
under: the Resource Management Act 1991

in the matter of: the proposed Canterbury Air Regional Plan

and: **Fonterra Co-operative Group Limited**
Submitter 63146
Further submitter C15C/102825

Statement of evidence of Jason Savelio Karena Pene

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STATEMENT OF EVIDENCE OF JASON SAVELIO KARENA PENE

- 1 My full name is Jason Savelio Karena Pene.
- 2 My qualifications and experience are summarised as follows:
 - 2.1 I hold the position of Senior Environmental Engineer at Beca Limited. I hold a Bachelor of Engineering (honours) degree in Chemical and Process Engineering from the University of Canterbury;
 - 2.2 I have been employed in the assessment and management of environmental impacts for the last 15 years, with a particular focus on air quality;
 - 2.3 during that period I have completed assessments of the air quality impacts of a range of discharges to air in Canterbury, across New Zealand and overseas, including industrial discharges, road transport projects and discharges to air from the municipal, agricultural, commercial, health and educational sectors.
 - 2.4 I have conducted air quality impact assessments of a number of Fonterra manufacturing sites in the North Island;
 - 2.5 previously I have been employed as a process engineer in the fertiliser industry responsible for projects to improve environmental performance and improve control of discharges to air;
 - 2.6 I have been employed by the Greater Wellington Regional Council in the assessment and auditing of consent applications for discharges to air and to act as compliance and enforcement officer in relation to those consents; and
 - 2.7 as a consultant I have also assessed and audited consent applications for discharges to air and provided technical air quality expert advice for Environment Canterbury and other regional councils.
- 3 In relation to the Canterbury Air Plan Review process I have provided advice to Fonterra since the release of the discussion document on the process in July 2014. I have had input into Fonterra's submissions on the proposed Canterbury Air Regional Plan (*pCARP*).
- 4 I have read the evidence briefs of **Mr Tim Keir, Mr Roger Cudmore, Mr Richard Chilton** and **Ms Justine Ashley** in compiling this brief of evidence.

SCOPE OF EVIDENCE

- 5 In my evidence I discuss the following topic in relation to :
 - 5.1 the pCARP's approach to air quality management;
 - 5.2 reverse sensitivity;
 - 5.3 the pCARP odour assessment framework;
 - 5.4 the approach to management of PM_{2.5} particulate;
 - 5.5 the proposed requirements to employ the best practicable option (BPO);
 - 5.6 the appropriateness of permitted combustion rule controls; and
 - 5.7 the proposed Schedule 6 emission testing requirements.
- 6 I note that although this is a Council hearing I have read the Expert Witness Code of Conduct set out in the Environment Court Practice Note 2014. I have complied with the code in preparing this evidence and I agree to comply with it while giving oral evidence. Except where I state that I am relying on the evidence of another person, this written evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in this evidence.

SUMMARY OF EVIDENCE

- 7 The conclusions of my evidence in relation to the topics described above are summarised as follows:
 - 7.1 The pCARP's approach to air quality management:
 - (a) Fonterra's milk processing plants are located in rural settings, which have different environmental characteristics to the urban areas where the majority of air quality issues in Canterbury are manifested. The pCARP should take account of this difference.
 - (b) Clean Air Zones (CAZs) specified in the pCARP encompass rural and semi-rural areas surrounding those urban areas that feature degraded air quality. Discharges within the peripheral areas of these proposed CAZs are unlikely to impact on degraded urban air quality. The CAZs should therefore be

modified to reflect existing urban areas and future urban areas provided for in operative district plans.

- (c) The partial adoption of particulate emission offsetting requirements of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (*NES-AQ*) and application of those requirements to pCARP CAZs will lead to inconsistencies with the regulations. Emission offsetting requirements should therefore be removed from the pCARP.
- (d) Rules 7.15 and 7.16 provide more appropriately for the difference between the urban areas within the CAZs and the rural areas without than Rules 7.17 and 7.18. Rules 7.17 and 7.18 involve inappropriate use of the Ministry for the Environment (*MfE*) Ambient Air Quality Guidelines¹ (*AAQG*) and should be deleted.
- (e) Discharges within rural areas, such as Fonterra's are generally isolated, have localised impacts on air quality and have little or no cumulative impact with other point source discharges. Those discharges are unlikely to result in the creation of new polluted airsheds as insinuated in the section 32 and section 42A reports for the proposed plan. The pCARP provisions are designed to avoid the potential for this to occur (such as Rules 7.17 and 7.18) are unnecessary.

7.2 Reverse sensitivity:

- (a) The pCARP provisions do not appropriately manage reverse sensitivity, and instead seek to entrench reverse sensitivity effects on existing discharges that have occurred as a result of historical encroachment of sensitive land uses (or may occur in future as a result of such encroachment).
- (b) Policies such as 6.7 could be used to force existing, appropriately located discharges to cease as a result of land use changes over which the discharger has little or no control and without regard for the overall effects of the discharge activity (including beneficial effects).

¹ Ministry for the Environment, Ministry of Health. 2002. "Ambient air quality guidelines: 2002 update".

7.3 The proposed odour assessment framework:

- (a) It is appropriate that offensive/objectionable effects are to be avoided. However Policy 6.5, which seeks to require this, should be modified to avoid the incorrect application of the FIDOL factors to **discharges** rather than to **effects**.
- (b) The specification of the FIDOL factors as assessment criteria for offensive/objectionable odour at Schedule 2 for compliance or enforcement purposes is appropriate, but this should not be confused with requirements for assessments of odour for consent applications. To avoid confusion, the specification and description of the criteria at Schedule 2 should only be for compliance or enforcement purposes. Schedule 2 should be modified to make this clear.
- (c) Not all of the odour assessment tools described in Schedule 2 are available for the stated purpose of compliance and enforcement investigations of existing discharges. Some of the tools are, instead, more commonly used for consent application assessments of the potential for odour effects to occur in future. The tools available for compliance/enforcement investigations and consent application assessments should be clearly delineated in Schedule 2.

7.4 Approach to management of PM_{2.5} particulate:

- (a) The pCARP's approach to managing PM_{2.5} concentrations by setting a target for CAZs is appropriate in the absence of national guidelines or standards.

7.5 Requirements to employ the best practicable option (BPO):

- (a) The requirements to employ the best practicable option, as provided for in the pCARP at Policy 6.10, as proposed in the modifications to Policies 6.20 and 6.21 discussed in **Ms Ashley's** evidence and taking account of the criteria set out in the pCARP and RMA definition, are appropriate.

