Clutha District Council

Date Lodged:	.....
Date Paid:	.....
Rct No:	.....
VZ No:	.....

Form 9

APPLICATION FOR RESOURCE CONSENT UNDER SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

To the Chief Executive, Clutha District Council, PO Box 25, Balclutha 9240

1. Name: Toko Development limited
   Address: C/O - P.O. Box 5724, Dunedin 9054
   Email: C/O - emmasweepconsultancy.co.nz
   Phone: _____ Mobile: C/O - 0274822214
   Contact Person: Emma Peters, Consultant, Sweep Consultancy Ltd
   (name and designation, if applicable)
   Address for service of applicant: P.O. Box 5724, Dunedin, 9054

2. The **location** of the proposed activity is as follows:
   Street: Loombe Hay Lane Town (Community): Toko Mouth
   Legal Description: Lot 4 DP 516455 (RT 605077) & Lot 3 DP 152557 (RT 78962
   Owner / Occupier (other than the applicant): N/A.

3. A **description** of the activity and why consent is needed:
   Please refer to attached AEE.

4. Consent(s) applied for:
   You may apply for 2 or more resource consents that are needed for the same activity on this form.

   - [x] Land use consent
   - [x] Subdivision consent
   - [ ] Change/cancellation of consent or consent notice conditions
   - [ ] Certificate of compliance
   - [ ] Existing use certificate
   - [ ] Extension of lapse period of existing consent (time extension)

5. Are additional resource consents needed for the proposed activity?

   (a) Is consent required under a National Environmental Standard (NES)?

   - [x] Yes
   - [ ] No

An applicant is required to address the NES in regard to past use of the land which could contaminate soil to a level that poses a risk to human health. Information about the NES is available at: www.mfe.govt.nz/laws/standards/contaminants-in-soil/

☐ This application does not involve subdivision (excluding production land), change of land use or removal of (or part of) a fuel storage system. Any earthworks will meet section 8(3) of the NES (including volume of earthworks not exceeding $25m^3$ per $500m^2$).

☐ I have found no record suggesting an activity on the Hazardous Activities and Industries List (HAIL) has taken place on the piece of land which is subject to the application. The List can be found at: http://www.mfe.govt.nz/land/risks-contaminated-land/my-land-contaminated/hazardous-activities-and-industries-list-hail

☐ An activity listed on the HAIL is likely to have taken place on the land which is subject to the application and I have addressed the NES requirements in the Assessment of Effects.

☑ I have included a Preliminary (or Detailed) Site Investigation undertaken by a Suitably Qualified and Experienced Practitioner.

(b) Is consent required from the Otago Regional Council, such as a discharge consent?

☐ Yes ☑ No

6. Information required to be submitted (please attach to this form):

☑ Computer Freehold Register (Certificate of Title) for the property, including any consent notice and covenants listed on the title.
See: https://apps.linz.govt.nz/survey-titles/order-copy/

☑ A plan or map showing the locality of the site, relevant features & buildings.
Our website contains aerial images/maps: http://103.14.216.134/SpliceMaps/map.html

☑ A site plan at a convenient scale (e.g. 1:1000)

N/A Written approval of every person who may be adversely affected by your proposed activity in a minor or more than minor way. → request that application receives limited notification to parties stated in AEE at para 18

☑ An Assessment of Effects (AEE)
An AEE explains the likely consequences on the environment of your proposal and helps to determine who may be adversely affected by it.
See the Assessment of Effects Guide to assist with this:
http://www.cluthadc.govt.nz/Web%20Pages/Regulatory%20Services/Regulatory%20Services%20Publications/Resource%20Consent/AEE%20-%20General.pdf

We can accept documents electronically – please ensure they are scanned at a minimum resolution of 300 dpi and in colour if relevant. Each document should be no greater than 10Mb in size.

7. Application deposit fee (note that an additional charge may also be payable).
Fees are set annually and can be found at:
http://www.cluthadc.govt.nz/Web%20Pages/Plans%20and%20Publications/Annual%20Plans/AnnualPlan201415/FeesCharges1415.pdf

8. I hereby apply for the resource consent(s) for the proposal described above and I certify that, to the best of my knowledge and belief, the information given in this application is complete and accurate.

Signed (by *or person authorised to sign on behalf of applicant*): _____

Full name: Emma Peters, Consultant, Sweep Consultancy Limited

Company: _____ Date: 14/10/22

Assessment of Environmental Effects

Coombe Hay Lane, Toko Mouth

14 October 2022

Prepared by Emma Peters
Sweep Consultancy Limited
P.O. Box 5724 Dunedin 9054
Phone 0274822214
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www.sweepconsultancy.co.nz

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Sweep Consultancy Limited
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Phone: 0274 822214
Email: emma@sweepconsultancy.co.nz

14 October 2022

Nathan Riley
Resource Consents Manager
Clutha District Council
P.O. Box 25
Balclutha 9240

Sent via email to:
nathan.riley@cluthadc.govt.nz
cc: planning @cluthadc.govt.nz

Hi Nathan,

SUBDIVISION & LAND USE CONSENT – LOT 9 DP 516455 & LOT 3 DP 512557
COOMBE HAY LANE, TOKO MOUTH

SITE & LOCATION

1. Our client, Toko Development Limited, owns a property situated at , Toko Mouth legally described as Lot 9 DP 516455 and Lot 3 DP 152557 contained in, respectively, records of title 805077 and 789620 (**site**)[1]. The location of the site is shown in Figure 1 below.

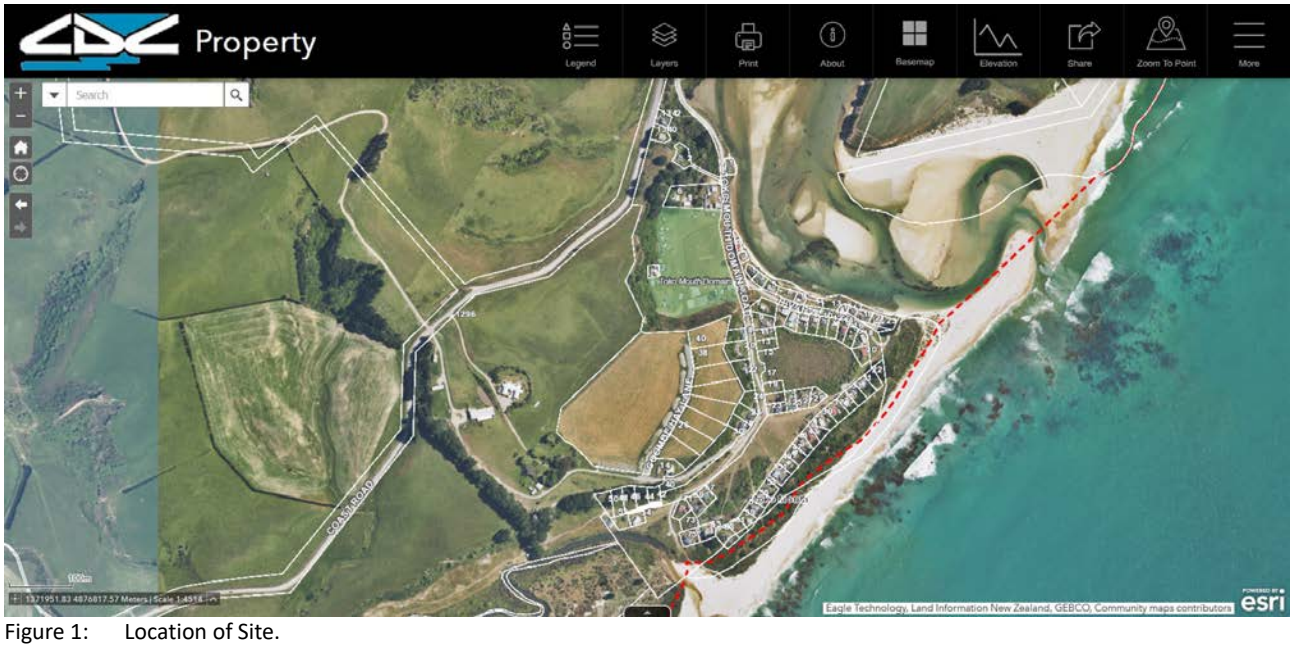


Figure 1: Location of Site.

2. The site contains approximately 5.9 hectares and consists of land which generally slopes reasonably gently from nor-west to south-east. The site is situated on an old marine terrace and is approximately 5m above sea level at its lowest point rising to approximately 20m above sea level at its highest point.

3. A previous subdivision, RM2229, resulted in eight record of titles to the east of Coombe Hay Lane.

1 Copy of the records of title are appended at Appendices 1a and 1b respectively.

These titles range in size from 1,620m^2 to 2,090m^2. These titles have all been sold to third parties and continuing demand for sections at Toko Mouth not threatened by sea level rise or river flooding risk has led the applicant to seek further subdivision and land use consent.

ZONING

4. The site is zoned *Coastal Resource Area* pursuant to the Clutha District Council District Plan 1998 (**district plan**). Figure 2 below shows the zoning of the site. There are no other planning features applicable to the site – see planning map U54 (*Toko Mouth*). The site is adjacent to *Reserve 231* being the Toko Mouth Domain.

Figure 2: Zoning of Site.

LAND USE CAPABILITY CLASSIFICATION

5. The site is classifed by Manaaki Whenua Landcare Research as LUC **class 4** – see Figure 3 beow.

6. The National Policy Statement For Highly Productive Land (**NPS-HPL**) which comes into force on 17 October 2022 only applies to LUC 1, 2 or 3 land which is zoned rural[2] as such the NPS-HPL is not applicable to the site.

2 See clause 3.5(7).

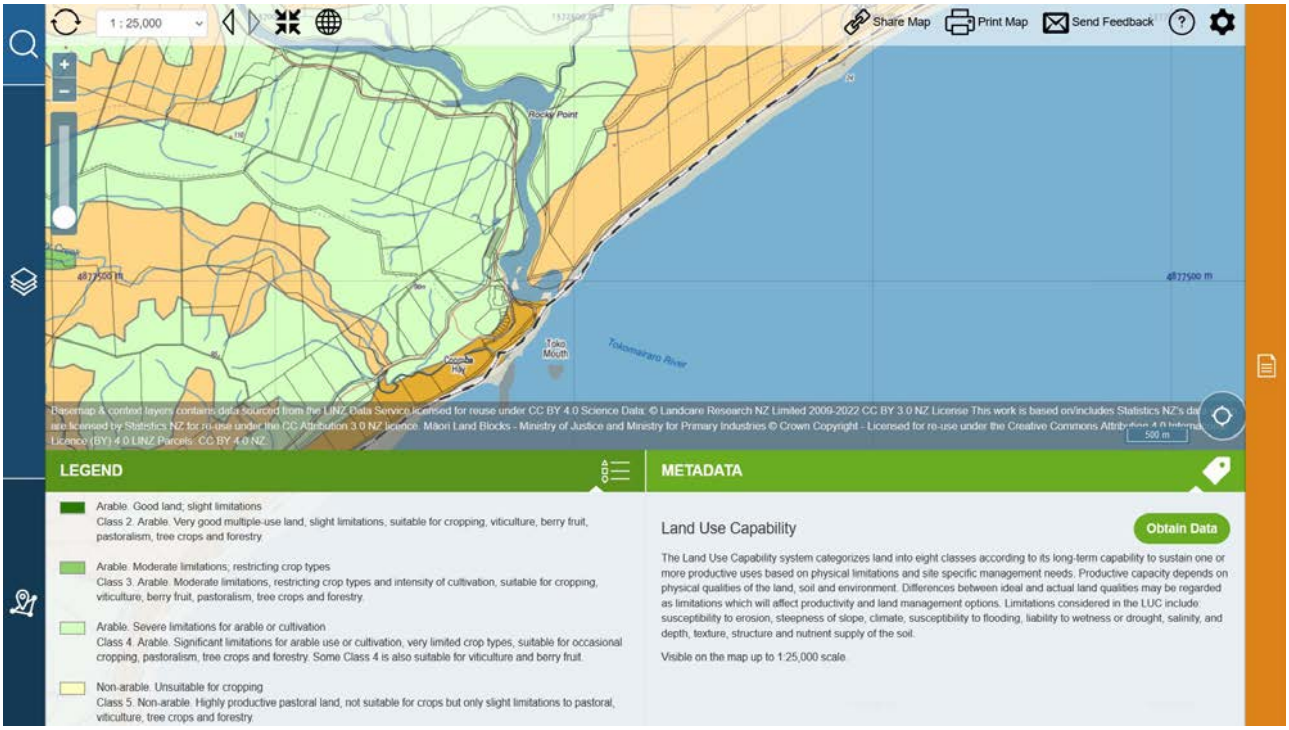


Figure 3: LUC Classification of the Site.

PROPOSED ACTIVITY

7. The applicant is applying for subdivision consent to subdivide the site into 13 lots and land use consent for the establishment of residential activity on each of the 13 lots with the remainder of the land within the site being left in a balance lot. A subdivision scheme plan is appended at Appendix 2.

8. Coombe Hay Lane will be formed to an appropriate width and standard as will entrances to the resulting allotments. The extension to Coombe Hay Lane will have a formed width of 6m and a metalled surface. The entrances to allotments will have a formed width of 3.5m and will be formed in accordance with the diagram appended at Appendix 3.

9. The proposed residential activity includes the following mitigation measures:

   a) All buildings shall be single story and a maximum of 5m height above existing ground level.

   b) For Lots 1 – 3 and 8 – 13, a minimum setback of 15m shall apply to all buildings from the top edge of the escarpment. Building siting shall otherwise be controlled as follows:

      i) On Lot 12, buildings shall not be located above the 96m contour.

      ii) On Lot 13, the dwelling is to be located within the building platform identified on the subdivision scheme plan.

   c) All buildings are to be finished in either naturally weathered timber or locally appropriate stone, or in colours that have low levels of contrast with the colours of its rural landscape setting. Painted surfaces will have light reflectivity ratings of no more than 25%.

   d) All services are to be located below ground.

e) The road is to be designed to reflect the existing Toko Mouth settlement character with gravel surface and soft edges (i.e. no kerb and channel). Any footpaths shall also have gravel surfaces, and there shall be no street lighting.

f) Driveways are to retain an informal rural character with gravel surface and soft edges (i.e. no kerbs). Monumental gates and driveway lighting are not permitted.

g) Water tanks will be sited, and / or buried and / or screened (by planting), and coloured to match the building colours, to have minimal visual impact from beyond the property.

h) Fencing is to be confined to standard rural post and wire construction. Where boundary definition is required, planting rather than fencing is promoted.

i) Except for the area required for driveway access (maximum 6m) a 3m strip along the road boundaries of the lots are to be established in locally appropriate indigenous species in accordance with the guidelines in **Appendix A** of the landscape assessment report[3] to provide a natural setting to the buildings.

j) For Lots 1 – 3 and 8 – 13, a 5m wide strip along the escarpment boundaries is to be established in locally appropriate indigenous species in accordance with the guidelines in **Appendix B** of the landscape assessment report, to provide some screening of the houses as viewed from the township below, and to assist in maintaining bank stability.

The proposed mitigation planting specified in Appendix B, along the escarpment boundary, is generally of lower stature so as to strike the right balance between screening / softening the visual impact of new buildings from external viewpoints and provision for views outward from within the new lots.

ACTIVITY STATUS

10. Subdivision in the *Coastal Resource Area* is a **discretionary** activity pursuant to Rule SUB.2.a[4] which states: "*Subdivision in the Coastal Resource Area is a discretionary activity. Council shall consider the standards and criteria contained in Rule SUB.1(d) and SUB.4, the Objectives and Policies of the Coastal Resource Area, the Regional Policy Statement, Regional Coast Plan, and the New Zealand Coastal Policy Statement*."

11. The proposed subdivision meets all relevant site criteria and performance standards contained in Rules SUB.1(d) and SUB.4[5].

12. An analysis of the proposed activity against the applicable policy framework is undertaken at Appendix 6. That analysis shows that the proposed activity is **generally consistent with relevant**

3 The landscape assessment report and accompanying figures have been prepared by Mr Mike Moore, Registered Landscape Architect. Copy of both the report and the figures are appended at Appendices 4a and 4b respectively.

4 Rule COA.5 refers the reader to Rule SUB.2.

5 See Appendices 5a and 5b respectively for an analysis of the proposed activity against these rules.

policy framework in the district plan, the partially operative regional policy statement and the New Zealand coastal policy statement.

13. Residential activity in the *Coastal Resource Area* is a **restricted discretionay** activity pursuant to Rule COA.4(b) with the discretion of Council restricted to the following matters:

- The ability of the site to dispose of wastes adequately;
- The effects of sea level rise or coastal erosion;
- The effect of the building and any associated signage on the natural character of the Coast particularly in terms of visual impact;
- The effect of the proposal on the intensity of development in the area;
- The effect of the building or structure on indigenous flora and fauna;
- The effect on cultural values; and
- Height, yard and open space requirements.

NATIONAL ENVIRONMENTAL STANDARDS

14. *National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health* (**NES-CS**). The NES-CS provides a nationally consistent set of planning controls and soil contaminant values to ensure that land affected by contaminants in soil is appropriately identified and assessed before it is developed – and, if necessary, the land is remediated or the contaminants contained to make the land safe for human use.

15. The HAIL status of the site was assessed at the time RM2229 which granted consent for the subdivision of the site from its parent title and also for the residential lots in what has become stage 1[6].

16. There is no evidence that the site has been used or is likely to have been used for any HAIL activities excepting an area within Lot 1 for which the applicant has commissioned a 'site remedial action plan' from Environmental Consultants Otago Limited[7]. The plan sets out remedial action to be undertaken with respect to Lot 1.

17. The executive summary of the site remedial action plan states: "*The concentrations of soil contaminants of concern are at or below background levels in the remainder of the development area (Lots 2 – 18). Consequently, proposed Lots 2 – 18 do not constitute a HAIL site and the NES does not apply to this part of the property*."

18. Regulation 5(9) of the NES-CS states: "*These regulations do not apply to a piece of land described in subclause (7) or (8) about which a detailed site investigation exists that demonstrates that any*

6 See paragraphs 16 and 116 of the s42a report for RM2229.
7 See Appendix 8 for a copy of that report.

contaminants in or on the piece of land are at, or below, background concentrations."

19. The executive summary goes on to state: "*The subdivision constitutes a change of use of the land for proposed Lots 1 – 18. The presence of contaminants in soil at concentrations above the Residential SCS within Lot 1 and adjacent land in Lot 19 indicates a potential risk to human health from the proposed development of this part of the site, and remediation is required*."

20. Lot 19 is the balance lot which will remain as production land and, therefore, the NES-CS does not apply to this lot because the proposed subdivision does not stop Lot 19 being production land[8]. Having said that the applicant will voluntarily remediate the affected land within Lot 19 when remediating Lot 1.

21. Consent is required as a **restricted discretionary activity** for Lot 1 pursuant to regulation 10 of the NES-CS.

NOTIFICATION

22. The applicant requests that the application receives **limited notification** to the following parties:

- Iwi;
- Department of Conservation; and
- Otago Regional Council; and
- Lot owners of residential lots created via RM2229; and
- Landowners and residents of the existing baches/dwellings within the Toko Mouth Settlement.

PERMITTED BASELINE

23. An important consideration for the assessment of effects is the application of what is commonly referred to as the permitted baseline assessment. The purpose of the permitted baseline assessment is to identify the non-fanciful effects of permitted activities and those effects authorised by resource consent in order to quantify the degree of effect of the proposed activity. Effects within the permitted baseline can be disregarded in the effects assessment of the activity.

24. However, in this case there is no permitted baseline for either subdivision or land use activities involving the erection of buildings within the *Coastal Resource Area*.

ASSESSMENT OF EFFECTS

25. This section of the report assesses the following environmental effects in terms of the matters to

8 NES-CS regulation 5(8)(c).

which the discretion of Council is restricted in Rule COA.4(b) being:

- The ability of the site to dispose of wastes adequately;
- The effects of sea level rise or coastal erosion;
- The effect of the building and any associated signage on the natural character of the Coast particularly in terms of visual impact;
- The effect of the proposal on the intensity of development in the area;
- The effect of the building or structure on indigenous flora and fauna;
- The effect on cultural values; and
- Height, yard and open space requirements.

Each of these is dealt with in turn below.

Ability of Site to Dispose of Wastes Adequately

26. Each of the resulting dwellings will be serviced for wastewater by their own onsite secondary treatment system with dispersal to field. In his report[9], Mr Shah concludes at page 18 that: "*Based on the site investigation and assessment each lot is confirmed suitable for onsite wastewater management system*." Mr Shah further notes that the specific wastewater system design for each dwelling will be provided at the time of building consent application.

27. The discharge of the treated wastewater to land is a permitted activity pursuant to Rule 12.1.A.4 of the Otago Regional Water Plan provided that certain conditions are met. Analysis of the proposed activity against those conditions is undertaken at Appendix 8 and demonstrates that the proposed treated wastewater discharge to land from each proposed dwelling complies with each condition.

28. In his report Mr Shah assesses the impact of the proposed activity with respect to stormwater and provides a stormwater management plan for the site to ensure that post development flows are no more than pre-development flows and that the existing stormwater flow paths through the site remain viable post development. Mr Shah has allowed for a total impremeable area on each lot of 250m^2 and notes that if any individual lot exceeds that then the lot owner will need to provide additional stormwater management details at the time of building consent.

29. The site and proposed activity mean that wastewater will be appropraitely disposed of and that any adverse effects resulting from the proposed activity on soil and water quality will be **less than minor**.

Effects of Sea Level Rise or Coastal Erosion

30. The site is located on an old marine terrace and at approximately 5 m above seal level at its lowest extent and approximately 200m from the foreshore is well located to avoid any adverse effects

9 See Appendix 9 for copy of the report.

associated with seal level rise and coastal erosion.

31. The proposed activity provides for the formation of an extended Coombe Hay Lane to connect to Coast Road with Coombe Hay Lane, including the extension, to vest in Council. This provides a secondary roading link to the lower part of Toko Mouth Settlement which builds resilience into the transportation network particularly if there is an issue with Toko Domain Road caused by natural hazard or otherwise.

32. The effects of the proposed activity with respect to sea level rise and coastal erosion are **positive**.

Effect of Building on Natural Character of Coast Particularly Visual Impact

33. In relation to effects on natural character of the coastal environment, Mr Moore, Registered Landscape Architect, firstly notes[10] that in his opinion the site sits just behind the inland extent of the coastal environment as defined in relation to Policy 1 of the New Zealand Coastal Policy Statement. Mr Moore concludes at page 7 that: "*Overall, it is my assessment that the effects of the proposed development on natural character will be adverse / low. Whilst the township scale will expand, the existing natural character is already significantly modified by the existing township and the agricultural land use, and the proposed development controls will ensure the impact of additional built form is modest, especially when the proposed plantings mature. There will be no significant changes to any natural processes.*"

34. 'Adverse low' falls within the 'less than minor' categorisation of adverse effects and, therefore, it is considered that the density of the proposed dwellings and impact of the proposed activity with respect to landscape including coastal character and visual amenity will have a **less than minor** adverse effect.

35. Mr Moore assesses the visual impact of the proposed activity in his landscape assessment report, noting at page 9 that the "...*key public viewpoints impacted by the proposed subdivision are the Toko Mouth settlement and beach to the east and south, and Toko Mouth Road to the north and west*..." with a desscription of the visual effects of the proposed activity provided for each representative viewpoint in the tables on pages 10 – 14 of his report. Each of these has been reproduced in Table 1 below.

Table 1: Visual Effects of Proposed Activity from Representative Viewpoints.

Viewpoint	**Visual Effects Assessment**
Toko Mouth river mouth / beach	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.

10 See Mr Moore's Landscape Assessment Report, page 6.

Toko Mouth settlement adjacent to Riverview Road turn-off	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.
Beach adjacent to Rocky Valley Creek	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.
Toko Mouth Road to the north of the settlement	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.
Wangaloa - Toko Mouth Road, north-east of the entrance to Coombe Hay farm	Naturalness will be further reduced by the road and earthworks but otherwise, change to the rural character will be limited.

36. The visual impact of the proosed activity is **no more than minor**.

Effect of Proposal on Intensity of Development in Area

37. The proposed actvitiy will result in 18 lots on which residential activity will be established and a balance lot which will be retained by the applicant for continued use for pastoral grazing. The existing densities within 'older Toko Mouth' and 'newer Toko Mouth' can be seen in Figure 3 below.

Figure 4: Density of Existing Residential Activity within Toko Mouth Settlement.

38. As noted by Mr Moore[11], the proposed development will read as an extension of the existing Toko Mouth settlement which already extends onto the old marine terrace on which the current site is located.

39. The dwellings will be set on larger sites than the older Toko Mouth baches and dwellings below the

11 See Mr Moore's Landscape Assessment Report, pages 3 and 4.

escarpment due to relatively modern requirements relating to wastewater disposal. However, Mr Moore concludes that the lower density when coupled with the proposed mitigation measures will integrate acceptably and will not have 'undue dominance'.

40. Mr Moore states at page 15 of his report: "*The new development will necessarily have a lower density than much of the existing township (due to septic disposal requirements) and it is to be expected that the new dwellings proposed, built to modern standards, will have a different scale and character to many of the existing crib style dwellings in the settlement currently. This is a function of the natural development of settlements generally, with various development stages being having distinctive character. The proposed mitigation measures however, will ensure that the new development integrates acceptably and does not have undue dominance, to the point that the character of the settlement generally is significantly altered*."

41. With respect to landscape and amenity values, Mr Moore concludes at page 15: "*Overall, it is my assessment that effects on the character and values of the Toko Mouth landscape will be adverse / low.*" As stated above in paragraph 25 'adverse low' equates to effects that are 'less than minor'in planning parlance.

Effect of Building or Structure on Indigenous Flora and Fauna

42. There is currently no indigenous flora within the site. The proposed activity includes the planting of indigenous vegetation which will increase the ecology and biodiversity associated with the site. The increased indigenous vegetation will help with respect to indigenous birdlife that feeds on the species included in the proposed plantings. The balance lot will remain as pastural grazing land and will be available for any indigenous birds that currently use the grassed space within the site.

43. The effects of the proposed activity on indigenous flora and fauna of the site is **positive** with respect to the increase in indigenous vegetation on the site and less than minor with respect to **less than minor** with respect to reduction in grassed area.

Effect on Cultural Values

44. The site not a scheduled or registered historic place, archaeological site or waahi tapu site. It is anticipated that the protocal in relation to accidential discovery of human remains or artefacts will be attached as a condition of consent to any grant of consent.

45. As stated at paragraph 15 above, the applicant requests that various parties receive limited notification of the proposal including local tangata whenua.

Height, Yard and Open Space Requirements

46. The most applicable height, yard and open space requirements are those relating to rural settlements such as the adjacent Toko Mouth Settlement. RST.2(iv) refers to the requirements of

Rule URB.4. Rule URB.4 contains the residential activity performance standards.

47. Hence, the maximum permitted height on level sites is 9 metres, subject of course to various recession plane controls, there is a 3 metres front yard requirement and a side and rear yard requirement of 1.5 metres and there is an open space requirement of 100m^2 minimum with not less than 60% of that minimum open area to be in permeable surface such as lawn, trees, shrubs and so on.

48. However, as mitigation measures with respect to height buildings will be required to be single storey and comply with a maximum height of 5m. Another mitigation measure requires that for lots abutting the escarpment, buildings are set back 15m. The proposed lots are of sufficient size that all of the other requirements can be complied with such compliance to be monitored at the time building consent applications are made.

49. The application **complies** with this matter.

Effects Assessment Conclusion

50. Overall, any adverse effects arising from the proposed activity will be in the range negligible to less than minor. There are a number of positive effects associated with the proposed activity.

ASSESSMENT OF POLICY FRAMEWORK

51. An analysis of the proposed activity against the relevant policy framework from the district plan, partially operative regional policy statement and the New Zealand coastal policy statement is undertaken at Appendix 6. That policy assessment demonstrates that the proposed activity is **generally consistent** with the policy framework.

CONCLUSION

52. The applicant is applying for subdivision consent to subdivide the site into 13 lots and land use consent for the establishment of residential activity on each of the 13 lots with the remainder of the land within the site being left in a balance lot. The proposed activity includes a number of mitigation measures as detailed at paragraph 10. The following reports have been prepared and form part of the application:

- A landscape assesmsent report including accompanying figures;
- An onsite wastewater feasibility assessment and stormwater management plan; and
- A site remedial action plan for proposed Lot 1.

53. The site is zoned *Coastal Resource Area* and the proposed subdivision has an activity status of discretionary whilst the resulting residential activity has an activity status of restricted discretionary meaning the overall activity status is **discretionary**.

54. A 'site remedial action plan' has been commissioned from Environmental Consultants Otago Limited with respect to **Lot 1 which is the only part of the site to which the NES-CS applies**.

55. The application has been lodged on a **limited notification** basis with notification to the parties listed at paragraph 15 being required.

56. There is **no** permitted baseline for either subdivision or erection of buildings within the Coastal Resource Area.

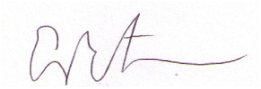
57. The assessment of effects demonstrates that, overall, **any adverse effects arising from the proposed activity will be in the range negligible to less than minor**. There are a **number of positive effects associated with the proposed activity**.

58. The assessment of the policy framework demonstrates that the proposed activity is **generally consistent** with relevant objectives and policies contained in the district plan, partially operative regional policy statement and the New Zealand coastal policy statement.

59. As such the applicant requests that Council **grants** consent to the proposed activity.

Please make contact if you wish to discuss this matter further or require any further information.

Yours sincerely,



Emma Peters Consultant Sweep Consultancy Limited P.O. Box 5724 Dunedin 9054 Phone 0274822214 www.sweepconsultancy.co.nz

Appendix 1a: Record of Title 805077.

