

*Ref: GL-19-09-23-GMD-000578-PC41A\_Response*

23 September 2019

Cubitt Consulting Ltd  
**Email: [allan@cubittconsulting.co.nz](mailto:allan@cubittconsulting.co.nz)**

Attention: Allan Cubitt

Dear Allan

## **Proposed Plan Change 41 And 41a To The Clutha District Plan Section 42A Response to Submissions**

### **1.0 Introduction**

We have been engaged by Clutha District Council to provide a response to submissions on the proposed Plan Change 41 and 41A (PC 41 and 41A) in relation to water supply, wastewater and stormwater “3 Waters” infrastructure.

Plan Change 41 and 41A relates to a plan change proposal for a change of land use to industrial and commercial land use north of Milton.

### **2.0 Background**

Fluent Solutions prepared a report entitled “Variation to Plan Change 41 – Industrial Resource Area on the Tokomairiro Plains – Three Water Infrastructure Engineering Review” (FS Review) dated September 2018 for Calder Stewart. The FS Review included possible technical solutions for the provision of infrastructure services for water supply, wastewater treatment and disposal and for the management of stormwater in the Tokomairiro River catchment and flood plains around Milton.

Submissions on the proposed change to the Clutha District Council (CDC) District Plan PC41 and 41A were received by the CDC. A schedule of the submissions received on PC41 and 41A, and two preceding plan change proposals referred to as PC39 and 40, with Fluent Solutions notes on 3 Waters matters raised in the submissions is attached. The attached schedule includes “Submission Points” with amendments received from Allan Cubitt Consulting. Where appropriate we referred back to the individual submissions.

### **3.0 Submission Response Summary**

#### **3.1 Water Supply**

There were no submissions that raised matters that would not be subject to future resource management consent and engineering approval processes that would follow any approval of plan change PC41 and 41A.

#### **3.2 Wastewater**

As for water supply, there were no submissions that raised matters that would not be subject to future resource management consent and engineering approval processes that would follow any approval of plan change PC41 and 41A.

#### **3.3 Stormwater**

There was a significant number of submitters that referred to potential effects of PC41 and 41A on stormwater and flooding downstream of the PC41A area.

Further to consideration of the Stormwater Management Structure Plan concept presented in the FS Review a variation was suggested that would see Schedule Drain G1 continue through the plan change area instead of being diverted to Schedule Drain G9. A peer review of the FS Review concept together with the variation regarding Schedule Drain G1 was undertaken by Pattle Delamore Partners Limited (PDP) and we received comments on the PDP review (attached) from 4Sight Consultants.

Our comment below refers to the submissions and to the PDP review.

##### **3.3.1 Stormwater Effects on Flooding**

The key concerns from submitters related to flood effects due to the increase in runoff due to impermeable surfaces from industrial development in the plan change area, and in particular:

- Flood level effects on property in the Tokomairiro River flood plain that is predominantly down gradient of the site, and
- The effects of flood flows in schedule drains on farm operations down gradient of the railway line.
- The loss of flood storage within the PC41 and 41A area on the alignment of Schedule Drain G1.
- Water quality effects due to industrial land use.

The Structure Plan has identified requirements that would address the concerns raised by submitters.

##### **3.3.2 PDP Peer Review**

The PDP review raised potential issues related the hydraulic capacity of channels and culverts downstream of the PC41 and 41A area and the control of the discharge from the detention basins provided for in the Structure Plan concept including the variation.

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3.3.2.1 Hydraulic Capacity of Channels

With regard to the hydraulic channels downstream of the PC41 and 41A area, the detention storage basins are provided to limit flows to the “pre- development” flow condition for the 100year Average Return Interval critical duration event. The provision of detention basins would ensure that channel flow through property, not affected by flood levels from the flood plain downstream, would not increase. A related note, in the FS Review Structure Plan concept where it was proposed to divert Schedule Drain G1 to Drain G9 it was also proposed to increase the capacity of G9.

Retaining Schedule Drain G1 in its current alignment through the PC41 and 41A area may require that an additional detention basin is provided for the PC41 and 41A area and allow for a loss of flood storage capacity. Provision for storage associated with Schedule Drain G1 can be assessed in detail within the scope of the Structure Plan concept.

3.3.2.2 Detention Basin Outlet Control

A number of potential issues were addressed by PDP. The issues included flow release control processes to avoid adverse effects related to pre-development flow regimes and reliability of the gate control systems at the basins. There is a range of measures that can be implemented to provide real time response to flood conditions and provide control system reliability. The point raised by PDP re control is relevant because there will be the need to develop a thorough understanding of flood characteristics in the Tokomairiro flood plain as part of development of any Structure Plan if the plan change is approved.

3.3.3 Conclusions

The development of the Stormwater Management Structure Plan concept presented in the FS Review used a stormwater modelling approach that would identify primary flow magnitudes. A more detailed approach to flood assessment and design should be applied for the subsequent stages of developing solutions within the Structure Plan.

Sufficient understanding exists that the Structure Plan can be developed and implemented within the resource consent and approval processes that are required by the Otago Regional Council and CDC.

Yours faithfully

**FLUENT INFRASTRUCTURE SOLUTIONS LTD**

Per:



Gary Dent  
Principal Engineer Director

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**Enclosures:**

- Summary of Submissions Received on PC39, PC40, PC41 and PC41A
- 4Sight Consultants Memorandum dated 14 August 2019 from Emma Spalding