7.6 Appropriateness of permitted combustion rule controls:

- (a) Several of the conditions specified in the permitted combustion discharge rules are not related to and will

not manage effects and should be modified to avoid frivolous requirements for resource consent.

7.7 Schedule 6 emission testing requirements:

- (a) The specification of mandatory test methods for emission testing in the pCARP is inappropriate. To allow for discharge-specific circumstances, Schedule 6 should instead only provide recommendations for contaminants to be measured and methods to be used.

PCARP APPROACH TO AIR QUALITY MANAGEMENT

8 In this section of my evidence, I discuss the overall approach to air quality management set out in the pCARP, particularly in relation to:

- 8.1 the key discharges to air from Fonterra's Canterbury sites, and their environmental setting;
- 8.2 the boundaries of the CAZs;
- 8.3 inconsistencies with the NES-AQ;
- 8.4 other CAZ restrictions and requirements, including pCARP Rules 7.15 – 7.18; and
- 8.5 airshed management as it relates to rural areas.

Fonterra discharges and their environmental setting

- 9 As described in the evidence of **Mr Chilton**, Fonterra's milk processing sites emit a variety of contaminants, principally milk powder particulate, combustion derived contaminants including fine particulate, and odour from wastewater treatment and milk drying activities.
- 10 As illustrated in the maps provided at **Appendix A** to my evidence, Fonterra's five Canterbury processing plants are situated in rural localities. By virtue of their rural location, they are well-sited to avoid or mitigate the potential health or amenity effects of associated discharges to air.
- 11 The rural localities in which Fonterra's discharges are located generally feature:
 - 11.1 Low population densities: For example, the population densities of the three census mesh blocks within which the Darfield site is located range from 1.6 to 7.3 people per hectare, whereas the population densities of five meshblocks in the residential area surrounding ECan's St Albans air

quality monitoring station range from 41.6 to 45.7 people per hectare². Additionally, there are generous separation distances between the discharges to air at each Fonterra site and sensitive activities (e.g. rural dwellings). This means that while there may be localised impacts on contaminant concentrations in close proximity to the discharges, those localised concentrations are unlikely to cause adverse effects due to a low probability of population exposure.

- 11.2 Low emission source densities: Anthropogenic emission sources in rural areas may include isolated rural industrial activities such as those at Fonterra's sites along with quarries, domestic wood burners located at rural residences, vehicles using rural roads, outdoor burning and other agricultural emission activities. These sources are scattered throughout the rural environment, and aside from the industrial discharges, occur on an intermittent basis. In rural areas, a greater proportion of ambient particulate levels are likely to be caused by natural/non-anthropogenic emissions than in more densely populated urban areas.
- 11.3 Large separation distances from urban areas (where both population and emission source densities are high).
- 12 Overall, as indicated in the pCARP introduction, ambient air quality in rural areas is "good". There may be localised areas of impact around individual emission sources but, as described in **Mr Cudmore's** evidence, discharges from these individual sources do not generally impact on overall ambient airshed air quality. On the basis of **Mr Chilton's** evidence it is also clear that there will be instances where localised effects are unavoidable.
- 13 The characteristics of these rural air quality environments differ urban environments, which tend to feature:
 - 13.1 High emission source density across the urban areas, with widespread discharges throughout the urban localities leading to degraded ambient air quality within the airshed – especially particulate air quality.
 - 13.2 High population densities leading to a high degree of population exposure (in terms of PM₁₀ particulate the predominant domestic heating emission sources are generally located where population densities are highest).

² <http://www.stats.govt.nz/StatsMaps/Home/People%20and%20households/2013-census-population-dwelling-map.aspx>, data retrieved 7 September 2015

- 13.3 Greater pressure on land resources in urban areas also leads to a greater potential for land use conflict and reverse sensitivity effects.
- 14 Overall, ambient air quality in rural areas is good and ambient air quality issues (particularly those relating to fine particulate) are largely restricted to urban areas. I consider it important that the approach set out in the pCARP reflects this difference, including with respect to:
- 14.1 the specification and use of CAZs; and
- 14.2 Airshed management.
- 15 As the pCARP treatment of the NES-AQ regulations relates to those two classifications, I will also discuss the inconsistencies of the pCARP with the NESAQ in paragraphs 23 to 31 below.

Clean Air Zones

- 16 The pCARP carries over the approach of the operative Natural Resource Regional Plan for Canterbury (NRRP) in applying CAZ classifications to urban areas featuring degraded particulate air quality to manage that particular issue.
- 17 The NRRP specified two types of CAZ (Clean Air Zones 1 and 2). The first type (CAZ 1) was similar in extent to the airsheds gazetted for Canterbury under the NES-AQ regulations. The second (CAZ 2) were applied over wider areas surrounding the CAZ 1 areas which included rural and semi-rural areas.
- 18 The NRRP CAZ were only applied to Christchurch, Rangiora and Kaiapoi. The provisions and requirements applicable to CAZ 1 and 2 areas differed in each locality.
- 19 In general large scale combustion controls were applied within NRRP CAZ 1, while further controls on domestic heating and outdoor burning were applied within both CAZ 1 and CAZ 2 areas.
- 20 The application of different rules for different local CAZ 1 and CAZ 2 areas in the NRRP led to a somewhat confusing proliferation of rules. I consider it appropriate that the pCARP has sought to reduce the number of rules to apply consistent controls to areas within CAZs or without, regardless of locality.
- 21 However, in doing so, the pCARP has effectively applied all CAZ controls to the equivalent of the CAZ 2 areas of the NRRP, despite the largely rural or low density nature of the CAZ 2 areas. Due to their low density nature, discharges within the peripheral areas encompassed within CAZ 2 are unlikely to have any significant

impact on degraded ambient air quality within the urban areas represented by the CAZ 1. On this basis, I disagree with the Section 42A report (pages 15 – 25) that the NRRP's CAZ 2 acts "*as 'buffer areas' to reduce pollution on the airshed*".

- 22 To better reflect the urban areas where ambient air quality issues occur (including high ambient particulate concentrations), I consider that the CAZs specified in Map Series 12 of the pCARP should be modified to only encompass existing urban areas and additional areas currently zoned for urban land use under operative district plans as requested in the Fonterra submission.

