in depth if they took no action to evacuate.”* This includes both permanent populations (e.g. people in house or workplaces) and temporary populations (e.g. road users, anglers, farmer workers). Consideration of dam failure occurring at day/night, weekday/weekend or summer/winter scenarios must also be included in defining the PAR.

Damwatch considered the effects from a breach when the storage pond is full at four locations along the pond embankments and concluded that the following main features will be potentially impacted by the hypothetical dam-break flood:

- ✧ **Residential houses:** Embankment breach at location “1C” provided the worst case impacts on residential houses. For this breach location, a total of 16 residences are potentially inundated by the dam-break flood. Of these 16 residences, one is flooded to a depth greater than 0.5 m above natural ground level and receive moderate (repairable) to severe (irreparable) structural damage, as well as damage to building, contents and interiors. The remaining 15 residences are flooded to a depth less than 0.5 m above natural ground level. Depending on the depth of flooding relative to the building floor level, these residences may experience light to minor non-structural damage with possible damage to building contents.
- ✧ **Critical and major infrastructure:** For all breach locations (“1A”, “1B”, “1C” and “1D”), local roads and power supply lines may be damaged with potential disruption to local transport and power services.
- ✧ **Farming infrastructure:** For all breach locations (“1A”, “1B”, “1C” and “1D”) farm land and farming infrastructure may be damaged.

The total population at risk (PAR)³ in the dam-break flood zone is dependent on the breach location. Embankment breach at location “1B” provided the worst case with up to 10 people at risk. The potential loss of life was determined using the USBR (2014) methodology and was estimated to be less than one for all breach locations (i.e. “1A”, “1B”, “1C” and “1D”). It is therefore not considered “highly likely that a life will be lost” according to definitions provided in the NZSOLD (2015) Dam Safety Guidelines. The overall damage level to residential houses, critical or major infrastructure, natural environment and community recovery time (CRT) was assessed to be ‘moderate’.

³ Population at risk (PAR) is defined in the NZSOLD (2015) Dam Safety Guidelines as “the number of people who would be directly exposed to inundation greater than 0.5 m in depth if they took no action to evacuate”

With a “moderate” damage level, a PAR of “1 to 10” and because it is not considered “highly likely that a life will be lost”, a **medium PIC** (Potential Impact Classification) has been assigned to the Akarana pond.

5.2.1 Residential Houses

Flood damages to buildings typically occur when water levels rise above a building’s floor level, which is generally 150 mm or more above the natural ground level. The PIC conservatively assumes that houses exposed to flood depths greater than 0.5 m above natural ground level are damaged sufficiently to render them uninhabitable. Based on flood depth to damage relationships developed by NIWA (2010) for one-story timber and weatherboard buildings, flood depths greater than 0.5 m above building floor levels may result in moderate (repairable) to severe (irreparable) structural damage, as well as damage to building contents and interiors. Houses exposed to flood depths less than 0.5 m above natural ground level are assumed for Potential Impact Classification to experience light to minor non-structural damage with possible damage to building contents.

Three residences (465 and 577 Barkers Road and 246 Vaughans Road) have been identified as being located less than 300 m downslope of the proposed BCIL Akarana Pond embankments. Due to their very close proximity to the Pond embankments, these residences could potentially be adversely affected were a breach to develop directly upslope. The Potential Impact Classification (PIC) report provides flood maps giving further detail on the flooding at these three properties. (The reader is reminded that the PIC report is contained in Appendix J of this assessment.)

Figure E1 in the PIC report shows that the residence at 465 Barkers Road is potentially affected by a breach of the south-west embankment (i.e. breach location 1A). However, the depth of flooding at this residence is relatively shallow (between 0.1 to 0.2 m above natural ground level). This is because the residence is on elevated ground above two adjacent paleochannels that have cut into the surrounding landform (refer to cross-section A-AA provided in Figure E3 of the PIC report). Flow from a hypothetical breach of the embankment upslope of 465 Barkers Road is conveyed primarily by these paleochannels, with only residual shallow surface flooding at the residence. The residence at 465 Barkers Road is unlikely to receive structural damage but, depending on the building floor level above natural ground level, flood waters may affect building interiors and/or contents.

Figure E2 and E3 in the PIC report shows that the residence at 246 Vaughans Road and 577 Barkers Road respectively are both in close proximity to the BCIL Akarana Pond embankments. The depth of flooding at these residences is significant, with flood depths up to 0.6 m and 0.8 m above natural ground level at 246 Vaughans and 577 Barkers Road respectively. Based on the NIWA (2010)

flood depth to damage relationships described previously, these residences may receive moderate (repairable) to severe (irreparable) structural damage and damage to building contents and interiors.

All other houses within the breakout zones have inundation depths less than 0.5 m. A list of all potentially affected land parcels is included as Table D1 in the Potential Impact Classification report (Appendix J).

Note: All properties identified in Potential Impact Classification report as potentially being inundated with any depth of water as a result of a potential dam break are considered to be affected parties.

As per Section 7.2 of the AEE, written approvals have been obtained from the residents at 577 Barkers Road. Please note that these approvals were obtained with the August 2016 draft AEE, which only included the ECan application. BCIL are currently consulting with owners of all properties that may be inundated as identified in the PIC report.

5.2.2 Critical or Major Infrastructure

Damwatch identified a powerline that passes through the dam break flood zone adjacent to Barkers Road and Mangins Road as a critical or major infrastructure. The damage level to critical or major infrastructure was determined to be “moderate”, indicating significant damage to at least one major infrastructure component, with a “moderate” category to restore operation of the infrastructure (up to three months).

BCIL have consulted with Electricity Ashburton Limited and they have provided written permission for the proposal. Please note that the written permission was obtained for the ECan application only; an updated written permission is currently being sought for the bundled ADC and ECan application.

5.2.3 Roading Network and Farmland

A number of rural roads are within the dambreak flood zones, but these roads are not considered critical or major infrastructure. Flood inundation depths over these roads is generally less than 0.4 m, however flood depth up to 0.7 m could occur on some roads should a breach occur.

BCIL has consulted with ADC roading and they have provided written permission for the proposal. Please note that as above, written permission was obtained for the ECan application only, and an updated written permission is currently being sought (for the bundled ADC/ECan application).

Farmland and irrigation infrastructure could also be inundated by a breach, with potential damage to fences, stock or crop losses. While there is potential for this type of damage to occur, the risk of breach occurring is considered very low.

5.2.4 Natural Environment

A “moderate” level of damage could occur to the natural environment. The damming of water, and any breach of that water, has the potential to adversely affect ecology in the area. As per the Dam Break analysis undertaken by Damwatch Engineering (2016c), in the event of a dam breach, a “moderate” level of damage to the natural environment could occur, corresponding to significant but recoverable effect to the natural environment.

The proposed pond and downstream areas potentially flooded in a hypothetical breach, as per the flood inundation maps produced by Damwatch Engineering, are not located within areas defined as significant in terms of local ecology or habitat according to the ECan online GIS database.

It is noted that the Rakaia River, which the RDR discharges to, and the riparian area associated with the Rakaia River, are listed as Wetlands of Representative Importance, Land of Outstanding Regional Significance, and Land of National Significance and Sites of Special Wildlife Significance. The flood inundation maps provided in the dam break report (Damwatch Engineering, 2016c) however indicate that the potential damage to the natural environment resulting from a dam break is not expected to occur in any of these areas associated with the Rakaia River. Furthermore, the flood inundation maps indicate that damage resulting from a hypothetical breach is not expected to occur to any Geoconservation Areas or Areas of Significant Natural Conservation Value as per the Ashburton District Plan – Planning Maps.

5.2.5 Heritage Sites

There are no Heritage Sites on or in the immediate vicinity of the proposed pond. Downstream areas potentially flooded in a hypothetical breach, as per the flood inundation maps produced by Damwatch Engineering, do not intersect any Heritage Sites as per the District Planning Maps.

5.2.6 Community Recovery Time

It is recognised that potential negative impacts on the community resulting from dam-break flooding could include erosion or siltation on farmland, loss of stock, destruction of fencing and other farm utilities, and damage to local roads and residential dwellings. Based on this level of damage, it is considered that repairs could take months to be complete.

5.3 Adverse Effects on Rural Landscape and Amenity Values

The proposed storage pond will be located on private land within a rural environment adjacent to the RDR. There are other smaller storage ponds in the vicinity of the proposed site (refer to pond location maps in Appendix A), and the RDR itself is an artificial watercourse. Therefore the addition of the proposed

Akarana storage pond is considered to be consistent with the existing land uses and landscape in the area, and is not considered to adversely affect the rural landscape character. Similarly the pond will not adversely affect the natural character of the area, as the character of the surrounding land is already rural with artificial water courses (the RDR and storage ponds).

As detailed in Table 1 there are four dwellings in the immediate vicinity of the proposed storage pond. These are 465 Barkers Road, 336 Darts Road, 246 Vaughans Road and 147 Vaughans Road. Aerial images indicate that there are shelter belts around most of these properties that will obscure the view of the embankment of the proposed pond. In addition there is an existing shelter belt along the south-eastern side of Barkers Road which will obscure the views of the pond from this direction. Irrespective of these considerations BCIL have indicated that they will plant trees (Douglas fir) along the southwestern boundary of the pond to obscure the visibility of the pond from this direction, as shown in Figure 9, Appendix A.

The site is remote, surrounded by agricultural land, and the nearest state highway (SH77, Mount Hutt Station Road) is located 2.7 km south-west of the Akarana pond. As such, the pond is unlikely to be regularly seen by the general public.

The proposed storage pond will be located on private land, and will not be located on any waterway. As such, no adverse effects on recreational uses are anticipated from the storage pond, and likewise the pond is not expected to affect the use or enjoyment of areas of public open space.

The Rakaia River is located 4 km north-east of the site and is listed as an Outstanding Natural Landscape as per the District Plan. The pond is not expected to lead to the loss or adverse effects on the public's access or viewpoints to the Rakaia. Pudding Hill and Mt Hutt, located over 10 km north-west of the site, are also designated as an Outstanding Natural Landscape under the District Plan. Views of the mountains may be obscured at Barkers Road in the immediate vicinity of the pond. However, overall the effect on the public's access or viewpoints to Outstanding Natural Landscape is considered to be less than minor.

Based on the considerations above and with the proposed mitigation in place (planting trees along the southwestern boundary) it is considered that the effect on amenity value will be less than minor once the pond is commissioned. It is noted that the Rakaia and Rangitata Rivers provide recreation and amenity opportunities, including water sports and fishing, however the pond is not expected to adversely affect either River. (Note: the take of water does not form part of this consent application)

The proposed pond is not located within a conservation site, Outstanding Natural Landscape, riparian area, or Area of Significant Conservation Value. As per the ADC District Planning Maps, the site is not located within any Geoconservation

Sites or Areas. The nearest Geoconservation Area is the Rakaia River and its associated riparian area, which is also listed as a Wetlands of Representative Importance, Land of Outstanding Regional Significance, and Land of National Significance and Sites of Special Wildlife Significance. The activity is not anticipated to adversely affect the RDR, or the Rakaia River, which the RDR discharges into.

It is also noted that the RDR legal Designation is Designation 83 as per the District Plan. The District Plan indicates that in relation to Lot 6 DP 1996 (577 Barkers Road), "the area/location of the designation is the area/location which is occupied by the Rangitata Diversion Race plus 6 meter access strips on each side of the race." The proposed activity does not occur within the legal designation.

5.4 Potential Effect of Damming on Ngai Tahu Values

The proposed storage pond is located within the rohe of Te Runanga o Arowhenua. The proposed storage pond is not located on any stream, rivers or wetlands, or in any Statutory Acknowledgement Areas, and there are no Silent Files or Treaty Settlement Areas. A review of the potential breakout areas has also been undertaken, and the inundation areas do not occur over any known sensitive areas to iwi.

A review of the relevant iwi management plans has been undertaken to assess how the proposed activities compare with the objectives and policies contained in the relevant iwi management plans. When the activities are carried out in accordance with the recommended mitigation measures and proposed consent conditions, the damming activity is not contrary to the objectives or policies contained in Section 8.9 of this report.

The use of the storage pond is therefore not expected to have any adverse effects on Ngai Tahu values.

In addition, as noted in Section 7.0, consultation will be undertaken with Te Runanga o Arowhenua subsequent to lodging this application.

5.5 Natural Hazards

The Preliminary Design Report (Appendix J) includes a description and assessment of natural hazards. A summary of these findings is provided below.

5.5.1 Flood Hazards

The proposed pond is an off-river storage reservoir, and potential flood hazards have been identified and considered in three general categories: river flooding, local runoff flooding, and extreme rainfall falling directly on the pond surface.

River flooding: The adjacent Rakaia River, Dry Creek and Ashburton Rivers are considered to pose no credible flood hazard.

Local runoff flooding: high intensity rainfall can cause runoff over the Canterbury Plains (referred to as “local runoff flooding”), which is typically shallow (0.1 to 0.3 m depth), and generally is contained in swales, drains and low areas. The pond embankments heights are elevated, ranging from 3 to 10 m above the natural ground level, well above any potential depth of local runoff flooding. The outer embankments will be grassed and will be able to withstand flow velocities and depths from local runoff flooding. Local runoff flooding is very unlikely to threaten the stability of the embankments (Damwatch Engineering, 2016a). It is noted that the natural slope of the land is to the south-east. Local drainage is not expected to be altered by the proposed pond given that the RDR intersects the site, adjacent to the proposed pond.

Extreme rainfall: the pond is required to either be able to absorb or pass a 1:10,000 AEP (annual exceedance probability) rainfall event. A critical duration storm of 24 hours was conservatively selected for the preliminary design, and the 1:10,000, 24 hour rainfall depth has been calculated to be 0.33 m. A freeboard of 1.5 m has been adopted to provide protection against overtopping of the embankments during extreme rainfall. Note that the pond design includes an emergency spillway which provides protection against longer duration extreme rainfall events (Damwatch Engineering, 2016a).

5.5.2 Seismic Hazards

A description of faults near the proposed pond site is provided in Section 4.2.3, and a detailed description is provided in the Design Report (Damwatch Engineering, 2016a, Appendix J). There is no evidence of an active fault mapped in the immediate area of the pond site. Design ground motions were considered in accordance with the NZSOLD Dam Safety Guidelines.

Fault displacement hazards are associated with the rupture of a fault either beneath the dam or within the reservoir; a rupture of a fault beneath a dam could potentially damage the embankment and result in the development of potential seepage erosion pathways. A rupture of a fault within the reservoir (the pond) could result in a loss of freeboard or generate seiche wave with the potential for overtopping (see Section 5.5.3). As per the Design Report, there are no active faults located beneath the embankments or within the pond reservoir area. Therefore, the preliminary design does not include measures to mitigate fault displacement hazards, which is consistent with the methodology provided in NZSOLD Dam Safety Guidelines for Medium PIC dams (Damwatch Engineering, 2016a).

With respect to liquefaction, the Design Report found there is no significant risk of liquefaction of foundation materials at the pond site. For the loess/silt pond invert liner, the loess/silts will be compacted, giving a dense material resistant to liquefaction under saturated conditions. With respect to the embankments, a geomembrane will be installed along the slopes, which will maintain unsaturated

conditions of the embankment fill materials; this, and proper compaction, will give a dense embankment material that is resistant to liquefaction (Damwatch Engineering, 2016a).

Dynamic settling can occur during large earthquakes if dam foundation materials are loose, which could lead to differential cracking of the overlying embankments and failure of the geomembrane liner and potentially the embankment.

However, the foundation materials are reasonably dense which minimises this risk. A very small amount of settlement is considered likely as a result of a large earthquake. The geomembrane liner along the embankment slopes will be checked and specified in the detailed design stage to withstand this level of cracking in the embankment (Damwatch Engineering, 2016a).

5.5.3 Wind and Wave Hazards

Wind and wave hazards were assessed in the Design Report (Appendix J), in accordance with the NZSOLD Dam Safety Guidelines, which requires a 1 in 100 AEP design wind speed to determine dam freeboard requirements. The total freeboard required above full supply level is the combination of reservoir surcharge, wave run-up and wind setup. The assessment found that a freeboard of 1.5 m (from the maximum operating level to the dam embankment crest) is required for protection against wave overtopping of the embankments. In addition, the proposed embankment freeboard of 1.5 m is expected to be adequate to contain any potential reservoir seiches generated by seismic ground shaking. Landslide-generated waves in the reservoir are not a credible hazard at the proposed pond site as the storage is off-stream on mildly sloping farmland.

5.6 Effects on Water Quality and Quantity from Stored Water

The Akarana pond will be filled with fresh water from the RDR, which is sourced from the Rangitata and Rakaia Rivers. While limited data is available on the quality of the water within the race, it is expected that the primary constituents are sediments and some nutrients.

Once constructed, the pond embankments will prevent any surrounding runoff from entering the pond, and contribution from rainfall is that which falls over the pond (clean water) and any runoff from the internal side of the embankments.

The embankments will be constructed and maintained in a manner which is aimed to prevent erosion and piping of the embankments, and therefore very little sediment is anticipated to be entrained in any runoff from the internal side of the embankments.

5.6.1 Effects to the Quality of the Stored Water

The permanent damming of water has the potential to adversely affect water in the pond, and therefore impact the down-gradient water use (i.e. irrigation). If

the water is stored for too long a period, there is the potential for the water quality to become degraded and encourage algal growth, which could potentially limit the use of the stored water.

During normal operating conditions, the Akarana pond will receive inflow of fresh water from the RDR on a daily basis. The water in the pond will regularly be mixed via the filling and delivery process, and a complete turnover of water stored in the pond will be achieved four to five times per year (i.e. every 2.5 to 3 months). The inflow and delivery process provides an unstable environment which promotes the mixing of the water. The combination of the relatively short residence time and the unstable environment ensures that potential effects on water temperature and oxygen levels are minimised. In addition, given the anticipated turnover frequency, the risk of nuisance or toxic algae forming is low.

As such, the water quality of the stored water is not expected to be rendered unsuitable for the anticipated use (irrigation). Therefore, any potential adverse effects to downstream users from the quality of the stored water are expected to be less than minor.

Water will be diverted from the RDR into the storage pond, and there is likely to be some naturally occurring sediment within the diverted water. The storage pond will provide some opportunity for the settling of sediment, and there may potentially be some build-up of sediment on the invert of the pond.

In order to ensure that the pond is able to provide the design storage volume, routine monitoring of the accumulated sediment depths will be undertaken as part of the pond's operation procedure. This monitoring regime will be outlined in the operations manual developed by BCIL and its consultants. When the build-up of sediment reaches a specific trigger level, the sediment will be excavated and disposed of in a suitable and appropriate location.

