Report

# SDC Plan Changes 8 and 9 - Odour Review

**Prepared for Selwyn District Council**

**By Beca Infrastructure Ltd (Beca)**

12 April 2011

## Revision History

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## Document Acceptance

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| on behalf of | Beca Infrastructure Ltd | | |

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# 1 Introduction

## 1.1 Background

Selwyn District Council (SDC) has received private plan change requests for Plan Change 8 and Plan Change 9 from Selwyn Plantation Board Ltd (SPBL). Both plan change requests wish to change the zoning of an area of land from rural (Outer Plains) to a new Living 3 zone which will have a higher average housing density. Both properties are located on the outskirts of Rolleston in the vicinity of the Pines Wastewater Treatment Plant (Pines WWTP), the Pines Resource Recovery Park (Pines RRP) and a Tegel intensive poultry farm.

SDC has commissioned Beca to review the odour assessments included in the plan change requests and the methods promulgated to avoid, remedy or mitigate any potentially adverse reverse sensitivity and nuisance effects of odour.

Since the plan change requests were lodged SDC has applied for and been granted resource consents from SDC (as regulatory authority) and Environment Canterbury (ECan) to enable an extension of the Pines WWTP. This is to allow for the projected increase in population in the area from 6000 persons to a forecast of 28000 by 2017 and 48000 by 2041. The applications include the following:

- a new consent to authorise the discharge to air from the spray irrigation of 25,614m$^3$ per day of treated wastewater;
- a variation to consent CRC040100 to authorise the discharge of contaminants to air resulting from the treatment and storage of wastewater and biosolids; and
- a Notice of Requirement (NOR) for the new disposal areas for treated wastewater and the increased footprint of the WWTP and the new sludge drying facilities.

The resource consent applications and the NOR application were granted on 17 December 2010, subject to conditions. The decisions and conditions included in the consents and NOR are relevant to this discussion. The conditions of the consents and NOR are discussed in section 4.

## 1.2 Reference Documents

In order to undertake the review of the odour aspects of the applications to discharge to air and to use land, Beca has reviewed the following documents provided by SDC:

- “Private Plan Change Request to the Selwyn District Plan – Proposed Rural Residential Living 3 Zone - PC090009 Skellerup Block – Dunns Crossing Road, Rolleston” 5/8/2010 prepared by Aurecon Ltd for Selwyn Plantation Board Ltd.
- “Private Plan Change Request to the Selwyn District Plan – Proposed Rural Residential Living 3 Zone - PC090008 Holmes Block – Intersection of Dunns Crossing Road and Main South Road, Rolleston” 5/8/2010 prepared by Aurecon Ltd for Selwyn Plantation Board Ltd.
- The original submissions and further submissions lodged on the plan change requests.
- The Council decision on the NOR for the Pines RRP.
- Consent CRC041489 for the discharge of contaminants to air from the Pines RRP.
- The decisions on applications CRC10119, CRC101111 and CRC040100.1 and a NOR by SDC for the Pines WWTP released on 17 December 2010.

- The Notice of Requirement to designate the land for the Pines Resource Recovery Park
- Resource consent CRC041489 to discharge to contaminants to air from the Pines Resource Recovery Park.
- Schedule of Proposed Amendments to Plan Changes 8&9 dated 29 March 2011.

# 2 Description of Plan Changes

## 2.1 Plan Change 8 Holmes Block

As notified Plan Change 8 proposed to rezone approximately 92ha of existing rural zoned land (Outer Plains) known as the "Holmes Block" to a new Living 3 zone for 125 rural residential parcels with an average density of one household per 5349m$^2$. In response to issues raised by submitters the applicant has reduced the number of properties to 97 rural residential parcels plus five, four hectare lots. The property is located on the western outskirts of Rolleston west of the PC1 Urban Limit and directly adjacent to the State Highway. The western edge of the Holmes Block is adjacent to the NOR boundary for the Pines WWTP. Figure 2.1 shows a map of the location of the Holmes Block.

## 2.2 Plan Change 9 Skellerup Block

As notifiec Plan Change 9 proposed to rezone approximately 72ha of existing rural zoned land (Outer Plains) known as the "Skellerup Block" to a new Living 3 zone for 100 rural residential parcels with an average density of one household per 5113m$^2$. In response to issues raised by submitters the applicant has reduced the number of properties to 68 rural residential properties plus five four hectare lots. The property is located on the southern outskirts of Rolleston to the south of the PC1 urban limit. Figure 2.1 also shows the location of the Skellerup Block.

