

12 May 2017

Before Hearing Commissioners
at Christchurch

under: the Resource Management Act 1991

in the matter of: applications CRC172455, CRC172522, CRC172456, and
CRC172523 to undertake channel deepening dredging
and maintenance dredging in Lyttelton Harbour

and

in the matter of: **Lyttelton Port Company Limited**
Applicant

Closing legal submissions on behalf of Lyttelton Port Company
Limited

Dated: 12 May 2017

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CLOSING LEGAL SUBMISSIONS ON BEHALF OF LYTTTELTON PORT COMPANY LIMITED

INTRODUCTION

- 1 The Commissioners have now heard from the Applicant, submitters and the Council Officers. A number of issues requiring further discussion have arisen.
- 2 These submissions:
 - 2.1 Discuss the evidence presented by LPC in support of its applications for four resource consents associated with Lyttelton Port Company Limited's (*LPC*) proposed Channel Deepening Project (*CDP*) (*Applications*);
 - 2.2 Within that discussion, provide responses to some of the key evidence in opposition to LPC's evidence;
 - 2.3 More specific responses to other evidence presented by submitters in opposition and Council Officers, including a discussion of 'net gain';
 - 2.4 Briefly consider again the suitability of an adaptive management programme in these circumstances; and
 - 2.5 Comment on other issues that have arisen throughout the hearing, including:
 - (a) Noise;
 - (b) The existing maintenance consent;
 - (c) Bonds;
 - (d) Lapse date; and
 - (e) Consent duration.

EVIDENCE IN SUPPORT OF THE APPLICATIONS AND RESPONSES TO KEY CHALLENGES

- 3 As outlined in the opening submissions LPC has applied for the following resource consents:
 - 3.1 A coastal permit to undertake channel deepening dredging;
 - 3.2 A discharge permit to discharge contaminants (seabed material and water) into water associated with channel deepening dredging;

- 3.3 A coastal permit to undertake maintenance dredging; and
- 3.4 A discharge permit to discharge contaminants (seabed material and water) into water associated with maintenance dredging.
- 4 In support of those Applications, LPC has presented evidence setting out:
 - 4.1 Its baseline monitoring programme;
 - 4.2 The modelling of dredge effects, i.e. plumes resulting from dredging and disposal, and the movement of sediment over a period of time;
 - 4.3 The process by which turbidity trigger values will be established;
 - 4.4 The operation of the turbidity triggers in practice; and
 - 4.5 Assessments of effects of the CDP, taking into account the above.
- 5 The evidence given on each of these topics is explained further below. Essentially though LPC has:
 - 5.1 Assessed the 'environment' through its baseline monitoring (water quality and otherwise);
 - 5.2 Assessed the 'effect' of dredging through the modelling of sediment plumes and movement over time;
 - 5.3 Completed assessments of the effects on the environment of dredging as required by s104(1)(a); and
 - 5.4 Proposed a comprehensive suite of conditions including conditions which ensure that the effects on the environment are no more than predicted at and outlined at this hearing, and that if they are, dredging must cease.

Baseline monitoring

- 6 The evidence of **Leonie Andersen** and **Jared Petterson** has outlined that LPC's baseline monitoring programme was developed over the course of 18 months. The final design represents the input from the Technical Advisory Group (TAG), and **Leonie Andersen**, an international expert in water quality monitoring with significant

experience in large dredging projects. No other submitter has demonstrated any actual relevant experience in that regard.¹

Baseline water quality monitoring

- 7 The water quality baseline monitoring programme was designed taking into account two key factors:
- 7.1 Firstly, and most obviously, the need to establish a baseline as a proxy for the 'environment' against which the effects of dredging could be assessed; and
- 7.2 Secondly, the most appropriate locations at which to establish that baseline environment (i.e. given the monitoring is designed to be self-referencing, where should the monitoring equipment be placed so as to effectively measure and respond to effects associated with dredging?).²
- 8 In terms of the latter, **Leonie Andersen** has outlined that the primary objective of the sites as chosen is to manage the dredge operations by acting as sentinels for the detection of dredge plumes prior to them reaching sensitive habitats.³ In effect, the monitoring locations chosen represent the 'edge' of the envelope within which effects from dredging will be considered acceptable.
- 9 There have been no specific issues by submitters or Council Officers as to the location of these monitoring sites, other than **Dr Hepburn's** comments around the adequacy of the monitoring programme in the more sheltered inner sections of Koukourarata and Lyttelton Harbour.⁴
- 10 In response, LPC submits:
- 10.1 **Leonie Andersen's** opinion is that half the number of monitoring sites would have been adequate for the project, and that additional sites have only been included by LPC in response to requests from the TAG rather than any scientific need; and
- 10.2 Considerable monitoring is already being undertaken in Lyttelton Harbour, particularly along the northern side of the shipping channel, as part of the existing maintenance

¹ Including Dougal Greer who covered matters well beyond his experience.

² Self-referencing means that information obtained during dredging is to be compared with data obtained from the same site prior to dredging, i.e. not the comparison of data from one site within the area predicted to be impacted by dredging with data from an area outside of dredge effects

³ See evidence of Leonie Andersen, and the summary evidence of Leonie Andersen

⁴ See his summary and response evidence at paragraph 36

dredging consent CRC135318. The monitoring will continue for the duration of that consent.⁵

- 11 The water quality baseline monitoring programme itself is comprehensive.⁶ It includes (but is not limited to):⁷
 - 11.1 14 real-time sub-surface telemetered turbidity monitors, one of which is a 'reference' site (i.e. will not have trigger levels attached during dredging, and is for information purposes only – there appears to have been an incorrect assumption by **Mr Greer** that this reference site had been removed)⁸;
 - 11.2 Two sediment altimeters;
 - 11.3 Five benthic self-logging turbidity monitors;
 - 11.4 Acoustic Doppler Current Profilers (*ADCPs*) which measure water currents;
 - 11.5 Measurements of water chemistry (e.g. pH, temperature, conductivity and dissolved oxygen); and
 - 11.6 Meteorological and river flow data collectors both offshore and in the Harbour.
- 12 The programme commenced in October 2016, and has so far gathered five full months of data. **Leonie Andersen** stated that she would be satisfied with the data collected to date. However, if consents are granted at least another seven months of baseline monitoring data will be obtained before dredging commences.
- 13 It is also pointed out that there are not monitoring sites for the northern side of the shipping channel for the purposes of establishing the baseline. This area is legitimately impacted by the existing maintenance disposal. To include those sites would therefore result in much higher baseline turbidity in those areas. LPC does not take advantage of that in establishing the baseline.

⁵ Dr Hepburn is not likely to have been aware of this monitoring

⁶ Noting that the same parameters will be measured during dredging, if consents are granted

⁷ See evidence of Leonie Andersen, and summary evidence of Leonie Andersen (particularly paragraph 28) for a full explanation of what is being monitored at each of the sites

⁸ This is because the CDP does not lend itself well to a Before-Control-After-Impact design. See the evidence of Ross Sneddon, and Leonie Andersen's explanation of how the complex and variable coastal system makes comparisons between sites in Lyttelton Harbour and Pegasus Bay difficult (paragraph 26 of her summary and response evidence)

- 14 As explained by **Leonie Andersen** in evidence, the data obtained so far has not come as a surprise. Significantly, the results have confirmed that there is no stratification within the water column: it is therefore expected that plumes from dredge activities will mix into the water column and be detected at the sub-surface monitoring sites.⁹ It is therefore not necessary to use benthic turbidity in either the development of trigger levels or for compliance purposes. This is discussed further below.