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**805077**
Land Registration District	**Otago**
Date Issued	02 February 2018

Prior References
789618

Estate	Fee Simple
Area	3.1621 hectares more or less
Legal Description	Lot 9 Deposited Plan 516455

Registered Owners
Toko Developments Limited

Interests

Appurtenant hereto is a right of way created by Transfer 347546 - 29.10.1969 at 2:15 pm

Appurtenant hereto is a right of way, right to drain water created by Easement Instrument 10868280.2 - 18.9.2017 at 9:59 am

The easements created by Easement Instrument 10868280.2 are subject to Section 243 (a) Resource Management Act 1991

10975013.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 2.2.2018 at 9:57 am

Subject to a right of way, right to drain water, right to convey electricity over part marked A on DP 516455 created by Easement Instrument 10975013.3 - 2.2.2018 at 9:57 am

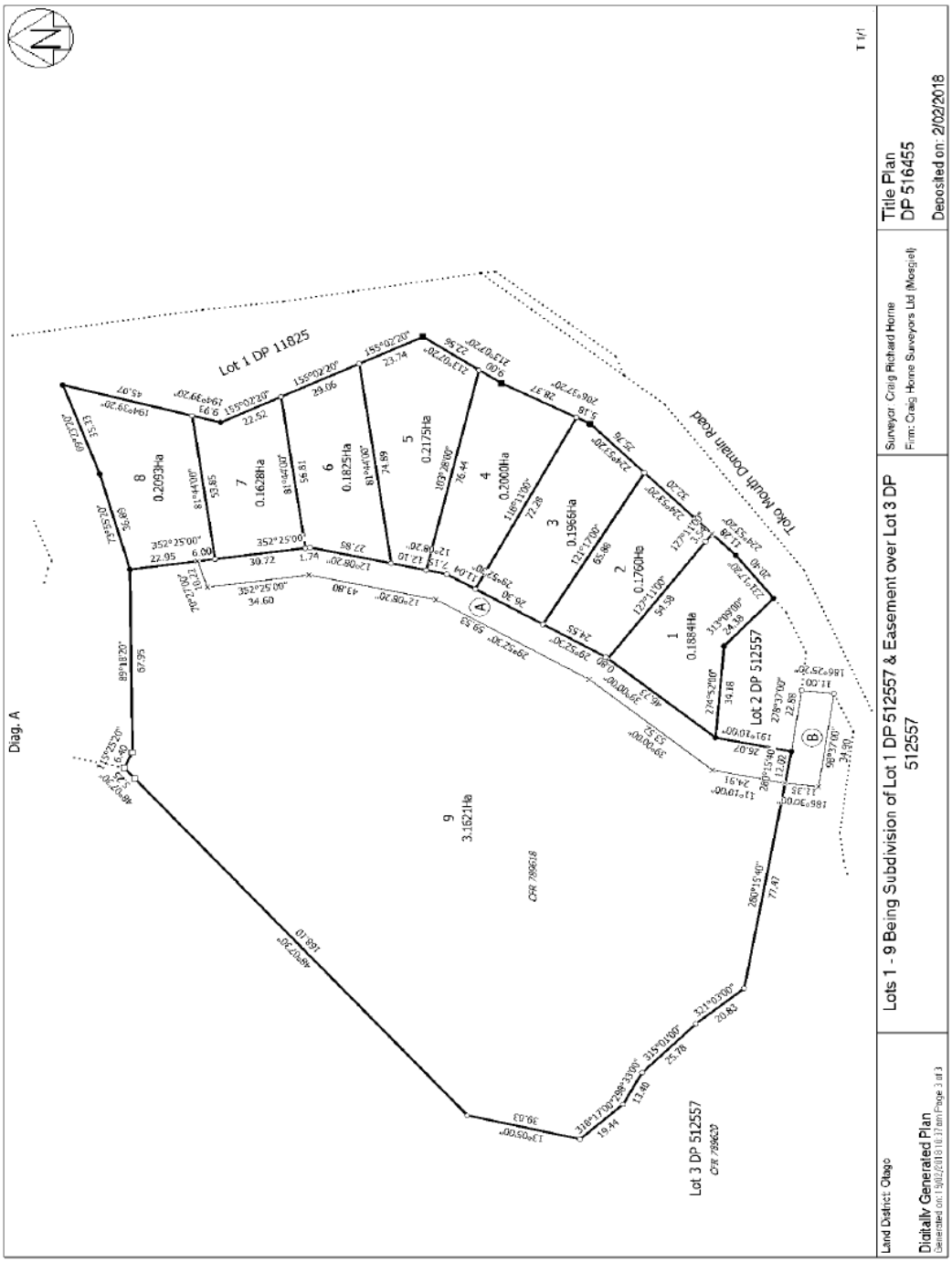
The easements created by Easement Instrument 10975013.3 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to convey electricity over part marked A on DP 516455 in favour of OtagoNet Limited created by Easement Instrument 10975013.4 - 2.2.2018 at 9:57 am

The easements created by Easement Instrument 10975013.4 are subject to Section 243 (a) Resource Management Act 1991

Land Covenant in Covenant Instrument 11548216.1 - 24.9.2019 at 3:53 pm

Identifier **805077**



Appendix 1b: Record of Title 789620.

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **789620**
Land Registration District **Otago**
Date Issued 15 December 2017

Prior References
OT13C/313 OT246/217 OT2D/1433
OT8C/747

Estate	Fee Simple
Area	23.9100 hectares more or less
Legal Description	Lot 3 Deposited Plan 512557

Registered Owners
Toko Farms Limited

Interests

Appurtenant hereto is a right of way created by Transfer 347546 - 29.10.1969 at 2:15 pm(Affects parts formerly CT OT13C/313)

8791232.3 Mortgage to ANZ National Bank Limited - 1.8.2011 at 3:28 pm

Subject to a right of way, right to drain water over part marked A on DP 512557 created by Easement Instrument 10868280.2 - Produced 18.9.2017 at 9:59 am and entered 15.12.2017 at 7.01 am

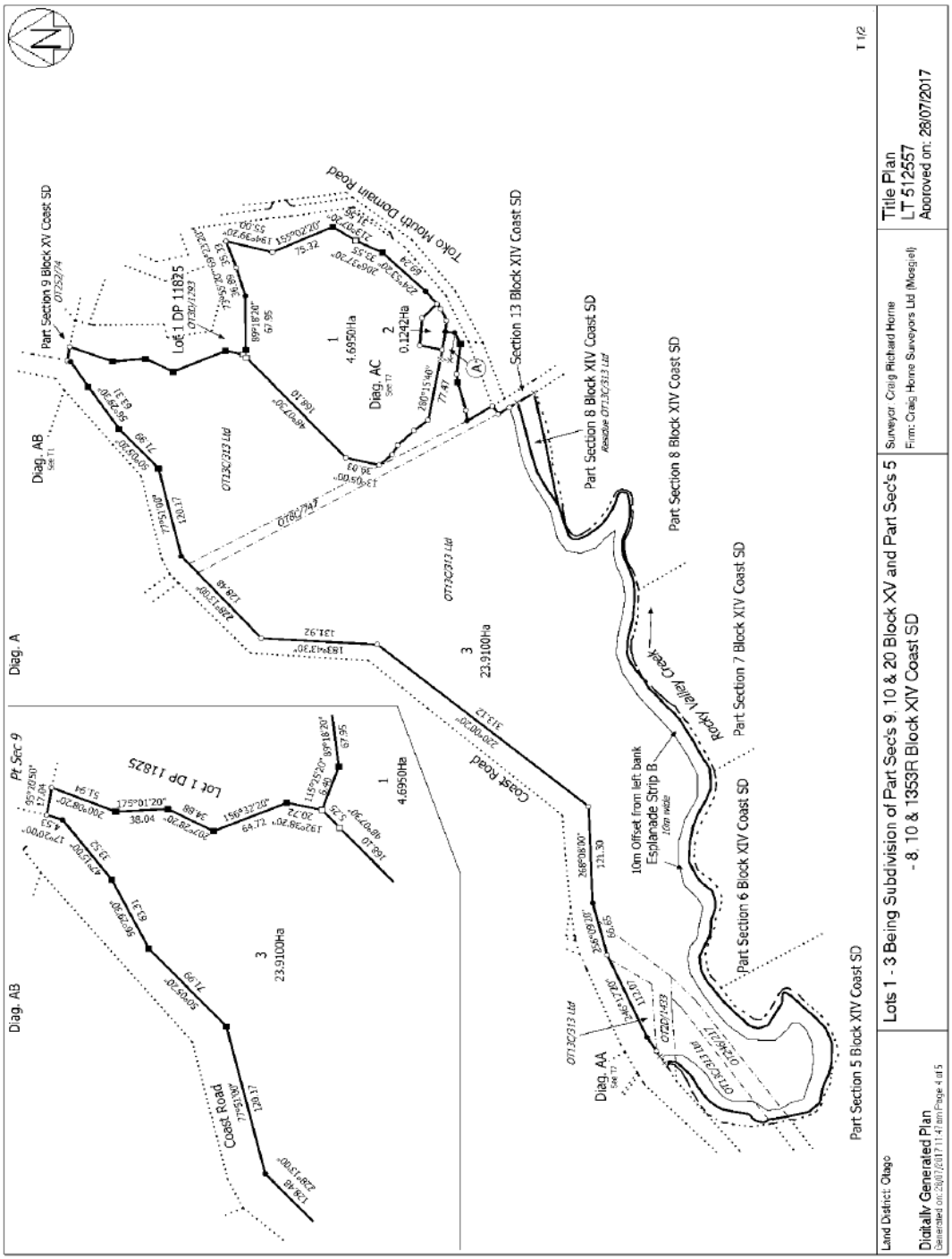
The easements created by Easement Instrument 10868280.2 are subject to Section 243 (a) Resource Management Act 1991

10868280.3 Esplanade Strip Instrument pursuant to Section 232 Resource Management Act 1991 - Produced 18.9.2017 at 9:59 am and entered 15.12.2017 at 7.01 am

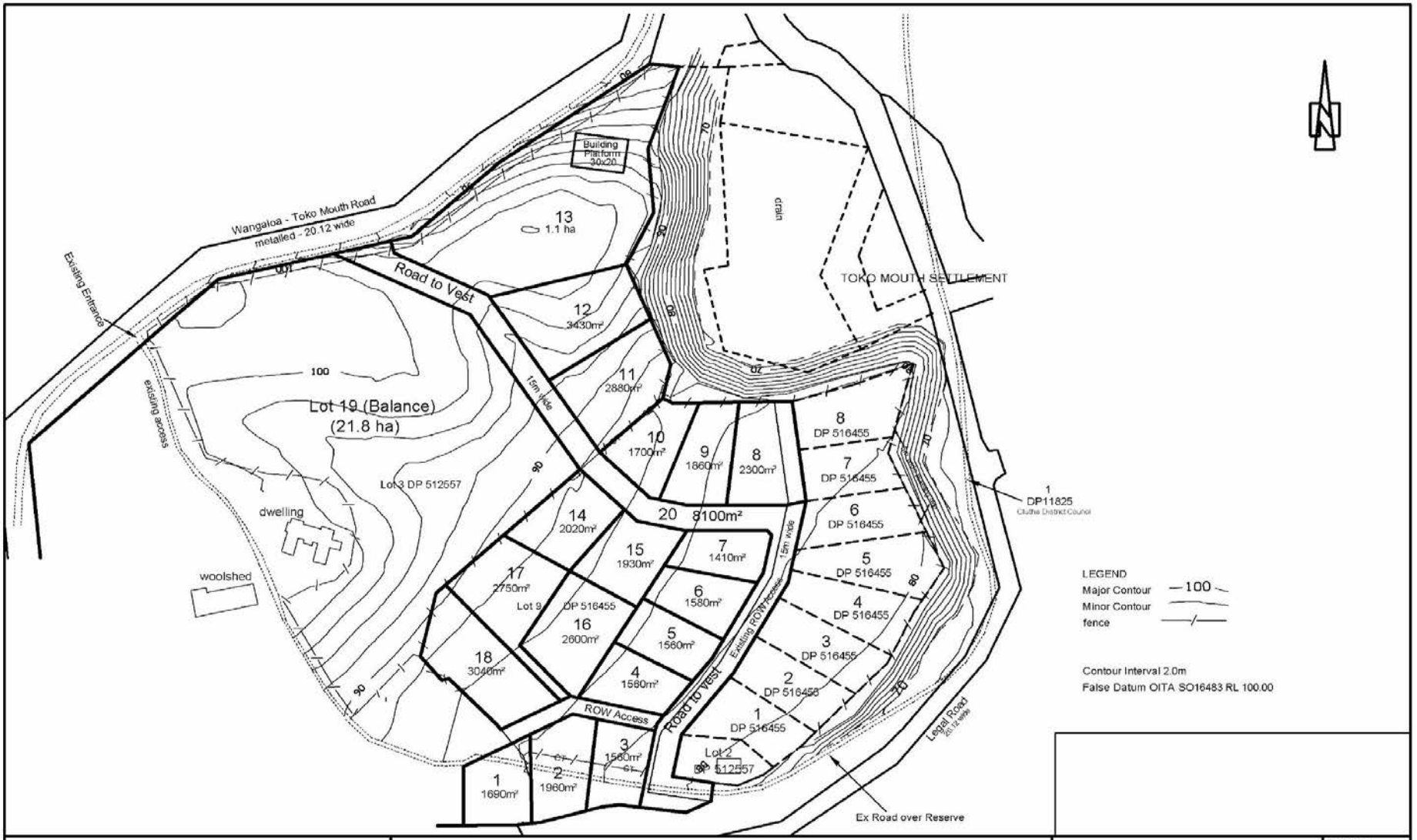
Subject to a right (in gross) to convey electricity over part marked B on DP 516455 in favour of OtagoNet Limited created by Easement Instrument 10975013.4 - 2.2.2018 at 9:57 am

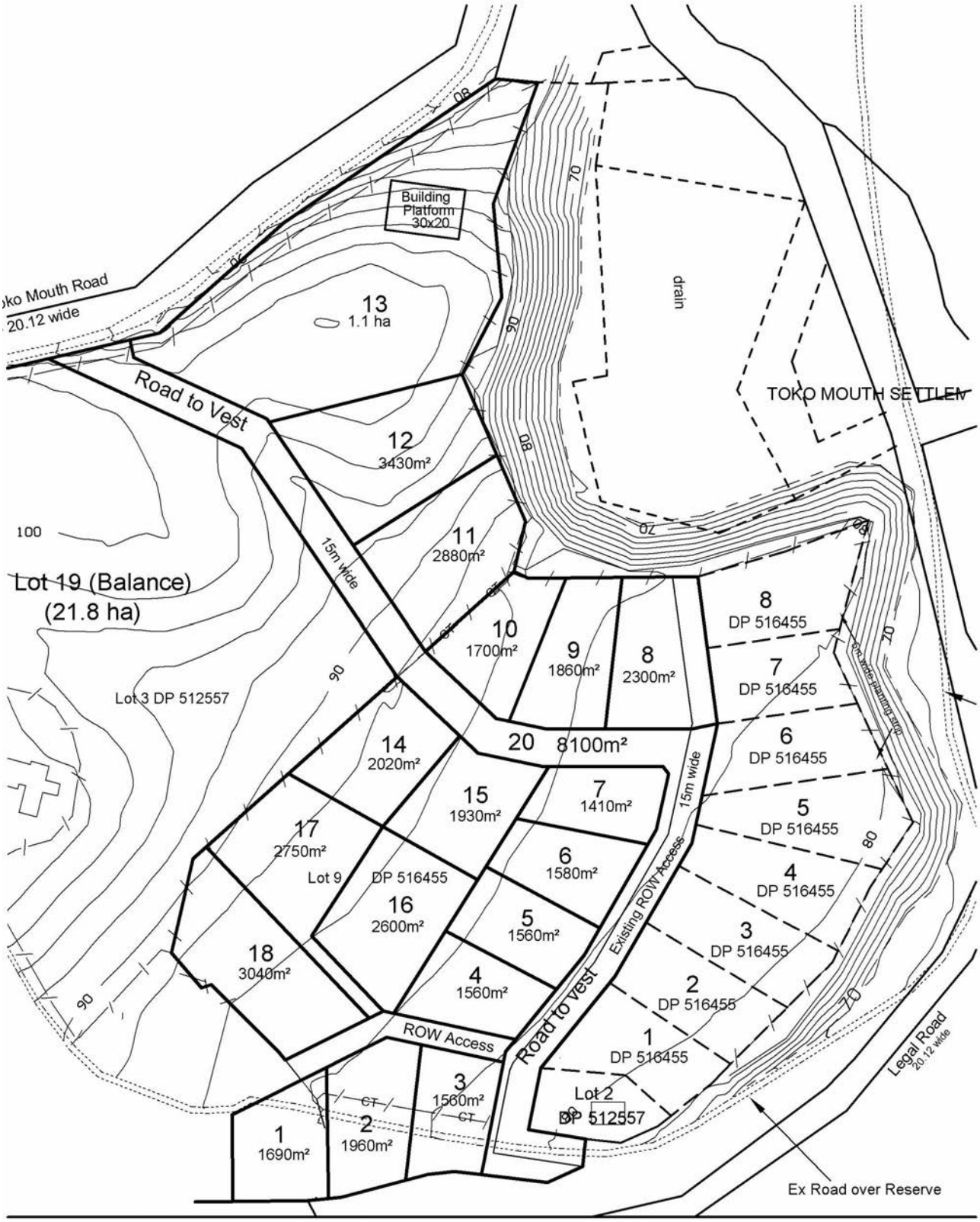
The easements created by Easement Instrument 10975013.4 are subject to Section 243 (a) Resource Management Act 1991

Identifier **789620**

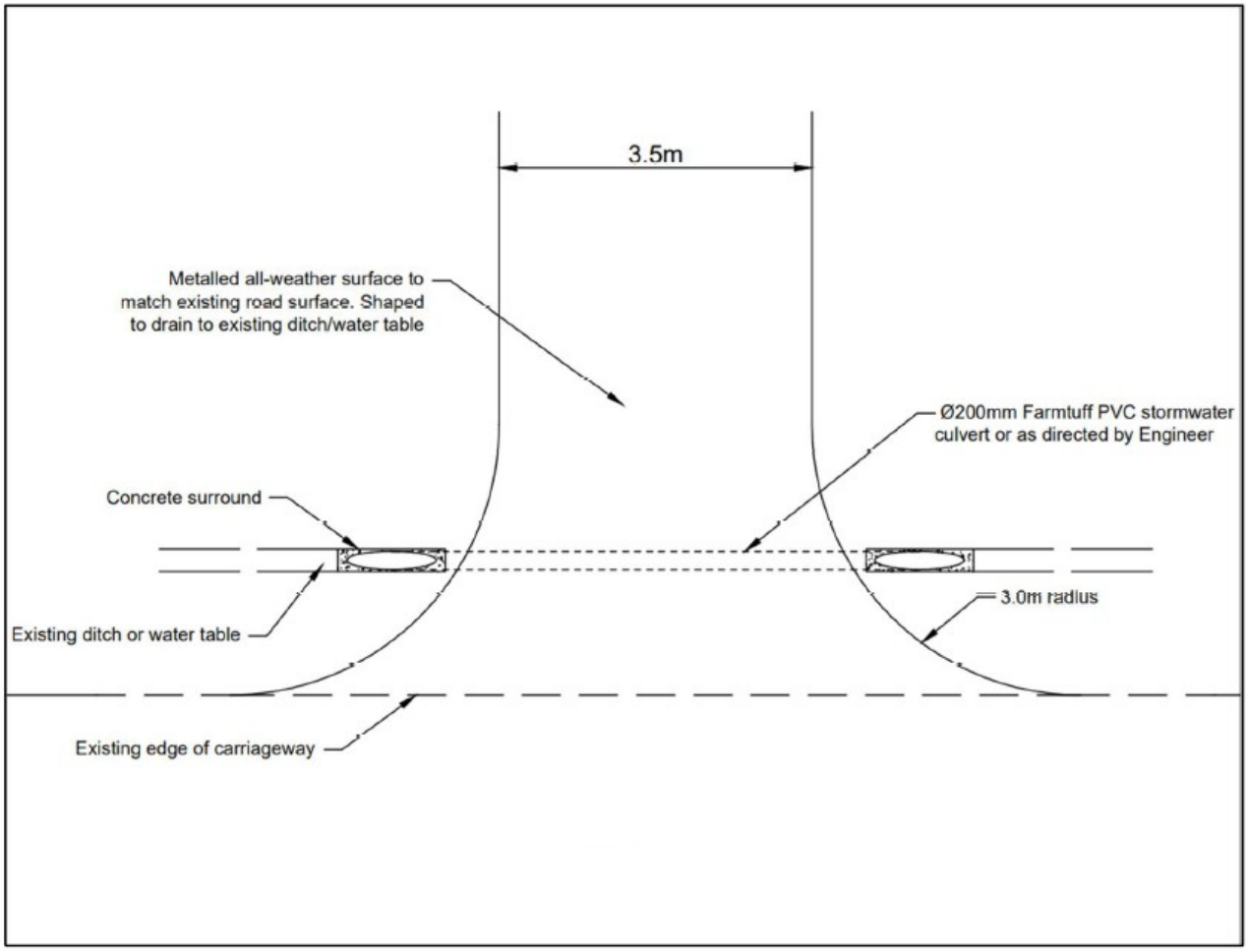


Appendix 2: Subdivision Scheme Plan




Building Platform 30x20
13
1.1 ha
drain
TOKO MOUTH SETTLEM
Road to Vest
12
3430m²
11
2880m²
10
1700m²
9
1860m²
8
2300m²
8
DP 516455
7
DP 516455
6
DP 516455
5
DP 516455
4
DP 516455
3
DP 516455
2
DP 516455
1
DP 516455
20
8100m²
15m wide
Existing ROW Access
Road to vest
Lot 19 (Balance)
(21.8 ha)
Lot 3 DP 512557
14
2020m²
15
1930m²
7
1410m²
17
2750m²
Lot 9
DP 516455
16
2600m²
6
1580m²
5
1560m²
18
3040m²
4
1560m²
ROW Access
3
1560m²
1
1690m²
2
1960m²
Lot 2
DP 512557
Legal Road
20.12 wide
Ex Road over Reserve

Appendix 3: Standard Details for Proposed Vehicle Crossings.



Appendix 4a: Natural Character & Landscape Effects Assessment Report.

Proposed Subdivision, Toko Developments Ltd, Toko Mouth

Natural Character and Landscape Effects Assessment

17 June 2021

Prepared by

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Introduction

Toko Developments Ltd is applying for Resource Consent to subdivide a further stage of its 4.6 ha property (Part Section 10 Block XV Coast SD) at Toko Mouth. Stage 1 of the development was consented in April 2017 and involved the creation of 8 residential lots. As shown in **Figure 1**, Stage 2 involves 18 residential lots, a road and a balance lot.

The site is located within the Coastal Resource Area in the Clutha District Plan (CDP). In terms of Rule SUB.2 subdivision in the Coastal Resource Area is a discretionary activity and Council will consider the standards and criteria contained in Rule SUB.1(d) and SUB.4, the objectives and policies of the Coastal Resource Area, the Regional Policy Statement, Regional Coastal Plan and the New Zealand Coastal Policy Statement.

The purpose of this report is to assess the effects of the proposed development on natural character and landscape character and values. It will be structured as follows:

- Methodology
- Site and area description
- The proposed development and mitigation measures
- Natural character effects
- Landscape effects
- Statutory Planning Assessment
- Conclusion

Methodology

This assessment follows the concepts and principles outlined in the NZILA Best practice guidelines[1], and has been informed by a review of the relevant statutory provisions and a site visit on 11 June 2021.

1 Te Tangi A Te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. April 2021

Site and area description

The site is located on the Coombe Hay property adjacent to the settlement of Toko Mouth, which is located on the coast on the south side of the Tokomairaro River Mouth. The Toko Mouth settlement occupies low lying land directly behind the beach between the Tokomairaro River and Rocky Valley Creek. Inland, the settlement is largely contained by a low scrub covered coastal escarpment approximately 10m high, although stage 1 of the subdivision has provided for the extension of the settlement above this escarpment. The buildings of Coombe Hay farm are on the coastal terraces above the scarp.

The subdivision site is on the coastal terrace behind the settlement. This area is currently largely open pasture land but the first stage of the subdivision has resulted in provision for 8 residential lots, 1600 – 2090m^2 in area, along the perimeter of the southern part of the escarpment, and an access road linked to the settlement below. There is currently one house developed only.

The wider landscape context of the site is the coastal area focused on the Tokomairaro River mouth and the settlement of Toko Mouth. It is defined to the west by gently rising hills, largely under pasture cover and grazed, and reflecting a series of marine terraces. This hill country terminates in a low coastal scarp covered in a mix of native and exotic scrub (dominantly gorse, broom, meuhlenbeckia, flax and cabbage tree) and a strip of marram covered foredunes lies between this and the beach. A reef lies off-shore adjacent to the Toko Mouth settlement.

Toko Mouth settlement modifies the natural character of the dune country and has its own distinctive 'crib settlement' character. It is largely comprised of holiday homes and development is typically lineal in pattern with dwellings generally closely spaced along the roads or nestled against the back of the dunes or coastal escarpment. There are two large areas of open mowed reserve as well as an area of wetland. Houses are generally single story and modest in scale, although variable in age, architectural style, materials and colour. The roads are informal and rural in character, being metaled, narrow and with no footpaths. Whilst there are some fences, often boundaries between properties are open and undefined. The vegetation is a mix of hardy coastal natives and exotics.

Figures 2 - 8 illustrate the character of the site and area.

The proposed development and mitigation measures

The proposed development is the extension of a residential subdivision that was consented in 2017. The site is on the coastal terrace top to the west of the settlement of Toko Mouth. As shown in Figure 1, it is proposed to create 18 additional residential lots (between 1410m^2 and 1.1ha in area). A 15m wide public road will link with the road associated with Stage 1 and will provide access from Wangaloa – Toko Mouth Road. Except where modified by proposed conditions, it is proposed that the CDP Urban Resource Area site development performance standards will apply to residential development on these lots.

The development is mainly located on flat – gently rising terrace top landform. At its northern end (Lots 11 - 13.) the land rises, reflecting an older less distinct terrace face, and this area is the most visually prominent part of the site. To minimise adverse natural character and landscape effects the lot layout and associated proposed development controls avoid building sites on this area, lot 13 having a building platform on its lower northern slopes. This ensures that landform largely screens the development from Wangaloa – Toko Mouth Road, visually containing the settlement.

As for Stage 1 of the development, to ensure that the ensuing residential development integrates acceptably with the character of the Toko Mouth settlement and to avoid or minimise any adverse effects on natural character and rural amenity, the following mitigation measures are recommended:

(a) All buildings shall be single story and a maximum of 5m height above existing ground level.

(b) For Lots 1 – 3 and 8 – 13, a minimum setback of 15m shall apply to all buildings from the top edge of the escarpment. Building siting shall otherwise be controlled as follows:
   i) On Lot 12, buildings shall not be located above the 96m contour
   ii) On Lot 13, the dwelling is to be located within the building platform identified in Figure 1.

(c) All buildings are to be finished in either naturally weathered timber or locally appropriate stone, or in colours that have low levels of contrast with the colours of its

rural landscape setting. Painted surfaces will have light reflectivity ratings of no more than 25%.

(d) All services are to be located below ground

(e) The road is to be designed to reflect the existing Toko Mouth settlement character with gravel surface and soft edges (i.e. no kerb and channel). Any footpaths shall also have gravel surfaces, and there shall be no street lighting.

(f) Driveways are to retain an informal rural character with gravel surface and soft edges (i.e. no kerbs). Monumental gates and driveway lighting is not permitted.

(g) Water tanks will be sited, and / or buried and / or screened (by planting), and coloured to match the building colours, to have minimal visual impact from beyond the property.

(h) Fencing is to be confined to standard rural post and wire construction. Where boundary definition is required, planting rather than fencing is promoted.

(i) Except for the area required for driveway access (maximum 6m) a 3m strip along the road boundaries of the lots are to be established in locally appropriate indigenous species in accordance with the guidelines in **Appendix A** to provide a natural setting to the buildings.

(j) For Lots 1 – 3 and 8 – 13, a 5m wide strip along the escarpment boundaries is to be established in locally appropriate indigenous species in accordance with the guidelines in **Appendix B**, to provide some screening of the houses as viewed from the township below, and to assist in maintaining bank stability.

The proposed mitigation planting specified in Appendix B, along the escarpment boundary, is generally of lower stature so as to strike the right balance between screening / softening the visual impact of new buildings from external viewpoints and provision for views outward from within the new lots.

Natural character effects

Natural character is defined as:
'Natural character is the distinct combination of an area's natural characteristics and qualities, including degree of naturalness'[2].

The effects of the proposed development on natural character are an issue given the proximity of the site to the coast and its Coastal Resource Area zoning.

The inland extent of the coastal environment

Although the Coastal Resource Area in the CDP extends inland as far as Wangaloa – Toko Mouth Road, it is my assessment that in terms of the guidance provided in Policy 1 of the New Zealand Coastal Policy Statement 2010 and as identified in Moore et al (2015)[3], the top of the coastal escarpment provides appropriate definition of the inland extent of the coastal environment. The Toko Mouth settlement, being seaward of the escarpment, is within the coastal environment, but the site itself is on the boundary or just beyond. Given the CDP zoning, the location on or directly adjacent to the boundary, I consider that it the effects of the development on the natural character of the coastal environment are an important and relevant matter for assessment.

Existing natural character

As discussed in the Moore et al report the Toko Mouth area received a medium (moderate) rating for natural character based on:

- The modification to the sand dune landforms by the settlement and by the presence of Marram.
- The mixed indigenous / exotic character of the vegetation.
- Moderate health and modification of the intertidal and aquatic habitats
- Infaunal communities typical of disturbed sandy beaches of southern New Zealand.
- The presence of dwellings and other buildings associated with the settlement.
- Medium – high wild and scenic qualities.

2 Te Tangi A Te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. April 2021
3 Moore et al (2015) Coastal Environment of Otago, Natural Character and Outstanding Natural Features and Landscapes Assessment, Clutha District Section Report.

Natural character effects of the proposed subdivision

Natural character effects describe the impact of the proposed development on the biophysical integrity and natural processes of the areas affected, as well as sensory / experiential effects on perceptions of natural character. They can be positive or adverse in nature and their degree is determined with reference to the degree of existing modification and the sensitivity of the existing environment to change, and the scale and nature of the proposed development. The degree of effect will be rated in terms of a 7 point scale from very low to very high as outlined below:

Degree of effect assessment scale

Very low	*Low*	*Moderate - low*	*Moderate*	*Moderate - high*	*High*	*Very high*

The subdivision involves the extension of the Toko Mouth settlement. Prior to stage 1, this was contained below the coastal scarp but stage 1 of the subdivision provides for a line of houses above the scarp, controlled as to height and colour and mitigated by plantings. This further subdivision proposed will extend the township on the terrace surface above the scarp, both behind and to either side of stage 1. The natural character of the area affected is already significantly modified by agricultural use and is largely under exotic pasture cover. The development will change the character from rural to 'township' and reduce naturalness by the introduction of roads and houses. On the positive side, there will be greater indigenous biodiversity due to the plantings required. The natural landform will remain largely unchanged at the larger scale except that the proposed access road from Wangaloa – Toko Mouth Road will require some earthworks, and existing drainage patterns may be modified as a result of this to a minor degree.

Overall, it is my assessment that the effects of the proposed development on natural character will be adverse / low. Whilst the township scale will expand, the existing natural character is already significantly modified by the existing township and the agricultural land use, and the proposed development controls will ensure the impact of additional built form is modest, especially when the proposed plantings mature. There will be no significant changes to any natural processes.

Landscape Effects

Landscape is defined as:

'Landscape embodies the relationship between people and place: it includes the physical character of an area, how the area is experienced and perceived, and the meanings associated with it[4].

As discussed above, the wider landscape context of the site is the coastal area focused on the Tokomairaro River mouth and the settlement of Toko Mouth, and defined to the west by gently rising largely pasture-covered hills. It includes the ocean, the beach, the Tokomairaro River mouth and estuary, the dunes and the Toko Mouth settlement, the scrub covered coastal escarpment and the rural / pastoral land above.

Existing landscape values

Physical attributes

There are no natural science values of especially recognized significance in the immediate vicinity of the site except that the CDP identifies the river at Toko Mouth as a significant wetland. In the wider coastal environment dynamic coastal processes are evident and sustain largely natural beach, dune and cliff landforms. The natural landscape values are modified by the widespread presence of Marram grass and around the Toko Mouth settlement, by dune modification and the presence of built elements. Natural landscape values however, are supported by the considerable presence of indigenous vegetation in places, including areas of wetland.

Perceptual attributes

Whilst naturalness values are modified by the presence of the settlement, and in the wider setting by agricultural land use, the area has scenic qualities based on the traditional crib settlement character of the township and the way it nestles recessively into its coastal / rural setting. The settlement has a strong sense of place based on its coastal crib settlement character that I believe is important to respect. Key elements supporting this are the modest scale and unpretentious character of the houses, the limited definition of boundaries by

4 Te Tangi A Te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. April 2021

fencing, and the lack of urban infrastructure such as sealed roads, footpaths, kerb and channel and street lighting.

In the working rural landscape surrounding, landscape values are based on openness and legible natural landform under grassland cover. Transient values associated with the coastal setting are important in this landscape and include the various moods and sea states of the ocean, the rhythm of tides, the presence of marine birds and mammals and the sounds of the sea.

Associative attributes

The CDP does not identify any potentially outstanding natural landscapes or outstanding natural features in this specific area, although Chrystalls Beach to the north of the river mouth is identified as a potentially outstanding natural landscape. The CDP identifies the river at Toko Mouth as a significant wetland.

The name Tokomairaro can be translated as 'place where the canoe must be poled'[5] and the Otago Regional Coastal Plan lists Kai Tahu cultural and spiritual values for the Tokomairaro Coastal Protection Area. I am unaware of any particular historic heritage significance for Toko Mouth. As a holiday / recreational destination however, it is likely that the Toko Mouth settlement and beach will be a place valued for its personal associations to many.

The Coastal Environment of Otago report (Moore et al, 2015)[6] assessed the landscape rating for the Toko Mouth area of the coastal environment (including the township) as high - medium overall, and not outstanding.

<u>Viewpoints assessment</u>

The key public viewpoints impacted by the proposed subdivision are the Toko Mouth settlement and beach to the east and south, and Toko Mouth Road to the north and west. The following is a brief assessment of the visual effects from representative viewpoints in these locations.

5 En.wikipedia.org

6 Moore et al (2015) Coastal Environment of Otago, Natural Character and Outstanding Natural Features and Landscapes Assessment, Clutha District Section Report.