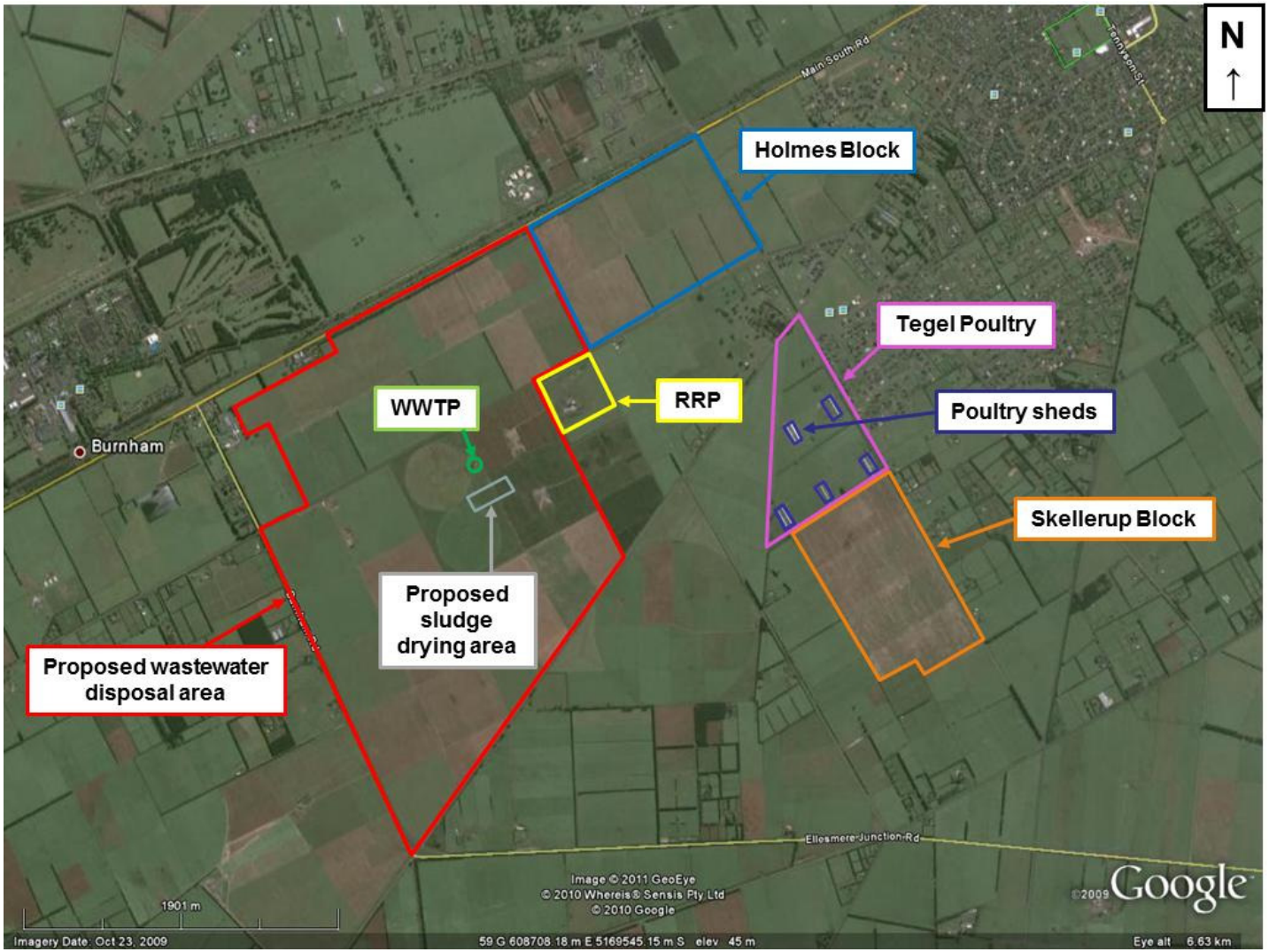


**Figure 2.1 Map Showing Location of Holmes and Skellerup Blocks plus the Pines WWTP and RRP and the Tegel poultry farm.**

# 3 Locality Description

## 3.1 Area Characteristics

The Holmes and Skellerup Blocks are located to the southwest of the township of Rolleston. The Pines WWTP and RRP are located to the southwest of the Holmes Block and to the northwest of the Skellerup Block. The proposed wastewater disposal area for the Pines WWTP adjoins the western boundary of the Holmes Block. A Tegel poultry farm is located immediately to the north of the Skellerup Block and to the south of the Holmes Block. These activities are all shown on Figure 2.1.

The majority of the land in the vicinity of the Holmes and Skellerup Blocks is rural land that is used for pastoral farming and cropping. There are some existing dispersed rural dwellings and some pockets of rural-residential type development.

The Pines WWTP and RRP and the Tegel poultry farm are all existing odour sources that have the potential to discharge odours beyond the boundaries of their respective properties. The poultry farm is a "breeder" poultry farm. Breeder farms produce fertile eggs that will be hatched in a hatchery to supply chickens for either meat or egg production. The breeder hens are kept on sheds on raised litter floors similar to sheds used for broiler or meat chickens. Breeder hens are fed less than broiler chickens and are kept in the shed for their life cycle of approximately one year.[1] Broiler hens have a much shorter life cycle of approximately 60 days.[2]

The recently consented changes to the Pines WWTP will increase the area of land over which treated wastewater may be irrigated and add outdoor biosolids drying to the processes undertaken on-site. These changes will alter the odour generation potential of the WWTP site. The proposed changes to the Pines WWTP are discussed in section 4.

## 3.2 Topography and Meteorology

The Holmes and Skellerup Blocks are located on the Canterbury Plains and the surrounding topography is generally flat with no significant hills. Radiation temperature inversions will be common during periods of limited cloud cover and low overnight wind speeds. Inversion conditions and low wind speeds limit the dispersion of contaminants that are emitted from sources at low elevations, such as those from the Pines WWTP and RRP and the Tegel poultry farm, and are the conditions of most concern with regard to odour effects.