5.6.2 Effects on Groundwater

During operation, stored pond water may seep from the base of the pond. The embankments of the pond will be lined with a HDPE geomembrane, and the invert of the pond will be lined with a compacted loess/silt layer. This will help reduce the seepage of water from the pond, however will not eliminate it entirely. While some leakage from the pond will occur, it will be very localised, and is not expected to adversely affect area groundwater levels, therefore the potential effect is expected to be minor. It is noted that while the discharge of seepage water requires a resource consent from ECan, proposed consent conditions (Section 10.0) have not been included. The discharge consent is required due to the historical waste disposal that occurred on the site, however any such encountered material will be disposed offsite, or if it is reburied, will

not be reburied within the pond footprint, as per the ADP. It is considered that this matter is appropriately addressed in the ADP.⁴

As discussed above, given the relatively short residence time and the unstable environment, the water quality of the stored water is expected to be suitable for the anticipated uses. The concentration of any dissolved contaminants within the stored pond water is expected to be similar to that in the RDR, and as such, the effect on groundwater quality from any seepage water is expected to be less than minor.

5.7 Effects on Land and Water from Construction Activities

The following sections (Sections 5.7 and 5.8) address the potential effects associated with the construction of the storage pond. The construction activities have the potential to affect the groundwater, air and land environment. It should be recalled that the construction works will not include the RDR, and any construction-related water discharges will be to land, not to the RDR or any other surface waterways.

The proposed works will occur over the unconfined aquifer. Aside from the earthworks, construction activities will also include the discharge of construction-phase stormwater water to ground and the discharge of site-dewatering to ground.

As noted in Section 4.3, based on the available piezometric data there is a possibility that groundwater may be encountered during the excavation works, particularly on the western edge. While actual site conditions and/or final earthworks design may avoid interception of the groundwater, this assessment conservatively considers the potential effects on any exposed groundwater in addition to the potential effects to groundwater which has not been exposed.

5.7.1 Effects on Water Quality

As detailed in the PSI, the site is considered to have had a HAIL activity occurring in the past (Waste disposal to land (HAIL reference G5))

Given this, there is a potential risk that the excavation activities will mobilise harmful contaminants within the soil or introduce leaching opportunities of these contaminants to groundwater. An Accidental Discovery Protocol (ADP) has been prepared by PDP in the event that the waste materials are encountered during the excavation works for the new pond. The protocol provides measures for the appropriate handling and disposal of any encountered waste and specifies a range of

⁴ Note: This application has been prepared on the basis that waste materials, if encountered, will be removed in accordance with the ADP. It is highly unlikely that any such materials will be reburied. If the reburying option is pursued, no waste materials will be reburied within the pond footprint, and reburying shall not occur until the activity is assessed against the relevant planning rules as referenced in the ADP.

actions to be undertaken if waste materials or soil contamination are encountered during excavations including:

- ∴ All works in the potentially affected area should cease immediately and the site supervisor contacted. In the unlikely event of an uncontrolled discharge of contaminants (i.e. inadvertent rupturing/dislodgement of containers or drums that may be present containing liquid), take all practical steps to contain the discharge and prevent further discharge;
- ∴ The area of concern must be isolated (e.g. fenced or barricaded);
- ∴ PDP shall be contacted immediately to determine the appropriate course of action in relation to environmental (and human) health requirements and any need to characterise the waste materials/soils or conduct soil sampling for determining the appropriate disposal requirements.

As noted in Section 4.3.3, groundwater may be encountered during excavations along the western boundary of the site (adjacent to the RDR), associated with seepage from the RDR, and at the western edge of the site, where groundwater is highest according to the ECan piezometric contours.

It is also understood that the base of the storage pond will be covered with approximately 1 m thickness of low permeability soils which will reduce the migration of water within the storage pond downwards towards the groundwater table. Based on these considerations and the implementation of the ADP it is considered that the potential risk to groundwater in the event of encountering waste materials or soil contamination is reduced and that the effect on groundwater quality is less than minor.

The materials used for the pond embankments and invert will be derived from fluvioglacial outwash materials and loess/silts recovered during on site excavations, and are therefore not considered to present a risk in terms of leaching contaminants. As per the ADP, excavated materials that contain waste materials, if encountered, will not be reused for the construction of the storage pond. A geomembrane liner will be used in the embankments and 30 m into the pond invert, and imported riprap and AP20 will be used near the pond's inlet and outlet structures for erosion protection. These imported materials will be clean, engineered materials and likewise do not pose a risk of leaching contaminants.

While the storage dam designers anticipate being able to balance the cut/fill with suitable on site materials, should additional material be necessary for the construction of the embankments, any imported material used will meet the criteria of clean fill (as defined in the Ministry for the Environment guide to Managing Clean fills) or virgin aggregate.

It is on this basis that the earthworks, including the materials used for the construction of the dam is unlikely to affect the groundwater quality.

All construction-phase stormwater will be discharged to land. The primary contaminant entrained in stormwater will be sediment. Sediment and erosion control measures, to be outlined in a site specific Erosion and Sediment control Plan, will be in place to reduce the potential for the uncontrolled movement of sediments, and the disposal of any construction-phase stormwater will be away from any exposed groundwater. The concentration of sediment entrained in the stormwater will be reduced by trapping via infiltration through the land. Therefore any potential effect of sediment entrained in stormwater on groundwater quality is expected to be less than minor.

Any site-dewatering water will also be discharged to land and away from any exposed groundwater. The concentration of potentially entrained sediments will be reduced by trapping via infiltration through the land. The PSI identified that historical waste disposal occurred on the site at two locations. It is important to note that the entire footprint of each area would not comprise waste, but would contain discrete waste pits where waste has historically been deposited. The historically disposed waste consisted of general farm waste, including dead stock and general household waste. These waste materials, if encountered during excavations, would be present in discrete locations. No dewatering will occur until any encountered waste materials have been appropriately characterised and dealt with (disposed at an appropriate facility or reburied) in accordance with the ADP, thereby reducing the potential for waste material leachate to become entrained in dewatering water. Therefore, any potential adverse effect from site-dewatering is expected to be less than minor.

Aside from the earthworks, there is the potential, albeit low risk, for accidental spills to affect groundwater quality. During construction, the risk of contaminants accidentally released to land and subsequently groundwater is limited to petroleum hydrocarbons (diesel and oil) from refuelling activities, and vehicles and equipment used during the construction process. This risk is small and will be further reduced by ensuring that any re-fuelling activity is carried away from any exposed groundwater, and that machinery is kept in good working order. Any diesel stored onsite in mobile containers during construction will only be stored in containers that have a valid test certificate under the HSNO, and will not be stored nearby a surface water body or groundwater bore. The development and implementation of accidental spill response protocol will reduce the potential risk to groundwater in the event of an accidental spill of fuel or any other contaminant.

5.7.2 Effects on Groundwater Quantity

During construction, site-dewatering may be required, in particular at the western edge of the site where the groundwater is highest, and otherwise along the western edge of the site adjacent to the RDR where water seeping from the RDR may be encountered (Section 4.3.5). In this event, the water intercepted by

site-dewatering will be discharged to land. Given that this water would subsequently infiltrate through the underlying land material, the potential effect to groundwater quantity is expected to be negligible.

Construction-phase stormwater will also be discharged to land, and given that stormwater currently infiltrates into ground, the net contribution is expected to be similar. However, there may be isolated areas where there is a localised effect on groundwater level, but this would be expected to be temporary.

5.7.3 Effects on Groundwater Users

As per the review of groundwater bores and users given in Section 4.3.6 of this report, there are no community water or domestic water supply bores within 2 km of the site, and no Community Drinking-water Protection zones intersect the proposed storage pond site. Therefore, the construction activities are not expected to adversely affect any groundwater users.

5.7.4 Differential Settlement of Compressible Soils

Where there may be a lowering of the groundwater table, there is the potential for land subsidence or settlement to occur. This is attributed to the fact that the pressure of water in the pore spaces supports some of the weight of the overlying sediments. Should there be a significant loss in aquifer pressure, this can cause the overlying sediments to settle and compact, especially in areas where soils are primarily comprised of compressible clay minerals or peats.

As per Section 4.1, the soils are generally comprised of loess, silts and outwash materials. Site dewatering may be required during construction, in particular in the western edge of the pond where the groundwater level is likely to be highest (Section 4.3.5). Site dewatering, if required, would potentially lower the groundwater table in a localised area temporarily during construction, however is expected to have a very low risk of causing any localised land settlement or subsidence.

Once construction has ceased and the dam has been commissioned, site dewatering will no longer be required. As such, land subsidence or settlement from lowering of the groundwater table will no longer be a potential issue.

5.7.5 Effects on Vegetation

As noted in Section 4.6, the site currently consists of paddocks for grazing livestock and cropping, with no significant native vegetation. Therefore no adverse effect is anticipated to native vegetation.

5.8 Adverse Effects on Air Quality from Construction Activities

The potential adverse effects of the proposed activity on air quality from emissions associated with the internal combustion of diesel during construction, and generation of fugitive dust.

The construction activity is expected to be completed within 4-6 months. It is anticipated that any diesel or internal combustion equipment and vehicles used for the construction works will be kept in good working order, and shall not generate emissions that are noxious, dangerous or offensive beyond the project site boundaries. Any potential effects of engine exhaust, related to the combustion of diesel from construction vehicles and the stationary screening plant, will be temporary and is expected to be minor.

5.8.1 Fugitive Dust

Dust can be considered a nuisance to both people and property. It can irritate eyes or land on surfaces such as windows or washing. Dust may be generated from excavation and filling of soil or gravel, stockpiling material and vehicle movement on unsealed roads/tracks.

When considering whether a dust discharge has caused an objectionable or offensive effect, the NRRP and pCARP states that the following matters need to be considered:

- ✧ the frequency of dust nuisance events;
- ✧ the intensity of dust nuisance events, as indicated by dust quantity and the degree of nuisance;
- ✧ the duration of each dust nuisance event;
- ✧ the offensiveness of the discharge, having regard to the nature of the dust; and
- ✧ the location of the dust nuisance, having regard to the sensitivity of the receiving environment, including taking into account the relevant zone(s) and provisions in the Operative District Plan.

5.8.2 Frequency and Intensity of Possible Events

A wind rose depicts the prevailing wind direction and the frequency breakdown of wind speed. To determine the potential dust effects on the neighbouring properties the prevailing winds at all boundaries of the site were evaluated. It does not relate to the distance that dust can be carried. Hourly wind data was obtained for the Snowdon weather station, due to its similar proximity to the Rakaia Gorge and the site. The funnelling effect the Rakaia Gorge is clear from the wind rose.

According to the hourly wind data and shown on the wind rose found on Figure 8A, Appendix A, the prevailing wind is from the north and north-west, blowing to the south and south-east respectively (and described as a northerly

and north-westerly wind respectively). The average wind speed in this direction is 4.81 m/s, and 62 % of the time, the wind speed ranges from 0.0 – 5.0 m/s. It is noted that wind speeds in excess of 5 m/s can generate dust from stock piles or exposed areas. There are two dwellings to the south of the site that could be affected by this wind, the first (246 Vaughans Road) is located about 50 m from the Barkers Road boundary for the project, and the second dwelling (147 Vaughans Road) is located more than 800 m from the Barkers Road boundary of the project site.

With respect to these dwellings the northerly and north-westerly wind occurs approximately 27 % and 26 % of the year, and 51 % and 13 % of this time the wind speed is less than 5.0 m/s, respectively. The northerly and north-westerly could carry dust in the direction of 246 Vaughans Road and 147 Vaughans Road, however based on this analysis it is anticipated that the occurrence of nuisance dust that may affect a residential dwelling is infrequent. It was considered that this data is more representative of conditions closer to the gorge and to get a different perspective the hourly wind data was obtained for the Methven CWS. This is represented by the wind rose found in Figure 8C, Appendix A. From this weather station, the prevailing winds are from both the north-east and north-west, blowing to the south-west and south-east respectively (and described as a north-easterly and north-westerly wind respectively) with the addition of a prevailing wind from the south blowing to the north (and described as a southerly wind). The average wind speed recorded at this weather station is 2.28 m/s, and 94 % of the time, the wind speed ranges from 0.0 – 5.0 m/s. The north-easterly and north-westerly wind has the potential to carry dust from the site towards 465 Barkers Road and 246 Vaughans Road. From aerial images there appears to be wind breaks which may assist in protecting 465 Barkers Road and 246 Vaughans Road from any dust nuisance although some nuisance will be experienced. Also, there is some risk of pasture contamination on the property at 465 Barkers Road, which could be reduced by low shrubbery on the boundary between the site and the property.

From the Methven CWS data, with respect to the dwellings located south-east and south-west of the site (465 Barkers Road and 246 Vaughans Road respectively) the north-easterly and north-westerly wind occurs approximately 19 % of the year and 20 % respectively. For the north-easterly 93 %, and for the north-westerly 91 % of this time, the wind speed is less than 5.0 m/s. The north-easterly has the potential to carry dust in the direction of the neighbouring property. However, based on this data it is anticipated that the occurrence of nuisance dust that may affect the neighbouring pasture is very infrequent. The southerly wind occurs 15 % of the year, and 98 % of this time the wind speed is less than 5.0 m/s so it is anticipated that the residential dwelling at 577 Barkers Road would not be affected by nuisance dust.

A stage-specific Dust Management Plan (DMP) will be prepared to ensure that the most appropriate mitigation measures are used.

In most cases, works will be staged and stockpiles situated to avoid the generation of dust which may become a nuisance beyond the property boundary. Dust suppression through the application of water may be used over exposed surfaces which are considered at risk of generating dust beyond the property boundary. Suppression using water can reduce dust emissions by approximately 70%. It is important to note that 78 % of the time (based on an average from both weather stations) the wind speed is within the range 0.0 – 5.0 m/s, which should not generate dust pick-up.

Dust mitigation measures will be used throughout the construction phase, and therefore even in high wind events such as a gusty northerly or southerly, the intensity of nuisance dust is expected to be low. In addition, dust mitigation measures will be used to minimise the potential for nuisance dust resulting from onsite vehicle movements.

5.8.3 Duration and Offensiveness

The dust will consist of soils and sediment that is present in the topsoil, underlying soils and imported material including gravel fill. This material is expected to be inert and thus not expected to cause any corrosion or nuisance effect beyond a layer of dust.

Figure 8B in Appendix A shows the cumulative probability of wind conditions that may result in potential dust nuisance. Approximately 50% of the prevailing northerly wind events are less than three hours in duration. Therefore the duration of any potential dust discharge is expected to be low and the potential effect on the neighbouring property will be less than minor.

Figure 8D in Appendix A shows the cumulative probability of wind conditions that may result in potential dust nuisance. The duration of events recorded at the Methven CWS were similar. Approximately 54% of the prevailing north-easterly wind events are less than three hours in duration. Therefore the duration of any potential dust discharge is expected to be low and the potential effect on the neighbouring property will be less than minor.

5.8.4 Location

The rural land use within the area is considered to be low sensitivity to dust impacts however residential dwellings within close proximity to the site are considered highly sensitive.

The land is zoned as Rural. The east and west of the site boundaries are not considered very sensitive to fugitive dust emissions due to the rural land use and less frequent easterly and westerly winds. To the east/south of the site development is a residential dwelling (246 Vaughans Road) which is the direct

path of the prevailing wind. The residential dwelling located to the north of the development (577 Barkers Road) is considered to be less likely to suffer from dust nuisance based on the predominance of wind directions, however given the close proximity to the works, consideration of site-specific dust minimisation will be undertaken. Specific mitigation measures will be built into the Dust Management Plan (DMP) to protect these two sensitive areas (residential dwellings).

It is noted that a second dwelling (147 Vaughans Road) is also located in the direct path of prevailing wind, however it is located more than 800 m from the Barkers Road boundary of the project site. It is considered this dwelling and any surrounding garden/patio/clothes lines associated with the dwelling is unlikely to be adversely affected by the generation of nuisance dust from this activity. That said, it is noted that any mitigation measures imposed to reduce the potential nuisance effect on the nearest dwelling will in turn mitigate any potential effect on this dwelling.

The dwelling at 465 Barkers Road is located about 300 m from the pond boundary. It is noted that there are two shelter belts located at this property. The first is situated in the general north-easterly/south-westerly direction from the track to the pond boundary (about 300 m long). The second shelter belt is about 50 m long and is located about halfway between the dwelling and the pond boundary. The shelter belts will offer some protection from dust generated in that direction. Dust mitigation measures will be in place when working along this boundary to ensure that potential nuisance effects on this dwelling arising from the works are avoided.

5.8.5 Summary

The nature of the air discharge is dust (PM₁₀) generated from excavation, handling and storage of material, and the movement of vehicles on unsealed surfaces. The discharge is not considered corrosive, noxious, dangerous, objectionable or offensive.

Airborne dust may be generated as a result of wind-blown dust from exposed surfaces and stockpiles. Fine material stockpiles can be subject to dust pick-up at winds in excess of 5 m/s. The average wind speed measured within the vicinity of this site was determined to be 4.81 m/s. It is expected that dust pick-up will be minimal and have less than minor effects outside of the boundary of work unless winds are in excess of 5 m/s. Extra precautionary measures will be built into the DMP for when weather conditions may result in fugitive dust emissions.

Stockpiles will be formed and maintained to reduce the pick-up of dust, water may be used as a dust suppressant where and when required and vehicle movements around the site will be controlled to prevent unnecessary dust generation.

It should be recalled that the construction activities are expected to be on the order of 4 to 6 months, and therefore will only occur for a short period of time.

It is considered that when carried out in accordance with the DMP prepared for the site, the discharge of dust to air during construction works will be temporary and will predominantly be contained within the site boundary, and any potential effects on neighbouring properties will be less than minor.

5.9 Effect on Ngai Tahu Values from the Construction Activities

As stated earlier, the proposed storage pond is not located in any Statutory Acknowledgement Areas, and there are no Silent Files or Treaty Settlement Areas, as such it is not anticipated that the earthworks will disturb any taonga, middens, urupa or other important sites significant to iwi. That said, an accidental discovery condition has been proposed to the land use consent to ensure that in the event of the discovery of archaeological material, the appropriate measures are undertaken.

Consideration of the potential effect on the environment from the discharges has been considered, and a review of the relevant iwi management plans has been undertaken to assess how the proposed construction activities compare with the objectives and policies contained in the relevant iwi management plans. When the activities are carried out in accordance with the recommended mitigation measures and proposed consent conditions, the activities are not contrary to the objectives or policies contained in Section 8.9 of this report.

The construction of the storage pond is therefore not expected to have any adverse effects on Ngai Tahu values.

Furthermore, as noted in Section 7.0, consultation will be undertaken with Te Runanga o Arowhenua subsequent to lodging this application.

5.10 Adverse Effects on Amenity Values from Construction

During construction of the ponds, there may be some limited, temporary effects to amenity values, in particular noise and vibration. It is expected that the works will be undertaken during normal business hours from Monday to Saturday, and will not occur on Sundays or public holidays. The construction activity will occur over a period of 4-6 months. Construction noise will be in accordance with NZS 6803:1999 Acoustics – Construction Noise, and as such the District Plan limits will not be exceeded. Therefore, the effect from construction noise and vibration is similarly expected to be minor and will cease once the storage pond is commissioned.

