MWH

BUILDING A BETTER WORLD

EXECUTIVE SUMMARY DOCUMENT

Pines Wastewater Treatment Plant and Irrigation Development

Prepared for Selwyn District Council

AUGUST 2009

In line with our Quality System, this document has been prepared by Janan Dunning and reviewed by Murray Sorrell and signed off by Shane Bishop.

CHRISTCHURCH
LOCAL GOVT

Tower 1, Deans Park, 7 Deans Avenue, Addington, Christchurch 8011

p +64 3 366 7449, f +64 3 341 5345

1 Overview

The Selwyn District Council (the Council) will shortly lodge applications for resource consent with Environment Canterbury (ECan), and lodge a Notice of Requirement to designate land for a proposed expansion of the Pines wastewater treatment plant (WWTP) at Rolleston. As the application documents are large and complex, this summary has been prepared to draw out the main points, and provide an overview of the proposal. The full application documents will be available for viewing from the Council.

2 Growth and Development in Selwyn District

Selwyn District has one of the fastest growing populations in New Zealand. Much of the growth is focussed in East Selwyn around Rolleston, Lincoln, and Prebbleton. These settlements are identified in the Greater Christchurch Urban Development Strategy (UDS) as focal points for future population growth. The UDS predicts that over the next 35 years 16% of Greater Christchurch's population growth will occur in Selwyn District. This growth would see the population of East Selwyn rise to approximately 47,700 people by 2041, in 11,900 new households. The recently released Draft Rolleston Structure Plan predicts the population of Rolleston alone to grow to 50,000 people by 2075.

The growth predictions guide the Council in planning for future growth in the District. Planning for growth is important to make sure that future communities are properly served with facilities like roads and parks, and services like drinking water, stormwater and wastewater.

Planning ahead for growth is one of the Council's primary functions. To properly plan for growth, infrastructure and services need to keep ahead of population increases so that the effects of growth on people, infrastructure and services can be managed. The current wastewater treatment and disposal arrangements for Rolleston, Lincoln and Prebbleton are not sufficient to meet predicted future growth. Wastewater from Lincoln and Prebbleton is currently diverted to the Christchurch City network which does not have capacity to accept any increase in wastewater. The Council must be able to treat and dispose of wastewater safely and effectively to properly provide for growth in Selwyn District.

In 2006, the Council investigated the future management of wastewater from the East Selwyn settlements. The Council's approach was driven by principles of sustainability based on achieving social, cultural, economic and environmental well-being in Selwyn District. The result was the development of the East Selwyn Sewerage Scheme (ESSS) concept which involves diverting wastewater from Lincoln, Springston and Prebbleton to the Pines Wastewater Treatment Plant (WWTP) near Rolleston for treatment and disposal to land, as well as continuing to manage increases in wastewater volumes from Rolleston. The Council adopted the ESSS concept to manage wastewater from future population growth as its preferred option, and needs to make changes to the existing Pines WWTP and irrigation area so it can receive, treat and dispose of wastewater efficiently without significantly affecting the environment.

3 The Proposal

There are two main components to wastewater treatment and disposal at Rolleston. The first is the treatment plant which treats raw sewage to a high standard. The second component is the disposal area where the treated wastewater is discharged to land.

The current Pines WWTP currently treats wastewater from Rolleston, and can treat wastewater associated with an equivalent population (PE) of approximately 6,000. Based on current population projections for Rolleston, the capacity of the existing plant is expected to be reached by around 2015. The Council currently holds resource consent to discharge treated wastewater to land at the Pines site for approximately 22,000 PE. The Council has an opportunity to act now to increase the capacity of the Pines WWTP, and the disposal area so wastewater treatment and disposal can keep ahead of the predicted population growth through to 2041 and beyond, allowing for connection of the settlements identified in the ESSS>

The expansion of the treatment plant would take place in stages within the existing designation, but the Council would need resource consent from ECan to discharge the additional treated wastewater to a new larger land area. The Council needs to designate the larger land area for land-based wastewater disposal to make sure that adequate land is available into the future to dispose of wastewater from the expanded plant. The staging of the expansion is shown in Figure 3 of this summary, with the plant layout and additional designation area shown in Attachment 1.