The nearest meteorological station to Rolleston is located at Lincoln, approximately 12km to the southeast of the site. Figure 3.1 presents a windrose for Lincoln for the period January 2004 to December 2005 using data obtained from the National Climate Database operated by NIWA. The Lincoln data may show slight differences from Rolleston due to the local influence of Banks Peninsula on the Lincoln site. For example, northeasterly winds at Lincoln may be slightly more orientated from the east (ie east-northeasterlies or easterly winds), and northwest winds may be slightly more westerly in origin (ie west-northwesterlies or westerly winds). However, with these limitations in mind and given that the Lincoln meteorological station and the Rolleston area are on

[1] http://www.pianz.org.nz/farming/breeding/parents

[2] http://www.poultryhub.org/index.php/Meat_chicken_farm_sequence

relatively flat terrain without significant hill/valley systems between them, the Lincoln data will give a reasonable representation of the general wind directions in the Rolleston area.

The Lincoln windrose indicates that the prevalent winds are from the northeasterly and southwesterly quarters. Winds in the area, as indicated by the Lincoln data, are generally light with an average wind speed of 4m/s.

Winds from the northeast will blow any odours produced by the Pines WWTP and RRP and the Tegel poultry farm towards the southwest and away from the Holmes Block. Winds from the southwest will blow any odours produced at the Pines WWTP and RRP directly towards the Holmes Block. The Skellerup Block should not be downwind of the local odour sources during southwesterly winds.

Southeasterly and northwesterly winds are uncommon. Local knowledge will suggest that the northwesterly is a common wind direction. However, the intensity of the wind rather than the frequency of wind from this direction is likely to give this perception. Winds from the southeast will blow odours from the Tegel poultry farm towards the Holmes Block and northwesterly winds will blow odours from the Pines WWTP, RRP and the Tegel poultry farm towards the Skellerup Block.

During calm conditions there are likely to be katabatic winds which will flow down across the Canterbury Plains from the northwesterly quarter. These winds may not show on the windrose due to the wind speeds being below the stall speed of the anemometer. Under very light katabatic wind conditions odours can carry long distances. Northwesterly drainage flows would carry odours from the Tegel poultry farm towards the Skellerup Block.

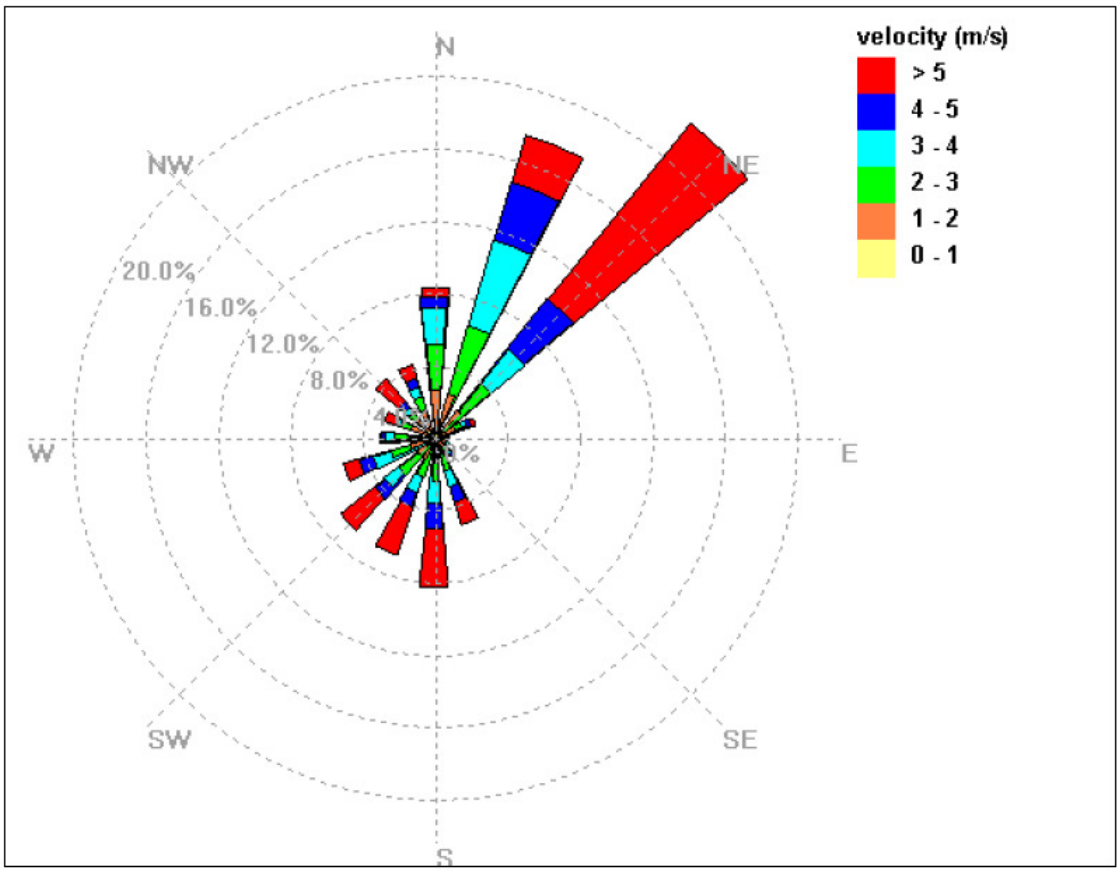


**Figure 3.1 Lincoln Windrose, 2004-2005**

# 4 Conditions Included in New WWTP Consents and NOR

The resource consent conditions included in the new consent for the Pines WWTP for wastewater disposal will have implications for the potential effects of odours and aerosols generated by the Pines WWTP on the Holmes and Skellerup Blocks. The controls on wastewater irrigation included in the conditions of consent CRC101109 that are most relevant to the control of odours and aerosols that may affect the Holmes and Skellerup Blocks include the following:

- The wastewater must be treated with ultra-violet disinfection prior to irrigation;
- The treated wastewater must not exceed limits for water quality parameters, including EColi Faecal coliforms and BOD;
- When irrigating wastewater adjacent to the Holmes Block the wastewater must be aerobic and have a minimum dissolved oxygen concentration which is continuously monitored and alarmed;
- The boundaries of the wastewater irrigation areas must be planted with shelter planting and on the common boundary between the irrigation area and the Holmes Block a triple row of closely plant evergreen trees must be planted;
- Irrigation of wastewater must not commence within 150 m of the boundary of the irrigation area until the shelter planting has reached a minimum of 3 m in height;
- When shelter planting is at least 3 m in height irrigation of wastewater must not be undertaken within 15 m of any site boundary, except on the boundary between the irrigation area and the Holmes block the setback distance must be at least 25 m;
- If wastewater being irrigated adjacent to the Holmes Block does not meet the minimum dissolved oxygen concentrations or has not had ultra-violet disinfection the wastewater must not discharged within 200 m of the common boundary when winds are blowing between 170° and 310°;
- The odours, aerosols and spray drift resulting from the irrigation of wastewater must not cause offensive or objectionable effects beyond the boundary of the discharge area;
- No end guns are permitted to be used on the wastewater irrigation system used on the land north of Burnham School Road (which includes the land adjacent to the Holmes Block);
- The wastewater irrigation systems used within 150 m of the common boundary between the Holmes Block and the irrigation area must have the following:
    - Irrigation nozzles that are no more than 2 m above ground level
    - Nozzles which produce large consistent droplets
    - Nozzles which have an operating pressure of no more than 103kPa.
- The wastewater treatment and sludge drying operations shall not cause any odour or dust particles that are offensive or objectionable beyond the property boundary of the consent holder.

Similarly, the conditions of consents CRC040100.1 and CRC101111 will have an impact on the control of odours generated from the Pines WWTP and the drying of biosolids. The controls of most relevance to this discussion are:

- The wastewater treatment and sludge drying shall not cause any odour or dust particles that are offensive or objectionable beyond the property boundary of the consent holder;
- The inlet works and screens at the WWTP must be fully enclosed and ventilated to emission control equipment;
- Sludges must be aerobically digested prior to air drying. No anaerobic drying of sludges or biosolids is to take place;
- Drying of sludges and biosolids must be restricted to air drying processes only.
- The size of the air drying beds are limited to a maximum area of 2.5 ha
- Wastewater disposal is prohibited on the parcel of land Pt Lot 2 DP 82068, which abuts the southern boundary of the Pines RRP and extends to Brookside Road.

# 5 Plan Change Applications

## 5.1 Applicant's Approach

Golder Associates (Golder) have prepared an assessment of the potential for odour discharges from the Pines WWTP and RRP and the Tegel poultry farm to affect any residential properties that may be developed on the Holmes and Skellerup Blocks. The overall assessment approach used by Golder and the buffer distances recommended by Golder are considered to be appropriate in general with some reservations:

- Golder has used buffer distances that are recommended by various Australian states and which are widely adopted in New Zealand. Some modifications to the locations of the buffer distances are recommended to take into account the proposed expansion of the Pines WWTP. Golder has assumed that the operations undertaken at the RRP can occur only on the southwest corner of the site that is presently used. However the NOR and resource consent for air discharges for the site do not restrict where operations such as composting may occur on the site. Hence the buffer distance recommended by Golders should in our opinion apply to the boundary of the entire RRP site rather than just the existing operations area.
- The dispersion modelling undertaken for assessing the effects of the Tegel poultry farm is not considered reliable and is discussed in paragraph 5.3.1.

The potential effects of each of the nearby odour sources on the Holmes and Skellerup Blocks are discussed separately below.

## 5.2 Plan Change 8 Holmes Block

### 5.2.1 Tegel Poultry Farm

It is considered that the existing buffer distance between the Tegel poultry chicken sheds and the Holmes Block of approximately 900m is sufficient and that the Holmes Block should not be adversely affected by odours from the Tegel poultry farm.

### 5.2.2 Pines RRP

Golder has presented a range of buffer distances for waste transfer stations and composting plants in their report based on various guidance documents prepared by several Australian states. The buffer distance recommended by Golder of 300m from the waste transfer and composting operations to the Holmes Block is considered to be appropriate. The NOR for the Pines RRP does not restrict where activities such as composting and waste processing must take place on site. At present these activities take place in the southwest corner of the site. In future it may be necessary to relocate these activities within the site and use other areas of the site for activities, such as composting, which fall within the scope of the existing NOR and discharge consent. Consequently the 300m buffer distance should apply from the boundary of the entire site in order to prevent odour issues arising on the Holmes Block in the future.