The proposed storage pond will be constructed on private land, and will not be located on any waterway. As such, no adverse effects on recreational uses are anticipated from the construction and use of the storage pond.

5.11 Human Health of Workers and Site Users

Direct contact with potentially contaminated soil is possible during excavation works in the vicinity of the historical waste pit areas. The PSI and ADP identify the main contaminants of concern and contamination sources, namely animal and general household wastes, and the ADP provides guidance on typical indicators of animal/general household waste. In the event of encountering any animal and/or general household wastes (and any associated contaminated soils), the ADP requires that excavations within any identified impacted area stop immediately and PDP is contacted to determine the appropriate course of action with regard to further contaminant characterisation and for determining the most appropriate disposal facility. The area of concern must be isolated to prevent other site workers from entering the area.

Furthermore, potential risks are properly taken care of as a work place issue under the *Health and Safety at Work Act 2015* by Contractors wearing personal protective equipment, minimising contact with soil and following the required site-specific documents.

By undertaking the work in accordance with the Health and Safety at Work Act 2015 and the ADP, the risk to site workers is considered to be acceptably low.

Once the pond is commissioned, any risk to future site users is highly unlikely, as detailed in the PSI. The ADP requires that any encountered waste pit materials are appropriately managed, or remove and disposed of at an appropriate facility.

5.12 Mitigation Measures and Control Measures

5.12.1 Management of Water Levels

BCIL have developed a proposed plan to manage water levels within the existing storage ponds and the proposed Akarana storage pond, in order to ensure that delivery of water to the scheme participants is efficient. BCIL will develop an operations manual which will detail the water levels, as well as requirements for maintenance and repairs to the storage pond and embankments. By implementing a management regime, the operations manual will help ensure that potential effects to scheme participants and any downgradient land users are minimised.

5.12.2 Management of Risk During Construction and Operation

BCIL will implement measures during construction and after the storage pond is commissioned to ensure that the effects from any potential breach is minimised. Areas of potential inundation have been identified as per the Damwatch Engineering report (Damwatch Engineering, 2016c) and the potentially affected landowners are currently being consulted with. A description of consultation and details of written approvals is provided in Section 7.0.

BCIL will develop, in consultation with its consultants, an operations manual that will provide guidance and timelines in which to undertake routine inspections and maintenance, in accordance with the New Zealand Dam Safety Guidelines. The operations manual will also identify critical periods at which further inspections and repair works may be required.

5.12.3 Erosion and Sediment Control Measures

During construction, the potential for erosion and sediment-laden runoff will be managed by the contractor. BCIL/the contractor will prepare and submit to ECan an Erosion and Sediment Control Plan (ESCP), in general accordance with the 2007 ECan Erosion and Sediment Control Guidelines. The erosion and sediment control measures will be dependent upon the construction methodology of the pond, which will be prepared during the detailed design stage of the pond. Therefore, the ESCP will be prepared at a later stage when the detailed construction methodology is being developed.

The aim of the ESCP will be to control run-on water, separate clean from dirty water, protect the land surface from erosion and prevent sediment from leaving the site. The plan will include site-specific measures, which are likely to include:

- ✧ Silt fencing, if required, to prevent sediment from exposed areas from entering open water or migrating off-site onto roadways;
- ✧ A stabilised all-weather access to the site, made of a base of aggregate, recycling crushed concrete, or a rock apron over a geotextile sheet;
- ✧ A wheel wash may be required should the stabilised entry point not sufficiently manage sediment being tracked offsite. Alternatively, a shaker ramp may be used to remove sediments from vehicles leaving the site;
- ✧ Sweeping of any sediment that is tracked off-site to prevent it becoming entrained in runoff or becoming a nuisance;
- ✧ As far as practical, permanent slopes (such as embankment external slopes) should be re-vegetated as soon as possible following formation;
- ✧ Use of diversion drains upslope of the construction site to prevent run-on water entering the site. Once embankment construction rises above the existing ground level, run-on water can be diverted away from the construction activity via drainage swales at the toe of embankments; and
- ✧ Runoff from within the excavation areas (the pond footprint) will be contained with the excavation areas, discharging to ground and infiltrating through the underlying soils.

The ESCP shall include, but not be limited to the following:

- ✧ A site drainage plan;
- ✧ Construction/design plan, including any excavation and compaction requirements;
- ✧ An implementation schedule detailing the anticipated time of stages associated with the construction works; including
 - Site preparation works;
 - Any equipment or plant mobilisation necessary for carrying out the construction works;
 - Works staging, and any field verification requirements;
- ✧ Measures to avoid or minimise any sediment entering exposed groundwater, RDR or being tracked onto roadways;
- ✧ Details of inspection of site management measures, and any maintenance necessary to ensure that measures are performing effectively;
- ✧ Identification of persons responsible for carrying out the actions within the ESCP.

In addition to these practices, a small bund will be constructed along the south-western boundary between the proposed pond location and the property at 465 Barkers Road to ensure that any sediment or runoff arising during the construction works does not flow into this property, but is constrained to the site property. This bund is to be constructed prior to site works occurring. (Please note that the applicant has offered a consent condition requiring the placement of this small bund.)

5.12.4 Accidental Spill Response

During the construction of the proposed storage pond, the risk of contaminants accidentally released to land or water is limited to petroleum hydrocarbons (diesel and oil) from refuelling activities, and vehicles and equipment used during the construction process. Any equipment used onsite will be maintained to ensure leaks are minimised, and re-fuelling activities will not occur in the excavation areas.

In the event of an accidental spill during installation, the contractor shall be equipped with onsite spill kits to deal with accidental spills and ensure staff are trained on its use. The Contractor will prepare a site management plan (SMP) for this site and as part of their onsite tailgate Health and Safety meetings, the SMP will be discussed with relevant staff and any sub-contractors. The content of the SMP includes fuel contaminants and spill response measures.

Once the construction has ceased and the storage pond has been commissioned, any risk of accidental spills will be further reduced given that vehicular access to the site and the use of machinery for maintenance will be limited. The consent holder shall undertake all practicable measures to avoid spills of fuel or any other hazardous substances within the site.

Should an accidental spill of contaminants occur on the site, an accidental spill response will be implemented by the consent holder (BCIL) as follows:

- ✧ In the event of a spill of fuel or any other hazardous substance, the consent holder will:
 - a. Clean up the spill as soon as practicable;
 - b. Implement measures, where practicable, to ensure the spill does not enter the existing drain;
 - c. Take measures to prevent a re-occurrence of the spill.
- ✧ The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours of a spill event, and shall provide the following information:
 - a. the date, time location and estimated volume of spill;
 - b. the cause of the spill;
 - c. the type of hazardous substance(s) spilled;
 - d. clean-up procedures undertaken;
 - e. details of steps taken to control and remediate the effects of the spill on the receiving environment;
 - f. an assessment of any potential effect of the spill; and
 - g. measures to be undertaken to prevent a re-occurrence.

5.12.5 Dust Management Plan

During construction, the potential for fugitive dust emissions will be managed by the Contractor. BCIL/the Contractor will prepare and submit to ECan a Dust Management Plan (DMP), in general accordance with the MfE's Good practice guide for assessing and managing the environmental effects of dust emissions. The plan will include site-specific measures, which may for example include spraying exposed surfaces with water to reduce susceptibility to wind erosion, spraying exposed surfaces with stonewall (polymer) to suppress dust generation, and covering stockpiles or batter slopes that are not worked for extended periods with a geotextile material.

The DMP shall include, but not be limited to the following:

- ✧ A description of the dust sources on site;
- ✧ Methods used for controlling dust at each source during construction, including excavation, earthmoving, stripping and stockpiling of materials, transport of materials, formation of dam embankments, screening of aggregate, vehicle movements;
- ✧ An implementation schedule detailing the anticipated time of stages associated with the construction works; including
 - Site preparation works;
 - Any equipment or plant mobilisation necessary for carrying out the construction works;
 - Works staging, and any field verification requirements
- ✧ Procedures for managing dust when staff are not on site
- ✧ Details of inspection of site management measures, and any maintenance necessary to ensure that measures are performing effectively.
- ✧ A method for recording and responding to complaints;
- ✧ Identification of persons responsible for carrying out the actions within the DMP.

5.12.6 Accidental Discovery Protocol

While preliminary desk-top review suggests that the storage pond is not located in any sensitive cultural or heritage areas, the consent holder will implement an accidental discovery protocol in the event of discovery during the construction works.

Specifically, in the event of disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), the BCIL/contractor, shall immediately:

- ✧ Advise the Ashburton District Council of the disturbance;
- ✧ Advise the Upoko Runanga of Arowhenua, or their representative, of the disturbance;
- ✧ Cease earthworks operations in the affected area until the area containing the Koiwa Tangata or taonga has been clearly demarcated, and the Kaumautua and archaeologists have certified that it is appropriate for earthworks to recommence.

5.12.7 Mitigation of Visual Effects

As detailed in Table 1 there are four dwellings in the immediate vicinity of the proposed storage pond. Aerial images indicate that there are shelter belts around most of these properties that will obscure the view of the embankment of the proposed pond. In addition there is an existing shelter belt along the south-eastern side of Barkers Road which will obscure the views of the pond from this direction. Irrespective of these considerations BCIL have indicated that they will plant Douglas fir trees along the south-western boundary of the pond to obscure the visibility of the pond from this direction. A map showing the proposed tree planting is provided in Figure 9 in Appendix A.

6.0 Statutory Considerations for Discharges

6.1 Consideration of Alternatives

Section 105(1) of the Resource Management Act (RMA) 1991 requires that alternatives to the proposed discharge must be considered.

6.1.1 Construction-Phase Stormwater, Site-Dewatering

For the discharge of construction-phase stormwater and water abstracted during construction-phase site-dewatering, the options are to:

- ∴ Discharge to land (preferred option)

This is the preferred option, as any potential adverse effects from the discharges to land are anticipated to be minor as outlined in Section 5.0 of this report. Any suspended sediment concentrations in the discharges are anticipated to be low, and when discharged to land, any potential suspended solids concentration will be further lowered as the discharge infiltrates the underlying soils. If waste materials are encountered during excavations, no dewatering will be undertaken in these areas until the waste materials have been characterised, disposed of at an appropriate disposal facility or reburied in accordance with the ADP.

- ∴ Discharge to Rangitata Diversion Race

The discharges detailed above could also potentially be discharged to the RDR. Discharge to land is preferable to discharging to the RDR, as infiltration through land would remove any potential suspended sediment that could otherwise enter the RDR. However, as discussed in Section 5.0 of this report, the concentration of suspended solids is expected to be low, and therefore discharging to the RDR could also be considered a viable option.

- ∴ Discharge to stormwater network

There is no stormwater network available in the vicinity of the site, and therefore this is not a viable option.

6.1.2 Discharge of Seepage Water

Once the pond is commissioned and is storing water, the pond will (to an extent) seep water. The pond embankment slopes will be lined with a HDPE geomembrane liner, with the invert lined with a compacted layer of silt, which will limit the extent of seepage. In practice it will not be possible to completely prevent the seepage of water from the pond (discharge of seepage water to land). The alternative would be to do nothing and not construct the proposed storage pond, however this would be expected to adversely affect the BCIL scheme's operation efficiency and reliability of water supply to its shareholders/irrigators.

6.1.3 Discharge to Air from Internal Combustion of Diesel, Petrol or Gas

During construction, it is proposed that a stationary screening plant will be used onsite to screen the excavated materials. Materials excavated onsite will be used to form the pond's embankments and liner, and as such screening will be required.

The alternatives would be to screen the material offsite, however this would incur additional costs and would not be practical, as it would require using vehicles to transport large volumes of excavated materials from and back to the site. Alternatively excavated materials could be removed and disposed of, and instead import engineered materials to build the pond embankments and liner. This option would be cost-prohibitive and unnecessary, and would require the disposal of large volumes of excavated materials offsite and is therefore not considered to be viable.

6.1.4 Discharge to Air from Fugitive Dust

Construction site discharges such as fugitive dust are site-specific, and alternative locations for such discharges are not feasible. Carrying out the construction works without any dust management controls could result in creating objectionable or offensive deposition to the neighbouring dwellings.

Best practice methods will be used to ensure that nuisance dust is avoided or minimised beyond the boundaries of the site. The site conditions will be assessed on an on-going basis to ensure that the dust management measures are effective, however from the expected works programme and the available wind data, it is not anticipated that more expensive or comprehensive management measures are necessary.

6.2 Section 107

Section 107 of the RMA provides restrictions on the granting of certain discharge permits. Section 107 states that the consent authority shall not grant consent to discharge a contaminant or water into water, if after reasonable mixing, the

contaminant or water discharge is likely to give rise to the all or any of the listed effects in the receiving water. The construction of the storage pond and associated discharges, when carried out in accordance with the recommended mitigation measures, will not adversely affect the groundwater or surface water. The stored water within the Akarana pond will be of suitable quality that when released to the BCIL system, it will not render water unsuitable for irrigation or stockwater supply.

7.0 Consultation

7.1 General Consultation

An initial draft AEE (August 2016) was prepared to support the Regional (ECan) consent application. BCIL consulted with the four property owners identified in Table 1, and provided these properties owners with a copy of the August 2016 draft AEE.

In addition, the August 2016 draft AEE was provided to ECan and ADC to undertake an initial review and provide feedback. Based on the feedback received, the AEE has now been expanded to include both the Regional and District consent applications as a bundled application, and contains an assessment of the activity against the Ashburton District Plan.

BCIL is currently consulting with all property owners whose properties may become inundated with water following the unlikely event of a dam failure (as identified in the Potential Impact Classification report). A copy of the most recent AEE (dated November 2016), which includes both the Regional and District planning assessment, will be provided to these property owners. In addition, Pattle Delamore Partners will undertake consultation with Te Runanga o Arowhenua. Outcomes of the consultation with the property owners and Te Runanga o Arowhenua will be provided to ADC and ECan subsequent to lodging the application.

7.2 Potentially Affected Parties

Section 95E of the RMA outlines who the consent authority considers to be an affected party. A person is considered to be an affected party if, in relation to an activity, the activity's adverse effects on the person are minor or more than minor.

As described in Section 5 of this report, in the unlikely event of a dam failure, the following are considered to be affected persons/parties arising from the damming activity:

- ✧ All properties that may be inundated with water;
- ✧ Electricity Ashburton; and

∴ Ashburton District Council (roading)

With respect to the construction of the pond and the construction-related activities, aside from the discharge of fugitive dust and potential visual impacts on the four dwellings in the immediate vicinity of the pond, there are no effects on any person or parties, where the effects are minor or more than minor.

The discharge of fugitive dust arising from the construction works, while temporary, may result in a minor impact on four dwellings. Once the pond has been constructed, there may also be minor visual impact on these four dwellings, however existing shelter belts and planting of Douglas firs on the southwestern side will obscure views of the embankment from these properties.

1. Helen and Mark Callaghan (577 Barkers Road – Lot 6 DP 1996)
2. Brian Callaghan, David Callaghan, B A Callaghan Trustee Limited (246 Vaughans Road – Lot 1 DP18185)
3. GR and DE King (465 Barkers Road – Lot 1 DP10024).
4. RT Watson (147 Vaughan's Road - Lot 5 DP473541).

7.2.1 Written Approvals

The Applicant, BCIL, has consulted with the four property owners identified above. Copies of the affected parties written approvals for Helen and Mark Callaghan (577 Barkers Road) are provided in Appendix G. It is noted that these parties were provided with a copy of the August 2016 draft AEE, which did not include the ADC application. BCIL is currently consulting with these property owners, and will provide a copy of the most recent AEE (November 2016) during consultation. Updated written approvals will be sought from these property owners.

BCIL have also consulted with ADC roading and Electricity Ashburton Limited who have provided written permission for the proposal. It is noted that these permissions were obtained for the ECan application (August 2016 AEE), and updated permissions will be sought under the most recent November 2016 AEE (which includes the ECan and ADC application)

In addition, BCIL is consulting with all property owners whose properties may become inundated with water following the unlikely event of a dam failure. These affected parties will be provided with the November 2016 AEE, and written approvals will be sought under both the ADC and ECan applications. Written approvals have already been obtained from JA Wright Farms Limited (360 Barkers Road) and Methven Dairies LP (357 Back Track), and copies of these approvals are provided in Appendix G.

7.3 Notification

Section 95A(2)(a) states unless a rule specifically precludes notification, a consent authority must publicly notify an application for a resource consent for an activity if it decides that the activity will have or is likely to have an adverse effect on the environment that is more than minor.

As demonstrated in Sections 5.1 through 5.4, the damming and use of land for storage will not have an adverse effect on the general environment that is more than minor when carried out in accordance with the proposed consent conditions.

With respect to the construction of the pond, and the associated activities, when carried out in accordance with the recommended mitigation measures will not have an adverse effect on the general environment that is more than minor.

Therefore the consent authority is not compelled to publicly notify this application.

Section 95B states that the consent authority must give limited notification to an affected person. Section 95E considers that a person providing written approval to the activity is not considered to be an affected person.

It is considered that all parties whose properties may be inundated in the unlikely event of a dam break (as identified in the Potential Impact Classification report) are potentially affected parties.

It is on this basis that we consider that this application can be processed in a limited-notified manner, with notification limited to Te Runanga o Arowhenua and to those parties identified as potentially being inundated with water in the unlikely event of a dam break.

8.0 Section 104 – Planning Matters

Section 104 of the RMA states:

(1) Subject to Part II, when considering an application for a resource consent and any submissions received, the consent authority shall have regard to:-

(a) Any actual and potential effects on the environment of allowing the activity;

(b) Any relevant provisions of –

i. a national environmental standard;

ii. other regulations;

iii. a national policy statement;

- iv. a New Zealand coastal policy statement;*
- v. a regional policy statement or proposed regional policy statement;*
- vi. a plan or proposed plan;*
- (c) Any other matters the consent authority considers relevant and reasonably necessary to determine the application.**

The actual and potential effects arising from the proposed activities have been considered in Section 5.0 of this report. The subsequent sections consider the relevant planning documents including national and regional documents.

It is noted that the Rakaia River and Rangitata River have Water Conservation Orders, however these are not relevant to the proposed works. Furthermore there are no relevant Heritage Orders or Designations to consider.

8.1 National Environmental Standards for Sources of Human Drinking Water Regulations 2007

The purpose of the National Environmental Standards (NES) for Sources of Human Drinking Water Regulations 2007 is to reduce the risk of contamination of drinking-water sources. It requires Regional Councils to consider the effects of certain activities on drinking-water sources.

As described in Section 4.3 of this report, there are no community water supply or domestic water supply bores within 2 km of the proposed pond, and no Community Drinking-water Protection zones intersect the proposed storage pond site. As such, no adverse effects on drinking water are expected. The proposed activities are considered to be in line with the NES for Sources of Human Drinking Water Regulations 2007, and therefore this NES does not compel the consent authority to decline the application.