**Schedule of Submissions Received on PC39, PC40, PC41 and PC41A**

Submitter	Submission Number	PC #	Oppose/Support /Neutral	Submission Points	Wants to be Heard?	Fluent - 3 Waters Assessment
Anzide Properties Limited	OS08	41	Support	1. Supports the rezoning in its entirety.	Y	N/A
Bedford, Mark	OS12	41 41A	Oppose	1. Seeks the provision of a buffer zone between Industrial zone and Milburn settlement zone. 2. Cumulative adverse effects. 3. Zone change contradicts Policy IND.5(a): <i>“compatibility with neighbouring activities/Resource Areas”</i> . Department of Corrections appear to support either locating industrial activity elsewhere or having a buffer zone. 4. Area to be rezoned is approximately 5x beyond projected industrial demand and should therefore be reduced in area. 5. Reverse sensitivity effects. 6. Submission to be read in conjunction with pre-notification information submitter provided.	Y	<b>Clutha District Plan Submission PC41A - Mark Bedford.pdf</b> <b>Reference: CDC-QF-190225-8HYAT-6NZ</b> <ul style="list-style-type: none"> <li>Submission related back to attachments in previous submission.</li> <li>Unable to identify any concerns.</li> </ul>
Bedford, Wendy	OS02	41	Oppose	1. Loss of rural amenity particularly on approach to Clutha. 2. Visual effects - industrial areas are ugly - necessary for providing work and income but not places people want to live, stay or stop for a cuppa - people go to industrial areas because they are paid to be on-site. 3. Value placed on visual impact of our towns, settlements and landscapes. 4. Consideration of alternative locations away from main access routes to our main settlements and towns. 5. Incompatibility of industrial activity with existing residential activity. 6. Adverse effects of noise, smell, pollutants, traffic, amenity and visual. 7. How will Council ensure industrial activity is for the benefit of community?	Not stated	N/A
Black, Gilbert & Judith	OS21	41A	Oppose	1. Concerned about visual impact, noise, vibration, height of buildings, lighting, amenity values, air quality, stormwater management. 2. Suggests use of buffer zone, screening and performance standard controls to address these issues.	Y	<b>Clutha District Plan Submission PC41A - Black, Brown &amp; Flannery.pdf - Starts pg 5</b> <ul style="list-style-type: none"> <li>Drainage - Increased runoff in already flood prone area. (pg5)</li> <li>Addresses restriction of Tokomairiro River flow between Tokoiti and Toko Mouth. Ponding areas to be developed to mitigate flooding effects. (pg 6)</li> </ul>
Brown, Alan John	OS39	41A	Oppose	1. Concerned about visual impact, noise, vibration, height of buildings, lighting, amenity values, air quality, stormwater management. 2. Suggests use of buffer zone, screening and performance standard controls to address these issues.	Y	<b>Clutha District Plan Submission PC41A - Black, Brown &amp; Flannery.pdf</b> <ul style="list-style-type: none"> <li>Drainage - Increased runoff in already flood prone area (pg1)</li> <li>Addresses restriction of Tokomairiro River flow between Tokoiti and Toko Mouth. Ponding areas to be developed to mitigate flooding effects. (pg 2)</li> </ul>
Calder Stewart Land Holdings Limited	OS13	41	Support (in part)	1. Supports rezoning of 330ha of land to Industrial Resource Area (Toko Plains) but considers it to be more effective to underpin PC41 with a proposed structure plan. 2. Opposes the inclusion of a structure plan relating to the Industrial Resource Area (Toko Plains) by way of a separate and future First Schedule Plan Change process. 3. Seeks the inclusion of a Structure Plan and Staging Plan developed by it and submitted as part of its submission. 4. Seeks to include additional land within the Industrial Resource Area (Toko Plains) zoning. 5. Proposes a number of changes to the provisions notified in PC41 and other wider district plan provisions to support the inclusion of the proposed Structure Plan and Staging Plan. 6. Seeks particular reference to the Industrial Resource Area (Toko Plains) within the existing policy framework. Wider District Plan provisions include: Section 3.3 Transportation, Section 3.7 Subdivision, Section 3.9 Natural Hazards and Section 4.4 Industrial Resource Area. 7. Seeks relief to provide additional evidence in support of the structure plan to address transportation effects, landscape assessment, flood hazard and stormwater management, aviation and infrastructure demand. See specific submission for details of amendments sought, structure plan and staging plan.	Y	<b>Calder Stewart Submission and Appendix A_PC41A_V0.3_25.02.19_Final.pdf</b> <ul style="list-style-type: none"> <li>2.5.2 Further, Calder Stewart notes that Rule FIN.3 WHEN PAYABLE already sets out that in circumstances where the adverse effect created by the development and/or subdivision will not occur until sometime in the future, Council may defer payment of the financial contribution through the use of covenants, bonds, consent notices, and where possible the review of conditions procedure. The Company supports this outcome and notes that in the case of large scale Industrial development the demand on Council infrastructure will likely occur once development is occupied, rather than at subdivision stage (particularly in relation to demands on 3 Waters Infrastructure). (pg 8)</li> <li>2.8.6 The Company seeks that Rule TRAN.6 PARKING (ii)(b) be amended as follows: <i>“(b) Stormwater originating from parking areas shall be adequately disposed of within the confines of the site with the exception of the Industrial Resource Area (Toko Plains), where all stormwater will be managed accordance with an approved Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3.”</i> (pg 11)</li> </ul>
	OS38	41A	Support (in part)	1. Supports rezoning of 330ha of land to Industrial Resource Area (Toko Plains) subject to various amendments sought. 2. Seeks correction of section 2.1 of s32 evaluation report and PC41A zone boundary to include Allotment 75-78 Deeds Plan 121 Block VI Tokomairiro Survey District (contained within Record of Title OT252/182); and Lot 4 Deposited Plan 390540 (contained within Record of Title 363906). 3. Seeks the following amendments to proposed and operative rules:		

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				<p>Rule IND 4.1(l)(b):  “(b) Rear and side yards of 4.5m shall be provided where a site adjoins any Urban, Transitional, or Rural Settlement Resource area without intervention of a road <u>or railway line.</u>”</p> <p>Rule IND 4.1(l)(c):  “The maximum height for buildings and structures in the area shall be 12 metres <u>from ground level</u> provided that where the site adjoins an Urban, Transitional or Rural Settlement Resource Area, Rule URB 4 (2) shall apply. <u>In the case of the Industrial Resource Area (Toko Plains) maximum building heights shall be in accordance with the structure plan for this zone which provides for a maximum building height of 25 metres from ground level for Large Format Industrial and a maximum building height of 16 metres from ground level for Industrial Resource Area (Toko Plains).</u> For the purpose of this rule, chimneys and stacks with a diameter of 2.5 metres or less are exempt from the height restriction <u>and within the Large Format area contained within the Industrial Resource Area (Toko Plains) Industrial Structure Plan chimneys and stacks with a diameter of 3.5 metres or less are exempt from the height restriction;</u> Fire Station hose drying towers up to a maximum height of 15 metres and maximum width of 1.5 metres; and radio and television aerials up to a maximum of 3.0 metres in height above the building to which it is attached, are exempt from the height restriction.”</p> <p>Rule IND 4.3:  “Signs shall conform with the following:  (a) One sign per road frontage for industrial buildings or where no buildings exist on the site, one sign per road frontage. In the case of a multi-occupancy building one directory type sign is permitted per road frontage.  (b) Illuminated signs are permitted provided that no signs are flashing <u>and in the Industrial Resource Area (Toko Plains) all illumination of signage is directed downwards.</u>  (c) No sign shall exceed the following dimensions:  (i) For horizontal signs - the length of the building frontage and a width of 1.2 metres.  (ii) <u>In the Industrial Resource Area (Toko Plains) for horizontal signs - the length of the building frontage and a width of 3 metres.</u>  (iii) For vertical signs - the height of the building frontage and a width of 1.2 metres.  (iv) <u>In the Industrial Resource Area (Toko Plains) for vertical signs - the height of the building frontage and a width of 3 metres.</u>  (v) For pole signs - an area of 3m<sup>2</sup> not exceeding 6 metres in height, with a separation distance of 10 metres between such signs.  (vi) <u>In the Industrial Resource Area (Toko Plains) for pole signs - an area of 8m<sup>2</sup> not exceeding 8 metres in height, with a maximum of 2 per site or 1 per 50 metres of street frontage, whichever is lesser and with a minimum distance of 10 metres between such signs.</u>  (vii) Directory Signs - the height of the building it refers to, with a width of no more than 3 metres.</p> <p>Any activity that exceeds these standards shall be considered as a restricted discretionary activity. Council shall restrict the exercise of its discretion to the effect on amenity values and the effect on the safe and efficient operation of the roading network.”</p> <p>IND.4 (4) Servicing and Financial Contributions, Section 3.7 Subdivision and Section 3.8 Financial and Reserve Contributions (Rule FIN.3 WHEN PAYABLE):  <u>“Unless otherwise agreed in writing by Council, where subdivision and development is implemented within the Industrial Resource Area (Toko Plains) all infrastructure servicing and financial contributions shall be provided for in accordance with the staging plan for the Industrial Resource Area (Toko Plains) and financial contributions are sought at a time when demand is generated on Council infrastructure.”</u></p> <p>IND.4 (8) Design Control  <u>“(i) Recessive colours exterior (within natural tones of grey, green, cool browns) + no light reflectivity value (LRV) of no more than 40%.</u>  <u>(ii) Roofing: rooftop material no more than 30% LRV.</u>  <u>(iii) Accessory buildings constructed with similar materials (unless less than 8m in height). No mirror glazing is permitted.</u>  <u>(iv) No activities shall result in any light spill onto any adjoining property beyond Industrial Resource Area (Toko Plains) exceeding 10 lux (horizontal and vertical).”</u>  <u>“Note: For the purposes of compliance with Rule IND.4 (8) (ii) Design Control (30% LRV for roofing materials:</u>  <u>(i) untreated zincalume is discouraged as a roofing material;</u>  <u>(ii) this rule does not apply to solar panels erected on the roof of Industrial Buildings located within the Industrial Resource Area (Toko Plains), however the intention within the Industrial Resource Area (Toko Plains) is that low reflectivity solar panels are selected in order to minimise glare effects.”</u></p>		