The Pines WWTP operation is closely monitored under the existing resource consents, with the results of the monitoring reported to ECan annually. The plant is currently performing very well, and is well within the limits set through the current consent conditions. The following table compares the monitoring results from the latest assessment up to August 2008 to the expected results from the proposed plant treating much greater volumes of wastewater, and demonstrates that the wastewater quality is expected to be better than is required by conditions outlined in the resource consent.

Table 1: Wastewater Quality: Current and Expected Performance

Parameter	Consent Limits	Median (to August 2008)	Expected quality from new plant
BOD (Biological Oxygen Demand)	1	4.	15
Total Nitrogen	7	2.4	7
Faecal Coliforms (cfu/100ml)	500	1	<2

The expected staged development of the treatment plant for the ESSS is to replace the existing plant (6,000PE) with a 25,000PE module, and then redevelop the existing plant to provide capacity for another 25,000PE when required.

The proposed resource consent application is to apply 25,614m^3/day over 160ha of land, with a consent duration of 35 years.

4 The Current Pines Wastewater Treatment Plant

The Pines WWTP is located on Burnham School Road approximately 4.5km southwest of the present centre of Rolleston (Figure 1). The WWTP site is designated in the Selwyn District Plan (the District Plan) for the treatment and disposal of wastewater (site D411 in the District Plan) over an 84ha site. A designation is a planning technique used by a requiring authority[1] to protect land for public works such as network utilities that are needed for the benefit of the community. In this case, the Council is a requiring authority, and the disposal of treated wastewater is the public work.

A designation allows the Council to undertake activities associated with wastewater treatment and disposal without needing land use consent first. It allows the Council to undertake works within the designation that are related to its purpose (in this case wastewater treatment and disposal), and protects the designated land from incompatible activities establishing on it in the future, making sure that the land is set aside for the specified activity. Designations only apply to land use activities that are managed under the District Plan, so resource consents from ECan may still be needed for some activities such as the discharge of treated wastewater or odour.

Discharging treated wastewater to land on the current designated site is authorised by ECan through resource consent CRC040099. Only 25ha within the site is currently used for disposal, with the rest of the area to be used in the future as wastewater volumes increase.