Other baseline monitoring

- 15 In terms of other baseline monitoring, LPC has:¹⁰

15.1 completed one round of ecological surveys;

15.2 completed one round of bathymetrical surveys;¹¹ and

15.3 assessed beach profiles and sediment textures.

- 16 Although not covered in evidence LPC has also installed four C-POD passive acoustic recorders which provide information on the presence and habitat usage of whales and dolphins.

- 17 As discussed further below, this baseline monitoring has been used in the assessments of effects completed by LPC witnesses.

Modelling of dredge effects

- 18 LPC accepts that no hydrodynamic model will ever be 100% correct given the complex and dynamic environment involved. **Brett Beamsley** has, however, presented six detailed reports along with his evidence which set out the extent of:

18.1 Plumes that can be expected to result from dredge spoil disposal;

18.2 Plumes that can be expected to result from dredging itself; and

18.3 The movement of sediment over a period of time.

- 19 This enabled assessments of the environmental effects of sediment to be undertaken, and also provided the figures for the dredge 'addition' for use in the development of turbidity triggers. Both of these aspects are discussed further below.

- 20 LPC has been clear of three things throughout the hearing:

⁹ See the evidence of Leonie Andersen at paragraphs 52-54

¹⁰ See the evidence of Ross Sneddon

¹¹ Noting though that this did not include the additional bathymetrical transects that LPC agreed to complete as a result of caucusing the week prior to the hearing

20.1 First, that the models used are conservative. **Brett Beamsley** has outlined:¹²

- (a) In relation to offshore modelling, that not using a depositional threshold is a conservative approach because plume concentrations could be expected to be higher and more confined, meaning turbidity triggers are set lower than they would be otherwise; and
- (b) In relation to inshore modelling:
 - (i) only considering the salient processes (tide and seiche velocities) means plume concentrations could be expected to be higher and more confined, meaning turbidity triggers are set lower than they would be otherwise;
 - (ii) using a 25% volume de-entrained from the overflow dynamic plume (as opposed to the 1% recommended by HR Wallingford) is a conservative approach;
 - (iii) modelling the discharge of that volume throughout the water column was also conservative, given the majority of sediment will be discharged below the hull of the dredger.

20.2 And second, that the modelled outcomes are consistent with the empirical observations of, for instance, **Derek Goring**, **Gary Teear** and **Ross Sneddon** over the many years they have been involved in assessing Lyttelton Harbour; and

20.3 **Leonie Andersen** has been out on the water many times installing the monitoring equipment and the results are consistent with her observations.

21 LPC submits that the results of the expert caucusing carried out on 10 May 2017 have borne out the above. The Joint Expert Witness Statement (*Joint Statement*) provided to the Commissioners on 10 May 2017 set out that:¹³

21.1 All of the experts agreed that there are no modelled or unmodelled scenarios which would not be picked up at the monitoring sites; and

¹² See also the Joint Expert Witness Statement at 5.1, 5.4, and 5.6 which refers to the models' conservatism

¹³ See 5.10

21.2 That the predicted plumes are not expected to reach the shoreline anywhere except for the locations adjacent to the Port.

22 LPC submits that along with the the other answers provided in the Joint Statement, Ngāi Tahu's opposition to the CDP must largely fall away: the modelling has been accepted as being accurate (or as accurate as is required to enable a proper assessment of environmental effects to be completed, and the proposed trigger value responses to be imposed).

Development of trigger values

23 The baseline monitoring information (or 'background') and the modelled dredge addition have been combined for the purposes of setting trigger values. As explained in LPC's opening submissions, and in evidence:¹⁴

23.1 A background plus dredge approach has been adopted (over a background only approach) in order to recognise that the CDP will have some effect on turbidity (i.e. the modelled effect). The very point of the modelling undertaken was to determine what that effect is when dredging is added to the background. That is what the Commissioners are asked to consider under section 104(1)(a);

23.2 Tier one, two and three trigger values are set at the 80th, 90th and 99th percentile of background plus dredge modelled turbidity respectively (noting, for contrast, that if trigger values were set at the 80th, 90th and 99th percentile of background, natural turbidity and turbidity associated with the CDP would have to be at less than background levels);

23.3 This means that the exceedance of any of the trigger levels do not give rise to any significant adverse effects on aquatic life. Rather they are used to elicit a management response to reduce the risk of such effects developing; and

23.4 In effect, they place limits on dredging so that sediment plumes cannot exceed what has been predicted by the modelling modelled (i.e. the trigger values are all less than the total background plus dredge turbidity) and what the assessments of effects have been based on.

24 The actual trigger values themselves are to be calculated for each monitoring location (i.e. there is no one central trigger value) using the statistical method explained in evidence by **David Fox**. Of note:

¹⁴ See the evidence and summary and response evidence of David Fox, Leonie Andersen and Jared Pettersson

- 24.1 Calculations using data from the baseline monitoring undertaken so far indicate that most of the trigger values will be very close to background levels; that is, the modelled dredge addition will be close to zero. As explained in the evidence of **Leonie Andersen** and **Jared Pettersson** this reflects that the monitoring locations are 'sentinels', located at the edge of the envelope within which effects from dredging are expected;
- 24.2 The statistical method used relies on the establishment of a relationship between Total Suspended Solids (TSS) and Nephelometric Turbidity Unity (NTU). This is because the modelled outputs are in TSS, while the data gathered at the monitoring stations is expressed in NTU; and
- 24.3 The effectiveness of the trigger values relies on there being a relationship between benthic and surface turbidity. This is because:
- (a) Sediment plumes originate below the surface, including on the sea floor;
 - (b) While benthic turbidity is monitored, the trigger values will be established and function on the basis of sub-surface turbidity measurements.
- 25 Ngāi Tahu and the Council Officers have raised concerns about the latter two issues. In response, LPC submits:
- 25.1 **David Fox** has given evidence that while there are outliers, there is a consistent relationship between TSS and NTU at all sites based on the baseline monitoring undertaken so far; a relationship between the two will therefore be able to be established by the time all of the data is available. The Commissioners are not expected to establish this relationship only to be satisfied it can be done as **David Fox** suggests; and
- 25.2 The reliance on sub-surface turbidity has been explained fully by **Leonie Andersen**. Her evidence is that:¹⁵
- (a) Benthic turbidity monitors are not reliable and the logistics of undertaking maintenance are difficult;
 - (b) Benthic data is highly variable and much more difficult to decipher than sub-surface turbidity measurements.

¹⁵ See evidence of Leonie Andersen at paragraphs 55-58, and summary evidence of Leonie Andersen

In this regard she stated that low quality information leads to low quality decisions; and

- (c) Benthic turbidity is only useful if ecological triggers have been established for sensitive benthic habitats. This is not the case for Lyttelton Harbour.

25.3 Significantly, however, the baseline data gathered so far shows that the water column is well mixed and that there is no stratification. Sediment plumes from dredging will be expressed at the surface (they will not 'sneak' along the bottom) and there is no need to take benthic turbidity into account.

