Resource Management Act 1991

Proposed Plan Change 49 to the Selwyn District Plan

Technical Report on Three Water Utility Matters

To:	Hearings Panel
From:	Liam Foster Opus International Consultants
Date:	25th May 2017

Note: ***The recommendations contained within this report do not constitute Council decisions until accepted.***

This report has been prepared under Section 42A of the Resource Management Act 1991. The purpose of the report is to assist Selwyn District Council's Hearing Commissioners evaluate and decide on submissions on the provisions in Proposed Plan Change 49 to the partially operative Selwyn District Plan by providing expert advice on technical matters. This report should be read in conjunction with the planning officer's report and any other relevant reports identified.

1. Introduction

1.1. My name is Liam Alexander Foster. I am a Principal Environmental Consultant for Opus International Consultants Ltd (Opus). I have held this position for three years. I have been asked to prepare a report commenting on water, wastewater and stormwater servicing-related matters and associated submissions on Proposed Plan Change 49 (PC49) to the operative District Plan on behalf of Selwyn District Council ("the Council").

1.2. I am a Chartered Water and Environmental Manager and have been since 2007. I have a Masters of Science Degree.

1.3. The Council operates the potable water, stormwater and wastewater network, which could be impacted by this plan change.

1.4. Opus has been engaged by Selwyn District Council (the Council) to deliver a wide range of professional services pertaining to the management of the five Waters utilities assets since 2008. These have included preparation of the five Waters Asset Management Plan 2009, water supply masterplanning, and asset data collection and analysis. I have liaised with the relevant contacts internally who have taken significant roles in these and other projects, as well as consulted with the Three Waters Asset Manager.

2. Background Information

2.1. The evidence provided is principally based on:

(i) PC49 Application taken from the Council's website - http://www.selwyn.govt.nz/__data/assets/pdf_file/0003/208596/20161109-PC49-00-Request-V2.0-Notifctn-version.pdf - 8th November 2016

(ii) Engineering Report (showing the three waters servicing reports). Taken from the Council's website - http://www.selwyn.govt.nz/__data/assets/pdf_file/0019/208603/20161109-PC49-Annex-06-Infrastructure-V2.0-Notifctn-version.pdf - 9th September 2016

(iii) Knowledge and experience within the Opus Christchurch team of the Council's network and assets

(iv) 5 Waters Activity Plan Part 2 – Water, Part 3 – Wastewater and Part 4 – Stormwater – June 2015

(v) Examination of plan records

(vi) Discussions with the Council's Utilities Team Leader and staff.

(vii) The Council's Policy Manual W304 - 25 June 2014

(viii) SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice

2.2. PC49 seeks to rezone 8.1 ha from Rural (Inner) Plains to Living 3 Zone in order to provide sixteen (16) rural residential lifestyle property lots to meet with existing and expected demand for future accommodation needs from the surrounding area. The site is located on the western side of the existing Tai Tapu township bounded by Hauschilds Road on the east, Lincoln Tai Tapu Road on the northern side and rural land on the western and southern sides.

3. Scope

3.1. The specific aspects of this proposal that my evidence relates to are the servicing of the three waters (Potable Water, Stormwater and Wastewater Networks). My evidence also addresses the specific relief sought by various submitters on these provisions where they relate to water, stormwater, or wastewater.

4. Proposal

4.1. The development partially adjoins existing Living 1A Zoning of the Tai Tapu Township and the proposal includes for re-zoning of approximately 8.1 ha of Rural (Inner Plains) to Living 3 Zone, allowing existing and future accommodation needs of residents of Greater Christchurch to be serviced.

4.2. As these requests seek rural residential zoning, they will be required to provide suitable three waters infrastructure to each new allotment and align with the sequencing of residential growth within the metropolitan urban limit.

4.3. The proposal will necessitate 'orphan' infrastructure that is an incremental increased burden on the existing community. The proposal will require connections to the existing Tai Tapu township water and wastewater supply schemes. The proposal will also require the discharge of stormwater to a communal stormwater collection and disposal system.

4.4. The site is located outside of an existing serviced area.

5. Water Supply Servicing

Background to Tai Tapu Water Supply

5.1. Tai Tapu is serviced by a community drinking water supply, providing untreated groundwater to the Tai Tapu township and the nearby Otahuna Valley area (restricted supply, 3 m^3/property).

5.2. Water, sourced from a single bore (34.6 m deep bore constructed during 1972), is supplied directly to the town, and to the Otahuna Valley supply zone via a booster pump station.

5.3. The Council holds a resource consent, CRC134786, to take and use groundwater from the 34.6 m deep bore. The resource consent limits abstraction rates to 25 l/s with a volume that must not exceed 6559 cubic metres per seven days.

