



Technical Advisor Report

Further advice on the Orion New Zealand Ltd CPP Proposal and submissions

**Report to
The Commerce Commission**

Strata Energy Consulting Limited

19 November 2013

This report has been prepared to assist the New Zealand Commerce Commission (the Commission) with its determination of a customised price-quality path (CPP) for Orion New Zealand Limited (Orion).

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About Strata

Strata Energy Consulting Limited specialises in providing services relating to the energy industry and energy utilisation. The Company, which was established in 2003, provides advice to clients through its own resources and through a network of Associate organisations. Strata Energy Consulting has completed work on a wide range of topics for clients in the energy sector both in New Zealand and overseas.

Brief biographies for the authors of this report are provided in Annex B.

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1 Introduction

1.1 Purpose of this report

- 1 On 2 August 2013 Strata Energy Consulting Limited (Strata) provided a Technical Advisor Report¹ to the Commerce Commission (the Commission) containing advice on various technical aspects of Orion NZ Limited's (Orion) Customised Price-quality Path (CPP) proposal. Subsequent to the Commission publishing its Draft Decision on the CPP proposal, submissions from Orion and other stakeholders have been received by the Commission.
- 2 This report provides further advice on technical aspects of Orion's CPP proposal taking into account the feedback provided in submissions.
- 3 The report contains a summary of Strata's findings and advice on adjustments to Orion's proposed expenditures.

1.2 Context

- 4 The expenditure objective requires that expenditure forecast in Orion's CPP proposal represents the efficient costs that a prudent supplier subject to price-quality regulation would require to:
 - (a) meet or manage the expected demand for electricity distribution services, at appropriate service standards, during the customised price-quality path regulatory period and over the longer term; and
 - (b) comply with applicable regulatory obligations associated with those services.²
- 5 If the CPP proposal is considered by the Commission not to meet the expenditure objective, adjustments will be required to produce a reasonable forecast that reflects the expenditure that would meet the expenditure objective.

¹ Strata Energy Consulting Limited "Technical Advisor Report on the Opinion on the Orion New Zealand Ltd CPP Proposal" (2 August 2013).

² *Electricity Distribution Services Input Methodologies Determination 2012* [2012] NZCC 26, clause 1.1.4.

- 6 In developing advice for the Commission, Strata has used the expenditure objective as the primary benchmark when assessing Orion's forecast expenditure. Secondary benchmarks such as good industry practice, asset management standards, and Orion's policies and standards have also been used.
- 7 Strata has also drawn on the experience of its principals from similar reviews of other electricity network businesses in New Zealand and internationally.

1.3 Information reviewed

- 8 Strata has reviewed:
 - (a) Orion Proposal for a Customised Price Path 19th February 2013 including appendices
 - (b) Geoff Brown Associates Verification Report and information provided at the Verifier's workshop with the Commission
 - (c) Additional information provided by Orion to the Commission at workshops and in response to information requests
 - (d) The Commission's Draft Decision on Orion's CPP proposal
 - (e) Orion's submission of 20th September on the Commission's Draft Decision
 - (f) Additional information provided by Orion in response to requests made by the Commission subsequent to the receipt of Orion's submission on the Draft Decision.
 - (g) Submissions on the Draft Decision made by:
 - (i) Auckland International Airport Limited
 - (ii) ANZCO Foods Limited
 - (iii) Christchurch City Holdings
 - (iv) Christchurch International Airport Limited
 - (v) Contact Energy Limited
 - (vi) The Electricity Networks Association
 - (vii) Meridian Energy Limited
 - (viii) The Major Electricity Users Group
 - (ix) Powerco Limited
 - (x) Selwyn District Council

- (xi) Transpower New Zealand Limited
 - (xii) Unison Networks Limited
 - (xiii) Vector Limited
 - (xiv) Wellington Electricity Lines Limited
- (h) Cross submissions from:
- (i) The Electricity Networks Association
 - (ii) The Major Electricity Users Group
 - (iii) Orion

1.4 Structure of this report

- 9 This report is structured to provide headlines, discuss major submission themes and summarise a number of proposed expenditure adjustments. The approach followed in this report does not repeat the advice provided in Strata's previous report on Orion's CPP proposal. It addresses the major themes arising from submissions and assesses Orion's response to the Commission's Draft Decision.
- 10 In each of the expenditure review areas Strata provides:
- (a) a summary of the key points of the Draft Decision;
 - (b) relevant points made in Orion's submission on the Draft Decision;
 - (c) relevant points made by other submitters;
 - (d) Strata's consideration of and response to key points made in submissions; and
 - (e) Strata's recommendations to the Commission.
- 11 This conclusions reached in this report are based on the professional experience and opinion of the authors, using a range of information provided to Strata by the Commission. Strata has also relied on the Commission's analysis and modelling in forming some of its views.

2 Headlines

- 12 In its submission on the Draft Decision Orion has proposed significant revisions to its original CPP proposal and, in addition, has:
- (a) confirmed Strata’s opinion that the initial expenditure forecasts in the CPP proposal were excessive;
 - (b) reinforced Strata’s opinion that there is an absence of evidence that an adequate internal top-down assessment and challenge had been undertaken by Orion; and
 - (c) strengthened Strata’s opinion that consumer and stakeholder consultation are insufficient on their own to justify network development expenditure that is beyond that required to restore the network to pre-earthquake security and reliability standards.
- 13 After taking into account comments in a number of submissions regarding asset management planning, Strata continues to hold the view that Orion’s CPP proposal is reflective of inefficient forecasting rather than inappropriate planning. This has led to an excessive forecast in most expenditure areas that Orion has partially sought to address in its subsequent submission.
- 14 A key point that Strata has considered in reaching its decision is whether the expenditure forecast reflects efficient and prudent costs that Orion is likely to actually incur during the CPP period. In Strata’s opinion, Orion’s submission has adjusted its expenditure forecast appropriately in some areas but not all. For example, Orion has substantially accepted the Commission’s adjustments to opex and has also made material downward adjustments to its replacement capex expenditure proposal.
- 15 In Strata’s view, some of Orion’s revised expenditure forecast is not justified and does not meet the expenditure objective because:
- (a) the proposed costs cannot be considered to be efficient and prudent if they do not reflect the costs that Orion is reasonably expected to incur during the CPP period;
 - (b) the forecast capital expenditure for developing the network is based on a planning standard that goes beyond the return to pre-earthquake quality levels that are expected by Orion’s consumers and other stakeholders;
 - (c) the timing of some major capital projects can be adjusted to achieve efficient and prudent costs required to deliver appropriate service levels during the CPP, whilst retaining options for the long term network architecture;

- (d) Orion’s adjustments to its forecast asset replacement capital expenditure take into account the application of prudent decision-making. However, as Orion indicates that further efficiency gains are likely to be made, the forecast is still considered to not fully comply with the expenditure objective; and
- (e) Orion has not adequately justified the expenditure for replacement of some asset categories on a basis additional to average age, asset health and condition.
- 16 For opex, Orion disagreed with the rationale provided in the Draft Decision but has accepted the adjustments recommended by Strata³ and provided in the Draft Decision. Strata considers that Orion’s adjusted opex forecast for the CPP period meets the requirements of the expenditure objective.
- 17 After taking into account points made in submissions and additional information provided by Orion, Strata’s revised views on the adjustments that are appropriate to make to the CPP proposed expenditure are:⁴
- (a) Development capex –
- (i) CPP 1 – a reduction of \$13.2m of proposed expenditure within the CPP period
- (ii) CPP 2 – is a committed project, no adjustment to be made; and
- (iii) CPP 3 to 20⁵ – a reduction of \$30.4m of proposed expenditure within the CPP period
- (b) Replacement capex –
- (i) inclusion of the \$3m required for Papanui transformers but omitted in error from Orion’s CPP proposal;
- (ii) a reduction of \$10.8m to take into account improved expenditure forecasting, reductions that are expected to be realised through the application of prudent management during the CPP period and reductions expected from the roll-over of work into the next period due to programme deliverability concerns.

³ After taking into account a calculation error made when applying the defect rate cap for cables in the emergency maintenance category.

⁴ The adjustment amounts stated are relative to the revised amounts included by Orion in its submission on the Draft Decision.

⁵ Note that, like CPP2, CPP5, CPP18 and CPP 20 are already committed projects with no expenditure forecast to occur within the CPP period.

- (c) Network opex –
 - (i) Orion has accepted the adjustment made to the CPP period opex forecast⁶ – no further adjustments are considered to be necessary for the expenditure to meet the expenditure objective.

18 The remainder of this report provides the rationale for these headline findings.

⁶ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 314.

3 Review of major projects capex

3.1 Consideration of major submission themes

- 19 This section sets out Strata’s views on the key submission themes related to major capex projects. These themes have been determined by considering each of the 15 submissions and 3 cross submissions received by the Commission following publication of its Draft Decision. Submissions and cross submissions are collectively referred to as “submissions” in this report.
- 20 As has been previously stated, Strata’s brief was to advise the Commission as to whether the expenditure proposed by Orion, within a set of specific capex and opex categories, meets the expenditure objective.
- 21 Assessing expenditure against the expenditure objective firstly requires that:
- (a) appropriate service standards are determined; and
 - (b) the expected demand for Orion’s services is determined.
- 22 The former relates to quality standards and the latter to connections and consumption forecasts that aggregate into demand forecasts at various levels in the network.
- 23 Accordingly, Strata’s review of key submission themes related to major capex projects starts by looking at views related to quality and demand, including planning uncertainty. The review then considers the more technical feedback received relating to expenditure and considers whether the proposed expenditure meets the expenditure objective.

3.1.1 Submission themes relating to quality

- 24 Strata has noted a range of views within submissions in relation to quality and considers that a number of questions arise from these submissions:
- (a) what quality standards should apply to Orion’s services?
 - (b) what can be determined from the initiatives to consult with consumers?
 - (c) if less is spent in the CPP period will this impact consumers’ long-term needs?

(d) what is resilience and how does it relate to planning standards?

25 These questions are considered in the following sections.

What quality standard should apply to Orion's services?

26 Quality is the measurable performance of an electricity distribution business's (EDB's) regulated services in terms that are meaningful to consumers. The usual quality measures for electricity distribution services related to reliability of supply are SAIDI, SAIFI and CAIDI. These measures focus on the continuity of electricity supply provided by the EDB's network at and above 11kV.⁷ Any two of these measures enables calculation of the third – consequentially, SAIDI and SAIFI are the usual service measures referenced.

27 In its CPP proposal, Orion proposed customised SAIDI and SAIFI limits for each of the years in the CPP period.⁸ Orion stated that:

- (a) the reliability limits it has proposed reflect the short-term impact of the earthquakes on its network and its target of returning quality levels to near pre-earthquake levels by 2019; and that
- (b) these reliability limits would meet the needs of its consumers over the CPP period and beyond.

28 In its Draft Decision, the Commission accepted Orion's proposed reliability limits but did not accept that Orion needed to spend all of the amounts included in its expenditure proposal in order to provide service that meets the reliability limits.⁹ This report provides further consideration of the trade-off between expenditure and quality in a later section.

29 Whilst the Commission has accepted Orion's proposed reliability limits over the CPP period, submissions have provided a considerable number of views in relation to the role of consumer consultation in determining consumer price/quality needs. Strata considers this feedback in the next section.

What can be determined from the efforts to consult consumers?

30 Orion has stated in its CPP proposal and in its submission on the Draft Decision that it has the full backing of its consumers in seeking to restore

⁷ These measures are, in fact, a subset of consumers' quality expectations but are the currently accepted proxy measures representing quality of supply. In particular, the reliability of any low voltage (LV i.e. 400/230 volt) equipment involved in supply to a consumer is not included in SAIDI or SAIFI metrics and the waveform quality of delivered electricity (i.e. voltage and frequency quality, frequently referred to as "power quality") is also not included.

⁸ Orion "Proposal for a customised price-quality path" (19 February 2013), p.89.

⁹ Commerce Commission "Setting the 2014-2019 customised price-quality path for Orion New Zealand Limited – Draft decision" (14 August 2013), paragraphs L15, L21.

the quality of its services to near pre-earthquake levels by the end of the CPP period (2019).

- 31 Orion's consultation process, undertaken in 2012, included information relating its proposed quality and price paths – a 15% increase in 2014 and a 1.2% increase above inflation in each of the following 4 years. However, Orion's proposal to consumers was for a single price/quality option – it provided no information on alternative price/quality paths that would give consumers information on the sensitivity of its proposal to different assumptions. Strata considers that providing sensitivity information of this sort to consumers is an essential component of fully informing consumers prior to soliciting their preferences. In its absence, it is not possible for consumers to provide fully informed views that may be relied upon.
- 32 In Strata's view, reliance solely on consultation has limitations in that the process seeks to determine the reasonable needs of a large population of consumers with diverse interests and priorities. Some consumers will clearly be more price-sensitive than others and no single view can truly represent a population view.
- 33 Strata notes Vector's view that, when asked, consumers normally opt for continuance of existing quality at existing price.¹⁰ This makes intuitive sense where the existing (or past) service levels experienced by consumers are broadly meeting (or have met) their needs.
- 34 Considering these points and in the absence of any compelling evidence to the contrary, Strata supports the view that most consumers would expect a return to pre-earthquake quality levels within a reasonable timeframe. The question then becomes what period provides a reasonable timeframe, as achieving the quality objective over different timeframes will materially impact prices to consumers.
- 35 Orion proposes to return to near pre-earthquake service levels within approximately 7 years of making its CPP proposal (i.e. by the end of FY2019). In Strata's view, a 7-year horizon for this objective is reasonable and Orion's proposed reliability limits represent a reasonable path to that end. Strata does, however, agree with the Commission's view in the Draft Decision that this outcome can reasonably be expected to be achieved by committing less expenditure than has been proposed by Orion.

¹⁰ Vector Limited "Submission to the Commerce Commission on Orion CPP Draft Decision" (20 September 2013), paragraph 76.

If less is spent in the CPP period will this impact consumers' long-term needs?