8.2 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011

The NES for Assessing and Management Contaminants in Soil to Protect Human Health provides a nationally consistent set of planning controls and soil contaminant values, and ensures that land affected by contaminants is appropriately identified and assessed before it is developed. This standard requires territorial authorities (district and city councils) enforce the requirements of this NES.

As per Section 5 of the NES, the NES regulations apply to land on which a HAIL activity is occurring, has occurred, or is more likely than not to have occurred. As per Section 4.1 of this report, a PSI prepared by PDP indicates that a historical HAIL activity (Waste disposal to land (HAIL reference G5)) has occurred within

the footprint of the proposed water storage pond. Therefore, the NES regulations are applicable, and resource consent is required under the NES. The type of consent required from the ADC under the NES would be a **discretionary activity**.

8.3 National Environmental Standard for Air Quality

The NES for Air Quality (2004) provides regulation regarding the quality of air and specified prohibitions and criteria in which the consent authority must decline a resource consent application.

Clause 13 of the NES for Air Quality sets out the ambient air quality standards for contaminants. The contaminant relevant to this proposal is particulate matter. Schedule 1 of the NES specifies a threshold concentration for particular matter finer than 10 µm (PM₁₀). The threshold for PM₁₀ is 50 µg/m³ expressed as a 24 hour mean, and the permissible exceedance is one exceedance in a 12-month period.

Clause 17 of the NES refers to Resource Consents for discharged of PM₁₀, and states that:

*“A consent authority must decline an application for a resource consent (the **proposed consent**) to discharge PM₁₀ if the discharge to be expressly allowed by the consent would be likely, at any time, to increase the concentration of PM₁₀ (calculated as a 24-hour mean under Schedule 1) by more than 2.5 micrograms per cubic metre in any part of a polluted airshed other than the site on which the consent would be exercised.”*

The proposed storage pond is located outside any Canterbury Regional Airshed as per the New Zealand Gazette as of 11 June 2015, and is similarly located outside any Canterbury Air Shed as per the proposed Canterbury Air Regional Plan. Given that the pond site is not located within or nearby a polluted airshed, Clause 17 of the NES for Air Quality does not apply, and the NES does not compel the consent authority to decline the application for resource consent.

Mitigation measures will be in place to limit the potential for fugitive dust, and therefore it is expected that Clause 13 will be complied with.

8.4 National Policy Statement for Freshwater Management

The National Policy for Freshwater Management (NPS-FM) requires regional councils to recognise the significance of fresh water for all New Zealanders and Te Mana o te Wai (the mana of the water). The NPS-FM states objectives and policies that aim to manage water in an integrated and sustainable way, whilst providing for economic growth within set water quantity and quality limits.

Part A pertains to water quality, with Objective A1 aiming to safeguard the life supporting capacity of freshwater, as well as the health of people and

communities in sustainably managing the use and development of land, and of discharges of contaminants. Objective A2 aims to maintain or improve the overall quality of fresh water in a region. The Part A policies are aimed at ensuring regional councils set freshwater objectives and quality limits, set targets and implement methods to address to improve water quality, and impose conditions on discharge permits to ensure the limits and targets can be met.

Part B addresses water quantity. Objective 1 sets out to safeguard the life supporting capacity of fresh water by sustainably managing the taking, using, damming, or diverting of fresh water. Objective 2 aims to avoid the over-allocation of freshwater. The Part B policies are aimed to ensure water use efficiency is maximised and that over-allocation is avoided.

Part C deals with integrated management, with Objective C1's aim being to improve the integrated management of fresh water and development of land in whole catchments. Policy C1 states regional councils are to manage fresh water, land use and development in an integrated and sustainable manner, so as to avoid, remedy or mitigate adverse effects on freshwater, including cumulative effects.

Damming with the purpose of providing additional water storage enables the objectives of the NPS-FM to be met. Further it is considered when the construction of the storage pond is carried out in accordance with the recommended mitigation measures and proposed consent conditions, the construction can be carried out in a manner that is also consistent with the objectives of the NPS-FM.

8.5 Canterbury Regional Policy Statement

The Canterbury Regional Policy Statement (CRPS) gives an overview of the significant resource management issues facing the region, including issues of resource management significance to Ngāi Tahu. The purpose of the CRPS is to set out objectives, policies and methods to resolve those resource management issues and to achieve the integrated management of the natural and physical resources of Canterbury.

Chapter 5 of the CRPS covers land-use and infrastructure. It focuses on development which results in changes to urban, rural-residential and rural areas, and the recognition and strategic integration of land-use and regionally significant infrastructure in the wider area. It is widely recognised that there is a great demand for water in Canterbury, particularly for irrigation. Chapter 5 aims to promote greater integration of all infrastructure across the region, including that necessary for the irrigation of crops and pasture. The proposed storage pond serves to provide storage for irrigation.

This chapter also seeks to reduce the adverse effects of development across the region arising from the infrastructure. The design and location of the proposed

storage pond has considered existing landscape and surrounding rural lands, and measures have been put in place to ensure that adverse effects on the surrounding area associated with the use of the storage pond are minimised or avoided. Therefore the damming and use for storage is in-line with the objectives and policies of this chapter.

Chapter 7 of the CRPS addresses fresh water.

Issue 7.1.3 outlines the need for high quality freshwater for drinking, customary use and other activities. Issue 7.1.4 and 7.1.5 highlight the current demand for freshwater for economic wellbeing, such as irrigating farm land. These issues note that this usage is at risk due to variable water availability based on climatic conditions and higher demand and use.

Objective 7.4.2 and Policy 7.3.4 outline water storage as a method to improve integrative management of freshwater. Method 9(b) recommends local authorities investigate options for water storage. Policy 7.3.8, Method (1)(c) and (d) recommend that the Canterbury Regional Council provide for specific water storage and distribution schemes identified in regional and zone implementation programmes, where such schemes achieve the purpose of the RMA. The RPS also recognises improved reliability of supply as a means to improve efficiency in water use for irrigation. The proposed Akarana storage pond aligns with these objectives and policies.

Issue 7.1.2 pertains to the adverse effects of activities on fresh water in terms of water quality, quantity and life supporting capacity. Objective 7.2.3 states that the overall quality of freshwater in the region is to be maintained or improved and its life supporting capacity be safeguarded.

Policy 7.3.7 relates to water quality, namely to avoid, remedy or mitigate adverse effects of changes in land use on the quality of fresh water. As discussed previously in Section 5.0 of this report, no adverse effects on water quality are expected to result from the construction of the storage pond. Sediment run-off during construction will be temporary and will be minimised with sediment control measures. Furthermore, measures will be in place to minimise the risk of any potential spills (hydrocarbons) resulting from refuelling and the use of construction equipment and vehicles, as well as appropriately dealing with any potential waste materials during excavations (see Accidental Discovery Protocol, Appendix I). As such, no adverse effects are expected on the quality of fresh water in the surrounding area, and the activity is therefore in-line with Chapter 7.

Chapter 12 of the CRPS addresses landscape, and is primarily concerned with landscape values and their protection and/or maintenance. Issue 12.1.1 notes that subdivision, use and development can result in the modification or loss of landscape values. Objective 12.2.1 seeks to identify and protect outstanding natural features and landscapes, and Objective 12.2.2 seeks to identify and

manage other important landscapes that are not outstanding natural landscapes. Policy 12.3.2 aims to achieve protection of outstanding natural features and landscapes from inappropriate subdivision, use and development, and Policy 12.3.3 seeks to protect important landscapes that are not outstanding natural landscapes, for natural character, historic cultural, historic heritage and amenity purposes.

The proposed storage pond will be constructed on a subdivided piece of land, which is currently agricultural land. Similarly, the surrounding land is agricultural, and there are other storage ponds in the vicinity (see Appendix A, Figures 4-7). Therefore, the construction of a new storage pond is consistent with the current land use and landscape in the area, and is considered to be consistent with the strategic objectives and policies of Chapter 12.

Chapter 11 addresses natural hazards. This chapter considers the importance of natural hazards in understanding the potential risks associated with human activities. As noted within this report, consideration of climate changes, flooding and seismic events has been undertaken when developing the dam design, and the recommended construction and maintenance regimes.

Chapter 14 deals with air quality. Objective 14.2.2 seeks to enable the discharges to air provided that there are no significant localised adverse effects on social, cultural and amenity values arising from the discharges. Policy 14.3.3 aims to avoid, remedy or mitigate localised adverse effects. The construction activity is of a limited duration of 4- 6 months. When carried out in accordance with the recommended mitigation measures, potential adverse effects on the environment from the construction activity will be minimised or avoided.

Chapter 17 of CRPS addresses contaminated land. It aims to identify issues associated with contamination of land and resolve issues relating to land that may currently be contaminated.

Policy 17.3.1 requires the identification of all potentially contaminated land, and where appropriate, requires verifying the existence and nature of contamination. Policy 17.3.2 requires that where a development is proposed on actually or potentially contaminated land, a site investigation is undertaken to determine the nature and extent of contamination. If contamination is detected, the actual or potential adverse effects of that contamination, or discharges from the contaminated land, shall be avoided, remedied or mitigated. Policy 17.3.3 states that where land has been identified as being contaminated, contaminants should only be allowed to remain in the ground if discharges beyond the site will not result in significant risk to human health or the environment.

A PSI has been completed which indicates the possibility for animal and general household wastes to be present at two locations within the footprint of the new storage pond. An Accidental Discovery Protocol has been prepared for the site (Appendix I), and when the works are undertaken as described in this report and

in accordance with the ADP will not pose a significant risk to human health or the environment. Therefore the activity is in-line with Policy 17.3.1-17.3.3 and Section 17 of the CRPS.

Chapter 18 relates to hazardous substances. Policy 18.3.2 seeks to avoid, remedy or mitigate adverse effects on the environment associated with the storage, use, transportation and disposal of hazardous substances. During construction, diesel will be stored onsite for refuelling construction vehicles. Diesel will only be stored in containers that have a valid test certificate under the HSNO, and will not be stored nearby a surface water body or groundwater bore. An Accidental Spill Response Procedure is included in Section 5.12.4. The activity is therefore considered to be in-line with Policy 18.3.2.

8.6 Canterbury Natural Resources Regional Plan

Chapter 3 of the NRRP deals with air quality. Policy AQL6 aims to avoid dust nuisance. It requires that the discharge to air of dust shall not be corrosive, noxious, dangerous, objectionable, or offensive to the extent that it has or is likely to cause an adverse effect on the environment beyond the boundary of the site where the discharge originates. Dust management measures will be in place to reduce the risk of fugitive dust, and any effects from dust nuisance are expected to be temporary and minor.

Chapter 4 Water Quality has been withdrawn as of 1 September 2015, regard must still be given to the relevant objectives and policies of Chapter 5 Water Quantity on the NRRP with respect to damming of water for storage. Chapter 5 addresses water quantity issues in the Canterbury region, with water storage and construction of water storage systems identified as one of the five main water management techniques for the region.

Objective WQN8 enables the augmentation of water supply, including the damming or storage of water, provided that:

- (a) it is consistent with the Objectives set out in WQN1 (a) to (h) of the NRRP, and the relevant provisions of Objective WQL1;
- (b) it will not adversely affect existing water permit holders reliability of supply;
- (c) and will result in long-term social, economic and environmental benefits to the regional community.

Policy WQN20 recognises that augmentation may be a practical option for improving water availability and reliability of supply in water bodies within the region. The proposed augmentation of water for the Akarana storage pond is therefore consistent with Objective WQN8 and Policy WQN20 of the NRRP, and will help improve access to reliable water in the region.

8.7 Land and Water Regional Plan

The LWRP provides objectives, policies and rules relating to the management of regional land and water resources in Canterbury.

8.7.1 Damming of Water for Storage

Objective 3.4 provides for a regional network of water storage and distribution facilities providing for sustainable, efficient and multiple uses of water.

Objective 3.21 aims to ensure that the erection, placement or failure of structures does not exacerbate the risk of flooding or erosion of land or damage to structures.

The damming of water at the Akarana storage pond provides additional storage to improve reliability and security for irrigation particularly when water restrictions are in place. The dam has been designed to ensure that the risk of failure, and any damages associated with failure is avoided or minimised.

Strategic Policy 4.8 requires that the storage of water for irrigation or hydro-electricity generation schemes contributes to and does not frustrate the attainment of the regional concept for water storage as set out in Schedule 16. It is considered that the Akarana pond is part of the regional concept for water storage as described in Schedule 16.

Strategic Policy 4.8B applies to the damming of fresh water, and requires the consent authority to have regard to the extent in which the activity would adversely affect safe guarding the life supporting capacity of fresh water, and any feasibility to avoid the adverse effect. As demonstrated in Section 5, the damming of water is unlikely to adversely affect the life-supporting capacity of freshwater.

Policy 4.48 specifies that any dam or infrastructure for the storage of water is sited, designed, constructed and operated to minimise any risk of overspill, leakage, slips or other dam failure, provides for the diversion of floodwaters, and any associated risk of inundation or other adverse effects on people, communities or their property. The dam has been designed so that at its maximum operating level, there is a freeboard of 1.5 m. The embankments will be lined with an HDPE geomembrane, with the pond invert lined with a layer of compacted loess/silts, thereby reducing the amount of leakage. As per Damwatch Engineering (2016c) dam break report, a medium PIC classification has been determined for the breach scenarios modelled. An operations manual will be developed by BCIL that will include inspection, maintenance and repair requirements, to manage risk both during construction and the operation of the storage pond.

8.7.2 Construction of the Storage Pond

Objective 3.8 seeks to ensure that the quality and quantity of water is managed to safeguard the life-supporting capacity of ecosystems and ecosystem processes, and Objective 3.8A seeks to ensure that high quality fresh water is available to meet actual and foreseeable needs for community drinking water supplies.

Objective 3.13 aims to ensure that groundwater resources remain a sustainable source of high quality water.

Objective 3.24 aims to ensure that all activities operate at good environmental practice or better to optimise efficient resource use and protect the regional's fresh water resources from quality and quantity degradation.

The construction, use and maintenance of the Akarana storage pond will be undertaken in a manner that will avoid adverse effects to the environment, and in particular the groundwater quality. Therefore the proposed construction activities are consistent with the desired outcomes defined in these objectives.

Policy 4.4 relates to the management of groundwater abstractions in terms of groundwater levels, quality and quantity. Site-dewatering may be required during construction, but the dewatering water will be discharged back into the ground onsite, and any water abstracted via site de-watering will be temporary in nature. Construction-phase stormwater will be also be discharged to ground, and there will be some seepage from the base of the pond during its operation.

Any potential effect on groundwater levels from construction activities is therefore expected to be temporary and minor, and based on the expected small seepage rate, the effect on groundwater levels from the use of the pond is anticipated to be localised in nature.

As demonstrated in the Section 5, adverse effects to the quality of the groundwater will be avoided by ensuring that suitable site management measures in place, and in the event of an accidental release of contaminants, suitable response measures are implemented to avoid or reduce any adverse effects associated with the release.

Strategic Policy 4.8A applies to discharge consent application, and requires the consent authority to have regard to the extent in which the activity would adversely affect safe guarding the life supporting capacity of fresh water, and any feasibility to avoid the adverse effect. When carried out in accordance with the recommended mitigation measures and the proposed consent conditions, the discharges will not adversely affect the life-supporting capacity of fresh water.

Policy 4.14 relates to the discharge of a contaminant into or onto land where it may enter groundwater. During construction, site-dewatering water and stormwater will be disposed of to land. The main contaminants of concern

during construction is sediment entrained in runoff and the potential to encounter waste material during construction. However, measures will be in place to minimise this risk of sediment entrainment, and a site-specific Accidental Discovery Protocol has been developed to minimise any risks associated with waste materials should these be encountered. There are no drinking-water supplies within 2 km of the site, and the discharge of stormwater and dewatering water would not result in the accumulation of pathogens or toxins. The discharges to land will also not raise the groundwater levels so that land drainage is impeded. Furthermore, there is the potential for hydrocarbon to enter groundwater in the unlikely event of a spill. The Contractor will take all practical measures to minimise any risk of spills, and will have spill kits on site in the unlikely event they are needed. As such, the activity is considered to be in-line with Policy 4.14.

Policy 4.19 requires that the discharge of contaminants to groundwater from earthworks and excavation is avoided or minimised by ensuring activities are sited, designed and managed accordingly. With the implementation of an Erosion and Sediment Control Plan, spill mitigation measures, the site-specific ADP, and proposed consent conditions, the activity is considered to adhere to Policy 4.19.

Policy 4.76 aims to prevent the localised subsidence of land or other significant effects on the flows or levels of surface water or groundwater resulting from the dewatering of construction sites, achieved either by limiting the duration of pumping or other appropriate mitigation measures. The risk of land subsidence is very low.

Policy 4.94 enables the extraction of gravel from land, provided that adverse on groundwater quality are minimised and remediation is undertaken to minimise any ongoing risk of groundwater contamination. Materials excavated during construction, including loess/silts and fluvioglacial outwash materials, will be used for the pond embankments and pond invert lining. Any potential effect on groundwater from the excavation works, when carried out with the recommended site measures, is expected to be minor, and therefore is in-line with this Policy.

8.7.3 Section 13 Ashburton

Section 13 of the LWRP provides additional policies for the Ashburton District. The policies in Section 13 relate to the Ashburton River, Ashburton River catchment, and Ashburton River Groundwater Allocation Zone, and are not relevant to this application.

8.7.4 Proposed Plan Change 2 to the LWRP

Proposed Plan Change 2 to the LWRP contains amendments and additions to the Ashburton sub-regional policies, the majority of which targeted at the

Hinds/Hekeao Plains Area. These are not relevant the proposed Akarana storage pond activity.

8.7.5 Proposed Plan Change 4 to the LWRP

The policy changes in Plan Change 4 to the LWRP are generally minor alterations to wordings, and does not change the aforementioned conclusion, namely that the proposed works are considered to be consistent with the objectives and policies outlined in Section 4 of LWRP.

Policy 4.14 has the addition of 4.14B, which specifies that regard must be given to Ngāi Tahu values, and in particular those expressed within an iwi management plan when considering applications for discharges which may adversely affect statutory acknowledgement areas, nohoanga sites, and cultural landscapes identified in this plan or in any iwi management plan. Section 8.9 of this report reviews the relevant iwi management plans, and thereby satisfies the aim of this Policy.

Policy 4.76, relating to site dewatering, has been amended and now includes Policy 4.76A which states that adverse effects on surface water quality are to be minimised through limiting the concentration of sediment and other contaminants present in the dewatering water prior to its discharge to surface water. Water from site-dewatering will be discharged to land and not to surface water, and therefore the addition of Policy 4.76A is not applicable. However, as described previously, sediment and erosion control measures will be in place to minimise the potential for the uncontrolled movement of sediments offsite, and the ADP will minimise the potential risks associated with discovering waste materials during excavation works.