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				<p>Section 11.4.2 Other Environmental Issues (Glare):  <u>"In the case of glare and illumination controls within the Industrial Resource Area (Toko Plains), the controls under Rule IND.4 (8) Design Control prevail for all development within the Industrial Resource Area (Toko Plains)."</u></p> <p>Rule 3.9.4 (NHZ.2 Activities Located Within an Area Identified as Hazard Prone):  <u>"1. LANDFILLS, WASTE DISPOSAL, OR THE STORAGE OR USE OF COMMERCIAL QUANTITIES OF HAZARDOUS GOODS OR SUBSTANCES</u>  <u>Landfills, waste disposal, or the storage or use of commercial quantities of hazardous goods or substances are non-complying activities in any area identified as being a natural hazard site where the site is not protected from the natural hazard by floodbanks or erosion protection. For the purposes of this rule, where hazard mitigation responses have been implemented on sites located within the Industrial Resource Area (Toko Plains) and implemented in accordance with an approved Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3 and where stored in accordance with Hazardous Substances and New Organisms (HSNO) Act, the storage of commercial quantities of hazardous substances is a permitted activity."</u></p> <p>Rule TRAN.6 PARKING (ii)(b):  <u>"(b) Stormwater originating from parking areas shall be adequately disposed of within the confines of the site with the exception of the Industrial Resource Area (Toko Plains), where all stormwater will be managed accordance with an approved Stormwater Management Structure Plan approved in accordance with Rule SUB.4.A.3."</u></p> <p>Rule TRAN.7 Vegetation (i)  <u>"(i) Road Reserve Vegetation – no vegetation shall be planted on a road reserve or on a property that allows it to overhang the legal roadside boundary, with the exception of the Industrial Resource Area (Toko Plains), where landscaping located within the road reserve approved under SUB.4.D.1 is exempt from this rule."</u></p> <p>4. Seek any similar amendments with like effect and any consequential amendments that stem from the above amendments.</p>		
Clark, Andrew	OS01	41	Supports (in part)	1. Supports the rezoning of land at 23 Back Road, Milton to Urban.	Not stated	N/A
Cowie, Ronald	OS22	41A	Oppose	<ol style="list-style-type: none"> <li>1. Opposes plan change in its entirety.</li> <li>2. Loss of rural, productive farmland.</li> <li>3. Effects of air pollution.</li> <li>4. Impermeable surfaces and stormwater management.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Ronald Cowie.pdf</b></p> <ul style="list-style-type: none"> <li>• Concerns about increase hardstand runoff contributing to flooding, references November flooding. (pg1)</li> </ul>
Crowther, David	OS04	41	Supports (in part)	1. Identifies that there are adverse effects associated with industrial activity, particularly if 24/7 operation, which need careful consideration but also identifies opportunity to design a world class, environmentally friendly Industrial estate which controls noise, light and traffic effects.	N but will consider a joint case	<p><b>Clutha District Plan Submission PC41A - David Crowther.pdf</b></p> <ul style="list-style-type: none"> <li>• "Increased flooding risk and surface water discharge from large industrial buildings will affect my property and with ever increasing weather events this is of concern to me". (pg 1)</li> <li>• Addresses hardstand runoff concerns and climate change effects.</li> </ul>
	OS40	41A	Opposes	<ol style="list-style-type: none"> <li>1. Negative impact on property values.</li> <li>2. Noise &amp; light pollution, cumulative effects with activities of Pan Pac and City Forest.</li> <li>3. Flooding risk and storm water management.</li> <li>4. Effects on safety of access to private property via Anicich Road.</li> <li>5. Effects on visual amenity.</li> </ol>		
Department of Corrections	OS14	41	Opposes (in part)	<ol style="list-style-type: none"> <li>1. Seeks alternative location for industrial park and retention of Rural Resource Area zoning.</li> <li>2. Concerned about reverse sensitivity issues arising.</li> <li>3. If sufficient demand can be demonstrated in line with National Policy Statement for development capacity then seeks following amendments to policies, objectives and rules:  (i) Amend Objective IND.3 as follows:  <u>That development within the Industrial Resource Area (Toko Plains) is efficient, coordinated and supported by adequate services; integrates with adjoining infrastructure; and does not compromise surrounding land uses, and the existing drainage systems.</u>  (ii) Amend Policy IND.5 as follows:  <u>To use a Structure Plan for development within the Industrial Resource Area (Toko Plains) to establish:</u>  <u>(a) The location, character, scale, and intensity of activities taking into account:</u>  ☐ the effects they generate;  ☐ compatibility with neighbouring activities/Resource Areas;  ☐ the location and efficiency of infrastructure, including transportation infrastructure;  ☐ the location and efficiency of the existing drainage systems within the Structure Plan area.  <u>(b) The provision of the primary roading structure within the Structure Plan area;</u> </li> </ol>	Y	<p><b>2017-12-11_Department of Corrections - Submission on Clutha District Plan - PC41.pdf</b></p> <ul style="list-style-type: none"> <li>• N/A</li> </ul>