Inconsistencies with NESAQ regulations

- 23 One application of the expanded CAZs in the pCARP is at Rule 7.14, which seeks to apply the PM₁₀ emission offsetting requirements of the NES-AQ (that apply to certain discharges affecting PM₁₀ levels in polluted airsheds) to discharges affecting PM₁₀ levels within the expanded CAZ of the pCARP.
- 24 If adopted, this will lead to the requirement for discharges located in rural areas of the CAZ (within the NRRP's CAZ 2 and outside a gazetted and polluted airshed) having to offset emissions within the polluted airsheds/urban areas despite there being potentially no exceedances of the NESAQ in the vicinity of the discharge.
- 25 The implications for Fonterra are, for example, that at its Studholme site, Rule 7.14 (as proposed) may require Fonterra to offset PM₁₀ emissions within Waimate Township due to PM₁₀ concentrations predicted to occur in the rural periphery around Waimate. This requirement would be in spite of the fact that those peripheral areas are unlikely to feature residential development (and human exposure to the predicted concentrations) over the life of the plan.
- 26 Helpfully, the section 42A report has recognised that the application of NES-AQ requirements to CAZs is inappropriate and has effectively recommended that Regulation 17 of the NESAQ is adopted in Rules 7.14.
- 27 While this is an improvement on the pCARP version of Rule 7.14 as it removes some of the most important inconsistencies with the NES-AQ, inconsistencies still remain. NES-AQ Regulation 17 applies particulate offsetting requirements to new or increased particulate discharges with certain characteristics³. Existing consented discharges are excluded from those requirements under Regulation

³ Regulation 17 of the NESAQ applies to discharges for which consent is sought that are likely to increase 24-hour average PM₁₀ concentrations in a polluted airshed other than the site on which the consent would be exercised. Applications for replacement of existing consents for discharges of the same rate and amount of PM₁₀ discharge as the existing consent are excluded under clause (2) of Regulation 17.

17. This has not been carried over into the pCARP (it is noted that existing discharges would be considered as new discharges under the Regulations).
- 28 Furthermore, the section 42A report has not recommended changes to Policy 6.22 (which if retained will continue to refer to offsetting within CAZs).
- 29 To avoid inconsistencies, and as it is unnecessary to reiterate the NES-AQ requirements in the plan, I consider that Rule 7.14 and Policy 6.22 should be deleted in their entirety (as outlined in Fonterra's submissions).
- 30 Fonterra's submissions (Points 24 and 26) seek the deletion of Rule 7.14 (and associated Policy 6.22). As an alternative to the adoption Policy 6.22 and Rule 7.14, Fonterra has highlighted the apparent aims of the provisions could instead be achieved by expanding the gazetted NESAQ airsheds as required (as urban areas expand). As this this would not require a plan process to enact and would be consistent with existing legislation, I consider this alternative would achieve the intent of the provisions in a more efficient and effective manner.
- 31 Overall I consider Rule 7.14 and Policy 6.22 to be unnecessary and both provisions should be deleted. As a less appropriate alternative, if Rule 7.14 is to be adopted in some form, I consider that the rule should reiterate all of the requirements of NES-AQ Regulation 17 (which the version recommended in the Section 42A report does not). Policy 6.22 should then be altered to match (with the reference to CAZs removed).

Clean Air Zone restrictions and requirements

- 32 Rules 7.17 and 7.18 proposed in the notified version of the pCARP apply different requirements for discharges located within a CAZ to those located outside the CAZs.
- 33 I agree with the intent of these rules to apply a different approach to managing ambient air quality impacts in CAZ areas where (at least in the NRRP's CAZ 1 urban areas) air quality is degraded and to areas outside of CAZ where ambient air quality is generally high.
- 34 However, as **Mr Cudmore** has described, the application of the AAQG in these rules is inconsistent with the intention of these guidelines, and is therefore inappropriate. I agree that Rules 7.17 and 7.18 should not apply activity statuses (particularly if the status is prohibited) on the basis of compliance with AAQG.
- 35 The Officers' recommendations in the Section 42A report support the deletion of Rules 7.17 and 7.18 and suggests that these should

be replaced *"with a new rule or rules that enable application of BPO as appropriate to the receiving environment, and in line with the Objectives of the Plan"*.

- 36 For the reasons outlined in paragraph 34 , I support the deletion of these rules. The application of the BPO is discussed later in my evidence at paragraphs 100 to 109. As discussed in that section of my evidence, an assessment or consideration of the BPO will, by definition, take account of the sensitivity of the receiving environment. Furthermore I consider that requirements to implement the BPO are best specified in objectives and policies (such as those discussed in **Ms Ashley's** evidence) as rules requiring implementation of the BPO will be unworkable. I therefore consider that, if deleted, Rules 7.17 and 7.18 will not require replacement.
- 37 Conversely, I consider Rules 7.15 and 7.16 to provide an appropriate type of rule framework, that is one that applies a more stringent expectation of particulate control and different management measures to discharges within CAZ areas than those located outside.
- 38 I note that the section 42A report has accepted Fonterra submissions on Rules 7.15 and 7.16 in regard to applying the requirements of these rules to PM₁₀ discharges of a certain emissions concentrations rather than emission rates. However the inclusion of "total" in the proposed amendments to the rules without further definition will reduce clarity, and I therefore consider it to be unnecessary.
- 39 I consider that subject to the modifications suggested by Fonterra, Rules 7.15 and 7.16 should be adopted to set out the differing expectations for particulate discharges and urban and rural areas. I consider Rules 7.17 and 7.18 to be inappropriate and unnecessary, and should be deleted.

Airshed management as it relates to rural areas

- 40 The NES-AQ Regulations consider all of the (largely rural) areas of the Canterbury region not encompassed within gazetted airsheds to be encompassed within one "remainder" airshed.
- 41 In reality there is likely to be little or no relationship between the air quality in one part of this "remainder" airshed with another. For example, the air quality in Southbridge is unlikely to be reflective of the air quality around Cheviot. Air quality in one location may be subject to the localised impacts of proximate discharges to air (e.g. in close proximity to a quarry there may be dust impacts), and may be subject to different environmental conditions that result in different ambient contaminant concentrations.

42 I consider the "grouping" and collective treatment of the rural areas outside gazetted airsheds as one airshed under the NESAQ to be due to regulatory expedience.

43 The pCARP seeks to carry over the collective consideration of the area outside of gazetted airsheds and CAZ collectively and essentially as one "airshed". The section 32 report (at page 4-32) states in relation to the management of Industrial and large-scale discharges to air:

Outside of polluted airsheds, management is necessary to ensure new polluted airsheds are not created.

44 In relation to Fonterra's discharges, they are isolated from other discharges to air beyond its site boundaries and are unlikely to cause cumulative impacts with other individual point source discharges located off-site. As described in the evidence of **Mr Cudmore**, Fonterra's discharges cause localised impacts on those areas within, and in reasonably close proximity, to its sites. Those discharges do not affect ambient air quality within the "remainder" airshed nor are they likely to cause the creation of new polluted airsheds.