- 36 Some submitters expressed a view that the Draft Decision takes a short-term view by seeking to defer expenditure when a longer-term focus would, in their view, be in the interests of consumers.¹¹
- 37 Strata disagrees. Consumer needs reflect a balance of service quality and price. As stated above, Strata agrees with the reliability limits proposed by Orion and accepted by the Commission in the Draft Decision. Achieving the service quality reflected in this path will meet consumer needs in the short-term and position Orion to further review consumer needs in the longer-term.
- 38 Achieving consumer service quality needs at the lowest net present cost is also in consumers' short and long-term interests.
- 39 Whilst it is still relatively early days, the evidence available to date (i.e. 2013 actuals and results from the first half of 2014 provided by Orion in response to a Commission information request¹²) indicates that quality levels are quite quickly returning to pre-earthquake levels.

What is resilience and how does it relate to planning standards?

- 40 Submissions frequently refer to “resilience” as a planning objective. Along with other lifeline agencies and infrastructure operators in recent years, EDBs have increasingly considered “resilience” within their asset management planning processes. The focus on resilience has intensified following some significant electricity supply failures over the last 15 years or so (the 1998 Auckland CBD supply event and, more recently, the Canterbury earthquakes are the obvious exemplars).¹³
- 41 From a review of Orion’s CPP proposal and of submissions on the draft determination, Strata considers that the meaning and use of the term resilience has become imprecise. In relation to the attributes of an electricity distribution network, Strata thinks there are two related usages of the term resilience that require clarification.

¹¹ For example, Christchurch City Holdings Limited “Submission by Christchurch City Holdings Limited to Commerce Commission in response to draft customised price path decision for Orion” (19 September 2013), p.4.

¹² Section 53ZD notice to supply information - Actual 2013 values for commissioned assets 9 October 2013.

¹³ In fact, electricity generators, Transpower (as both grid owner and system operator) and EDBs have continuously strived to provide enhanced resilience to unforeseen contingencies since network supplies began in the 19th century. Resilience as a business/service objective is not a recent phenomenon but it has in more recent times developed heightened business and consumer awareness as reliance on continuous, high quality electricity supply has continued to increase.

- 42 Firstly, resilience is used in a general way to describe a broad set of attributes that a well-performing network should possess, or aspire to possess. These attributes can be delivered in a wide variety of ways and relate to assets, policies, processes and capabilities that allow the business to flexibly and rapidly respond to unforeseen contingencies – not just rare, major catastrophic events. For example, establishing bilateral arrangements with other EBDs to share backup field resources that can be called on in extreme network damage situations (frequently weather-related) is a cost-effective and flexible approach to ensuring that rapid response teams are available to restore supplies in extreme events.
- 43 Similarly, Orion has described its review of urban network architecture that has resulted in it moving over time from a radial architecture to a meshed architecture.¹⁴ Over time, Orion expects this change will provide benefits in terms of providing the operational flexibility to maintain or promptly restore supply following certain common mode failure scenarios.
- 44 Strata has no concern about the cost-effective pursuit of these types of continuous improvement initiatives that well-performing businesses strive for. Strata simply notes that the term “resilience” has come to represent a wide range of tools that collectively enable prompt and flexible response to relatively rare and difficult-to-predict service failure modes.
- 45 The second context in which resilience is used is with specific reference to the security standards that Orion has adopted. Here, the objective of resilience is reflected in a specific network planning objective, which is to provide enough urban 66kV subtransmission links so that the whole of Christchurch can be continuously supplied from the grid at either Islington or Bromley GXPs at system peak demand.
- 46 In Strata’s view, this is a planning criterion that represents a level of security that was not built into Orion’s pre-earthquake urban network. It is, therefore, incorrect to assert that the urban 66kV subtransmission network proposed for completion within the CPP period represents a *return* to near pre-earthquake levels of resilience, security and expected reliability. The new pan-Christchurch 66kV GXP links drawn in the proposed major urban capex plan were not planned for in 2010 and represent an enhanced level of security that did not exist in 2010.
- 47 Strata also expects that supplying system peak demand in any New Zealand major city after losing all supply from a primary urban GXP would be beyond the limits of normal subtransmission planning criteria.¹⁵ GXP-level supply security falls appropriately within the transmission domain and

¹⁴ Orion “Proposal for a customised price-quality path” (19 February 2013), Appendix 6 Network Architecture Review: Subtransmission 2012 p.39.

¹⁵ Consider these examples: Penrose or Otahuhu GXPs in Auckland, Wilton or Haywards GXPs in Wellington, Halfway Bush or South Dunedin GXPs in Dunedin and Hamilton GXP in Hamilton.

requires careful coordination with Transpower to achieve lowest net cost outcomes for given levels of security.

- 48 Therefore, Strata supported in the Draft Decision, and continues to support, the lower cost alternative subtransmission development proposal proposed by Partna Consulting Group (Partna).¹⁶

3.1.2 Submission themes relating to the demand for services

- 49 Related to demand forecasts, Strata has noted a specific submission theme relating to planning uncertainty, particularly as it relates to whether anticipated new large consumer loads will materialise within the CPP period.¹⁷ Orion has made specific provision in its major capex proposal for a number of anticipated but not yet committed large consumer loads that, if confirmed, would trigger the need for significant connection and/or network capacity upgrades.

- 50 The Draft Decision took the following approaches in considering whether related specific proposed expenditures met the expenditure objective:

- (a) The expenditure was allowed (after deducting an amount reflecting the expected customer capital contribution), where information was provided that reasonably supported a conclusion that the need would in fact arise within the CPP period. The Porters Heights development having gained resource consents is an example of this.
- (b) Part of the expenditure was allowed, applying a discount to the proposed expenditure to reflect the risk that the customer need would not be committed within the CPP period. For example, a discount of 50% was applied to the Steeles Road generation connection planned for 2018.
- (c) None of the expenditure was allowed, reflecting a view that the need would likely not arise within the CPP period. The expenditure proposed for CPP11 for development of a new zone substation at Norwood, which depended significantly on the commitment of two new large customer loads in the area, is an example of this.

- 51 Having further considered the treatment of planning uncertainty, Strata considers that:

¹⁶ Partna Consulting Group “Findings on the Orion CPP Proposal – Urban Projects – North (CPP1) and Darlington (CPP2)” (June 2013).

¹⁷ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 226.

- (a) it is very difficult for an applicant and the Commission to predict whether anticipated large new loads (i.e. possible new loads that have been discussed with the EDB) will be committed¹⁸ within a CPP period, particularly if the need is forecast towards the end of the period;
- (b) it is not sufficient that a CPP applicant simply warrants that it has used the best planning information available at the time of submitting its CPP proposal. CPP applicants are incentivised to include speculative spot load developments in their CPP proposals and at least some of these are unlikely to materialise. Conversely, as Orion has pointed out,¹⁹ some currently unforeseen new customer connection/capacity needs are likely to materialise within the CPP period;
- (c) in the absence of a better approach, a 50% discount of currently uncommitted costs, net of customer contributions, reflects a reasonable approach to developing an allowance for large new customer connection/capacity needs;
- (d) EDBs should critically review their capital contributions policies to ensure they reflect efficient price signals to prospective new consumer loads. In addition, EDBs should minimise their own stranding risk and the commensurate risk that other consumers will end up cross-subsidising early terminators. In Strata’s view, the developer is best placed to manage early termination risk; and
- (e) at a suitable review opportunity, the Commission should consider alternative mechanisms to better provide for material anticipated but uncommitted new loads. Strata notes that “contingent provision and explicit trigger” mechanisms are successfully used in other regulatory jurisdictions to manage similar issues.

3.1.3 Submission themes relating to trade-offs between quality and expenditure

- 52 Having established the reliability limits, which set the service quality target, the next question is whether the opex and capex proposed by Orion reflects the efficient costs that a prudent supplier of electricity lines services would require to meet or manage the expected demand for its services.

¹⁸ Or, if committed, will fully utilise the customer-requested capacity in the requested timeframe.

¹⁹ For example, Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 240.

- 53 The Draft Decision took the view that Orion would provide service within the proposed reliability limits but could do that by spending less than it had proposed.²⁰
- 54 A number of submitters, including Orion, considered that because the Draft Decision proposed a reduction in expenditure, it should correspondingly adjust the reliability limits to reflect poorer quality service over the CPP period and beyond.²¹ In its submission, Orion provided alternative reliability limits that it expected to provide service within if the Commission confirmed the expenditure reductions it had proposed in the Draft Decision.²²
- 55 In response to a section 53ZD information request, Orion has provided additional information that shows how it calculated its alternative reliability limits. Having considered this new information, Strata has determined that the alternative reliability limits are identical to the reliability limits in Orion’s CPP proposal, with two exceptions:
- (a) a high level assumption is made that outages caused by 11kV rural and urban system failures will improve only half as fast as Orion predicted in its CPP proposal, resulting in an additional 30.9 SAIDI minutes in the CPP period; and
 - (b) an additional 4.7 SAIDI minutes of non-supply in 2019 caused by 66kV urban network failures due to not completing stage 2 of the proposed Waimakariri zone substation in 2018.²³

11kV rural and urban failures

- 56 Orion has stated that it will continue to undertake testing and inspection of 11kV equipment that will allow it to identify impending equipment failures. Strata considers that this is reasonable as Orion has accepted the opex allowances set out in the Draft Decision.²⁴
- 57 However, Orion also says that it will not be able to replace 11kV equipment that through detailed condition assessment would trigger its replacement criteria because the Commission has reduced the replacement capex allowances by 30%. This would result in known substandard equipment remaining in service.

²⁰ Commerce Commission “Setting the 2014-2019 customised price-quality path for Orion New Zealand Limited – Draft decision” (14 August 2013), paragraph L22.

²¹ See, for example, the ENA submission: Electricity Networks Association “Comment on the Draft Decision on Orion’s CPP Application and Implications for the Future Implementation of Part 4” (18 September 2013), p.12, paragraph 63.

²² Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 383.

²³ Consequential SAIFI impacts also accrue but are ignored here for simplicity.

²⁴ Orion response to Commission section 53ZD information request “Trade off between expenditure and reliability levels”, 11 October 2013.

- 58 Strata considers that based on the data Orion has provided on asset health and condition rating it is unlikely that the proposed adjustments will materially affect the network's quality performance to the extent described by Orion. Defects identified in condition assessments are routinely prioritised for remedial action with implementation timeframes based on what is found. Whether Orion's proposed replacement capex meets the expenditure objective is addressed in section 4.
- 59 Orion further points out that its alternative reliability limits reflect the expected impact of the reduced rural major capex allowance provided in the Draft Decision. Orion considers that a slower rural subtransmission development programme will increase both the likelihood and duration of 11kV system failures.
- 60 In Strata's view, more or less rural subtransmission development will not impact the likelihood of 11kV failures. Orion has a reinforcement allowance of around \$4.5m annually that should enable situational relief of stressed 11kV feeders. Orion states in the reinforcement capex project summary document that this reinforcement programme is not targeted to specific known situations, which indicates to us that there is considerable flexibility to target this substantial budget to the areas that would most benefit in terms of reliability improvement.

66kV urban failures

- 61 Orion states in its response to the section 53ZD information request that it has removed the step improvement between FY18 and FY19 assumed in determining the reliability limits included in its proposal that reflected the completion of the Waimakariri zone substation to provide an n-1 security level.
- 62 Orion has provided no detail of its calculation, as was requested in the information request, so Strata can only comment that a 4.7 SAIDI minute increase in 2019 remains unsubstantiated. Strata notes that 66kV equipment is subject to very low failure rates in general and that an estimate of 4.7 SAIDI minutes per year for every year that Waimakariri is not upgraded to an n-1 security level seems very high, particularly as full 11 kV backup is available to loads within this area following switching of supplies.

Planned outage rates

- 63 Strata considers that less work at 11kV in particular should result in less planned SAIDI minutes but notes no evidence that Orion has provided such an allowance in its alternative reliability limits that would reflect this.

3.2 Review of major capex projects

- 64 This section presents Strata's views on the major capex projects included in Orion's CPP proposal.

- 65 The Commission has asked Strata to review submissions relating to major project capex covering the major projects in the range CPP3 – CPP20, for expenditure forecast to be undertaken within the CPP period.
- 66 Partna has reviewed CPP1. CPP2, CPP5, CPP18 and CPP20 have no expenditure forecast within the CPP period 2015 – 2019 inclusive, so are not included in this review.
- 67 The Commission has also asked Strata to undertake a peer review of Partna’s review of CPP1. This review is provided in section 3.3.

3.3 Peer review of Partna’s review of CPP1 expenditure

- 68 In reviewing CPP1, Strata has considered:
- (a) Orion’s CPP proposal, in particular the project-specific information provided in the individual Project Summary documents;
 - (b) the Commission’s Draft Decision;
 - (c) submissions received by the Commission from 15 submitters and provided to Strata; and
 - (d) Partna’s report *Response to submissions – Urban Major Projects – North, November 2013* (Partna’s review).
- 69 CPP1 provides for:
- (a) two new zone substations at Waimakariri and Marshland supplied by meshed 66kV underground cables to existing substations east and west, to supply anticipated demand growth in north Christchurch;
 - (b) an additional new cable to Rawhiti to provide subtransmission n-1 security for Rawhiti load; and
 - (c) diesel generation at Belfast to provide additional supply security to that area.
- 70 Orion’s proposed CPP period expenditure for CPP1 is summarised in Table 1.

Table 1: CPP1 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Waimakariri substation stage 1	\$ 5,312					
Hawthornden-Waimakariri 66kV link	\$ 7,494					
Marshland to Waimakariri 66kV link	\$10,738					
Rawhiti to Marshland 66kV link		\$ 11,429				
Belfast diesel generation - stage 1		\$ 1,285				
Marshland zone substation				\$ 6,255		
Hawthornden T-off				\$ 1,300		
Waimakariri substation stage 2				\$ 2,377		
CPP1 Total - Major urban (North)	\$23,544	\$12,714	\$ -	\$ 9,932	\$ -	\$ 46,190

71 The Draft Decision:

- (a) agreed with provision of new zone substations at Waimakariri (stage 1 only) and Marshland;
- (b) agreed with the provision of diesel generation at Belfast; but
- (c) disagreed with the proposed configuration of the two 66kV circuits supplying Marshland because more cost effective options were identified that would meet Orion's security standards; and
- (d) disagreed with the proposed timing of the Waimakariri stage 2 upgrade in 2018, as the load forecast for that zone substation did not justify it.