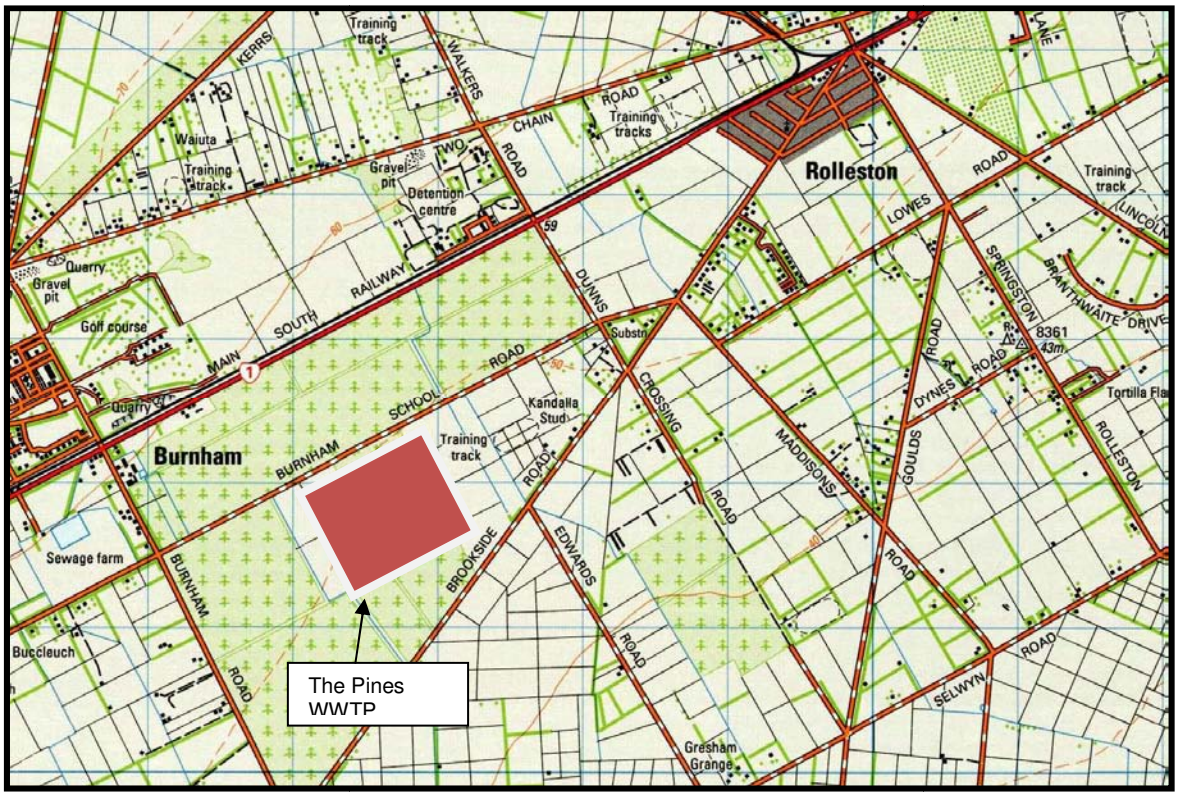


Figure 1: Location of the Pines WWTP and Current Designation

[1] A requiring authority is a Minister of the Crown, a local authority or a network utility operator approved as such under s.167 RMA.

4.1 The Notice of Requirement

A notice of requirement is formal advice to a local authority that a requiring authority wants to designate land in the District Plan. In this case, the Council is both the requiring authority and the local authority, so a recommendation on whether to accept the notice of requirement will be made by an independent authority such as a commissioner.

The Council will shortly issue a notice of requirement to designate 306ha of land adjacent to the Pines WWTP. This new designation site lies south of State Highway 1, east of Burnham Road and north of Brookside Road, and is currently owned by the Selwyn Plantation Board. The new designation would be in addition to the existing 84ha designation for the Pines. The existing designation, the new designation and the potential irrigation pattern are shown in the map in **Attachment 1**. The new designation would include additional land only for the irrigation of treated wastewater to land.

To irrigate the increased treated wastewater from the predicted population, the Council needs at least 160ha of suitable land to meet population growth to 2041 estimated within the UDS. The new and existing designations combined would cover 390ha, but some of this area would be taken up by the treatment plant, bio-solids drying beds (all within the existing designation), setbacks, shelterbelts and the area between the irrigators. The actual area left for irrigation would be around 375ha. The land in the new designation would be used only for irrigating treated wastewater to land using pivot irrigation and K-line irrigation.

The new designation would provide the Council with the flexibility to irrigate treated wastewater in the most appropriate location. The irrigation area would controlled by the commercial viability of secondary land use (such as grazing), operational flexibility, setbacks from public roads and adjacent properties, and shelterbelt planting and buffer areas. Designating the whole site however allows the Council to future-proof the site for treated wastewater disposal beyond 2041, the extent of the UDS population predictions.

4.2 The Discharge Consents

Resource consent to discharge treated wastewater will be sought from ECan at the same time the Notice of Requirement is lodged. The applications include consents to discharge:

- treated wastewater to land;
- odour (from the treatment plant) and contaminants to air (from pivot irrigation).

The applications hold a discretionary activity status under the relevant regional planning regulations.