8.8 Ashburton District Plan

8.8.1 Section 3: Rural Zone

Chapter 3 of the Operative District Plan for the Ashburton District contains the objectives and policies for rural land zones. As per planning Map R39, the site is located in zone Rural B.

Objective 3.1 aims to enable primary production to function efficiently and effectively in Rural A and B zones. Policy 3.1A provides for the continued productive use through farming activities and protection of highly productive and/or versatile soils, and their associated irrigation resources, by ensuring that such land is not developed for intensive residential activity and/or non-rural activities and the extent of coverage by structures or hard surfaces is limited. The proposed storage pond will help deliver water to irrigators, thereby helping primary production to function efficiently and effectively.

Objective 3.2 and its associated policies address the protection of biodiversity, and Objective 3.3 and its associated policy address the protection of Outstanding Natural Features and Landscapes. Objective 3.4 aims to preserve the natural character of the Ashburton District's coastal environment, rivers, lakes, wetlands and their margins and protect them from inappropriate subdivision, land use and development. The Rakaia River and immediately adjacent land is classified as areas of Outstanding Natural Landscape and of Significant Nature Conservation Value. However, the proposed storage pond does not intersect these areas. The proposed storage pond is located adjacent to the RDR, which is an artificial watercourse, and therefore is not located within a river or its margin. Overall the proposal is considered to be consistent with these objectives and policies.

Objective 3.5 seeks to protect and maintain the character and amenity values of rural areas, considering its productive uses whilst providing for non-rural activities that meet the needs of local and regional communities and the nation. The site is located in a rural/agricultural area, and several smaller storage ponds are located in the vicinity. As such, the addition of the proposed storage pond is consistent with the current character of the rural area. As per Section 5.8 of this report, while some amenity effects are expected in terms fugitive dust and noise, these are expected to be minor and will cease once construction is completed.

Objective 3.6 pertains to extractive activities, including earthworks, whilst protecting the amenity values of the rural environment and rural resources. Policy 3.6D requires earthworks to be controlled so as to ensure minimal adverse effects on amenity values and land stability, whilst protecting important geoconservation sites, Outstanding Natural Landscapes, riparian areas and Areas of Significant Nature Conservation Value. The excavation works will not occur in a conservation site, Outstanding Natural Landscape, riparian area, or Area of Significant Conservation Value. As per Section 5.8, dust and noise resulting from the excavation and construction works are expected to have a short term, and minor effect. Similarly,

The risk of a dam failure occurring is very low when the dam is designed, constructed, operated and maintained in accordance with the NZSOLD Guidelines. While there is potential for "moderate" (i.e. significant but recoverable) damage in the event of a failure, this risk of damage to the critical infrastructure, community and natural environment considered to be unlikely. As per Section 5.12.2, an operations manual will be completed which details a management regime and maintenance and inspection requirements, which will help minimise potential effects downgradient of the pond. As such, the proposed works are considered to be in-line with Objective 3.6 and Policy 3.6D.

8.8.1.1 Section 3.11.11 Assessment Matters

In addition, Section 3.11.11 of the District Plan provides assessment matters for earthworks in rural zones, these are also relevant to the application and have been considered in the preparation of this AEE.

Matters 3.11.11 a and b relate to tree planting. As discussed in Section 5.12.7, Douglas firs will be planted along the south-western boundary of the pond. These trees will be sited on flat land, surrounded by established farm land uses, and therefore the risk of wilding spread is not considered to be high. There will be no planting of trees on riparian margins, geological/geo-morphological areas and nature conservation values.

Matter 3.11.11 c: the detailed construction methodology will be developed at a later stage, when the pond design progresses to the detailed design stage. The general considerations and preliminary methodology are described in Sections 2.5 and 2.6.

Matter 3.11.11 d: the earthworks will not occur on a prominent ridgeline, therefore this matter is not relevant.

Matter 3.11.11 e: as noted in Section 5.8, the construction activity is expected to be completed over a 4-6 month period. The earthworks will involve the excavation and deposition of onsite materials. The natural ground level at the site ranges from approximately 338 to 331 m RL, and the maximum excavation depth will be 330.0 m RL (Damwatch Engineering, 2016). Therefore, excavations may extend up to 8 m bgl.

Matter 3.11.11 f: a site specific Dust Management Plan and Erosion and Sediment Control Plan will be developed for the works, as outlined in Section 5.12 of the AEE.

Matter 3.11.11 g: construction will occur over a 4-6 month period, and it is expected the works will be undertaken during normal business hours from Monday to Saturday, and will not occur on Sundays or public holidays.

Matter 3.11.11 h and i: materials excavated onsite will be reused to form the pond embankments and pond liner as noted in Section 2.5. If contaminated material is encountered during excavations, this material may be disposed of offsite at a suitable facility. Should additional material be required to form the pond embankments, imported materials will include imported clean fill material or virgin aggregate. Additionally, diesel fuel will be imported and stored onsite during construction.

Matter 3.11.11 j, and k: the finished pond will have embankments up to 10 m above the existing ground levels. The exterior of the embankments will be grassed, and trees will be planted along the south-western boundary of the

pond. As discussed in Section 5.3, the visual effect on the landscape is considered to be less than minor.

Matter 3.11.11 l-s: As per Section 5.3 of the AEE, any loss, or adverse effects on, views of outstanding landscape from locations to which the public has access, or public access to these views or viewpoints, is considered to be less than minor. Pudding Hill and Mt Hutt, which are designated as an Outstanding Natural Landscape under the District Plan, are located over 10 km north-west of the site, and views of the mountain may be obscured at Barkers Road but only in the immediate vicinity of the pond, therefore this effect is considered to be less than minor. The pond is considered to be consistent with the surrounding rural land use and landscape, and any adverse effect on the natural landscape pattern or natural character of the area is considered to be less than minor. The pond is not expected to adversely affect the openness and spaciousness of the landscape, the overall natural character of the area, or indigenous ecosystem integrity and functioning. As noted in Section 4.6, there are no geomorphological values of the geoconservation sites or Areas of Significant Nature Conservation Values on the site, and therefore there will be no adverse effects on such values or sites. The potential effect of the pond construction to existing vegetation is considered to be less than minor, as noted in Section 5.7.5.

Matter 3.11.11 t: the activity is not expected to adversely affect tangata whenua values (Sections 5.4 and 5.9). There are no heritage sites or known archaeological sites on or within the immediate vicinity of the site (Section 4.7), and therefore no effect on historic values is expected. The activity is considered to be consistent with the existing landscape, and any effect on aesthetic values is anticipated to be less than minor. The activity is not anticipated to have an effect on natural science values, legibility, transient values, shared and recognised values.

Matter 3.11.11 u: potential effects on amenity values are considered to be less than minor, as per Section 5.3. Existing shelter belts, and the proposed planting of trees will obscure visibility of the embankments from the four properties (refer to Table 1) in close proximity to the pond. These four properties may have a minor effect in terms of visual impact, however signed approvals have been obtained as noted in Section 7.2.1. The activity is not anticipated to have an effect on riparian areas. It is noted that in the unlikely event of a dam break, the potential areas flooded, as per the flood inundation maps produced by Damwatch Engineering, does not reach the riparian area associated with the Rakaia River (Section 5.2.4).

Matter 3.11.11 v: as noted above, there are no Areas of Significant Nature Values within the site. No adverse effects on natural conservation values are anticipated. Similarly, any potential effect on the existing landscape (Section 5.3) and Takata Whenua values (Sections 5.4 and 5.9) is considered to be less than

minor. The activity is not expected to have an effect on riparian areas, or the public's access to and enjoyment of riparian areas.

8.8.2 Section 11: Noise

Section 11 of the District Plan relates to noise. Objective 11.1 aims to minimise the potential for conflict between noise emissions from land use activities and other more sensitive land users. Policy 11.1A requires setting noise limits to adequately protect community health and welfare, and 11.1B to avoid or mitigate effect of noise on residential uses, by ensuring activities comply with the appropriate standard. During construction of the ponds, there may be some limited, temporary effects with respect to noise and vibration. As discussed in Section 5.3, any potential effect from construction noise will be temporary and expected to be minor. Moreover, construction noise will comply with NZS 6803:1999 Acoustics – Construction Noise.

8.8.3 Section 14: Utilities

Section 14 of the District Plan relates to utilities. The proposed storage pond will be a part of BCIL's system for the conveyance of water, and therefore the pond and associated pipes/channels can be considered a utility. Further clarification is offered by Rule 14.7.1 which classifies the operation, maintenance, refurbishment, upgrade, and enhancement of irrigation and stock water systems, open drains and channels, water reservoirs, storage ponds and related facilities/structures as a permitted activity. As such, the proposed storage pond is considered a utility under the District Plan.

Objective 14.1 aims to provide for the construction, installation, operating, upgrading and maintenance of utilities whilst avoiding, remedying or mitigating adverse effects on amenity and the surrounding environment. Policy 14.1A requires that adverse environmental effects from the construction, installation, operating and maintenance of utilities avoids, remedies or mitigates adverse environmental effects. Section 5.0 of this report provides an assessment of effects on the environment and discusses measures to minimise any adverse effects. By carrying out activities in accordance with the recommended mitigation measures and proposed consent conditions, Policy 14.1A is satisfied.

Policy 14.1.C relates to ensuring the health and safety of the community during construction and utilisation of utilities. The proposed pond is on private property, and the existing farm fencing will be kept in place around the site boundary during construction. Should there be any deep excavations during construction, the Contractor has indicated temporary fencing will be installed around any such excavations when the site is unattended. Upon completion of the pond, a permanent deer type fence will be installed around the outside perimeter of the pond.

Policy 14.1E seeks to encourage utility operators to adopt monitoring system to ensure the effects of utilities and their operation are regularly evaluated to avoid, remedy or mitigate adverse effects. As described in Sections 5.12.1 and 5.12.2, an operations manual will be completed by BCIL which will outline maintenance and inspection requirements.

Objective 14.2 is to maintain and protect the economic and social wellbeing of communities through the establishment, use and maintenance of utilities, and associated Policy 14.2B seeks to recognise the need for new utilities and account for the strategic needs of a utility and its benefits/costs to the community when considering alternative locations or sites and the appearance of a utility. In this case the proposed utility will have significant benefits to the community and is sited and designed appropriately so as not to be inconsistent with this objective and policy.

Objective 14.5 relates to rural water and the ongoing operation, maintenance and upgrade of rural irrigation and stock water systems. Policy 14.5A requires the recognition and provision for the continuing efficient use and development of irrigation, including associated water storage facility, and stock water systems. The purpose of the proposed storage pond will be to improve the operation efficiency and reliability of BCIL's water supply to its shareholders/irrigators. Therefore the proposed storage pond is in-line with this policy.

Assessment matters for utilities are outlined in Section 14.9 of the District Plan. These have been considered in the preparation of this AEE as follows:

8.8.3.1 Section 14.9 Assessment Matters

Section 14.9 outlines the assessment matters with respect to utilities.

Matter 14.9 a: As per Section 5.3, the pond is not expected to lead to the loss or adverse effects on views of outstanding landscapes, or the public's access to these views or viewpoints. Pudding Hill and Mt Hutt are located over 10 km north-west of the site, and views of the mountain may be obscured at Barkers Road but only in the immediate vicinity of the pond, therefore this effect is considered to be less than minor. No adverse effect is expected with respect to vegetation patterns (Section 5.7.5), the openness and spaciousness of the landscape or apparent naturalness of the landscape (Section 5.3), historic heritage (Section 5.2.5), or the use and enjoyment of areas of public open space (Section 5.3).

Matter 14.9 b: The visual effect of the pond embankments is considered in Section 5.3; existing shelter belts, and the proposed planting of trees will obscure visibility of the embankments from the four properties in close proximity to the pond. These four properties may have a minor effect in terms of visual impact, however signed approvals have been obtained as noted in Section 7.2.1.

Matter 14.9 c, d, e addresses the effect from having reduced setbacks and landscaping. As discussed below in Section 8.8.3.2, the activity will comply with the Site Standards and therefore this matter is not relevant.

Matter 14.9 f requires consideration of alternative locations. The operational effectiveness of the proposed reservoir is only achievable in a limited area adjacent to a specific segment of the RDR. Several sites were initially chosen for consideration. These included one site close to the town of Methven and one adjacent to the Rakaia River and above the Highbank power station. The alternative sites posed more risk in the unlikely event of a dam breach. To be operationally effective the reservoir also needs to be in close proximity to existing delivery pipelines operated by the BCI Scheme.

Other key factors under consideration include a landowner's willingness to providing access to their property for the reservoir, and a high level assessment of potential environmental effects.

Ultimately the site and design concept subject to the current application was selected. Although many factors contributed to this decision, the overriding influences were that it offered the best solution in terms of accessing suitable property for the reservoir, and had the least risk to life and property from a hypothetical dam-break flood. Secondary influences included:

- ✧ The site is not located in an existing watercourse or wetlands (no flooding or ecological issues); and
- ✧ Embankment volumes and heights are manageable in terms of their costs.

Matter 14.9 g requires consideration of any additional costs imposed by requiring compliance with any performance standard listed. The preliminary design for the storage pond has been undertaken by Damwatch Engineering in accordance with NZSOLD Dam Safety Guidelines, and the Contractor has confirmed that construction noise will be able to comply with NZS 6803:1999 Acoustics – Construction Noise (as required by Section 11 of the District Plan). It is not considered that additional costs have been imposed by requiring compliance with performance standards.

Matter 14.9 h: positive benefits to the community are considered in Section 5.1 of the AEE. With respect to health and safety, the main consideration is with respect to a potential dam break. This is addressed in Section 5.2 of the AEE.

Matter 14.9 i: consideration has been given to Ngai Tahu values, and an assessment of Iwi Management Plans (Section 8.9) has been undertaken. It is considered that adverse effects to Ngai Tahu values both during and post construction (Sections 5.4 and 5.9). Consultation with Te Runanga o Arowhenua will also been undertaken, as noted in Section 7.1.

Matter 14.9 j: alternative locations for the pond were considered, as noted above under Matter 14.9 f. With respect to the proposed location, the pond will essentially take up the entire (subdivided) land parcel footprint. Therefore, it is considered that there isn't the potential for co-siting utility facilities, however it is noted the proposed pond will tie into the existing Barrhill Chertsey Scheme by conveying water to the BCI Methven Line.

Matter 14.9 k address glare. The pond is not expected to cause any glare, and therefore this matter is not relevant to the application.

Matter 14.9 l relates to the construction of coastal or river protection works, and therefore is not relevant.

Matter 14.9 m address the extent to which the utility provides a benefit in relation to renewable energy generation. The pond will be used to distribute water to shareholders and irrigators, not for energy generation, and as such this matter is not applicable.

Matter 14.9 n: it is not considered that there are any operational or technological requirements that may dictate the location or scale or form of development that is relevant to the consideration of the proposed utility.

Matter 14.9 o addresses the level of risk to the utility from flooding. This is addressed in Section 5.5 of the AEE.

Lastly, Matter 14.9 p relates to the adverse effects resulting from the proposed energy generation facility. The pond will be used for storing and distributing water, not energy generation, and as such this matter is not applicable.

8.8.3.2 Section 14 Site Standards

The applicable Section 14 Site Standards are Site Standard 14.8.3, relating to setbacks, Site Standard 14.8.5, relating to utility building scale, and Site Standard 14.8.8, relating to landscaping. These Site Standards will be complied with, with the exception of 14.8.5, as the dam embankments (classified as a building under the District Plan) will be greater than 50 m² in floor area and 3.5 m in height. For a detailed assessment of the Site Standards, please refer to Appendix D of the AEE.

8.8.4 Section 16: Hazardous Substances

Section 16 of the District Plan addresses hazardous substances. Policy 16.1C seeks to ensure hazardous substances are stored under conditions to reduce the risk of any leaks or spills contaminating land or water. During construction, diesel will be stored in portable containers, and will only be stored in containers that have a valid test certificate under the HSNO, and at least 20 m away from

the RDR and/or any groundwater bores and will comply with the relevant Site Standard 16.7.7, described below. An accidental spill response has been included in Section 5.12.4. It is considered that the onsite storage of diesel fuel during construction is consistent with Section 16 of the Plan.

Assessment matters for hazardous substances are outlined in Section 16.8 of the District Plan. These have been considered in the preparation of this AEE, and are described below.

8.8.4.1 Section 16.8 Assessment Matters

Matter 16.8a: the proposed activity will involve the storage of 12,000 L of diesel on site during construction (via a fuel tank truck). The risk to the environment is considered to be low and in-line with Section 16 of the Plan. Diesel will not be stored within 20 m of a surface waterbody (i.e. the RDR), nor within 20 m of any groundwater bores. Similarly, diesel will not be stored near any exposed groundwater. In accordance with Site Standard 16.7.7, no storage will occur within 20 m of any boundary with a site containing a sensitive activity, and therefore there is not considered to be any risk to adjacent properties. Diesel will only be stored in containers that have a valid test certificate under the HSNO. Should a spill occur, the Contractor will be equipped with onsite spill kits and ensure all of its staff are trained on its use, and will take all practical measures to minimise any risk of spills, as per the accidental spill response (Section 5.12.4 of the AEE). The risk to site workers during construction is considered to be very low. The existing ground elevation slopes to the south-east, and there is no stormwater network in proximity to the site. Therefore, the activity will not pose a risk to the stormwater network/offsite infrastructure in the unlikely event of a spill.

Matter 16.8 b: risks of flooding and other natural hazards are considered in Section 5.5 of the AEE. Mitigation measures, including measures during the construction and operation of the pond, and an accidental spill response, are addressed in Section 5.12.

Matter 16c and d: it is not considered that the storage of diesel during construction presents any undue risk. The storage will comply with Site Standard 16.7.7, and in particular no storage will occur within 20 m of a watercourse. It is very unlikely that the storage of diesel during construction will result in any significant adverse effect on the environment. An accidental spill response is included in Section 5.12.

Matter 16e: Site entry and exit points will be confirmed when the detailed design and detailed construction methodology are undertaken. Traffic to and from the site will be managed to avoid heavy traffic volumes in local roads.

Matter 16f: as noted above, the storage of diesel during construction is not considered to pose any undue risk. An accidental spill response has been prepared for the unlikely event of a spill.

Matter 16g: this assessment matter relates to the extent to which an existing facility will decrease the risk associated with the current storage/use of hazardous substances, and is not relevant to the application.

8.8.4.2 Section 16 Site Standard 16.7.7

The relevant Site Standard is 16.7.7 (Storage and loading/unloading areas). As detailed in Appendix D of the AEE, Site Standard 16.7.7 will be complied with.

8.9 Iwi Management Plans

A desk-top initial review of the ECan GIS database indicates that there are no Silent Files or Treaty Settlement Areas within the project boundaries. There are three relevant Iwi Management Plans to consider when assessing the potential physical effect on Ngāi Tahu values from the proposed activities. The plans are:

- ✧ Ngāi Tahu Hazardous Substances and New Organisms Policy Statement 2008;
- ✧ Te Runanga o Ngāi Tahu Freshwater Policy;
- ✧ Te Whakatau Kaupapa - Resource Management Strategy for Canterbury;
- ✧ Iwi Management Plan of Kati Huirapa for the Area Rakaia to Waitaki (July 1992); and
- ✧ Mahaanui Iwi Management Plan 2013.