Operation of the turbidity triggers

26 How the turbidity triggers will operate in practice was explained in the evidence of **David Fox** and **Jared Pettersson**. A further explanation is provided in the updated draft Environmental Monitoring and Management Plan (*EMMP*) and updated draft conditions provided to the Commissioners today.

27 To summarise, the purpose of the turbidity triggers is to initiate adaptive management responses using a measure of turbidity expressed in terms of intensity and duration.¹⁶

28 Three tier levels are proposed.¹⁷

28.1 An exceedance of a tier 1 trigger is proposed to function as a warning that turbidity levels are elevated. Management actions are to be commenced;

28.2 An exceedance of a tier 2 trigger signals that turbidity levels are still increasing despite those management actions, and that further management actions are required; and

28.3 A tier three exceedance will require dredging/disposal to halt in the vicinity of the monitoring location showing the exceedance. This is expressed via the conditions as a compliance condition.

29 The dredge operator and LPC will be notified in real time of any turbidity trigger exceedances, meaning it is possible to undertake management responses immediately, i.e. adaptively manage the dredge operations as they are occurring.

30 LPC agrees the turbidity triggers are conservative for the reasons raised in the evidence of **Mr Greer**: at times, the triggers will be

¹⁶ See the updated draft channel deepening conditions

¹⁷ See the updated draft EMMP

exceeded by background turbidity levels alone, without any dredge impact. The proposed system was designed so that LPC has to (with one exception discussed further below) account for natural turbidity variations during dredging and disposal activities.¹⁸ This is to ensure the sediment plumes resulting from the CDP do not exceed those modelled.

31 The exception referred to above relates to elevated levels of
turbidity resulting from an "extraordinary natural event and not
attributable to dredging".¹⁹ In that case, LPC will be permitted to
continue dredging provided the process outlined in that condition is
followed. Examples of extraordinary natural events are included in
an advice note, which lists a tsunami, a weather event causing
significant flooding, extreme off-shore swells or a land slip.

32 Amendments to that condition should, LPC submits, satisfy the
concerns raised by **Dr Pritchard** and the Council Officers about the
kinds of events that would invoke that condition.²⁰

33 At a more general level, however, LPC wish emphasises that the
turbidity trigger approach would have been valid *even if* the Joint
Statement had concluded LPC's modelling was wrong, and *even if*
there was still some uncertainty as to aspects of that modelling. As
emphasised throughout the hearing, if the modelling did not show
the true extent of plumes:²¹

33.1 Trigger values at the monitoring points would be exceeded;

33.2 The consent conditions and Environmental Monitoring and
Management Plan framework would respond; and

33.3 Tier one, two, or three responses would be required. At
minimum, this would require internal notification and
investigation, while at maximum would require dredging to
cease in the vicinity of the relevant monitoring station.

34 In effect, dredging will have to cease altogether if the sediment
plumes are far greater than what has been modelled (i.e. significant
enough to trigger all of the monitoring stations).²² LPC would need
to apply for a new consent, with a new assessment of environment
effects, in order to undertake the CDP.

¹⁸ This also negates concern expressed by **Dr Pritchard** around the inability for LPC
to determine whether turbidity is natural or dredge related: see the summary and
response evidence of Daniel Pritchard at paragraph 40

¹⁹ See the updated draft channel deepening conditions at 9.12

²⁰ See Daniel Pritchard's summary and rebuttal evidence at paragraph 40

²¹ By David Fox and Jared Pettersson in particular

²² See the evidence and summary and response evidence of Jared Pettersson
(EMMP). This was also agreed in the Joint Statement at 5.10.

- 35 As submitted in the opening legal submissions the risk of the models being wrong is therefore not on the environment, but on LPC and the ongoing operation of the CDP.
- 36 By way of example, **Mr Oldman** included two figures in his summary evidence which showed:
- 36.1 LPC's modelled sediment plumes resulting from dredging around the Port; and
- 36.2 His demonstration modelled plumes resulting from dredging around the Port.
- 37 These figures are reproduced in Appendix 1 to the submissions: Mr Oldman's modelled plumes extend further up the Harbour than LPC's modelled plumes.
- 38 Given the contents of the Joint Statement, these differences presumably result from Mr Oldman's use of an unvalidated, uncalibrated model prepared over a short period of time.²³ It shows, however, that *even if* John Oldman's demonstration model was correct:
- 38.1 The plume would be picked up by monitoring site UH1 and if the turbidity triggers at UH1 were exceeded, management responses would be required. This is consistent with the Joint Statement in which the modelling experts agreed there are no scenarios which would not be picked up at the monitoring sites;²⁴ and
- 38.2 The plumes do not reach any sensitive receptors. Again, this is consistent with the Joint Statement.²⁵
- 39 The sum of this evidence is that if there were greater impacts than predicted by the model these would be transparently detected and there is no irreversible risk to the environment as in any event even if **Mr Oldman's** scenario came to pass the dredge would be stopped but in any event there would not be adverse effects on sensitive receptors.
- Assessments of effects**
- 40 One of the key messages from Ngāi Tahu throughout the hearing has been that the effects of the CDP have not been properly

²³ Noting that 'unvalidated' means that the model assumptions have not been compared against real data and adjusted accordingly.

²⁴ See 5.10 of the Joint Statement

²⁵ See 5.10 of the Joint Statement

assessed by LPC's expert witnesses. This is on the basis that the modelling upon which those assessments have based is wrong.²⁶

- 41 Given the outcome of the Joint Statement, LPC submits that Ngāi Tahu's position is no longer sustainable:²⁷
- 41.1 The modelling has almost entirely been accepted as being accurate;
- 41.2 It has been agreed that the monitoring network will pick up all sediment plumes; and
- 41.3 It has been agreed that plumes are not expected to reach the shoreline except for locations adjacent to the Port.
- 42 The assessments of environmental effects undertaken by, for example, **Ross Sneddon, James Bentley, Shaun Ogilvie, Robert Greenaway**, and **Thomas Shand** are therefore valid, and do not need to be updated.

SPECIFIC RESPONSES TO EVIDENCE FROM SUBMITTERS AND COUNCIL OFFICERS

- 43 This section contains an outline of LPC's understanding of the respective positions of Ngāi Tahu and the Council Officers, and responds directly to concerns they have raised.²⁸
- Council Officers - position**
- 44 The section 42A report recommends that the Commissioners grant the consents sought subject to an appropriate set of conditions.²⁹ The Council's position was somewhat confused, however, when their expert witness **Dr Bolton-Ritchie** expressed the opinion that the consents should not be granted until a relationship between TSS and NTU is established.³⁰ She did not consider that merely having a methodology for establishing that relationship was adequate.³¹
- 45 Given that Dr Bolton-Ritchie's position has not been carried through into the addendum to the section 42A report presented by Council Officers, the inference should be drawn from that is that the Council

²⁶ See for instance paragraphs 26, 60, 96(c) of Ngāi Tahu's opening legal submissions, paragraphs 9, 23 and 25 of Philippa Lynch's summary and response evidence

²⁷ See the Joint Statement

²⁸ Noting that many of the key concerns relating to the accuracy of the modelling and uncertainty around effects has already been discussed above,

²⁹ See paragraph 643 of the s42A report

³⁰ See summary and response evidence of Dr Lesley Bolton-Ritchie at paragraph 7. She was also questioned on this point by the Commissioners.