The treatment process currently produces a high standard of wastewater which the expansion of the treatment plant capacity would need to at least maintain. The plant upgrades would manage wastewater through the treatment process shown in Figure 2.

Only wastewater that has been fully treated and disinfected would be discharged to land. The Council is likely to use the same method of treatment as at present in upgrading the plant, although alternative methods may be considered where the same or better quality can be achieved and other advantages gained.

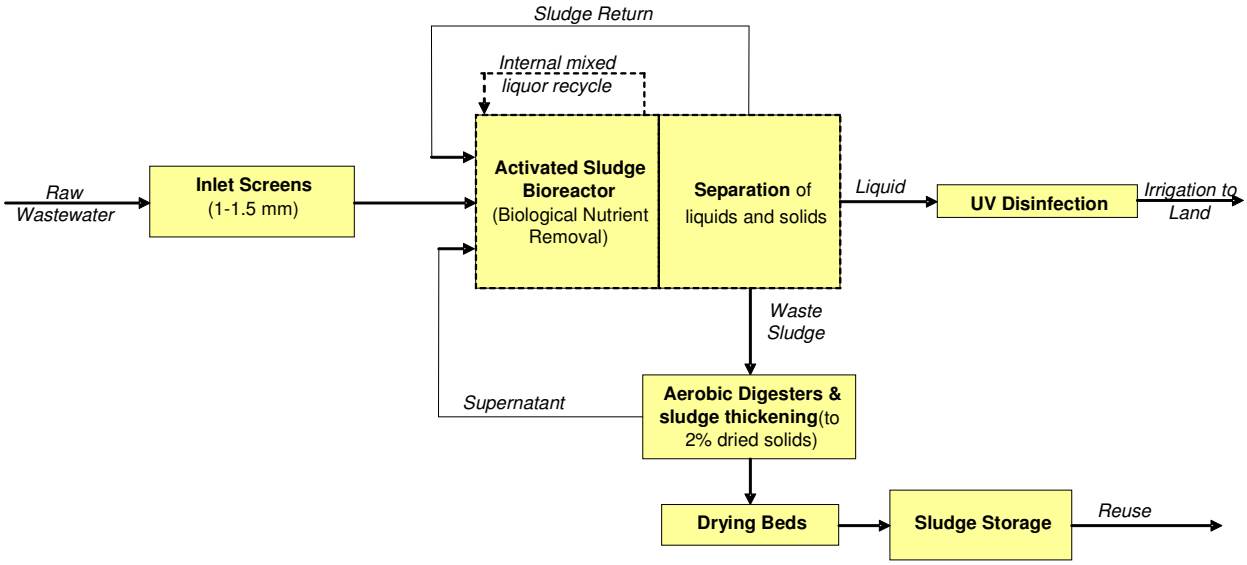


Figure 2: The Wastewater Treatment Process

The current discharge consent allows for a maximum of 7,760m^3/day of treated wastewater to be discharged within the 84ha designation, at an average daily hydraulic loading rate[2] of 8mm/day.

The Council will apply to ECan for consent to discharge a maximum of 25,614m^3/day over an area of 160ha, at the same hydraulic loading rate. The average application rate would be 12,807m^3/day.

Bio-solids would be treated on site in impermeable natural air drying beds next to the treatment plant, and then be taken off-site for disposal. The treatment and management methods will mean that at most, very little odour would be produced from the drying beds. Overall, the wastewater treatment uses an aerobic process which does not produce offensive odours, and other activities that could produce odours such as screenings would be covered over.

The operation and management of the treatment process will ensure that offensive odours are not detectable beyond the site boundary.

The Council will also apply for consent to discharge treated wastewater to air over the additional disposal area using spray irrigation. While it is unlikely, there is some potential for spray drift from the irrigators during very strong winds. However, droplet size and the treatment process using UV disinfection would ensure there are no appreciable public health risks. Also, the application areas would be setback from the site boundaries by large buffers, and since shelterbelts at least three layers deep would be planted around the boundary, it is very unlikely that spray would drift off the site.