72 Orion has provided the following information in its submission:

- (a) Orion disagrees with the proposed capex allowances provided by the Commission for CPP1 as the alternative described by the Commission would not provide the resilience and security required by Orion's consumers;
- (b) the resource consent for the temporary overhead line supplying Rawhiti will expire in 2014 and, in keeping with Orion's undertaking to the community when the line was built, an extension to that consent will not be sought.

73 A summary of Partna's view is:

- (a) no further technical information has been provided by submitters on major urban project north (CPP1) that would provide a basis to alter the Commission's Draft Decision;
- (b) the network development allowed for within the Draft Decision, along with the significant back feed capability in the 11kV network between zone substations, aligns with Orion's pre-earthquake security criteria²⁵ and therefore meets Orion's stated objective of

²⁵ Refer Orion's 2010 Asset Management Plan, section 5.3.1.

“restoring the network resilience and reliability to near pre-earthquake security levels”.

- (c) the timing for Waimakariri and Marshlands substations allowed for in the Draft Decision aligns with that sought by Orion;
 - (d) the expenditure allowed for in the Draft Decision is appropriate in respect to the establishment of the Waimakariri and Marshlands substations and associated 66kV circuits;
 - (e) an additional 66kV cable to supply Rawhiti from Dallington (at an estimated cost of \$6.8m) is a reasonable addition to the Draft Decision allowances for CPP1, given that the temporary overhead line will need to be removed.²⁶
- 74 Having considered relevant submissions and Partna’s review, Strata endorses:
- (a) Partna’s analysis of relevant submissions on the Draft Decision and consider that Partna’s views on relevant major submission themes are consistent with Strata’s views on those topics;
 - (b) Partna’s view that Orion’s expenditure proposal for CPP1 would result in too much subtransmission being built in north Christchurch too quickly. Orion’s pre-earthquake development planning for this area indicates that a simpler, less extensive/expensive network architecture would securely meet currently forecast north Christchurch demand within the CPP period and beyond;
 - (c) Partna’s view that the more extensive 66kV cable network proposed by Orion for north Christchurch to provide resilience to HILP events does not meet the expenditure objective within the CPP period; and
 - (d) Partna’s view that an allowance for an additional cable in 2015 from Dallington to Rawhiti would meet the expenditure objective because Rawhiti peak demand meets the criteria for provision of an n-1 security level. Strata accepts that Orion clearly intends to (and is required to) decommission and remove the temporary overhead line supplying Rawhiti.
- 75 Finally, Strata notes and supports Partna’s recommendation²⁷ that the proposed allowed capex for CPP1 shown in Table 2 is adopted by the Commission in its final decision on Orion’s CPP proposal.

²⁶ Partna review, paragraph 2.

²⁷ Partna review, paragraph 3.

Table 2: CPP1 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Waimakariri substation stage 1	\$ 5,312					
Hawthornden-Waimakariri 66kV link	\$ 7,494					
Marshland to Waimakariri 66kV link	\$ -					
Rawhiti to Marshland 66kV link		\$ -				
Belfast diesel generation - stage 1		\$ 1,285				
Marshland zone substation				\$ 6,255		
Hawthornden T-off				\$ -		
Waimakariri substation stage 2				\$ -		
McFaddens-Marshland 66kV link				\$ 5,828		
Dallington-Rawhiti 66kV link	\$ 6,800					
CPP1 Total - Major urban (North)	\$ 19,606	\$ 1,285	\$ -	\$ 12,083	\$ -	\$ 32,974

3.4 Review of CPP3 – CPP19 expenditure

3.4.1 Approach

76 In reviewing CPP3 – CPP19, Strata has considered:

- (a) Orion’s CPP proposal, in particular the project-specific information provided in the individual Project Summary documents;
- (b) the Commission’s Draft Decision; and
- (c) submissions received by the Commission from 15 submitters and provided to Strata.

77 For each of the projects in this group, Strata has formed a view as to whether the proposed expenditure meets the expenditure objective.

78 Strata’s views are consistent with its consideration of the major submission themes discussed in section 3.1.

79 Strata’s review of the 15 submissions received on the Draft Decision reveals that Orion’s submission is the only submission that provides detailed technical feedback on specific major projects. Submissions from other parties provide higher-level feedback relevant to quality and expenditure. Strata has provided its views of relevant other submissions in section 3.1. Accordingly, the following section considers only Orion’s detailed feedback for major projects in the range CPP3 – CPP19 that include forecast expenditure within the CPP period.

3.4.2 Strata's view of major project capex

80 In Strata’s opinion, some of, but not all of, Orion’s revised major project capex forecast for the CPP period meets the expenditure objective. A project-by-project review of submitted feedback is provided in Appendix A.

81 For the majority of the major projects reviewed, Strata has supported the conclusions developed in the Draft Decision. In general, Strata considers that Orion has provided very little new information that would alter the Commission’s view reached in the Draft Decision.

- 82 Strata’s review departs from the Draft Decision in one material area. Strata’s Technical Advisor Report on Orion’s CPP Proposal stated the following:²⁸

76 The Commission’s assessment, along with our recommendations as summarised in Table 1, result in the removal of three rural zone substations from the CPP period major capex projects. In Strata’s view, taking into account the planning uncertainty that exists in 2013 for expenditures considered necessary in the period 2015 – 2019, it would not be unreasonable to expect that one of the three rural zone substations might be justified in updated planning inputs.

77 Accordingly, the Commission may consider that allowing one of the three rural zone substations would represent a reasonable expectation, when viewed from a top-down perspective. Strata recommends that the Commission considers this view and/or invites Orion to address this possibility in its submission in response to the Commission’s Draft Decision.

- 83 Having undertaken a further detailed review, Strata now considers that this comment should relate to four rural zone substation projects, not three as stated (as Strata had considered Creyke as a replacement of Darfield rather than as a new zone substation). The four relevant projects are as follows:
- (a) CPP7: Major rural (Rolleston) – stage 1 of the proposed Burnham zone substation in 2015 and the upgrade of Highfield zone substation to 66kV in 2017/18.
 - (b) CPP8: Major rural (Hororata/Creyke) – stage 1 of the proposed Creyke zone substation in 2018.
 - (c) CPP11: Major rural (Norwood) – the proposed Norwood zone substation in 2019.
 - (d) CPP15: Major rural (Southbridge) – the proposed Southbridge zone substation in 2018.
- 84 Having considered submissions relating to planning uncertainty (discussed in section 3.1.2), Strata continues to hold the view that an allowance of one rural zone substation of the four identified above would meet the expenditure objective.
- 85 However, given the range of planning uncertainties discussed for these projects in Appendix A, including anticipated but currently uncommitted large spot loads that would trigger a step change in area demand, Strata cannot identify which of the four projects would be most likely to be committed within the CPP period.

²⁸ Strata Energy Consulting Limited “Technical Advisor Report on the Opinion on the Orion New Zealand Ltd CPP Proposal” (2 August 2013), paragraphs 76 and 77.

86 Accordingly, it is proposed that 25% of each of the relevant project components is allowed in the Commission’s final decision. This would provide a cost and time-weighted approximation of the expenditure necessary to complete one rural zone substation within the CPP period.

87 The expenditure effect is shown in Table 3.

Table 3: Allowed expenditure for one rural zone substation (\$000 – constant 2013 values)

Project code	Description	2015	2016	2017	2018	2019	Total
CPP7	25% of zone substation and line - Rolleston	\$ 888		\$ 387	\$ 178		
CPP8	25% of zone substation and line - Creyke				\$ 846		
CPP11	25% of zone substation and line - Norwood					\$ 1,384	
CPP15	25% of zone substation and line - Southbridge				\$ 1,071		
	Total - additional zone substation contingency	\$ 888	\$ -	\$ 387	\$ 2,095	\$ 1,384	\$ 4,754

88 Table 3 indicates a reasonable spread of allowed expenditure across the CPP period but is weighted towards more expenditure in the later years, reflecting the years in which the planning uncertainty is most acute.

3.4.3 Expenditure summary for CPP3 – CPP19

89 Table 4 provides a summary of the expenditure for CPP3 – CPP19 that Strata considers to meet the expenditure objective.

Table 4: CPP3 – CPP19 allowed expenditure summary (\$000 – constant 2013 values)

Project code	Description	CPP proposal (2015 - 2019) \$000	Draft Decision \$000	GAP		Orion submission \$000	GAP		Strata review \$000	GAP	
				Draft decision less CPP application \$000			Orion submission less CPP application \$000			Strata review less Orion submission \$000	
CPP3	Major urban - West	\$ 6,684	\$ 329	-\$ 6,355		\$ 6,684	\$ -	\$ 329	-\$ 6,355		
CPP4	Major urban - Southeast	\$ 8,773	\$ 700	-\$ 8,073		\$ 8,773	\$ -	\$ 700	-\$ 8,073		
CPP6	Major urban - CBD	\$ 500	\$ -	-\$ 500		\$ -	\$ 500	\$ -	\$ -		
CPP7	Major rural - Rolleston	\$ 5,810	\$ -	-\$ 5,810		\$ 5,810	\$ -	\$ 1,453	-\$ 4,358		
CPP8	Major rural - Hororata/Creyke	\$ 5,856	\$ 2,471	-\$ 3,385		\$ 5,856	\$ -	\$ 3,317	-\$ 2,539		
CPP9	Major rural - Central Plains Water	\$ 3,723	\$ 931	-\$ 2,792		\$ 1,862	-\$ 1,862	\$ 931	-\$ 931		
CPP10	Major rural - Springston	\$ 1,186	\$ 608	-\$ 578		\$ 1,186	\$ -	\$ 608	-\$ 578		
CPP11	Major rural - Norwood	\$ 5,784	\$ 250	-\$ 5,534		\$ 5,784	\$ -	\$ 1,634	-\$ 4,151		
CPP12	Major rural - Power factor	\$ 600	\$ 600	\$ -		\$ 600	\$ -	\$ 600	\$ -		
CPP13	Major rural - Annat	\$ 393	\$ 197	-\$ 197		\$ 393	\$ -	\$ 197	-\$ 197		
CPP14	Major rural - Banks Peninsular	\$ 773	\$ 773	\$ -		\$ 773	\$ -	\$ 773	\$ -		
CPP15	Major rural - Southbridge	\$ 4,385	\$ 100	-\$ 4,285		\$ 4,385	\$ -	\$ 1,171	-\$ 3,214		
CPP16	Major rural - Dunsandel	\$ 2,415	\$ 2,415	\$ -		\$ 2,415	\$ -	\$ 2,415	\$ -		
CPP17	Major rural - Porters Heights	\$ 4,137	\$ 2,069	-\$ 2,069		\$ 2,069	-\$ 2,069	\$ 2,069	\$ -		
CPP19	Major rural - Alpine	\$ 249	\$ 249	\$ -		\$ 249	\$ -	\$ 249	\$ -		
Total CPP3-19		\$ 51,268	\$ 11,691	-\$ 39,577	23%	\$ 46,838	-\$ 4,430	\$ 16,444	-\$ 30,394	91%	35%

4 Review of replacement capex

4.1 Orion's CPP proposal

90 In its CPP proposal, Orion forecast replacement capex to be \$124.4m as summarised in Table 5.

Table 5: Replacement capex proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Overhead lines subtransmission	\$ 340	\$ 2,040	\$ 340	\$ 340	\$ 340	\$ 3,400
Overhead lines 11kV and 400V	\$ 2,675	\$ 2,675	\$ 2,675	\$ 2,675	\$ 2,675	\$ 13,375
Underground cables 11kV and 400V	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 10,000
Pilots and protection	\$ 2,244	\$ 2,673	\$ 2,706	\$ 2,564	\$ 2,703	\$ 12,890
Control systems	\$ 1,515	\$ 1,535	\$ 1,415	\$ 1,375	\$ 1,655	\$ 7,495
Load management systems	\$ 130	\$ 1,480	\$ 940	\$ 940	\$ 460	\$ 3,950
Switchgear	\$ 9,343	\$ 9,031	\$ 10,949	\$ 8,808	\$ 9,880	\$ 48,011
Transformers	\$ 2,160	\$ 2,160	\$ 2,160	\$ 1,910	\$ 1,910	\$ 10,300
Substations	\$ 425	\$ 425	\$ 425	\$ 425	\$ 425	\$ 2,125
Buildings and grounds	\$ 1,215	\$ 715	\$ 715	\$ 715	\$ 1,965	\$ 5,325
Meters	\$ 130	\$ 180	\$ 80	\$ 80	\$ 130	\$ 600
Underground cables subtransmission	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Asset management systems	\$ 1,021	\$ 151	\$ 901	\$ 1,021	\$ 151	\$ 3,243
Distribution management system	\$ 940	\$ 690	\$ 610	\$ 810	\$ 610	\$ 3,660
Total - Replacement capex	\$ 24,138	\$ 25,755	\$ 25,916	\$ 23,663	\$ 24,904	\$ 124,374

4.2 The Draft Decision

91 In its Draft Decision, the Commission considered that the replacement capex forecast should be reduced to \$87.1m. The adjustment was made on the basis that:

- (a) the adjusted forecast reflected the capex reasonably required to maintain asset health and average asset age; and
- (b) Orion will apply prudent and efficient management practices to secure reduced costs.

4.3 Orion's submission

92 In its submission, Orion has:

- (a) revisited its expenditure forecast for replacement capex and identified reductions of 4.9% of the original CPP proposal;

- (b) made an additional 10% downward adjustment to take into account opportunities to defer further asset replacements that can be achieved during the CPP period;
 - (c) identified a material omission in its CPP proposal related to replacement transformers at Papanui, resulting in increased forecast replacement capex of 2.4% (\$3m).²⁹
- 93 The above adjustments result in a net reduction of 14.4% (\$17.9m) to the replacement capex forecast that was included in the CPP proposal.
- 94 Orion considers³⁰ that, whilst Strata’s dashboard approach to establishing an age and condition based expenditure forecast is similar to Orion’s, it did not take into account that:
- (a) the costs of replacing individual components of a switchboard is likely be more expensive than replacing the whole board at one time;
 - (b) combining old and new components may not be practical; and
 - (c) replacement of switchgear and protection systems at the same time can result in lower overall cost than undertaking replacement at different times.³¹
- 95 Orion identified that the 20% adjustment for switchgear and 23% adjustment for protection replacements proposed by Strata as a flat reduction did not take into account that the differences produced by the Strata approach began to occur in FY17 onwards.
- 96 Orion questioned the reasonableness of extrapolating the assessment results from switchgear to other asset categories, given the divergences in increases in replacement costs and due to some assets having sustained earthquake damage.