Toko Mouth river mouth / beach (see Figure 4)

Relevance of viewpoint	A popular recreational beach adjacent to a crib settlement. This viewpoint is also representative of effects from the more easterly parts of the settlement nearby.
Viewers / Viewer sensitivity	The area is a holiday / recreational destination based to a large extent on its coastal amenity values. I assess viewer sensitivity as high.
Approx distance to the proposed development	600m
Existing view description	The site is visible in the middle distance above the scrub covered coastal scarp. In the foreground, is the Tokomairaro River with fairly densely spaced cribs are lined alongside its banks. Above the escarpment, the first of the houses associated with the subdivision stage 1 is visible – not yet softened by the required plantings. Beyond, in the background, is the rural landscape including the Coombe Hay homestead, pasture covered slopes, lineal exotic shelter trees and patches of indigenous scrub / forest.
Description of visual effects	Much of the proposed stage 2 development will be partially screened by the stage 1 houses and plantings in front. Development on Lots 8 – 12 will be the most visible and will continue the pattern of development along the top of the escarpment. Building on Lot 13 will appear as an outlier and the highest part of the escarpment top will remain free of buildings. Built impact will be minimised by the design controls, including building height, colour and escarpment edge plantings. The development overall, will result in awareness of an extension to the township at a higher level, above the escarpment.
Visual effects assessment	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.

Toko Mouth settlement adjacent to Riverview Road turn-off (see Figure 5)

Relevance of viewpoint	Indicative of viewpoints close to the escarpment base.
Viewers / Viewer sensitivity	The area is a holiday / recreational destination based to a large extent on its coastal amenity values. I assess viewer sensitivity as high.
Approx distance to the proposed development	150m
Existing view description	The camp ground including various existing buildings are set against the scrub covered escarpment. From this close proximity to the base of the scarp, landform screens the existing stage 1 dwelling.
Description of visual effects	Dwellings on lots 10 – 13 will probably be visible to varying extents, dependent on their exact siting. These will be seen over the escarpment top on the immediate skyline. The visual impact of these dwellings will be minimised by the proposed height and colour requirements and eventually, by the proposed clifftop plantings.
Visual effects assessment	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.

Beach adjacent to Rocky Valley Creek (see Figure 6)

Relevance of viewpoint	Representative of views toward the site from the beach and cribs to the south.
Viewers / Viewer sensitivity	The area is a holiday / recreational destination based to a large extent on its coastal amenity values. I assess viewer sensitivity as high.
Approx distance to the proposed development	180m

Existing view description	This is a view toward the site which is located behind mature macrocarpa trees lining the top of the escarpment. In the foreground is Rocky Valley Creek which has dune lands in a relatively natural state to its south. Various cribs are located in the area between the creek and the escarpment and in the dunes nearby. The existing Coombe Hay farm cottage is visible near the top of the escarpment and an additional dwelling is likely to be visible to its right, when developed on the stage 1 lot adjacent.
Description of visual effects	The large macrocarpa trees are likely to be removed (opening up sun access to the properties below) and dwellings on lots 1 – 3 will be visible in their place. Buildings on the sites further back are unlikely have much visibility from this viewpoint given the low viewing angle and the landform screening provided by the scarp, and the height controls proposed. The proposed clifftop planting and the building controls will help to minimise the visual impact of dwellings on Lots 1 – 3. The removal of the large trees will significantly change the view, but given their exotic character, will not unduly reduce naturalness.
Visual effects assessment	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.

Toko Mouth Road to the north of the settlement (see Figure 7)

Relevance of viewpoint	Toko Mouth Road is an important public road in this area
Viewers / Viewer sensitivity	The area is a holiday / recreational destination based to a large extent on its coastal amenity values. I assess viewer sensitivity as high.
Approx distance to the proposed development	580m
Existing view description	The site is visible as the higher terrace top land forming the backdrop to this view. The Toko Mouth settlement is visible in two enclaves, one close-by and adjacent to Toko Mouth Road, and the

	other more distant and adjacent to the bank of the Tokomairaro River. One house on stage 1 of the subdivision can be seen above the escarpment and is as yet unsoftened by the clifftop mitigation plantings. Further dwellings from stage 1 may have some visibility but will be significantly screened by the escarpment landform (due to the viewing angle). Mature exotic trees in the middle distance screen much of the site but the pasture covered slopes of proposed lot 13 can be seen above where Wangaloa – Toko Mouth Road cuts up the hill.
Description of visual effects	Buildings on lots 8 – 12 will be largely screened by existing intervening vegetation but if this were to be removed, would be seen in the context of the existing terrace-top house, lined along the escarpment top. The visual impact of these would be controlled by the proposed height and colour requirements and eventually, the cliff-top plantings. Houses in the remainder of the subdivision will have low visibility given the flat landform and the viewing angle across the escarpment top. From this viewpoint, the most prominent house will be that on the building platform on Lot 13. This will appear as part of the rural environment, isolated from the rest of the development and its visual impact will be mitigated by the height and colour controls and the landform backdrop.
Visual effects assessment	Naturalness will be further reduced but to a minor extent given the presence of the existing township, the proposed native plantings and the building controls. These controls will also ensure that the extended township integrates with the character of the existing.

Wangaloa - Toko Mouth Road, north-east of the entrance to Coombe Hay farm (see Figure 8)

Relevance of viewpoint	Wangaloa - Toko Mouth Road is an important public road in this area
Viewers / Viewer sensitivity	The area is a holiday / recreational destination based to a large extent on its coastal amenity values. I assess viewer sensitivity as high.
Approx distance to the proposed	100m

development	
Existing view description	This a view north-eastward along Wangaloa – Toko Mouth Road where it descends toward Tokomairaro River and Toko Mouth settlement. The site is currently seen as open rolling pastureland to the east side of the road with the ocean visible beyond.
Description of visual effects	The main effect of the subdivision from this viewpoint will be the proposed new road and the earthworks associated with its development. These will modify the existing natural landforms to an extent. There may be some minor visibility of built form on the Lot 13 platform but all other lots will be screened by landform.
Visual effects assessment	Naturalness will be further reduced by the road and earthworks but otherwise, change to the rural character will be limited.

Landscape effects of the proposed subdivision

Landscape effects are defined as follows:
'Landscape effects are consequences for landscape values of changes to landscape attributes. Change itself is not an effect. Landscapes are always changing.[7]

I assess the landscape effects of the development against the landscape values discussed above. Landscape effects may be positive or adverse in nature and I rate the degree of effect in terms of the 7 point rating scale discussed under natural character effects above.

Toko Mouth settlement is characterised by a series of fairly dense, often lineal nodes of dwellings of generally modest scale and informal 'crib' character, arranged around river banks, wetlands and the coastal escarpment. The proposed development extends the already consented stage 1 of the subdivision – which expanded the settlement above the previously containing escarpment, and is located largely on the flat terrace surface above this. The subdivision reflects modern septic disposal requirements and is less dense than much of the existing settlement, but it is sensitive to the character of the existing settlement in that it:

- Includes controls to reflect the existing 'informal' streetscape character.
- Includes controls to minimize the impact of individual buildings.
- Will result in a significant amount of locally appropriate indigenous vegetation.

7 Te Tangi A Te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. April 2021

- Responds largely to the existing landform in that it does not significantly encroach on the containing landforms behind the terrace top.

The site is at the edge of the coastal environment and the development will have no impact on dynamic coastal or estuarine processes and associated values. It will have some localized effects on the natural landforms related to earthworks for the proposed road and for development on Lots 12 and 13 in particular, which are located on low hill forms behind the flat terrace top. It will extend the township footprint, changing the terrace top area from rural to township character but in so doing, indigenous biodiversity will be enhanced. Naturalness values will be reduced by the greater extent of the township, but this is not unduly significant given that the current rural land use already modifies naturalness values considerably.

The new development will necessarily have a lower density than much of the existing township (due to septic disposal requirements) and it is to be expected that the new dwellings proposed, built to modern standards, will have a different scale and character to many of the existing crib style dwellings in the settlement currently. This is a function of the natural development of settlements generally, with various development stages being having distinctive character. The proposed mitigation measures however, will ensure that the new development integrates acceptably and does not have undue dominance, to the point that the character of the settlement generally is significantly altered.

Overall, it is my assessment that effects on the character and values of the Toko Mouth landscape will be adverse / low.

Statutory planning assessment

Rule SUB.2 and Rule COA.5 in the Clutha District Plan (CDP) makes subdivision in the Coastal Resource Area a discretionary activity. Rule COA.5 refers to the assessment criteria as follows:

'In assessing any application under this rule, Council in addition to those matters set out in Section 104 of the Act shall also consider the criteria of Section 3.7 Subdivision, Rule SUB 1(d) and Rule SUB.4, the objectives and policies of the Coastal Resource Area and the Regional Policy Statement, Regional Coast Plan and the New Zealand Coastal Policy Statement'.

Those matters relevant to the natural character and landscape effects of the proposed development in the CDP and NZCPS are identified, with brief comment below as follows. The Otago Regional Policy Statement and Regional Plan: Coast are not specifically addressed due to the high level, overarching nature of the former, and the fact that the latter is mainly relevant to areas below mean high water springs.

To relate my effects ratings to the terminology of the Resource Management Act 1991 (RMA), I adopt the relationship outlined in the NZILA best practice guide[8], outlined below.

Very low	*Low*	*Low- mod*	*Moderate*	*Mod- high*	*High*	*Very high*

Less than minor	*Minor*	*More than minor*	*Significant*

Clutha District Plan

Objective COA.1 *To preserve the natural character of the coastal environment and protect it from inappropriate subdivision, use and development.*	Toko Mouth settlement and agricultural land use in the area surrounding, already modifies the natural character in this area. In my assessment, the proposed extension of the settlement is located and controlled such that further adverse effects on natural character will be no more than minor.
Objective COA.4 *To protect the outstanding natural features and landscapes of the Districts coastline from inappropriate subdivision, use and development.*	Toko Mouth is not identified as an outstanding natural feature or landscape in the CDP, or in the Coastal Environment of Otago Natural Character and Outstanding Natural Features and Landscapes Assessment[9].
Policy COA.1 *To ensure the subdivision, use and development of the coast and in particular, buildings and structures avoids, remedies, or mitigates any adverse effects on:* • *Natural character values* • *Outstanding natural features and landscapes* • *Amenity values of the coast ….*	It is my assessment that the proposed subdivision will have minor adverse effects on natural character values and that there are no outstanding natural features or landscapes impacted. As regards amenity values, I consider that the design and the proposed development controls will mitigate adverse effects by ensuring that the subdivision is not unduly visually prominent and that it integrates acceptably with the character of the existing Toko Mouth settlement.
Policy COA.2 *To manage the subdivision, use and development of the Coastal Resource Area to ensure adverse effects are avoided as far as*	The proposed development provides for the sensitive expansion of an existing coastal settlement. Whilst adverse effects are not completely avoided, they are appropriately

8 Te Tangi A Te Manu, Aotearoa New Zealand Landscape Assessment Guidelines. April 2021

9 Moore et al (2015) Coastal Environment of Otago Natural Character and Outstanding Natural Features and Landscapes Assessment – Clutha District Assessment Report.

practicable and that where complete avoidance is not practicable, that adverse effects are mitigated or provision is made for remedying those effects.	mitigated in my assessment.
Policy COA.10 *To control the erection of buildings in the coastal area to ensure adverse effects on natural character are avoided, remedied or mitigated.*	Development design controls are included to ensure that the effects on natural character associated with additional built form, are appropriately mitigated.
Policy COA.11 *To preserve the areas of the Coastal Resource Area where natural character is largely uncompromised through restricting, to the extent practicable, subdivision, use and development to areas where natural character is already compromised.*	In my assessment, Toko Mouth is a part of the Coastal Resource Area, where natural character is already compromised. I consider that the proposed subdivision is consistent with this policy.

New Zealand Coastal Policy Statement 2010

Policy 6 - Activities in the coastal environment *In relation to the coastal environment:* *(c) Encourage the consolidation of existing coastal settlements and urban areas where this will contribute to the avoidance or mitigation of sprawling or sporadic patterns of settlement and urban growth.* *(f) Consider where development that maintains the character of the existing built environment should be encouraged, and where development resulting in a change in character would be acceptable.* *(h) Consider how adverse visual impacts of development can be avoided in areas sensitive to such effects, such as headlands and prominent ridgelines, and as far as practicable and reasonable apply such controls or conditions to avoid those effects.*	The proposed subdivision extends the existing Toko Mouth settlement and is adjacent to existing development. Its density largely reflects the practicalities of septic disposal. In my assessment it does not constitute a sprawling or sporadic pattern of development. Given present building standards, the development proposed will not be entirely similar to the character of the existing Toko Mouth settlement. The proposed development conditions however, seek to ensure that its character integrates acceptably with that of the settlement. The proposed subdivision is located on a coastal terrace landform and the edges of this (escarpment top areas) have a moderate – high degree of visual sensitivity. Stage 1 of the subdivision however, has already provided for escarpment top development and the development proposed will extend this rather than introduce an entirely new effect. The mitigation measures proposed for Stage 1 (primarily building height and colour controls and provision for plantings) are adopted for the current stage, and the design avoids the introduction of built form to the highest, most visually sensitive part of the site.
Policy 13 – Preservation of natural character *(1) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development* *(a) avoid adverse effects of activities on*	The site not within an area of outstanding natural character and Policy 13 (1) (a) is therefore not relevant. In my assessment, the proposed development does not give rise to significant adverse effects on natural character, and avoids and mitigates other adverse effects. I

natural character in areas of the coastal environment with outstanding natural character; and *(b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment….*	therefore consider it to be consistent with Policy 13 (1) (b).
Policy 15 – Natural features and natural landscapes *To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use, and development:* *(a) avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and* *(b) avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the coastal environment…*	The site is not within / does not impact any outstanding natural feature or landscape and Policy 15 (a) is therefore not relevant. In my assessment, the proposed development does not give rise to significant adverse effects on natural features and landscapes within the coastal environment, and avoids and mitigates other adverse effects. I therefore consider it to be consistent with Policy 15 (b).

Conclusion

The application involves the continuation of recent subdivision that extends the Toko Mouth settlement onto the coastal terrace above the existing township. The site is within the Coastal Resource Area in the CDP and in my assessment, on the margin of the coastal environment as per the Policy 1 guidance in the NZCPS 2010. The development has been designed to avoid the most visually prominent, upper part of the site and includes design controls aimed at minimizing the prominence of built form and at integrating the development to the extent practicable with the character of the existing settlement.

Natural character in this area is already significantly modified and taking this and the proposed mitigation measures into account, I have assessed the natural character effects of the proposed development as no more than adverse / low (minor). Likewise, I consider that effects on landscape values will be no more than adverse / low (minor). I consider that the proposed subdivision is generally consistent with the statutory provisions relating to natural character and landscape matters.

Mike Moore

Registered NZILA Landscape Architect

Appendix A: Planting specification

Toko Developments Ltd Subdivision. Road boundary planting strip

A 3m wide strip along the road and / or ROW frontage of Lots 1 – 12, Lots 14 – 15 and Lot 18 is to be established in locally appropriate indigenous species in accordance with the guidelines below. The entire frontage is to be planted except for the area required for access (maximum length – 6m).

The plantings are to be established at maximum spacing's of 1.5m (two rows minimum). The species to be planted are listed below and the planting composition for each lot should include approximately equal numbers of each species. The plantings are to be implemented and maintained to ensure successful establishment including protection from animal browse, weed control, irrigation and replacement of any plants that fail to thrive, as required.

- Austroderia richardii (Toetoe)
- Cordyline australis (Cabbage tree)
- Coprosma propinqua (Mingimingi)
- Fuchsia excorticata (Fuchsia)
- Griselinia littoralis (Broadleaf)
- Hebe salicifolia (Koromiko)
- Leptospermum scoparium (Manuka)
- Myoporum laetum (Ngaio)
- Myrsine australis (Mapou)
- Olearia fragrantissima
- Phormium tenax (Flax)

Appendix B: Planting specification

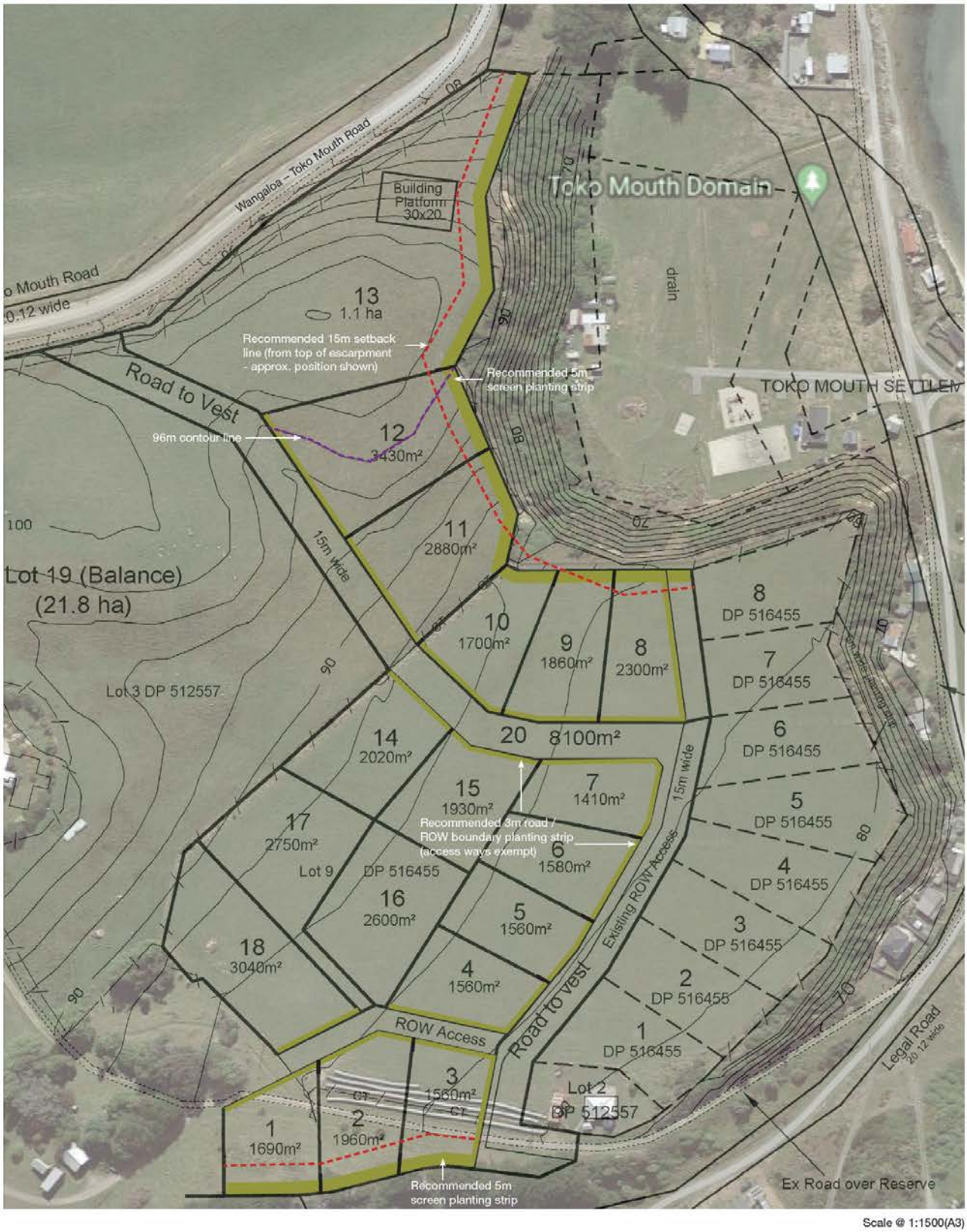
Toko Developments Ltd Subdivision. Escarpment boundary planting strip

A 5m wide strip along the escarpment boundaries of Lots 1 – 3 and Lots 8 - 13 is to be established in locally appropriate indigenous species in accordance with the guidelines below.

The plantings are to be established at maximum spacing's of 1.5m (two rows minimum). The species to be planted are listed below and the planting composition for each lot should include approximately equal numbers of each species. It is assumed that the specific layout of the planting will account appropriately for view shafts from the new houses. The plantings are to be implemented and maintained to ensure successful establishment, including protection from animal browse, weed control, irrigation and replacement of any plants that fail to thrive, as required.

- Austroderia richardii (Toetoe)
- Coprosma propinqua (Mingimingi)
- Cordyline australis (Cabbage tree)
- Hebe salicifolia (Koromiko)
- Leptospermum scoparium (Manuka)
- Phormium tenax (Flax)

Appendix 4b: Landscape Figures.



Scale @ 1:1500(A3)

Figure 1: Proposed Subdivision Plan, Toko Developments Ltd, Toko Mouth

Figure 2: Oblique aerial view of the site

Figure 3: View across the site looking south-eastward from proposed Lot 12.

Figure 4: View toward the site from the beach at the Tokomairaro River mouth

Figure 5: View toward the site from Toko Mouth settlement adjacent to the Riverview Road turnoff

Figure 6: View toward the site from the beach adjacent to Rocky Valley Creek

Figure 7: View toward the site from Toko Mouth Road, to the north of the settlement

Figure 8: View toward the site from Wangaloa – Toko Mouth Road, north-east of the entrance to Coombe Hay farm.

Appendix 5a: Analysis of Proposed Subdivision against Rule SUB.1(d).

Rule SUB.1(d) sets out several site criteria being:

i. the site has a minimum area of not less than 1,600m^2; and

ii. the site is capable of the adequate and safe disposal of effluent in terms of Rule RST.8; and

iii. the standards set out in Rule SUB.4are met.

The subdivision scheme plan provides for lots which exceed 1,600m^2 except Lots 3 – 7 which have proposed areas of 1,410m^2 to 1,580m^2.

Rule RST.8 states:

"*All sites shall be capable of the effective disposal of effluent safely within the site PROVIDED THAT for any site below 4,000m^2 Council shall require a certificate from Council's Environmental Health Officer or from a person professionally qualified in effluent disposal that effluent can be safely disposed of within the site*."

The applicant has engaged Mr Zaaid Shah of Wai360 an investigation of the site in relation to stormwater and wastewater and produced a report. Mr Zaaid concludes at page 18 of his report that: "*Based on the site investigation and assessment each lot is confirmed suitable for onsite wastewater management system*." Wastewater resulting from the proposed residential activity can be effectively and safely disposed of via secondary treatment to dispersal fields within each of the proposed lots with the particulars regarding treatment method and dispersal dealt with at the time of building consent for each lot.

An analysis of the proposed activity against the standards set out in Rule SUB.4 is provided in Appendix 3b. That analysis shows that the proposed subdivision complies with all relevant performance standards.

Rule SUB.1(d) also requires consideration of the proposed activity against matters set out in Rule SUB.1(f). This consideration is undertaken below in Table 1.

Table 1: Consideration of Assessment Matters set out in Rule SUB.1(f).

A. THE EFFECTS OF SUBDIVISION DESIGN	
1. THE ABILITY OF THE SUBDIVISIONS DESIGN TO: facilitate convenient, safe and easy access by both people and vehicles, to a public road; facilitate and provide for convenient and easy public access to the coast, any river, stream or lake, or any public reserve; facilitate the provision and operation of essential services; facilitate access to passive solar energy sources; relate to adjoining development; connect to appropriate network utility services particularly sewerage, water, stormwater, electricity and telephone reticulation; to facilitate any foreseeable subsequent resubdivision or redevelopment having regard to: (i) the provision of road access, (ii) the economic provision of network utility services securing an appropriate and coordinated ultimate pattern of development.	The proposed subdivision provides for legal and vehicle access from Toko Mouth Road. This new legal road will be vested in Council at the time of subdivision. The roading network is well capable of absorbing the additional traffic movements associated with the proposed activity. The site has no direct access to the coast nor the river. The orientation of the proposed lots provides for good solar access and the provision of what will become public road links the proposed subdivision with a previous stage. Wastewater will be disposed of on-site via a minimum of secondary treatment system with dispersal to field. Potatable water will be supplied via collection of stormwater for storage in tanks of an appropriate size. A separate static reserve will be maintained for firefighting purposes. Excess stromwater from roof surfaces will be directed to sumps. Stormwater from hard surfaces will be directed to swales. Electricity services will be provided to the boundary of lots, wireless telecommunications via Unifone. Proposed subdivision **complies** with this assessment matter.
2. THE SUBDIVISION'S EFFECT ON NATURAL AND SIGNIFICANT FEATURES INCLUDING: registered historic places archaeological sites and waahi tapu; significant trees and significant stands of indigenous vegetation; the habitats of indigenous fauna and valued non-indigenous fauna; waterways, lakes, wetlands and their margins;	The site is not a registered historic place, archaeological site or waahi tapu site. There are no significant trees or stands of indigenous vegetation on the site. Nor is the site within an outstanding natural landscape or contain any outstanding natural features. The applicant has requested limited notfication of the proposal to various

ridgelines and hills contributing to the character of the rural and urban areas; areas of outstanding landscape character; outstanding natural features; the efficient functioning of natural drainage systems.	parties including Department of Conservation and tangata whenua. The site currently consists of open pasture used for pastoral grazing purposes which contributes to the rural amenity values of the locale. The proposed subdvision and resulting residential activity will change the current amenity and character of the site to; however, the proposed mitigation measures will ensure that the resultant amenity and character, although more built up than current, is positive. To the extent that this assessment matter applies to the site, the proposed subdivision **complies**.
B. THE EFFECTS OF NATURAL HAZARDS	
1. The effects of natural hazard on the site, and the subdivisions potential in causing natural hazard events to adjoining land. 2. The extent of earthworks necessary.	The site sits on the coastal terrace behind the Toko Mouth settlement. This coastal terrace is essentially flat to gently sloping. The geotech report for the previous subdivision granted in April 2017 concluded that there was "*...no evidence of mass movement on the terraces...no risk of instability from slope failure on top of the terrace*." Given the topography it is anticipated that the need for earthworks will be relatively minimal. Proposed subdivision **complies** with this assessment matter.
C. NATURAL VALUES	
The effects the subdivision may have on the following areas; (i) the margins of wetlands, lakes and rivers or any area that may impact on wetlands, lakes and rivers, (ii) areas considered to be outstanding natural features and/or landscapes (see Table 13.3A and B) (iii) areas of significant indigenous vegetation and significant habitats of indigenous fauna. (iv) areas of high visual amenity	The site is located on an old marine terrace above the existing Toko Mouth Settlement including domain. The site is not annotated as an outstanding natural feature or landscape and there are no areas of indigenous vegetation currently existing on the site. The landscape report states at page 6: "*Although the Coastal Resource Area in the CDP extends inland as far as Wangaloa – Toko Mouth Road, it is my assessment that in terms of the guidance provided in Policy 1 of the New Zealand Coastal Policy Statement 2010 and as identified in Moore et al (2015)[12], the top of the coastal escarpment provides appropriate definition of the inland extent of the coastal environment. The Toko Mouth settlement, being seaward of the escarpment, is within the coastal environment, but the site itself is on the boundary or just beyond. Given the CDP zoning, the location on or directly adjacent to the boundary, I consider that it the effects of the development on the natural character of the coastal environment are an important and relevant matter for assessment*." Mr Moore goes on to state at page 7: "*Overall, it is my assessment that the effects of the proposed development on natural character will be adverse / low. Whilst the township scale will expand, the existing natural character is already significantly modified by the existing township and the agricultural land use, and the proposed development controls will ensure the impact of additional*

12 Moore et al (2015) Coastal Environment of Otago, Natural Character and Outstanding Natural Features and Landscapes Assessment, Clutha District Section Report.

	built form is modest, especially when the proposed plantings mature. There will be no significant changes to any natural processes." Mr Moore assesses the landscape affects including visual amenity and concludes: "*Overall, it is my assessment that effects on the character and values of the Toko Mouth landscape will be adverse / low*." Proposed activity **complies** with this assessment matter.
D. PROVISION OF NETWORK UTILITY SERVICES	
1. GENERAL Council shall exercise its discretion in respect of the provision and construction standards of network utility services, including roads to and within any subdivision. 2. STORMWATER & EFFLUENT DISPOSAL Note: For subdivision in unreticulated areas, see Rule SUB.4.C(4). 3. WATER SUPPLY... 4. ROADING (a) Where any subdivision results in additional allotments and provision for new roads and/or accessways, or the upgrading of existing roads, is required, then except as provided in the following subclauses, all such roads and facilities shall be constructed by the subdivider and vested in Council or the NZ Transport Agency as appropriate. (b) Where a subdivision of land within any part of the District results in additional allotments and the subdivision fronts an existing road then: • where the road is unformed or is only a road reserve, or is existing but is not of adequate standard then the road shall be constructed as part of the subdivision by the subdivider; • where road widening or a segregation strip is required as a consequence of the subdivision then such land shall vest as part of the subdivision. 5. TELECOMMUNICATIONS & ELECTRICITY Telecommunications, electricity reticulation and street lighting shall be provided at the time of land subdivision and shall be in accordance with the requirements of the relevant supply authority and with the NZS 4404 1981 Urban Land Subdivision unless Council determines otherwise in any particular case. Electricity and Telecommunication reticulation shall generally be installed in a manner which minimises potential hazards, and shall be provided underground and within road berms. 6. ENGINEERING ASPECTS Where any subdivision or development involves any engineering aspect, certified design plans from a suitably qualified person shall be submitted with any application.	D1, D4 & D6. The legal road will be designed and constructed to an appropriate standard in order to allow vesting of the road in Council. D2. The proposed subdivision complies with rule SUB.4.C(4). D3. Not applicable as no reticulated system. D5. Electricity services will be provided to the boundaries of the allotments within the legal road reserve. Telecommunication services will be provided wirelessly via Unifone. No streetlighting is required with respect to the proposed activity as the subdivision and resultant residential activity is not within an urban zone. Proposed activity **complies** with this assessment matter.
E FINANCIAL & RESERVE REQUIREMENTS	
Council shall, where considered appropriate, impose	Rule FIN.1 sets out the circumstances when a financial or

conditions requiring financial and reserve contributions in accordance with the provisions of Section 3.8 Financial and Reserve Requirements.	reserve contribution can be imposed by Council. The specified circumstances are: where the proposed activity may have an adverse effect on: (a) the recreational resources and facilities of the District, or (b) public network utilities, including sewerage, stormwater, water and roading systems, or (c) ecosystems, habitats, landscapes, landforms, or significant natural features including the natural character of rivers, lakes, the coast, and their margins, or (d) amenity values, including visual amenity, or (e) any other public services or facilities, including parking facilities, community centres, libraries etc., or (f) where the adverse effects of the activity impose on Council or the community costs which are not covered by the points above, and where any adverse effects described above have not been adequately avoided, remedied, mitigated or compensated by way of other means. There are no public reticulated services within Toko Mouth Settlement. There is an existing reserve of approximately 1.8 hectares[13] within Toko Mouth Settlement which contains a tennis court, community hall and public toilets. The domain is of sufficient size to meet the needs of existing residents and future residents within the proposed subdivision site. The additional rate take resulting from the proposed activity will help pay for maintenance of the Toko Mouth Domain and facilities therein. The only extension to pubic infrastructure will be roading which will be paid for by the developer. The proposed activity provides for a secondary access out of the lower part of Toko Mouth Settlement which is important during times of emergency. The proposed activity includes the planting of indigenous vegetation. The proposed actvitiy includes mitigation measures which mean the landscape architect engaged by the applicant has determined that the effects are adverse low. There is no requirement for any other public services or facilities at Toko Mouth Settlement and there are no other costs which will be imposed on either Council or the community. None of these circumstances are triggered by the proposed activity and, therefore, Council cannot justify the imposition of a financial or reserve requirement in this case. **Not applicable.**
F PUBLIC INTEREST	
The effect the subdivision has on the general public particularly in respect of: • expenditure of ratepayers money, either as part of supplying services to the subdivision or as on-going	There will be no cost to the ratepayer with respect to supplying of services to the subdivision as the developer will pay for the construction of the road prior to vesting in Council and will also pay for installation of electricity

13 This refers to the 'mown' area in the vicinity of the tennis court used for camping. The actual area of the reserve land in Toko Mouth is greater.

maintenance of services supplied to the subdivision that has no benefit to the general ratepayer of the District • any restriction of public access rights to and/or along the coast, lakes and rivers, and otherrecreational, historical, or culturally important sites or resources.	reticulated service. Telecommunication services within Toko Mouth are provided wirelessly via the provider Unifone. Maintenance of the legal road once vested in Council will be paid for from the rates take from the new dwellings resulting from the proposed subdivision. The site does not currently provide access to the coast. The proposed subdivision will result in a legal road from Wangaloa – Toko Mouth Road to the existing Toko Mouth Settlement. The proposed activity **complies** with this assessment matter.
G. ELECTRICITY TRANSMISSION LINE CORRIDOR	
...	**Not applicable** to present application.