[2] The hydraulic loading rate is the amount of wastewater applied to any given location within the disposal area.

5 The Proposed Expansion of the Wastewater Treatment Plant

The upgrade to the Pines WWTP would be carried out in stages as each settlement is connected, and as population increases. The upgrades would occur wholly within the existing designation (**Attachment 2**), and do not need consent. The table below however demonstrates how the upgrades would keep pace with population growth, why the Council is proposing the changes, and why the designation of land for disposal is necessary.

The staging is shown in Figure 3* below:

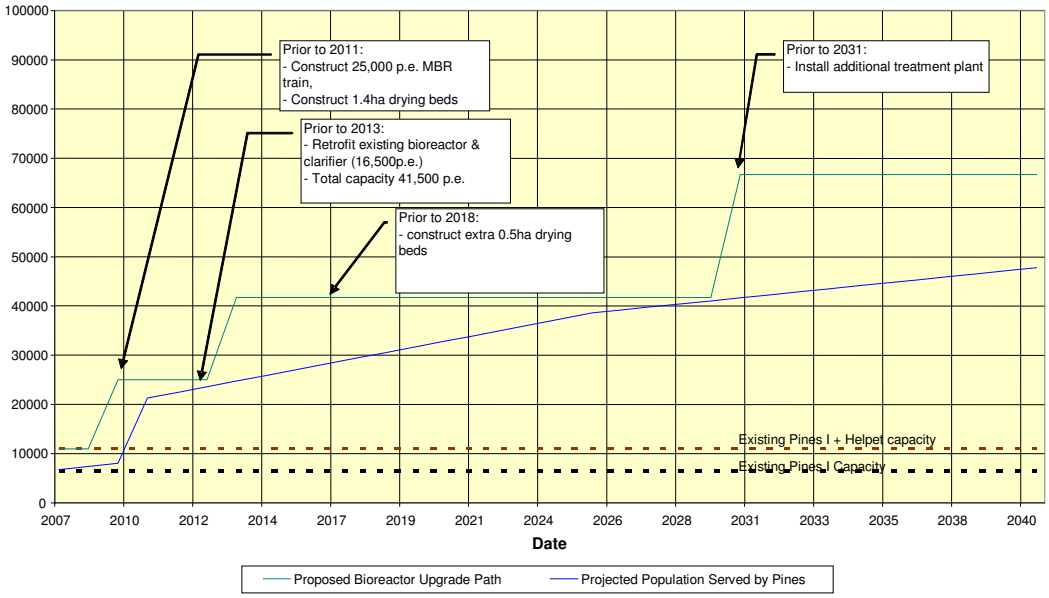


Figure 3: Staging of the Pines WWTP Upgrades by Population Equivalents (PE)

* The timeframes for the development contained in Figure 3 are indicative only and subject to change to reflect growth rates

6 What are the Effects?

The resource consent application document and the Notice of Requirement document contain full assessments of environmental effects (AEE). The key effects assessments are summarised below.

Effects on Groundwater

Groundwater quality can be affected by nitrate nitrogen and pathogenic micro-organisms entering groundwater from treated wastewater discharges. These types of effects will be considered by ECan when they process the discharge consent application the Council has applied for.

A significant amount of nitrate nitrogen would be removed from the wastewater at the treatment plant. The nitrogen remaining in the treated wastewater would normally be absorbed by grass growing on the disposal site before it could enter groundwater. The grass would be cut and carried away for disposal off-site, taking most of the nitrate nitrogen with it. During prolonged periods of particularly wet weather however, levels of groundwater nitrogen could become temporarily elevated when the grass is not able to

absorb it all, and groundwater levels are high. While monitoring doesn't show any significant nitrate levels, computer modelling of worst case scenarios shows there could be some effects on groundwater up to approximately 900m downstream from the disposal area.