4.4 Relevant points made by other submitters

- 97 The ENA³² submitted that the reductions in capex did not provide sufficient transparency in how they were derived. The ENA considered that it did not

²⁹ Orion makes this adjustment in its revised replacement capex forecast; it represents a 9.5% adjustment on the original CPP forecast. See Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 269.

³⁰ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 258.

³¹ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 257.

³² Electricity Networks Association “Comment on Commissions Paper on Orion’s CPP Application” (24 May 2013), p.3.

seem reasonable in a CPP process that reductions in capex should be made without supporting analysis.

- 98 Powerco submitted that Strata’s assumption that the asset condition of all assets is the same as that for switchgear and protection, based on limited evidence, did not address the consequences of this assumption being wrong.³³ Vector also submitted the view that whilst it accepted that the onus lies with Orion to justify the condition of the assets it intends to replace, it did not consider that the adjustment across all asset categories was, in this case, reasonable.³⁴
- 99 Powerco pointed out that it could take some time to achieve all the efficiency benefits that will arise from Orion’s adoption of Condition Based Risk Management (CBRM).³⁵
- 100 Vector submitted that switchgear replacement is undertaken on a specific asset condition basis, not on overall category age or asset health status.³⁶ Vector considered that the overall health profile would not be materially affected by the replacement programme due to the large volume of switchgear in service compared with the proportion that would be replaced.

4.5 Consideration of points raised in submissions

4.5.1 Strata’s assessment methodology

- 101 Submissions from Orion, ENA, Powerco and Vector have highlighted the challenges of determining whether expenditure forecasts meet the expenditure objective. Replacement capex in particular raises challenges due to the information, resource and network knowledge asymmetry between the regulator (including its advisers) and the applicant.
- 102 It was primarily for this reason that Strata adopted the top-down assessment methodology described in its previous report. This approach did not seek to replicate the asset management planning functions but rather to challenge the applicant to justify specific areas of its proposed expenditure forecast. Strata expects that a prudently managed EDB would undertake a similar review.

³³ Powerco Limited “Powerco submission on ‘Invitation to have your say on Orion’s proposal to change its prices and quality standards’” (24 May 2013), p.5.

³⁴ Vector Limited “Submission to the Commerce Commission on Orion CPP Draft Decision” (20 September 2013), paragraph 92.

³⁵ Powerco Limited “Powerco submission on ‘Invitation to have your say on Orion’s proposal to change its prices and quality standards’” (24 May 2013), p.5.

³⁶ Vector Limited “Submission to the Commerce Commission on Orion CPP Issues Paper” (24 May 2013), paragraph 93.

- 103 In its top-down review, Strata sought to confirm with Orion how the replacement expenditure forecast had been developed. Orion clearly stated that assets were programmed for replacement on condition (asset health and Orion rating) and asset age-based criteria. The only asset age and condition databases made available to Strata were for switchgear and protection relays.
- 104 Strata used what Orion confirmed was a similar methodology to its own, to determine the impact of the proposed expenditure on average asset condition and age.³⁷ It was found that average asset age and condition could be maintained at current levels with a 20% lower expenditure forecast than Orion had proposed.
- 105 In the absence of adequate justification for additional expenditure, Strata concluded that Orion’s proposed expenditure for replacement capex did not meet the expenditure objective because it was in excess of that which was required to maintain average asset age, health and condition at reasonable levels.
- 106 Strata agrees with submitted views that, in practice, asset replacement will take into account broader issues than asset age when undertaking good practice asset lifecycle management. Strata understands that Orion takes into account aspects such as risk when setting asset health ratings. However, the approach Strata took was to assess the methodology with which Orion produced its forecast and not how it managed the replacement programme in practice, even though it would be expected that these would be aligned.
- 107 Following an initial review of submissions, the Commission has sought additional information from Orion to determine the implications of broader asset life-cycle considerations for the expenditure forecast.

4.5.2 Establishing a reasonable expenditure forecast

- 108 The fact that Orion has responded to the Draft Decision by making reductions in its replacement capex (and opex) expenditure forecasts confirms that the CPP proposal does not meet the expenditure objective.
- 109 Strata notes that Orion is continuing to review its replacement programme for all asset categories³⁸ and has proposed the adjustments included in its submission based on preliminary indications from this study. This poses a problem for Strata when advising the Commission on the compliance of the expenditure proposal with the expenditure objective because:

³⁷ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 256.

³⁸ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 269

- (a) by proposing its own adjustments in its submission, Orion has confirmed that its CPP proposal did not meet the expenditure objective; and
- (b) Orion's submitted expenditure adjustments are based on preliminary results.

110 Strata must therefore determine what level of replacement capex would meet the expenditure objective. To align with previous advice provided to the Commission, this report addresses this question by first considering asset lifecycle considerations followed by considering the issues of prudent management and deliverability.

Asset lifecycle considerations

111 In its submission, Orion has stated that undertaking programmes of replacements of complete switchboards within a substation will result in a lower lifetime cost than undertaking condition-only partial switchboard replacements at the levels proposed by the Commission in its Draft Decision.³⁹ The Commission requested that Orion provide information to support this.

112 In its information request, the Commission asked Orion to provide:

- policies or standard procedures Orion has in place that govern this approach to replacement planning and any cost benefit analysis in support of these policies or procedures previously undertaken by Orion;
- any other analysis that has been undertaken by Orion that shows that this approach results in a lower lifetime cost than the condition-only unit-specific approach;
- identification of each substation where replacement of complete switchboards will generate lower lifetime costs; and
- a list of forecast switchgear replacements in the CPP proposal that are proposed to be replaced solely on the basis that they are part of a total switchboard renewal and where Orion has determined that their replacement will result in lower lifetime cost.

113 The following information for each asset was requested: Orion Asset ID, Category, Type, Model, Manufacture Year, Project Year, Health Index, Orion Ranking and Age Replacement.

114 In response to the Commission's request for additional information, Orion provided:

³⁹ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraphs 259 and 261

- (a) more detail by describing its view of asset lifecycle theory and practice; and
- (b) data on its proposed switchgear replacement programme.
- 115 Orion has also provided information on two substations where it considers that all of the switchgear components should be replaced at a certain date but where Strata has proposed to delay some of the replacements.
- 116 To be clear, Strata did not propose to delay specific asset replacements, it was intended that Orion would make those decisions as a matter of course but would do so within 80% of its proposed expenditure forecast.
- 117 Strata understands Orion’s explanation of asset life cycle management and accepts that lower life cycle costs can be achieved by taking into account other aspects in addition to asset age and condition. However, in Strata’s opinion, Orion’s response to the above request did not adequately address the second bullet point, as no analysis has been provided to demonstrate how Orion has determined that the replacement projects, included in its proposed expenditure, deliver lower lifecycle costs.
- 118 The information request asked Orion to identify switchgear that is being replaced earlier than would be expected and the lower lifecycle costs that would result. In response, Orion stated:
- As we have indicated above there are many reasons for our practice of replacing a total switchboard. The attached file ‘Switchgear replacement.xlsx’ contains a list of switchboards which we have determined should be replaced. Within this list there are some units which may not fulfil all the criteria for replacement in the way that Strata has applied it in a mechanical way.*
- 119 Strata has considered the data and information provided by Orion in the Switchgear Replacement spreadsheet. The data provides justification for some, but not all, of Orion’s proposed expenditure on total switchboards.
- 120 For example, Breezes Road North substation has components with health and condition ratings as shown in Table 6.

Table 6: Breezes Road North switchgear condition ratings

Health Index	Orion Ranking
4	62
4	62
3	62
3	62
4	62
4	62
7	0
4	62
4	62

- 121 Strata accepts Orion's justification for the proposal to replace the switchboard based on the need to replace the unit with critically low health and condition ratings. Orion also supports this data with a full description of the assets to be replaced and why the full switchboard replacement will deliver lower lifecycle costs.
- 122 For Dallington substation, Orion has demonstrated that deferral of one of the switchboard replacements would not be feasible because of other changes to better meet loading requirements and optimise civil works.
- 123 However, for other substations the health and condition rating of the assets suggests that full replacement proposals could be reasonable candidates for deferral. For example, Mays Road, Merrin Street and Middleton substations all have all components in the switchboard to be replaced assessed as being in fair to good condition. Orion has not provided any supporting information on these or other projects.
- 124 In making the above comments, Strata is not seeking to determine which assets are to be replaced, but rather to obtain a reasonable assessment on what is likely to be spent when the replacement programme is undertaken. In Strata's opinion, Orion has provided sufficient justification to demonstrate some, but not all, of its revised replacement expenditure forecast.
- 125 In its previous report, Strata considered that only 80% of Orion's proposed replacement capex expenditure was justified on the basis of asset age, condition and health. Taking into consideration the additional information provided by Orion, Strata now considers that this allowance be increased to 90%, to take into account the asset lifecycle cost reductions that can reasonably be achieved.

Application of findings to other asset categories

- 126 It is now necessary to consider the implications of the above discussion for other asset categories. In its previous advice to the Commission, Strata considered that the findings for switchgear and protection relays should be applied to other asset categories. As described above in section 4.4,

Orion, ENA, Vector and Powerco submitted that this approach did not take into consideration differences between asset types. However, no submitter provided an alternative methodology that could be used given the limited asset information available.

- 127 In its submission, Orion has proposed a range of adjustments across individual asset categories and this effectively provides a profile for its proposed overall 5% reduction across all asset categories.⁴⁰ Orion's reductions are based on preliminary findings of its asset management review.⁴¹
- 128 Strata agrees with Orion that further review will reveal additional reductions to the forecast and that the preliminary 5% identified by Orion will increase. In the absence of the results of this review, Strata considers that it is reasonable to apply the same 10% adjustment that was determined for switchgear.
- 129 Strata expects that this overall reduction can be applied using the same profile across individual asset categories as Orion used when proposing the 5% reduction in its submission. This is because Strata considers that Orion is in the best position to know *how* savings of this type can be allocated across individual asset categories – Strata has simply concluded that Orion will more reasonably find a 10% overall reduction when it looks beyond its preliminary findings.
- 130 In summary, Strata considers that the total replacement capex budget should be allowed at 90% of the CPP proposal to account for the application of good asset management practices in forecasting expenditure.

4.5.3 Prudent management and estimation accuracy

- 131 In its submission, Orion has made a 10% overall adjustment to its forecast to reflect anticipated further deferrals to its replacement capex forecast.⁴² This approach is aligned with Strata's view that Orion will make prudent decisions during the CPP period that will lead to further reductions in costs being realised.
- 132 Whilst Orion may challenge Strata's views on the reasons why such an adjustment is valid (e.g. improvements in cost estimations), there is agreement that gains will result from Orion's initiative to explore opportunities to further reduce replacement expenditure during the CCP period.⁴³

⁴⁰ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraphs 270 and 273.

⁴¹ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 269.

⁴² Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 21.3

⁴³ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 272.

- 133 Strata accepts Orion’s 10% reduction to the CPP proposal forecast to take into account these expected gains within the CPP period.

4.5.4 Deliverability

- 134 In its previous report to the Commission, Strata discussed the likelihood of Orion delivering a replacement capex programme that included significantly more expenditure than previously. The Verifier had also raised this issue and recommended that the Commission used Orion’s achievement of its plans in FY2013 as an indicator of likely deliverability of the forecast programme.⁴⁴
- 135 Table 7, reproduced from Strata’s previous report,⁴⁵ shows the results for FY2013.

Table 7: 2013 replacement capex forecast vs actual

	CPP proposal (\$m)	Actual Value (\$m)	Difference (\$m)	Difference %
Lines and Cables	5.1	3.5	1.6	31%
Switchgear	9.2	3.1	6.1	66%
Transformers	1.4	0.7	0.7	50%
Other	7	5.4	1.6	23%

- 136 In its response to the Commission’s request for further information, Orion has provided information on the reasons for the indicated underspend. The reasons include factors such as delays to the Christchurch rebuild, difficulties in gaining access to suitable outage windows and changes to information on assets. Strata accepts that these are legitimate issues that will endure and probably become more challenging for Orion as the reconstruction efforts build in volume.
- 137 Orion’s proposed adjustments for forecast improvements and prudent management do not take into account the implications of deliverability on the forecast. To ensure that the forecast represents what is reasonably likely to be spent, such an adjustment must be made.
- 138 Given Orion’s experience in FY2013 and the increasing reconstruction activity, Strata expects that similar deliverability challenges would arise during the CPP period. It is also reasonable to take into account the asset management and efficiency gains that will be achieved by Orion in

⁴⁴ Geoff Brown & Associates Ltd “Verification report and certificate”, in Orion Application for a customised price-quality path (19 February 2013), Appendix 7, p1.

⁴⁵ Strata Energy Consulting Limited “Technical Advisor Report on the Opinion on the Orion New Zealand Ltd CPP Proposal” (2 August 2013).

FY2013, but are not likely to have been taken into account when setting the forecast for that year.

- 139 Determining a deliverability adjustment based on the FY2013 result and taking into account the potential forecast inaccuracy due to 20% combined asset management and prudent management adjustments (i.e. as determined for the CPP forecast), suggests an adjustment of 46% for switchgear and 30% for transformers would be needed to take into account deliverability.
- 140 Given the assumptions used to derive this value and on the basis of the information and data available, Strata considers that a reasonable range for a deliverability adjustment is between 5% and 10%. Given the assumptions used to derive this value, Strata considers that the Commission should apply the lower end of this range and make a downwards adjustment of 5% to take into account the expected roll-over of components of the replacement capex programme into the following period.