³¹ Dr Lesley Bolton-Ritchie's answers to questions posed by the Commissioners

does not adopt **Dr Bolton-Ritchie's** recommendations and that their position remains that the consents should be granted subject to the conditions that have now been agreed.

Ngāi Tahu - position

46 Ngāi Tahu's opening legal submissions submitted that the Commissioners had three options. Those were to:³²

- 46.1 Decline the applications entirely;
- 46.2 Adjourn the hearing until LPC has undertaken adequate baseline monitoring and a revised modelling exercise, including if necessary, a revised effects assessment; or
- 46.3 Grant the consents, but require the remodelling and adequate monitoring to be undertaken and reported on to ECan prior to any dredging starting.

47 Ngāi Tahu's preferred option is the second, given, "the serious consequences if the effects are shown to be understated, and considering the inability to determine those effects through monitoring until it is essentially too late".

48 As submitted above, Ngāi Tahu's opposition to the Applications must largely fall away on the basis of the Joint Statement on modelling:

48.1 There are now no fundamental areas of disagreement between the witnesses for LPC, Ngāi Tahu or the Council; **Brett Beamsley's** modelling evidence can be accepted on the basis that:³³

- (a) If the effects are understated there are no scenarios that would not be picked up at the monitoring sites; and
 - (b) The predicted plumes are not expected to reach sensitive receptors so there are no "serious consequences";
- 48.2 On that basis, and as submitted above, the assessments of environmental effects completed on the basis of that modelling must also (largely) be accepted as being accurate.

Net gain

49 As set out in the evidence of **John O'Dea** it was the hope of LPC that LPC and Ngāi Tahu would have reached agreement over a joint commitment to work together to achieve a net gain in mahinga kai

³² See paragraph 33

³³ Joint Statement, especially 5.10

within the harbours of Whakaraupō and Koukourārata prior to this hearing. This would include the establishment of a co-governance entity to manage and deliver the enhancement and protection of mahinga kai in Whakaraupō and Koukourārata. This agreement would extend well beyond the context of the applications before the Commissioners, which considers only the effects of dredging.

50 Mr Christensen describes the engagement by LPC as “recent and reluctant”. That criticism is not borne out by the facts, or the evidence of the Ngāi Tahu witnesses themselves. You have heard about the establishment of the Manawhenua Advisory Group which has been meeting for a number of years with the 28th meeting held on 12 April 2017. It was also LPC that initiated discussion on a potential co-governance agreement following the Ngāi Tahu decision.

51 **John O’Dea** has outlined the focus at recent meetings on the specific issue of net gain and mahinga kai, including the presentation by Tasman Gillies of a proposed framework for achieving a net gain in mahinga kai through partnership with LPC and the joint decision that there would be further meetings focusing on mahinga kai outside of the Manawhenua Advisory Group to further work on the partnership between manawhenua and LPC to achieve a net gain in mahinga kai. The last of these meetings occurred on 27 April 2017.

52 Regardless of that background, LPC and Ngāi Tahu have nevertheless arrived at this hearing asking the Commissioners for a decision on the applications for channel deepening and maintenance dredging. At this time, to use Mr Christensen’s words “we are some considerable distance from that outcome” (an agreement being reached).

53 It appears to be Ngāi Tahu’s case, that in the absence of an agreement that any additional effort to be expended by LPC to achieve net gain in mahinga kai in the context of these dredging applications can now only be dealt with via the imposition of conditions of consent as the Commissioners cannot impose an agreement on unwilling parties.

54 It is LPC’s preference that these matters are dealt with outside conditions, as in its view, this will allow the parties to work together in partnership, will allow a wider consideration than on a project by project approach and allows the parties to be direct masters of their own destiny rather than relying on ECan to indirectly enforce commitments.

55 LPC agrees that if the Commissioners decide that LPC has not yet already expended sufficient effort towards achieving a net gain in mahinga kai and that the existing conditions are insufficient to

ensure those efforts continue in the future then an additional condition is the only option.

56 The fact that the imposition of an additional condition, or not, is
now the only mechanism the Commissioners have available to them
to deal with the effects of the specific application before them is not
to say that the wider discussions will cease. **John O'Dea** has stated
that LPC is committed to continuing these discussions with Ngāti
Wheke and Koukourāta to achieve a co-governance approach to
enhancing mahinga kai.³⁴

57 In practical terms both parties are incentivised to reach agreement.
Both will have a continuing and long term relationship with
Whakaraupō and Koukourāta. LPC will continue to develop as the
largest port service in the South Island and manawhenua will
continue to have status as kaitiaki of coastal waters. LPC has
lodged applications for resource consents relating to the reclamation
which will necessitate discussion. The wider discussion about co-
governance and the achievement of net gain overall will therefore
inevitably continue outside the context of this particular application.

Net Gain – The Legal Basis

58 Mr Christensen agrees with the conclusion in LPC's opening that
"there is no direction in any of the statutory instruments that a net
gain in mahinga kai must be achieved".

59 Mr Christensen appears to be saying that there are two types of
effects on the environment raised by this application that the
Commissioners need to consider under s104(1)(a). These are firstly
physical ecological effects and secondly cultural effects (and these
may be interrelated).

60 He appears to be saying that in this case the degree of change in
the existing environment brought about by physical and cultural
effects of the CDP are so significant that the Panel should exercise
its discretion to decline consents unless LPC can offer some sort of
offset which would not only take the environment back to where it
was before the dredging but additionally translate into a positive
gain for the environment.

61 At a basic legal level nowhere in section 104(1)(a) or section 5 of
the Resource Management Act is there a requirement to have no
adverse effects, let alone achieve an overall positive effect as a
result of an application. The RMA is all about granting
authorisations for activities which have adverse effects.

62 Mr Christensen referred to some examples where applicants have
offered offsets or compensation in the absence of which the decision

³⁴ Paragraph 30 and 31 of the Summary and Response evidence of John O'Dea

maker may have declined consents. However he did not refer to the multitude of examples where consents have been granted notwithstanding adverse effects, sometimes significant effects.

63 He referred a number of times to the Buller Coal cases in relation to opencast mining on the Denniston plateau. In that case the applicant acknowledged that there were very significant and irreversible impacts on the environment in terms of loss of indigenous biodiversity as a result of the activities for which they sought consent. The applicant decided that it needed to offer some form of offset to gets itself anywhere near an argument that the effects on the environment were acceptable. That was a decision made by the applicant in that case in the face of significant adverse effects and it was not with the aim of providing for an overall net gain.

64 There is there the question of what is meant by "net gain".

65 *What is net gain?*
Section 104(1)(a) provides for the Commissioners:

"... subject to Part 2, to have regard to –

(a) any actual and potential effects on the environment of allowing the activity."

66 The Court has previously stated:

"[106] The determination of the relevant environment is thus fundamental to the determination of the "effects". In order to determine what the "effects" will be, one must first establish what it is that they are effects upon. The existing environment therefore constitutes a fundamental starting point or reference point for the assessment of any application."³⁵

67 LPC submits that the existing 'environment' is also the reference point for assessing whether the channel deepening and maintenance applications will result in net gain or represent an effort by LPC towards achieving net gain.