A 300m buffer distance extending from the boundary of the RRP site will encroach into the Holmes Block at the southern corner of the block by 300m (see Figure 5.1)

### 5.2.3 Pines WWTP

The extended Pines WWTP plant will be designed for a population equivalent of 48,000, an eight-fold increase from the present capacity of 6,000 persons. The area consented for wastewater disposal will increase from 80ha to 375ha and the consent allows for aerobic digestion of sludge

and outdoor drying of sludge on a 2.5ha area located immediately to the south of the treatment plant.

Golder's assessment was based on the effects from a WWTP serving a population of 50,000 which is consistent with the capacity of the extended plant. The buffer distance of 500m recommended by Golders is considered to be appropriate. This buffer distance does not impact on the Holmes Block as the distance between the nearest boundary of the Holmes Block and the WWTP is approximately 900m (see Figure 5.1).

The aerobic treatment of sludge has a high potential to discharge odours. The consent for the extended plant does not allow for composting of sludge. The application for the extended plant did not allow for any extraction or odour treatment system for the sludge stabilisation process and the proposed conditions of consent do not specifically require this. There is a risk that the sludge stabilisation system will be a source of odours at the plant especially if the aeration system is not successful or malfunctions occur. Golder recommended a buffer distance of 1000m surrounding the sludge digestion facilities based on the level of uncertainty regarding the potential treatment method to be used and the fact that the WWTP is located downwind of the Holmes Block during southwesterly winds. This buffer distance is considered to be appropriate. A buffer distance of 1000m impacts on the southwesterly corner of the Holmes Block by approximately 100m (see Figure 5.1).

The proposed changes to the Pines WWTP include air drying of aerobically digested sludge in outdoor drying beds to be located to the south of the WWTP. Golder recommended a buffer distance of 500m between the drying beds and sensitive locations and this is considered to be appropriate. This buffer distance should not impact on the Holmes Block as the distance between the planned location of the sludge drying beds and the nearest boundary of the Holmes Block is approximately 900m (see Figure 5.1).

Golder recommended a buffer distance of 200m for the disposal of treated wastewater to land which is considered appropriate. However, the area of land consented to be used for the disposal of wastewater has been increased and includes land immediately to the west and bordering the Holmes Block. The conditions of consent for the extensions to the Pines WWTP include a number of setback distances from the Holmes Block for the disposal of treated wastewater. The shortest setback distance is 25m. To ensure a minimum separation distance between future residences and wastewater disposal of 200m as recommended by Golder, it is recommended that a restriction be placed on the building of houses on the Holmes Block within 175m of the westerly boundary of the land.

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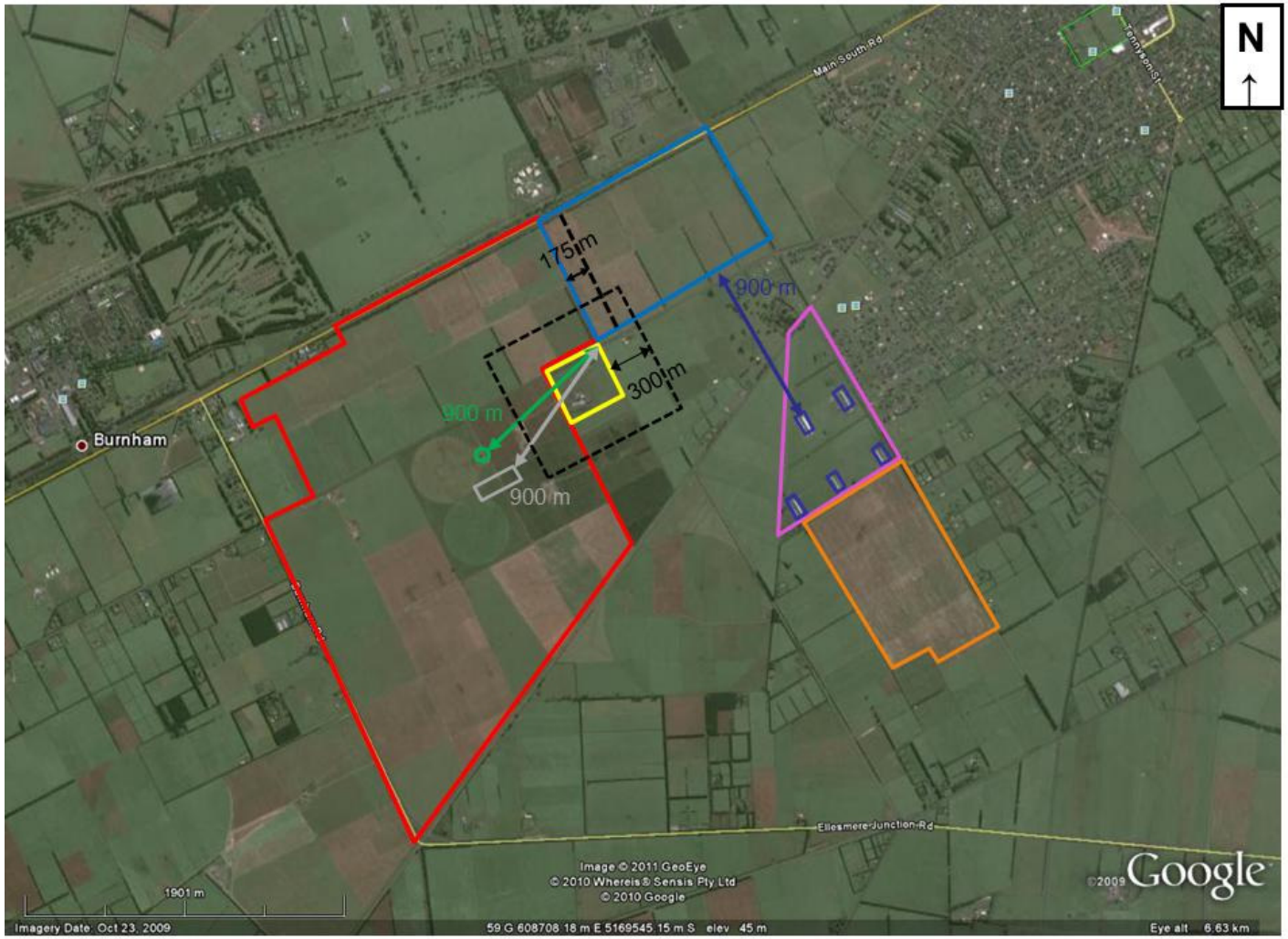