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				<p>(c) The staging of development, having regard to the efficient and co-ordinated provision of services including internal roading;</p> <p>(d) Safe and efficient connections with adjoining infrastructure, in particular the State Highway and the Main South Railway Line.</p> <p>(e) Appropriate areas of landscaping and open space:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> to mitigate any adverse visual effects of industrial development;</li> <li><input checked="" type="checkbox"/> to protect existing drainage systems within the Structure Plan area; and</li> <li><input checked="" type="checkbox"/> to provide for an appropriate level of amenity within the Structure Plan area;</li> </ul> <p>(f) Where land use controls <del>within Rule IND.4</del> may need to be amended or included for activities within the Structure Plan.</p> <p><i>Explanation.</i></p> <p>The Industrial Resource Area (Toko Plains) comprises a large (approximately 330ha), tract of generally undeveloped rural land on the Tokomairiro Plain that stretches from Milburn in the north down to the outskirts of Milton in the South. The zone is bordered by the Main South railway line to the west and State Highway One to the east. To achieve co-ordinated and integrated development of this site, <u>in a way which does not comprise surrounding land uses</u>, a Structure Plan is considered necessary.</p> <p>(iii) Amend Rule IND.2 as follows:</p> <p>Any activity that conforms with the rules contained in Rule IND.4 Performance Standards (except as provided in Rule IND.3) <del>and where the activity is located in the Industrial Resource Area (Toko Plains), the Structure Plan for that Resource Area, is a permitted activity.</del></p> <p><i>Reason</i></p> <p>The performance standards of Rule IND.4 are intended to avoid, minimise or mitigate adverse effects of any activity. <del>Development of the Industrial Resource Area (Toko Plains) in general accordance with the Structure Plan will ensure:</del></p> <ul style="list-style-type: none"> <li><del><input checked="" type="checkbox"/> the efficient and integrated development of the land for industrial purposes;</del></li> <li><del><input checked="" type="checkbox"/> the provision of a connected, safe, and efficient transportation network;</del></li> <li><del><input checked="" type="checkbox"/> the ongoing efficiency of the existing drainage system within the area;</del></li> <li><del><input checked="" type="checkbox"/> the provision of water, sewer and stormwater infrastructure on a coordinated basis;</del></li> <li><del><input checked="" type="checkbox"/> the mitigation of any adverse effects visual effects of industrial development</del></li> </ul> <p>(iv) Amend Rule IND.3 as follows:</p> <p>The following activities are discretionary activities:</p> <p>(a) Any activity that requires a license as an offensive trade within the meaning of the third schedule of the Health Act 1956.</p> <p>(b) Residential activities except where ancillary to an industrial activity.</p> <p>(c) Commercial service activities.</p> <p>(d) Community support activities. For the purpose of this rule, “emergency service facilities” as defined in Section 5 of this Plan are not considered community support activities.</p> <p>(e) Unless otherwise stated, non-compliance with any standard within Rule IND.4.</p> <p><del>(f) Activities or development that is not in general accordance with the Structure Plan for the Industrial Resource Area (Toko Plains).</del></p> <p><u>(f) Any industrial or commercial development within the Industrial Resource Area (Toko Plains), that occurs prior to the preparation and incorporation of a Structure Plan into the District Plan under the First Schedule RMA process.</u></p> <p>(v) Make any consequential changes necessary as a result of the amendments.</p> <p>4. Retain Rule IND.1 as notified.</p>		
Federated Farmers of NZ	OS15	39,40, 41	Oppose (in part)	<ol style="list-style-type: none"> <li>1. Seeks to underline the continuing significant importance of primary production to the District, both in direct and indirect terms, and in relation to economic and other benefits.</li> <li>2. Recognise the marginal benefits of development of rural land for alternative purposes, where this is justified by demand for these land uses.</li> <li>3. Seeks to ensure provisions associated with land use in the rural areas recognise the need for primary production to be relatively unencumbered.</li> <li>4. In particular, requests careful consideration of the potential reverse sensitivity issues likely to arise from the zoning review and how these may impact primary production activities.</li> </ol>	Y	<p><b>20190225 Clutha DC PC41a FedFarm.pdf</b></p> <ul style="list-style-type: none"> <li>• Effects on Neighbouring properties 3.3. (pg 4) “ In addition, industrial activities could impact water quality through surface runoff or leaching contaminants into groundwater. Rules need to be set in place to avoid water contamination occurring. Council also needs to be mindful of not impacting neighbouring properties under the Otago Air Plan and Otago Water Plan”.</li> <li>• Concerns regarding contamination of surface runoff and groundwater of neighbouring properties under Otago Water Plan.</li> <li>• Wants to see rules to avoid, remedy or mitigate and adverse effects on neighbouring properties.</li> <li>• Rules or limits on activities which may affect water quality.</li> </ul>
	OS24	41A	Neutral	<ol style="list-style-type: none"> <li>1. Reserves an interest in entire plan change.</li> <li>2. Identifies a lack of high quality farmland.</li> <li>3. Essential that Council balances the economic, social, cultural and environmental considerations of any</li> </ol>		