68 *What is the environment?*
At a fundamental starting point the date for the assessment of the existing environment is the date of hearing. In the Court of Appeal decision in *Hawthorne* this was referred to in a number of places in the judgment and in *Bay of Plenty RC v Fonterra Co-operative*

³⁵ *Rotokawa Joint Venture Limited and Mighty River Power Limited v Taupo District Council & Ors*, A41/2007, para 106

Group Limited [2011] NZEnvC 73 the Court paraphrased the *Hawthorne* principles as being:

"The existing environment is the environment as it exists at the time of hearing **including all operative consents** and any consents operating under section 124 of the Act, overlaying by those future activities which are permitted activities and also unimplemented consents (which can be considered at the discretion of the Authority)."

- 69 This means that the 'environment' that the Commissioners must consider as the starting point for assessing the effects of the dredging applications and for determining whether there is effort towards achieving net gain, is one which includes the authorised effects of the existing maintenance disposal under CRC135318.
- 70 There are shades in the submission of Ngāi Tahu of an argument that when the Panel considers what the existing environment is and assesses what the added effects of the dredging applications are to that environment that they should consider an existing environment that disregards the impacts of the legitimate activity that LPC currently carries out to dispose of maintenance dredge material. Put another way they say that in assessing whether the application results in a net gain the Commissioners are not entitled to include in the balance the positive effects of moving the existing spoil grounds offshore.
- 71 However, it is wrong to approach the existing environment and define it as what a submitter would like it to be rather than what it actually is. This type of approach was rejected in *Tainui Hapu v Environment Waikato* which the Court referred to in *Alexandra District Flood Action Society Inc v Otago Regional Council*:

"[64] The second relevant case we were referred to is *Tainui Hapu v Environment Waikato*. There the Environment Court was concerned with resource consents required for "a proposed upgrade of the existing wastewater treatment plant at Raglan". The District Council proposed improving the operation of the two existing sewage ponds in various ways, and constructing two new ponds and wetland system to ensure that effluent met bathing-water guidelines, shellfish gathering quality and to meet tangata whenua sensitivities. The effluent was then to be piped through a new outfall to a new discharge point in the main channel of Raglan Harbour's estuary. When defining the environment to be considered the Court referred to *Aley v North Shore City Council*⁷⁸ and the "*Fast Ferries*" case as authorities for its proposition that:

... the Court has to have regard to the effects of allowing the proposed discharge on the environment as

it exists at the time of the appeal hearing; and that it is not appropriate to judge the application by reference to the effects it would have on the environment as it existed at a halcyon time in the past

We agree, which is why the Edenic scenario which Mr Randle appeared to seek is not appropriate for us to consider.

72 The legal position is that the effects of the operation of the existing maintenance consents are part and parcel of the existing environment against which the effects of the dredging activity are to be assessed. Therefore one of the effects of the application that the Commissioners are required to weigh in the balance in assessing the impacts of the application on the existing environment is the positive effect of moving the existing maintenance grounds offshore.

73 LPC simply does not understand Ngāi Tahu's submission that the removal of the maintenance ground offshore should not be considered as part of assessing LPC's efforts toward achieving net gain because the removal is for "financial and operational reasons". The reality is that it is a direct and positive effect of these applications. If the applications are not granted LPC will continue to dispose of maintenance spoil as it does at present relying on the existing consent.

What are the effects to which a net gain condition would relate?

74 Mr Christensen described the effects of concern to Ngāi Tahu as physical ecological effects, and cultural effects. The physical ecological effects are also the same concerns shared by other submitters. It is submitted that the conditions of consent are appropriate to deal with the physical ecological effects.

Ngāi Tahu's draft condition

75 That then leaves cultural effects. LPC's position is that:

75.1 The removal of the existing maintenance ground is a positive cultural effect and this was expressed as a desire in the 2016 Cultural Impact Assessment; and

75.2 Manawhenua have had and will continue to have the opportunity to be involved in the monitoring, technical assessments and ongoing management via the Technical Advisory Group during the life of the consents. LPC considers that this involvement has enabled Ngāi Tahu to exercise guardianship and have a hand in ensuring ongoing compliance.

76 It will be for the Commissioners to decide if an additional condition relating to cultural effects is required. As sated previously LPC's

preference is that a condition is not imposed and the parties are left to form their own partnership on their own agreed terms.

77 Having said that in Ms Lynch's evidence a net gain condition is proposed. If the Commissioners decide that a condition is required LPC has a number of comments in relation to the validity of the condition as drafted by Ms Lynch.

78 Firstly the power to impose conditions on a planning consent is not unlimited. In the words of *Newbury*, to be valid at law a condition must:

- Be for a resource management purpose, not for an ulterior one;
- Fairly and reasonably relate to the development authorised by the consent to which the condition is attached; and
- Not be so unreasonable that a reasonable planning authority, duly appreciating its statutory duties could not have approved it.³⁶

79 The Courts in New Zealand have discussed many times the application of the Newbury principals to New Zealand resource management law. The Supreme Court in *Waitakere CC v Estate Homes Limited* [2007] 2 NZLR 149 held that the application of common law principles and the planning context requires conditions to be "logically connected to the development, not unrelated to it, and not relating to external or ulterior concerns".

80 The proposed condition in Ms Lynch's evidence goes well beyond the permissible connection between the effects of the dredging application and the conditions of consent. The conditions are not linked to avoiding, remedying, or mitigating the effects of the dredging application and require LPC as a result of this application to demonstrate a net gain in mahinga kai for Lyttelton Harbour/Whakaraupō and Koukourārata.

81 LPC therefore attaches as Appendix 2 an alternative condition which if the Commissioners decide an additional condition is appropriate in the context of this application is as far as the Panel can go in terms of imposing conditions on LPC to deal with the cultural effects of these particular applications.

82 LPC submits that its draft of the condition, rather than the condition sought by Ngāi Tahu should be included within consent conditions *if*

³⁶ *Newbury DC v Secretary of State for the Environment* [1981] AC578

the Commissioners consider an additional condition is required at all.

Specific responses to remaining areas of disagreement

- 83 Other outstanding areas of disagreement between the parties are addressed as follows.

Dr Islay Marsden

- 84 **Dr Marsden** raised issues over the recovery periods for the dredge spoil grounds.³⁷ In response, LPC refers to:

84.1 **Ross Sneddon's** evidence at paragraph 83, which refers to healthy populations of paua within the existing maintenance spoil disposal grounds. The report on which his evidence was based states that the population of paua was similar in density to those at harvestable depths elsewhere in the Harbour and in Pegasus Bay, and were actually the largest paua at any site surveyed;³⁸

84.2 The existing maintenance spoil grounds have been subject to monitoring surveys on a 5-yearly basis since 1992. There is accordingly a good understanding of communities that re-establish.

Dr Hepburn

- 85 **Dr Hepburn** accepted in his oral evidence that "there were not too many points of difference" between himself and **Ross Sneddon**. He did raise concern, however, over the lack of monitoring sites in the inner sections of Koukourārata and Lyttelton Harbour. In response, LPC says:

85.1 Monitoring undertaken as part of the existing maintenance dredge consent (and therefore not replicated in these Applications) is outlined above; and

85.2 There is no need for any further monitoring in Koukourārata. The plumes are not expected to enter the Harbour, and in any event, the entrance to Koukourārata is monitored by OS2 (offshore sub-surface telemetry, offshore sub-surface telemetry and ADCP, and benthic self-logging turbidity), and intertidal and benthic monitoring are both proposed at two locations within the Harbour.