Appendix 5b: Analysis of Proposed Subdivision against Rule SUB.4 Subdivision Performance Standards.

Rule SUB.4 states that all subdivisions, excluding minor boundary adjustments and amendments to flats plans, shall be designed to comply with the performance standards contained in the rule. An analysis of the proposed activity in relation to those performance standards is contained in Table 2 below.

Table 2: Analysis of the Proposed Activity in Relation to the Performance Standards Contained in Rule SUB.4.

A. LAND SUITABILITY STANDARD	
1. Unless not relevant to its likely development or use, the land to be subdivided must provide a sufficient area of land capable of accommodating any foreseeable building and associated development which: • is above the 50 year flood level (2% probability flood level) or any flood level identified on the District Planning Maps. • Complies with Rule NHZ.3 • does not contain uncontrolled fill, peat soils or other unconsolidated material • is not closer than 20m to: - any stream or river of 3 metres in width or greater, any wetland or lake identified in Table 13.5, any other wetland or lake 2 hectares or greater in area, any waterbody within those water supply catchments identified on the Planning Maps. - any waterbody identified in Schedule 6.6 • in any Urban, Transitional or Rural Settlement Resource Area or within 50 metres of the bank of any such defined water body in any Rural or Coastal Resource Area. • does not involve significant earthworks or where earthworks cannot be avoided, the characteristics of the site allows for the mitigation of any effects associated with those earthworks. 2. Where the subdivision involves the creation of allotments for separate parts of a building, or involves a building adjoining an allotment boundary, the structural integrity and fire safety of that building shall comply with the Building Act 1991. 3. Drainage Systems Where significant drainage systems are located within the land to be subdivided, or the site is located within the area provided for by the "Milton 2060 strategy: A Flood Risk Management Strategy for Milton and the Tokomairiro Plain"), a structure plan shall be prepared that sets out...	The allotments contain sufficient land for building location to comply with A.1. A.2 is not relevant to this application. A.3 is not relevant to this application – the subdivision design takes into account existing drainage systems on the site. Proposed subdivision **complies** with this performance standard.

B. MINIMUM FRONTAGE AND PROVISION OF VEHICULAR ACCESS	
1. The minimum frontage for any allotment of any subdivision shall be 3.5 metres (except as provided by Section 321 of the Local Government Act 1974). This dimension may be encumbered or subject to right of way or registrable interest. PROVIDED THAT for multiple access, physical access shall be provided for as shown in (5) below. 2. Where any subdivision involves the division of any land and buildings into separate allotments for the individual occupancies to be held under freehold title, cross lease, company lease or unit titles then the size, shape and arrangement of such allotments shall make provision for access thereto in a manner that... 3. All weather vehicular access shall be provided to any subdivision of land or to each allotment of any subdivision either directly from a street or over an individual or shared access to a standard adequate to:... 4. The location and design of all points of access from a legal road within the District shall comply with the requirements set out under Section 3.3.5 Rule TRAN.4. 5. The width of such access shall be as follows...	B1: Allotments 3 – 15 have frontage to the road to be vested in Council in excess of 3.5m. Allotments 1, 2 and 16 - 18 have frontage to a right of way which provides access from the road to vest in Council. These frontages meet or exceed the 3.5m required by this performance standard. B2 – 5: The accesses meet the relevant requirements, will have an all-weather surface and will comply with applicable performance standards contained in Rule TRAN.4. Proposed subdivision **complies** with this performance standard.
C. DESIGN FACTORS	
1. The subdivision shall be planned, designed, constructed and maintained so as to:... 2. Where a site is intended to accommodate a building the site shall contain an adequate buildable area free of impediments such as drainage lines and the yard and open space requirements of the relevant Resource Area (see Section 4). If the allotment is located within the "National Grid Subdivision Corridor", all allotments shall identify an indicative building platform outside of the National Grid Yard for all buildings (including dwellings) that may be facilitated by the subdivision. 3. [not applicable]. Continued overleaf...	C1: The subdivision has been designed so that: • the coast is protected as are public drains; • water tables associated with the road to vest in Council and the right of way will provide a system by which water within the subdivision will be removed without causing damage or harm, including by flooding, to the natural environment, or to property or persons within the development or subdivision or in other areas. Stormwater management within each individual lot can also be assessed at the time of building consent; and • each lot is of sufficient size and topography for the dispersal of treated wastewater to field. It is anticipated that standard industry practice with respect to control of sedimentation will be used during earthwork construction both of the subdivision and within individual lots at the time of dwelling construction. C2: Each allotment contains a suitable building site.

4. Where the allotment is in a non-serviced area the minimum area shall be determined in each case by the method adopted to: • dispose of stormwater and sewage effluent in a manner that avoids contamination of water resources including any cumulative adverse effects on ground water. PROVIDED THAT with respect to the disposal of sewage effluent • any site created less than 4000m² or where the activity on the site will generate quantities of effluent in excess of three household units or the equivalent thereof regardless of area it shall be certified by Council's Environmental Health Officer or by a person suitably qualified in effluent disposal that the site meets this criteria. • avoid, remedy or mitigate any disturbance to any river, lake and wetland ecosystems. • avoid, remedy or mitigate any disturbance to any area of indigenous vegetation.	C4. All of the sites have been determined to be suitable for treated effluent dispersal – see report by Mr Zaaid Shah, Wai360. Proposed subdivision **complies** with this performance standard.

Appendix 6: Consideration of Policy Framework.

Table 3: Analysis of Proposed Activity in relation to Relevant Policy Framework.

Clutha District Plan:	
Objective / Policy	**Consideration**
Objective COA.1 To preserve the natural character of the coastal environment and protect it from inappropriate subdivision, use and development. Policy COA.1 To ensure the subdivision, use and development of the coast and in particular, buildings and structures avoids, remedies, or mitigates any adverse effects on: • natural character values • outstanding natural features and landscapes • amenity values of the coast • the safety of the public • the enjoyment of the coast by the public. Policy COA.2 To manage the subdivision, use and development of the Coastal Resource Area to ensure adverse effects are avoided as far as practicable and that where complete avoidance is not practicable, that adverse effects are mitigated or provision is made for remedying those effects. Policy COA.10 To control the erection of buildings in the coastal area to ensure adverse effects on natural character are avoided, remedied or mitigated. Policy COA.11 To preserve the areas of the Coastal Resource Area where natural character is largely uncompromised through restricting, to the extent practicable, subdivision, use and development to areas where natural character is already compromised.	In his report, Mr Moore states at page 6: "*Although the Coastal Resource Area in the CDP extends inland as far as Wangaloa – Toko Mouth Road, it is my assessment that in terms of the guidance provided in Policy 1 of the New Zealand Coastal Policy Statement 2010 and as identified in Moore et al (2015)[14], the top of the coastal escarpment provides appropriate definition of the inland extent of the coastal environment. The Toko Mouth settlement, being seaward of the escarpment, is within the coastal environment, but the site itself is on the boundary or just beyond. Given the CDP zoning, the location on or directly adjacent to the boundary, I consider that it the effects of the development on the natural character of the coastal environment are an important and relevant matter for assessment*." Mr Moore concludes at page 7 that: "*Overall, it is my assessment that the effects of the proposed development on natural character will be adverse / low. Whilst the township scale will expand, the existing natural character is already significantly modified by the existing township and the agricultural land use, and the proposed development controls will ensure the impact of additional built form is modest, especially when the proposed plantings mature. There will be no significant changes to any natural processes*." Proposed activity is **consistent** with this objective and these policies.

14 Moore et al (2015) Coastal Environment of Otago, Natural Character and Outstanding Natural Features and Landscapes Assessment, Clutha District Section Report.

Objective COA.2 To recognise the importance of coastal resources to Maori. Policy COA.5 To consult and work with • the Department of Conservation • the Otago Regional Council • manawhenua • affected landowners in resource management issues of the Coastal Resource Area.	The applicant has requested limited notification to these parties occurs. Proposed activity is **consistent** with this objective and policy.
Objective COA.3 To avoid or mitigate the adverse effects that natural hazards and in particular sea level rise may have on the natural and physical resources of the District. Policy COA.4 To ensure that the subdivision, use and development of the Coastal Resource Area avoids, as far as practicable, the adverse effects of sea level rise by adopting the best available international estimate of sea level rise.	The area in which the proposed residential activity is to be located, is on an old marine terrace located approximately 5m above sea level at its lowest extent which is well above expected sea level rise in this area. Proposed activity is **consistent** with this objective and policy.
Partially Operative Otago Regional Policy Statement 2019	
Policy	**Consideration**
Policy 3.1.5 Coastal Water Manage coastal water to: a) Maintain coastal water quality or enhance it where it has been degraded; b) Maintain healthy coastal ecosystems, the range of indigenous habitats provided by the coastal marine area, and the migratory patterns of indigenous coastal water species or enhance these values where they have been degraded; c) Maintain or enhance important recreation values; d) Maintain or enhance, as far as practicable: i. Coastal values; and ii. The habitats provided by the coastal marine area for trout and salmon	Waste water will be dealt with via onsite treatment to at least a secondary standard with dispersal to field. The particular details of each secondary treatment system and dispersal field will be dealt with at the time of application for building consent. Proposed activity is **consistent** with this policy.

unless detrimental to indigenous biological diversity. e) Control the adverse effects of pest species, prevent their introduction and reduce their spread.	
Policy 3.1.10 Biodiversity in the Coastal Environment Avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on: a) Areas of predominantly indigenous vegetation in the coastal environment; b) Habitats in the coastal environment that are important during the vulnerable life stages of indigenous species; c) Indigenous ecosystems and habitats that are only found in the coastal environment and are particularly vulnerable to modification, including estuaries, lagoons, coastal wetlands, dunelands, intertidal zones, rocky reef systems, eelgrass and saltmarsh; d) Habitats of indigenous species in the coastal environment that are important for recreational, commercial, traditional or cultural purposes; e) Habitats, including areas and routes, important to migratory species; and f) Ecological corridors, and areas important for linking or maintaining biological values identified under this policy.	The proposed activity includes the planting of indigenous vegetation in an area that is currently pasture. Proposed activity is **consistent** with this policy.
Policy 3.1.12 Natural Character in the Coastal Environment Recognise the values of natural character in the coastal environment are derived from one or more of the following attributes: a) Natural elements, processes and patterns; b) Biophysical, ecological, geological and geomorphological aspects; c) Natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, estuaries, reefs, freshwater springs and surf breaks; d) The natural movement of water and sediment; e) The natural darkness of the night sky; f) Places or areas that are wild or scenic;	In his report, Mr Moore, registered landscape architect, states at page 7: "*Overall, it is my assessment that the effects of the proposed development on natural character will be adverse / low. Whilst the township scale will expand, the existing natural character is already significantly modified by the existing township and the agricultural land use, and the proposed development controls will ensure the impact of additional built form is modest, especially when the proposed plantings mature. There will be no significant changes to any natural processes*." Proposed activity is **consistent** with this policy.

g) A range of natural character from pristine to modified; h) Experiential attributes, including the sounds and smell of the sea; and their context or setting.	
Policy 4.2.1 Sea Level Rise Ensure Otago's people and communities are able to adapt to, or mitigate the effects of sea level rise, over no less than 100 years, by using: a) A sea level rise of at least 1 metre by 2115, relative to 1990 mean sea level (Otago Metric Datum); and b) Adding an additional 10mm per year beyond 2115, or the most up-to-date national or regional guidance on likely sea level rise.	The proposed residential activity is to be located on an old marine terrace located at its lowest point approximately 5m above sea level. Proposed activity is **consistent** with this policy.
Policy 4.5.1 Providing for Urban Growth & Development Provide for urban growth and development in a strategic and co-ordinated way, including by... f) Having particular regard to: i. Providing for rural production activities by minimising adverse effects on significant soils and activities which sustain food production; ii. Minimising competing demands for natural resources; iii. Maintaining high and outstanding natural character in the coastal environment; outstanding natural features, landscapes, and seascapes; and areas of significant indigenous vegetation and significant habitats of indigenous fauna; iv. Maintaining important cultural or historic heritage values; v. Avoiding land with significant risk from natural hazards... j) Consolidating existing coastal settlements and coastal urban areas where this will contribute to avoiding or mitigating sprawling or sporadic patterns of settlement and urban growth.	The proposed activity provides for the consolidation of the existing coastal settlement of Toko Mouth in an area that is well out of reach of anticipated sea level rise. Whilst used for pastural grazing purposes the site contains LUC class 4 land and is, therefore, does not meet the criteria for highly productive land contained in the NPS-HPL. The applicant concurs that the site of the proposed activity does not contain significant soils being predominantly silt loam over clay. Given the amount of land available for rural production purposes in the Clutha District, the cumulative impact of the loss of this site to residential activity will be insignificant. The site does not contain any outstanding natural features. Mr Moore states at page 15 of his report that: "*The site is at the edge of the coastal environment and the development will have no impact on dynamic coastal or estuarine processes and associated values. It will have some localized effects on the natural landforms related to earthworks for the proposed road and for development on Lots 12 and 13 in particular, which are located on low hill forms behind the flat terrace top. It will extend the township footprint, changing the terrace top area from rural to township character but in so doing, indigenous biodiversity will be enhanced. Naturalness values will be reduced by the greater extent of the township, but this is not unduly significant given that the current rural land use already modifies naturalness values considerably*." The site does not have any associated natural hazard risks.

	Proposed activity is **consistent** with this policy.
New Zealand Coastal Policy Statement 2010	
Policy	**Consideration**
Policy 6 Activities in the Coastal Environment... 1.b. consider the rate at which built development and the associated public infrastructure should be enabled to provide for the reasonably foreseeable needs of population growth without compromising the other values of the coastal environment; 1.c. encourage the consolidation of existing coastal settlements and urban areas where this will contribute to the avoidance or mitigation of sprawling or sporadic patterns of settlement and urban growth;... 1.i. set back development from the coastal marine area and other water bodies, where practicable and reasonable, to protect the natural character, open space, public access and amenity values of the coastal environment;...	The proposed activity provides for the consolidation of the coastal settlement of Toko Mouth on an old marine terrace well above the anticipated threat level from sea level rise. Mr Moore notes in his report that the site sits just beyond the inland extent of the coastal environment which is located at the top of the coastal escarpment. Mr Moore states at page 15: "*The site is at the edge of the coastal environment and the development will have no impact on dynamic coastal or estuarine processes and associated values. It will have some localized effects on the natural landforms related to earthworks for the proposed road and for development on Lots 12 and 13 in particular, which are located on low hill forms behind the flat terrace top. It will extend the township footprint, changing the terrace top area from rural to township character but in so doing, indigenous biodiversity will be enhanced. Naturalness values will be reduced by the greater extent of the township, but this is not unduly significant given that the current rural land use already modifies naturalness values considerably.* *The new development will necessarily have a lower density than much of the existing township (due to septic disposal requirements) and it is to be expected that the new dwellings proposed, built to modern standards, will have a different scale and character to many of the existing crib style dwellings in the settlement currently. This is a function of the natural development of settlements generally, with various development stages being having distinctive character. The proposed mitigation measures however, will ensure that the new development integrates acceptably and does not have undue dominance, to the point that the character of the settlement generally is significantly altered.* *Overall, it is my assessment that effects on the character and values of the Toko Mouth landscape will be adverse / low*." Proposed activity is **consistent** with this policy.

Policy 13 Preservation of Natural Character To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development: a. avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and b. avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment; including by: c. assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character... Recognise that natural character is not the same as natural features and landscapes or amenity values...	Mr Moore states in his report at page 6 that: *"Although the Coastal Resource Area in the CDP extends inland as far as Wangaloa – Toko Mouth Road, it is my assessment that in terms of the guidance provided in Policy 1 of the New Zealand Coastal Policy Statement 2010 and as identified in Moore et al (2015)[15], the top of the coastal escarpment provides appropriate definition of the inland extent of the coastal environment. The Toko Mouth settlement, being seaward of the escarpment, is within the coastal environment, but the site itself is on the boundary or just beyond. Given the CDP zoning, the location on or directly adjacent to the boundary, I consider that it the effects of the development on the natural character of the coastal environment are an important and relevant matter for assessment*." Mr Moore concludes at page 7 that: "*Overall, it is my assessment that the effects of the proposed development on natural character will be adverse / low. Whilst the township scale will expand, the existing natural character is already significantly modified by the existing township and the agricultural land use, and the proposed development controls will ensure the impact of additional built form is modest, especially when the proposed plantings mature. There will be no significant changes to any natural processes*." Proposed activity is **consistent** with this policy.

15 Moore et al (2015) Coastal Environment of Otago, Natural Character and Outstanding Natural Features and Landscapes Assessment, Clutha District Section Report.

Appendix 7: Analysis of Requirements of Rule 12.A.1.4 Otago Regional Water Plan.

Table 4: Analysis of Proposed Activity in Relation to Rule 12.A.1.4 Otago Regional Water Plan.

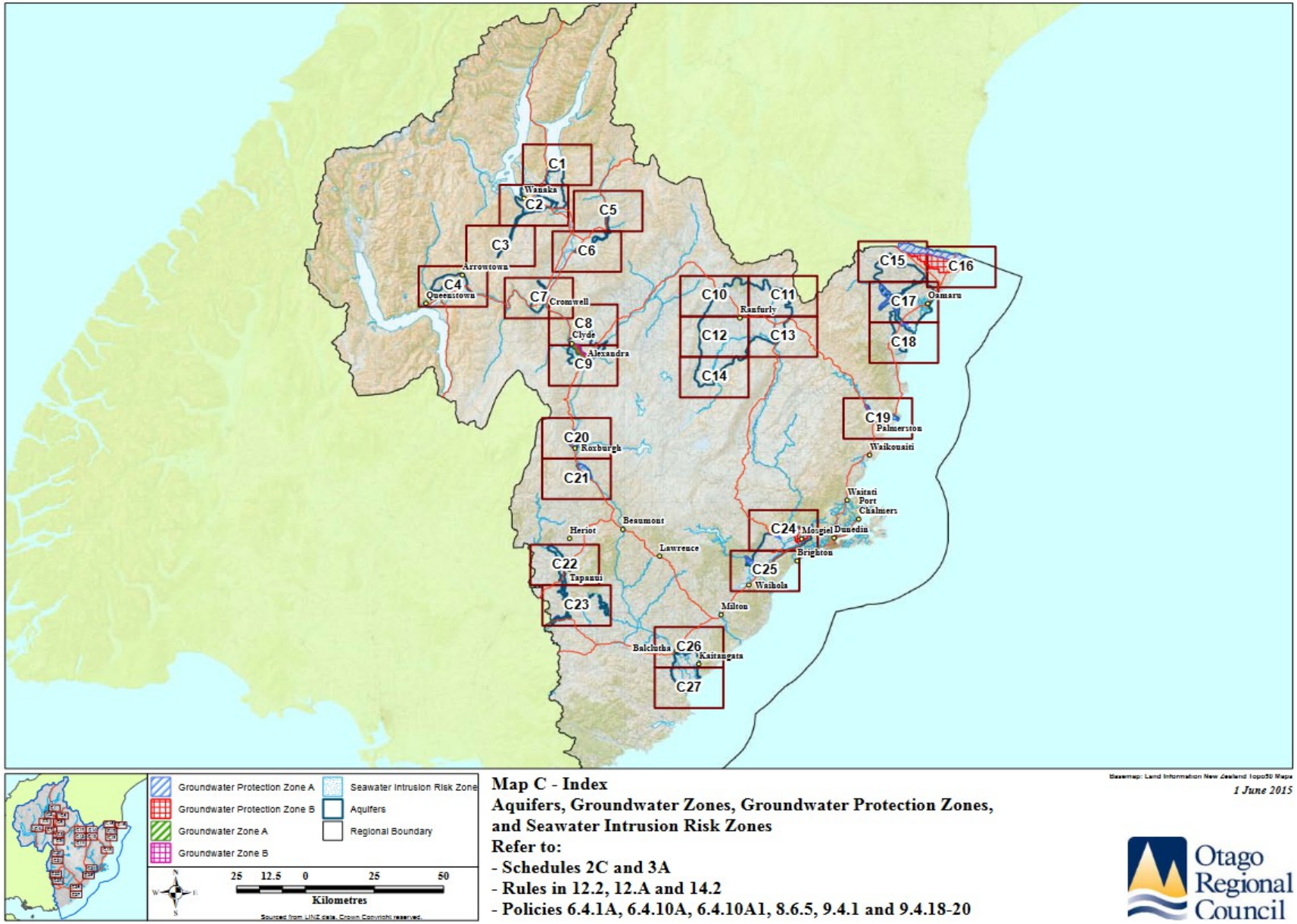
Rule 12.A.1.4	Analysis of Proposed Activity
12.A.1.4(a): The discharge does not exceed 2000 litres per day (calculated as a weekly average).	The discharge from each individual wastewater system will be within this limit. Proposed activity **complies** with this performance standard.
12.A.1.4(b): The discharge does not occur within the A zone of any Groundwater Protection Zone, as identified on the C-series maps...	The discharge from each individual wastewater system will not occur within the A zone of any Groundwater Protection Zone as the site is not located within such a zone[16]. Proposed activity **complies** with this performance standard.
12.A.1.4(c): The system's disposal field is sited more than 50 metres from any surface water body or mean high water springs.	'Surface water body' is not defined in the plan; however, 'water body' has the same meaning as that in the RMA being: *"...fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area*." The plan also uses the same definition for 'river' as the RMA being *"...a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal)*." The drains within the site fall within the exclusion applying to 'farm drainage canal'. None of the proposed allotments are within 50m of any surface water body or mean high water springs. Proposed activity **complies** with this performance standard.
12.A.1.4(d): The system's disposal field is sited more than 50 metres from any bore which: i. Existed before the commencement of the discharge activity; and ii. Is used to supply water for domestic needs or drinking water for livestock.	There are no bores shown on the Otago Regional Council Mapping Resource within 50m of the site[17]. The applicant informs that it is unaware of any other bores not shown on the Otago Regional Council Mapping Resource. Proposed activity **complies** with this performance standard.
12.A.1.4(e): There is no direct discharge of human sewage, or effluent derived from it, to water in any drain or water race, or to groundwater.	The intention is that each individual wastewater disposal field will be designed and located in such a way that compliance with this performance standard is achieved. This can also be checked at the time of application for building consent when the specific details of the disposal field including location are known. Proposed activity **complies** with this performance standard.
12.A.1.4(f): Effluent from the system does not run off to any other person's property.	The intention is that each individual wastewater disposal field will be designed and located in such a way that compliance with this performance standard is achieved. This can also be checked at the time of application for

16 See Appendix 7a overleaf for copy of the areas covered by the c series maps in the Otago Region.

17 See Appendix 7b overleaf for copy of the map in relation to the site.

	building consent when the specific details of the disposal field including location are known. Proposed activity **complies** with this performance standard.
12.A1.4(g): The discharge does not cause flooding of any other person's property, erosion, land instability, sedimentation or property damage.	The intention is that each individual wastewater disposal field will be designed and located in such a way that compliance with this performance standard is achieved. This can also be checked at the time of application for building consent when the specific details of the disposal field including location are known. Proposed activity **complies** with this performance standard.

Appendix 7a: Otago Regional Council – Areas Covered by C-Series Maps.

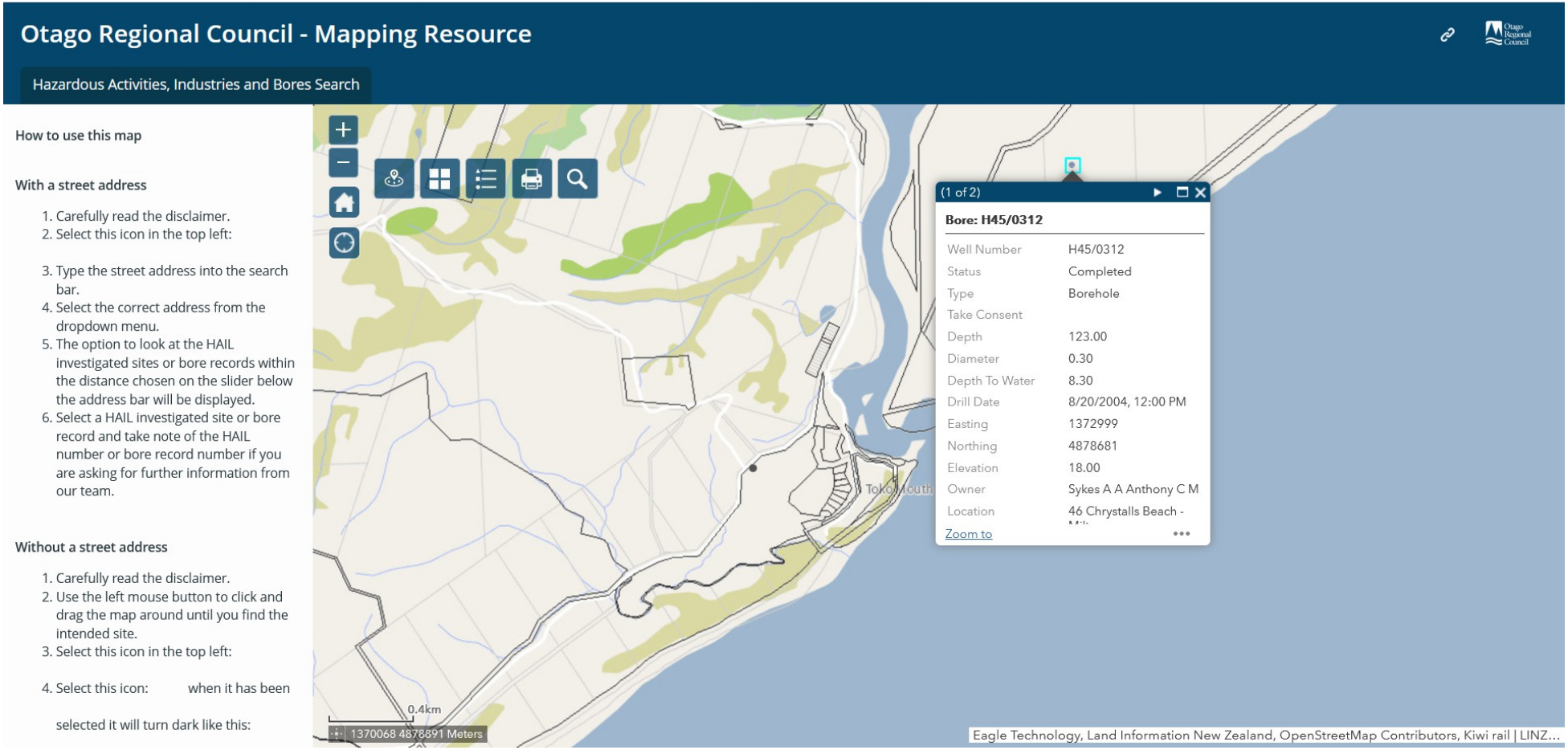


Map C - Index
Aquifers, Groundwater Zones, Groundwater Protection Zones, and Seawater Intrusion Risk Zones
Refer to:
- Schedules 2C and 3A
- Rules in 12.2, 12.A and 14.2
- Policies 6.4.1A, 6.4.10A, 6.4.10A1, 8.6.5, 9.4.1 and 9.4.18-20

Basemap: Land Information New Zealand Topo50 Maps
1 June 2015

Otago Regional Council

Appendix 7b: Bores in Vicinity of Site.



Appendix 8: Site Remedial Action Plan.

EC Otago

Environmental Consultants Otago Ltd

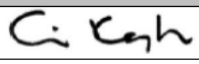
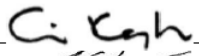
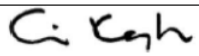
Site Remedial Action Plan

Coombe Hay Lane
Toko Mouth

for
Toko Developments Ltd

March 2022

Environmental Consultants Otago Ltd
Environmental and Contaminated Site Assessment ▪ Planning and Urban Design ▪ Landscape Architecture
PO Box 5522 Dunedin 9058 ▪ 64 3 4728875

Task	Responsibility	Signature
Project Manager:	Ciaran Keogh, MBA	
Prepared By:	Ciaran Keogh, MBA	
Reviewed By:	Bernice Chapman, CEnvP, PhD, MEIANZ	
Approved For Issue By:	Ciaran Keogh, MBA	

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Client:	Toko Developments Ltd
Job Reference:	320-21 CoombeHay
Date:	28 March 2022
Version:	0

Table of Contents

Abbreviations

CCME	Canadian Council of Ministers of the Environment
CSMP	Contaminated Soil Management Plan
CDC	Clutha District Council
DSI	Detailed Site Investigation
HAIL	Hazardous Activities and Industries List
HDPE	High Density Polyethylene
MMP	Ongoing Monitoring and Management Plan
NES	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
ORC	Otago Regional Council
RAP	Site Remedial Action Plan
SCS	Soil Contaminant Standards
SGV	Soil Guideline Values
SVR	Site Validation Report
UCL	95% Upper Confidence Limit
XRF	X-ray Fluorescence Analyser

Executive Summary

The 27ha property at Coombe Hay Lane, Toko Mouth, which is owned by Tokofarms Limited, is currently used for sheep and cattle farming. Part of the property is proposed to be subdivided into 18 residential lots with the remainder of the property, including the existing dwelling, outbuildings and approximately 21.8 ha of farmland, forming Lot 19 and remaining in use as farm/production land.

The property history has been documented in a Detailed Site Investigation Report (DSI), which investigated the 18 proposed residential lots. The investigation confirmed that Hazardous Activities and Industries List (HAIL) activities have historically been undertaken on part of the property that formerly contained a shed, stockyards, sheep dip and the adjacent land, resulting in soil contamination which overlaps onto the proposed residential subdivision. Arsenic concentrations exceeding the *Residential* Soil Contaminant Standard (SCS) were found within the footprint of the former shed, stockyards and sheep dip, which were contained within the proposed Lot 1 of the subdivision. The contamination extends into the adjacent land that forms part of proposed Lot 19. The arsenic concentration in some locations also exceeds the *Commercial/ industrial outdoor worker (unpaved)* SCS of 70 mg/kg. As a result, the provisions of the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES) apply to these affected parts of the property, which are defined as the site for the purposes of this report. High levels of arsenic were also found within a rubbish burn pile within the site.

The concentrations of soil contaminants of concern are at or below background levels in the remainder of the development area (Lots 2 – 18). Consequently, proposed Lots 2 – 18 do not constitute a HAIL site and the NES does not apply to this part of the property.

The subdivision constitutes a change of use of the land for proposed Lots 1 – 18. The presence of contaminants in soil at concentrations above the *Residential* SCS within Lot 1 and adjacent land in Lot 19 indicates a potential risk to human health from the proposed development of this part of the site, and remediation is required.

This Remedial Action Plan has been prepared to outline the remediation strategy for the site, in conjunction with the Contaminated Soil Management Plan, to ensure the impacts on human and environmental health are minimised during remedial activities.

The preferred remediation methodology being proposed for Lot 1 is removal of all the contaminated soil with disposal to a purpose designed Encapsulation Cell within Lot 19. However, if removal of deeper contamination is not feasible a proportion of Lot 1 will be capped to prevent direct exposure to contaminated soils.

The Encapsulation Cell will be located within the identified HAIL site but external to the land proposed to be developed for residential use.

All works will be undertaken in accordance with the site-specific Contaminated Soil Management Plan.

At the completion of the works, a Site Validation Report will be prepared to confirm compliance with the Remedial Action Plan and Contaminated Soil Management Plan, the volume of soil relocated and disposal location, incidences and/or complaints that occurred during the earthworks, and report on the validation testing (if applicable).

1 Introduction

Environmental Consultants Otago Limited (EC Otago) have been commissioned by Toko Developments Limited to prepare a Site Remedial Action Plan (RAP) and Contaminated Soil Management Plan (CSMP) for the remediation of the contaminated areas of the Coombe Hay Lane subdivision at Toko Mouth. This RAP was prepared in accordance with the Ministry for the Environment's *Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand*, and the proposal submitted to Toko Developments Limited by EC Otago dated 21 February 2022 and subsequent discussions. A statement of EC Otago's experience is attached as Appendix A.