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				<p>particular policy or provision - whilst clear and necessary regulation is critical, Federated Farmers also considers important that Council considers the implications for those working under that regulation.</p> <ol style="list-style-type: none"> <li>Seeks rules to manage reverse sensitivity effects (including no-complaint covenant).</li> <li>Effects on air quality - Milton frequently exceeds national air quality standards. Future industrial activity needs to be consistent with the Otago Air Plan.</li> <li>Effects on water quality.</li> <li>Seeks definitions for the industrial zone and industrial activities. Identify industrial activities permitted in the industrial zone and those activities not anticipated within the zone.</li> </ol>		
Fire Emergency New Zealand	OS11	39, 40, 41	Neutral	<ol style="list-style-type: none"> <li>Ensure any new zoning provides adequate firefighting water supply, access to the supply, and access and manoeuvring for firefighting appliances.</li> <li>Provision to be made for additional emergency service facilities should there be a subsequent need arise from the rezoning.</li> </ol>	Not stated	Not supplied - Addresses need for suitable water supply for firefighting in industrial areas.
Flannery, Bernard & Christine	OS25	41A	Oppose	<ol style="list-style-type: none"> <li>Concerned about visual impact, noise, vibration, height of buildings, lighting, amenity values, air quality, stormwater management.</li> <li>Suggests use of buffer zone, screening and performance standard controls to address these issues.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Black, Brown &amp; Flannery.pdf - Starts pg 9</b></p> <ul style="list-style-type: none"> <li>Drainage - Increased runoff in already flood prone area. (pg 9)</li> <li>Addresses restriction of Tokomiriro River flow between Tokoiti and Toko Mouth. Ponding areas to be developed to mitigate flooding effects. (pg 10)</li> </ul>
Fonterra Limited	OS16	40	Support (in part) & Oppose (in part)	<ol style="list-style-type: none"> <li>Supports the rezoning of Lot 1 DP301857 and Lots 1 and 2 DP394882 from Rural Resource Area to Industrial Resource Area as notified.</li> <li>Opposes the rezoning of Part Lot 1 DP2254 and seeks to retain Rural Resource Area zoning in accordance with the operative District Plan planning maps.</li> <li>Supports the establishment of a Noise Control Boundary around Fonterra's Stirling site subject to either the boundary being amended in accordance with the map included at Appendix 1 of the submission; or amend the NCB to reflect the 50bBLAeq (15 min) noise contour, plus any consequential amendments.</li> <li>Amend Rule NSE.1 as notified.</li> <li>Retain new Objective RRA.7 as notified.</li> <li>Retain Policy RRA.13 as notified, subject to inserting new Policy RRA.14 as follows:  <u>"To ensure that new sensitive activities or additions to existing sensitive activities in the rural environment do not result in reverse sensitivity effects on operations at the Stirling dairy factory site by requiring such activities within the noise control boundary to meet minimum standards for acoustic insulation."</u> </li> <li>Delete the proposed amendment to Rule RRA.3(iv) as follows:  <u>"...uses, produces or stores commercial quantities of hazardous substances OR any residential activity which is to located within a "Noise Nuisance Area" boundary as shown on the planning maps is a discretionary activity."</u>  Delete any remaining references (if any) to 'Noise Nuisance Area' and replace with '<u>Noise Control Boundary</u>'. </li> <li>Amend Rule RRA.10(iv) as follows:  <u>"Any new sensitive activity, or additions that increase the flood area of an existing sensitive activity located within the Noise Control Boundary associated with the Stirling Dairy Manufacturing Site shall be constructed to achieve an internal design level of 35dBLAeq(1hr) in all habitable rooms with the windows closed. Any activity that fails to comply with this standard is a discretionary activity. application for non-compliance with this rule shall only require written approval from the Operator of the Stirling Dairy Manufacturing Site shall be considered an affected party in relation to any application arising from non-compliance with this standard."</u> </li> <li>Renumber Rule RRA.10(iv) to (v) as notified.</li> <li>Amend Rule RRA.10(v) as follows:  <u>"Any activity that fails to comply with these standards (i) to (iii) above, is a restricted discretionary activity."</u> </li> <li>Amend Rule IND.2(2) as follows:  <u>"On the Stirling ...10pm - 7am 45bBLAeq (15 min) and 75 LAFmax. Non-compliance with this requirement shall be considered as a restricted discretionary activity. Council shall restrict the exercise of its discretion to the operational requirements of the site, and the effect of noise on adjoining sensitive activities within the Noise Control Boundary."</u> </li> <li>Retain the use of the operative plan definition of "Sensitive Activity".</li> </ol>	Y	
Frost, Larry	OS36	41A	Opposes (in part)	<ol style="list-style-type: none"> <li>Opposes rezoning of Tokomairiro Sports Ground and paddocks behind to Industrial Resource Area as sufficient industrial land provided in rest of industrial park area.</li> <li>Seeks this area to be further developed for recreation purposes - e.g. soccer fields, BMX or cycle track, heritage park, Milton Hub for social gardening project.</li> </ol>	Not stated	<p><b>Clutha District Plan Submission PC41A - Larry Frost.pdf</b></p> <ul style="list-style-type: none"> <li>No direct issues - idea for area redevelopment to recreational facilities may require stormwater management.</li> </ul>

Submitter	Submission Number	PC #	Oppose/Support /Neutral	Submission Points	Wants to be Heard?	Fluent - 3 Waters Assessment
Gray, Glenda	OS09	41	Oppose	<ol style="list-style-type: none"> <li>1. Loss of productive, rural, farm land with high quality soils which are a non-renewable resource due to aeons it takes these to form.</li> <li>2. The plan change will result in cumulative effects that are more than minor with respect to open space amenity, soil and water quality and unsustainable development.</li> <li>3. Seeks site size restrictions on residential (1 acre) and lifestyle (20 acre) lots.</li> <li>4. Cumulative effects of industrial land rezoning on air, land and water quality.</li> <li>5. Seeks monitoring of water quality.</li> </ol>	N	Not supplied - discusses need to water quality monitoring.
Hollows Timber Company Limited	OS05	39	Support	<ol style="list-style-type: none"> <li>1. Seeks additional industrial land rezoned adjoining existing timber mill to provide for future expansion of business.</li> </ol>	Not stated	N/A
Hutton, Graham	OS10	41	Oppose	<ol style="list-style-type: none"> <li>1. Adopts submission of Glenda Grey.</li> <li>2. Loss of productive, rural, farm land with high quality soils which are a non-renewable resource due to aeons it takes these to form.</li> <li>3. The plan change will result in cumulative effects that are more than minor with respect to open space amenity, soil and water quality and unsustainable development.</li> <li>4. Seeks site size restrictions on residential (1 acre) and lifestyle (20 acre) lots.</li> <li>5. Cumulative effects of industrial land rezoning on air, land and water quality.</li> <li>6. Seeks monitoring of water quality.</li> </ol>	Not stated	Not supplied - discusses need to water quality monitoring.
Kalb, Peter & Ainslie	OS26	41A	Oppose	<ol style="list-style-type: none"> <li>1. Concerned about sustainability of water allocation particularly during periods of low flow.</li> <li>2. Whether proposed stormwater management will be effective.</li> <li>3. Effects from heliports and shunting lines particularly noise, dust &amp; vibration; potential mitigation by restricting activities to 8am-5pm &amp; regular monitoring and enforcement.</li> <li>4. Visual effects of 25m buildings &amp; no height limit for stacked containers particularly because it will take 20-30 years for trees to provide effective screening.</li> <li>5. Concern regarding installation of additional water treatment plant. Screening of existing water treatment plant is ineffective.</li> <li>6. Traffic effects.</li> <li>7. Seeks industrial activity to be restricted to dry industry only. Maximum height limit of 10m for buildings.</li> <li>8. Options for rail considered.</li> <li>9. Regular compliance monitoring.</li> <li>10. Options to reduce water allocation.</li> </ol>	N will consider making a joint case	<p><b>Clutha District Plan Submission PC41A - Peter and Ainslie Kalb.pdf</b></p> <ul style="list-style-type: none"> <li>• Concerns regarding insufficient water available for needs required by industrial sites. Believes 45ha allocated to wet industry is unsustainable given current river flow rates. Seeks that area be dry industry only to reduce water allocation requirement.</li> <li>• Concerns regarding stormwater runoff from hardstand areas. Consider SW detention or investigate alternative solution for SW runoff</li> <li>• Concern regarding additional water treatment plant being built alongside existing one on Nth Branch Road - believes facility would be "totally ineffective".</li> </ul>
Kiwirail Holdings Limited	OS17	39, 40, 41	Support	<ol style="list-style-type: none"> <li>1. KiwiRail seeks to protect itself from reverse sensitivity issues and also advises that new crossings of the rail network will be at its discretion.</li> <li>2. Balclutha, Stirling and Milton Planning Maps - retain as notified.</li> <li>3. Stirling rezoning: Section 3.13 - Rule NSE.1 Noise Measurement and Section 4.1 - Objective RRA.7 and Policy RRA.13 - retain as notified.</li> <li>4. Milton rezoning: Section 3.3 - Objective IND.3, Policy IND.5 and Rule IND.5.2 - retain as notified.</li> </ol>	Y	N/A
McElrea, Anna	OS27	41A	Oppose	<ol style="list-style-type: none"> <li>1. Stormwater management: Concerned regarding potential change in hydrology during flood events including capacity of existing infrastructure.</li> <li>2. Water intake: potential risk to water quality as a result of change in land use, concern regarding effect of quantum of water intake, concern no requirement to capture rainwater from roof surfaces for use.</li> <li>3. Traffic generation.</li> <li>4. Potential increase in water treatment station.</li> <li>5. Noise effects.</li> <li>6. Visual impact &amp; inadequacy of proposed screenings.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Anna McElrea.pdf</b></p> <ul style="list-style-type: none"> <li>• Concern is "the impact of the significant change of the hydrology of the 330ha site on the functioning of Gorge Creek and the 1A Tokomairiro Floodplain during flood events.</li> <li>• Believes "insufficient work done to ensure development doesn't increase the depth or duration during peak flow events".</li> <li>• Concern regarding risk of pollutants entering waterways.</li> <li>• Believes "three waters modelling is required to ensure stormwater components will be adequate to ensure no adverse impact on catchment".</li> <li>• Believes proposed water intake is extraordinarily high and no assessment of impact on the river.</li> <li>• Lacking thought on collection and use of rainwater given large roof surface areas.</li> <li>• Noticed increase in vehicles per day past house as a result of sludge issues associated with new treatment plant.</li> <li>• Identified reading requirement for new larger pipes with no details on the impact on their farm.</li> </ul>