4.5.5 Papanui transformers

- 141 Orion has included a further sum of \$3m in the transformer asset replacement category for two transformer replacements at Papanui substation.⁴⁶ Orion states that these items were excluded in error from the CPP proposal.
- 142 Strata considers that this expenditure meets the expenditure objective and should be allowed for in the replacement capex expenditure forecast.

4.6 Strata's conclusions on replacement capex

- 143 In Strata's opinion, Orion's revised replacement capex forecast for the CPP period does not fully meet the expenditure objective because it is in excess of what is a reasonable forecast to:
- (a) meet or manage expected demand at appropriate service standards; and
 - (b) comply with applicable regulatory obligations.
- 144 Strata has formed this view because:
- (a) Orion's preliminary assessments relating to forecasting accuracy improvements arising from its reviews are preliminary and expected to be 5% higher;

⁴⁶ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 270.4.

- (b) in addition to the prudent management adjustment of 10% applied by Orion, a deliverability adjustment of a further 5% should be made to take into account the expected roll-over of work planned for completion in the CPP period into the following period.

145 Table 8 summarises the revised adjustments recommended by Strata following consideration of submissions and additional information.

Table 8: Summary of adjustments for replacement capex (\$m – constant 2013 values)

CPP TOTAL	Asset management			Prudency			Roll out (deliverability)			Add PAP transformers	FINAL TOTAL
	Adjustment	Amount	Balance	Adjustment	Amount	Balance	Adjustment	Amount	Balance		
\$ 124.4	-10%	-\$ 12.5	\$ 111.9	-10%	-\$ 11.2	\$ 100.7	-5%	-\$ 5.0	\$ 95.7	\$ 3.0	\$ 98.7

4.7 Recommendations on replacement capex

146 Strata recommends the following adjustments to Orion's CPP proposal:⁴⁷

- (a) a downward adjustment of \$12.5m (-10%) to take into account improved expenditure forecasting;
- (b) an additional downward adjustment of \$11.2m (-10%) to take into account prudent decision making that is expected to be realised during the CPP period;
- (c) an additional downward adjustment of \$5.0m (-5%) to account for expected roll-over of work into the next period due to programme deliverability; and
- (d) inclusion of the \$3.0m omitted from the CPP proposal for replacement of the Papanui transformers.

147 In combination, the recommended adjustments result in a replacement capex forecast of \$98.7m which represents a 20.6% downwards adjustment to the replacement capex forecast contained in Orion's CPP proposal.

⁴⁷ Note that these adjustments are relative to Orion's CPP proposal.

5 Opex programmes of work

5.1 Orion's CPP

148 In the CPP proposal, Orion forecast opex to be \$129.3m for network opex and \$81.2m for non-network opex, as summarised in Table 9.

Table 9: Opex proposed expenditure (\$'000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Emergency maintenance	\$ 6,525	\$ 7,725	\$ 6,525	\$ 6,525	\$ 6,525	\$ 33,825
Scheduled maintenance	\$18,168	\$17,828	\$16,693	\$16,343	\$16,433	\$ 85,465
Unscheduled maintenance	\$ 1,995	\$ 1,995	\$ 1,995	\$ 1,995	\$ 1,995	\$ 9,975
Network management	\$16,226	\$16,326	\$16,160	\$16,208	\$16,276	\$ 81,196
Total - Identified opex categories	\$42,914	\$43,874	\$41,373	\$41,071	\$41,229	\$210,461

5.2 The Draft Decision

149 The Draft Decision adjusted network opex downwards to \$108.3m (a 16.2% reduction to Orion's proposal)⁴⁸ and non-network opex to \$76.1m (an 6.2% reduction to Orion's proposal).⁴⁹

150 Subsequent to the publication of the Draft Decision, Strata identified an error in its calculation of the adjustment for emergency maintenance. Strata considered that a reasonable forecast of defects would be capped at 200% of pre-earthquake levels. When applying this adjustment Strata incorrectly used 2014 emergency maintenance values rather than 2010. This error meant that the adjustment in the Draft Decision for emergency maintenance had a \$7.1m effect on the maximum allowable revenues.

5.3 Orion's submission

151 In its submission, Orion recognised that the Draft Decision, based on Strata's advice, provided for higher levels of expenditure during the CPP period than had been incurred previous to the earthquakes.⁵⁰

⁴⁸ Commerce Commission "Setting the 2014-2019 customised price-quality path for Orion New Zealand Limited – Draft decision" (14 August 2013), p. 170, Table E2.

⁴⁹ Commerce Commission "Setting the 2014-2019 customised price-quality path for Orion New Zealand Limited – Draft decision" (14 August 2013), p. 1956, Table G1.

⁵⁰ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 312.

- 152 For the CPP Period, Orion has agreed with the adjustments contained in the Draft Decision, other than for:
- (a) inclusion of the correction for emergency maintenance (as discussed at paragraph 150)
 - (b) retrospective adjustments for FY14; and
 - (c) the adjustment for regulatory engagement of \$0.75m in FY19.⁵¹
- 153 As items (b) and (c) are outside the scope of its review, Strata has not provided advice or comment on them in this report.

5.4 Relevant points made by other submitters

- 154 In its submission⁵², ENA provides comments on the trade off between service quality and price. ENA is concerned that the Commission, when making a downward adjustment to Orion’s proposed opex and capex allowances (and proposed prices), has not made a corresponding adjustment to Orion’s proposed service quality.
- 155 Meridian Energy in its submission⁵³ also discussed the trade off between price and quality of network services and considered that informing these decisions through consultation with electricity consumers is critical. Meridian Energy agreed with the Commission that *more information on the service consumers could expect to receive and on the price they would pay would have enabled customers to provide better feedback.*
- 156 Powerco considers⁵⁴ the Commission’s basis for determining Orion’s proposed reliability limits to be conservative and supported by limited evidence. However, Powerco noted that this may be due to the level of information that Orion was able to provide on the links between expenditure and quality.
- 157 The ENA⁵⁵ considered that the level of analysis provided to support the adjustments made to opex, in the Draft Decision, required greater transparency.

⁵¹ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 314.

⁵² Electricity Networks Association “Comment on Commissions Paper on Orion’s CPP Application” (24 May 2013), p.3.

⁵³ Meridian Energy Limited “Orion’s customised price-quality path” (22 May 2013), p.1.

⁵⁴ Powerco Limited “Powerco submission on ‘Invitation to have your say on Orion’s proposal to change its prices and quality standards’” (24 May 2013), p.5.

⁵⁵ Electricity Networks Association “Comment on Commissions Paper on Orion’s CPP Application” (24 May 2013), p.3 paragraph 21.

- 158 On emergency maintenance expenditure, Powerco questioned the Commission’s reliance on 2013 data as evidence of the future trend, rather than considering this as part of a longer time series.⁵⁶
- 159 In its submission, Vector raised concerns regarding the Commission’s reduction in Orion’s opex forecasts by 10% to account for prudent management and efficiency gains over the CPP regulatory period.⁵⁷ Vector considered that this adjustment appeared to share efficiency gains with consumers that may not be achieved in reality or *before those efficiency gains have been realised*.
- 160 Vector is also concerned that the opex adjustments seem excessive when considered in aggregate and taking into account the removal of the maintenance contingency.⁵⁸

5.5 Consideration of points raised in submissions

- 161 Orion has given consideration to the points raised by the Commission in the Draft Decision and to Strata’s Technical Advisor Report. In its submission, Orion has made revisions to its forecast opex that now align the overall allowance level for opex with that provided in the Draft Decision. On this basis, Strata has concluded that Orion’s adjustments to opex for the CPP period, as set out in its submission on the Commission’s Draft Decision, meet the expenditure objective.
- 162 For completeness, Strata provides the following comments on related issues that submitters have raised.

5.5.1 Expenditure/quality trade off

- 163 This issue is discussed in section 3.1.3.

5.5.2 Prudent management adjustments

- 164 When determining its view of an appropriate opex forecast, Strata took into account the investment that Orion had already made in making improvements in its asset management capability. It was noted that Orion had confirmed that it had not specifically accounted for any benefits arising from these improvements when setting its forecast.

⁵⁶ Powerco “Powerco submission to Setting the 2014-2019 customised price-quality path for Orion New Zealand Limited: Draft Decision” (20 September 2013), p.5.

⁵⁷ Vector Limited “Submission to the Commerce Commission on Orion CPP Issues Paper” (24 May 2013), p.6.

⁵⁸ Vector Limited “Submission to the Commerce Commission on Orion CPP Issues Paper” (24 May 2013), p.25.

- 165 Strata considers that it is reasonable when setting expenditure forecasts that benefits arising from improvements should be anticipated and specifically accounted for. Whilst Vector's point that the total amount of these gains may not be realised in the CPP period is legitimate, Strata considers that, given the level of investments previously made by Orion in establishing improvements, some benefits must accrue within the CPP period.
- 166 In the case of improvements due to asset management systems and enhanced capability, Strata notes that consumers will have met the costs of these investments through previous network charges. Therefore, it is appropriate that consumers obtain the gains and benefits achieved from these investments.
- 167 With respect to efficiency incentives, Strata has not recommended any adjustments for efficiency gains that would arise from improvements that could not yet have been identified by Orion.

5.5.3 Supporting analysis for the adjustments

- 168 Strata's top-down approach to the assessment of opex is considered to be complementary to, and not a replacement for, Orion's bottom-up process for establishing its opex forecast. The approach taken for a top-down assessment is what would be expected to occur through an effective executive and Board-level challenge to a management expenditure proposal. This is the type and level of analysis that Strata applied to its assessment. See section 6.1 for further discussion on this issue.

5.6 Strata's conclusions on opex

- 169 In Strata's opinion, Orion's revised opex forecast for the CPP period meets the expenditure objective because:
- (a) it meets or manages expected demand at appropriate service standards; and
 - (b) it complies with applicable regulatory obligations.
- 170 Orion has accepted the adjustments recommended by Strata⁵⁹ and contained in the Commission's Draft Decision.⁶⁰ Strata considers that Orion's adjusted expenditure forecast for the CPP period meets the expenditure objective.

⁵⁹ After taking into account a calculation error made when applying the defect rate cap for cables in the emergency maintenance category.

⁶⁰ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 314.

5.7 Recommendations on opex

171 The above adjustments in opex will result in the following downward adjustments to Orion's expenditure forecast included in the CPP proposal:

- (a) the removal of the unsupported contingency sum of \$7.5m;
- (b) a further \$2.775m reduction in emergency maintenance opex to take into account a reasonable expectation of future cable fault rates;
- (c) a further reduction of 5% to scheduled maintenance and unscheduled maintenance to reflect the expected gains from improved asset knowledge and management and the application of prudent management practices.

172 These adjustments are summarised in Table 10.

Table 10: Summary of adjustments for opex (\$'000 – constant 2013 values)

Description	Adjustments					TOTAL
	2015	2016	2017	2018	2019	
Emergency maintenance	-\$ 555	-\$ 555	-\$ 555	-\$ 555	-\$ 555	
Scheduled maintenance (less contingency)	-\$ 1,500	-\$ 1,500	-\$ 1,500	-\$ 1,500	-\$ 1,500	
Scheduled maintenance (prudency)	95%	95%	95%	95%	95%	
Unscheduled maintenance	95%	95%	95%	95%	95%	
Network management	-\$ 1,024	-\$ 1,024	-\$ 1,024	-\$ 1,024	-\$ 1,024	
	Allowance					
	2015	2016	2017	2018	2019	TOTAL
Emergency maintenance	\$ 5,970	\$ 7,170	\$ 5,970	\$ 5,970	\$ 5,970	\$ 31,050
Scheduled maintenance (less contingency)	-\$ 1,500	-\$ 1,500	-\$ 1,500	-\$ 1,500	-\$ 1,500	
Scheduled maintenance (prudency)	\$ 17,260	\$ 16,937	\$ 15,858	\$ 15,526	\$ 15,611	\$ 73,692
Unscheduled maintenance	\$ 1,895	\$ 1,895	\$ 1,895	\$ 1,895	\$ 1,895	\$ 9,476
Network management	\$ 15,203	\$ 15,303	\$ 15,137	\$ 15,185	\$ 15,253	\$ 76,079
Total - Opex	\$ 38,827	\$ 39,804	\$ 37,360	\$ 37,076	\$ 37,229	\$ 190,297

6 Other comments

6.1 Orion's expenditure forecasts

- 173 Under the requirements of the Inputs Methodology, Orion was to submit expenditure forecasts included in its CPP proposal that met the expenditure objective. Key indications that this did not happen are:
- (a) in its report, the Verifier indicated areas of the expenditure forecast that it considered the Commission should review in detail;
 - (b) Strata's review of the expenditure proposals and recommended adjustments;
 - (c) Orion's adjustments to replacement capex and opex contained in its submission.
- 174 An important component of the expenditure establishment process is rigorous governance and executive level review of the proposed programmes. Key questions that should be addressed at the governance level include:
- (a) what are the key inputs and assumptions and are they reasonable?
 - (b) should all the expenditure proposed by management be spent?
 - (c) is it reasonable to expect that savings can be made prior to committing the expenditure?
 - (d) can all the expenditure proposed by management realistically be spent within the planning period?
- 175 The expenditure forecasts contained in the CPP proposal and supporting information provided by Orion did not indicate that a rigorous challenge had been undertaken. In Strata's opinion, this is a primary reason why the Commission has been required to consider significant adjustments to Orion's expenditure forecasts.
- 176 Because of the issues identified with Orion's expenditure forecasts, the Commission had to establish an alternative expenditure forecast that would meet the expenditure objective. It is important to note that as a result of Strata's findings and the adjustments contained in the Draft Decision, Orion's submission included significant reductions to the expenditure it forecast in its CPP proposal.