1.1 Background and Objectives

The Coombe Hay Lane subdivision is proposed to consist of 18 new residential lots and a 21.8 ha rural lot which will include the existing dwelling, outbuildings (Lot 19) and remain in use as farm/ production land.

EC Otago has previously undertaken a Detailed Site Investigation (DSI)[1] on the proposed 18 residential lots, which confirmed activities listed on the Hazardous Activities and Industries List (HAIL) had been undertaken on parts of the property and therefore the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES) apply to those parts when soil disturbance and change of use take place at the property. The DSI included soil sampling, which identified exceedances of the *Residential* and *Commercial / industrial outdoor worker (unpaved)* Soil Contaminant Standard (SCS) for arsenic in the area around the site of the former shed, sheep dip and stockyards. The affected area covers proposed Lot 1 and the immediately adjacent land within proposed Lot 19 and are defined as the site for the purposes of this report.

This RAP and associated CSMP focus only on the part of the property which overlies the contaminated soils (i.e. the site), and identifies the measures required during the earthworks to minimise risks to human health and the environment. The RAP provides recommendations for the forthcoming Site Validation Report (SVR).

The RAP and CSMP provide the minimum standards and best practice options for the management, removal and disposal of contaminated soil during remediation and construction activities.

1.2 Scope of Work

Consistent with the Ministry for the Environment guidelines, the following scope of work was undertaken:

- Set remediation or management goals that ensure the site will be suitable for its current or proposed land use and will pose no unacceptable risk to human health or the environment, either on-site or off-site.
- Identify appropriate control measures and plans to minimise potential human and environmental risks during disturbance of soil associated with remediation of contaminated areas.
- Establish a recording mechanism to ensure activities proceed as detailed in the remedial action plan.

[1] EC Otago Ltd, 2022. *Detailed Site Investigation - Coombe Hay Lane, Toko Mouth v2.*

- Identify and include proof of the necessary approvals, permits or licences required by regulatory authorities to undertake remediation.
- Provide recommendations for validation sampling and reporting.

1.3 Roles and Responsibilities

The following responsibilities shall be assigned at the start of the project:

Site Manager

The appointed earthworks contractor will assign a site manager to the project, who will be responsible for the implementation of this RAP and the CSMP on the site and notifying the contaminated land specialist of any contamination complications that may arise during site works.

Contaminated Land Advisor

A Suitably Qualified and Experienced Practitioner in the area of contaminated land management (Contaminated Land Advisor) will be appointed to provide advice to the contractor on contaminated land issues encountered. The advisor will also be responsible for soil sampling, disposal recommendations, and validation reporting.

1.4 Limitations

Services for this project have been performed in accordance with current professional standards for environmental site assessments, no guarantees are either expressed or implied. This report does not attempt to fulfil the requirements of legal due diligence. There is no investigation that is thorough enough to preclude the presence of materials at the property that presently, or in the future, may be considered hazardous. EC Otago should be contacted immediately if soils and/or site conditions are found to differ from the observations and assumptions presented in this report.

Any recommendations, opinions or findings stated in this report are based on circumstances, facts and assessment criteria as they existed at the time that the work was performed, and on data obtained from the investigations and site observations as detailed in this report. Opinions and judgments expressed in this report, which are based on an understanding and interpretation of assessment standards, should not be construed as legal opinions. This report, and the information it contains, have been prepared solely for the use of Toko Developments Limited and the relevant territorial authorities in relation to the specific project described herein and should not be used or relied upon by any other person or entity for any other project. Any reliance on this report by other parties shall be at such party's own risk.

2 Site Overview

2.1 Site Identification

The general location is shown in Figure 1, and the relevant property details are given in Table 1. The site is accessed by Coombe Hay Lane, off Toko Mouth Domain Road. The property presently consists of two lots proposed to be subdivided into a total of 19 lots, of which 18 lots will form the residential subdivision and the remaining lot (Lot 19) will retain the existing dwelling, outbuildings and farm and will continue to be used for farming/production activities. For the purposes of this report, the site is defined as the portion of the property affected by historical HAIL activities requiring remediation as shown in Figure 2. The affected area of land at the location of the former shed, dip and yards is comprises all of proposed Lot 1 (1,690 m^2) and extends into proposed Lot 19 with a total area of approximately 3,600 m^2.

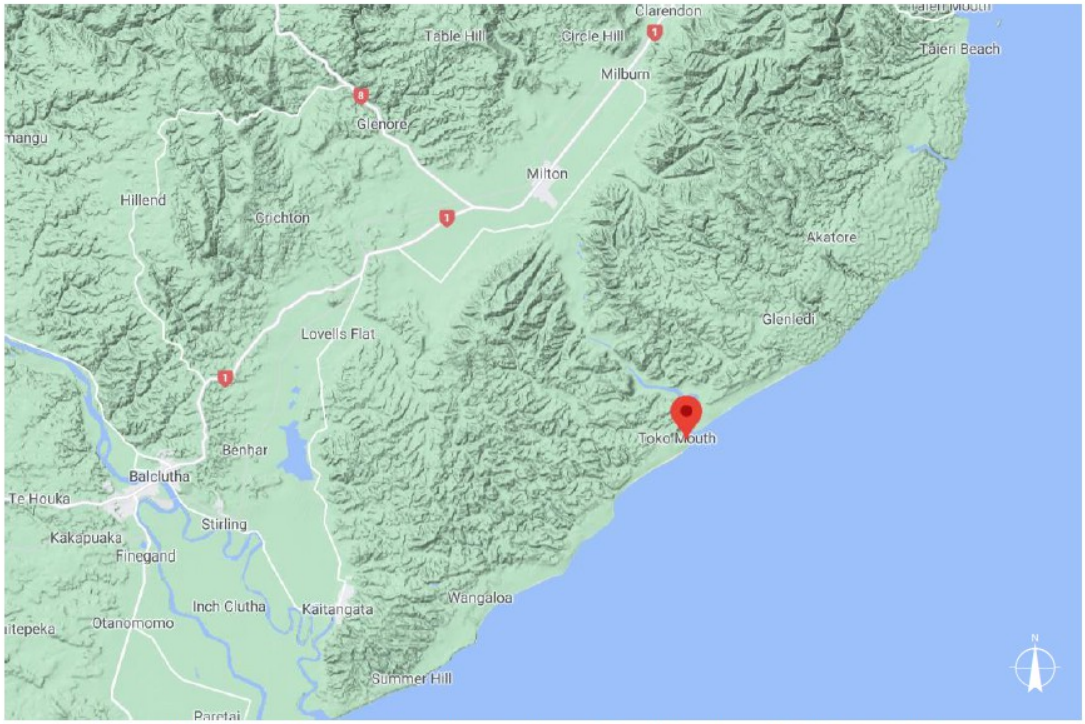


Figure 1: General location of the property shown with a red tag (Map data ©2021, Google).

Table 1: Property Details

Owner	Tokofarms Limited
Address	14 Coombe Hay Lane, Toko Mouth/1296 Coast Road
Legal description	LOT 3 DP 512557, LOT 9 DP 516455
Certificate of Title	789620, 805077
Area	27.0721 ha
District Plan / zoning	Part Coastal Resource Area, Part Rural Resource Area

Figure 2: The site affected by arsenic contamination is shown outlined in magenta with the proposed residential subdivision outlined in turquoise.

2.2 Proposed Development

The property consists of two lots, Lot 3 DP 512557 and Lot 9 DP 516455, which are proposed to be subdivided into eighteen residential lots ranging from 0.1410 ha to 1.1 ha in size (Figure 3). The remainder of the property, including the existing dwelling, outbuildings and approximately 21.8 ha of farmland, will form Lot 19 and remain in use as farm/production land.

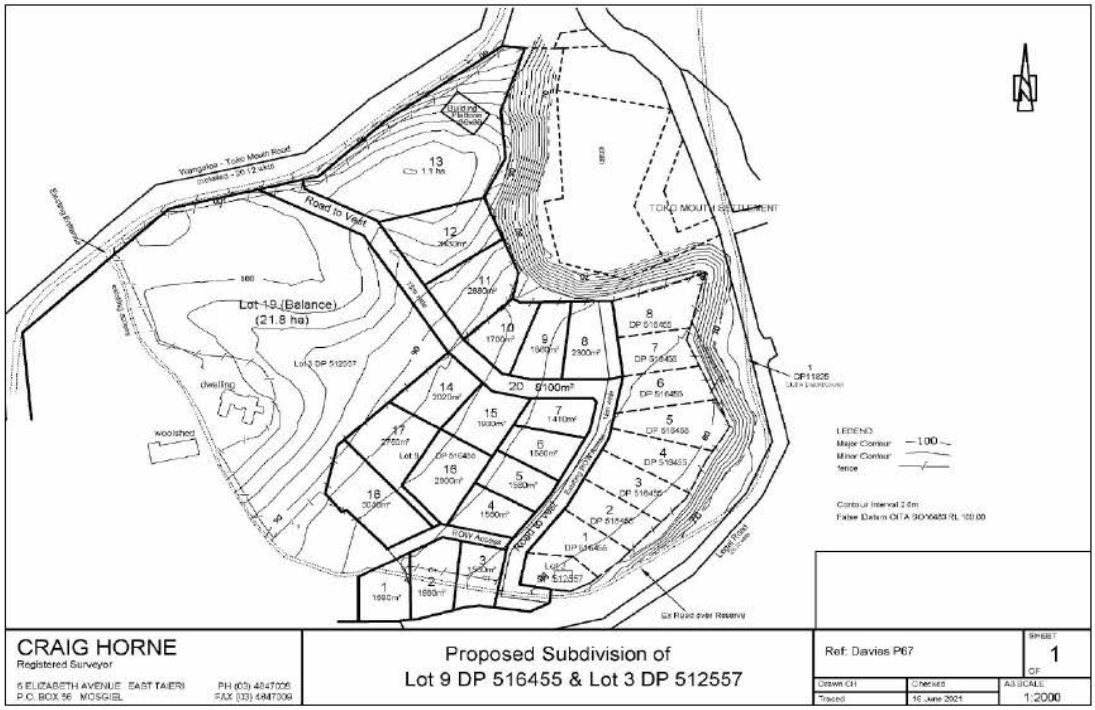


Figure 3: The proposed development, comprising 19 new lots, with 18 new residential lots and the remainder of the property with existing dwelling, outbuildings and farmland forming Lot 19. (Proposed Subdivision of Lot 9 DP 516455 & Lot 3 DP 512557, Craig Horne, version dated 16 June 2021).

2.3 Site History

The full history of the property is provided in the DSI. In summary, the wider farm was predominantly in pasture from the time of the first aerial photograph in 1946. A large shed and sheep yards were present within the eastern part of the site, within proposed Lot 1. The sheep yards appeared to have been demolished by 1975, and by 1982 the large shed had also been removed. The site has subsequently remained in pasture with very little change since 1982.

2.4 Site Condition

The property is situated on an old marine terrace and the topography is generally flat with a slight eastward slope, grading from approximately 24 m to 14 m above sea level.

No complete structures from the yards or old shed are remaining within the site, but several concrete remnants can be seen buried under the grass. During the site investigation, fill was encountered up to 0.6 m depth. The fill consisted of a silty sand, most likely sourced locally, overlying an old topsoil layer.

In the western part of the site, a large pile of burnt materials that included treated timber, a chemical shed, and an offal pit are observed. A garage potentially clad in asbestos containing materials with an underground fuel tank adjacent to its frontage was also noted in the paddock adjacent to the site. These areas of interest are located in the portion of land that will form Lot 19 and will not be included in the land intended to be developed into a residential subdivision.

2.5 Geology

The geology is mapped by the GNS Online Geology Web Map as comprising Late Pleistocene ocean beach deposits, consisting of slightly weathered gravel, sand, silt and loess. The north-eastern corner of the site is mapped by GNS as being overlain with Holocene river deposits, including loose, well sorted, sandstone- schist- and volcanic-derived gravel and sand, often quartzose, with minor mud and peat.

The GNS Webmap also notes that the active Akatore Fault lies approximately 780 m west of the site.

The site is mapped by the Otago Regional Council (ORC) Hazards Database[2] as having low to no liquefaction potential (Domain A).

2.6 Hydrology

2.6.1 Surface Water

No surface water or ponding was evident on the site at the time of the site visit. The Tokomairaro River is approximately 170 m northeast of the site boundary, Valley Creek is 70 m south and the Pacific Ocean 280 m southeast.

2.6.2 Groundwater

The site is not located over any identified aquifer. The bore records held by the ORC do not identify any bores located on the site or within 1 km of the site boundaries. During the site visit, two hand auger boreholes (CH12 and CH13) encountered ground water (likely to be a perched water layer) at a depth of 0.3 m and 0.4 m, respectively.

2.7 Hazards

The ORC Hazards Database does not record any flooding, instability or coastal hazards for the site.

[2] https://maps.orc.govt.nz/portal/apps/MapSeries/index.html?appid=b24672e379394bb79a32c9977460d4c2

3 Site Assessment and Characterisation

3.1 Soil Acceptance Criteria

The portion of the property proposed to form the residential subdivision is zoned Coastal Resource Area in the Clutha District Plan. Subdivision is a discretionary activity in a Coastal Resource Area and residential dwellings must comply with the rules of the Rural Resource Area. The *Residential* SCSs apply to the proposed development. The residential land-use scenario includes the consumption of up to 10% home-grown produce.

For some analytes, the Ministry for the Environment has not established SCSs and as per the established hierarchy[3] Soil Guideline Values (SGV) from the Australian National Environment Protection (Assessment of Site Contamination) Measure (NEPM)[4] have been used.

The soils are also compared to the Canadian Council of Ministers of the Environment (CCME) soil guidelines for the protection of environmental health[5] as an indication of the environmental risk from potential contaminants.

3.2 Summary of Contamination Assessment

The sampling results show that there is widespread heavy metal contamination across the site, with concentrations of arsenic above the *Residential* and the *Commercial/industrial* SCS in several locations. The arsenic concentrations ranged from 2 – 500 ppm. The site average and the calculated 95% Upper Confidence Limit (UCL) both also exceed the *Residential* and the *Commercial/industrial* SCS which are 20 and 70 ppm respectively. Exceedances were found in both the surface and deeper soils and the results indicate that the part of the site forming proposed Lot 1 presents a risk to human health for the proposed residential land use and during development works. No samples below a depth of 0.6 m were assessed for contamination. The levels also exceed the CCME guidelines protective of environmental health under a residential/parkland setting (17 ppm).

Figure 4 shows the extent of the contamination. This part of the property is a HAIL site under Category A8 (Livestock dip or spray race operations) and is considered a 'piece of land' under the NES. It also constitutes the site for this report. Note that the contamination extends from proposed Lot 1 into the adjacent proposed Lot 19. The whole of proposed Lot 19 was not investigated as part of the DSI and may contain additional HAIL sites elsewhere on the property.

The results indicate that the site presents a risk to human health in its current state, and remediation is required prior to the proposed residential land use in Lot 1. Further investigation and sampling will be required to determine the full extent of the contamination and to ensure that this remediation plan is given full effect.

Contamination hot spots are to be expected, in particular significantly higher arsenic and potentially pesticide concentrations may be present in close proximity to the former dip location. The results indicate there is a risk to human health and the environment during development. Extreme care must be taken during soil disturbance to manage and prevent potential discharges such as dust, silt or sediment.

[3] Ministry for the Environment, 2011. *Contaminated Land Management Guidelines No. 2: Hierarchy and application in New Zealand of environmental guideline values (revised 2011)*.
[4] National Environment Protection Council (Australia), 2013. *National Environment Protection (Assessment of Site Contamination) Measure 1999*.
[5] Canadian Council of Ministers of the Environment, 2021. *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health*.

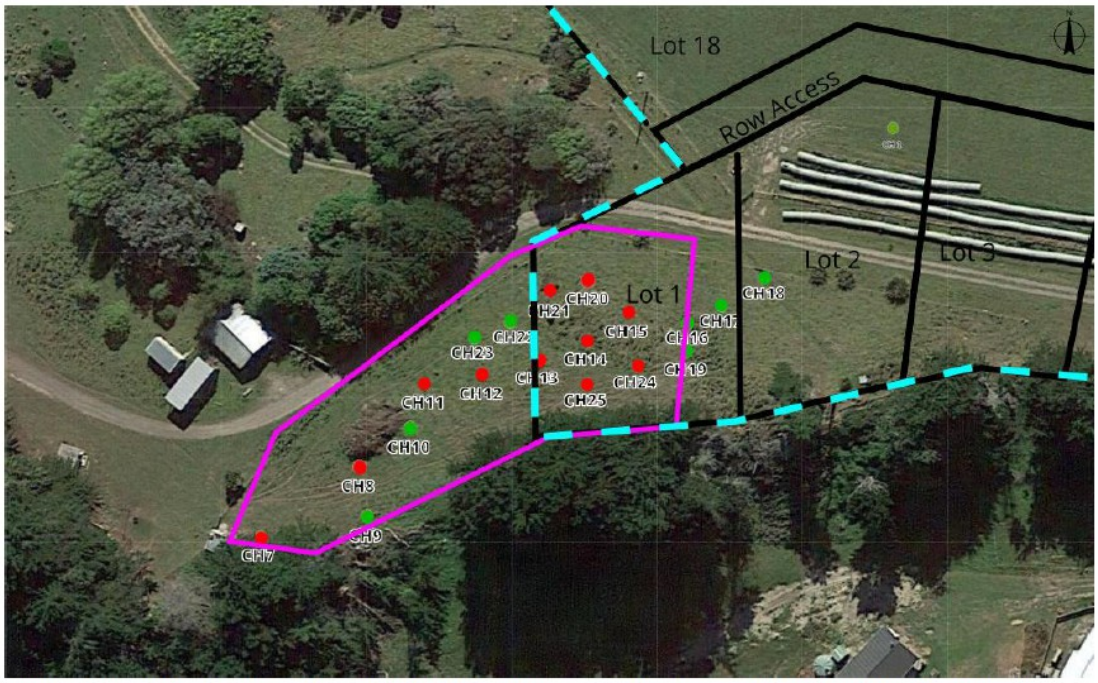


Figure 4: Sampling locations from 14 July 2021, with green indicating results below the SCS and red showing exceedances. The proposed residential lots in close proximity are shown in black outlined with turquoise, and the HAIL site is outlined with magenta.

3.3 Conceptual Site Model

Based on the information obtained during the site investigation, a conceptual site model was developed. The likely routes of exposure and potential receptors are outlined in Table 2, which has been developed based on the proposed residential land use and arsenic exceedances.

The pathways for human exposure consist of ingestion of soil or dust or contaminated groundwater, dust inhalation, consumption of produce grown in soils on the site and absorption through the skin during contact with contaminated soil, particularly for site residents. Other receptors include construction/site workers during site remediation and development works, and ongoing maintenance activities. Residents on the adjoining the land may also be exposed, primarily from dust or sediment discharges.

Ingestion of soil and produce is the primary pathway for arsenic contamination, with dermal absorption being insignificant. As the water supply to the proposed development is likely to be via rainwater, the consumption of contaminated groundwater-sourced drinking water is not considered a likely exposure route. The particulate (dust) inhalation pathway typically contributes considerably less than one per cent to the total exposure and is therefore not considered significant.

Table 2: Assessment of Exposure Routes and Receptors.

Receptor	Pathways					Risk/Justification
	Soil Ingestion	Produce Ingestion	Water Ingestion	Dermal Contact	Inhalation	
Residents	Complete	Possibly Complete	Possibly Complete	Not applicable	Possibly Complete	High – the subdivision is rural with large section sizes and residents growing produce on site or disturbing soil through gardening is likely.
Maintenance & Service Staff	Complete	Incomplete	Incomplete	Not applicable	Complete	Moderate – several instances of arsenic recorded exceeding the *Commercial / industrial outdoor worker (unpaved)* SCS.
Construction Workers	Complete	Incomplete	Incomplete	Not applicable	Complete	
Neighbouring properties	Possibly Complete	Incomplete	Incomplete	Not applicable	Possibly Complete	Low – particularly if the works are appropriately managed. Dust emissions could potentially affect all neighbouring sites leading to inhalation or settlement of dust on adjacent properties.

3.4 Potential for Degradation

Arsenic does not degrade and therefore remediation is required to address the identified exceedances.

4 Remedial Actions

4.1 Remediation Goal

The remediation goal is to ensure the safety of future residents at the site (i.e. to prevent contact with and ingestion of soil containing contaminants that exceed the applicable SCS).

Several options were considered to achieve the goals:

- Excavate soil with disposal off-site at a suitable landfill;
- Excavate soil with disposal on-site within an encapsulation cell;
- Dilution through mixing with clean material;
- Capping/containment to prevent direct contact, run-off and leaching.

Removal of the contaminated soil from proposed Lot 1 is the preferred option to fully remediate the lot and ensure it is suitable for residential land use. However, given the potential depth of contamination associated with the sheep dip (which may be greater than 1 metre in depth in the vicinity of the former sheep dip), removal of all the contaminated material from this area may not be feasible. Therefore, a combined approach of excavation for removal with capping for deeper contaminated subsoil if required is proposed. Capping will ensure the area is protected from direct contact and reduce the potential for migration of contamination. If capping is employed, Lot 1 will be considered to have the contamination managed rather than fully which will be recorded on the ORC HAIL database.

Disposal to landfill of all the affected material was not considered a sustainable option due to the cost and cartage distance, and because alternatives exist for disposal within land affected by HAIL activity that does not present a risk to human health or the environment. The preferred approach is the placement of excavated soil within an encapsulation cell located on the west part of the site, with removal to landfill if required. The area proposed for the encapsulation cell is not affected by any flood hazard and is predicted to have negligible liquefaction effects.

An Ongoing Monitoring and Management Plan (MMP) will be required for proposed Lot 1 if any contamination remains in situ and is capped. An MMP will also be required for the encapsulation cell.

4.2 Remediation Methodology – Lot 1

Prior to any excavation works, the Encapsulation Cell (the area shaded blue in Figure 5) shall be prepared so excavated soils may be removed directly for disposal to avoid stockpiling within Lot 1.

All of the affected topsoil within Lot 1 (the area shaded red in Figure 5) shall excavated to expose the subsoil and removed for disposal. The excavation depth will be variable due to the placement of fill in this area up to a depth of at least 0.6 m, the fill material is to be removed along with the topsoil. The extent of the area affected by contamination will be determined on site during works through analysis with a handheld X-ray Fluorescence Analyser (XRF). As shown with the magenta outline in Figure 5, the north and eastern most extents of Lot 1 are not thought to require remediation. It is anticipated that approximately 300 - 500 m^3 of material will be stripped from the part of the site overlying Lot 1.

Once the subsoil has been exposed, and any buried remnants of the sheep dip removed, the site will be assessed by XRF to identify the extent of deeper contamination. Deeper contamination is known to be present at 0.5 – 0.6 m at locations CH13, CH14, CH15 and CH20. This will be excavated further where practical, or the location will be noted and confirmed via survey followed by covering with a

capping system to prevent direct exposure to contaminated soils. The extent of the contaminated area shall be noted on the certificate of title.

The capping system shall consist of permanent hard surfaces such as buildings or asphalt/concrete paving, or a soft capping system consisting of a permeable geotextile layer covered with a minimum of 1 m of clean subsoil and 0.3 m topsoil. The geotextile layer acts both as a physical barrier and as a marker layer demarcating the change from clean to contaminated soil. The depth of subsoil is intended prevent accidental disturbance during installation of services to a dwelling on the site and to minimise ongoing maintenance requirements and to reduce the potential for vertical infiltration.

The subsoil and topsoil are to be sourced from the parts of the development area that soil sampling has identified to be outside of the contaminated area, and placement is to be overseen by an engineer to meet the criteria of an engineered fill layer.

Due to the high concentrations of arsenic in the soil with exceedances of the *Commercial/Industrial* SCS, the earthworks must be carried out in accordance with the CSMP in Appendix B until the area is capped. Caution is required as the deeper material may contain far higher levels of arsenic than identified during the site investigation, and these will be exposed once the surface is scraped.

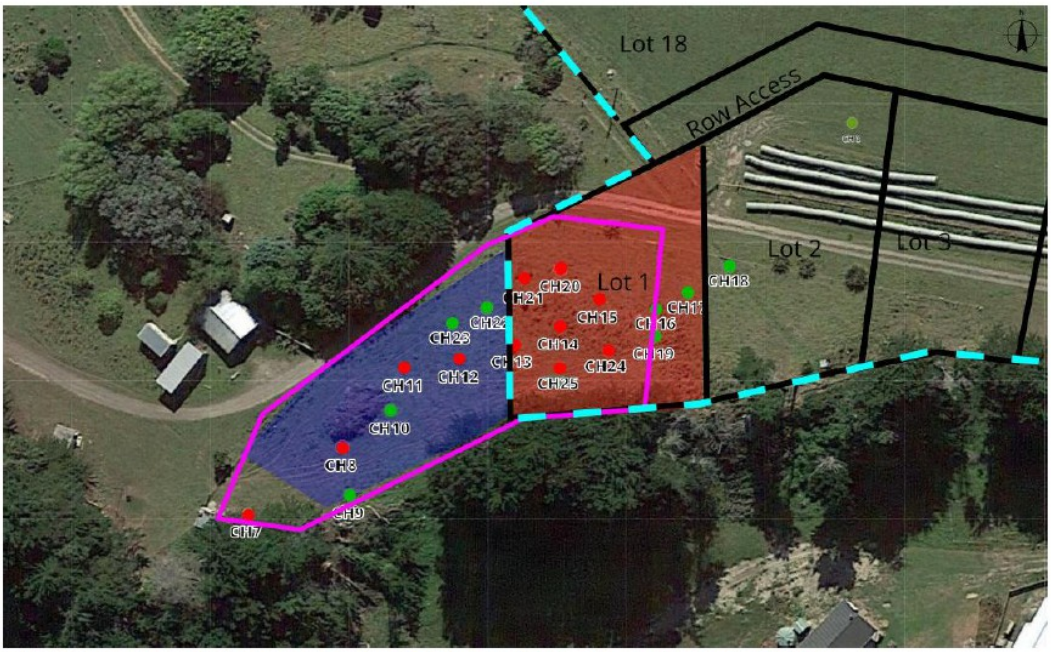


Figure 5: The remediation area shown shaded red with the disposal area shaded blue.

If all contaminated soil is removed the site will be suitable for residential land use at completion of the works with no ongoing monitoring and maintenance.

However, if capping is employed the methodology requires ongoing management:

- Any contaminated area remaining that has been capped is to be defined by survey and the certificate of title annotated accordingly.
- An Ongoing Monitoring and Management Plan is required to provide site owners with information relating to ongoing maintenance requirements.

- If any earthworks or excavations are required in the future in soils below the capping layer, they will require resource consent from the ORC and the (Clutha District Council) CDC and must be managed in accordance with the CSMP.
- If any damage occurs the capping layer, it must be repaired and reinstated.

4.2.1 Validation Testing and Reporting – Lot 1

A Site Validation Report (SVR) will be prepared at the completion of the works to confirm the volume of soil removed, the volume and source of soil/clean fill materials imported, report on the sampling undertaken to confirm the extent and depth of the contamination, detail the location of any contamination remaining within Lot 1 and the capping installed, and incidences and/or complaints that occurred during the earthworks. The quantity of contaminated soil removed can be assessed based on changes in level determined by a land surveyor, and the final finished surface and depth of clean fill imported can be similarly determined, if capping has been installed. If all contamination has been removed from Lot 1, the depth of imported clean soil does not require confirmation by survey as it is not required for contamination management purposes. However, the material must be placed as an engineered fill to facilitate, and not limit, future development.

4.3 Encapsulation Cell

The proposed Encapsulation Cell area is gently sloping to the south ranging from approximately 22 to 19 m above sea level and is elevated 16 m above Valley Creek which is 70 m to the south as shown in Figure 6.

The Encapsulation Cell is to be constructed as shown in Figure 7, with a bund formed from subsoil obtained within the property along the downslope (southern) side and on the boundary with Lot 1 on its eastern side. The bund is to be sufficiently high that it contains all the material excavated from the site (at least 2 m high) and approximately 50 m long, with the design and construction overseen by an engineer. It is anticipated that the outer batter slope shall be no more than 3:1 (H:V) or as specified by the engineer to ensure long term stability based on the nature of the subsoil. The bund is also to be cut into the ground so that all topsoil is removed prior to construction, and the bund is founded on clean subsoil. An open drain is to be constructed adjacent to the track along the northern (upslope) boundary of the Encapsulation Cell to divert any external surface flows and to also drain any part of the surface of the Encapsulation Cell that drains towards it.

The contaminated material is to be placed such that it is at least 0.5 m below the top of the bund, covered with a permeable geotextile layer and is to be capped with 0.5 m clean subsoil. The geotextile layer acts both as a physical barrier in addition to a marker layer demarcating the change from clean to contaminated soil. There is to be a minimum finished slope of no less than 3% slope to the south and back to roadside drain to the north to facilitate surface run- off as shown in the schematic in Figure 7.

The earth bund and Encapsulation Cell shall be covered with 0.3 m clean topsoil and sown with grass turf or shallow rooting plants (<0.5 m) which shall not disturb the cell. No trees or plants with tap roots systems or edible crops will be permitted.

The subsoil bund, capping, contaminated material and topsoil is to be compacted in accordance with the directions of the project engineer to ensure that it is stable and not subject to settlement following placement.

The Encapsulation Cell shall cover an area of approximately 1,000 m^2 (20 m x 50 m) with a maximum fill depth of 1.5 m contaminated soil and 2.3 m including capping. The cell is designed to hold approximately 520 m^3 contaminated soil

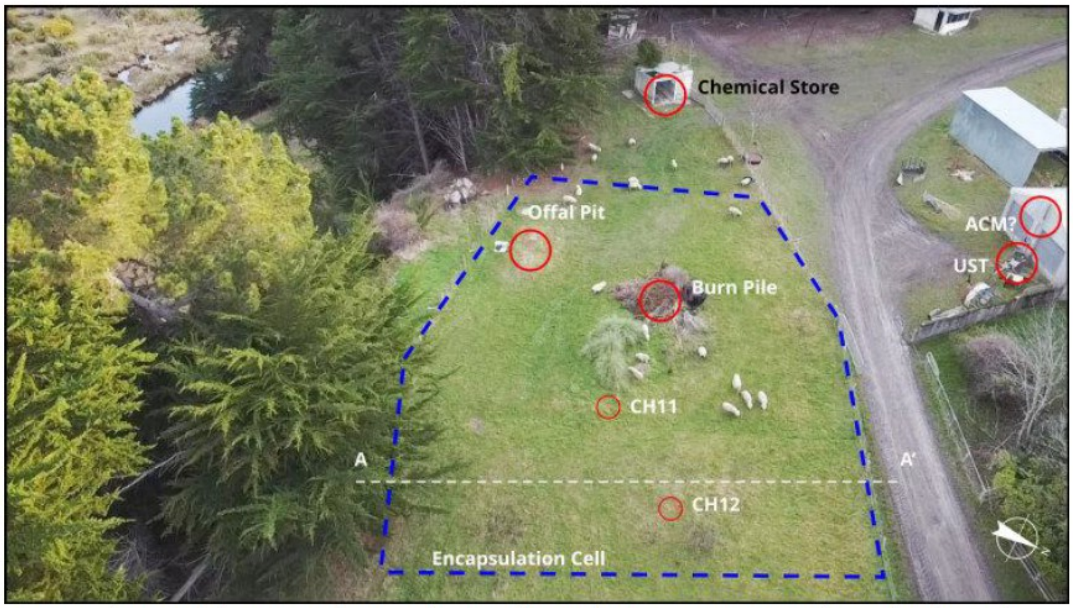


Figure 6: The site of the proposed Encapsulation Cell area showing HAIL activities located within and adjacent to the area, and sampling loctions CH11 and CH12. Valley Creek is visible to the south through the trees. The white dashed line relates to the cross section scematic in Figure 7.