Submitter	Submission Number	PC #	Oppose/Support /Neutral	Submission Points	Wants to be Heard?	Fluent - 3 Waters Assessment
						<ul style="list-style-type: none"> <li>Wishes to have engagement regarding changes in ditches running through their farm.</li> </ul>
McElrea, Barbara	OS28	41A	Oppose	<ol style="list-style-type: none"> <li>Loss of rural productive land and rural amenity values.</li> <li>Noise and light pollution and health effects on nearby residents.</li> <li>Adverse visual impacts.</li> <li>Insufficient consideration of alternative locations which do not affect rural productive land and existing residential activity. Seeks an alternative location for the industrial zone.</li> <li>Would like to have been notified of proposed zone changes earlier.</li> </ol>	Y	N/A
McElrea, Gary & Lisa	OS29	41A	Oppose	<ol style="list-style-type: none"> <li>Opposes PC41 rezone of land from rural to industrial &amp; PC41A structure plan.</li> <li>Proposed 85% impermeable surfaces &amp; stormwater management will have major impact on their farming operation due to diversion of water from drains G1 &amp; G11 into G9 which runs through their farm. This will change the flood flow from 2m<sup>3</sup>/sec to 17m<sup>3</sup>/sec.</li> <li>Risk of pollutants entering the waterways via the stormwater system.</li> <li>Require further evidence that stormwater management components (e.g. detentions basins and culverts) will be designed to accommodate high flow events and allow gradual release after peak flows so as not to cause damage to their property and others in area 1A and also in a way which does not prolong flood events.</li> <li>Seeks assurances regarding maintenance of existing and proposed stormwater infrastructure.</li> <li>Concerns about the nature, scale and intensity of industrial activities including effects of noise, lighting, 24/7 operation and 25m building height all of which will have a negative impact on rural character and amenity values as well as visual effects. The significant visual effects from Finch Road have not been addressed.</li> <li>Concerns regarding traffic generation particularly on North Branch Road. Seeks more detailed information regarding proposed water treatment upgrades.</li> <li>Seeks screen planting along railway line.</li> <li>Seek reduction of the proposed water intake via capture of stormwater from roof surfaces.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Gary and Lisa McElrea.msg (photos supplied)</b></p> <ul style="list-style-type: none"> <li>Concerns regarding negative impact increased flow on drain G9 will have on deer farming operation.</li> <li>Major concern regarding stormwater as report indicates development will result in major change to the hydrology o the site.</li> <li>Diversion of G1 and G11 drains will have major impact on G9 drain which runs through 6No. deer fenced paddocks.</li> <li>Flow increase from 2m<sup>3</sup>/sec to 17m<sup>3</sup>/sec.</li> <li>G9 drain has had no maintenance during their 80yr ownership of property, does not handle flooding events (approx. 3/year).</li> <li>More hydraulic evidence required regarding detention basins and culverts to show they will accommodate high flow events and provide gradual release after peak flows resulting in zero damage to property.</li> <li>Suggest use of rain water to reduce water take requirement.</li> <li>Concerns regarding upgrades to new water treatment plant and impact from installation of new pipes on farming operation.</li> </ul>
McElrea, John	OS30	41A	Oppose	<ol style="list-style-type: none"> <li>Traffic effects including dust.</li> <li>Increase to water treatment plant.</li> <li>Stormwater management and maintenance. Seeks upgrade of the many culverts in the main ditch to take the extra flow from development to Gorge Creek.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - John McElrea.pdf</b></p> <ul style="list-style-type: none"> <li>Concerns regarding additional water supply work - traffic based.</li> </ul>
McElrea, Richard	OS23	41A	Oppose	<ol style="list-style-type: none"> <li>Concerned over increase in flood flow from 2m<sup>3</sup> to 17m<sup>3</sup> from development. Photos of flood from November 2018 flood event.</li> <li>On-going maintenance of drainage system, particularly Drain G9 - needs to be maintained to adequate standard.</li> <li>Seeks further hydrological investigation and analysis. Potential to prolong flooding event depending on timing of release of stormwater from development.</li> <li>Traffic effects particularly on North Branch Road and the one-lane bridge. Reduction in speed from 100km/hr to 30km/hr required for safe operation of bridge.</li> <li>Concerned over discharges to settling ponds and potential upgrades to treatment plant.</li> <li>Overall water quality and use. Ecological impact assessment on river from proposed water take required. Opportunity for rainwater capture from roof surfaces and re-use to reduce water take.</li> <li>Significant adverse visual effects. Seeks additional screening from plantings.</li> <li>Significant noise and lighting effects particularly from night-time operations.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Richard McElrea.msg</b>  <b>Clutha District Plan Submission PC41A - Richard McElrea - Added submission.msg (photos provided)</b></p> <ul style="list-style-type: none"> <li>Increase in water down drain G9 from 2m<sup>3</sup> to 17m<sup>3</sup>.</li> <li>Water quality needs to be tested at railway to ensure its up to standard.</li> <li>Currently drain G9 poorly maintain from ORC, who will maintain it.</li> <li>Will settling (detention?) ponds release slowly after peak.</li> <li>Further hydraulic assessment required.</li> </ul>
McElrea, Rob & Kath	OS31	41A	Oppose	<ol style="list-style-type: none"> <li>Milton requires release of residential land to match industrial development.</li> <li>Concerned about stormwater management and the potential to prolong flood events, changes to drainage patterns and ongoing maintenance of stormwater management systems.</li> <li>Traffic effects particularly on North Branch Road and one lane bridge. Speed reduction to 30km/hr required for safety.</li> <li>Visual effects. No screening of development from Finch Road.</li> <li>Scale and intensity of proposed industrial activity.</li> <li>Reverse sensitivity.</li> <li>Ecological impact of increased water take on river.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Rob and Kath McElrea.pdf</b></p> <ul style="list-style-type: none"> <li>Concerns stormwater and drainage changes may affect farming operation and access and egress to residential homes.</li> <li>Currently there is poor management of the drains by ORC.</li> <li>Addressed controlled release of detained water may prolong drying times and limit access.</li> <li>Concern higher water take from river may have ecological impact.</li> </ul>
Murdoch, Evan	OS07	41	Opposes (in part)	<ol style="list-style-type: none"> <li>Opposes change from Rural to Urban for land adjacent to his property at 2 Cherry Lane Milton.</li> </ol>	N	