Table 1 Resource Consent (taken from AMP Plan 2015)

Consent	Description	Location	Date Issued	Expiry Date	Consented Max Instantaneous Flow (L/s)	Consented Max Daily Volume (m^3/day)
CRC134786 *(Issued-Active)*	To take and use groundwater.	Perymans Road, TAI TAPU	27-Mar-13	31-Jan-35	25	937 (avg)

5.4. At the time of writing this evidence, the Council advised that the following water connection information in relation to this bore is as follows:

- 186 full connections (properties connected),
- 1 property with multiple connections (e.g. school), and
- 31 properties with half connections (ability to connect but are not yet connected).
- 50 properties in the Otahuna rural zone (restricted supply)

This gives a total of 221 unrestricted and 50 restricted connections pre-plan change and 221 unrestricted and 66 restricted post plan change.

5.5. The 5Waters Activity Management Plan Part 2 report identifies that the Tai Tapu water supply has capacity for additional connections providing instantaneous demand can be managed.

5.6. The well was installed to meet a Medical Officer of Health requirement to protect public health. Previously failing septic tank effluent and high groundwater levels were impacting shallow domestic wells.

Fire Fighting Capacity

5.7. The Tai Tapu water supply scheme was designed as a domestic supply and will not comply with the NZ Fire Fighting Code of Practice in all areas due to the size of the reticulation.

5.8. All new subdivisions are required to be designed and constructed in accordance with the Councils 'Engineering Code of Practice'. Section 7.5.4 – Fire Service requirements, provides the following requirement:

The water supply reticulation should comply with the Fire Service Code of Practice. In particular, the reticulation must meet the requirements for firefighting flows, residual fire pressure and the spacing of hydrants.

5.9. This is further covered within Council policy W211. The Fire Fighting Standard Community Waterworks policy states:

Community waterworks shall be designed and installed to comply with SNZ PAS 4509 and subsequent amendments. This shall apply to:

a) new subdivisions where they shall be connected to community waterworks;

b) communities with standalone household supplies that are considering developing community waterworks and in accordance with Policy W210;

c) renewals and capital works to existing community waterworks, where:

1) "renewals" is defined as works that upgrade, refurbish or replace existing facilities with facilities of equivalent capacity or performance capability; ii) "capital works" is defined as works that create new assets or increase the capacity of existing assets beyond their original design capacity or service potential.

2) The requirement for compliance of any community waterworks with SNZ PAS 4509 shall be at the discretion of the Asset Delivery Manager.

5.10. There are options available for the subdivision to achieve the firefighting requirements specific to the development and that this can be achieved during the subsequent scrutiny at engineering subdivision consent stage

Future Growth Demand

5.11. Recent investigations to support the AMP 2015 documentation have identified that the current supply servicing has recorded peak weekly and peak day demands at about 70% of that consented. The AMP identifies that provided instantaneous demand can be manged within the capacity of the installed pump, there is the potential to accommodate

additional connections to the supply.

5.12. The AMP and further discussions with the Asset Manager has identified that the supply capacity is sufficient to meet current and future projected demands.

Water Servicing

5.13. The take and use of groundwater water for community drinking water supply purposes is not considered a significant issue for the PC49 area. While there are constraints (e.g. demand management requirements including conservation water, effects on neighbouring wells etc), this type of water demand has been recognised as having high priority within the Canterbury Water Management Strategy.

5.14. The proposal seeks rural residential densities, requiring connection to the community network within the metropolitan urban limits of Tai Tapu.

5.15. Water can be accessed from extending the current DN100 water main on Hauschilds Road. A 130m extension of this main is proposed along new Road C, with new DN63 submains up each of the three new roads, providing reticulation to each property connection. Minimum fire hydrant distances recommendations in SNZ PAS 4509, may require that the DN100 is extended further into Road C.

5.16. There are options for servicing the water requirements for this Plan Change that can be further refined during the engineering subdivision consenting process. At this stage, these should include the delivery of a 'restricted' supply connection (2m3 / day / property) connected to the township water supply, use of existing private bores on site (provided they are secure and meet the Drinking Water Standard 2005 (revised 2008)) or via specific developer contributions to accelerate the infrastructure provision to suit preferred timescales.

Conclusion

5.17. Water provision and water networks for the proposed Plan Change development present challenges, however the restricted supply connection and further scrutiny at engineering subdivision consent stage will help to secure the supply of water to this subdivision without affecting current levels of service.

5.18. As such, water servicing does not therefore present a constraint on this Plan Change.

6. Wastewater Supply Servicing

Background to Tai Tapu Wastewater Supply

6.1. A community wastewater collection and disposal system was constructed in 1998. The system consists of gravity reticulation conveying wastewater to a single pump station on School Road.