45 In relation to other discharges to air clustered in rural areas to which the above section 42A report statement may be referring, it may be appropriate for discharges to air to be located in close proximity to each other for reasons of air quality (i.e. where there is little population exposure) and for other reasons (e.g. access to transport and water supply). If there is no population exposure and therefore no effect it may be appropriate for those discharges to be clustered together even if they cause localised concentrations within the cluster to exceed the AAQG. Again, it is the localised level of effect that is relevant to considering discharges (either individually or cumulatively) within a rural area.

46 The section 42A report (at page 10-10) states in relation to Policy 6.12:

This is necessary, particularly where emission reduction is required in order to achieve the NESAQ, but also outside of polluted airsheds, where "space" can be created for economic growth, or effects on the environment can be reduced.

47 It is unclear what "space" the Section 42A refers to. As described above discharges, such as those associated with Fonterra's processing sites, create localised impacts with the requirement for "space".

- 48 Overall, the consideration of air quality management in rural areas in the Section 32 and Section 42A reports appears confused, and this has been translated into provisions of the pCARP (such as Rule 7.17 and 7.18) that set out inappropriate and onerous requirements for discharges in rural areas.

REVERSE SENSITIVITY

The pCARP approach to managing reverse sensitivity effects

- 49 **Ms Ashley** describes reverse sensitivity and its misguided treatment in the pCARP.
- 50 I consider that the pCARP misconstrues reverse sensitivity (which is an effect on existing discharges) with the sensitivity of the receiving environment of discharges (which is an important consideration in the assessment of effects of a discharge but does not equate to reverse sensitivity). Policy 6.7 serves to entrench historical reverse sensitivity effects and Policy 6.8 places inappropriate requirements on dischargers to avoid or manage reverse sensitivity effects over which they have little or no control.
- 51 In general I consider that plan provisions requiring the management of the effects of a discharge in adjacent areas to meet the expectations, values or characteristics of those adjacent areas to be appropriate. I consider this is an important facet of air quality management.
- 52 For example, the expectations for the management of amenity effects would be higher where a discharge of nuisance contaminants into an urban high density residential area than the equivalent expectations for a discharge of the same contaminants into a sparsely or unpopulated rural area.
- 53 I do not consider that Policy 6.7 (or the associated Policy 6.6) provides for this expectation clearly and effectively.
- 54 Policy 6.7 is potentially detrimental as it relates only to discharges where the receiving environment has changed and become more sensitive. Neither Policy 6.6 or 6.7 or any of the pCARP policies specifically require or promote the management of effects of discharges to meet the expectations of the receiving environment where that environment has not changed.
- 55 Policy 6.7 also ignores the investment of the discharger in the site and the positive/beneficial effects of the activity. It is also unclear as to how the plan can require activities to relocate as it can only direct that discharges are ceased (which may infer relocation but could also lead to cessation of the activity altogether).

- 56 I therefore consider Policy 6.7 (along with Policy 6.6) should be deleted and replaced with the policies proffered in Fonterra's submission's (Point 15). The issues raised by ECan in relation to legacy issues could be managed more efficiently with policies that require management of effects to the expectations of the receiving environment

Effects of the pCARP's reverse sensitivity provisions on Fonterra

- 57 As described above, Fonterra's processing sites in Canterbury are all situated in rural localities. Each site is well-located to avoid or mitigate health or amenity effects of associated discharges to air.
- 58 The receiving environments surrounding these sites feature low population densities, generous separation from sensitive activities (e.g. rural dwellings) and are distant from urban areas. Existing district plan provisions provide for both for Fonterra's activity and the maintenance of rural, low density environmental settings. Fonterra's sites are located in accordance with what I understand to be the intent of Policies 6.6 and 6.19 of the pCARP.
- 59 However, as described in the evidence of **Ms Ashley**, land use activities in the areas surrounding the Fonterra plants are controlled by territorial authorities and, aside from potential input via any notification processes, Fonterra has no control over or input into changes in that environment.
- 60 For instance, Fonterra is likely to discourage a territorial authority from enabling the location of a new sensitive land use (e.g. rural subdivision) in proximity to its sites. However, it has little or no control over whether authorisation is given for that change in land use.
- 61 Were such a change in land use allowed to occur, and in the absence of a balancing "enabling" policy in the pCARP, as discussed in **Ms Ashley's** evidence, Policy 6.7 as currently proposed in the pCARP could potentially be used to force Fonterra to cease operation (relocate) regardless of the existing investment it has in the site or the benefits it brings to the local and wider community. I consider this example serves to illustrate the inappropriateness of Policy 6.7.
- 62 As a result I consider Policies 6.6 – 6.8 in the pCARP should be deleted and replaced as recommended in Fonterra's submissions (Points 15 and 16). The definition of reverse sensitivity (if one is to be adopted) should reflect the description contained in the Regional Policy Statement (RPS), as outlined in **Ms Ashley's** evidence.
- 63 Further provision could be included in the pCARP to encourage territorial authorities to manage land use conflicts to avoid reverse

sensitivities on existing appropriately located discharges. This is currently achieved in the NRRP by Policy AQL5(c). However, in my experience regional plan provisions are generally given little or no weight in district planning decisions. Instead the RPS already includes provisions of this nature (such as RPS Policy 14.3.5), which the district council is required to give effect to.

ODOUR ASSESSMENT FRAMEWORK

- 64 In the following section of my evidence I discuss the overall approach to odour assessment set out in the pCARP, particularly in relation to:

64.1 use of FIDOL factors at Policy 6.5

64.2 Schedule 2 as it describes Odour Assessment Criteria

64.3 Schedule 2 as it describes Odour Assessment Tools

Use of FIDOL factors at Policy 6.5

- 65 I consider it consistent with good air quality management practice in New Zealand that odour, dust or other nuisance discharges are managed so that offensive or objectionable effects beyond the activity boundary are avoided. I consider it appropriate that this is stated in pCARP policy.
- 66 Policy 6.5 in the pCARP does this, but goes further to include what I consider to be a misapplication of what are termed the FIDOL factors.
- 67 The FIDOL factors provide a framework for determining the scale of observed nuisance effects. In New Zealand they are commonly used by regional council enforcement officers for determining whether odour or dust has caused an offensive or objectionable effect.
- 68 Additionally they also may be used as a framework for considering consent applications for nuisance discharges when determining the scale of nuisance effects that may result and whether offensive or objectionable effects may occur as a result of granting the application.
- 69 I describe the FIDOL factors as they relate to generic nuisance effects (that could be caused by odour, dust or smoke) in the following table:

Frequency	How often the nuisance effect is occurring. This can be influenced by the frequency of the nuisance contaminant discharge but will also be influenced by environmental factors such as wind conditions (e.g. the frequency of exposure to a constant discharge will be highest downwind in the prevailing wind direction).
Intensity	The strength of the nuisance effect observed. This can be influenced by the strength of the nuisance contaminant discharge but also the degree of dispersion/dilution that has occurred before it reaches the receptor or observation location.
Duration	The length of the nuisance. Similarly to the frequency factor, the duration of odour observed can be influenced by both the duration of the discharge and also wind conditions.
Offensiveness/ character	The character relates to the 'hedonic tone' of the nuisance, which may be pleasant, neutral or unpleasant. In relation to odour this can vary markedly by odour type (e.g. floral odour may be perceived as pleasant in small doses whereas sewage odour usually has a distinctly unpleasant perception).
Location	The sensitivity of the receptor or observation location to nuisance effects will influence the degree of nuisance effect at that location. For instance in a residential area the expectation of amenity and sensitivity to odour will be high, whereas if the nuisance contaminant is discharged into an unoccupied area from which the public is excluded the sensitivity is likely to be low.

- 70 As noted in the *Criteria for assessing offensive or objectionable odour* section of Schedule 2 of the pCARP (where the FIDOL factors are described) they are used to assess effects. To assess effects the FIDOL factors are required to be applied where the effect is occurring (e.g. at the point of odour occurrence or observance). Policy 6.5 does not seek to apply the factors at the point of effect but instead incorrectly applies the factors to the discharge.
- 71 The discharger has little or no control over the sensitivity of the receiving environment and therefore cannot control the "L" or location factor. The discharger can only be reasonably expected to control the FIDO of the discharge in order to manage the FIDO of the resulting nuisance effect experienced at locations within the receiving environment.
- 72 Overall I consider it appropriate that a FIDOL factor description is provided in the pCARP (at Schedule 2, subject to modifications described below). However, I consider that Policy 6.5 requires correction to avoid confusion over the application of those factors. I consider the version suggested in Fonterra's submissions to do so in an appropriate manner.

Schedule 2 – Odour Assessment Criteria

- 73 The *Criteria for assessing offensive or objectionable odour* which is provided in section of Schedule 2 describes the criteria (being the FIDOL factors) to be used to assess offensive or objectionable effects. The purpose specified for use of these criteria in the pCARP is where assessments of odour are required for the purposes of assessing compliance, and by association enforcement, investigations.
- 74 As above I consider it appropriate for the pCARP to specify the criteria it will use for this purpose. Further, the criteria description provided in Schedule 2 confuses the stated purpose of the assessments (compliance) with an alternative purpose (assessing consent applications for odour discharges).
- 75 The focus of each type of assessment differs:
- 75.1 A compliance investigation is focused on determining whether offensive/objectionable odour **has** occurred (and resulted in a breach of consent conditions or the other matters described in Schedule 2). The historical nature of breaches of those matters is acknowledged in the third paragraph of the section, which states (emphasis added): ... *in the event that an assessment determines that a discharge **has** caused an "offensive or objectionable" effect beyond the property boundary....*
- 75.2 An assessment for a consent application is focussed on determining whether offensive/objectionable odour **may** occur over the lifetime of the consent.
- 76 This confusion is manifested in a number of areas of this section of the pCARP as highlighted in Fonterra's submissions.
- 77 For example, criterion 5 of the Criteria for assessing offensive or objectionable odour (relating to the "L" or location of the FIDOL factors) is described as follows:
- The location of the odour, having regard to the sensitivity of the receiving environment, including taking into account the relevant zone(s) and provisions in the relevant District Plan.*
- 78 I consider that assessing the sensitivity of activities allowed in an area zoned in a district plan within the receiving environment of a discharge (and may be reasonably expected to occur over the lifetime of a consent) to be a reasonable factor to be considered in determining whether a consent for the discharge should be granted.

79 However, in determining whether an offensive and objectionable effect has occurred and resulted in a breach of the matters described in the Schedule 2, the consideration can only include the sensitivity of activities subject to that effect (i.e. the sensitivity of activities existing at the time). I therefore agree with Fonterra's submissions (Point 28) that "*including taking into account the relevant zone(s) and provisions in the relevant District Plan*" should be deleted.

80 Likewise the text of the initial paragraph should be modified to exclude "is likely to", as follows, to limit the consideration to the correct historical tense:

The Canterbury Regional Council, for the purposes of assessing compliance with permitted activity conditions, resource consent conditions, or sections 17(3)(a), 314(1)(a)(ii) or 322(1)(a)(ii) of the RMA, will have regard to the following matters when determining whether or not a discharge of odour ~~is likely to, or~~ has caused an objectionable or offensive effect:

81 The Section 42A report has sought to address the confusion over the purpose of assessments described in Schedule 2 by including the text "*and applicants for resource consents carrying out assessments pursuant to this Schedule*" in the paragraph above. I consider this recommended change to be unhelpful as it will further confuse the purpose of the criteria and dilute their clarity and effectiveness.

82 Alternatively, I consider that the description of criteria and odour assessment tools should be clearly segregated in Schedule 2 into the two assessment purposes described above. To avoid confusion over the purpose of the criteria for assessing offensive or objectionable odour I consider its scope should be limited to assessments for compliance purposes only, as proposed in the pCARP.

83 In addition to the confusion over purpose, Fonterra's submissions note that Criterion 2 (relating to the "I" or intensity of the FIDOL factors) incorrectly includes a reference to the character of odour. The character is taken into account in Criterion 4 (relating to the "O" or offensiveness/character of the FIDOL factors), and I consider that the reference to character should be deleted from Criterion 2.

84 The potential effect of the inaccuracies of this section of Schedule 2 is an enforcement officer making an ill-informed consideration of whether offensive/objectionable odour has occurred, and consequently requiring dischargers that value a good record of compliance to expend significant time and resources to disprove the erroneous consideration.