Submitter	Submission Number	PC #	Oppose/Support /Neutral	Submission Points	Wants to be Heard?	Fluent - 3 Waters Assessment
New Zealand Transport Agency	OS18	41	Supports (in part)	<ol style="list-style-type: none"> <li>Supports in principle because: a) ensures sufficient industrial land capacity for current and future needs; b) requires a structure plan ensuring integrated development and sustainable management of land transport system ; c) formalises some existing land use activities; d) reduces risk of land development occurring in ad hoc fashion which does not integrate land use and transport infrastructure.</li> <li>Amend Objective IND.3 to include underlined wording as follows: "... and does not compromise the existing drainage systems <u>and the safety and efficiency of the transport system.</u>"</li> <li>Retain Policy IND.5(a)-(f) as notified excepting correction to typographical error in Policy IND.5 Explanation "compromises" to "<u>comprises</u>".</li> <li>Retain Rules IND.1, IND.2 and IND.3 as notified.</li> <li>Amend Rule IND.4 to ensure screening/landscaping of the Industrial Resource Area (Toko Plains) as required by Rule IND.4 does not result in shading of State Highway between 10am and 2pm on the shortest day of the year.</li> </ol>	Y	
Otago Regional Council	OS19	39, 40, 41	Supports (in part)	<ol style="list-style-type: none"> <li>Seeks that future activities in newly zoned low-lying areas do not exacerbate flood hazard.</li> <li>PC39: Ensure zoning changes continue to prevent the exacerbation of flood hazards. Ensure the plan directs users to ORC Flood Protection By-law 2012.</li> <li>PC41: Amend Objective IND.3 to include underlined text "...and does not compromise the existing drainage systems, <u>including overland flow paths</u>" and Amend Policy IND.5(e) to include the underlined text "...to protect existing drainage systems <u>and overland flowpaths</u> within the Structure Plan area". These changes are required to make it clear that both the functions of the manmade and natural drainage systems are to be protected.</li> <li>Amend Rule IND.1 bullet point 6 to include the underlined text "...within the Structure Plan area <u>to ensure there is no increase in flood hazards;</u>" to clarify that the purpose of the policy is to avoid increases in flood hazards and subsequent adverse effects.</li> <li>Amend Rule IND.2 - Reasoning to include the underlined words to bullet point 3 "...<u>and overland flowpaths</u>" after the words "drainage system".</li> <li>Structure plan should advise community of other controls including ORC Flood Protection By-law 2012 and Regional Plans for Air, Waste and Water.</li> </ol>	N	
	OS32	41A	Support	<ol style="list-style-type: none"> <li>It is likely that ORC consent will be required for some activities under its Air and Water plans and also Flood Protection Management Bylaw 2012. Any works which affect ORC assets require consent. Formal process for works which will 'dispose of' any such assets. Encourages parties to contact ORC when get to design stage if plan change successful.</li> <li>Seeks to ensure plan provisions provide good control over quality of wastewater outputs.</li> <li>Seeks to ensure plan provisions provide good control over stormwater management and water quality.</li> </ol>		
Pan Pac Limited	OS20	41	Supports (in part)	<ol style="list-style-type: none"> <li>Seeks to have the Structure Plan prepared by Calder Stewart included in the plan change process. Supports the 10m landscape buffer. Seeks a 20 metre rather than 16 metre maximum height. Seeks inclusion of existing access point from Pan Pac owned land onto SH1 not included in CS structure plan. Holds reservations about the operation of the private airstrip close to Pan Pac owned land.</li> <li>Opposes the transfer of costs associated with installation of public infrastructure supporting the new industrial zone to be the responsibility of Clutha District Council. Costs related to these installations will be recovered over time through the rates charges applied to new industrial land use activities.</li> </ol>	Y	
	OS33	41A	Supports (in part)	<ol style="list-style-type: none"> <li>Generally supports enabling provisions of proposed industrial provisions and structure plan subject to various amendments detailed in submission point 2.</li> <li>Seeks the following amendments: (a) IND.4 (6) be amended as follows: <i>In the Industrial Resource Area (Toko Plains), all landscaping shall be designed in accordance with the following design principles and outcomes:</i> <ol style="list-style-type: none"> <li>Landscaping and any associated mounding shall seek to mitigate the visual dominance of future industrial development on site when viewed from public places and the wider receiving environment;</li> <li>That the green spaces identified within the Structure Plan are provided for;</li> <li>Planting shall be undertaken using the range of species identified in Table 1 attached at page X; [Note: For the purposes of this report, the species list is attached in Appendix 2]</li> <li>All development stages shall be underpinned with a landscaping plan that identifies <u>mounding areas</u>, planted areas detailing the proposed plant species, plant sourcing, plant sizes at time of planting, plant locations, density of planting, and timing of planting; and</li> <li>A programme of establishment and post establishment protection and maintenance (fertilising, weed</li> </ol> </li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Pan Pac Final.pdf</b></p> <ul style="list-style-type: none"> <li>Specified mounding may introduce hindrances to stormwater - not mentioned, this is a Fluent note.</li> </ul>

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				<p>removal/spraying, replacement of dead/poorly performing plants, watering to maintain soil moisture, length of maintenance programme). The proposed maintenance programme shall seek to ensure a survival rate of at least 90% of all landscaping within the first 5 years.</p> <p><i>(vi) For the purposes of the 10 metre landscape strip fronting the property legally described as Section 1 SO 465421 and Lot 2 DP 23974 and identified within the Industrial Structure Plan, the landscaping strip shall comprise a minimum landscaping strip of 4.5 metres from the front State Highway boundary with associated naturalised mounding. Note: For the purposes of this rule, mounding may extend outside of this 10 metre landscape strip and naturalised mounding is encouraged along the State Highway frontage.</i></p> <p>3. Any similar amendments with like effect and any consequential amendments that stem from the amendments.</p>		
Ritchie, Ian & Wendy	OS34	41A	Oppose	<ol style="list-style-type: none"> <li>Noise pollution.</li> <li>Increase in train numbers and safety of North Branch Road rail crossing.</li> <li>Visual effects particularly ability of mitigation planting to be effective - buildings will be put up quicker than the plantings can grow tall enough to screen buildings.</li> <li>Loss of rural amenity.</li> <li>Concern that plan change will not adequately govern scale and intensity of future industrial activity changes in scale and intensity.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - Ian and Wendy Ritchie.pdf</b></p> <ul style="list-style-type: none"> <li>N/A</li> </ul>
South Otago Heritage Society Inc	OS35	41A	Oppose (in part)	<ol style="list-style-type: none"> <li>Opposes rezoning of Tokomairiro Sports Ground and paddocks behind to Industrial Resource Area and seeks this area to be retained for recreation purposes.</li> <li>Seeks for Part Section 104 Block 12 Tokomairiro SD retain current status of Recreation Reserve.</li> </ol>	Y	<p><b>Clutha District Plan Submission PC41A - South Otago Heritage Society Inc. .pdf</b></p> <ul style="list-style-type: none"> <li>N/A</li> </ul>
Thomas, Mark & Penny	OS03	41	Oppose	<ol style="list-style-type: none"> <li>Concerned with the management of health and safety of nearby residents, stock and vegetation.</li> <li>Seeks all roads near rezones to be tar sealed or at minimum dust effects from un-sealed roads to be managed.</li> <li>Seeks sufficient stormwater management/drainage to ensure no flooding of existing properties.</li> <li>Seeks to ensure there are no adverse effects from rezoning on existing properties.</li> </ol>	N but will consider joint case	Not provided.
Toko Rugby Football Club	OS37	41A	Oppose	<ol style="list-style-type: none"> <li>Opposes rezoning of Tokomairiro Sports Ground and paddocks behind to Industrial Resource Area.</li> <li>Seeks this area to be further developed for recreation purposes.</li> </ol>	Not stated	N/A
Wilson, Russell	OS06	39	Oppose	<ol style="list-style-type: none"> <li>Seeks that no additional residential zoned land on Golfer's Drive due to concerns regarding adverse effects on amenity and native wildlife.</li> </ol>	Y	N/A