Thomas Hildebrand

- 86 **Mr Hildebrand's** evidence requested that a monitoring programme for mussel farms be developed prior to the conclusion of the hearing. In response, LPC submits:

³⁷ Summary evidence of Islay Marsden at paragraph 2

³⁸ See page 127 of the Report, attached to the Applications as Appendix 15A

- 86.1 The modelling is clear that sediment plumes will not reach mussel farms;³⁹
- 86.2 With the exception of Ngāi Tahu Seafoods and Koukourāata Development Trust, LPC has already reached agreement with all of the mussel farmers that submitted on the CDP. That agreement does not include monitoring, and LPC submits the Commissioners should not alter the terms of that agreement where its parties are not asking for the same;
- 86.3 Mussel farmers have not consented to LPC entering their farms and undertaking works. This was discussed with the Banks Peninsula Marine Farmers mussel farmers who do not want disruption to their own activities. The imposition of a condition requiring the same could potentially frustrate the grant of consent;⁴⁰
- 86.4 Unless the other farmers consent, and LPC understands that they don't, practically, monitoring of a few farms would not be of use without significant baseline information to use as a comparison;
- 86.5 In any event evidence from **Shaun Ogilvie** was that monitoring was unlikely to be required.
- 87 Mr Hildebrand has also requested the imposition of a bond. This is discussed further below.
- David Boone*
- 88 Mr Boone appeared for the Surfbreak Protection Society (SPS). He did not raise any new issues, and LPC submits the evidence of **Brett Beamsley** is clear that the concerns raised by SPS are not warranted.⁴¹
- 89 Yesterday LPC received a copy of further comments from eCoast (who is the organisation Mr Greer works for) states that LPC did not respond to their correspondence dated December 2016. That correspondence is attached. In January 2017 LPC wrote directly to SPS.

ADAPTIVE MANAGEMENT

- 90 LPC submits that an adaptive management approach to these Applications is appropriate on the basis of *Sustain our Sounds*

³⁹ See the evidence and summary and response evidence of Brett Beamsley

⁴⁰ See the general principle in *Residential Management Ltd v Papatoetoe City* A062/86 (PT) for example that consent conditions cannot have the effect of frustrating the grant of consent.

⁴¹ See Brett Beamsley's summary and response evidence at paragraphs 6-26.

Incorporated v The New Zealand King Salmon Company Limited (King Salmon)).⁴² Without repeating the discussion from LPC's opening submissions, it is clear that the criteria from that case are met on the basis of the evidence described above.

OTHER ISSUES THAT HAVE ARISEN DURING THE HEARING

91 The final section of these closing submissions deals with:

91.1 Noise;

91.2 The existing maintenance consent;

91.3 Bonds;

91.4 Lapse date; and

91.5 Consent duration.

Noise

92 Noise issues were raised by **Dr Stephen Gardner**. LPC submits in response that the oil berth (which is incorrectly shown in **Dr Gardner's** evidence) is not part of this proposal and is therefore not relevant.

Existing maintenance consent

93 LPC does not intend to surrender its existing maintenance dredging consent (CRC135318). This is because:

93.1 If these Applications are granted, the maintenance dredging components will only authorise dredging and disposal activities from the deepened shipping channel as that is defined; and

93.2 These Applications do not include reference to dredging in the Inner Harbour. That will continue to occur under the existing maintenance consent.

94 CRC expressed a concern about duplications of consents. That concern is not a reality. Once the channel is deepened LPC can only rely on the new consents as the existing consents do not authorise the maintenance dredging of the deepened channel. The deepened channel can only physically be dredged once.

Bonds

95 **Mr Hildebrand's** evidence seeks an "environmental bond condition that would cover remedial, restoration, or maintenance work on our

⁴² *Sustain our Sounds Incorporated v The New Zealand King Salmon Company Limited* [2014] NZSC 40

fisheries and aquaculture from adverse effects associated with dredging activities".⁴³

96 This was carried through into Mr Christensen's legal submissions, where he submitted Ngāi Tahu seek the imposition of a bond similar to that proposed in the Chatham Rock Phosphate case.

97 The RMA provides:

97.1 That a condition requiring a bond may be imposed on a resource consent (s 108(2)(b));

97.2 That bonds may be required for the performance of a condition where a consent authority considers appropriate, and that bonds may continue after the expiry of a resource consent to secure the ongoing performance of conditions relating the long-term effects, including:

- (a) A condition relating to the alteration or removal of structures;
- (b) A condition relating to remedial, restoration or maintenance work; and
- (c) A condition providing for ongoing monitoring of long term effects. (s108A); and

97.3 Where the consent holder fails to do any work in respect of which a bond is given, the consent authority may enter on land and complete the work and recover the cost from the holder of the bond (s 109(4)).

98 The purpose of those provisions is outlined in *Morgan v Whangarei District Council* as being to:⁴⁴

Enable consent authorities to carry out work that consent holders ought to have done, and recoup their costs.

99 Bonds have been required as part of conditions where there is:

99.1 A liability period for the maintenance of infrastructure, where the ownership of that infrastructure will pass to a council: *Progressive Enterprises Limited v Auckland Council* [2013] NZEnvC 205;

⁴³ Evidence of Thomas Hildebrand at paragraph 9

⁴⁴ [2008] NZRMA 113 at [53].

- 99.2 Planting work which needs to be maintained for a period of time: *Third Fairway Development Limited v Auckland Council* [2015] NZEnvC 123;
 - 99.3 A requirement for site rehabilitation in respect of land used for mineral extraction: *Re Road Metals Co Ltd* [2013] NZEnvC 118
 - 99.4 A potential need to remove buildings from an area that may be inundated by the sea: *Carter Holt Harvey Limited v Tasman District Council* [2013] NZEnvC 25
 - 99.5 Cost associated with acoustic installation work required by conditions to avoid, remedy or mitigate effects: *Cross Group Limited v Dunedin City Council C007/08*.
- 100 It is clear from the above that bonds are not typically used for projects such as the CDP. This is especially so given:
- 100.1 the modelling work and assessments of environmental effects undertaken do not indicate there will be any adverse effects on aquaculture;⁴⁵ and
 - 100.2 it is not clear what the remedial, restoration, or maintenance work in respect of fisheries and aquaculture would be. It is not the case that land can be rehabilitated, there are no structures to remove, and no other realistic options have been provided.
- 101 Neither is there a risk that LPC will fail to comply with the ongoing monitoring obligations proposed in these Applications. It is a well-resourced, profitable, council owned organisation.
- 102 For completeness, LPC submits that:
- 102.1 While a bond condition was included within the Tauranga dredge consent there is no reference to it having been *imposed*, as suggested by Mr Christensen, as opposed to *offered* by the applicant;
 - 102.2 There was no bond imposed in respect of the Port Otago dredging; and
 - 102.3 LPC is not offering a bond here.