**Figure 5.1 Diagram Showing Recommended Separation Distances between the Pines WWTP, RRPand Tegel Poultry Farm and the Holmes Block**

### 5.2.4 Post Notification Changes to Plan Change 8

Since Plan Change 8 was notified the applicant has proposed a number of amendments in response to concerns raised by submitters. These amendments include adding a rule to the District Plan (rule 4.9.28) which states

*Any dwelling, family flat, and any rooms within accessory buildings used for sleeping or living purposes in the Living 3 Zone at Rolleston (as shown on the Outline Development in Appendix 37) shall not be located within the "Odour Constrained Area" as shown in Appendix 37 (Holmes Block).*

The map included in Appendix 37 is shown in Figure 5.2.

The "Odour Constrained Area" restricts building within the southwest corner of the Holmes Block but does not extend along the entire length of the southwestern boundary of the block. In my opinion it will not provide a sufficient setback between future residences and the wastewater disposal area or between future residences and the Pines RRP.


**Figure 5.2 Appendix 37 Holmes Block Odour Constrained Area**

### 5.2.5 Summary

The assessment method used by Golder to determine buffer distances is supported. The buffer distances recommended between the WWTP and the sludge disposal areas and residences do not impact on the Holmes Block. The buffer distances recommended for the RRP, aerobic digestion of sludge and the disposal of wastewater to land encroach into the Holmes Block. In order to maintain all of the recommended buffer distances, the building of houses on an area of land along the western and southern boundaries of the Holmes Block needs to be restricted. The "Odour Constrained Area" proposed by the applicant after the notification of the plan changes is in my opinion insufficient.

## 5.3 Plan Change 9 Skellerup Block

Golder has undertaken a similar odour assessment of the potential effects of odours from the Pines WWTP, RRP and the Tegel poultry farm on the proposed Skellerup Block. Golder has used buffer distances recommended by Australian environmental authorities for the basis of the assessments for the Pines WWTP and RRP which is supported. However, they have also used results of dispersion modelling to estimate a buffer distance for the Tegel poultry farm and this is considered to have some limitations.

### 5.3.1 Tegel Poultry Farm

For the assessment of the likely effects of odours from the Tegel poultry farm on the Skellerup Block, Golder has made reference to buffer distances published by various Australian states and also undertaken dispersion modelling. The buffer distances referred to by Golder range between 300m and 1000m. Golder recommend in their report that due to the size and nature of the poultry operation at Rolleston that a buffer distance at the low end of the range is sufficient. It is agreed that a buffer distance of 300m should be sufficient to adequately mitigate the effects of odour from the poultry farm on the Skellerup Block given the relatively low density of birds at the Tegel farm. Also of note is the requirement in the Selwyn District Plan for any new sensitive activity to be set back at least 300m from any existing lawfully established intensive farming activity. The setback distance is measured from the edge of any permanent building or yard in which the intensive farming activity occurs. In this case the farming activity occurs within the poultry sheds. Establishing a new "sensitive activity" within 300m of an existing intensive farming activity is a restricted discretionary activity.

Golder has also presented a modelling assessment of the effects of odours from the Tegel farm and concludes that a buffer distance of 150m should be sufficient to prevent odour nuisance for the Skellerup Block. The modelling method followed procedures that were established in 2001 for another Canterbury poultry farm, however the odour modelling guidelines were established for a broiler farm rather than a breeder farm where the pattern of odour discharge is different.

In addition, studies carried out on poultry farm modelling methods over the past five years or so have highlighted that this modelling method using a steady state model (AUSPLUME) and non-buoyant odour sources does not adequately simulate the nature of dispersion of odours from poultry farming. This has culminated in a report published in Australia in 2010 about chicken farm dispersion modelling and separation distances[3]. This paper discusses the efficacy of dispersion modelling, using an advanced model known as CALPUFF which has better handling of low wind

[3] Australian Government Rural Industries Research and Development Corporation "Separation Distances for Broiler Farms – Verifying methods and investigating the effects of thermal buoyance" RIRDC Publication No. 10/073 June 2010.

speeds than AUSPLUME, for estimating separation distances for broiler farms. The paper discusses the separation distances estimated using CALPUFF with various separation distance formulas used by a number of Australian states.