Pathogenic micro-organisms and faecal coliforms are mostly killed by the UV disinfection plant during treatment, with any organisms surviving that process dying very quickly in the natural environment before contacting groundwater.

The potential for any contaminants to enter groundwater after treatment and migrate in groundwater flow from the new disposal area was calculated using a computer model to show how quickly any remaining microbes would disperse and die in groundwater. The modelling demonstrates that the effects of the proposal on groundwater quality would be minor, and would only result in contaminated groundwater under extreme circumstances. Under normal circumstances, groundwater contamination could occur up to 20m downstream of the irrigation areas. Under worst case scenarios, computer modelling shows the potential for groundwater contamination to 1,400m downstream of the irrigation areas.

The expected quality of the proposed discharge is based on information gathered from the operation of the existing treatment plant. The same treatment methods would be used in the expanded treatment plant, and the treated wastewater would be applied to land in the same way, and at the same rate. The quality of the effluent will also be closely monitored to make sure the plant is operating effectively. However, while the treatment plant will treat the wastewater to a very high standard to prevent significant effects on groundwater quality, the Council intends to provide a reticulated water supply to properties up to 1400m down-gradient of the new disposal area to make sure reliable water supply is available.

The assessment of effects in the discharge consent application to ECan demonstrates that the effect of discharging wastewater at the site on groundwater quality is expected to be suitably mitigated because of the high quality of the treated wastewater, the careful management and monitoring of potential groundwater contaminants and the reticulation of water supply.

Landscape Effects

The future treatment plant buildings are similar in size and appearance to rural buildings. The expanded treatment plant facilities will cover a larger area, but would be very similar in appearance to the existing plant. The treatment plant buildings and structures can be built on the existing designation as long as they are for wastewater treatment purposes, but the cladding, colour and design of the buildings would be selected to make sure they are compatible with their rural setting. Future landscaping around the treatment plant and site boundary will help screen the buildings, and further reduce any visual effects.

The only structures proposed on the new designation would be pivot irrigators for treated wastewater irrigation. The irrigators would be set back from the property boundaries, particularly next to public roads or residential properties. They would have the feel and appearance of irrigators used on rural pastureland dedicated to grazing. Shelterbelts would be planted along the perimeter of the site, using a mix of deciduous and evergreen trees to provide variety, and to help screen the site. The shelterbelts would be arranged to provide variety and interest in the landscape.

Noise

The upgraded treatment plant would not generate any more noise than it does at the moment, and since the new designation would contain only irrigators, the noise generated as a result of the proposed upgrades would continue to be well within the noise limits that are permitted by the Council under the District Plan.

Surface Water

Two surface water races flow through the new designation area. The water races may be realigned or piped through the irrigation area, or irrigation would be set back from them by at least 20m, and three-layer deep shelterbelts would be planted along their length. The quality of water in the water races would

not be affected by the proposed discharges. The best option to protect the water races will be determined once the final irrigation areas are defined.

Air Quality

The treatment process is very effective, and produces wastewater of a very high quality. To control public health risks from aerosols, the Department of Health Guidelines (1992) recommend a setback of at least 15m between wastewater irrigation application areas and neighbouring land if a multi-layer shelterbelt is established between properties. The shelterbelts proposed would be at least three layers deep, and there would be plenty of opportunities to establish large buffers and shelter planting on the new designation proposed.

Odour

The treatment process would avoid the conditions where odour-producing bacteria grow, so very little odour would be produced, and it would not extend beyond the site boundary. Because of the effectiveness of the treatment process, the treated wastewater would not smell either, so the irrigation areas would be free from unpleasant odours.