⁴⁵ See the evidence and summary and response evidence of Shaun Ogilvie

Consent duration

- 103 LPC submits that submitters have not expressed any convincing reasons as to why 35 year consent durations are inappropriate. Rather, LPC has justified the consent durations sought on the basis of the scale and wider context of the CDP.
- 104 **John O'Dea** has explained that the CDP is a long-term project that will respond to international shipping demands to accommodate larger ships over time. While channel deepening dredging is required now, dredging to the full 14.5 metres over all tides is not required immediately. Rather the deepening will occur over an extended time-period, to match the gradual increase in the number of larger vessels arriving at the Port.
- 105 **John O'Dea** also explained that initially, LPC will be able to manager larger vessels by providing for vessels with a draught of up to 14.5 metres to enter the Port at high tide only. When demand from larger vessels increases (so that large ships cannot be managed during high tide only) LPC will proceed with deepening the channel so that larger vessels can access the Port during all tides.
- 106 LPC needs a 35 year consent term in order to have the flexibility to be able to manage the CDP (and the very significant costs involved) in response to this demand.
- 107 Further, the additional container capacity of larger vessels needs to be matched with an increase in container terminal facilities at the Port. Therefore, the progress of the CDP is closely aligned with the Te Awaparahi Bay Reclamation project (for which LPC has recently lodged a consent application). The reclamation is a very long-term project, expected to take up to 35 years post-consent, and therefore it is necessary that the CDP aligns as much as possible with this timeframe.

Dated 12 May 2017

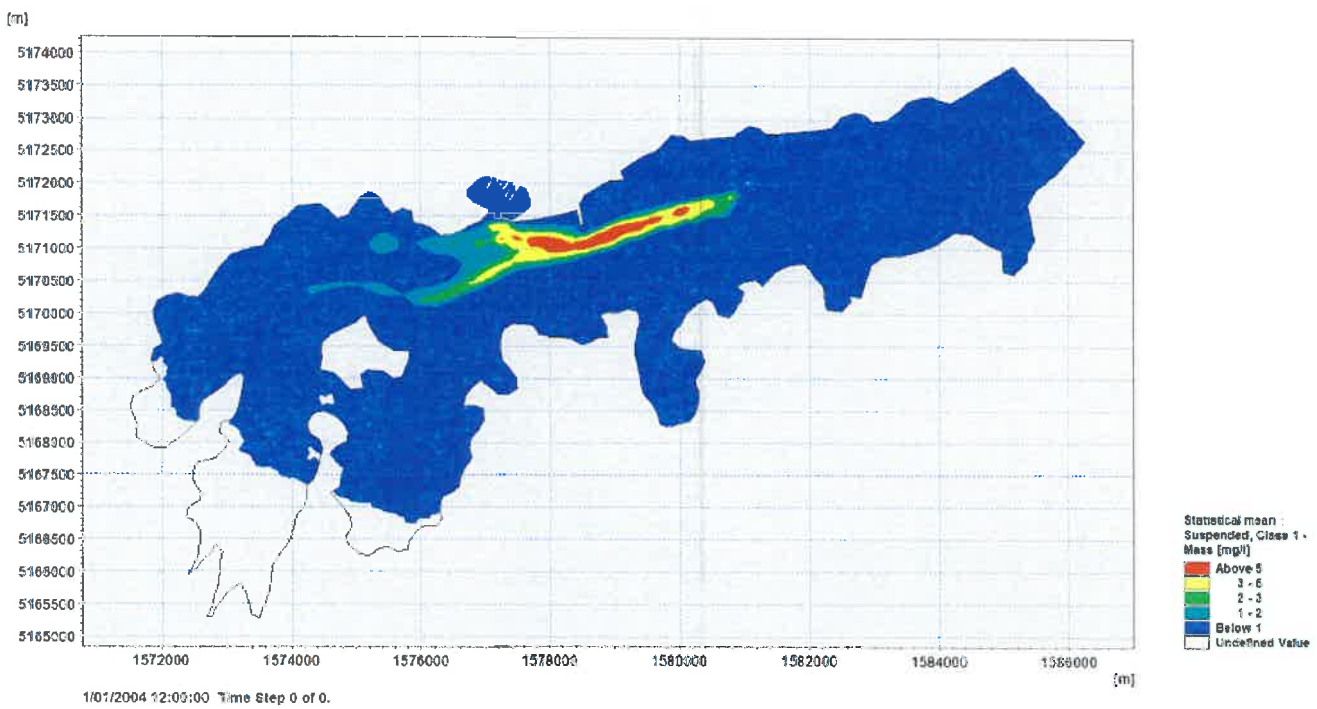


J M Appleyard

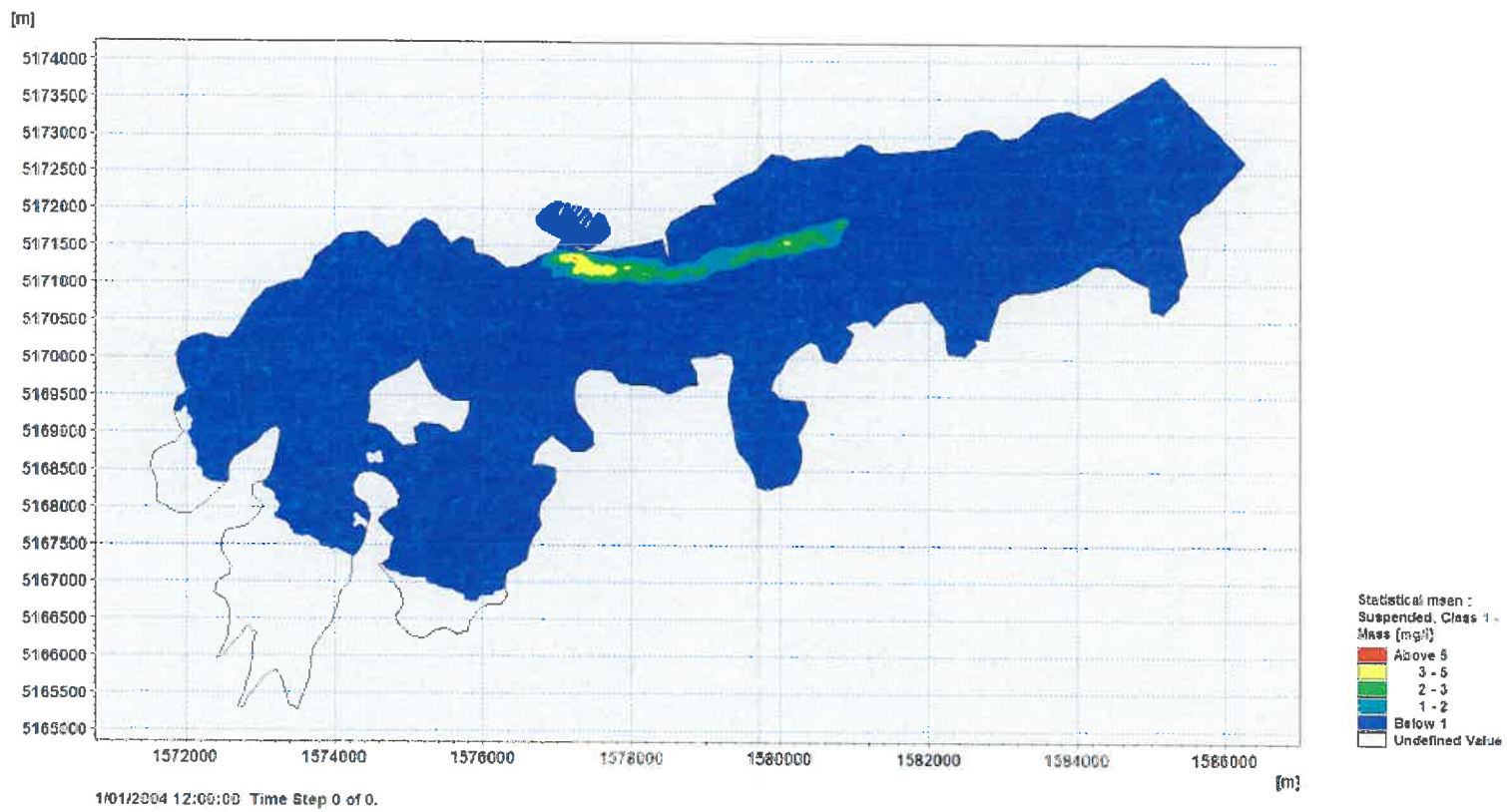
(Counsel for Lyttelton Port Company Limited)