8.9.1 Ngāi Tahu Hazardous Substances and New Organisms Policy Statement 2008

The Ngāi Tahu Hazardous Substances and New Organisms Policy Statement 2008 was developed to set out Ngāi Tahu perspectives on the risks of using and introducing hazardous substances and new organisms in or onto New Zealand. Its aim was to provide guidance to Ngāi Tahu whanau, Environmental Risk Management Authority (ERMA), now part of the Environmental Protection Authority (EPA), and ERMA applicants, to evaluate the issues of importance to Ngāi Tahu. Additionally, the document may be used by others to identify potential areas of concern to Ngāi Tahu.

Section 3.1 of the statement notes that one of the significant issues to Ngāi Tahu relates to the pollution of the natural environment, the potential effects on native species, and the risk to human health resulting from the import, manufacture, containment or release of hazardous substances. Policies contained within Section 3.1 seek to address these issues.

As per the PSI, farm waste was historically deposited in two locations within the footprint of the proposed storage pond. An Accidental Discovery Protocol has been prepared to ensure any waste materials, encountered during excavation works, are appropriately dealt with. While unlikely, there is the potential risk of accidental spills (hydrocarbons) during the construction works. Management measure will be put in place to reduce this risk. Should a spill occur, the contractor will be equipped with onsite spill kits and ensure all of its staff are trained on its use, and will take all practical measures to minimise any risk of spills. Therefore, the proposed works are not inconsistent with the policies contained in the Ngāi Tahu Hazardous Substances and New Organisms Policy Statement 2008.

8.9.2 Ngāi Tahu's Freshwater Policy Statement

The Te Runanga o Ngāi Tahu Freshwater Policy outlines the environmental outcomes sought by Ngāi Tahu with respect to the freshwater resources. The Freshwater Policy recognises that irrigation activities may result in potential adverse effects on the freshwater resources considered essential to the iwi. This policy encourages making more efficient use of water resources, e.g. water harvesting. The overall purpose of the Akarana storage ponds is to store water for irrigation. While these applications are not seeking to take additional water, it can be seen that the storage pond concept encourages more efficient use of the water resources.

The Freshwater Policy also identifies the importance of protecting the water quality arising from point source and non-point source discharges. The constructions works, and future maintenance activities, will be carried out in a manner to avoid adversely affecting the water quality of surface water or groundwater.

8.9.3 Te Whakatau Kaupapa - Resource Management Strategy for Canterbury

Te Whakatau Kaupapa - Resource Management Strategy for Canterbury was first published in 1990 to assist planners, resource managers and politicians at regional and district levels, and provides a statement of Ngai Tahu beliefs and values.

Section 4 of the document contains Ngai Tahu objectives and policy statements. The General Water Policy Statement of Te Whakatau Kaupapa identifies the maintenance of water quality and quantity as a key resource management issue to Ngai Tahu. Furthermore, Ngai Tahu resource management is primarily focused on the ethic of sustainability and the long-term welfare of the environment and the people within the environment.

Policy 1 of the General Water Policy Statement specifies that no discharge to any waterbody should be permitted if that discharge will result in contamination of

the receiving water. During construction, construction-phase stormwater has the potential to entrain sediment, however this water will be discharged to land. Infiltration through the underlying soils will remove entrained sediments. As noted in Section 5.7.1, farm waste was historically deposited at two discrete locations within the pond footprint area. No dewatering will occur until any encountered waste materials have been appropriately characterised and dealt with, in accordance with the Accidental Discovery Protocol prepared for the site. Any potential adverse effect on groundwater quality from site-dewatering and construction stormwater is expected to be less than minor.

Policy 9 actively encourages the storage of excess water, for example via wetlands and dams. The proposed activity will result in the construction of a storage pond, which will store up to 1.6 million m³ water. The activity is therefore considered to be consistent with this Policy.

As per the assessment of environmental effects presented in Section 5.0, potential adverse effects from the activity are considered to be less than minor when undertaken in accordance with this document and proposed mitigation measures and consent conditions, and the activity will bring water security and economic benefits to the local community. Therefore, the activity is considered to be consistent with the intent of Te Whakatau Kaupapa - Resource Management Strategy for Canterbury.

8.9.4 Iwi Management Plan of Kati Huirapa for the Area Rakaia to Waitaki (July 1992)

The Iwi Management Plan of Kati Huirapa was released in July 1992, which is applicable to area between the Waitaki and Rakaia Rivers.

The Plan aims to clean up all rivers, lakes, waterways and coastal waters, with high water quality and no discharges of waste to water. The proposed activity will not involve the discharge of waste to water, and as outlined in the AEE, any potential adverse effect on water quality during construction and operation of the pond is expected to be less than minor.

The Plan seeks to restore the life supporting capacity of all natural waters and waterways, and in reference to abstractions, dams and diversions of water, seeks to return all water to the rivers. While the pond will temporarily store water as part of the BCIL irrigation distribution system, the reader is reminded that the take and use of that water does not form part of this application.

A further objective of the Plan is to cease all discharges of harmful contaminants into the air which threaten the life support capacity of air. During construction, there is the potential for dust to be emitted, however this temporary risk will be minimised by implementing erosion and sediment control and dust suppressing measures.

Furthermore, the Plan states that the use, storage and transport of hazardous substances be controlled to ensure they do not cause damage to the environment, nor put people at risk from contamination. During construction, diesel will be stored in portable containers, and will only be stored in containers that are that have a valid test certificate under the HSNO, and at least 20 m away from the RDR and/or any groundwater bores. An accidental spill response has been included in Section 5.12.4.

The Plan also indicates that should any bones or artefacts be encountered during ground disturbance activities, the runanga be contacted. An Archeological Accidental Discovery Protocol has been included in the proposed consent conditions, which requires contacting the local Runanga upon discovery.

8.9.5 Mahaanui Iwi Management Plan 2013

The Mahaanui Iwi Management Plan was released in 2013, and is a planning document reflecting the collective efforts of six Papatipu Rūnanga, and provides a statement of Ngāi Tahu objectives, issues and policies for the management of natural resources and environment for many areas within Canterbury. The Mahaanui Iwi Management Plan's purpose is to provide tāngata whenua a tool to express kaitiakitanga and protect taonga.

8.9.5.1 Damming and the Use of Land for Storage

At the outset, it should be recognised that Mahaanui Iwi Management Plan conceptually supports the storage of water through local and regional infrastructure development. Chapter 5.3 Wai Maori identifies the need for a robust cultural frame work to assess regional water infrastructure proposals, based on sound cultural and environmental bottom lines.

Policy WM9.3 supports in principle the storage of water through local and regional infrastructure development subject to (f) there is a robust and critical assessment of effects on Ngāi Tahu values. Policy WM9.4 seeks to critically evaluate the cultural implications of any damming or water storage proposals that may have an adverse effect on resources and values of importance to Tangata Whenua, with particular regard to: the effects of increased water availability and subsequent land use changes (d), measures to avoid non-point source pollution (e) and the cultural imperative to leave the natural environment in a better state for future generations (j). The storage pond increases the reliability of supply to the BCIL shareholders, and the current water take and use consent imposes conditions which avoid or mitigate adverse effects arising from the use of water.

Policy WM9.5 aims to critically evaluate the potential for damming, diversion or water storage proposals to have positive effects on Ngāi Tahu values, with particular regard to: increase controls and consistence for land use activities benefiting from infrastructure (c). The storage pond provides water to BCIL

shareholders, who must operate in accordance with specific farm management measures as specific by current consent CRC162882 (use of land for farming activities).

Policy WM9.6 is to ensure that the effects of any proposed water infrastructure scheme are assessed with reference to the objectives for ecological and cultural health of waterways rather than the degraded state of the resource.

Policy WM9.7 requires that any proposed regional water infrastructure includes provisions to remedy unanticipated effects on the environment (e.g. dam failure). The infrastructure has been designed in accordance to the requirements for the medium PIC classification. Management plans will be developed and implemented to ensure that the structure continues to be safe and suitable for purpose.

Chapter 6.12 Rakaia ki Hakatere provides specific policies for areas located between the Rakaia and Ashburton rivers. This chapter recognises the issues of over-allocation in surface water and groundwater catchments, and it is noted that the damming of water for storage will increase the reliability during time of water restrictions.

8.9.5.2 Construction Activities

Chapter 5.2 (Ranginui) provides objectives and policies pertaining to air. Issue R1 notes that the discharge of contaminants into air can have adverse effects on Ngāi Tahu values such as mauri, mahinga kai, wāhi tapu, wāhi taonga and marae. During construction, there is the potential for fugitive dust to be discharged to air. However, this will be of a temporary nature, and erosion and sediment control measures will be in place to limit the potential for fugitive dust. During construction, refuelling may occur onsite and a stationary screening plant will be used, however any potential discharge to air from these activities is not expected to be noxious, dangerous, offensive or objectionable so as to have an adverse effect on the environment not cultural values. No adverse effects are anticipated on Ngāi Tahu values, and as such the activity meets Policy R1.1

Policy R1.2 requires that Regional Councils recognise and provide for the relationship of Ngāi Tahu with air and the specific cultural considerations for air quality. The potential impacts on Ngāi Tahu values are described herein, and therefore recognises that Ngāi Tahu have an interest in the potential impacts arising from the proposed activities.

Chapter 5.3 (Wai Māori) outlines the policies and objectives in relation to the management of water. Issue WM1 states that tāngata whenua have specific rights and interests associated with freshwater, and Policy WM1.4 requires local authorities to recognise the longstanding relationship of tāngata whenua to freshwater, and that this relationship is fundamental to the culture and cultural well-being of Ngāi Tahu. The potential impacts on Ngāi Tahu values are

described herein, and therefore recognises that tāngata whenua have an interest in the potential impacts arising from the proposed activities.

Issue WM6 addresses the decline in water quality, for example resulting from direct discharges of contaminants to water. Policy WM6.1 requires the improvement of water quality to be recognised as a matter of regional and immediate importance, and Policy WM6.2 requires water quality to be of a standard that ensures that the relation of Ngāi Tahu to freshwater is protected and provided for, including that of the eco-cultural system.

Policy WM6.8 continues to oppose the discharge of contaminants to water, as well as to land where contaminants may enter the water. Construction-phase stormwater will be discharged to land, as will water from site dewatering. The main potential contaminant is suspended sediment, however any adverse effect is expected to be minor. An Accidental Discovery Protocol (ADP) has been prepared in the event of encountering waste materials during excavations. Site-dewatering shall not occur until any such materials have appropriately been dealt with as per the ADP. Therefore, the proposed activity is in-line with Policy WM6.8.

Policy WM6.11 specifies that discharge to land activities must be subject to appropriate consent conditions to protect ground and surface water. With the mitigation measures and consent conditions proposed in this application, any potential effects on ground or surface water are expected to be minimal.

Policy WM6.16 requires that all potential contaminants that may enter water are managed on site and at source rather than discharged off site. The proposed works aim to limit the migration of contaminants (sediments) off site. Sediment and erosion control measures will be in place to minimise the potential for the runoff of sediment laden water during construction, and the ADP has been prepared to suitably manage any potential waste materials encountered during excavations.

Policy WM8.6 requires that aquifers are recognised and protected as wāhi taonga, and includes the protection of groundwater quality and quantity from shallow aquifers. Given the expected depths to groundwater described in Section 4.3.1, site-dewatering may be required. Site-dewatering would only be required temporarily so long as to allow construction to be completed. Once operational, some seepage from the base of the pond is expected, however this will be reduced through the use of a compacted loess/silt layer at the pond invert. Therefore, any potential effects on groundwater are expected to be minor, and the activity is considered to be in-line with Policy WM8.6.

Chapter 5.4 (Papatūānuku) outlines the objectives and policies relating to land use and development activities. The land (Papatūānuku) sustains the people, and the people must ensure their activities do not compromise the environment's capacity to support life.

Policy P6.1 requires onsite solutions for stormwater management, and aims to reduce contaminant loadings. Policy P6.2 opposes the use of existing natural waterways for the treatment and discharge of stormwater. As discussed previously in this report, stormwater will be discharged to land onsite, and sediment and erosion control measures will be in place to limit the movement of sediments in runoff.

Policy P11.1 requires proposals for earthworks to be assessed and managed in relation to potential effects on waterways, wāhi tapu and wāhi taonga, and erosion and sediment control. As described previously, erosion and sediment control measures will be in place to minimise the risk of sediment-entrained runoff.

This policy also seeks to ensure that site works are managed to avoid damaging or destroying sites of significance. An accidental discovery protocol condition has been proposed to ensure that the appropriate process is undertaken in the event of the discovery of significant archaeological or heritage items.

Chapter 6.12 Rakaia ki Hakatere provides specific policies for areas located between the Rakaia and Ashburton rivers. Policy RH5.1 recognises the importance of requiring effective controls to regulate the discharge to land activities associated agricultural activities. This policy is intended to address risk associated with farming (i.e. nutrients), which BCIL already hold a current consent CRC162882. That said, the discharges associated with the construction of the storage pond will be undertaken in a manner to avoid adverse effects to groundwater quality.

8.10 Canterbury Water Management Strategy (CWMS)

On 12 April 2010, the Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 went into effect. Section 63 of this Act directs Environment Canterbury to have particular regard to the visions and the principles of the Canterbury Water Management Strategy (CWMS) when considering any proposed regional policy statement or plan.

The CWMS was notified in November 2009 and was developed to help manage Canterbury's water resources, as they are deemed vitally important to the region and to the nation. Lakes, rivers, streams and aquifers are used for hydro electricity generation, agricultural production and drinking water, as well as for a range of customary and recreational uses. The desired outcome of the CWMS is:

"To enable present and future generations to gain the greatest social, economic, recreational and cultural benefit from our water resources within an environmentally sustainable framework."

This vision includes the outcome that water users will have reliable access to water. Irrigation and water use efficiency were identified as fundamental

principles of the CWMS, and water storage and related infrastructure were identified as targets to achieving reliable access to water. As suitable water storage sites are limited, the strategy recommends that District Councils work alongside Environment Canterbury to identify possible sites.

BCIL has identified the Akarana storage pond as a suitable site for storing water. The Akarana storage pond align with the principles and the vision of the CWMS by increasing the potential for economic benefit to present and future generations through increased water reliability for irrigation. There are significant social benefits associated with the Akarana storage pond related to the improved reliability of water for irrigation when access to river water is restricted.

9.0 Part II Purpose and Principles

9.1 Purpose of the Act – Section 5

The purpose of the Act is to “promote the sustainable management of natural and physical resources”. Section 5.0 of this report provides an assessment of environmental effects for the damming of water and use of land for storage, and potential effects associated with the construction of the storage pond.

The damming of water for storage enables increase reliability of supply during time of water restriction.

While there are potential consequences arising from a dam failure, the risk of such a failure is low when the dam is constructed, maintained and operated in accordance with the NZSOLD criteria for a medium PIC dam. It is on this basis that the damming of water for the use of storage represents the sustainable management of resources.

The assessment of effects also concludes that when carried out in accordance with the recommended mitigation measures and proposed consent conditions, the effects on the environment, namely groundwater, land and air from the construction and use of the storage pond, are temporary and minor.

9.2 Matters of National Importance – Section 6

Section 6 outlines matters of national importance that are to be recognised and provided for in achieving the purpose of the Act. These matters of national importance are:

- (a) the preservation of the natural character of the coastal environment, wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development;*
- (b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use and development;*

- (c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;*
- (d) the maintenance and enhancement of public access to and along coastal marine areas, lakes and rivers;*
- (e) the relationship of Maori, their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga;*
- (f) the protection of historic heritage from inappropriate subdivision, use and development;*
- (g) the protection of protected customary rights.*

It is considered that no matters of national importance are compromised by this proposal.

9.3 Other Matters – Section 7

Section 7 of the Act sets out those matters that have particular regard attributed to them in achieving the purpose of the Act. Those matters are as follows:

- (a) Kaitiakitanga;*
- (aa) The ethic of stewardship;*
- (b) The efficient use and development of natural and physical resources;*
- (ba) The efficiency of the end use of energy;*
- (c) The maintenance and enhancement of amenity values;*
- (d) Intrinsic values of ecosystems;*
- (e) [Repealed];*
- (f) Maintenance and enhancement of the quality of the environment;*
- (g) Any finite characteristics of natural and physical resources;*
- (h) The protection of the habitat of trout and salmon;*
- (i) The effects of climate change;*
- (j) The benefits to be derived from the use and development of renewable energy.*

Relevant to this proposal are (b), (c), (d), (f) and (g). With the assessment of environmental effects and the mitigation measures proposed herein, it is considered that these issues have been adequately taken into account.

9.4 The Principles of the Treaty of Waitangi

The Act states in Section 8 that:

“In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection

of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)."

The Court of Appeal has identified four principles, which form the basis of developing a relationship of partnership and communication. These are the Essential Bargain, Tribal Self-Regulation, The Treaty Relationship, and Active Protection. The third principle, the Treaty Relationship, accords Maori with special status as a Treaty Partner, distinct and separate from status as an 'affected party'. This application will be reviewed by the ECan Iwi Liaison officer prior to any decision on the application being made. In addition, consideration has been given to the relevant Iwi Management Plans and has been included as part of this application.

It is considered that the granting of this application will not compromise the principles contained of the Treaty.

10.0 Proposed Consent Conditions

10.1 CRC16XXXX (Land Use)

Barrhill Chertsey Irrigation Limited seek resource consent to use land for the earthworks associated with the construction, maintenance and use of a large storage pond and the associated infrastructure, subject to the following consent conditions:

DEFINITIONS

For the purposes of this consent, the following terms are defined:

- ✧ Bulk earthworks: the excavation of and filling of subsoils, engineering fills and topsoils during the construction of the storage pond, and any associated stockpiling.
- ✧ Construction-phase stormwater: surface runoff generated from rainfall on the site during the construction of the storage pond.
- ✧ Dam: the proposed Akarana Storage pond located on the piece of land as shown on Plan CRC16XXXXA
- ✧ Erosion and sediment control measures: measures undertaken to prevent or minimise the potential for uncontrolled movement of sediment off the storage pond site during the construction-phase of the project.

SCOPE

1. All activities authorised by this consent shall be undertaken in general accordance with the information contained in the Application, the Assessment of Environmental Effects (BCIL Akarana Storage Pond Consenting), and all supporting technical documents and plans as

provided to the Canterbury Regional Council, except where inconsistent with these conditions.

LIMITS

2. The works shall be limited to the use of land to:
 - a. Excavate material; and
 - b. Deposit material; and
 - c. Use land for the storage of water.
3. For the purposes of the construction, use and maintenance of the storage pond and associated infrastructure shall occur on in parcel Lot 6, DP 1996, located at 577 Barkers Road, at or about map reference Topo BX21:9408-7217, as shown on Plan CRC16XXXXA, which forms part of this consent.