The paper recommends that a proposed formula developed by the Queensland Chicken Growers Association (QCGA) be used in preference to CALPUFF in most situations. The paper noted that the proposed QCGA separation distance formula calculated greater and more conservative separation distances than the dispersion model for the majority of situations. However, the formula substantially under predicted separation requirements in some cases. The separation distance formula tended to underestimate separation distances (compared to CALPUFF) when low wind speeds, low surface roughness and complex terrain combined. At Rolleston low wind speeds will be common although the Tegel farm will not be upwind of the Skellerup Block frequently. The surface roughness is low, but the terrain is not complex. Hence it is expected that the QCGA formula will provide a conservative estimate of the separation distance. Applying the QCGA formula to the Tegel site for 16000 birds (two sheds together, the worst case cumulative impact for the Skellerup Block) produces a recommended separation distance of 250m (see Appendix A for separation distance calculations). The calculations are based on conditions applying to broiler farms which are not exactly the same as breeder farms. The QCGA does not unfortunately provide factors for breeder farms. Hence there is an element of uncertainty regarding the appropriateness of the recommended separation distance.

Dr Terry Brady, an independent air quality consultant, provided a report in support of the submission by Tegel Foods on the Skellerup Block application. Dr Brady raises concerns with the dispersion modelling carried out by Golder in the areas of choice of model, modelling in general, and intermittent discharges. Beca concurs with Dr Brady in these matters.

Given the uncertainties in the inputs to the model and the limitations of the type of model used it is considered that the modelling results should be used with caution. It is therefore recommended that the separation distance between the Tegel poultry farm sheds and the Skellerup block be based on buffer distances and that a minimum of 300m between the poultry farm sheds and residences should be maintained in accordance with the rules in the SDC district plan.

### 5.3.2 Pines RRP

The Skellerup Block is located more than 1000m from the boundary of the Pines RRP site (see Figure 5.2). Golder's finding that the Pines RRP is located beyond the distance at which odours are likely to cause adverse effects on the Skellerup Block is supported.

### 5.3.3 Pines WWTP

The nearest boundary of the Skellerup Block is located approximately 1000m from the area proposed for wastewater disposal and at least 1700m from the WWTP and the area proposed to be used for biosolids drying (see Figure 5.2). The Skellerup Block is therefore unlikely to be adversely affected by odours from the Pines WWTP and the disposal of wastewater to land which is consistent with Golder's conclusions.