APPENDIX 1

John Oldman's modelled diagram



LPC's modelled diagram



APPENDIX 2 – MAHINGA KAI CONDITION

1. MAHINGA KAI MANAGEMENT PLAN (MKMP)

1.1 At least two months prior to the commencement of the first Dredging Stage, the consent holder shall prepare a Mahinga Kai Management Plan (MKMP). The Consent Holder shall invite Te Hapū o Ngāti Wheke and Te Rūnanga o Koukourārata to jointly develop the MKMP.

1.2 The purpose of the MKMP is to specify how cultural effects of Dredging will be addressed so as to achieve a net gain in Mahinga Kai within Lyttelton Harbour/Whakaraupō and Koukourārata/Port Levy.

1.3 To achieve the purposes of the MKMP, the MKMP shall identify the measures and actions to support and enable Ngai Tahu to exercise kaitiakitanga and achieve a net gain in mahinga kai in response to those effects caused by Dredging that could include, but not be limited to:

1.3.1 Mātauranga

1.3.2 Monitoring and research

1.3.3 Active Restoration

1.3.4 Managing Access

1.3.5 Education

1.3.6 Compliance

1.4 Measures to achieve a net gain in mahinga kai are to complement the work to achieve a net gain in mahinga kai through the implementation of the Whakaraupō/Lyttelton Harbour Catchment Management Plan process initiated by the Lyttelton Port Recovery Plan.

1.5 The MKMP shall be prepared by a suitably qualified person appointed by the consent holder after consultation with Te Hapū o Ngāti Wheke and Te Rūnanga o Koukourārata,

1.6 Details of any funding arrangements to be put in place to ensure that the measures are implemented over the full duration of both the channel deepening and maintenance dredging consents.

1.7 A copy of the MKMP shall be provided to the consent authority.

Katie Morrison

From: Michelle Nicol
Sent: Friday, 12 May 2017 9:16 a.m.
To: Katie Morrison
Subject: Fwd: Lyttelton Port Company - Channel Deepening
Attachments: linkedin1111.png; logo1111.png

Sent from my Samsung Galaxy smartphone.

----- Original message -----

From: Jo Appleyard <Jo.Appleyard@chapmantripp.com>
Date: 11/05/17 6:17 PM (GMT+12:00)
To: Michelle Nicol <Michelle.Nicol@chapmantripp.com>
Subject: Fwd: Lyttelton Port Company - Channel Deepening

Sent from my iPhone

Begin forwarded message:

From: Jared Pettersson <Jared.Pettersson@lpc.co.nz>
Date: 11 May 2017 at 12:29:12 PM NZST
To: Jo Appleyard <Jo.Appleyard@chapmantripp.com>
Subject: FW: Lyttelton Port Company - Channel Deepening

Jared Pettersson

Project Director

T: +64 3 328 8198

M: 021 679 838

E: Jared.Pettersson@lpc.co.nz <<mailto:Jared.Pettersson@lpc.co.nz>>

41 Chapmans Road, Woolston, Christchurch 8022

[cid:logo1111.png] <<http://www.lpc.co.nz>>

[cid:linkedin1111.png] <<https://nz.linkedin.com/company/lyttelton-port-company>>

From: Jared Pettersson
Sent: Wednesday, 25 January 2017 2:34 p.m.
To: 'info@surfbreak.org.nz'
Subject: Lyttelton Port Company - Channel Deepening

Hi Paul,

I am the Project Director for LPC's Channel Deepening consent and am keen to have a catch up with you about the project and issues raised in your submission. We have commenced additional modelling work to further evaluate potential effects on surf waves and it would be great to discuss the methods we are using and preliminary results.

I'm not sure where you are based, but it would be great to catch up in person if we could, failing that maybe a phone conversation?

Please let me know if you are keen to have a meeting, and if so what would work best for you.

Regards and I look forward to hearing from you,

Jared Pettersson

Jared Pettersson

Project Director

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M: 021 679 838

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Katie Morrison

From: Michelle Nicol
Sent: Friday, 12 May 2017 9:16 a.m.
To: Katie Morrison
Subject: Fwd: Port dredging operations and eCoast services
Attachments: linkedin1111.png; logo1111.png

Sent from my Samsung Galaxy smartphone.

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Sent from my iPhone

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From: Jared Pettersson <Jared.Pettersson@lpc.co.nz>
Date: 11 May 2017 at 12:34:54 PM NZST
To: Jo Appleyard <Jo.Appleyard@chapmantripp.com>
Subject: FW: Port dredging operations and eCoast services

Jared Pettersson

Project Director

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[cid:linkedin1111.png] <<https://nz.linkedin.com/company/lyttelton-port-company>>

From: Ed Atkin [e.atkin@ecoast.co.nz]
Sent: Wednesday, 7 December 2016 4:00 p.m.
To: Jared Pettersson
Subject: Port dredging operations and eCoast services

Dear Jared

My name is Ed Atkin of eCoast Marine Consulting and Research, based up in Raglan. I received your contact details from Andrea Richardson at eCan after I enquired about who to speak with about management of the proposed dredge material. eCoast has worked as the technical advisors to the surf break protection society since the group started. As result we have been involved in all cases concerning environmental impact on surfing, e.g. Port Otago's dredge operations. As we are Surfbreak Protection Society's (SPS) technical advisors we consult with SPS to ensure that their concerns are addressed but evaluated in a scientific manner. Indeed, eCoast is the world's leading group of dedicated surf scientists and engineers. We have been part of the working group that has amicably managed the operations at Port Otago and preserved the surf breaks of Aramoana and Whareakeake, in the case of the former the surfing conditions were reported to have been improved as a result our management recommendations. Based on the application, there is the potential for impacts to the swell corridor of the regionally significant Christchurch surf breaks of Taylors Mistake and Sumner, and potentially further north with the dominant swells from the southern quarter.

Following the 2011 Christchurch earthquakes we initiated a research project to determine if there was potential to use debris generated by the earthquakes in a beneficial manner. The case study looked at disposing material at Sumner Beach to increase biodiversity, shoreline protection and surfing wave quality. We have seen at other established surf breaks how dredge material can be used to enhance surfing amenity to the local area.

If this is an avenue that the Port would be interesting in pursuing, or be keen to engage eCoast's services in any other capacity, including the sustainable management of the local surf breaks, please feel free to get in touch.

Kind Regards | Ngā mihi

Ed Atkin | Director | Oceanographer
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Cell +64 210 820 0821 | Ph +64 7 825 0087
Skype: e.atkin | www.ecoast.co.nz<<http://www.ecoast.co.nz>> |
www.surfbreakresearch.org<<http://www.surfbreakresearch.org>>

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