6.2 The top-down assessment method

- 177 As agreed with the Commission, Strata adopted a top-down assessment of Orion's CPP expenditure forecasts and the revised forecasts provided in Orion's submission on the Draft Decision. Internationally, regulators and their advisors use the top-down approach. For example:
- (a) the Commerce Commission has relied on top-down methodologies for successive reviews of Transpower's expenditure plans;
 - (b) the Australian Energy Regulator (AER)⁶¹ has relied on similar top-down reviews undertaken on Revenue Proposals and Revised Revenue Proposals for Powerlink, ElectraNet and SP AusNet;
 - (c) the Economic Regulatory Authority⁶² (ERA) relied on a similar approach when assessing Western Power's expenditure forecasts for its revenue reset proposal in 2012; and
 - (d) Strata has also been involved in a review of a major Asian transmission and distribution company where a similar method was adopted.
- 178 Due to the significant information and resource assymetry between the regulator and the regulated entity it is not possible, nor would it be efficient, for the regulator to duplicate the detailed bottom-up processes expected to have been undertaken by the applicant. Consequently, a relatively high level top-down approach that includes detailed reviews of a number of specific expenditure components, is the approach generally adopted.
- 179 In many respects, the top-down approach duplicates what would have been expected to have been undertaken in a rigorous governance level review. The questions included in section 6.1 form a key part of the top-down review.
- 180 Importantly, the onus is on the regulated entity to fully demonstrate and justify that its expenditure forecast meets the requirements. If it does not do this then it is exposed, as Orion has been, to the regulator forming a view as to what the expenditure levels should more appropriately be.

⁶¹ www.AER.gov.com.au

⁶² www.ERA.gov.com.au

6.3 Responsibility for asset performance

- 181 When forming its views on what adjustments should be made to produce an alternative expenditure forecast, Strata has not undertaken detailed programme planning assessments. Strata’s review is, by necessity and in scope, undertaken from a relatively high level.
- 182 The resulting alternative expenditure forecast is Strata’s opinion of what is needed to be spent, and is likely to be spent during the CPP period. In reaching this view, Strata has relied on the information provided by Orion and the professional experience of its review team members.
- 183 At no point in the review has Strata made any attempt to advise Orion on how it must manage its assets. For example, Strata’s review of replacement capex using the asset age and health dashboard was not intended to produce an alternative asset replacement programme for Orion to implement. The dashboard was used to determine what expenditure level would likely be required to maintain current average asset age, condition and health ratings.
- 184 The responsibility for managing the network assets, as required by Orion’s policies and in keeping with the use of good industry practice, remains with Orion. The alternative expenditure forecast provides Strata’s assessment of the expenditure that would meet the expenditure objective.

Annex A - Detailed project evaluations CPP3 – CPP19

- A1 This appendix provides detailed project evaluations for major projects in the range CPP3 – CPP19. Note that CPP5, CPP18 and CPP20 contained no expenditure in the CPP period and are accordingly omitted from this evaluation.

A.1 CPP3 – Major urban (West)

- A2 CPP3 provides for the staged upgrade of Hornby area 33kV zone substations that are supplied from the Islington GXP. Three zone substations – Moffett, Hornby and Shands supply this predominantly commercial and industrial area. The option selected is to upgrade Shands to 66kV within the CPP period, which will require acquisition of an adjacent property to provide space to build the 66kV switchyard.
- A3 A new 66kV zone substation at Templeton, planned for construction outside the CPP period, will require land acquisition within the CPP period so that the development option to build at the right time is protected.
- A4 Also included within this group is a project to increase the effective capacity provided at Moffett by installing larger capacity 33kV cables, thus realising the full capacity of the existing 33/11kV transformers.
- A5 Orion's proposed CPP period expenditure for CPP3 is summarised in Table 11.

Table 11: CPP3 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Land acquisition for Templeton substation	\$ 100					
Land acquisition for Shands 66kV switchyard		\$ 100				
Convert Shands to 66kV			\$ 6,355			
Moffett substation replace 33kV feeders			\$ 129			
CPP3 Total - Major urban (West)						\$ 6,684

- A6 The Draft Decision:
- (a) agreed with the two land acquisition projects (527, 721), as they would cost-effectively protect likely future development options;⁶³

⁶³ Strata considers that strategic land acquisitions at current market value represent an efficient investment for Orion, since the benefits of protecting future development options are considerable and appreciating land values along with any interim income (e.g. from lease

- (b) agreed with the 33kV cable upgrade at Moffett (332), as it would cost-effectively provide additional capacity by relieving a constraint; but
 - (c) disagreed with the timing of the project to upgrade Shands to 66kV (669), because the load forecasts did not support it.
- A7 Orion has provided the following information in its submission:⁶⁴
- (a) There is significant industrial load growth that will not be supportable on the 33kV network in the long term.
 - (b) The proposal is indicative of the expenditure that will be required to finalise a solution for this area.
 - (c) It is not appropriate to reject an expenditure proposal simply because detailed design has not yet been done.
 - (d) Adequate zone substation capacity exists in this area.
 - (e) Without the proposed upgrading of Shands to 66kV, 11kV development will be suboptimal, as some 11kV cables will eventually become stranded.
- A8 Having considered these points, Strata's view is:
- (a) The new information does not make a compelling case for reinstatement of project ID 669 (\$6.355m), which was removed from the CPP proposal in the Draft Decision, as security standards are not exceeded in the CPP period and there is no new information relating to the 11kV constraints cited in Orion's CPP proposal.
 - (b) There may be better options that resolve the Islington 33kV (n-2) security issue that Orion mentions (e.g. additional 220/33 kV banks). This has not been considered in the CPP proposal or in Orion's submission.
 - (c) Upgrading Shands to 66 kV is a subtransmission investment, the timing of which should be primarily determined by subtransmission capacity and security and forecast demand. These factors are not an issue within the CPP period.
 - (d) Based on the firm capacity headroom at the three zone substations under review, there appears to be reasonable scope

grazing) provide an effective hedge against net loss if the development option is eventually passed up.

⁶⁴ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraphs 227 and 228.

for 11kV development as currently uncertain spot load developments become firm.

- (e) Without having finalised the conceptual subtransmission design (not the detailed design as Orion suggests) it is not possible to determine the extent of any 11kV asset stranding and, hence, the extent to which this is a material factor.
- A9 In summary, project ID 669 appears to be committed too soon, based on speculative demand information and without a full consideration of options.
- A10 Having considered the information provided in submissions, Strata considers the expenditure proposed for CPP3 in the Draft Decision meets the expenditure objective. This results in the expenditure shown in Table 12.

Table 12: CPP3 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Land acquisition for Templeton substation	\$ 100					
Land acquisition for Shands 66kV switchyard		\$ 100				
Convert Shands to 66kV			\$ -			
Moffett substation replace 33kV feeders			\$ 129			
CPP3 Total - Major urban (West)						\$ 329

A.2 CPP4 – Major urban (Southeast)

- A11 CPP4 provides for completion of one stage of a larger development programme that will eventually form a 66kV urban subtransmission ring linking Bromley GXP with Lancaster, Milton, Hoon Hay, Halswell, Heathcote and Barnett Park zone substations.
- A12 CPP4 includes:
- (a) land acquisition to enable further development of the existing Milton and Hoon Hay substations; and
- (b) installation of the Lancaster to Milton cable and termination at each end.
- A13 Orion's proposed CPP period expenditure for CPP4 is summarised in Table 13.

Table 13: CPP4 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Land acquisition for Milton 66kV switchroom	\$ 500					
Land acquisition for Hoon Hay 66kV switchyard		\$ 200				
Milton 66kV switchgear for Lancaster cable		\$ 4,487				
Lancaster 66kV switchgear for Milton cable		\$ 809				
Lancaster to Milton 66kV link			\$ 2,777			
CPP4 Total - Major urban (Southeast)						\$ 8,773

- A14 The Draft Decision:

- (a) agreed with the two land acquisition projects (694, 722), as they would cost-effectively protect likely future development options; but
- (b) disagreed with the timing of the project to install and terminate the Lancaster to Milton cable (723, 727, 589), because the objective of the investment is to provide resilience but the suburban loads supplied at Lancaster and Milton are already adequately secured to Orion’s planning standards and the post-quake reinstatement of CBD load is highly uncertain.
- A15 Orion has provided the following information in its submission:⁶⁵
- (a) The Lancaster – Milton 66 kV link provides vital resilience to Addington and the CBD.
- (b) Orion is conscious of the potential impact of an Alpine fault (or other HILP events) on its network and considers that this resilience investment is appropriate.
- A16 Having considered these points, Strata’s view is:
- (a) The new information does not make a compelling case for reinstatement of project IDs 723, 727 and 589 (\$8.073m), which was removed from the CPP proposal in the Draft Decision, as security standards are not exceeded in the CPP period and there is no new information provided that would justify this relatively high cost resilience investment.
- A17 In summary, project IDs 723, 727 and 589 appear to be committed too soon.
- A18 Having considered the information provided in submissions, Strata considers the expenditure proposed for CPP4 in the Draft Decision meets the expenditure objective. This results in the expenditure shown in Table 14.

Table 14: CPP4 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Land acquisition for Milton 66kV switchroom	\$ 500					
Land acquisition for Hoon Hay 66kV switchyard		\$ 200				
Milton 66kV switchgear for Lancaster cable		\$ -				
Lancaster 66kV switchgear for Milton cable		\$ -				
Lancaster to Milton 66kV link			\$ -			
CPP4 Total - Major urban (Southeast)						\$ 700

⁶⁵ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 229.

A.3 CPP6 – Major urban (CBD)

- A19 CPP6 provides for landscaping and modifications to the exterior of substation buildings and fencing within the CBD zone referred to as the Frame.
- A20 Orion’s proposed CPP period expenditure for CPP4 is summarised in Table 15.

Table 15: CPP6 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Site development for Armagh and Oxford-Tuam	\$ 500					
CPP6 Total - Major urban (CBD)						\$ 500

- A21 The Draft Decision:
- (a) disagreed with the inclusion of expenditure that provided amenity value only at the request or requirement of an external agency.
- A22 Orion has provided the following information in its submission:⁶⁶
- (a) Orion has had further discussions with CERA and the external request/requirement has been withdrawn.
- (b) Accordingly, Orion agrees with the Draft Decision proposal that this project be removed from the CPP period expenditure.
- A23 Having considered the information provided in submissions, Strata considers that Orion’s agreement confirms the Draft Decision. This results in the expenditure shown in Table 16.

Table 16: CPP6 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Site development for Armagh and Oxford-Tuam	\$ -					
CPP6 Total - Major urban (CBD)						\$ -

A.4 CPP7 – Major rural (Rolleston)

- A24 CPP7 provides for on-going expenditure within a programme of capacity and reliability-related upgrades in the Rolleston area. Three projects from this programme are included in the CPP proposal for implementation within the CPP period.
- A25 CPP7 includes:

⁶⁶ Orion “Orion CPP proposal: Draft Decision” (20 September 2013), paragraph 230.

- (a) development of the first stage of a new zone substation at Burnham;
- (b) a line upgrade to 66kV; and
- (c) conversion of Highfield to 66kV.

A26 Orion's proposed CPP period expenditure for CPP7 is summarised in Table 17.

Table 17: CPP7 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Burnham substation stage 1	\$ 3,552					
Weedons to Highfield tee 66kV line conversion			\$ 1,548			
Convert Highfield zone substation to 66/11kV				\$ 710		
CPP7 Total - Major rural (Rolleston)						\$ 5,810

A27 The Draft Decision:

- (a) disagreed with these proposed expenditures (639, 415, 114) on grounds that the load growth was uncertain and that the verifier considered that the timing of the need to upgrade Highfield to 66kV was speculative (in turn due to whether or not some speculative large loads materialised).

A28 Orion has provided the following information in its submission:⁶⁷

- (a) Orion reinforces the point that it anticipates the load growth outlined in its proposal (but provides no updated forecast of this).
- (b) Orion restates the case put forward in the CPP proposal, highlighting the need to reinforce the Norwood area, which involves first converting sections of the 33kV network to 66kV.

A29 Having considered these points, Strata's view is:

- (a) The new information does not make a compelling case for reinstatement of project IDs 639, 415 and 114 (\$5.81m), which was removed from the CPP proposal in the Draft Decision, as security standards are not demonstrably exceeded in the CPP period.
- (b) Orion has adopted a D1 security level for Highfield and Rolleston but this is not clearly substantiated in the project summary (are the stated peak loads summer or winter?). As Orion states, there is significant summer/winter peak diversity between these two locations and an ability to offload Rolleston demand to Larcomb

⁶⁷ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraphs 232 – 236.

and Weedons (both of which have 23MVA of firm capacity with plenty of headroom). A clearer case would require an aggregated coincident peak load forecast, which has not been made available.

- (c) That Rolleston has experienced poor reliability historically is linked by Orion to it not having n-1 security historically. However, it does now (for up to 10MVA) and it appears that at least some future load growth can be transferred to Larcomb or Weedons. The assertion in section 3.5 of the project summary that offloading Rolleston load to Larcomb or Weedons would result in a decrease in security (to n) is difficult to reconcile with Strata’s understanding that the Larcomb to Weedons circuit has been installed, completing a 66kV subtransmission loop between Islington and Springston.
- (d) The anticipated Westland Milk new load (9.4MW), which is a significant driver of the proposed expenditures (project summary section 1.4 Drivers), appears to remain uncommitted. Orion forecast this new load for the spring of 2014 and it would be reasonable to expect that this would have been confirmed by now. There is no further information provided on the timing of this new load in Orion’s submission, casting further doubt on it. A second factor relevant to this load is that it is planned to be normally supplied at 11kV from Larcomb, which has adequate firm capacity without requiring additional CPP period expenditure. Strata’s conclusion is that this load has no bearing on the three projects under consideration within the CPP period. The CPP7 project summary is very difficult to follow as providing a clear logical progression from driver to options to preferred solution.
- A30 In summary, from a bottom-up review perspective, project IDs 639, 415 and 114 appear to be committed too soon.
- A31 However, in section 3.4.2 Strata stated a view that, from a top-down perspective, it would be reasonable to expect that providing for one of the four rural zone substation upgrades included in projects CPP7, CPP8, CPP11 and CPP15 would meet the expenditure objective. Each of these projects is subject to planning uncertainty associated with load forecasts, including currently uncommitted large new loads. Allowing 25% of each relevant project component (including associated lines and substation) provides a reasonable cost and time-weighted allowance approximately equating to one rural zone substation and associated subtransmission feeders that Orion can commit to the highest value need at the appropriate time.
- A32 In respect of this view, Strata considers that an allowance of 25% of the expenditure proposed for CPP7 (but disallowed in the Draft Decision) as part of an overall allowance for the equivalent of one rural zone substation across CPP7, CPP8, CPP11 and CPP15 meets the expenditure objective. This results in the expenditure shown in Table 18.