Positive Effects

The treatment plant upgrade and the designation of the site proposed would have the following positive effects:

- The ability to treat and dispose of wastewater in East Selwyn from projected population growth with minimal adverse effects on the environment.
- Future proofing high quality wastewater disposal into the future, supporting the health, safety and wellbeing of the community and the environment;
- The centralised treatment and disposal of wastewater would be efficient, cost effective and would avoid smaller isolated wastewater treatment and disposal systems, the need for land to be set aside near each community for disposal, and the adoption of less favourable disposal methods (such as surface water disposal);
- There is adequate area for staging, and for buffers and perimeter planting;
- Regular irrigation of pasture within the disposal area;
- The proposal provides the community with certainty regarding the long term use of the site, which in turn allows long term planning to take the designated land use into account;
- It provides the community with a culturally and socially acceptable means of managing, treating and disposing of wastewater;
- It is an economically and environmentally sustainable means of managing, treating and disposing of wastewater.

7 Progress to Date

Shortly the applications for consent and the Notice of Requirement will be lodged. These two processes are likely to run in parallel, and will involve consultation between the directly affected parties and the Council. As it will be a public process, submissions will be invited from the public who can become involved in the decision making process.

In the meantime, if you would like more detailed information, the consent application document and the notice of requirement can be viewed at the Selwyn District Council offices or online at www.selwyn.govt.nz.

8 Summary

Population growth predictions for the Selwyn District through to 2041 predict that current discharge arrangements from the East Selwyn settlements will not be adequate into the future. This and the current availability of land next to the existing Pines WWTP site provides the Council with the opportunity to designate an additional 306ha for wastewater irrigation, with 160ha required to cater for anticipated population growth to 2041, and the remaining area set aside for future treated wastewater irrigation. The new designation would provide adequate land area to support the upgrade and improvement of the Pines WWTP, and enable the current application rates and hydraulic and contaminant loading rates to be maintained.

The expansion of the treatment plant would take place within the existing designation, with only irrigation disposal to land occurring within the new designation. The treatment plant upgrade and expansion of irrigation would occur in stages to keep pace with population growth.

Monitoring of the existing wastewater discharge demonstrates that the current treatment process operates well, and delivers outputs that are well within existing consent limits, and do not significantly affect the quality of the environment.

Attachment 1

Printed from MapToaster NZTopo

K-Line

KEY

- Area of proposed designation
- Existing designation
- Pines WastewaterTreatment Plant
- Centre pivot and K-Line Irrigators

Scale 1:25,000 (A3)

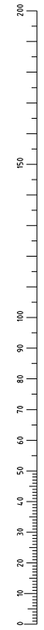
5735000
5734000
5733000
5732000
5731000
5730000
5729000
5728000
2451000
2452000
2453000
2454000
2455000
2456000
2457000
2458000
2459000
2460000
2461000