Schedule 2 – Odour Assessment Tools

- 85 The *List of Tools* that follows the *Criteria for assessing offensive or objectionable odour* in Schedule 2 continues the confusion over the purpose of odour assessments.
- 86 Each of the tools listed in this section of the pCARP are available for use in odour assessments conducted for consent applications. However, few of the listed tools are available for determining whether offensive/objectionable effects have occurred for the purposes of assessing compliance, and if required, to inform any subsequent enforcement action that may require court proceedings.
- 87 For instance:
- 87.1 odour dispersion modelling may be useful in determining the scale of effects that may occur from a proposed odour discharge to inform a consent application. However, this method is unlikely to be used in determining whether and offensive/objectionable effect has occurred due to an existing discharge; and
 - 87.2 a consideration of odour control/mitigation methods, whether they equate to the BPO and whether there may be appropriate alternatives is a requirement for a consent application for an odour discharge. However, consideration of those matters is irrelevant in determining whether an offensive/objectionable effect has occurred (though they may have some subsequent bearing on whether enforcement action is to be taken).
- 88 It is my view that compliance and enforcement investigations instead rely principally on site investigations by regional council enforcement officers, whether in response to complaints or otherwise.
- 89 Community involvement into compliance and enforcement investigations is usually provided via collection of neighbour witness statements or affidavits. Such statements could be in relation to the acute effects of a specific incident or may relate to chronic effects observed over a period of time. Statements could be augmented by records of nuisance observations compiled by the witness/neighbour (e.g. in the form of odour diaries).
- 90 Similarly, community odour annoyance surveys conducted by anonymous telephone survey methods may be useful for determining the general level of odour annoyance within a community to inform the re-consenting of an existing discharge. However, in relation to compliance investigations they are more likely to be used to determine the general level of annoyance or

nuisance effect resulting from an existing odour discharge. If annoyance levels are identified to be high this is likely to require further investigation to determine whether chronic exposure to odour is causing an offensive or objectionable effect.

- 91 Given the unsuitability of the many of tools listed in Schedule 2 for the stated purpose of compliance/enforcement investigations of existing discharges, Fonterra submitted that Schedule 2 relating to odour should be deleted from the *List of tools* onwards. Additionally the submissions recommended that reference be instead made to the more extensive description provided in MfE guidance on odour assessment and management⁴ (hereafter I refer to this document as the "MfE Odour Guide").
- 92 However, subsequent to the lodgement of Fonterra's submissions on the pCARP, MfE has initiated a process of review and revision of the MfE Odour Guide.
- 93 Having been involved in this consultation process , it is apparent that there are likely to be substantive changes to the description of the odour assessment tools provided in the existing MfE Odour Guide. As a result the future content of the MfE Odour Guide and its relevance and appropriateness for odour assessment is currently uncertain.
- 94 Given this uncertainty I consider it appropriate that a description of available odour assessment tools is retained at Schedule 2 but that clear specification of the purpose of odour assessments and the tools available for each purpose should be provided in the schedule. I consider that the modifications to Schedule 2 proffered in the attachment to **Ms Ashley's** evidence would achieve this outcome.

APPROACH TO MANAGEMENT OF PM_{2.5} PARTICULATE

- 95 **Mr Cudmore** has described the AAQG, which include guidelines for ambient PM₁₀ concentrations.
- 96 As indicated in **Mr Cudmore's** evidence, health research indicates that finer fractions of particulate (e.g. of PM_{2.5}) are primarily responsible for health effects of ambient particulate⁵. As PM_{2.5} concentrations are an issue in urban areas throughout the country I consider guidelines or standards for PM_{2.5} should be set at a national level in the first instance. However, at present, the AAQG do not

⁴ Ministry for the Environment. 2003. "Good practice guide for assessing and managing odour in New Zealand".

⁵ World Health Organisation, Regional Office for Europe. 2013. "Review of evidence on health aspects of air pollution – REVIHAAP Project. Technical Report".

cover PM_{2.5} concentrations and PM_{2.5} is not governed under the NES-AQ regulations.

97 In the absence of national standards or guidelines I consider the pCARP approach to managing ambient PM_{2.5} concentrations through the use of a 2030 target in preference to a guideline to be appropriate. I agree with recommendation in the section 42A report for retention of Policy 6.4, which is in agreement with Fonterra submission point 13. I agree that

98 The PM_{2.5} definition recommended for adoption in the section 42A report is incorrect. PM_{2.5} is defined by the World Health Organisation⁶ (WHO) as:

"particulate matter with an aerodynamic diameter smaller than 2.5 µm".

99 I consider this would provide a more appropriate definition for the plan. Similarly if this definition were to be adopted for PM_{2.5}, PM₁₀ should also be defined as:

"particulate matter with an aerodynamic diameter smaller than 10 µm".

REQUIREMENTS TO EMPLOY THE BEST PRACTICABLE OPTION (BPO)

100 A range of methods and measures are employed by operators of discharges to air to control or manage emissions and to avoid or mitigate adverse effects on the environment.

101 These measures may relate not only to the control or treatment of emissions to air but also to the minimisation of emissions at source (e.g. measures that increase process efficiency), containment of emissions (e.g. enclosure of diffuse emission sources) or dispersion of emissions (e.g. via chimney stacks).

102 In choosing which methods are most appropriate for a particular discharge, the pCARP (at Policy 6.10) proposes to require the application of the BPO. This approach is currently applied in the NRRP and is consistent with section 108 of the RMA (relating to conditions of consent for discharge permits).

103 The BPO is defined in the pCARP (as well as in the RMA) as the best method for preventing or minimising the adverse effects on the environment, having regard, among other things, to the criteria described in the following table:

⁶ Ibid.

BPO Criteria		Comment
1	The nature of the discharge or emission and the sensitivity of the receiving environment to adverse effects	The sensitivity of the receiving environment to adverse effects can include not only the sensitivity of proximate activities but also the existing background level of exposure to the discharged contaminants.
2	The financial implications, and the effects on the environment, of that option compared to other options	High-cost mitigation measures generally have a design life, the financial implications of replacement with newer technology before the end of that intended lifetime may have significant financial implications.
3	The current state of technical knowledge and the likelihood that the option can be successfully applied	Technological advances in mitigation methods are likely to occur over time. This is recognised in Policy 6.12. The speed of advances will vary (e.g. control methods for diffuse dust sources have changed relatively little compared to electronic process control methods that may minimise the generation of contaminants from combustion or industrial processes). The feasibility of employing certain mitigation methods may be dependent on discharge circumstances.