Table 18: CPP7 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Burnham substation stage 1	\$ 888					
Weedons to Highfield tee 66kV line conversion			\$ 387			
Convert Highfield zone substation to 66/11kV				\$ 178		
CPP7 Total - Major rural (Rolleston)						\$ 1,453

A.5 CPP8 – Major rural (Hororata/Creyke)

A33 CPP8 provides for a programme of six related projects that meet future load growth in the Hororata and Darfield areas and to transition the subtransmission in that area from 33kV to 66kV.

A34 CPP7 includes:

- (a) transfer of Hororata 11kV load from the 33kV bus to the 66kV bus;
- (b) stage 1 development of a new zone substation at Creyke; and
- (c) installation of 11kV ripple plants at Annat and Bankside.

A35 Orion's proposed CPP period expenditure for CPP8 is summarised in Table 19.

Table 19: CPP8 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Convert Hororata sub from 33/11kV to 66/11kV	\$ 1,501					
Land acquisition for Creyke 66kV substation			\$ 250			
Darfield to Creyke 66kV line stage 1				\$ 578		
Creyke zone substation stage 1				\$ 2,807		
Bankside 11kV ripple plant					\$ 360	
Annat 11kV ripple plant					\$ 360	
CPP8 Total - Major rural (Hororata/Creyke)						\$ 5,856

A36 The Draft Decision:

- (a) agreed with the transfer of Hororata 11kV load to the 66kV bus by installing a new 66/11kV transformer (601), which would manage the Hororata 33kV firm capacity constraint;
- (b) agreed with the land acquisition project (655), as it would cost-effectively protect a likely future development option;
- (c) agreed with the installation of 11kV ripple plants at Bankside and Annat (603, 605); but

- (d) disagreed with the proposed expenditures (580, 584) to develop stage 1 of Creyke on grounds that there may be a better option to supply Darfield area load growth from Kimberley at 33kV.
- A37 Orion has provided the following information in its submission:⁶⁸
- (a) The alternative proposed in the Draft Decision of providing 33 kV from Kimberley is not feasible, as it would require non-standard 66/33/11kV transformers.
- (b) Restates that the case put forward in the CPP proposal provides the best solution to avoid the need to replace the Hororata 33kV switchgear in 2020 and eventually exit 33kV supply from Hororata.
- A38 Having considered these points, Strata's view is:
- (a) The Draft Decision allowed a new 66/11 kV bank at Hororata, which enables ~7 MVA peak load to be offloaded from Hororata 33 kV, relieving the immediate 66/33kV constraint at Hororata. This seems appropriate.
- (b) The forecast Darfield 11 kV peak excess (only a few hundred kilowatts) should be manageable with offloading to Kimberley and/or DSM for the few hours a year it is likely an issue. Transferring a larger 33/11kV transformer to Darfield would provide additional capacity if one were available.
- (c) Whilst Strata accepts Orion's submission regarding the feasibility of providing 33kV from Kimberley, significant doubt remains over the proposed Creyke development as consideration of 33 kV alternatives has not been demonstrated. The proposed solution appears to favour 66 kV upgrades and insufficient information has been provided that would give confidence that all feasible options have been considered. Some alternatives may include simply replacing the 33kV switchgear at Hororata (possibly by transferring equipment from other sites, if available) or direct connecting the south circuit to one transformer (as is proposed) and the two north circuits to the other.
- (d) The 2020 date for Hororata 33 kV switchgear replacement has not been substantiated. No information has been provided that CBRM or other deferral options have been considered. It is also not clear whether all of the switchgear should be decommissioned at the same time on an assessed condition basis.

⁶⁸ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 237 - 239.

- (e) With respect to the allowance of \$0.72M for new 11 kV ripple plants at Annat and Bankside, this looks to be an expensive load control option for these loads. Strata agrees with Orion's view that it should consider more cost-effective alternatives. However, as the amounts are relatively small in the context of the major projects budget, Strata is comfortable with retaining the Draft Decision allowances for these projects.
- A39 In summary, from a bottom-up review perspective, project IDs 580 and 584 appear to be committed too soon.
- A40 However, in section 3.4.2 Strata stated a view that, from a top-down perspective, it would be reasonable to expect that providing for one of the four rural zone substation upgrades included in projects CPP7, CPP8, CPP11 and CPP15 would meet the expenditure objective. Each of these projects is subject to planning uncertainty associated with load forecasts, including currently uncommitted large new loads. Allowing 25% of each relevant project component (including associated lines and substation) provides a reasonable cost and time-weighted allowance approximately equating to one rural zone substation and associated subtransmission feeders that Orion can commit to the highest value need at the appropriate time.
- A41 In respect of this view, Strata considers that an allowance of 25% of the expenditure proposed for project IDs 580 and 584 within CPP8 (but disallowed in the Draft Decision) as part of an overall allowance for the equivalent of one rural zone substation across CPP7, CPP8, CPP11 and CPP15 meets the expenditure objective. This results in the expenditure shown in Table 20.

Table 20: CPP8 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Convert Hororata sub from 33/11kV to 66/11kV	\$ 1,501					
Land acquisition for Creyke 66kV substation		\$ 250				
Darfield to Creyke 66kV line stage 1			\$ 145			
Creyke zone substation stage 1			\$ 702			
Bankside 11kV ripple plant				\$ 360		
Annat 11kV ripple plant				\$ 360		
CPP8 Total - Major rural (Hororata/Creyke)						\$ 3,317

A.6 CPP9 – Major rural (Central Plains Water)

- A42 CPP9 provides a 66kV connection for an anticipated 7MW generator at Steeles Road near the Rakaia River.
- A43 CPP9 includes:
- (a) a new substation at Steeles Road and a 66kV line to Te Pirita; and
 - (b) a 66kV line connection at Te Pirita.

A44 Orion's proposed CPP period expenditure for CPP9 is summarised in Table 21.

Table 21: CPP9 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Steeles Rd substation and 66kV line				\$ 2,916		
Te Pirita 66kV bays				\$ 807		
CPP9 Total - Major rural (Central Plains Water)						\$ 3,723

A45 The Draft Decision:

- (a) agreed to an allowance of 25% of the project costs (670, 587), representing a 50% reduction to reflect the potential for total costs to be provided by a customer capital contribution and an further 50% reduction to reflect the uncertainty of this currently uncommitted project proceeding within the CPP period.

A46 Orion has provided the following information in its submission:⁶⁹

- (a) Orion agrees with our estimate of the proposed 50% reduction of total costs that would be provided by a customer capital contribution.
- (b) Orion disagrees with the 50% proposed reduction to reflect the uncertainty of this currently uncommitted project proceeding within the CPP period. No further information is provided relating to the likelihood of customer commitment within the CPP period.

A47 Having considered these points, Strata's view is:

- (a) The proposed 50% reduction of total costs that would be provided by a customer capital contribution is reasonable and has been acknowledged as reasonable by Orion.
- (b) In line with the views expressed in section 3.1.2 relating to the planning uncertainty created by anticipated but uncommitted single large loads, Strata considers that a 50% allowance of the portion of the project not covered by customer capital contribution is reasonable.

A48 In respect of this view, Strata considers that an allowance of 25% of the expenditure proposed for project IDs 670 and 587 meets the expenditure objective. This results in the expenditure shown in Table 22.

⁶⁹ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraphs 240 – 241.

Table 22: CPP9 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Steeles Rd substation and 66kV line				\$ 729		
Te Pirita 66kV bays				\$ 202		
CPP9 Total - Major rural (Central Plains Water)						\$ 931

A.7 CPP10 – Major rural (Springston)

A49 CPP10 provides for capacity to meet residential growth forecast in the Lincoln and Springston areas.

A50 CPP10 includes:

- (a) installation of a new section of 66kV line that would enable removal of an existing 33kV line in Lincoln township; and
- (b) a new 11kV switch room at Springston to enable the replacement and extension of 11kV switchgear.

A51 Orion's proposed CPP period expenditure for CPP10 is summarised in Table 23.

Table 23: CPP10 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Greenpark 66kV line	\$ 578					
Springston 11kV switchroom	\$ 608					
CPP10 Total - Major rural (Springston)						\$ 1,186

A52 The Draft Decision:

- (a) agreed with the new Springston 11kV switch room (728); but
- (b) disagreed with the Greenpark 66kV line section, on the basis that it resulted from the amenity value undergrounding of an existing 33kV line through Lincoln township that should be funded by the local community.

A53 Orion has provided the following information in its submission:⁷⁰

- (a) Orion states that the proposed undergrounding of the 33 kV line on Edward St was not a local Council requirement, as the Draft Decision assumed, but Orion's own initiative.
- (b) Hence, Orion considers the proposed expenditure should be allowed to allow for the eventual replacement of Lincoln zone substation with a new 66 kV zone substation at Greenpark.

⁷⁰ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 242.

- A54 Having considered these points, Strata’s view is:
- (a) That Orion’s correction of the Draft Decision assumption regarding the driver for undergrounding the 33kV line being Orion and not the local Council is accepted.
 - (b) However, Strata considers that the case for undergrounding that line in 2015 remains unsubstantiated – why does it need to be undergrounded now? The only reason stated is that Orion proposes undergrounding along a street that is “*developing into an urban-style setting*”. This implies an amenity improvement driver, which is why the Draft Decision assumed it was Council-driven.
 - (c) Greenpark is not planned for development until 2030 and the 66kV line deviation (that would replace the 33 kV line along Edward Street) could be deferred without service consequence until much closer to that date. The proposed line section is planned to run along a roadside and should therefore pose no difficulties in obtaining a suitable route nearer to 2030.
- A55 Accordingly, Strata considers that project ID 697 does not meet the expenditure objective for inclusion within the CPP period.

A56 This results in the expenditure shown in Table 24.

Table 24: CPP10 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Greenpark 66kV line	\$ -					
Springston 11kV switchroom	\$ 608					
CPP10 Total - Major rural (Springston)						\$ 608

A.8 CPP11 – Major rural (Norwood)

- A57 CPP11 provides for a new zone substation at Norwood to provide capacity and security in that area for forecast demand growth.
- A58 CPP11 includes:
- (a) land acquisition for Norwood substation;
 - (b) a section of new 66kV line to tee into the Highfield – Weedons line; and
 - (c) a new zone substation at Norwood.
- A59 Orion’s proposed CPP period expenditure for CPP11 is summarised in Table 25.

Table 25: CPP11 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Land acquisition for Norwood substation				\$ 250		
Norwood-Highfield/Weedons tee 66kV line					\$ 2,250	
Norwood zone substation					\$ 3,284	
CPP11 Total - Major rural (Norwood)						\$ 5,784

A60 The Draft Decision:

- (a) agreed with the land acquisition project (654), as it would cost-effectively protect a likely future development option; but
- (b) disagreed with the proposed expenditures (626, 597) to develop Norwood as the load growth forecast trigger relied on the commitment of anticipated large loads (Meadow Mushrooms and Malvern Abattoirs).

A61 Orion has provided the following information in its submission:⁷¹

- (a) Orion reiterates that the network in this area operates at near full capacity and that small increases in load will require a new zone substation.

A62 Having considered these points, Strata's view is that:

- (a) it agrees with the Draft Decision rationale that the proposal relies on uncertain new load from Meadow Mushrooms and Malvern Abattoirs. Orion in its project summary document (section 1.4 Drivers) states that, without these new loads, the existing network capacity is adequate until sometime after 2020.
- (b) no new information has been provided relating to the certainty of either or both of these new load developments.

A63 In summary, from a bottom-up review perspective, project IDs 626 and 597 appear to be committed too soon.

A64 However, in section 3.4.2 Strata stated a view that, from a top-down perspective, it would be reasonable to expect that providing for one of the four rural zone substation upgrades included in projects CPP7, CPP8, CPP11 and CPP15 would meet the expenditure objective. Each of these projects is subject to planning uncertainty associated with load forecasts, including currently uncommitted large new loads. Allowing 25% of each relevant project component (including associated lines and substation) provides a reasonable cost and time-weighted allowance approximately equating to one rural zone substation and associated subtransmission

⁷¹ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 243.

feeders that Orion can commit to the highest value need at the appropriate time.

- A65 In respect of this view, Strata considers that an allowance of 25% of the expenditure proposed for project IDs 626 and 597 within CPP11 (but disallowed in the Draft Decision) as part of an overall allowance for the equivalent of one rural zone substation across CPP7, CPP8, CPP11 and CPP15 meets the expenditure objective. This results in the expenditure shown in Table 26.

Table 26: CPP11 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Land acquisition for Norwood substation				\$ 250		
Norwood-Highfield/Weedons tee 66kV line					\$ 563	
Norwood zone substation					\$ 821	
CPP11 Total - Major rural (Norwood)						\$ 1,634

A.9 CPP12 – Major rural (Power Factor)

- A66 CPP12 provides for staged installation of power factor correction and voltage support equipment at suitable locations within Orion’s rural network.
- A67 CPP12 includes:
- (a) Installations of the order of 1MVar of PFC for each year within the CPP period.
- A68 Orion’s proposed CPP period expenditure for CPP12 is summarised in Table 27.

Table 27: CPP12 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Rural power factor correction	\$ 120					
Rural power factor correction		\$ 120				
Rural power factor correction			\$ 120			
Rural power factor correction				\$ 120		
Rural power factor correction					\$ 120	
CPP12 Total - Major rural (power factor)						\$ 600

- A69 The Draft Decision:
- (a) agreed that the expenditure met the expenditure objective.
- A70 Orion provided no further information in its submission.
- A71 Whilst Strata would have preferred that Orion had provided further information related to its progress in developing a comprehensive power factor correction policy in its submission, Strata agrees with the Draft Decision rationale that the proposed expenditure is likely to represent a prudent investment in network efficiency and provide a cost-effective

approach to extending the capacity of existing network, particularly the 11kV distribution.