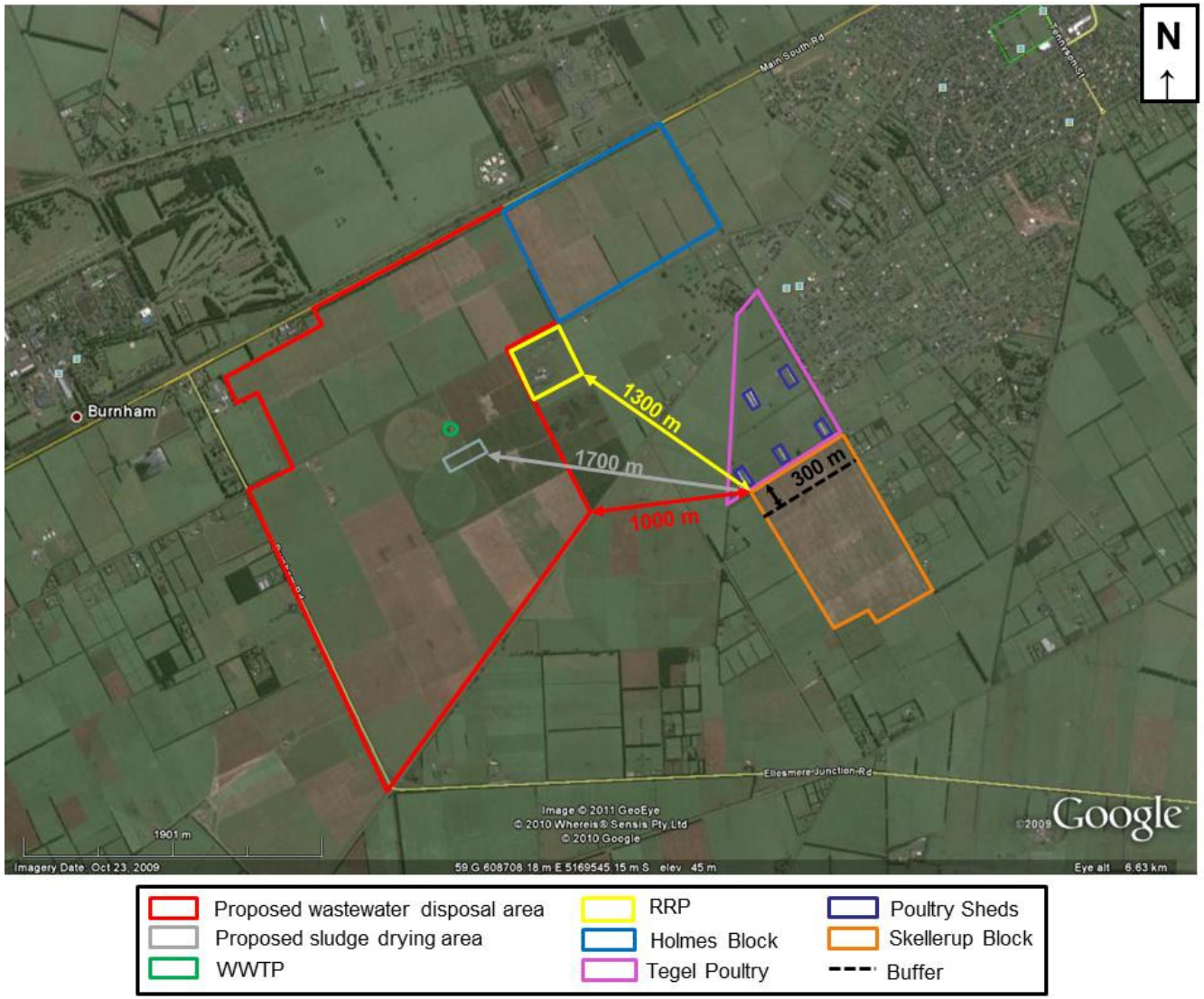


**Figure 5.2 Diagram Showing Separation Distances between the Pines WWTP, RRPand Tegel Poultry Farm and the Holmes Block**

### 5.3.4 Post Notification Changes to Plan Change 9

Since Plan Change 9 was notified the applicant has proposed a number of amendments in response to concerns raised by submitters. These amendments include adding a rule to the District Plan (rule 4.9.27) which states

*Any sensitive activity in the Living 3 Zone at Rolleston (as shown on the Outline Development in Appendix 38) shall be setback at least 200m from the northern boundary shared with Lot 3 DP20007 containing a poultry breeder farm, provided that this rule shall cease to have effect upon the cessation of intensive farming operations on Lot 3 DP20007.*

The map included in Appendix 38 is shown in Figure 5.3


**Figure 5.3 Appendix 38 Skellerup Block**

From aerial photos of the site it appears that the nearest poultry farm shed is approximately 40m from the boundary with the Skellerup Block. Hence combined with the setback distance proposed in Rule 4.9.27 a buffer distance of 240m would be achieved between the poultry sheds and any

future residences. In my opinion this is not sufficient and the setback distance in Rule 4.9.27 should be increased to at least 250m.

### 5.3.5 Summary

The emission of odour from the Pines RRP and WWTP are considered unlikely to cause adverse effects on the Skellerup Block. It is recommended that the modelling results presented by Golder be treated with caution and that a buffer distance of at least 300m be maintained between the Tegel poultry farm sheds and future residences on the Skellerup Block. In my opinion the setback distance proposed in Rule 4.9.27 is not sufficient and should be increased to a minimum of 250m.

# 6 Potential Reverse Sensitivity Effects

If Plan Change 8 and 9 are implemented and insufficient buffer distances are required there is the potential for new residences in the Holmes Block and the Skellerup Block to be adversely affected by odours from the Pines WWTP, RRP and the Tegel poultry farm. If this eventuates odour complaints may occur and the regulatory authorities may be forced to require changes at the odour producing facilities in order to reduce effects. This may result in the following outcomes, all of which would have negative financial and operational implications for the existing activities:

- Additional odour control methods may be required;
- Production levels may be reduced or prevented from growing;
- The type and scale of activities on the sites may be restricted;
- Possibility for legal action; and
- Difficulty in renewing resource consents in the future.

# 7 Conclusion

The rezoning of land from rural to rural residential at the Holmes and Skellerup Blocks may result in reverse sensitivity issues for the Pines WWTP, RRP and the Tegel poultry farm at Rolleston. Golder has recommended buffer distances between the existing odour sources and the two areas proposed for rezoning. Since the applications were made for Plan Changes 8 and 9, consents have been granted which increase the scale of the Pines WWTP and the area over which treated wastewater will be irrigated.

The buffer distances proposed by Golder are supported in the main but with some alterations. The recommended alterations are:

- Building of residences within 175 m of the common boundary between the Holmes Block and the wastewater treatment area should be restricted to accommodate the planned increase in area over which treated wastewater may be irrigated;
- Building of residences within 300m of the boundary of the site designated for the RRP and the Holmes Block should be restricted; and
- Building of residences within 300m of the sheds housing poultry on the Tegel poultry farm should be restricted on the Skellerup Block.

Since the plan changes were notified the applicant has proposed some new rules which restrict the areas where sensitive areas may be built on for both the Holmes and Skellerup Blocks. In my opinion the proposed “Odour Constrained Area” proposed for Plan Change 8 in proposed rule 4.9.28 is insufficient as is the setback distance proposed for Plan Change 9 in proposed rule 4.9.27.

Provided the recommended buffer distances are adopted the potential for reverse sensitivity effects on the Pines WWTP and RRP and the Tegel poultry farm should be low. However if sufficient buffer distances are not adopted there is the potential for adverse reverse sensitivity effects to occur which may have negative financial and operational impacts on the existing activities.

Appendix A

# QCGA Separation Distance Calculation