- 104 A BPO consideration takes account of all of the criteria collectively. For instance, the technology expectations of a discharge in a sensitive environment (e.g. a particulate discharge in a polluted airshed or an odour discharge in a residential area) are higher than an equivalent discharge into a comparatively insensitive environment (e.g. an equivalent particulate discharge into an unpopulated rural environment).
- 105 The requirement to apply the BPO does not preclude a discharger from employing methods that exceed the BPO. As described by **Mr Chilton**, Fonterra has employed combustion particulate emissions control technology that would equate to current best industry practice despite discharging into the relatively insensitive receiving environment.
- 106 The section 42A report (at pages 13–7 and 13–8) discusses the application of the BPO in new (unspecified) policies and rules intended to replace Policy 6.20, 6.21 and Rules 7.17 and 7.18.
- 107 I consider that requirements to implement the BPO for avoiding or mitigating environmental effects are most appropriately specified in policies and objectives. I consider the modifications to Policies 6.20

and 6.21 proposed in **Ms Ashley's** evidence to set out this requirement for industrial and large scale discharges in an effective manner.

- 108 On the other hand, I consider that any determination of activity status specified in plan rules based on application of the BPO would be unclear, subject to subjective interpretation and, as a result, broadly unworkable. In my opinion, such rules should be avoided in favour of rules of the nature of Rule 7.15 and 7.16.
- 109 Overall I consider the approach to require the adoption of the BPO for minimising adverse effects on the environment to be appropriate and should be retained within the pCARP at Policy 6.10. Additionally, the modifications to Policy 6.20 and 6.21 proposed in **Ms Ashley's** evidence would provide further suitable guidance on the application of the BPO to industrial and large scale discharges. Conversely I consider that rules relating to implementation of the BPO would be unnecessary and unworkable.

APPROPRIATENESS OF PERMITTED COMBUSTION RULE CONTROLS

- 110 Fonterra's submissions (point 29) highlight that a number of conditions of the permitted combustion discharge rules (Rules 7.19 – 7.22) do not relate to or manage environmental effects. These submissions are not addressed in the section 42A report.
- 111 Conditions 7.19(3), 7.20(4), 7.21(5), 7.22(6)) relate to buildings of a certain height (relative to ground level) within 25 m of a discharge. Although proximity (in both the horizontal and vertical dimensions) of the discharge to adjacent buildings or structures that may cause downwash or eddy effects on the discharge plume can be an important influence on the localised impacts of the discharge, the conditions take no account of vertical proximity of the building and discharge. With sufficient vertical clearance of the discharge above an adjacent building, its horizontal proximity may not have any influence on the effects of the discharge.
- 112 Similarly conditions 7.20(5), 7.21(5), 7.22(6)) relate to a variation in ground level elevation of 0.5 m or more within 25 m of a discharge. A discharge from a lower elevation relative to surrounding areas may lead to impingement of the emission plume and higher contaminant concentrations in surrounding areas of higher elevation. However a discharge from a higher elevation will have a reduced effect on lower elevation areas. I consider that the apparent intent of the conditions (to manage potential impingement at higher elevations) would be more effectively achieved through conditions relating to minimum stack heights relative to the ground level of all areas within 25 m of the discharge.

- 113 In order to avoid frivolous requirements for consent for discharges where effects are otherwise below (and potentially well below) the permitted baseline provided by the remaining conditions of the rules, I consider the conditions should be modified as set out in Fonterra submissions.

SCHEDULE 6 EMISSION TESTING REQUIREMENTS

- 114 Schedule 6 of the pCARP specifies mandatory test methods to be used for the testing of particulate emissions from combustion sources.
- 115 I consider that the specification of mandatory emission test methods to be inappropriate and instead consider that recommendations or a statement of expectations for monitored contaminants and methods would be more appropriate to be specified at Schedule 6.
- 116 The potential for discharge-specific test conditions to exist is narrowed by the application of the requirements of Schedule 6 to combustion sources only. However, there will still be variation in fuels, fuel condition, emission control methods and combustion plant design that will influence the suitability of test methods.
- 117 Test methods are liable to change over the prospective lifetime of the pCARP. Furthermore certain methods identified in Schedule 6 have fallibilities as indicated in the submissions of Fonterra (Point 32) and Winstone Wallboards. For example:
- 117.1 In relation to USEPA Method 202 (measuring condensable particulate) – the USEPA has acknowledged that there are deficiencies in Method 202 that may result in positive bias and overstate condensable particulate emissions. Testing in accordance with Method 202 is in the order of three times more expensive than testing using the filterable methods specified earlier in the schedule.
- 117.2 In relation to Method 201A (measuring PM₁₀) – Winstone Wallboards have pointed out that Method 201A cannot be used where moisture levels are high or “saturated”. I agree with the modifications proposed by Winstone Wallboards in principle but consider that “saturated” should be defined, as outlined in Fonterra further submissions.
- 118 Overall I consider that if the second half of Schedule 6 is not deleted, as sought in Fonterra submissions, it should be modified as described in the attachment to **Ms Ashley’s** evidence to provide recommendations that could be used as a basis for discussions between Canterbury Regional Council and consent

applicants/holders regarding the most appropriate test methods to be used on a case by case basis.