DESIGN

4. Construction works shall be undertaken in general accordance with the preliminary design provided in the application, and any amendments to that design as required by any necessary building consents.

PRE-CONSTRUCTION

5. Prior to construction commencing, a copy of this resource consent shall be given to all persons involved in the construction of the dam.
6. The Consent Holder shall be responsible for all the contracted operations relating to the exercise of this consent and shall ensure that all personnel working on the site are aware of the consent conditions, have access to the contents of this consent document and shall ensure compliance with consent conditions.
7. Prior to commencement of works the Consent Holder or their agent shall arrange and conduct a pre-construction site meeting between the Canterbury Regional Council and all relevant parties, including the primary contractor. At a minimum, the following shall be covered at the meeting:
 - a. Scheduling and staging of the works;
 - b. Responsibilities of all relevant parties;
 - c. Contact details for all relevant parties;
 - d. Expectations regarding communication between all relevant parties;
 - e. Procedures for implementing any amendments;

- f. Site inspection; and
 - g. Confirmation that all relevant parties have copies of the contents of this consent document and all associated erosion and sediment control plans and methodology.
8. Erosion and sediment control measures recommended in the Erosion and Sediment Control Plan prepared as part of Condition 9 shall be installed before any excavation occurs onsite. The small bund described in Condition 10 shall also be installed before any excavation occurs onsite.

EROSION AND SEDIMENT CONTROL

9. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP).
- a. No less than one month before the commencement of the earthworks, a copy of the ESCP shall be submitted to the Canterbury Regional Council: RMA Compliance and Enforcement Manager for review and certification. All activities authorised by this consent must be carried out in accordance with the ESCP.

Unless Canterbury Regional Council provides notice in writing that it is unable to certify the ESCP, the ESCP is deemed to be certified within one month of it having been provided to the Canterbury Regional Council.

For this purposes of this condition, "Certification" means that the ESCP contains all the information specified in Condition 8 (b).

- b. The ESCP shall include, but not be limited to the following:
 - i. A site drainage plan;
 - ii. Construction/design plan, including any excavation and compaction requirements;
 - iii. An implementation schedule detailing the anticipated time of stages associated with the construction works; including:
 - 1. Site preparation works;
 - 2. Any equipment or plant mobilisation necessary for carrying out the construction works;
 - 3. Works staging, and any field verification requirements

- iv. Measures to avoid or minimise any sediment entering exposed groundwater, Rangitata Diversion Race or being tracked onto roadways, or onto neighbouring properties;
 - v. Details of inspection of site management measures, and any maintenance necessary to ensure that measures are performing effectively.
 - vi. Identification of persons responsible for carrying out the actions within the ESCP.
- c. Any amendments or revisions to the ESCP must be submitted to Canterbury Regional Council.
10. During construction, all practicable measures shall be undertaken to minimise discharges of sediment-laden runoff or exposed groundwater, including the construction of a small bund along the pond construction site and the boundary of the property located at 465 Barkers Road (lot 1 DP10024).

PLANTING

11. Douglas fir trees will be planted along the southwestern boundary of the site to obscure the visibility of the pond from this direction, as shown on Plan CRC16XXXXA, which forms part of this consent.

ACCIDENTAL RELEASES OR SPILLS

12. All practicable measures shall be undertaken to avoid spills of fuel or any other hazardous substances within the site. In the event of a spill of fuel or any other hazardous substance:
- a. In the event of a spill of fuel or any other hazardous substance, the consent holder shall clean up the spill as soon as practicable; invoke measures, where practicable, to ensure the spill does not enter the timber lined drain; and take measures to prevent a re-occurrence.
 - b. The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours of a spill event, and shall provide the following information:
 - i. the date, time location and estimated volume of spill;
 - ii. the cause of the spill;
 - iii. the type of hazardous substance(s) spilled;
 - iv. clean-up procedures undertaken;

- v. details of steps taken to control and remediate the effects of the spill on the receiving environment;
- vi. an assessment of any potential effect of the spill; and
- vii. measures to be undertaken to prevent a re-occurrence.

ARCHEOLOGICAL ACCIDENTAL DISCOVERY PROTOCOL

13. In the event of disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), the BCIL/Contractor, shall immediately:
- a. Advise the Ashburton District Council of the disturbance;
 - b. Advise the Upoko Runanga of Arowhenua, or their representative, of the disturbance;
 - c. Cease earthworks operations in the affected area until the area containing the Koiwa Tangata or taonga has been clearly demarcated, and the Kaumautua and archaeologists have certified that it is appropriate for earthworks to recommence.

ACCIDENTAL DISCOVERY PROTOCOL FOR ENCOUNTERING WASTE MATERIALS/CONTAMINATED SOILS

14. In the event of encountering visual or olfactory indicators of waste materials and/or soil contamination the following actions shall be undertaken:
- a. All works in the potentially affected area shall cease immediately and the site supervisor contacted. In the unlikely event of an uncontrolled discharge of contaminants (i.e. inadvertent rupturing/dislodgement of containers or drums that may be present containing liquid), all practical steps shall be taken to contain the discharge and prevent further discharge, whilst avoiding any contact with the discharging substance;
 - b. The area of concern shall be isolated (e.g. fenced or barricaded) to prevent other site workers from entering the area;
 - c. Personnel shall not enter excavations or subsurface confined spaces where possible toxic or hazardous atmospheric zones may be present without approval/permission by a person qualified to issue permits (note that decaying carcasses may generate toxic gases); and
 - d. An appropriate qualified trained contaminated land specialist shall be contacted immediately to determine the appropriate course of action in relation to environmental and human health requirements and any need to characterise the waste

materials/soils or conduct soil sampling for determining the appropriate disposal requirements.

ADMINISTRATION

15. The lapsing date for the purposes of Section 125 of the RMA 1991 shall be [5 years from the date consent is issued].
16. The Canterbury Regional Council may, once per year, on any of the last five working days of November, serve notice of its intention to review the conditions of this consent for the purposes or:
 - a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent; or
 - b. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.
17. The duration of this consent shall be 35 years.

10.2 CRC16YYYY (Damming)

Barrhill Chertsey Irrigation Limited seek resource consent to dam up to 1.6 million m³ of water and to use land to store water, subject to the following consent conditions:

LIMITS

1. Water shall be diverted from the Rangitata Diversion Race on parcel Lot 6, DP 1996 at or about map reference Topo BX21:9356-7229, and dammed only on in parcel Lot 6, DP 1996, located at 577 Barkers Road, at or about map reference Topo BX21:9408-7217, as shown on Plan CRC16YYYYA, which forms part of this consent.
2. The dammed water shall only be water authorised by the take and use consents, and limited runoff from the pond embankments and rainfall over the pond.

DESIGN

3. The maximum volume of water damming within the pond during normal operation at any one time shall not exceed 1.6 million cubic metres. The maximum dam embankment height, as measured from the dam crest to the lowest elevation at the outside limit of the dam shall not exceed 10 metres.
4. The dam crest level shall not exceed 339.0 m RL.
5. The consent holder shall ensure that the freeboard in the dam is a minimum of 1.5 metres.

6. The dam shall have a spillway, with a crest level set to 0.5 m above the normal operating level. The capacity of the spillway shall be greater than the inflow capacity of the dam.

CONSTRUCTION

7. No less than one week before the commencement of construction under CRC16XXXX (Land Use Consent), a copy of this resource consent shall be given to all persons involved in the construction of the dam.
8. A construction report for the dam shall be prepared by the person responsible for the design of the dam and the person responsible for the construction of the dam, and a copy of which shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of the completion of construction of the dam.
9. On completion of the dam, and before first filling, the person responsible for the design of the dam and the person responsible for the construction of the dam, shall certify the dam as safe and ready for operation. A copy of the certification document shall be forwarded to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager.
10. For the dam:
 - a. The person responsible for the design of the dam and the person responsible for the construction of the dam shall be present during first filling and shall record any faults observed.
 - b. The consent holder shall immediately remedy any faults recorded during first filling.
 - c. A report shall be prepared detailing any faults observed and the remedial action taken, a copy of which shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of first filling.
11. The dam shall have a HDPE geomembrane lining on the inside embankment slopes, extended 30 m into the invert of the dam.
12. The dam invert will be lined with a minimum of 1.0 m of compressed loess/silts.
13. Any imported materials for the pond invert lining shall be clean, engineered materials.
14. The crest and outside embankment slopes shall be sown with grass within one month of the completion of the dam, if completed during period September through April. Should construction of the dam be

completed outside of this period, the embankments will be stabilised with suitable matting (or equivalent), and sown with grass.

OPERATION AND MAINTENANCE MANUAL (OMP)

15. Prior to the commissioning of the dam, the consent holder shall develop an Operation and Maintenance Manual (OMP).

- a. No less than 10 working days before the commissioning of the dam, a copy of the OMP shall be submitted to the Canterbury Regional Council: RMA Compliance and Enforcement Manager for review and certification. All activities authorised by this consent must be carried out in accordance with the OMP.

Unless Canterbury Regional Council provides notice in writing that it is unable to certify the OMP, the OMP is deemed to be certified within 10 working days of it having been provided to the Canterbury Regional Council.

For this purposes of this condition, "Certification" means that the OMP contains all the information specified in Condition 20 (b).

- b. The OMP shall include, but not be limited to the following:
 - i. Management of water levels;
 - ii. Maintenance requirements for storage pond and embankments;
 - iii. Criteria to determine whether repairs are required;
 - iv. Guidance and timelines in which to undertake routine inspections and maintenance; and
 - v. The OMP will based on New Zealand Dam Safety Guidelines.
- c. Any amendments or revisions to the OMP must be submitted to Canterbury Regional Council no less than 10 working days prior to implementing the amendments or revisions.

16. A copy of the OMP and this resource consent shall be given to every person involved in the operation and maintenance of the dam.

DAM SAFETY MANAGEMENT PLAN AND EMERGENCY EVACUATION PLAN

17. Prior to the commissioning of the dam, the consent holder shall develop a Dam Safety Management Plan in accordance with the most recent version of the NZSOLD New Zealand Dam Safety Guidelines.

18. The Dam Safety Management Plan shall include an Emergency Action Plan. The Emergency Action Plan shall be prepared in consultation with the Civil Defence Emergency Management Group, including the Ashburton District Council and the Canterbury Regional Council, and shall, as far as practicable, be consistent with the NZSOLD New Zealand Dam Safety Guidelines 2015, and with any Civil Defence Emergency Management Group Plan governing the Regional and District Councils pursuant to the Civil Defence Emergency Management Act 2002.

UPON FILLING OF DAM

- 19.
- a. The consent holder shall ensure that a chartered professional engineer inspects the dam within five days of first filling.
 - b. The chartered professional engineer shall record any faults or findings that could potentially lead to dam failure, and recommend the appropriate remedial works. A report of these findings and recommended remedial actions shall be prepared and a copy of which shall be provided to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of the inspection.
 - c. The consent holder shall immediately undertake any remedial works or corrective action recommended by the Engineer and notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one week of completion.

INSPECTIONS

- 20.
- a. The consent holder shall undertake routine monthly inspections and maintenance works on the dam.
 - b. The details and findings of any inspections and maintenance works shall be recorded in a logbook kept for that purpose. A copy of the logbook shall be forwarded to Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, by 30 June each year.
21. The consent holder shall ensure that the dam is inspected comprehensively by, or under the supervision of, a chartered professional engineer, yearly. A copy of the inspection report shall be forwarded to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within one month of the inspection.

22. In the event of any evidence of erosion, seepage, cracking, settlement, slipping or other embankment deformation the consent holder shall, immediately:
- a. Report the event to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager; and the Ashburton District Council (ADC), Attention: Roading and Street Services manager; and
 - b. Consult a chartered professional engineer who shall be requested to take responsibility for:
 - i. the inspection of the dam;
 - ii. the identification of remedial action required;
 - iii. the recording of the details of the inspection, reasons for the fault and remedial action required, in a report, a copy of which shall be forwarded to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, and the ADC, Attention: Roading and Street Services Manager, within one month of the inspection.
 - c. Undertake any remedial works or corrective action recommended by the engineer, and notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, and the ADC, Attention: Roading and Street Services Manager, within one week of completion.
23. In the event of dam failure, the consent holder shall immediately contact a chartered professional engineer who shall complete a report detailing the cause of failure and the action taken. A copy of this report shall be forwarded to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, and the ADC, Attention: Roading and Street Services Manager, within one month of the event.

ADMINISTRATION

24. The lapsing date for the purposes of Section 125 of the RMA 1991 shall be [5 years from the date consent is issued].
25. The Canterbury Regional Council may, once per year, on any of the last five working days of November, serve notice of its intention to review the conditions of this consent for the purposes or:
- a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent; or

- b. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.

26. The duration of this consent shall be 35 years.

10.3 CRC16ZZZZ (Discharges of Water to Land during Construction)

Barrhill Chertsey Irrigation Limited seek resource consent to discharge water and contaminants (sediment) to land during the construction of the large storage pond, subject to the following consent conditions:

SCOPE

1. All activities authorised by this consent shall be undertaken in general accordance with the information contained in the Application, the Assessment of Environmental Effects (BCIL Akarana Storage Pond Consenting), and all supporting technical documents and plans as provided to the Canterbury Regional Council, except where inconsistent with these conditions.

LIMITS

2. The discharge shall be only:
 - a. Sediment-laden stormwater during site construction; and
 - b. De-watering water during site construction.
3. The discharge described in Condition 2 shall only be from the site located only on in parcel Lot 6, DP 1996, located at 577 Barkers Road, at or about map reference Topo BX21:9408-7217, at the general location as shown on Plan CRC16ZZZZA, which forms part of this consent.
4. The Consent Holder shall be responsible for all the contracted operations relating to the exercise of this consent and shall ensure that all personnel working on the site are aware of the consent conditions, have access to the contents of this consent document and shall ensure compliance with consent conditions.
5. Prior to commencement of works the Consent Holder or their agent shall arrange and conduct a pre-construction site meeting between the Canterbury Regional Council and all relevant parties, including the primary Contractor. At a minimum, the following shall be covered at the meeting:
 - a. Scheduling and staging of the works;
 - b. Responsibilities of all relevant parties;
 - c. Contact details for all relevant parties;

- d. Expectations regarding communication between all relevant parties;
 - e. Procedures for implementing any amendments;
 - f. Site inspection; and
 - g. Confirmation that all relevant parties have copies of the contents of this consent document and all associated erosion and sediment control plans and methodology.
6. During construction, all practicable measures shall be undertaken to minimise discharges of sediment-laden runoff or exposed groundwater, including the construction of a small bund along the pond construction site and the boundary of the property located at 465 Barkers Road (lot 1 DP10024).
7. The discharge of construction site stormwater or dewatering water shall only take place during the site construction period at the above mentioned site.
8. The Consent Holder shall ensure stormwater generated on or over any re-fuelling areas and/or vehicle repair areas is managed such that stormwater entrained with oil/fuels/hazardous substances from these areas is not discharged to groundwater or surface waters without treatment. All exposed surfaces shall be stabilised once works are complete or if they are not to be worked for a period of 14 days or more.
9. Erosion and sediment control measures recommended in the Erosion and Sediment Control Plan prepared as part of Condition 10 shall be installed before any excavation occurs onsite. The small bund described in Condition 6 shall also be installed before any excavation occurs onsite.

EROSION AND SEDIMENT CONTROL

10. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP).
- a. No less than one month before the commencement of the earthworks, a copy of the ESCP shall be submitted to the Canterbury Regional Council: RMA Compliance and Enforcement Manager for review and certification. All activities authorised by this consent must be carried out in accordance with the ESCP.

Unless Canterbury Regional Council provides notice in writing that it is unable to certify the ESCP, the ESCP is deemed to be

certified within one month of it having been provided to the Canterbury Regional Council.

For this purposes of this condition, "Certification" means that the ESCP contains all the information specified in Condition 10 (b).

- b. The ESCP shall include, but not be limited to the following:
 - i. A site drainage plan;
 - ii. Construction/design plan, including any excavation and compaction requirements;
 - iii. An implementation schedule detailing the anticipated time of stages associated with the construction works; including:
 - 1. Site preparation works;
 - 2. Any equipment or plant mobilisation necessary for carrying out the construction works;
 - 3. Works staging, and any field verification requirements
 - iv. Measures to avoid or minimise any sediment entering exposed groundwater, Rangitata Diversion Race or being tracked onto roadways, or onto neighbouring properties;
 - v. Details of inspection of site management measures, and any maintenance necessary to ensure that measures are performing effectively.
 - vi. Identification of persons responsible for carrying out the actions within the ESCP.
- c. Any amendments or revisions to the ESCP must be submitted to Canterbury Regional Council.

ACCIDENTAL RELEASES OR SPILLS

- 11. All practicable measures shall be undertaken to avoid spills of fuel or any other hazardous substances within the site. In the event of a spill of fuel or any other hazardous substance:
 - a. In the event of a spill of fuel or any other hazardous substance, the consent holder shall clean up the spill as soon as practicable; invoke measures, where practicable, to ensure the spill does not enter the timber lined drain; and take measures to prevent a re-occurrence.

- b. The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours of a spill event, and shall provide the following information:
 - i. the date, time location and estimated volume of spill;
 - ii. the cause of the spill;
 - iii. the type of hazardous substance(s) spilled;
 - iv. clean-up procedures undertaken;
 - v. details of steps taken to control and remediate the effects of the spill on the receiving environment;
 - vi. an assessment of any potential effect of the spill; and
 - vii. measures to be undertaken to prevent a re-occurrence.

ACCIDENTAL DISCOVERY PROTOCOL FOR ENCOUNTERING WASTE MATERIALS/CONTAMINATED SOILS

- 12. In the event of encountering visual or olfactory indicators of waste materials and/or soil contamination the following actions shall be undertaken:
 - a. All works in the potentially affected area shall cease immediately and the site supervisor contacted. In the unlikely event of an uncontrolled discharge of contaminants (i.e. inadvertent rupturing/dislodgement of containers or drums that may be present containing liquid), all practical steps shall be taken to contain the discharge and prevent further discharge, whilst avoiding any contact with the discharging substance;
 - b. The area of concern shall be isolated (e.g. fenced or barricaded) to prevent other site workers from entering the area;
 - c. Personnel shall not enter excavations or subsurface confined spaces where possible toxic or hazardous atmospheric zones may be present without approval/permission by a person qualified to issue permits (note that decaying carcasses may generate toxic gases); and
 - d. An appropriate qualified trained contaminated land specialist shall be contacted immediately to determine the appropriate course of action in relation to environmental and human health requirements and any need to characterise the waste materials/soils or conduct soil sampling for determining the appropriate disposal requirements.

DECOMMISSIONING

13. Once construction of the site has ceased, decommissioning of sediment and erosion measures shall be undertaken.
14. Erosion and sediment control measures shall not be decommissioned until the site is stabilised and the stormwater system for the developed site is functioning.