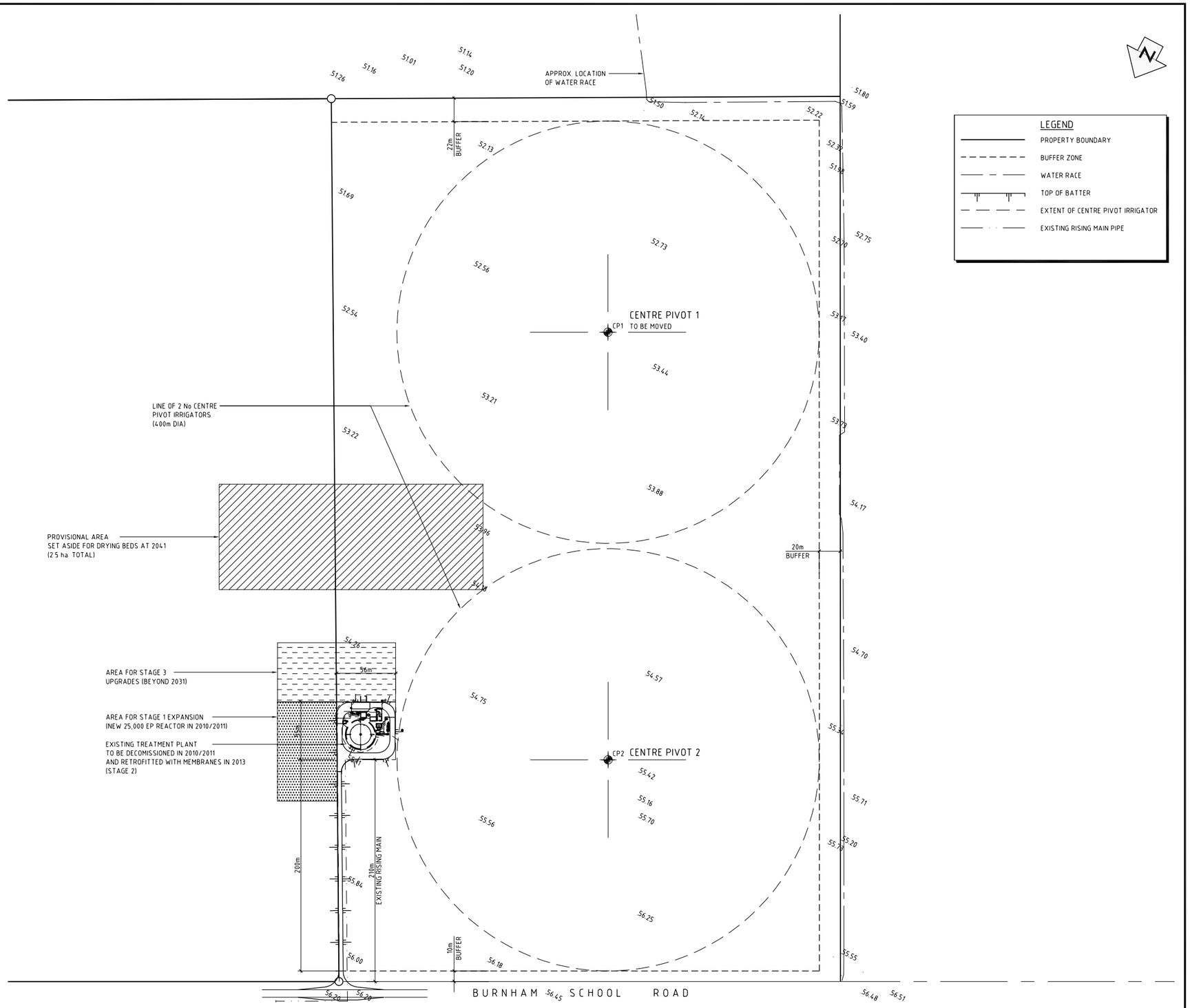
Map Series: Aerial Photos, Sheet: M36A 2000/2001, Scale 1:25000. [Crown Copyright Reserved]

Attachment 2

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1





NOT FOR CONSTRUCTION

REV	AMENDMENTS	CHECKED INITIAL	CHECKED DATE	APPROVED INITIAL	APPROVED DATE
A	PRELIMINARY ISSUE	DW	01.09	DW	01.09

TAB/DWG : Layout1 / Z6913511_C001.dwg
SERVER : CHRISTCHURCH (NZCHC2S01)
XREFS : XREF-SPOT LEVELS, X_Site Layout Plan

FIELDBOOK	Name	Date
SURVEYED		
DESIGNED	DW	01.09
DRAWN	EM	01.09
CHECKED	DW	01.09
APPROVED	DW	01.09

MWH

Selwyn DISTRICT COUNCIL

PINES WWTP

WASTEWATER TREATMENT PLANT
SITE LAYOUT PLAN

Status Stamp: AS BUILT
Date Stamp: 08-01-09
SCALES (A1) 1:2000

Job No.	Sheet No.	Rev.
Z6913511	C001	A

\\nzchc2s01\projects\0 E1 PROJECTS\Z69000+\Z69135 Rolleston TC Work\Z6913511\G-CAD\Z6913511_C001.dwg