## Memorandum

**To:** Anthony Steel, Fluent Solutions  
**From:** Emma Spalding, 4Sight Consulting Limited  
**Date:** 14 August 2019  
**Subject:** Stormwater Management Review

### 1. Introduction

Calder Stewart engaged Pattle Delamore Partners Limited (PDP) to complete a review of technical material relating to stormwater management.

Technical material provided by Calder Stewart to PDP relating to stormwater management is the report by Fluent Solutions *'Variation to Plan Change 41 – Industrial Resource Area on the Tokomairiro Plains – Three Waters Infrastructure Engineering Review'*.

PDP undertook a site visit to the proposed Industrial Resource Area (IRA) and surrounding area on 29 May 2019, accompanied by Donald Stewart of Calder Stewart. Their review, dated 11 June 2019, involves a technical review and observations from the site visit along with recommendations for consideration.

The PDP review discusses background to the plan change and structure plan, and describes the hydrological setting of the Tokomairiro River Catchment, Tokomairiro Floodplain, Floodway Corridors and the Scheduled Drain Network (SDN) administered by the Otago Regional Council.

### 2. Amendments to the Proposed Stormwater System

PDP notes that the stormwater concept has changed from what was presented in the Fluent Solutions report. The main change proposed relates to the G1 drain, which will continue on its existing flow path and will not be intercepted by T2, therefore reducing the amount of works required to increase the capacity of the G9 drain. In addition, G11 will be intercepted by T2 and discharge into G1.

### 3. Hydrological Model Review

Stormwater from within the IRA is to be collected via a stormwater collection system comprising of open swales and pipes and directed to one of two stormwater detention basins located within the IRA. Sizing of the detention basins has been determined from a hydrological model developed for IRA and upstream catchments.

The PDP report summarizes the model developed in the Fluent Solutions report and finds the model approach used for determining pre and post-development runoff flows and volumes is suitable. Several recommendations are proposed, however the outcomes are unlikely to affect the feasibility of the proposal. The recommendations include:

- Investigating whether any site-specific information is available to inform the model, in relation to soils and vegetation and Curve Number (CN);
- Updating the rainfall scenario;
- Investigating whether any measured flow data is available within Gorge Creek or SDN drains to calibrate pre-development model scenario; and
- Assessing whether baseflow within the SDN drains may affect flood flow.

#### 4. Stormwater System Design

PDP have identified several issues regarding the stormwater concept presented by Fluent Solutions and Calder Stewart. The primary issues identified relate to the hydraulic capacity of channels and culverts downstream of the proposed IRA, their relationship to the accurate determination of pre-development flows, and the practicalities of automated control gates to control outflow from the proposed detention basins. It is recommended that these potential issues are addressed as the outcome may affect the feasibility of the development.

In terms of the through-site conveyance system, (and in light of the proposed changes to the Stormwater Concept) PDP recommend:

- PDP note that Channel G1 will require capacity upgrade to convey the peak flow from G11, and G9 will not require upgrading. PDP recommend recalculating the peak flow in G1 to assess if channel upgrade is feasible and to identify potential flooding effects to land downstream of the Railway, also taking into account for backwater effects from the Tokomairiro Floodplain.
- PDP note that the existing culvert diameter along G1 under the Railway is unknown and may be undersized to convey additional flow from G11. Upsizing the railway culverts may increase flows and flooding downstream. As the proposed basins are proposed to discharge into G9 and G3/G4 at pre-development rates, and given the diameter of the Railway culverts, basin outflows will be significantly restricted, potentially causing flooding upstream of the Railway.
- PDP therefore recommends complete hydraulic assessment of existing Railway culverts to assess if culvert upgrades are feasible and to identify potential flooding effects to land upstream and downstream of the Railway. Assessment should account for backwater effects from the Tokomairiro Floodplain and outflow from the proposed basins.
- In terms of secondary flood flow, PDP recommend assessment of whether floodway corridors need to be expanded to convey additional flow from intercepted drains, and assessment of flooding effects from the Tokomairiro Floodplain and extra flow in G9.
- PDP also recommends assessing the potential impacts of floodplain encroachment in terms of displacement of volume, or consider exclusion of future development or earthworks within the encroachment area.

The stormwater collection system has been assessed by PDP and is considered suitable.

In terms of Detention Basins, the approach of detention basins to reduce peak flows for 100-year events is considered suitable, however, the practicalities of using automated control gates is questioned by PDP. PDP raise concerns regarding:

- Ensuring the basin outflow does not increase the peak flow within the Tokomairiro Floodplain under variable flood durations and magnitudes.
- Gradual release of water when peak flow starts to recede at 13 hours, rather than release at pre-development levels
- Linking the gates to the Tokomairiro Floodplain so that the gates open only when the peak has passed
- False peak flood events
- Reliability of the gates during a flood event (eg power supply)
- Annual maintenance

PDP also note that groundwater levels have not been assessed, and high groundwater levels may limit the depth of basins. They recommend a review of groundwater levels within the vicinity of the basins. PDP also recommend sensitivity analysis to assess variation in basin sizing.

PDP also note that maintaining G1 along its existing flow path will likely require that a third attenuation pond is constructed upstream of the existing G1 railway culvert. The water attenuation analysis should be reconsidered to account for the change in drainage pathways as well as the outputs of recommended hydraulic assessment of the existing culverts and pre-development flows.

In terms of water quality, PDP recommend assessment of potential adverse effects of reduced baseflow in Gorge Creek between SDN drains G1 and G11.

## **5. Conclusion**

In general, PDP finds the model approach used for determining pre and post-development runoff flows and volumes is suitable. PDP have identified several potential issues regarding the stormwater concept presented by Fluent Solutions and Calder Stewart, as described above, and further investigation is recommended.