6.2. At the time of writing this evidence, the Council advised that the following wastewater connection information in relation to this system is as follows:

- 180 full connections (properties connected),
- 4 properties with multiple connections (e.g. school), and
- 36 properties with half connections (ability to connect but are not yet connected).

This gives 228 connections.

6.3. The School Road pump station pumps wastewater to Christchurch City Council's (CCC) wastewater network via a pressure main. The wastewater receives treatment at CCC's Bromley Wastewater Treatment Works (WwTW). An agreement between the Council and CCC enables the Council to discharge untreated wastewater into CCC's network. The agreement limits annual volume to 90,000 cubic metres with a peak discharge rate of 7.5 l/s. The existing pump has sufficient capacity to achieve this agreed rate.

6.4. A review of the available flow data between 2010 and 2017, identifies that the average daily flow was 105m^3 (summer) and 132 m^3 (winter). The annual average volume (2010 – 2016 inclusive) was 44,100 $m^{3,}$ with a peak annual volume of 48,800 m^3 in 2013.

6.5. The 5Waters Activity Management Plan Part 3 report identifies the system has capacity for up to 279 domestic connections within the serviced area. These 51 (279 minus the existing 228 connections) additional properties can be serviced comfortably (in relation to the existing peak flow rate and annual volumes) within the agreement with CCC.

Wastewater Servicing

6.6. This plan change lies outside of the existing wastewater serviced area for Tai Tapu.

6.7. Provision for wastewater disposal is made by way of connecting a private low-pressure system. Individual lot pump stations and infrastructure on private property would remain the responsibility of the property owner(s). These would then connect to a small diameter, shallow pressure pipe network within each of the three road reserves. The three new pressure pipes would be vested to the Council and lift flow to connect with the current public wastewater main at three manholes located within Hauschilds Road.

6.8. Design wastewater flows have been calculated for the proposed plan change of 16 units,

using the Council's Engineering Code of Practice, predicting Average Sewerage Flows of 1.92 l/s with a Maximum Sewage Flow of 9.6 l/s. This increase in wastewater load should be small relative to the design load for the downstream receiving collection network and pump station.

6.9. There are options for servicing the wastewater requirements for this Plan Change that can be further refined during the engineering subdivision consenting process. At this stage, these should include:

6.9.1.1 Agreeing mechanism to guarantee long term configuration of the individual lot pumping control system to operate during off-peak hours and agreeing with the Council as to whether the Council would seek to manually control each pump;

6.9.1.2 Amending the conditions of the time that the volume is stored on site such that '….including a storage tank that provides at least 48 hours storage';

6.9.1.3 The pumps/tanks are to be located within raised building platform to reduce risk of stormwater inundation;

6.9.1.4 The applicant providing sufficient evidence that there is hydraulic capacity within the receiving gravity pipe work;

6.9.1.5 Amending the design such that the common pressure mains are not vested within the Council;

6.9.1.6 Agreement to deliver improvements to receiving manholes in Hauschilds Road to minimise the impact of potential corrosion and odour issues on the Council's and CCC's wastewater network;

6.10. It is advised that the developer liaise with the Council to understand the impacts and specific requirements during future subdivision process.

6.11. Any increase in wastewater load will be insignificant relative to the design load for the Bromley WwTW with a less than minor effect.

Conclusion

6.12. Wastewater provision for the proposed Plan Change development presents challenges, however the proposed low pressure supply and pumping the development wastewater off-peak as well as further scrutiny at engineering subdivision consent stage will help to secure the wastewater network provision to this subdivision without impacting on current levels of service.

6.13. As such, wastewater servicing does not therefore present a constraint on this Plan Change.

7. Stormwater Supply Servicing

Background to Tai Tapu Stormwater Supply

7.1. Stormwater runoff from the existing Tai Tapu Township is predominantly captured and conveyed by a piped network to the Halswell River. The Halswell River flows in an east to west direction along the township's northern boundary.

7.2. A large stormwater basin on School Road attenuates flows during large rainfall events, reducing the risk of inundation of the Tai Tapu township.

7.3. When the Halswell River has a high water level the ability of the township's stormwater network to discharge stormwater is significantly reduced. The Council owns a number of pumps that are used to pump water from the Tai Tapu stormwater network into the Halswell River when river levels necessitate.

7.4. An Integrated Surface Water Management Plan (ISWMP) is in preparation for the township and will cover the existing serviced urban area only.

7.5. A series of open drains operated and maintained by Environment Canterbury (ECan) services the rural land to the east and south of the Tai Tapu township. Ryans Drain and Bains No.1 and No.2 Drains predominate. These drains discharge in Burkes Creek, at the intersection of Gilmores Road and Macartneys Road, which in turn discharges into the Halswell River.