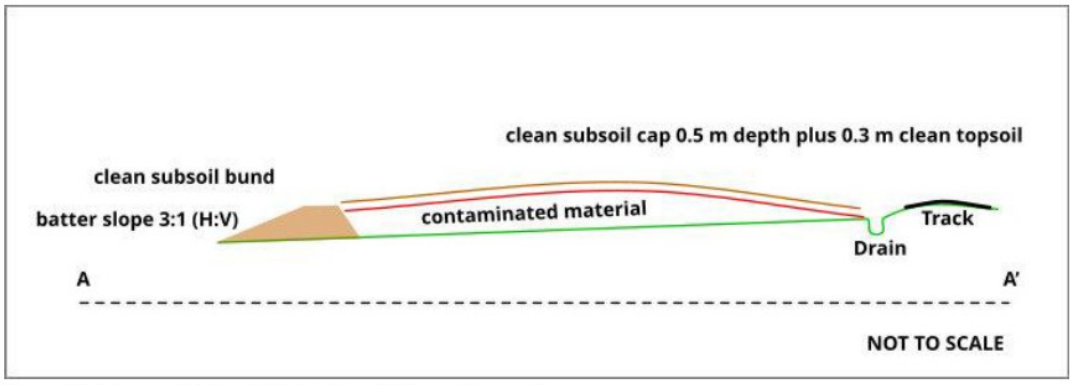


Figure 7: Encapsulation Cell design within earth bund.

The encapsulation cell requires ongoing management:

- The location of the Encapsulation Cell is to be surveyed and recorded on the certificate of title.
- The area shall not be available for general residential use or the production of edible crops, and no deliberate soil disturbance may occur but it may be used for grazing livestock.
- An Ongoing Monitoring and Management Plan is required to provide site owners with information relating to ongoing maintenance requirements.
- If the cell is damaged, it must be repaired and reinstated. Any works which require disturbance of the geotextile layer (and therefore contact with contaminated soil) must be

undertaken in accordance with the CSMP and the ORC must be notified. Consent may be required from the ORC and the CDC.

4.3.1 Validation Testing and Reporting - Encapsulation Cell

An SVR will be prepared at the completion of the works to confirm final dimensions of the encapsulation cell, the approximate volume of contaminated soil deposited, and confirm the volume of material placed as a cap. The cell dimensions and final finished surface levels shall be assessed by a land surveyor and certified by an engineer.

4.4 Contaminated Soil Management Plan

All works will be undertaken in accordance with the CSMP in Appendix B.

4.5 Regulatory Requirements and Procedures

Consent is required from the CDC under the NES for the disturbance of a HAIL site with proposed earthworks that exceed the permitted activity limit of 25 m^3/500 m^2.

Consent is also required from the ORC to disturb a contaminated site and to discharge contaminants to land.

Prior to disturbance of the contaminated sites, a pre-earthworks site meeting will be held and attended by staff involved with the earthworks to discuss the risks associated with the works, the CSMP, the safe handling of contaminated soils and the Health and Safety Plan requirements.

5 Health and Safety

The contractor is ultimately responsible for the Health and Safety procedures related to the earthworks and shall prepare a site-specific Health and Safety Plan in accordance with the requirements of the *Health and Safety at Work Act 2015* and the WorkSafeNZ guide *Managing Occupational Health on Contaminated Sites*. The plan shall cover exposure to contaminated soil, groundwater, dust and air for construction workers and the general public, including Personal Protection Equipment (PPE) requirements. The CSMP provides guidance specifically relating to working with contaminated or potentially contaminated soil during earthworks. All personnel working on the site during excavation/disturbance of contaminated soil are required to participate in an induction to be made fully aware of the requirements of the RAP and CSMP in addition to the site general health and safety requirements.

6 References

EC Otago Ltd, 2022. *Detailed Site Investigation - Coombe Hay Lane, Toko Mouth v2*. Job Reference: 320-21 Coombe Hay.

Ministry for the Environment, 2012. *Users' Guide - National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*. Publication number: ME 1092; ISBN 978-0-478-37281-6 (print); 978-0-478-37282-3 (electronic).

Ministry for the Environment, 2011. *Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand (Revised 2011)*. Publication number: ME 1071; ISBN 978-0-478-37258-8.

Ministry for the Environment, 2011. *Contaminated Land Management Guidelines No. 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011)*. Publication number: ME 1072; ISBN 978-0-478-37259-5.

National Environment Protection Council (Australia), 2013. *National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013)*. (https://www.legislation.gov.au/Details/F2013C00288).

WorkSafe New Zealand, 2016. *Managing Occupational Health on Contaminated Sites*. Reference WSNZ_2215_APR 16.

Appendix A EC Otago Statement of Experience

Environmental Consultants Otago Limited (EC Otago) was established in Dunedin in 2014 when the principal, Ciaran Keogh, recognized the need for a dedicated environmental consultancy in the region. The company is particularly focused on contaminated land issues. EC Otago undertakes the preparation of Preliminary and Detailed Site Investigation Reports, Assessments of Environmental Effects, Site Remedial Action Plans, Soil Disposition Reports and Site Validation Reports, working together with other environmental consultancies when a broader range of experience is required.

Ciaran Keogh - Principal and Senior Environmental Planner
Master of Regional and Resource Planning, Master of Business Administration.

Ciaran has over 9 years' experience focussing specifically on contaminated land investigations in Otago with more than 200 site investigations completed, and over 30 years' experience in environmental and RMA planning, and executive management in regional and local government. His experience includes feasibility, planning and visual assessments, site rehabilitation projects for landfills, mines and transmission lines and switchyards, and management of the preparation of regional and district plans and the supporting policy.

Ciaran has previously worked as the Director of Planning with Taupo District Council, CEO of Clutha District Council, General Manager of Wakool Shire Council (Australia) and CEO of Environment Southland.

Bernice Chapman - Senior Environmental Biotechnologist
CEnvP, PhD in Biochemistry, Member of the Environment Institute of Australia and New Zealand.

Berni is a Certified Environmental Practitioner (Certification Number 1376) who has worked in small consultancy firms for 18 years in the waste management, waste-to-energy and contaminated land sectors. She has a strong ethos of waste minimisation, containment and management, the effective operation of existing resources with beneficial reuse where possible, protection of the environment and overall sustainability coupled with a pragmatic approach from direct involvement in day-to-day operations. Her experience includes preliminary and detailed site investigations, sampling and analysis, site remediation, feasibility studies, problem solving and process design. This work includes the management of a range of environmentally polluting industrial effluents, contaminated land investigations and site remediation.

Berni has previously worked as Laboratory Manager for Waste Solutions Ltd, an Associate for CPG New Zealand Ltd, and a Wastewater Treatment Specialist for ADI Systems.

Appendix B Contaminated Soil Management Plan

ECOtago

Environmental Consultants Otago Ltd

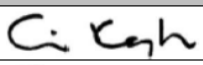
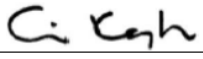
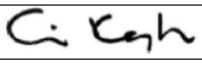
Contaminated Soil Management Plan

Coombe Hay Lane
Toko Mouth

for
Toko Developments Limited

March 2022

Environmental Consultants Otago Ltd
Environmental and Contaminated Site Assessment • Planning and Urban Design • Landscape Architecture
PO Box 5522 Dunedin 9058 • 64 3 4728875

Task	Responsibility	Signature
Project Manager:	Ciaran Keogh, MBA, MRRP	
Prepared By:	Ciaran Keogh, MBA, MRRP	
Reviewed By:	Bernice Chapman, CEnvP, PhD, MEIANZ	
Approved For Issue By:	Ciaran Keogh, MBA, MRRP	

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Client: Toko Developments Limited
Job Ref.: 320-21 Coombe Hay
Date: 31 March 2022

Table of Contents

Abbreviations

CDC	Clutha District Council
CSMP	Contaminated Soil Management Plan
DSI	Detailed Site Investigation
HAIL	Hazardous Activities and Industries List
H&S	Health & Safety
HSO	Environmental H&S Officer
NES	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
ORC	Otago Regional Council
PPE	Personal Protection Equipment
RAP	Site Remedial Action Plan
RMA	Resource Management Act 1991
SCS	Soil Contaminant Standards
SVR	Site Validation Report
XRF	X-ray Fluorescence Analyser

1 Introduction

1.1 Background

The land at Coombe Hay Lane, Toko Mouth is being subdivided into 18 residential lots (Lot 1 – 18) by Toko Developments Limited with the bulk of the property (Lot 19) remaining in use as farm/production land. Part of the property is a Hazardous Activities and Industries List (HAIL) site due to the former use as stockyards and a sheep dip (HAIL Category A8) resulting in contamination levels in excess of the *Residential* and the *Commercial/ industrial outdoor worker (unpaved)* Soil Contaminant Standards / Soil Guideline Values (SCS / SGV). The HAIL site is not identified on the Otago Regional Council (ORC) HAIL database. A Detailed Site Investigation (DSI)[1] by Environmental Consultants Otago Limited (EC Otago) identified contamination within Lot 1 of the proposed development as well as on the adjacent land within Lot 19. The affected area is defined as the site. Remediation of Lot 1 is required to ensure the land is suitable for residential land use and will not pose a risk to human health. A Remedial Action Plan (RAP)[2] has been prepared for the site.

The remediation strategy proposed is removal of the contaminated material that exceeds the applicable criteria to the maximum extent practicable and, if required, to cap any deeper contamination. The contaminated soil is proposed to be placed in an Encapsulation Cell within Lot 19, or sent to landfill.

The *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES) applies to the site, and consent to disturb a HAIL site is required from Clutha District Council (CDC). Consent to disturb a contaminated site and discharge of contaminants to land is also required from the ORC under the Regional Plan: Waste for Otago. Consent will also be required from ORC under Rule 14.5.2.1 of Proposed Plan Change 8 to the Regional Plan: Water for Otago for earthworks for residential development given earthworks will occur on contaminated land.

EC Otago have prepared this Contaminated Soil Management Plan (CSMP) to set out responsibilities for soil handling, management and disposal procedures and controls to minimise or mitigate the effects of earthworks within the site. This CSMP should be read in conjunction with the RAP, and the conditions of consent issued by the CDC and ORC.

1.2 Location of Earthworks

The property details are shown in Table 1.

Table 1: Property Details

Owner	Tokofarms Limited
Address	14 Coombe Hay Lane, Toko Mouth/1296 Coast Road
Legal description	LOT 3 DP 512557, LOT 9 DP 516455
Certificate of Title	789620, 805077
Area	27.0721 ha
District Plan / zoning	Part Coastal Resource Area, Part Rural Resource Area

For the purposes of this report, the site is defined as the area affected by historical HAIL activities requiring remediation as shown in Figure 1.

[1] EC Otago Ltd, 2022. *Detailed Site Investigation - Coombe Hay Lane, Toko Mouth v2.*
[2] EC Otago Ltd, 2022. *Site Remedial Action Plan - Coombe Hay Lane, Toko Mouth.*

Figure 1: The site affected by arsenic contamination is shown outlined in magenta with the proposed residential subdivision outlined in turquoise.

1.3 Proposed Works

The works are detailed in the RAP, which must be read in conjunction with this CSMP.

The site soils contain arsenic contamination up to 500 ppm, which is more than 7 times over both the *Residential* and the *Commercial/industrial* SCS. Higher concentrations may be present at depth. The soils present a high risk to human health and the environment during development works and need to be handled with due care as specified in this CSMP.

Removal of the contaminated soil from proposed Lot 1 (shaded red in Figure 2) is the preferred option to fully remediate the lot and ensure it is suitable for residential land use. However, given the potential depth of contamination associated with the sheep dip (which may be greater than 1 metre in depth in the vicinity of the former sheep dip), removal of all the contaminated material from this area may not be feasible. Therefore, a combined approach of excavation for removal with capping for deeper contaminated subsoil if required is proposed. The works are to be guided on site with the use of a handheld X-ray Fluorescence Analyser (XRF).

Disposal to landfill of all the affected material was not considered a sustainable option due to the cost and cartage distance. The preferred approach is the placement of excavated soil within an Encapsulation Cell located on the west part of the site (shaded blue in Figure 2), with removal to landfill if required. Details of the Encapsulation Cell construction are provided in the RAP.

In summary, the contaminated soils will either be removed to landfill, contained within an Encapsulation Cell, or capped with a geofabric and a minimum of 1 m of clean soil cover.

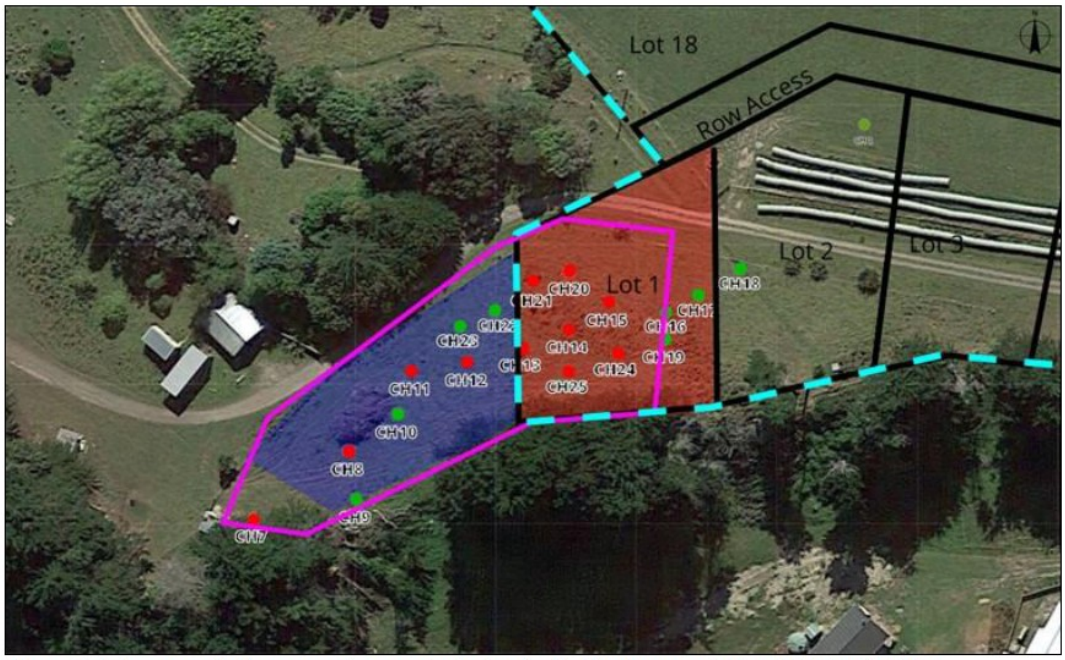

Figure 2: The remediation area shown shaded red with the Encapsulation Cell shaded blue.

1.4 Limitations

The information contained in this document is intended solely for the use of Toko Developments Limited and their agents for the purpose for which it has been prepared, and no representation is made or is to be implied as being made to any third party. Other than for the exclusive use of Toko Developments Limited and their agents, no part of this report may be reproduced, stored in a retrieval system or transmitted in any form or by any means.

2 Responsibilities and Basis for CSMP Procedures

2.1 Responsibilities

The overall responsibility for the implementation of this CSMP shall be held by Toko Developments Limited and their agents, however, the specific requirements and provisions of this CSMP shall be under the control of Toko Developments Limited's nominated agent or contractor (hereafter Site Manager). The Site Manager shall be responsible for management of the works and implementation of the procedures set out below during earthworks at the site. Additional provisions regarding responsibility apply, as follows:

- Toko Developments Limited shall be responsible for providing the contents of previous investigations relevant to soils within the earthworks site to the Site Manager;
- Toko Developments Limited shall be responsible for providing the copies of the applicable consents to the Site Manager;
- Toko Developments Limited or their Site Manager shall engage a Suitably Qualified and Experienced Practitioner in the area of contaminated land management (Contaminated Land Advisor) to observe works and sample soils as required;
- While this CSMP is intended to assist the Site Manager in meeting legal obligations related to contaminated soils with respect to health, safety and the environment, this CSMP does not and shall not relieve the Site Manager of legal responsibilities in this respect and it does not cover the general site safety procedures required for typical excavation and construction activities within the earthworks site;
- The Site Manager shall ensure that any conditions imposed by regulatory authorities must be adhered to in addition to this CSMP to ensure the risks associated with contaminated soils are managed appropriately;
- All personnel involved in the earthworks shall be familiar with this CSMP and ensure that the requirements of this CSMP have been followed; and
- Additional responsibilities for work safety with contaminated soils are described in Sections 3 and 4.

2.2 Basis for Procedures

The rationale behind procedures set out herein is to ensure appropriate controls are in place during earthworks to manage the potential for exposure effects to workers, to the general public and to the environment. Potential off-site human health and environmental effects are addressed by ensuring that potential discharges are avoided during earthworks, and by disposing of excavated soil to a purpose-constructed encapsulation cell on the property or landfill. Both general and specific management and control procedures and requirements shall be considered as directives. General management directives are as follows:

- This CSMP applies only to the site area as shown in Figure 1;
- A copy of this CSMP is to remain available on-site at all times so that reference can be made to it when undertaking any earthworks; and
- This CSMP shall be enforced throughout the duration of the earthworks in the applicable area.

3 Earthworks Controls and Management

Material exists within the site that present a risk to health and safety during site works. Routine personal hygiene, including the washing of hands before breaks or after contact with the site soils, and daily changing of overalls during earthworks shall be mandated when undertaking excavation in the areas identified as subject to the RAP. Dust suppression measures are to be in place if there is any risk of dust generation during excavation or transport (i.e. dampening down of soil if required to prevent dust discharges).

The NES requires active prevention of discharges of materials during works; procedures to ensure this are detailed below and shall be implemented by the Site Manager. All procedures are to comply with the relevant regulatory conditions, Council bylaws, and conditions of land use and earthworks consent conditions, as detailed in Section 2.

3.1 Earthworks Site Establishment and Management

Prior to works' commencing, the Site Manager shall ensure the following to aid in the management of aspects of site safety and environmental compliance:

- The terms stipulated in this CSMP for Health and Safety planning are incorporated into the overall worksite Health and Safety Plan;
- That access to the site is restricted to authorised personnel, and that access is only allowed following appropriate induction procedures;
- That, as the earthworks site is under the Site Manager's control, staff and visitors shall also fulfil the Site Manager's Site Safe requirements and that all staff working onsite are made aware of the environmental and human health hazards of working on this site and the measures in place to avoid, remedy or mitigate those hazards;
- That signage is posted, including earthworks site information, Health and Safety requirements, and earthworks site reporting requirements – signage shall include a large notice board at the entrance to the earthworks site providing site management contact details;
- That Health and Safety facilities and equipment such as washing facilities for earthworks site staff, appropriate personal protection equipment (PPE) and first aid points are in place;
- That a preventative maintenance programme and contingency measures are in place to minimise equipment failure and unplanned downtime;
- That procedures for receiving and responding to complaints are in place;
- That dust control systems are in place ;
- That storm water (surface runoff) diversion and collection systems and silt control measures are in place;
- That any needed stockpiling plans are in place and ready for implementation. However stockpiling should be avoided and soil should be directly removed from site to landfill or deposited into the Encapsulation Cell;
- That equipment required for vehicle cleaning is in place;
- That provisions are made in order to maintain the earthworks site in an orderly, litter-free, condition at all times; and
- Further, the Site Manager shall ensure that formed access for truck entry and exit are used.

The following contact details shall be provided on the site entrance notice board:

- Site Manager's contact;
- Alternate contact if the Site Manager is unavailable; and
- Contact of Contaminated Land Advisor responsible for earthworks site monitoring.

3.2 Dust Control Procedures

Dust generated by earthworks, excavation and loading contains high levels of contaminants, and this could result in the discharge of contaminated airborne particulate matter. To control this risk, the Site Manager shall ensure that works comply with the *Good Practice Guide for Assessing and Managing Dust* (Ministry for the Environment, 2016), and the following practices are enforced:

- Take account of daily forecast wind speed, wind direction and soil conditions before commencing an operation that has a high dust potential;
- The earthworks site is to be kept free of dust and mud by minimising earthworks when adverse site conditions exist (e.g. wind or heavy rain);
- Work with a high potential for dust creation should be stopped if wind speeds exceed 10 m/s;
- If adverse weather conditions are predicted once works have begun, then any exposed contaminated soils are to be protected to reduce dust emissions, for example through covering or stabilisation by the addition of polymer;
- Any existing sealed surfaces or aggregate roadways are to be maintained around excavations and at the earthworks site entry and exit points to the greatest extent possible;
- Clean aggregate roadways or other appropriate surface protection measures are to be installed and used to provide all-weather access for vehicles entering and exiting the site;
- Limit vehicle speeds on unsealed surfaces to 10 km/h in order to minimise dust;
- Trucks that have come into contact with contaminated site soils shall have their wheels swept down in a dedicated decontamination area with silt containment before they leave the earthworks site. Should the earthworks site become wet, wheels shall be washed down in the in a decontamination area before a vehicle exits the earthworks site;
- Limit exposed surfaces as much as possible, retain as much vegetation as possible, and keep exposed surfaces damp in dry windy conditions;
- Material to be excavated is to be maintained in a damp (not wet) condition during excavation and cartage;
- Drop heights from loaders and diggers are to be minimised as far as possible;
- Limit load sizes to avoid spillages; and
- Any stockpiles formed are to be covered when not being actively worked.

3.3 Storm/surface, Groundwater and Silt/sediment Control Procedures

Off-site transport of contaminated soils via water or erosion of exposed silt/sediments is a risk during earthworks. To control this risk the Site Manager shall ensure that the following practices are adhered to within the remediation and deposition sites:

- The Site Manager shall undertake inspections on a daily basis, and after every significant rainfall event, and shall ensure that consent conditions are adhered to;
- That excavation of contaminated site soils shall not occur when it is raining or when free water is present in any excavated area;
- That the movement of saturated soils is avoided;
- That erosion and sediment controls are installed prior to the commencement of earthworks or excavation and that these are suitable to ensure that no silt or sediments are transported off-site, including during unpredictably high rain events;
- That all soil, silt or sediment exposed or generated in the sites during the works shall be construed as part of earthworks, and within the earthworks site, as defined above, and that all such material captured by erosion controls are managed in the same manner as other site soils, as described in Section 3.4;

- Take account of daily weather forecast, if adverse weather conditions are predicted then any exposed contaminated soils are to be protected to reduce erosion;
- That surface water in contact with exposed earthworks is contained within the earthworks site and prevented from entering any nearby watercourses or storm water drains;
- That surface water entering excavations is avoided (by working in dry conditions where possible);
- That any surface water entering excavations and wash water generated within the site is allowed to soak into the ground;
- If infiltration to ground is not adequate to contain the wash water from the dedicated decontamination area, then it will be captured and treated as potentially contaminated until demonstrated otherwise or removed by an appropriately licensed contractor;
- If groundwater is encountered during earthworks, the Site Manager shall ensure it is contained within the site and shall be allowed to soak back into the ground.

3.4 Soil Handling Control Procedures

Contaminated and potentially contaminated soils, geomaterials, and buried wastes at the earthworks sites pose a high exposure risk, and earthworks have great potential to exacerbate risks if not properly controlled, particularly during disposal. To control these risks, the Site Manager shall ensure that the terms herein are strictly adhered to.

3.4.1 On-site management and control

- The Site Manager shall ensure that records are kept of all excavations and soil movements on-site including the location and dimensions of the excavation, ground conditions, relocation or reuse of soil, and whether waste materials, or other visual or olfactory indicators of potential contamination are observed. Visual and olfactory indicators include:
    - Unusual odours or detection of VOCs;
    - Discolouration, stained water seeps and soils;
    - Suspected petroleum hydrocarbon contaminated soil and/or free product;
    - Any material that might appear to be hazardous waste (liquid or solid), putrescible waste, household refuse, or combustion by-products;
    - Intact or broken drums, tanks, underground concrete structures or other containers;
    - Inclusions of non-clean fill allowable deleterious materials[3], such as:
        - combustible, putrescible, degradable or leachable components;
        - hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown;
        - products or materials derived from hazardous waste treatment, stabilisation or disposal practices;
        - materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health if excavated;
        - contaminated soil and other contaminated materials; and
        - liquid waste.
    - Suspected asbestos containing materials (ACM); and
    - Groundwater with an oil sheen, odour or discolouration.
- Any potentially contaminated material that is to be reused at the earthworks site shall be placed to ensure that future human exposure risk is highly unlikely, as determined by the Contaminated Land Advisor;

[3] Ministry for the Environment, 2002. *A Guide to the Management of Cleanfills*. And WasteMINZ, 2016. *Technical Guidelines for Disposal to Land*.

- Any observation of unexpected waste materials or visual or olfactory indicators of potential contamination shall be treated as an incident. Works in the affected area shall cease, and the Contaminated Land Advisor shall be consulted immediately. Works shall only resume in the affected area again once the Contaminated Land Advisor has indicated that works' resumption is suitable;
- Any base course that is intermixed with soil is to be managed as contaminated soil; and
- Any excavated material that is stockpiled on the earthworks site shall be subject to stockpile control procedures outlined below.

3.4.2 Stockpile management and control

Stockpiling should be avoided and soil should be directly removed from site to landfill or deposited into the Encapsulation Cell. However, if required the following procedures should be applied:

- Stockpiled materials shall be placed on suitable material (250 µm polyethylene sheet or equivalent) to prevent contaminants leaching into clean soils;
- Any stockpile shall be maintained at a maximum height of 2 m to reduce chances for erosion in the event of unforeseen precipitation, and dust discharge from wind;
- Stockpiled material shall be placed in an area where runoff can be controlled, and shall be located in a manner to avoid off-site transport and on-site remobilization;
- Stockpiles should be located to maximise shelter from winds as far as practicable;
- Stockpiles being actively worked should be kept damp at all times;
- Stockpiles shall be located to minimise potential contact by earthworks site workers;
- Stockpiled material, when not being actively worked, shall be surrounded by silt fencing and covered by a suitable material (250 µm polyethylene sheet or equivalent) to prevent the ingress of rainwater into the stockpile and dust discharges. Covers should be secured with sandbags for longer term storage.

3.4.3 Off-site management and control

Contaminated soil will either be sent to landfill for disposal, or will be deposited in the Encapsulation Cell.

For off-site disposal to landfill, if it occurs, the following procedures must be adhered to:

- When off-site disposal is proposed, plans for off-site disposal shall be in place prior to the removal of any material;
- All material must be demonstrated to have been disposed of at an appropriately consented landfill;
- Material scheduled for off-site disposal shall be excavated and removed directly where reasonably possible. Alternatively, if soil must be stockpiled on the earthworks site, it shall be subject to the stockpile control procedures outlined in Section 3.4.2;
- Trucks shall be loaded within the earthworks site in locations where runoff and possible spills/dust during loading can be controlled and contained;
- Any vehicle in contact with earthworks site soils shall have its wheels either swept down or washed before leaving the earthworks site;
- The site manager shall maintain a log of each truck transporting material off-site; and
- All weighbridge dockets shall be retained by the Site Manager and copies provided to the relevant authority with the Site Validation Report.

For deposition within the Encapsulation Cell, soil disposal shall adhere to the following procedures:

- The Encapsulation Cell must be prepared prior to earthworks to avoid the requirement for stockpiling;
- Material shall be excavated and removed directly to the encapsulation cell where reasonably possible. Alternatively, if soil must be stockpiled on the earthworks site, it shall be subject to the stockpile control procedures outlined in Section 3.4.2;
- Trucks shall be loaded within the earthworks site in locations where runoff and possible spills/dust during loading can be controlled and contained;
- Any vehicle in contact with earthworks site soils shall have its wheels either swept down or washed before leaving the earthworks site; and
- Details of the material deposited in the Encapsulation Cell shall be provided in the Site Validation Report as confirmed by survey.

3.5 Imported Material Procedure

Material imported to the earthworks site for the purposes of filling shall be clean fill, and the Site Manager shall maintain records to demonstrate that any imported material is obtained from a quarry or other certified source. Any material not meeting this criterion shall be demonstrated to be acceptable to the client and relevant regulatory authorities subsequent to sampling and analysis by a Suitably Qualified and Experienced Practitioner in contaminated land management.

4 Health & Safety Plan – Contaminated Soils

4.1 Introduction

This Health & Safety (H&S) plan provides guidance that the Site Manager shall adhere to when working with contaminated contaminated soil or geomaterials during the earthworks. It should be read in accordance with and in addition to the WorkSafeNZ guide *Managing Occupational Health on Contaminated Sites* and the Department of Labour's *Health and Safety Guidelines on the Cleanup of Contaminated Sites*. The guidance has been developed to provide a framework for managing potential contamination-related effects at the earthworks site; however, this CSMP H&S plan does not replace or supersede the Site Manager's overall responsibility for the H&S of people within or adjoining the earthworks site, or their responsibility for protecting the environment, as outlined in other relevant guidance documents and H&S plans and legislation. General H&S based on the requirements of the *Health and Safety at Work Act 2015* shall be covered in the Site H&S Plan. The H&S procedures described in this section of the CSMP shall be implemented by the Site Manager, however, this shall not be taken as absolving either Toko Developments Limited or their agent from the overarching responsibility of ensuring that the earthworks site is managed appropriately.

The purpose of this contaminated land-related H&S Plan is as follows:

- To provide and maintain a safe working environment for workers while handling contaminated soils;
- To ensure provision of facilities and procedures to prevent exposure to contaminated soil by workers and the general public;
- To ensure awareness of potential exposure and harm resulting from handling contaminated soils; and
- To provide guidance on relevant industrial hygiene procedures.

4.2 Earthworks Site Establishment

The Site Manager shall ensure the following with respect to contaminated land-related H&S during earthworks site establishment:

- Hazard identification signage is in place to warn workers that the earthworks site soils are contaminated;
- A washing facility is established, and appropriate PPE is available and used by earthworks site workers; and
- First aid points are in place.

4.2.1 Hazard management

The hazard of contaminated soil shall be managed by minimising exposure to/contact with contaminated soils *AT ALL TIMES*. Adherence to all of the controls/directives herein is essential to contaminated soil hazard management.

4.3 Responsibility for Work Safety with Contaminated Soils

All staff at the earthworks site shall be required to undergo a contaminated soil safety induction before commencing work. The purpose of the safety induction is to make sure each worker is aware of the exposure risk related to the contaminated soil, of safe working procedures, of safety equipment and requirements, and of the action plan in case of an emergency.

In particular the induction should note that the arsenic levels adjacent to the sheep dip can be up to 20-fold higher than the *Commercial / industrial outdoor worker (unpaved)* criteria.

An environmental H&S officer (HSO) shall be appointed by the Site Manager for the duration of the works so that during work with contaminated soils there is a person responsible for ensuring the contaminated land-related H&S procedures are adhered to, alongside of those required under the Site H&S Plan. The HSO shall ensure that all personnel are familiar with the application and use of PPE and procedures specified in this CSMP before commencement of site work.

4.4 Contaminated Soils Safety and Hazard Minimisation Procedures

The following safety and hazard minimisation procedures are specific to the issue of contaminated soil at the earthworks site, and shall be followed by all staff working on-site:

- Any incidents shall be reported to the HSO; incidents involving discovery of unexpected waste materials, or unexpected visual or olfactory indicators of potential contamination shall result in immediate cessation of works in the affected area, the Contaminated Land Advisor shall be consulted immediately, and works shall only resume in the affected area again once the Contaminated Land Advisor has indicated that works' resumption is suitable;
- Earthworks site workers shall avoid unnecessary contact with contaminated soil or suspected contaminated soil;
- Earthworks site workers shall wear gloves at any time they might be in contact with contaminated soils, and dust masks at any time there is a breach of dust control. Failure of dust control shall constitute an H&S incident;
- Overalls are to be worn by workers at the site when exposed soils exist and the worker is involved in earthworks, or if the worker might otherwise be in contact with soils at the site;
- Overalls are to be removed on-site at the end of each day and these are to be laundered daily or disposable overalls are to be worn and disposed of daily;
- Appropriate footwear is to be worn and if this has come in contact with the earthworks site soils, is to be washed before leaving the earthworks site or entering a vehicle or earthworks site building;
- Contact with water at the earthworks site that has been in contact with soils shall be avoided;
- There shall be no eating, drinking or smoking in the works area other than in an appropriately designated location (earthworks site office or other location outside of earthworks site) in order to prevent contaminated soil from contacting food or being ingested directly via soiled hands;
- Food, drink, and any other item that might be in oral contact, shall not be allowed within the works area other than in an appropriately designated location, as defined above;
- Hand to mouth and hand to face contact shall be avoided during work; and
- Hands are to be washed before eating, drinking or smoking, and on every occasion when a person leaves the site.