POST CONSTRUCTION

15. The vegetation on the embankment areas or the strips adjacent to the races shall be maintained in a healthy and uniform state, with the exception of seasonal browning off. Maintenance shall include, but not be limited to:
 - a. Removal of weeds; and
 - b. Re-planting of vegetation where erosion or die-off has resulted in bare or patchy soil cover.

ADMINISTRATION

16. The lapsing date for the purposes of Section 125 of the RMA 1991 shall be [5 years from the date consent is issued].
17. The Canterbury Regional Council may, once per year, on any of the last five working days of November, serve notice of its intention to review the conditions of this consent for the purposes or:
 - a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent; or
 - b. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.
18. The duration of this consent shall be 5 years.

10.4 CRC16UUUU (Take and Use of Groundwater for Site Dewatering)

Barrhill Chertsey Irrigation Limited seek resource consent to take, use and discharge groundwater for the purpose of site dewatering during construction of the large storage pond, subject to the following conditions:

SCOPE

1. All activities authorised by this consent shall be undertaken in general accordance with the information contained in the Application, the Assessment of Environmental Effects (BCIL Akarana Storage Pond

Consenting), and all supporting technical documents and plans as provided to the Canterbury Regional Council, except where inconsistent with these conditions.

LIMITS

2. The activities authorised by this consent shall be only the take and use of groundwater for dewatering purposes during the excavation works for the construction of the dam and infrastructure associated with the dam located at the land parcel legally described as Lot 6, DP 1996, located at 577 Barkers Road, at or about map reference Topo BX21:9408-7217, as generally shown on Plan CRC16UUUUA, which forms part of this consent.
3. In the event that contaminated material is encountered during earthworks for the construction of the dam, the contaminated material shall be managed in accordance with the Accidental Discovery Protocol, as outlined in *Accidental Discovery Protocol for Encountering Waste Materials/Contaminated Soils – Water Storage Pond Construction at 577 Barkers Road, Methven*, prepared by Pattle Delamore Partners Limited (dated 15 August 2016). No dewatering shall occur until the contaminated material is appropriately managed or disposed of at a suitable facility in accordance with the Accidental Discovery Protocol.
4. The dewatering operation shall:
 - a. Not exceed six months from the commencement of dewatering; and
 - b. Not lower the groundwater level more than 8 m below the ground level of the site or cause subsidence of any other site.

ADMINISTRATION

5. The lapsing date for the purposes of Section 125 of the RMA 1991 shall be [5 years from the date consent is issued].
6. The Canterbury Regional Council may, once per year, on any of the last five working days of November, serve notice of its intention to review the conditions of this consent for the purposes or:
 - c. Dealing with any adverse effect on the environment which may arise from the exercise of this consent; or
 - d. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.
7. The duration of this consent shall be 5 years.

10.5 CRC16VVVV (Discharges to Air during Construction)

Barrhill Chertsey Irrigation Limited seek resource consent to discharge fugitive dust and combustion product to air during the construction of the large storage pond, subject to the following conditions:

LIMITS

1. The discharge of contaminants to air shall be only particulate matter and the products of combustion associated with the construction of the dam and associated infrastructure on only on in parcel Lot 6, DP 1996, located at 577 Barkers Road, at or about map reference Topo BX21:9408-7217, as generally shown on Plan CRC16VVVA, which forms part of this consent.
2. The discharge of contaminants to air shall arise only from:
 - a. Excavation;
 - b. Earthmoving;
 - c. Stripping and stockpiling soil;
 - d. Transport of materials;
 - e. Formation of dam embankments;
 - f. Screening of aggregate and excavated material;
 - g. Vehicle movements;
 - h. Placing and anchoring of geomembrane;
 - i. Combustion of diesel to power screening plant; and
 - j. Placement of clean, engineered materials.
3. There shall be no discharge of dust or the products of combustion, as a result of the exercise of this consent, that is noxious, dangerous, offensive or objectionable to the extent that it causes an adverse effect beyond the boundary of the site on which the discharge occurs.
4. The Consent Holder shall prepare and implement a Dust Management Plan (DMP):
 - a. The consent holder shall prepare a Dust Management Plan. No less than one month before the commencement of the earthworks, a copy of the DMP shall be submitted to the Canterbury Regional Council: RMA Compliance and Enforcement Manager for review and certification. All activities authorised by this consent must be carried out in accordance with the DMP.

Unless Canterbury Regional Council provides notice in writing that it is unable to certify the DMP, the DMP is deemed to be certified within one month of it having been provided to the Canterbury Regional Council.

For this purposes of this condition, "Certification" means that the DMP contains all the information specified in Condition 4 (b).

- b. The DMP shall include, but not be limited to the following:
 - a. A description of the dust sources on site;
 - b. Methods used for controlling dust at each source during construction, including excavation, earthmoving, stripping and stockpiling of materials, transport of materials, formation of dam embankments, screening of aggregate, vehicle movements;
 - c. An implementation schedule detailing the anticipated time of stages associated with the construction works; including
 - i. Site preparation works;
 - ii. Any equipment or plant mobilisation necessary for carrying out the construction works;
 - iii. Works staging, and any field verification requirements
 - iv. Procedures for managing dust when staff are not on site
 - v. Details of inspection of site management measures, and any maintenance necessary to ensure that measures are performing effectively.
 - vi. A method for recording and responding to complaints;
 - vii. Identification of persons responsible for carrying out the actions within the DMP.
 - c. Any amendments or revisions to the DMP must be submitted to Canterbury Regional Council.
5. The Consent Holder shall be responsible for all the contracted operations relating to the exercise of this consent and shall ensure that all personnel working on the site are aware of the consent conditions,

have access to the contents of this consent document and shall ensure compliance with consent conditions.

ADMINISTRATION

6. The lapsing date for the purposes of Section 125 of the RMA 1991 shall be [5 years from the date consent is issued].
7. The Canterbury Regional Council may, once per year, on any of the last five working days of November, serve notice of its intention to review the conditions of this consent for the purposes or:
 - a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent; or
 - b. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.
8. The duration of this consent shall be 5 years.

10.6 RMAXXXXXX

Barrhill Chertsey Irrigation Limited seek resource consent for the establishment and use/operation of a storage pond, including the use land for the earthworks associated with the construction, maintenance and use of a large storage pond and the associated infrastructure, and the storage of water, and the storage of diesel during construction, subject to the following consent conditions:

DEFINITIONS

For the purposes of this consent, the following terms are defined:

- ∴ Accidental Discovery Protocol (ADP): Accidental Discovery Protocol prepared for the site by Pattle Delamore Partners Limited, titled *Accidental Discovery Protocol for Encountering Waste Materials/Contaminated Soils – Water Storage Pond Construction at 577 Barkers Road, Methven*, dated 15 August 2016.
- ∴ Bulk earthworks: the excavation of and filling of subsoils, engineering fills and topsoils during the construction of the storage pond, and any associated stockpiling.
- ∴ Construction-phase stormwater: surface runoff generated from rainfall on the site during the construction of the storage pond.
- ∴ Dam: the proposed Akarana Storage pond located on the piece of land as shown on Plan RMA16XXXXA
- ∴ Erosion and sediment control measures: measures undertaken to prevent or minimise the potential for uncontrolled movement of

sediment off the storage pond site during the construction-phase of the project.

SCOPE

1. All activities authorised by this consent shall be undertaken in general accordance with the information contained in the Application, the Assessment of Environmental Effects (BCIL Akarana Storage Pond Consenting), and all supporting technical documents and plans as provided to the Canterbury Regional Council, except where inconsistent with these conditions.

LIMITS

2. The works shall be limited to the use of land to:
 - a. Establishment the Akarana Storage pond, including all associated earthworks and soil disturbance activities; and
 - b. Store diesel onsite during construction.
3. For the purposes of the construction, use and maintenance of the storage pond and associated infrastructure shall occur on parcel Lot 6, DP 1996, located at 577 Barkers Road, at or about map reference Topo BX21:9408-7217, as shown on Plan RMAXXXA, which forms part of this consent.

DESIGN

4. Construction works shall be undertaken in general accordance with the preliminary design provided in the application, and any amendments to that design as required by any necessary building consents.

PRE-CONSTRUCTION

5. Prior to construction commencing, a copy of this resource consent shall and the Accidental Discovery Protocol shall be given to all persons involved in the construction of the dam.
6. The Consent Holder shall be responsible for all the contracted operations relating to the exercise of this consent and shall ensure that all personnel working on the site are aware of the consent conditions, have access to the contents of this consent document and shall ensure compliance with consent conditions.
7. Prior to commencement of works the Consent Holder or their agent shall arrange and conduct a pre-construction site meeting between the Ashburton District Council and all relevant parties, including the primary contractor. At a minimum, the following shall be covered at the meeting:
 - a. Scheduling and staging of the works;

- b. Responsibilities of all relevant parties;
 - c. Contact details for all relevant parties;
 - d. Expectations regarding communication between all relevant parties;
 - e. Procedures for implementing any amendments;
 - f. Site inspection; and
 - g. Confirmation that all relevant parties have copies of the contents of this consent document and all associated erosion and sediment control plans and methodology.
8. Erosion and sediment control measures recommended in the Erosion and Sediment Control Plan prepared as part of Condition 9 shall be installed before any excavation occurs onsite. The small bund described in Condition 10 shall also be installed before any excavation occurs onsite.

EROSION AND SEDIMENT CONTROL

9. The consent holder shall prepare an Erosion and Sediment Control Plan (ESCP).
- d. No less than one month before the commencement of the earthworks, a copy of the ESCP shall be submitted to the Ashburton District Council for review and certification. All activities authorised by this consent must be carried out in accordance with the ESCP.

Unless Canterbury Regional Council provides notice in writing that it is unable to certify the ESCP, the ESCP is deemed to be certified within one month of it having been provided to the Canterbury Regional Council.

For this purposes of this condition, "Certification" means that the ESCP contains all the information specified in Condition 9 (b).

- e. The ESCP shall include, but not be limited to the following:
 - i. A site drainage plan;
 - ii. Construction/design plan, including any excavation and compaction requirements;
 - iii. An implementation schedule detailing the anticipated time of stages associated with the construction works; including:
 - 1. Site preparation works;

2. Any equipment or plant mobilisation necessary for carrying out the construction works;
 3. Works staging, and any field verification requirements
 - iv. Measures to avoid or minimise any sediment entering exposed groundwater, Rangitata Diversion Race or being tracked onto roadways, or onto neighbouring properties;
 - v. Details of inspection of site management measures, and any maintenance necessary to ensure that measures are performing effectively.
 - vi. Identification of persons responsible for carrying out the actions within the ESCP.
- f. Any amendments or revisions to the ESCP must be submitted to Ashburton District Council.
10. During construction, all practicable measures shall be undertaken to minimise discharges of sediment-laden runoff or exposed groundwater, including the construction of a small bund along the pond construction site and the boundary of the property located at 465 Barkers Road (lot 1 DP10024).

DUST

11. There shall be no discharge of dust as a result of the exercise of this consent, that is noxious, dangerous, offensive or objectionable to the extent that it causes an adverse effect beyond the boundary of the site on which the discharge occurs.
12. The Consent Holder shall prepare and implement a Dust Management Plan (DMP):
 - a. The consent holder shall prepare a Dust Management Plan. No less than one month before the commencement of the earthworks, a copy of the DMP shall be submitted to the Ashburton District Council for review and certification. All activities authorised by this consent must be carried out in accordance with the DMP.

Unless Ashburton District Council provides notice in writing that it is unable to certify the DMP, the DMP is deemed to be certified within one month of it having been provided to the Ashburton District Council.

For this purposes of this condition, “Certification” means that the DMP contains all the information specified in Condition 4 (b).

- b. The DMP shall include, but not be limited to the following:
 - a. A description of the dust sources on site;
 - b. Methods used for controlling dust at each source during construction, including excavation, earthmoving, stripping and stockpiling of materials, transport of materials, formation of dam embankments, screening of aggregate, vehicle movements;
 - c. An implementation schedule detailing the anticipated time of stages associated with the construction works; including
 - i. Site preparation works;
 - ii. Any equipment or plant mobilisation necessary for carrying out the construction works;
 - iii. Works staging, and any field verification requirements
 - iv. Procedures for managing dust when staff are not on site
 - v. Details of inspection of site management measures, and any maintenance necessary to ensure that measures are performing effectively.
 - vi. A method for recording and responding to complaints;
 - vii. Identification of persons responsible for carrying out the actions within the DMP.
- c. Any amendments or revisions to the DMP must be submitted to Ashburton District Council.

NOISE

- 13. Construction noise on site shall be managed in accordance with the New Zealand Standard 6803:1999 Acoustics – Construction Noise.

STORAGE OF HAZARDOUS SUBSTANCES

- 14. Diesel stored onsite during construction in mobile above ground storage containers shall not be stored within 20 m of a surface water body, exposed groundwater or a bore.

ACCIDENTAL RELEASES OR SPILLS

15. All practicable measures shall be undertaken to avoid spills of fuel or any other hazardous substances within the site. In the event of a spill of fuel or any other hazardous substance:

- a. In the event of a spill of fuel or any other hazardous substance, the consent holder shall clean up the spill as soon as practicable; invoke measures, where practicable, to ensure the spill does not enter the timber lined drain; and take measures to prevent a re-occurrence.
- b. The consent holder shall inform the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, within 24 hours of a spill event, and shall provide the following information:
 - i. the date, time location and estimated volume of spill;
 - ii. the cause of the spill;
 - iii. the type of hazardous substance(s) spilled;
 - iv. clean-up procedures undertaken;
 - v. details of steps taken to control and remediate the effects of the spill on the receiving environment;
 - vi. an assessment of any potential effect of the spill; and
 - vii. measures to be undertaken to prevent a re-occurrence.

PLANTING

16. Douglas fir trees will be planted along the southwestern boundary of the site to obscure the visibility of the pond from this direction, as shown on Plan RMA16XXXXA which forms part of this consent.

ARCHEOLOGICAL ACCIDENTAL DISCOVERY PROTOCOL

17. In the event of disturbance of Koiwi Tangata (human bones) or taonga (treasured artefacts), the BCIL/contractor, shall immediately:
- a. Advise the Ashburton District Council of the disturbance;
 - b. Advise the Upoko Runanga of Arowhenua, or their representative, of the disturbance;

- c. Cease earthworks operations in the affected area until the area containing the Koiwa Tangata or taonga has been clearly demarcated, and the Kaumautua and archaeologists have certified that it is appropriate for earthworks to recommence.

ACCIDENTAL DISCOVERY PROTOCOL FOR ENCOUNTERING WASTE MATERIALS/CONTAMINATED SOILS

18. In the event of encountering visual or olfactory indicators of waste materials and/or soil contamination the following actions shall be undertaken:
- a. All works in the potentially affected area shall cease immediately and the site supervisor contacted. In the unlikely event of an uncontrolled discharge of contaminants (i.e. inadvertent rupturing/dislodgement of containers or drums that may be present containing liquid), all practical steps shall be taken to contain the discharge and prevent further discharge, whilst avoiding any contact with the discharging substance;
 - b. The area of concern shall be isolated (e.g. fenced or barricaded) to prevent other site workers from entering the area;
 - c. Personnel shall not enter excavations or subsurface confined spaces where possible toxic or hazardous atmospheric zones may be present without approval/permission by a person qualified to issue permits (note that decaying carcasses may generate toxic gases); and
 - d. An appropriate qualified trained contaminated land specialist shall be contacted immediately to determine the appropriate course of action in relation to environmental and human health requirements and any need to characterise the waste materials/soils or conduct soil sampling for determining the appropriate disposal requirements.

OPERATION AND MAINTENANCE MANUAL (OMP)

19. Prior to the commissioning of the dam, the consent holder shall develop an Operation and Maintenance Manual (OMP).
- a. No less than 10 working days before the commissioning of the dam, a copy of the OMP shall be submitted to the Canterbury Regional Council: RMA Compliance and Enforcement Manager for review and certification. All activities authorised by this consent must be carried out in accordance with the OMP.

Unless Canterbury Regional Council provides notice in writing that it is unable to certify the OMP, the OMP is deemed to be

certified within 10 working days of it having been provided to the Canterbury Regional Council.

For this purposes of this condition, "Certification" means that the OMP contains all the information specified in Condition 20 (b).

- b. The OMP shall include, but not be limited to the following:
 - i. Management of water levels;
 - ii. Maintenance requirements for storage pond and embankments
 - iii. Criteria to determine whether repairs are required;
 - iv. guidance and timelines in which to undertake routine inspections and maintenance
 - v. The OMP will based on New Zealand Dam Safety Guidelines.
- c. Any amendments or revisions to the OMP must be submitted to Canterbury Regional Council no less than 10 working days prior to implementing the amendments or revisions.

20. A copy of the OMP and this resource consent shall be given to every person involved in the operation and maintenance of the dam.

DAM SAFETY MANAGEMENT PLAN AND EMERGENCY EVACUATION PLAN

- 21. Prior to the commissioning of the dam, the consent holder shall develop a Dam Safety Management Plan in accordance with the most recent version of the NZSOLD New Zealand Dam Safety Guidelines.
- 22. The Dam Safety Management Plan shall include an Emergency Action Plan. The Emergency Action Plan shall be prepared in consultation with the Civil Defence Emergency Management Group, including the Ashburton District Council and the Canterbury Regional Council, and shall, as far as practicable, be consistent with the NZSOLD New Zealand Dam Safety Guidelines 2015, and with any Civil Defence Emergency Management Group Plan governing the Regional and District Councils pursuant to the Civil Defence Emergency Management Act 2002.

ADMINISTRATION

- 23. The Ashburton District Council may, within a period of three months commencing on each anniversary of the date of commencement of this resource consent, serve notice of its intention to review the conditions of this consent for the purposes of:

- a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent; or
- b. Requiring the consent holder to carry out monitoring and reporting instead of, or in addition to, that required by the consent.

24. The duration of this consent shall be 35 years.

11.0 Conclusion

It is considered that the excavation, deposition, and air and water discharges associated with the construction of the Akarana storage pond, the use of land to store (dam) water and the discharge of seepage water associated with the operation of the storage pond, the establishment of a new utility (the storage pond), the disturbance of soil and the storage of diesel onsite during construction are consistent with the objectives and policies outlined in the relevant national documents, regional and district policies and plans.

As per the assessment of environmental effects presented in Section 5.0, any potential or actual adverse effects on the environment and downstream users as a result of the proposed activity are considered to be less than minor when carried out in accordance with this report, the site specific ADP, and the proposed consent conditions provided in Section 11.0, , with the exception of effects on affected parties as outlined in Section 7.2 where there may be a minor effect. Consultation with these affected parties is currently being undertaken. Once commissioned, the pond will provide significant water storage which will improve the reliability of water supply to the BCIL shareholders. The pond is anticipated to provide economic benefits to the shareholders as well as the local community.

12.0 References

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