- A72 In respect of this view, Strata considers that proposed expenditure for project IDs 711 – 715 inclusive meets the expenditure objective. This results in the expenditure shown in Table 28.

Table 28: CPP12 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Rural power factor correction	\$ 120					
Rural power factor correction		\$ 120				
Rural power factor correction			\$ 120			
Rural power factor correction				\$ 120		
Rural power factor correction					\$ 120	
CPP12 Total - Major rural (power factor)						\$ 600

A.10 CPP13 – Major rural (Annat)

- A73 CPP13 provides upgraded 33/11kV transformer capacity at Annat to supply the anticipated new demand created by the Central Plains Water scheme.

- A74 CPP9 includes:

- (a) Installation of a transferred 7.5MVA transformer.

- A75 Orion's proposed CPP period expenditure for CPP9 is summarised in Table 29.

Table 29: CPP13 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Annat transformer upgrade				\$ 393		
CPP13 Total - Major rural (Annat)						\$ 393

- A76 The Draft Decision:

- (a) agreed to an allowance of 50% of the project costs (no project ID provided), representing a reduction of total costs that reflects the uncertainty of this currently uncommitted project proceeding within the CPP period.

- A77 Orion has provided the following information in its submission:⁷²

- (a) Orion disagrees the 50% proposed reduction to reflect the uncertainty of this currently uncommitted project proceeding within

⁷² Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 244.

the CPP period. No further information is provided relating to the likelihood of customer commitment within the CPP period.

- A78 Having considered these points and in line with the views expressed in section 3.1.2 related to the planning uncertainty posed by anticipated but uncommitted single large loads, Strata’s view is that a 50% allowance of the portion of the project not covered by customer capital contribution is reasonable.
- A79 Strata notes that the Commission has proposed a further 50% reduction of total costs for other major projects reflecting its estimated customer capital contribution amounts. However, this additional 50% has not been applied to CPP12. Orion has acknowledged a reduction of total costs reflecting customer capital contributions for some other projects. However, in this case, Strata considers that the amount in question (\$98k) is not material.
- A80 In respect of this view, Strata considers that an allowance of 50% of the expenditure proposed for the Annat transformer upgrade meets the expenditure objective. This results in the expenditure shown in Table 30.

Table 30: CPP13 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Annat transformer upgrade				\$ 197		
CPP13 Total - Major rural (Annat)						\$ 197

A.11 CPP14 – Major rural (Banks Peninsula)

- A81 CPP14 provides for a transformer upgrade to provide expanded capacity to meet Banks Peninsula demand growth.
- A82 CPP14 includes:
- (a) Installation of a transferred 7.5MVA transformer at Teddington.
- A83 Orion’s proposed CPP period expenditure for CPP14 is summarised in Table 31.

Table 31: CPP14 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Teddington transformer upgrade	\$ 773					
CPP14 Total - Major rural (Banks Peninsula)						\$ 773

- A84 The Draft Decision:
- (a) agreed that the expenditure for project ID 361 was a reasonable solution to meeting continued demand growth in the area.
- A85 Orion provided no further information in its submission.
- A86 Having considered these points, Strata agrees with the Draft Decision.

A87 In respect of this view, Strata considers that proposed expenditure for project ID 361 meets the expenditure objective. This results in the expenditure shown in Table 32.

Table 32: CPP14 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Teddington transformer upgrade	\$ 773					
CPP14 Total - Major rural (Banks Peninsula)						\$ 773

A.12 CPP15 – Major rural (Springston)

A88 CPP15 provides for a new zone substation at Springston to provide capacity and security in that area for forecast demand growth.

A89 CPP15 includes:

- (a) land acquisition for Southbridge substation;
- (b) a section of new 66kV line to tee into the Brookside – Killinchy line; and
- (c) a new zone substation at Southbridge.

A90 Orion's proposed CPP period expenditure for CPP15 is summarised in Table 33.

Table 33: CPP15 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Land acquisition for Southbridge substation			\$ 100			
Southbridge 66kV line				\$ 1,010		
Southbridge zone substation				\$ 3,275		
CPP15 Total - Major rural (Southbridge)						\$ 4,385

A91 The Draft Decision:

- (a) agreed with the land acquisition project (716), as it would cost-effectively protect a likely future development option; but
- (b) disagreed with the proposed expenditures (627, 610) to develop Southbridge as the load growth forecast did not support it.

A92 Orion has provided the following information in its submission:⁷³

- (a) Demands are near transformer capacity limits at three adjacent zone substations.

⁷³ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 245 - 246.

- (b) There is limited spare capacity available to back up the adjacent substations at 11kV.
- (c) Area loads justify the provision of n-1 security.
- A93 Having considered these points, Strata's view is:
- (a) Forecast aggregate demand increases through to 2019 are very modest (~2.5MVA).
- (b) Less expensive solutions to provide upgraded transformer capacity are available (e.g. possibly through transformer swaps as per CPP 14). If transformer swaps not available, buying new transformers would still be significantly less expensive than developing a new zone substation.
- (c) Additionally, the Dunsandel upgrade (CPP 16) will allow some offloading of Killinchy and Brookside (see section 3.3 of the project summary).
- (d) Substation demands less than 15MVA do not justify n-1 security, per Orion's planning standards (and as set out in the project summary in section 1.4 (Drivers), which states that a D2 security level is appropriate). Each of the substations in question supplies < 15MVA peak. It is not clear how Orion has reached the new conclusion in its submission that n-1 security (which would be consistent with a D1 security level) is appropriate.
- (e) Per the comment Strata made in its peer view of the Draft Decision, there is no information provided indicating that alternatives have been considered to manage the 11 kV capacity constraints on Rakaia Island. No further information has been provided on this issue.
- A94 In summary, from a bottom-up review perspective, Strata considers that project IDs 627 and 610 appear to be committed too soon.
- A95 However, in section 3.4.2 Strata stated a view that, from a top-down perspective, it would be reasonable to expect that providing for one of the four rural zone substation upgrades included in projects CPP7, CPP8, CPP11 and CPP15 would meet the expenditure objective. Each of these projects is subject to planning uncertainty associated with load forecasts, including currently uncommitted large new loads. Allowing 25% of each relevant project component (including associated lines and substation) provides a reasonable cost and time-weighted allowance approximately equating to one rural zone substation and associated subtransmission feeders that Orion can commit to the highest value need at the appropriate time.
- A96 In respect of this view, Strata considers that an allowance of 25% of the expenditure proposed for project IDs 627 and 610 within CPP15 (but disallowed in the Draft Decision) as part of an overall allowance for the

equivalent of one rural zone substation across CPP7, CPP8, CPP11 and CPP15 meets the expenditure objective. This results in the expenditure shown in Table 34.

Table 34: CPP15 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Land acquisition for Southbridge substation			\$ 100			
Southbridge 66kV line				\$ 253		
Southbridge zone substation				\$ 819		
CPP15 Total - Major rural (Southbridge)						\$ 1,171

A.13 CPP16 – Major rural (Dunsandel)

A97 CPP16 provides for a transformer upgrade to provide expanded capacity to meet demand growth at the Synlait dairy factory.

A98 CPP16 includes:

(a) Installation of two new 11.5/23MVA transformers at Dunsandel.

A99 Orion's proposed CPP period expenditure for CPP16 is summarised in Table 35.

Table 35: CPP16 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Dunsandel transformer upgrade			\$ 2,415			
CPP16 Total - Major rural (Dunsandel)						\$ 2,415

A100 The Draft Decision:

(a) agreed that the expenditure for project ID 699 was a reasonable solution to meeting Synlait demand growth and general demand growth in the area.

A101 Orion provided no further information in its submission.

A102 Having considered these points, Strata's view is:

(a) Strata notes an apparent level of inconsistency for this project against the treatment of significant but uncommitted loads applied to other projects. In other similar situations, a 50% reduction of project costs has been allowed to reflect planning uncertainty and a further 50% to reflect the potential for a customer capital contribution. Strata reflected this concern in its peer review of the Commission's review of major projects undertaken for the Draft Decision.

(b) That said, Strata agrees with the Draft Decision as the allowance for this project can also be considered as an additional provision that reflects the planning uncertainty associated with uncommitted large new loads.

- A103 In respect of this view, Strata considers that proposed expenditure for project ID 699 meets the expenditure objective. This results in the expenditure shown in Table 36.

Table 36: CPP16 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Dunsandel transformer upgrade			\$ 2,415			
CPP16 Total - Major rural (Dunsandel)						\$ 2,415

A.14 CPP17 – Major rural (Porters Heights)

- A104 CPP17 provides new connection capacity to supply demand growth for the Porters Heights alpine village and winter sports resort near Porters Pass.
- A105 CPP17 includes:
- (a) an estimated sum to supply the initial stage of the development from Castle Hill GXP, possibly at 22kV.
- A106 Orion's proposed CPP period expenditure for CPP17 is summarised in Table 37.

Table 37: CPP17 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Porters Heights connection	\$ 4,137					
CPP17 Total - Major rural (Porters Heights)						\$ 4,137

- A107 The Draft Decision:
- (a) agreed to an allowance of 50% of the project costs (666), representing a reduction of total estimated costs that would potentially be provided by a customer capital contribution.
- A108 Orion has provided the following information in its submission:⁷⁴
- (a) "The Draft Decision reduces the proposed budget by 50%, which we accept as reasonable."
- A109 Having considered these points, Strata's view is:
- (a) The proposed 50% reduction of total costs that would be provided taking into account a customer capital contribution is reasonable and has been acknowledged by Orion.
- (b) The project summary states that planning consent has been granted for this development. Strata considers that this reduces,

⁷⁴ Orion "Orion CPP proposal: Draft Decision" (20 September 2013), paragraph 247.

but does not completely remove, the planning uncertainty associated with this project.

- A110 In respect of this view, Strata considers that an allowance of 50% of the expenditure proposed for project ID 666 meets the expenditure objective. This results in the expenditure shown in Table 38.

Table 38: CPP17 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Porters Heights connection	\$ 2,069					
CPP17 Total - Major rural (Porters Heights)						\$ 2,069

A.15 CPP19 – Major rural (Alpine)

- A111 CPP19 provides for the installation of diesel generators to provide additional supply security for two of the remote alpine regions of the network.
- A112 CPP19 includes:
- (a) Installation of diesel gensets at Castle Hill and Arthurs Pass.
- A113 Orion's proposed CPP period expenditure for CPP19 is summarised in Table 39.

Table 39: CPP19 proposed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	TOTAL
Castle Hill generators		\$ 181				
Arthurs Pass generators		\$ 68				
CPP19 Total - Major rural (Alpine)						\$ 249

- A114 The Draft Decision:
- (a) agreed that the expenditure for project IDs 671 and 672 was a cost-effective solution to providing additional security for remote regions with relatively small loads.
- A115 Orion provided no further information in its submission.
- A116 Having considered these points, Strata agrees with the Draft Decision.
- A117 In respect of this view, Strata considers that proposed expenditure for project IDs 699 inclusive meets the expenditure objective. This results in the expenditure shown in Table 40.

Table 40: CPP19 allowed expenditure (\$000 – constant 2013 values)

Description	2015	2016	2017	2018	2019	Total
Castle Hill generators		\$ 181				
Arthurs Pass generators		\$ 68				
CPP19 Total - Major rural (Alpine)						\$ 249

Annex B - Author biographies

Bill Heaps

Bill Heaps is Managing Director of Strata Energy Consulting Limited. He has over 35 years' experience in electricity utility engineering, management and consulting roles.

Bill is an electrical engineer with senior management experience in energy utilisation, distribution, retail, transmission and power generation. He has recently held three influential advisory group chairmanship roles for the New Zealand Electricity Commission and currently chairs the Investment Advisory Group for the Electricity Authority. From 2006 to 2008 Bill was a Director of Orion Group Limited, one of New Zealand's largest electricity distribution businesses.

Career summary

- Managing director of Strata Energy Consulting
- General Manager (Commercial Services) at Transpower, New Zealand's electricity transmission and system operating company
- General Manager (Geothermal) of the Electricity Corporation of New Zealand (ECNZ)
- General Manager Energy Brokers New Zealand
- General Manager Commercial Services CentralPower, New Zealand

Expertise

- **Wholesale electricity market** – Expertise in the design, governance, regulation and operation of electricity markets
- **Electricity Generation** – experienced in power generation plant management and investment planning
- **Electricity transmission networks** – experienced in the provision of transmission services, including pricing and revenue, contracts, asset management systems and performance
- **Electricity distribution** – Experienced in distribution company governance, strategy and policy development and distribution business processes
- **Retail electricity markets** – Expertise in retail market design and operation, including market processes, price risk management, metering, reconciliation and information systems regulation, rules and governance
- **Electricity Utilisation** – experienced in the use of load management techniques in major industrial manufacturing plants and commercial buildings.

Clive Bull

Clive Bull is an electrical engineer with 30 years senior management experience in the New Zealand energy distribution and transmission sectors. In this time, Clive has performed a number of advisory and working group roles for the New Zealand Electricity Commission, the Gas Industry Steering Group, the Gas Industry Company, the Electricity and Gas Complaints Commission and the former Electricity Market Company (EMCO). Clive has been a partner at Strata Energy Consulting Limited since 2010.

Having held senior management roles in Transpower and Vector, Clive has an in-depth, hands-on understanding of transmission and distribution network operations and development and customer management. Clive also possesses significant recent experience in emerging technologies around consumer-scale distributed generation, load management, electric vehicles, smart metering and smart grids.

Career Summary

- Director, Strata Energy Consulting Ltd
- Manager Future Solutions (various other positions) United Networks/Vector Ltd
- Grid Development Manager (other various positions) Transpower NZ Ltd

Expertise

- **Electricity transmission** - provision of transmission services, including pricing and revenue contracts. System operations and network development. Transmission regulation and governance.
- **Electricity distribution** – distribution network design and operations, regulation, asset management, commercial business systems and customer service.
- **Electricity and gas retail markets** – market and regulation design, implementation and operation, including retail competition, market processes, metering and information systems and access for new technologies.
- **Wholesale electricity markets** – including market design and implementation, market operation, governance and enhancement, market pricing, metering and reconciliation arrangements.