Based on the hazard minimisation procedures above, the Site Manager shall ensure availability and supply of the following contaminated land-related PPE that is to be used when working with earthworks site soils:

- Overalls;
- P2 respiratory protection; and
- Disposable nitrile /rubber gloves or construction gloves.

PPE shall be used and replaced as appropriate to site conditions.

4.5 Emergency Procedures

Direct contact of any person with potentially contaminated dust, soil or groundwater shall be treated as an incident and a potential emergency situation and shall be reported to the HSO for immediate assessment and action.

5 Closure

On completion of earthworks, a Site Validation Report shall be provided to the consent authority providing confirmation of the following:

- That the earthworks works are complete;
- That all earthworks were carried out according to this CSMP, the RAP and the conditions of consent, and that there were no variations during the works; and
- To confirm the volume of soil removed, the volume and source of soil/clean fill materials imported
- Report on the sampling undertaken to confirm the extent and depth of the contamination
- To detail the location of any contamination remaining within Lot 1 and the capping installed
- Report any incidences and/or complaints that occurred during the earthworks
- That any failure to carry out work as specified herein is detailed, along with measures taken to rectify the failure and/or mitigate effects.

6 Applicability

This plan has been prepared for the benefit of Toko Developments Limited with respect to the particular brief given to us, and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

7 References

Department of Labour, 1994. *Health and Safety Guidelines on the Cleanup of Contaminated Sites*. ISBN 0-477-03546-9.

EC Otago Ltd, 2022. *Detailed Site Investigation - Coombe Hay Lane, Toko Mouth v2*. Job Reference: 320-21 Coombe Hay.

EC Otago Ltd, 2022. *Site Remedial Action Plan - Coombe Hay Lane, Toko Mouth*. Job Reference: 320-21 Coombe Hay.

Ministry for the Environment, 1999. *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011).* ISBN 978-0-478-37261-8.

Occupational Safety and Health Service, Department of Labour, 1992. *Code of Practice for the Design, Installation, and Operation of Underground Petroleum Storage Systems.*

Waste Management Institute New Zealand (WasteMINZ), 2016. *Technical Guidelines for Disposal to Land.* ISBN 978-0-473-35718-4.

WorkSafe New Zealand, 2016. *Managing Occupational Health on Contaminated Sites*. Reference WSNZ_2215_APR 16.

EC Otago

Site Manager Checklist: Coombe Hay Lane, Toko Mouth

Note: this checklist does not absolve the Site Manager from responsibility to read, fully understand, and abide by all of the terms of this CSMP.

Prior to commencement of works

- Establish earthworks (dust, erosion, sediment, storm water, odour) controls as per CSMP;
- Provide hazard board to state contaminated soil may be present and indicating H&S requirements for workers;
- Obtain PPE appropriate to the extent of exposure/contact.

During works

- Maintain earthworks controls as per CSMP;
- Implement CSMP H&S procedures, in addition to all other needed and applicable H&S procedures;
- Cease work and contact the Contaminated Land Advisor in the event of potential unforeseen contamination incidents, including encountering visual and or olfactory indicators of contamination, as follows:
    - Unusual odours;
    - Discolouration, stained water seeps and soils;
    - Suspected petroleum hydrocarbon contaminated soil and/or free product;
    - Any material that might appear to be hazardous waste (liquid or solid), putrescible waste, household refuse, or combustion by-products;
    - Intact or broken drums or other containers;
    - Inclusions of non-clean fill allowable deleterious materials, such as:
        - combustible, putrescible, degradable or leachable components;
        - hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown;
        - products or materials derived from hazardous waste treatment, stabilisation or disposal practices;
        - materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health if excavated;
        - contaminated soil and other contaminated materials; and
        - liquid waste.
    - Suspected asbestos containing materials (ACM); and
    - Groundwater with an oil sheen, odour or discolouration;

At completion of earthworks

- Document and report the following for the Site Validation Report:
    - Any incidents relating to discharges during the works;
    - Details of unexpected encounters/events and the action taken;
    - Details of visits made by council representatives;
    - Summary of material removed to landfill or deposited in the encapsulation cell; and
    - Confirmation that all other works were undertaken, as described herein.

EC Otago

Site Contact Details: Coombe Hay Lane, Toko Mouth.

Note: these details must be completed prior to initiation of the works.

Site Owner	Name	Toko Developments Limited	
	Phone		
	Email	tokofarms@gmail.com	
Contractor	Name		
	Phone		
	Email		
Site Manager	Name		
	Phone		
	Email		
Health & Safety Officer	Name		
	Phone		
	Email		
Environmental H&S Officer (if different from above)	Name		
	Phone		
	Email		
Contaminated Land Advisor	Name	Ciaran Keogh	Berni Chapman
	Phone	0274 128 004	021 254 1560
	Email	ciaran@ecotago.co.nz	berni@ecotago.co.nz
Emergency/After Hours Contact	Name		
	Phone		
Clutha District Council	Phone	03-419 0200	
Otago Regional Council	Phone	0800 474 082	

Appendix 9: Onsite Wastewater Feasibility Assessment & Stormwater Management Plan.

TOKO FARMS LIMITED

Toko Mouth Residential Subdivision Development

Onsite Wastewater Feasibility Assessment
&
Stormwater Management Plan
(OWWFA & SWMP)

Wai360
Think Sustainable Engineering

www.wai360.co.nz

MAY 6, 2022

Toko Farms Limited

Toko Mouth Residential Subdivision Development (TMRSD)

Onsite Wastewater Feasibility Assessment
&
Stormwater Management Plan
(OWWFA & SWMP)

Prepared By:

Wai360 Engineering Ltd

Work Description	Personnel	Signature
Author:	Zaaid Shah	

Company Information
18 Huia Street,
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Dunedin 9022, New Zealand
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Project Information
Project Number: W000002
Date: 06 May 2022
Reference Number: *Ref: RP 22-05-06_ZS_W000002.Docx*

Table of Contents

Part A – Stormwater Management Plan

1. Introduction

1.1. Purpose

Wai360 Engineering Limited has been engaged by Toko Farms Limited to provide for the Onsite Wastewater Feasibility Assessment & Stormwater Management Plan (OWWFA & SWMP) affecting the proposed residential subdivision development at Coombe Hay Lane, Toko Mouth. The (OWWFA & SWMP) is to provide:

a) Measures to mitigate the increase in impervious area that would anticipate for the post-development scenario for the proposed residential subdivision development.
b) Provide a SWMP showing the proposed mitigation works for the site, relating to collection, storage, and disposal of stormwater runoff.
c) Onsite Wastewater Feasibility Assessment

1.2. Location

The TMRSD site is located at Coombe Hay Lane, Toko Mouth, is approximately 16.1km southeast of the Milton township. The TMRSD is approximately 5.2ha in size and is coastal property located on a cliff terrace approximately more than 500m away from the Tokomairiro River mouth.

Figure 2.0 below shows the site locality, the existing stormwater infrastructure and natural flow path down gradient from the site.

1.3. Development Overview

The TMRSD site will be developed in 18 individual residential lots with private access ways via Toko Mouth Domain Rd and Coast Rd. Figure 1.0 below presents the site lot layout for the proposed TMRSD development by the Surveyor "Craig Horne".

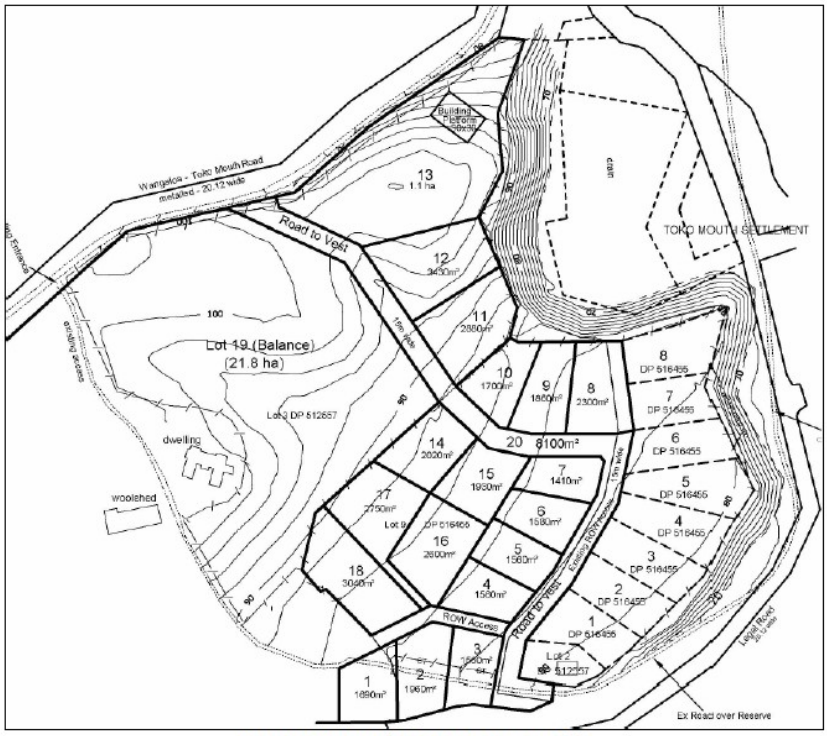


Figure 1.0: Proposed Lot Layout Plan

2. Background

2.1. Stormwater Catchment Characteristics and Existing Drainage

The proposed subdivision development site is part of various catchments, and potentially the site drains into these catchments based on the underlaying nature of the topography that dictates this, as shown in Figure 2.0 below.

Lots 1 to 10 and Lots 14 to 18 that forms part of the Balance Lot Catchment that overland flows into the Coombe Hay Lane roadside drainage system, that later conveys the collected flows into the existing 450mm dia. culvert located at the junction of Coombe Hay Lane.

The 450mm dia. culvert receives the stormwater runoff from Balance Lot Catchment via Combe Hay Lane side drain, and from the Farm Catchment 2 via the Cut-off Drain 1. Subsequently, the 450mm dia. culvert discharges the stormwater onto the cliff terrace that overland flows into the Toko Mouth Domain Roadside drainage system. Later, the roadside drain conveys and discharges the stormwater into the Rocky Valley Creek.

The Lots 11 to 12 are the constituents of Farm Catchment 1 that drains into Cut-off Drain 2, which also collects the stormwater from Terrace & Ground Catchment and subsequently discharges into the Tokomairiro River.

Lot 13 is the constituent of Farm Catchment 4. The stormwater runoff from the Lot 13 and Farm Catchment 4 runs into the Coast Roadside drain that conveys the runoff into the 225mm dia. culvert located under the Coast Rd that drains into Farm Catchment 3. Subsequently, the stormwater overland flow into the Farm 3 Creek drainage system. The Farm 3 Creek discharges all the collected stormwater from the Farm Catchment 3 and 4 into the Tokomairaro River, as shown in the Figure 2.0 below.

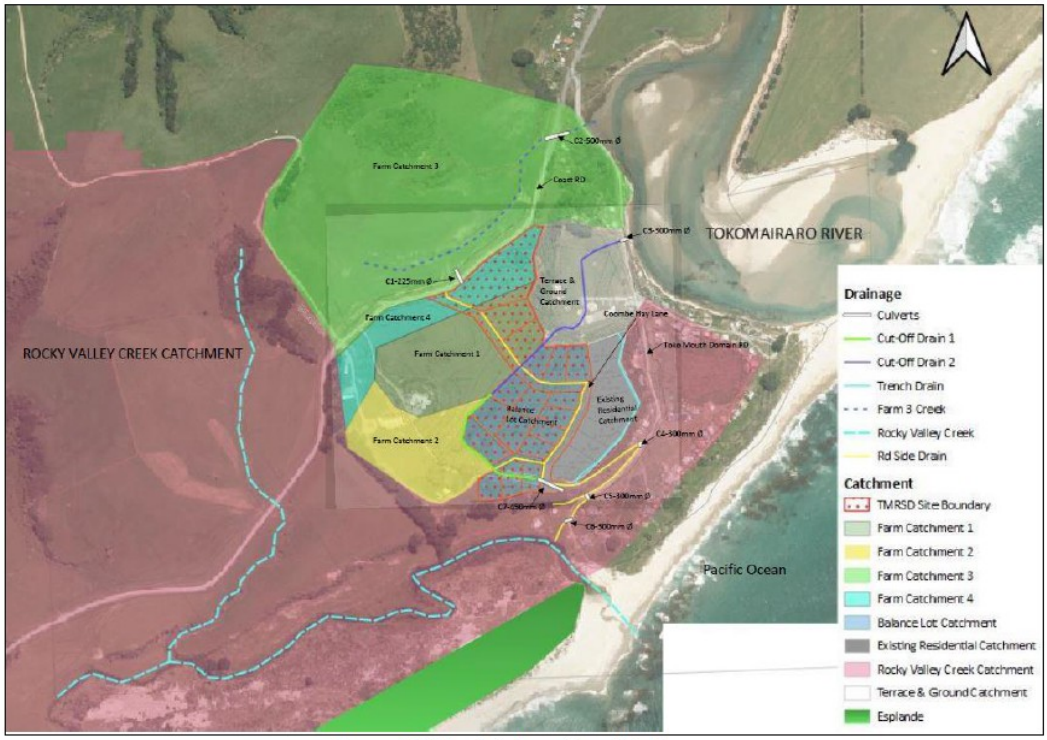


Figure 2.0 Site Catchment and Drainage

2.2. Coastal and Flood Hazards

According to the Otago Regional Council's (ORC) hazard map, the area immediately downstream to east and south of the site is designated as Coastal Hazard zone. This land area includes the Rocky Valley Creek estuary, the esplanade, recreational ground area and residential settlement that are prone to flooding caused by storm surge, as shown in schematic Figure 2.1 below.

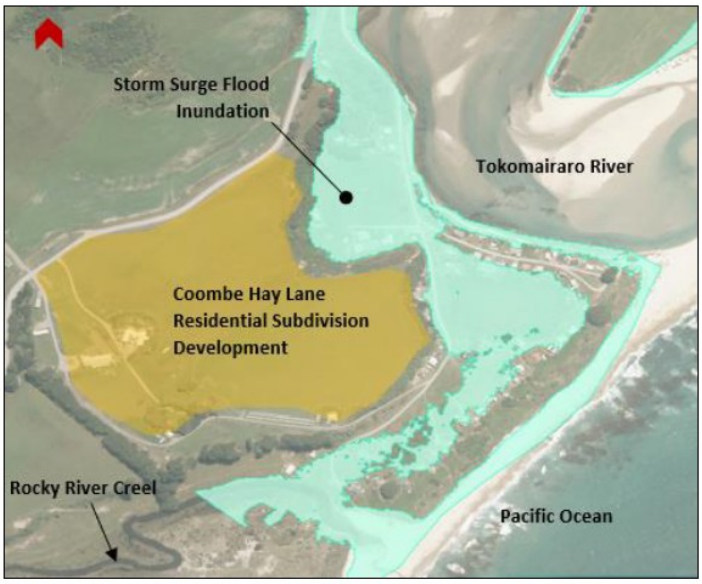


Figure 2.1: Storm Surge Inundating Low-lying Areas Downstream to Site

The low-lying areas on the east and south of the site is prone to flooding caused by the rise in the flood levels in the Tokomairaro River and Rocky Valley Creek produced by heavy precipitation in the upper Tokomairaro River and Rocky Valley Creek catchment. Moreover, according to *"Milton 2060 Technical Report (July 2012)",* the Tokomairaro River is classified as Area 1A - Tokomairaro River Floodplain.

3. Regulatory Requirements

3.1. Clutha District Council (CDC) Requirements

For the stormwater management, the CDC requires the following under section 3.7.4 Rule Sub. 4 – Subdivision Performance of 3-Drainage Systems of the District Plan.

"

- *On-site stormwater management systems (retention/detention and secondary flow paths) that are designed for a 1 in 100 years average recurrence interval event. Stormwater retention/detention measures shall be provided on-site as part of the overall development.*
- *A rate of stormwater discharge that remains equal to or less than that of the pre- development up to the 1 in 100 years average recurrence interval event.*
- *The integration of infrastructure, including roading and reserves, with the stormwater management systems. "*

4. Pre- and Post-development Assessment Methodology

4.1. Hydrological Models

HEC-HMS was used to create a hydrological model of the site to determine pre-development and post-development flows. The model was used to compute 10-year and 100-year ARI storm runoff hydrographs to calculate Detention Tank capacity requirements for various events.

4.1.1. Pre-development Catchment Model

Figure 4.0 below shows the pre-development catchment areas used to derive current stormwater runoff flows. The Farm catchments and Lot areas as per the schematic below represent the catchments used for the runoff estimates in the pre and post development models in HEC-HMS.

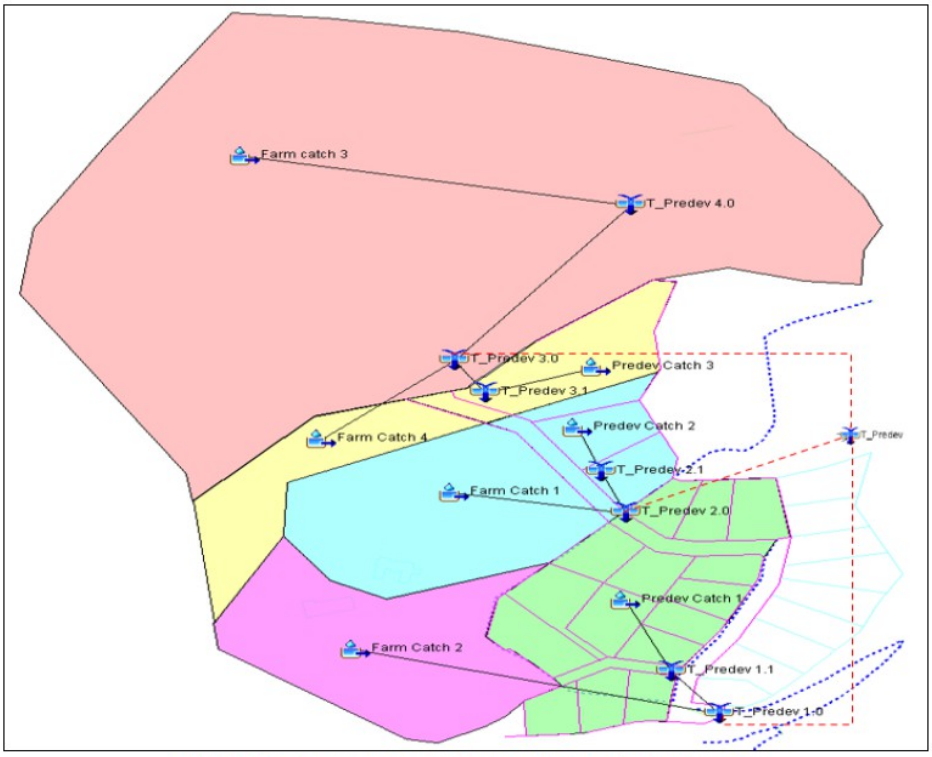


Figure 4.0: Pre-development Catchments in HEC-HMS Model

The following Table 4.0 shows the summary of catchments in HEC-HMS model discharging at various locations.

Table 4.0: HEC-HMS Pre-development Model Summary

Flow Junctions	T_Predev 1.0 Discharge into 450mm Dia. Culvert	T_Predev 2.0 Discharge into Cut-off Drain 2	T_Predev 3.0 Discharge into Coast Rd Side Drain	T_Predev Total Runoff
Catchments	✓ Farm Catchment 2. ✓ Predev Catch 1 consists of: ▪ Lot 1 – 10 ▪ Lot 14, 15, 16 17 & 18 ▪ Lot 20: Combe Hay Lane Access Road catchment	✓ Farm Catchment 1. ✓ Predev Catch 2 consists of: ▪ Lot 11 – 12 ▪ Part of Lot 13 ▪ Lot 20: Combe Hay Lane Access Road catchment	✓ Farm Catchment 4. ✓ Predev Catch 3 consists of: ▪ Lot 13. ▪ Lot 20: Combe Hay Lane Access Road catchment	Sum of total runoff from T_Predev 1.0, 2.0 and 3.0

4.1.2. Post-development Catchment Model

The Lot areas 1 to 18 and Lot 20 (Coombe Hay Lane Access Rd) in the schematic Figure 4.1 below represent the post-development catchments simulated in the HEC-HMS model to estimate the stormwater runoff and volume for the site.

Lots 1 to 18 was further delineated into pervious and impervious sub-catchment areas to estimate the post-development stormwater runoff condition for the site, as shown in Figure 4.1 below.

Pervious Sub-catchments

- Surface Runoff Sub-catchment – being the ground surface around the new dwelling for the proposed individual lots.

Impervious Sub-catchments

- The 250m² allotted impervious area is modelled in HEC-HMS for the following.
  - Roof Runoff Sub-catchment – being the building roof area
  - Driveway Runoff Sub-catchment

The HEC-HMS model also included a storage element (detention storage tank) to help determine the appropriate amount of detention storage and estimate the size of the restricted tank outlet flow.

The model was used to confirm that the 10-year and 100-year Average Recurrence Interval (ARI) rainfall event post-development peak flows from the Detention Tank was equivalent to or less than the pre-development flow rates.

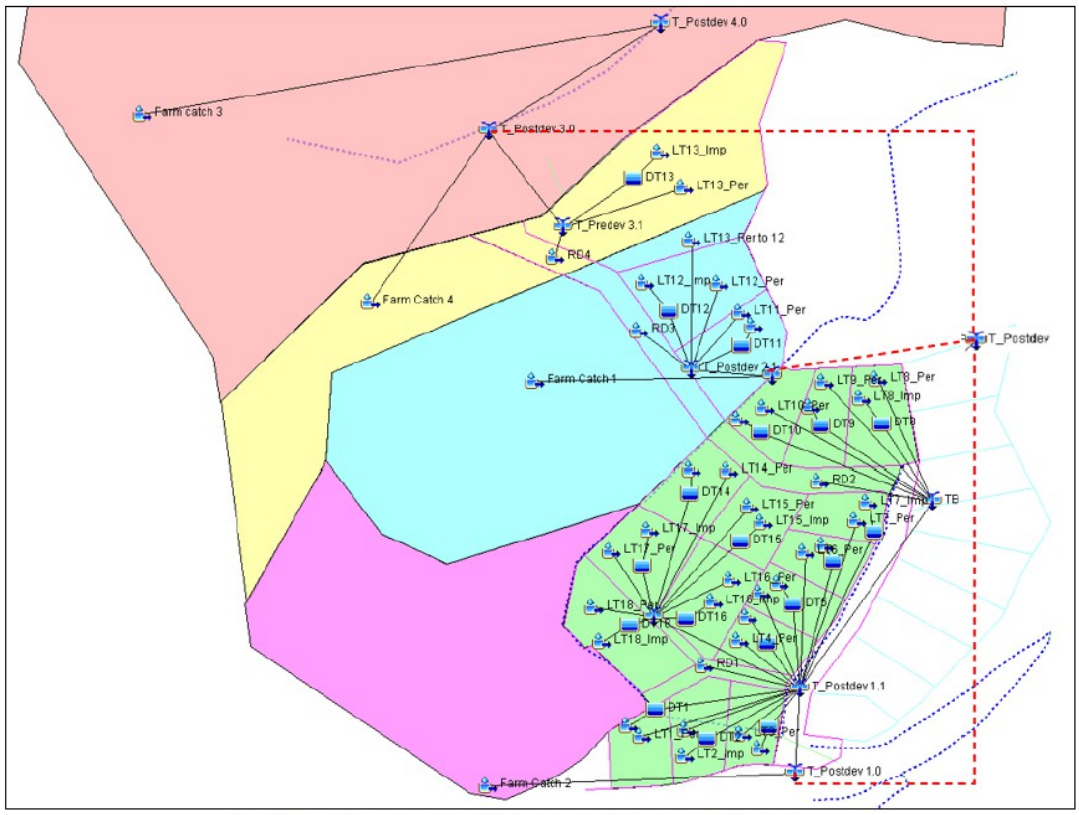


Figure 4.1: Post-development Catchments in HEC-HMS Model

The following Table 4.1 shows the summary of catchments in HEC-HMS model discharging at various locations.

Table 4.1: HEC-HMS Pre-development Model Summary				
Flow Junctions	**T_Postdev 1.0 Discharge into 450mm Dia. Culvert**	**T_Postdev 2.0 Discharge into Cut-off Drain 2**	**T_Postdev 3.0 Discharge into Coast Rd Side Drain**	**T_Postdev Total Runoff**
Catchments	✓ Farm Catchment 2. ✓ Post-development consists of: ▪ Lot 1 – 10 ▪ Lot 14, 15, 16 17 & 18 ▪ Lot 20: Combe Hay Lane Access Road catchment	✓ Farm Catchment 1. ✓ Post-development consists of: ▪ Lot 11 – 12 ▪ Part of Lot 13 ▪ Lot: 20 Combe Hay Lane Access Road catchment	✓ Farm Catchment 4. ✓ Post-development consists of: ▪ Lot 13. ▪ Lot 20: Combe Hay Lane Access Road catchment	Sum of total runoff from T_Postdev 1.0, 2.0 and 3.0

4.2. Catchment Model Characteristics

4.2.1. Soil Parameters

The soil classification data for the locality has provided the basis for estimating the Curve Number (CN) values as the basis of the Soil Conservation Service rainfall – runoff estimation methodology. CN numbers determine the infiltration and hence the rainfall runoff rate in the pre and post-development-HMS models. The specific CN values were estimated using the CN tables as per the HEC-HMS Technical Reference Manual, (Feldman, 2000).

From the Soil Map analysis, the general classification of soils within the site and the catchment is silty loam soils over clay soils, (Landcare Research, 2018). This soil description was interpreted as a Type C soil in the context of the CN hydrological method.

For estimating the initial rainfall loss to soil in the model an initial abstraction parameter of 0.2S was applied where S is derived from the CN.

Pre-development Scenario CN

Based on the SCS TR-55 Table 2.2c Runoff curve numbers for other agricultural lands, the pervious surfaces were assumed to be pasture for grazing with a poor hydrological condition. After all the above parameters were investigated the CN value of 79 was adopted for the HEC-HMS model for the pre-development scenario for the site.

Post-development Scenario CN

The assumed post-development impermeable area is 250m² per lot. The 250m² of area assumes the buildings account for 60.0% (150m²) of the impermeable area and the balance of 40.0% (100m²) is pavement area. If the impervious area exceeds 250m² then additional detention storage would be required to be provided on the lot by the lot owner.

From the (Hydrologic Modelling Systems (HEC-HMS 4.8): Technical Reference Manual, 2000) a CN value of 98 was adopted for the impermeable areas including paved parking lots, roofs, and driveways.

A post-developments CN value of 74 was used for the pervious areas lower than the pre-development scenario. The reduction in the post-development condition for the pervious area is due to no grazing that will have no compaction impact. Therefore, the pervious surface is assumed to be good condition grass cover on 75% or more of the lot area.

Similarly, it is assumed that there will be more planting of vegetative cover, including trees and lawns that will enable increase infiltration rate of stormwater and would then mitigate high surface runoff of rate.

4.3. Time of Concentration and Lag Time

The time of concentration is a measure of the catchment's response to rainfall and how the rainfall moves over the length of the catchment with time as sheet, and shallow flow.

Pre-development Scenario
For the pre-development condition, the lag time for the pervious surface is assumed in the model as 4 minutes, which is 0.6 times the time of concentration.

Post-development Scenario
For the post-development condition, the lag time for the pervious surface for TMRSD lots is assumed in the model as 4 minutes, which is 0.6 of the time of concentration. For the impervious surface the lag time for Lots TMRSD lots is assumed in the model as 3 minutes, which is also 0.6 of the time of concentration.

The 5 minutes lag time for the Farm Catchments 1, 2 & 4, while the lag time for Farm Catchment 3 is 10 minutes for both the pre and post development conditions.

4.4. Rainfall Hydrographs

4.4.1. Methodology

A series of triangular rainfall hyetographs (rainfall depth versus time graph) were developed for a range of storm durations. The developed rainfall hyetographs were imported into the HEC-HMS model and runoff flows were calculated.

The triangular hyetograph methodology adopted by the Christchurch City Council "Advanced Analysis" method provided in the "Waterways, Wetlands and Drainage Guideline" was used to develop the hyetographs. In the past few years, other Councils in the South Island have accepted this form of design storm hyetograph. The triangular hyetograph utilizes the average rainfall intensity for a given duration as the basis for design with the peak intensity being 2 times the average intensity and occurring at 0.7 times the duration.

4.4.2. Climate Change

For the site, the projected climate change of 2°C temperature for Otago region is accounted in the design rainfall.

4.4.3. Storm Durations

Stormwater flows were estimated for both the 10- and 100-year ARI storm events for the following durations: 0.5-hour, 1 hour, 2 hours, 6 hours, 12 hours, and 24 hours. The objective of this approach is to identify the critical storm for enhanced stormwater management.

The 10-year ARI is used for the design of the detention storage and the 100-year ARI event is used to estimate the 100-year ARI flow from the site discharging into the secondary overland flow path to assess the potential effects due to the proposed development on the site.

5. Proposed Stormwater Management Plan

5.1. Stormwater Management Objective

The proposed land use change from the 100 percent pervious surface to a residential zone will increase the impervious area for the proposed development site. Because of the proposed land use change the area would have a higher percentage of impervious area for roofs, parking and roads that would result in an increase in the rate of runoff and a significant increase in the volume of runoff. Mitigation measures are therefore required as part of the proposed stormwater management plan to reduce the peak runoff flows and discharge volumes from the post-developed site to the pre-development conditions (e.g., to achieve "hydraulic neutrality").

The objectives behind the proposed stormwater management plan for the collection and disposal of stormwater from the site are as follows:

a. Ensure that stormwater runoff from the site does not have adverse effects on people, infrastructure, and property downstream. The potential for adverse effects in this case would be due to an increase in flow rate and this would be mitigated by the proposed provision of stormwater Detention Tank System.
b. Manage stormwater quality to ensure that adverse effects on the receiving waters are avoided.

5.2. Proposed Stormwater Management Layout Plan

The proposed SWMP plan layout is illustrated in *"Sheet C200 - Site Layout Stormwater Management Plan"* in Appendix A.

5.3. Proposed Stormwater Management Plan Components

This section describes the functions of components of the SWMP presented in *"Sheet C200 - Site Layout Stormwater Management Plan"* in Appendix A.

Site stormwater components are as follows:

- Stormwater Collection Systems.
- Detention Tank System.
- Existing Cut-off Drains for upstream and site catchment stormwater runoff conveyance.
- Existing 450mm dia. Culvert
- Upgrade stormwater culvert under Coast Rd.

5.3.1. Stormwater Collection System

The Coombe Hay Lane Side Drains illustrated in Sheet C200 of Appendix A is the primary stormwater collector system that would collect stormwater from the pervious, impervious (driveways) and discharge from the Detention Tank. Later, the Coombe Hay Lane Side Drain would discharge the collected stormwater into either; Cut-off Drain 2 or 450mm dia. culvert or the Coast Rd side drain that is located on the downstream environment.

5.3.2. Existing Cut-off Drains 1 & 2

In the Post-development scenario, the existing Cut-off Drain 1 and 2 located on the upstream of Lot 9, 10, 14, 17 and 18 will continue to intercept the stormwater runoff from the upstream environment.

Cut-off Drain 1 would collect stormwater runoff from Farm Catchment 2 and Lot 1, 2 & 3. Cut-off Drain 2 would collect stormwater runoff from Farm Catchment 1 and Lots 11, 12, and Part of Lot 13. The Cut-off Drain 1 and 2 are shown in Sheet C200 of Appendix A.

5.3.3. Detention Tank Systems

Initially, the stormwater collection system would collect and discharge the stormwater into the single or multiple Reuse Water Tank(s) - approximately larger than 16000 litres in capacity for reuse of water for domestic purpose. As a result of Reuse Water Tanks reaching to its maximum level, it would subsequently overflow and discharge into Detention Tank System. Thus, the purpose of the Detention Tank System is to control the post-development flows at the pre-development rate.

Thus, the relative level (RL) for the Reuse Water Tank discharging into the Detention Tank must be same or greater than the high-level inlet of the Detention Tank System.

A 16000 Litres Aqua Tank or similar tank system is proposed for TMRSD for each lot to control the post-development flows at a pre-development level. The Detention Tank System is fitted with orifice control that will restrict the post-development flowrate to be less than the peak pre-development flowrate from each individual lot.