Dated: 18 September 2015

Jason Savelio Karena Pene

Appendix A

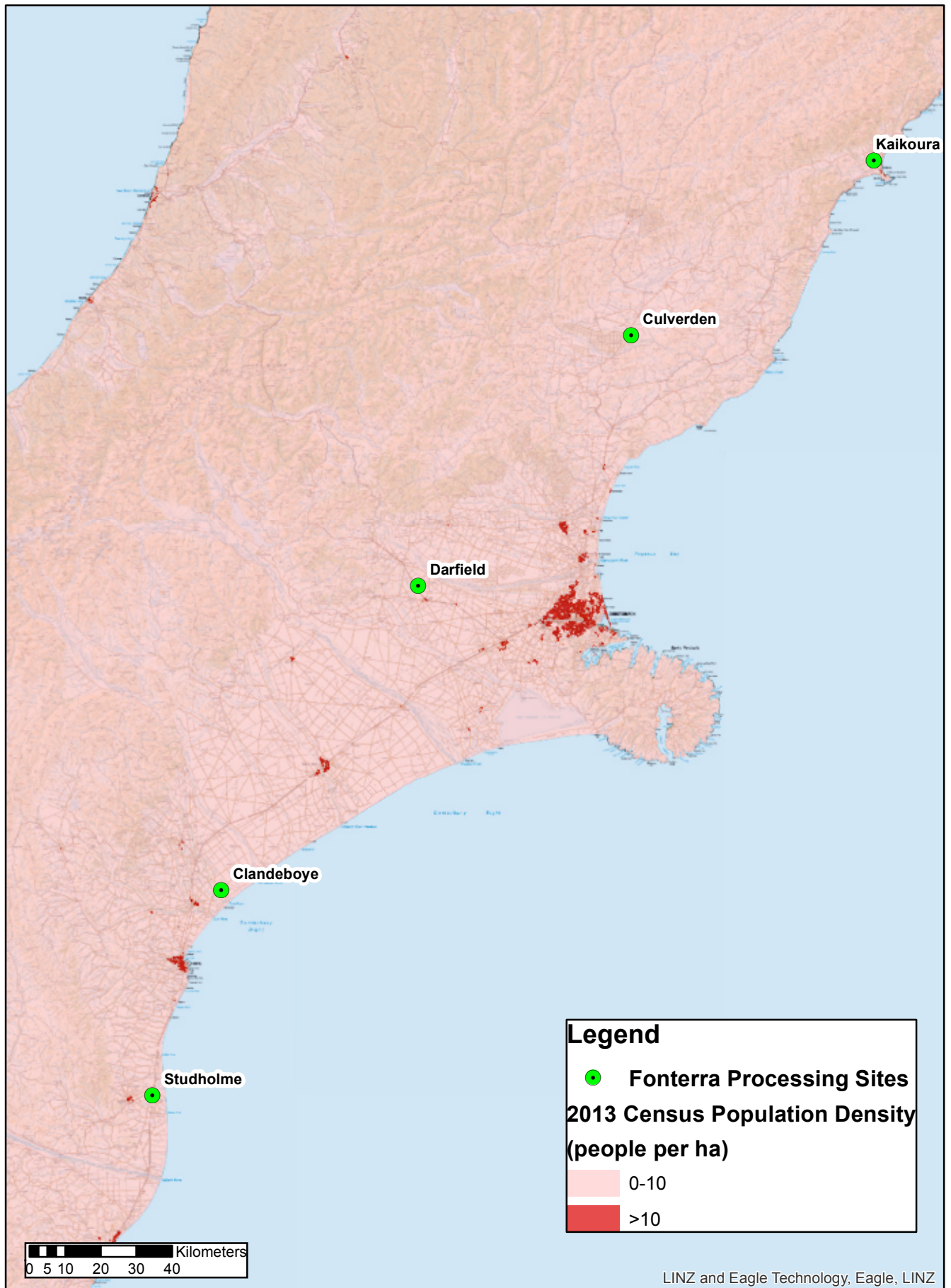


Figure A1: Fonterra Processing Site Locations and 2013 Census Population Densities by Meshblock
Source: Stats NZ

Appendix A

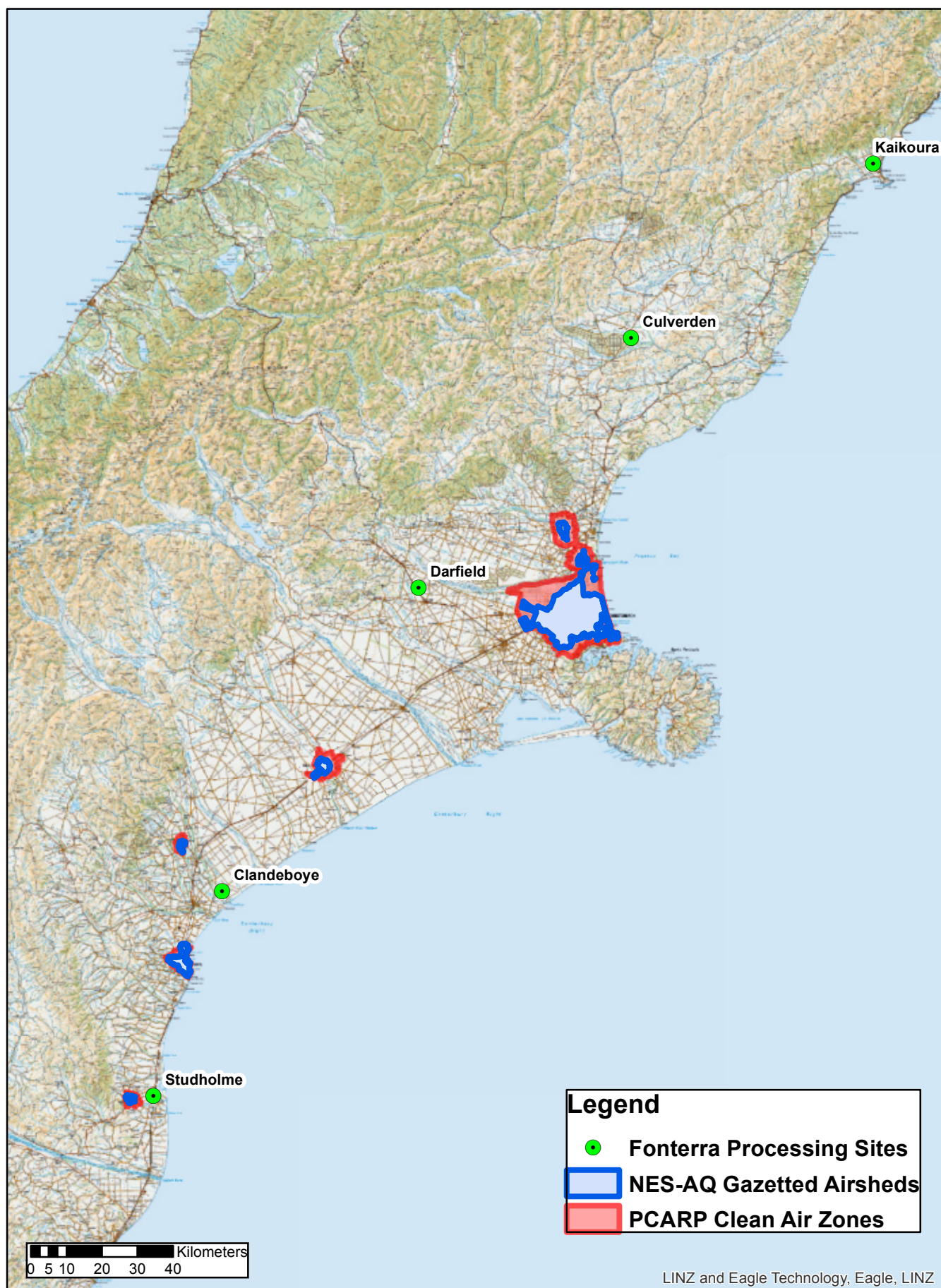


Figure A2: Fonterra Processing Site Locations, pCARP Clean Air Zones and NES-AQ Airsheds

Source: Stats NZ