5.3.4. Detention Tank System Discharge Controls

There will be two discharge flow controls, located at different levels in Detention Tank System, this is to limit the rate of discharge from the Detention Tank System, thus, enabling the total runoff from the site to be less than the pre-development flow rate for the 10-year and 100-year ARI design storms.

The primary discharge control is a 15mm diameter orifice assumed to be located at the invert level of the Detention Tank System, thus, to control runoff for up to the 100-year ARI storm event. The secondary discharge control is a 100mm dia. pipe for extreme storm events (exceeding 100-year ARI storm), which is the Detention Tank built-in overflow system located at 1.8m above the invert level.

The combination of the two outlet controls enables the design flow for the 10-year and 100-year ARI events to be effectively controlled and provides for safe discharge in extreme events, and further allows for mitigation of potential malfunctions of the primary orifice, such as blockages.

5.3.5. Existing 450mm dia. Culvert – C7

The existing 450mm dia. culvert located at the junction of Coombe Hay Lane would continue to receive pre-development flows rates from Cut-off Drain 1 and Coombe Hay Lane Side Drain, and subsequently discharging the stormwater onto the cliff terrace, which subsequently overland flows into the Toko Mouth Domain Roadside drainage system. Later, the roadside drain conveys and discharges the stormwater into the Rocky Valley Creek, as shown in Sheet C100 & C200 of Appendix A.

5.3.6. Upgrade Piped Culvert – C1

An upgrade of the existing 225mm Ø culvert (C1) is to be replaced with a new piped culvert for the conveyance of flows arriving from subdivision Lot 13 and Farm Catchment 4. The detail design of these will be performed during engineering approval for the proposed subdivision development.

5.3.7. Secondary Flow Path

For events larger than the 100-year ARI rainfall, any flow in excess of the capacity of the Coombe Hay Lane Side Drain, Cut-off Drains and other collection system would overland flow following the contour into the downstream environment.

Currently, any excess flow from Lot 13 over the 100-year ARI would potentially flow over the Coast Rd into Farm Catchment 3.

In case of Cut-off Drain 1 exceeding its maximum capacity due to excess flows from subdivision Lot 11 and Lot 12 will then disperse its flows onto the larger Terrace & Ground Catchment that would

subsequently be functioning as a secondary overland flow path and later discharge into the Tokomairaro River.

For the Balance Lot Catchment subdivision (i.e., Lots 1 to 10 and Lots 14 to 18) for storms above the 100-year ARI causing the Coombe Hay Lane Side Drain or the 450mmØ exceed its limits would eventually overland flow onto Davis Access Rd and later onto Tokomairiro Domain Rd, thus discharging into the Rocky Valley Creek.

6. Detention Tank Design Performance Result

6.1. Pre and Post development Calculation Summary

Table 6.0 presented below shows the estimated pre- and post-development runoff results for TMRSD on the assumptions in the above sections for the HEC-HMS modelling. The 10-year and 100yr ARI critical duration peak flow estimates (the maximum flows) for the pre and post development conditions is highlighted in green.

The Table 6.0 further confirms that the estimated critical flow for the 10-year and 100yr ARI events are less than the maximum pre-development flow for the 10-year and 100-yearARI rainfall events. The maximum pre-development runoff flow occurs for the 6-hour duration for the 10-year ARI event, while the maximum runoff for 100-year ARI rainfall event is estimated to occur for the 2-hour duration storm event.

Table 6.0: Pre and Post Development Peak Site Runoff Flows

Pre & Post Development Flows for TMRSD													
Storm	Pre-development (l/s)				Post development (l/s)				Difference Post & Pre Development (l/s)				Critical Peak Flows
	T_Predev 1.0 Discharge into 450mm Dia. Culvert	T_Predev 2.0 Discharge into Cut-off Drain 2	T_Predev 3.0 Discharge into Coast	T_Predev Total Runoff	T_Postdev 1.0 Discharge into 450mm Dia. Culvert	T_Postdev 2.0 Discharge into Cut-off	T_Postdev 3.0 Discharge into Coast Rd Side Drain	T_PostDev	T_1.0	T_2.0	T_3.0	T_T	
	l/s	l/s	l/s	l/s	l/s	l/s	l/s	l/s	l/s	l/s	l/s	l/s	
10yr, 0.5hr	17	9	6	32	14	10	6	30	78	46	30	154	
10yr, 1hr	43	29	17	89	34	25	14	73	58	31	22	111	
10yr, 2hr	75	47	30	152	65	43	25	133	27	13	11	51	
10yr, 6hr	92	56	36	184	86	53	32	171	6	3	4	13	✓
10yr, 12hr	85	52	33	170	83	49	30	162	9	7	6	22	
10yr, 24hr	66	40	26	132	67	39	24	130	25	17	12	54	
100yr, 0.5hr	175	129	74	378	161	109	65	335	141	84	57	282	
100yr, 1hr	264	180	109	553	253	161	98	512	49	32	24	105	
100yr, 2hr	302	193	122	617	294	181	111	586	8	12	11	31	✓
100yr, 6hr	257	158	101	516	254	151	94	499	48	42	28	118	
100yr, 12hr	199	122	78	399	202	118	74	394	100	75	48	223	
100yr, 24hr	143	87	56	286	149	85	54	288	153	108	68	329	

6.2. 10-year ARI Critical Duration Peak Flow Result

The following schematic Figure 6.0, 6.1 and 6.3 below presents the hydrograph extracted from the HEC-HMS model illustrating the critical peak flow for the 10-year ARI, 6-hour storm for the pre and post development scenarios for discharge of stormwater arriving at *the 450mm dia. Discharge Culvert, Cut-off Drain 2 and Coast Rd Side Drain respectively.*

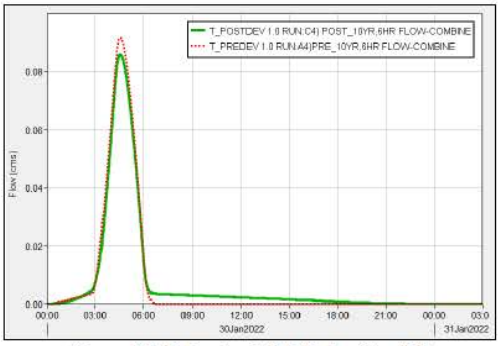


Figure 6.0: T_Predev 1.0 & T_Postdev 1.0 Discharge into 450mm Dia. Culvert

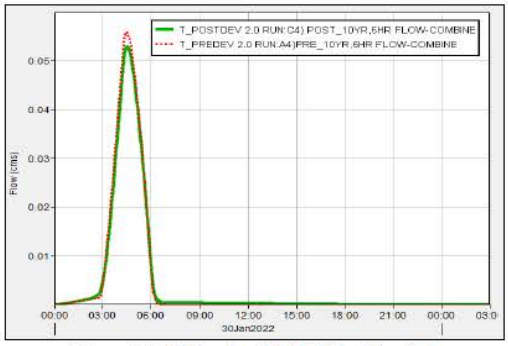


Figure 6.1: T_Predev 2.0 & T_Postdev 2.0 Discharge into Cut-off Drain 2

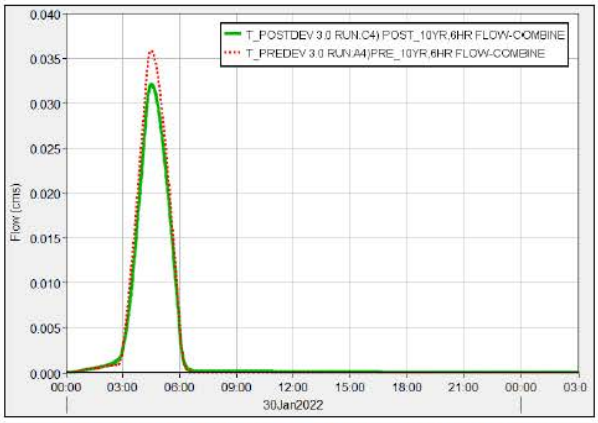


Figure 6.2: T_Predev 3.0 & T_Postdev 3.0 Discharge into Coast Rd Side Drain

As per Figure 6.0 flow post-development flows arriving at the 450mm dia. Culvert is 86 l/s, which is less than the pre-development of 92 l/s.

The post-development flows arriving at the Cut-off Drain 2 is 53 l/s, which is less than the pre-development flow of 56 l/s, shown in schematic Figure 6.1.

For the 32 l/s post-development flows discharging into the Coast Rd side drain is less than the pre-development flow of 36 l/s, as per Figure 6.2 above.

The hydrograph in schematic Figure 6.3 below shows the sum of pre and post development flows from the TMRSD that demonstrates by incorporating the detention storage with a discharge control in the form of an orifice limits the post-development peak flow to 176 l/s, which is less than the estimated pre-development peak flow of 184 l/s.

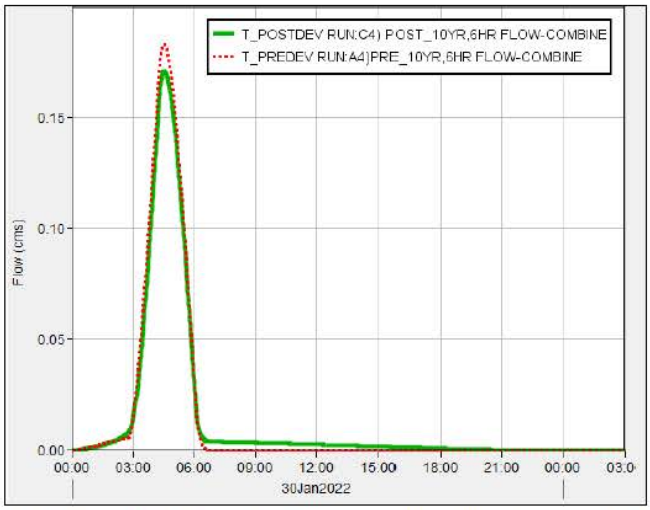


Figure 6.3: 10-year ARI, 6-hour Duration Pre and Post development Peak Flows

6.3. 100-year ARI Critical Duration Peak Flow Result

The following schematic Figure 6.4, 6.5 and 6.6 below presents the hydrograph extracted from the HEC-HMS model illustrating the critical peak flow for the 10-year ARI, 6-hour storm for the pre and post development scenarios for discharge of stormwater arriving at *the 450mm dia. Discharge Culvert, Cut-off Drain 2 and Coast Rd Side Drain respectively.*

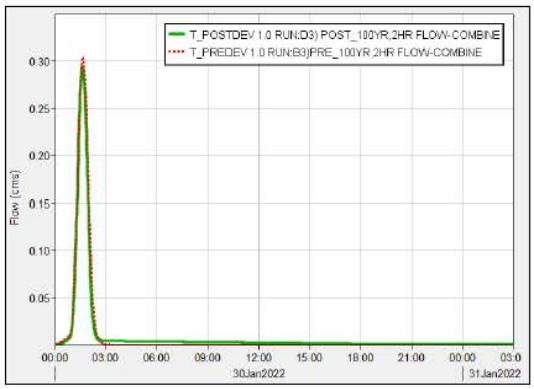


Figure 6.4: T_Predev 1.0 & T_Postdev 1.0 Discharge into 450mm Dia. Culvert

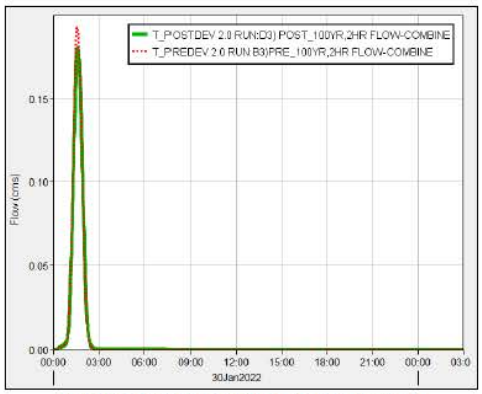


Figure 6.5: T_Predev 2.0 & T_Postdev 2.0 Discharge into Cut-off Drain 2

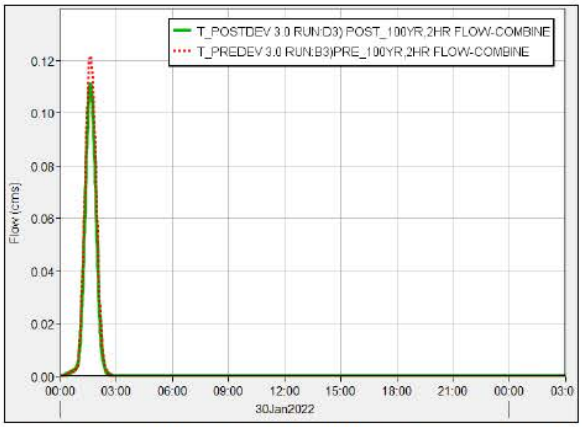


Figure 6.6: T_Predev 3.0 & T_Postdev 3.0 Discharge into Coast Rd Side Drain

As per Figure 6.4 flow post-development flows arriving at the 450mm dia. Culvert is 294 l/s, which is less than the pre-development of 312 l/s.

The post-development flows arriving at the Cut-off Drain 2 is 181 l/s, which is less than the pre-development flow of 193 l/s, shown in schematic Figure 6.5.

For the 111 l/s post-development flows discharging into the Coast Rd side drain is less than the pre-development flow of 122 l/s, as per Figure 6.6 above.

The hydrograph in schematic Figure 6.7 below shows the sum of pre and post development flows from the TMRSD that demonstrates by incorporating the detention storage with a discharge control in the form of an orifice limits the post-development peak flow to 586 l/s, which is less than the estimated pre-development peak flow of 617 l/s.

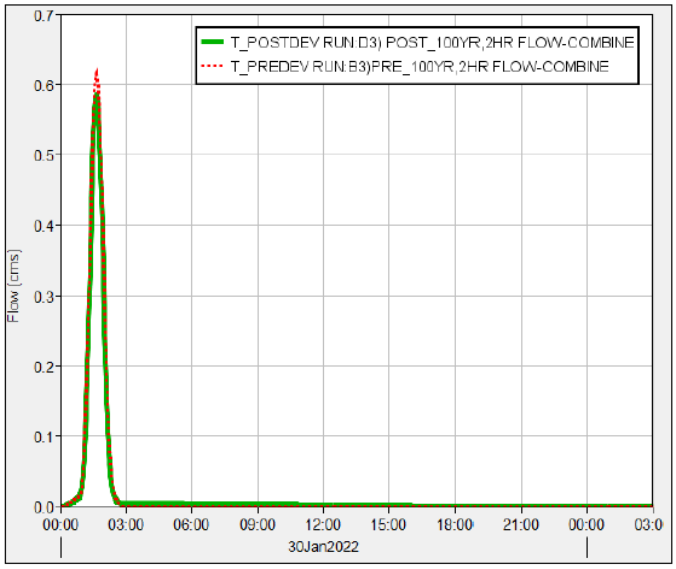


Figure 6.7: 100-year ARI, 2-hour Duration Pre and Post development Peak Flows

7. Conclusion

The Stormwater Management Plan (SWMP) set out for the TMRSD site as presented above in this report identifies the following:

- The Sheet C200 of Appendix A describes that the stormwater collection, detention, and discharge for the proposed development. The disposal strategy is on the Detention Tank System to control the post-development flowrate at or less than a pre-development level.
- The dimensions and parameters for the Detention Tank outlet associated with hydraulic controls have been determined and are appropriate to ensure that the post-development flowrate is reduced to less than the pre-development level.
- SWMP is consistent with the CDC District Plan requirements and are appropriate in mitigating any adverse effect onto the downstream environment and properties.
- The existing stormwater flow paths through the proposed development site would continue to be utilised following the development.
- Indicative location of stormwater collection and disposal plan for the proposed TMRSD is provided in Sheet C200 of Appendix A. The final design stage would ensure that the collection

and disposal strategy functions in conjunction with the individual Detention Tank System installed on individual Lots.

- The TMRSD site has a secondary overland flow path in the event when the stormwater flows exceed the capacity for the following infrastructure.
    - 450mm diameter culvert.
    - Cut-off Drains
    - Coombe Hay Lane Side Drain
- The SWMP is subject to a maximum impermeable area per lot of 250m². Subsequently, if lot owners opt to develop the lots to include an impermeable area greater than 250m² then additional stormwater detention storage or other measures may be required to mitigate stormwater runoff effects.
- To ensure that the requirements of this SWMP are achieved regular maintenance will be required. A Stormwater Facilities Maintenance Plan is required to be formulated by the individual Lot owners during the building consenting phase.

Part B – Onsite Wastewater Feasibility Assessment

1. Site Evaluation

1.1. Soil Test Pit Locations

To determine the feasibility of the onsite wastewater dispersal, Wai360 performed a site assessment on 24 October 2021 for the proposed TMRSD. Several test pits (TP1 – TP9) were excavated onsite as per *"Sheet C300 – Test-Pit Locations"* in Appendix A.

Figure 8.0: Excavated Test Pit

1.2. General Guideline

The TMRSD OWWFA was performed in accordance with S/NZS 1547:2012 *"On-site Domestic Wastewater Management".*

1.3. Soil Investigation

The excavation of all test pits performed established similar soil profiles. The underlying soil strata comprising of significant depth of 400mm topsoil with underlying silty clay layer that extended to the depth.

1.4. Groundwater Condition

According to the survey data, TMRSD is greater than 80m above sea level and situated on a cliff terrace. And based on the test pits greater than 450mm excavation performed, the site topography and existing drainage; it is anticipated that the groundwater level would be well below and close to that of Tokomairiro River level. Thus, the design of the onsite wastewater systems for the TMRSD poses no consequences to the groundwater.

1.5. Conclusion

Established on the onsite investigation via test pit excavation, the of soils underlying the topsoil is classified as Category 5 in accordance with AS/NZS 1547:2012 *"On-site Domestic Wastewater Management".*

At the time of onsite wastewater system design for each individual lot, a further soil and permeability tests are required to be performed to establish the soil characteristics for that lot.

2. Consent Conditions - *Regional Plan: Water for Otago*

According to the *section 12.A.1.4 of the Regional Plan: Water for Otago,* the discharge of human sewage through any on-site wastewater treatment system, installed after 28 February 1998, onto or into land is a permitted activity; providing that the system designed disposal field shall be contained to minimise the probability of contamination onsite and downstream environment.

Thus, the sections in the following outlines the necessary consenting considerations required based under section *12. A.1.4 of the Regional Plan: Water for Otago*.

2.1. Discharge Rate

Based on the *sections 12.A.1.4(a),* for the onsite wastewater system design to be a permitted activity; therefore provided, the discharge for each lot does not exceed 2000 litres per day (calculated as a weekly average). It proposed that each individual lot will have a self-contained wastewater system and that not a communal wastewater system, thus the wastewater system discharge rate of 2000 liters per day is for single individual lot.

2.2. Groundwater Protection Zone

Under *section 12.A.1.4(b),* the discharge does not occur within the A zone of any Groundwater Protection Zone, as identified on the C-series.

Thus, based on the above condition it is identified the TMRSD is not within the zone of groundwater protection zone.

2.3. Proximity Surface Water or Mean High Spring Water

According to *section 12.A.1.4(c),* The system's disposal field is sited more than 50 metres from any surface water body or mean high water springs, thus, for the TMRSD is located greater than 50 metres of the Tokomairiro River.

The existing swale drains, and stormwater collector systems will form part of the TMRSD and considered in proximity and part of the TMRSD. However, the existing drains and stormwater collector systems are not considered as a *"water body or river"* as per the following definitions in the *Regional Plan: Water for Otago.*

Water Body *"means fresh water or geothermal water in a river, lake, stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area".*

River *"means a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal)."*

2.4. Proximity Bore

Based on the to *section 12.A.1.4(d),* the wastewater system's disposal field shall be more than 50 meters from any bore for water supply for domestic use or for livestock.

Thus, for the TMRSD there is no water bore is identified within the proximity of 50 meters with proposed lots for the development.

2.5. Discharge into Drain or Race or Groundwater

As per *section 12.A.1.4(e),* during design and construction of the wastewater must ensure that there is no direct discharge of human sewerage into the drain or race, or groundwater. The wastewater system design must demonstrate and envelope thorough mitigation systems that shall be constructed to mitigate any issues that may arise with wastewater discharge runoff.

2.6. Effluent Runoff

According to *section 12.A.1.4(f),* the design and installation of the wastewater system must ensure that there is no such wastewater effluent runoff from the system or dispersal field into the neighboring properties.

2.7. Not to Cause Flooding

The water table is located well below the ground surface. Consequently, the wastewater system design for each lot as per the *section 12.A.1.4(g),* must ensure that the discharge of wastewater must not cause flooding to property, erosion, sedimentation, land instability issues within TMRSD or onto the downstream environment. The design must entail appropriate drainage paths etc., to mitigate adverse effects onto the downstream environment and properties.

3. Onsite Wastewater Management Plan (OWWMP)

After evaluating the site investigation and assessment performed for TMRSD, thus, each individual lot have a confirmed capacity for suitable onsite wastewater management system.

The type of system that is proposed for the TMRSD could be both in form primary and secondary treatment onsite wastewater system.

Dispersal Method 1 design could include a primary septic tank system with the secondary treatment that may comprise of a Wisconsin sand mount as a dispersal field.

Dispersal Method 2 design could include a primary septic tank system with the secondary treatment that may comprise of a ground dispersal via the pressure compensating dripline emitter system that is laid into the topsoil layer.

For two the methods above in conjunction with the maximum allowable flow of 2000 litres per day would require the area for dispersal field approximately in between 350m² to 500m² that is restricted up by the number of people per dwelling. Subsequently, the dispersal field area is further depended on the sustainable preservation and conservation measures to onsite waste management for each lot. This area can be accommodated with the minimum lot area of 1400m² as per the TMRSD layout plan.

The selection of onsite wastewater treatment system design is specific to development plans for each lot. And the treatment system is critical, and each lot development must cater for the probability of intermittent occupancy.

4. Conclusion

The OWWFA set out for the TMRSD site as presented above in this report outlines the following:

- It is expected that each individual lot will have a self-contained wastewater system and that not a communal wastewater system, thus the wastewater system discharge rate of 2000 liters per day is for single individual lot.
- Based on the site investigation and assessment each lot is confirmed suitable for onsite wastewater management system.
- For Building Consent application each individual lot would require site specific wastewater system design.

Appendix A

Wai360 Drawings

Sheet C100

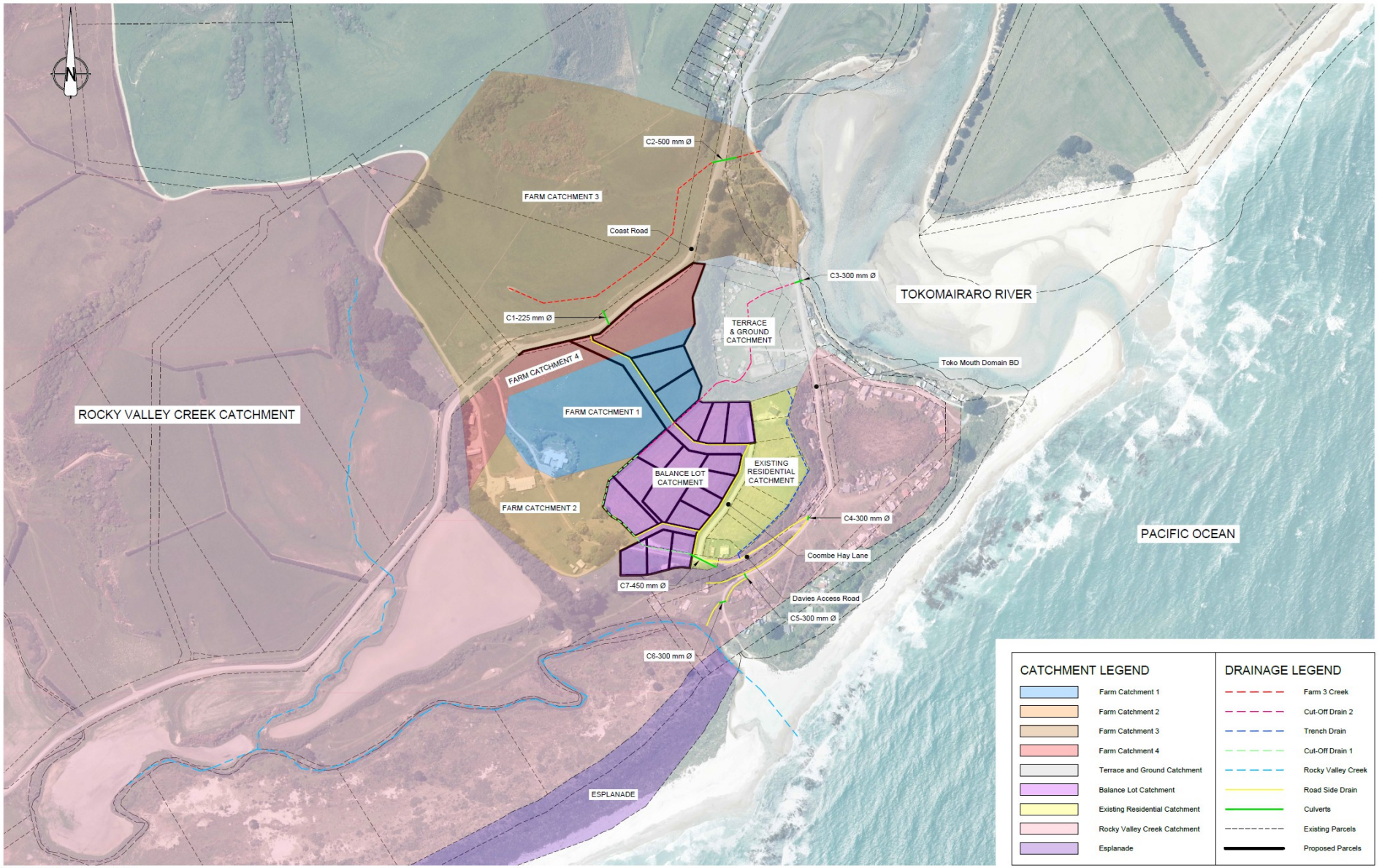
Overall Stormwater Management Plan

Sheet C200

Site Layout Stormwater Management Plan

Sheet C300

Test-Pit Locations



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Wai360
Think Sustainable Engineering

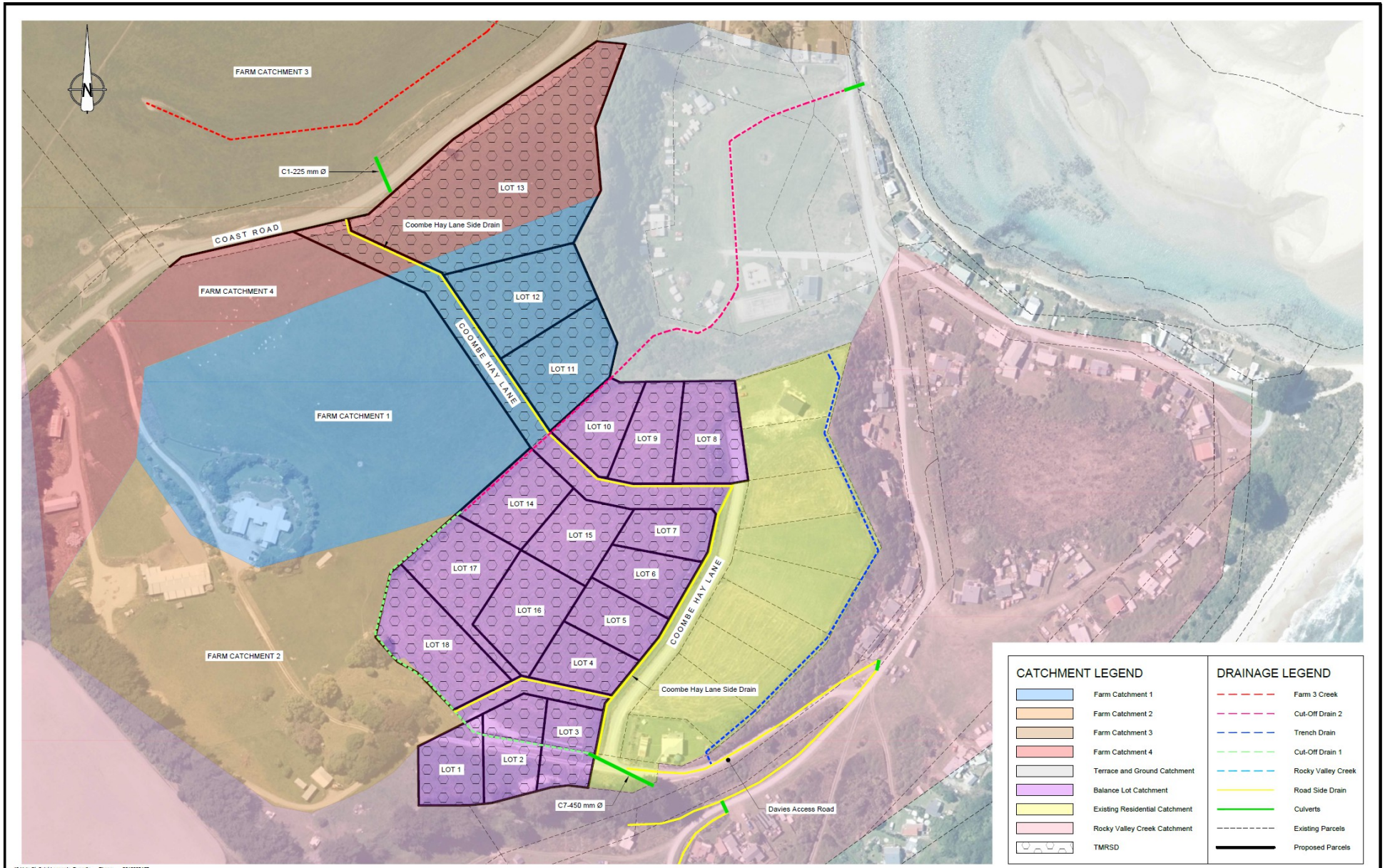
CLIENT:
TOKO FARMS LIMITED

PROJECT TITLE:
TOKOMOUTH
PROPOSED SUBDIVISION OF
LOT 9 DP 516455 & LOT 3 DP 512557

SHEET TITLE:
OVERALL STORMWATER MANAGEMENT PLAN

No:	REVISION:	APPROVED BY:	DRAWN BY:	DATE:
A	For Client Review	Z.S	Z.S	13/04/2022
B	For Consent	Z.S	Z.S	06/05/2022

JOB NUMBER: W000002
A1 SCALE: 1:2500 m
A3 SCALE: 1:5000 m
REV: B
SHEET No: C100



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Email: zaab@wai360.co.nz Web: www.wai360.co.nz

Wai360 Think Sustainable Engineering

CLIENT:
TOKO FARMS LIMITED

PROJECT TITLE:
TOKOMOUTH
PROPOSED SUBDIVISION OF
LOT 9 DP 516455 & LOT 3 DP 512557

SHEET TITLE:
SITE LAYOUT
STORMWATER MANGEMENT
PLAN

No:	REVISION:	APPROVED BY:	DRAWN BY:	DATE:
A	For Client Review	Z.S	Z.S	13/04/2022
B	For Consent	Z.S	Z.S	06/05/2022

JOB NUMBER: W000002
A1 SCALE: 1:1000 m
A3 SCALE: 1:2000 m
REV: B
SHEET No: C200

TEST PIT CO-ORDINATES:		
POINT:	NORTHING:	EASTING:
TP1	759899.280	381307.115
TP2	759951.787	381336.262
TP3	759990.513	381290.303
TP4	760042.118	381334.462
TP5	760020.252	381378.542
TP6	760085.986	381418.507
TP7	760089.392	381377.170
TP8	760195.857	381342.707
TP9	760297.473	381372.683

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Wai360 Think Sustainable Engineering

CLIENT:
TOKO FARMS LIMITED

PROJECT TITLE:
TOKOMOUTH
PROPOSED SUBDIVISION OF
LOT 9 DP 516455 & LOT 3 DP 512557

SHEET TITLE:
TEST-PIT LOCATIONS

No:	REVISION:	APPROVED BY:	DRAWN BY:	DATE:
A	For Client Review	ZS	ZS	13/04/2022
B	For Consent	ZS	ZS	06/05/2022

JOB NUMBER: W000002
A1 SCALE: 1:1000 m
A3 SCALE: 1:2000 m
REV: B
SHEET No: C300