Stormwater Servicing

7.6. Stormwater from the plan change site will discharge to a waterway known as Ryans Drain at southwest corner of the site, which ultimately discharges to the Halswell River and on to Lake Ellesmere.

7.7. The Council's current position regarding stormwater treatment and management is that the applicant will, as appropriate, obtain consent from ECan for construction phase discharge and the operational phase discharge that involve the ongoing control of treatment and disposal of stormwater.

7.8. The Council's current position regarding flooding and flood management is that the applicant will, as appropriate, obtain consent from ECan for the construction and operational phase levels of protection and level of service.

7.9. On discussion with the Council's Three Waters Asset Manager, the Council will not accept any of the proposed stormwater system assets nor the transfer of any consents to it for management. Therefore, I advise the applicant to enter into discussions with ECan.

7.10. I have also assessed the areas of land dedicated in the Outline Development Plan for the stormwater facilities and the reported treatment volumes. These appear adequately sized at the conceptual level.

7.11. Several of the submitters (see Section 8 below) have raised concern regarding the potential for increased flood vulnerability due to the development. The provision of offset storage at level for level and volume for volume basis is an appropriate mechanism to help offset the potential impacts of development (including raising land to provide onsite flood protection); however, ECan should consider these concerns.

7.12. Stormwater treatment and storage attenuation as proposed (via vegetated swales and first flush dry basins and detention basins) are appropriate systems for balancing the impacts of additional stormwater to the catchment from development.

7.13. I consider this proposed 'treatment train' concept to be in accordance with the goals and objectives set out in the Council's Activity Management Plan and future Tai Tapu ISWMP. These methods have been utilised across Canterbury.

7.14. I have concerns as to the viability of splitting significant stormwater devices across several lot titles and the ability to ensure the ongoing operation and compliance of these. However, ECan will lead on these requirements.

Conclusion

7.15. There is a viable means to dispose of stormwater for this plan change area.

7.16. I would recommend that the applicant obtain a stormwater consent from ECan prior to lodging an application for subdivision consent from the Council.

8. Comment on Relevant Submissions to the Plan Change Application

8.1. Submissions have been analysed. Those relating to the three waters infrastructure provision have been summarised here with specific response. Each response is referenced to the individual Decision Number as reported in "Proposed Plan Change 49 - Z & S Croft and J K Williams, proposed Tai Tapu Living 3 zone Summary of Decisions Sought"

8.2. A number of the submitters raise some issues around each of the three waters infrastructure provision and the potential impact that this may have on surrounding properties. The servicing report points to the need for further additional engineering design services to be undertaken in advance of the subsequent subdivision consent phase.

8.3. The process through to engineering subdivision consent will include for significant liaison

with the Council's representatives, such that the resultant infrastructure will be designed in accordance with the rules, regulations and best practices set forth in the relevant Council strategies, policies and guidelines

8.4. As advised in Section 7, concerns in relation to stormwater quantity / quality and flood management will require liaison and agreement with ECan.

8.5. Receipt of the consent from ECan and mitigation to this extent will satisfy the Council that the effects of the proposal on the environment and neighbouring properties will be less than minor.

Decision Number	Submission response
D1.1	The applicant's proposal can be accommodated by the township's existing wastewater and water supply reticulation systems provided the applicant's proposed infrastructure be appropriately designed.
D2.1	The applicant's proposal can be accommodated by the township's existing wastewater and stormwater systems provided the applicant's proposed infrastructure is appropriately designed and consent is sought from ECan (stormwater and flooding).
D3.2	The applicant's proposal can be accommodated without causing the requirements of the Council's agreement with CCC to be exceeded provided the applicant's proposed infrastructure is appropriately designed
D5.2	The applicant's proposal includes provision for compensatory flood storage and attenuation of stormwater runoff. Provided the proposed infrastructure is appropriately designed and consented through ECan, the effect on the surrounding area's ability to manage stormwater will be less than minor.
D6.1	Stormwater runoff from the applicant's site currently contributes to flows within Ryans and Bains Drains. The applicant's proposal includes provision to attenuate stormwater runoff to match pre-development flows. Provided the applicant's proposed infrastructure is appropriately designed and consented through ECan, the effect on Ryans and Bains Drains will be less than minor.
D7.2	The applicant's proposal includes the provision for appropriate stormwater infrastructure, however the applicant is required to liaise and obtain consent for the stormwater provision from ECan.

Decision Number	Submission response
D8.1	The 2004 ECan report is a factual report detailing the information held about the site at that time. The applicant's proposal states: "…it is proposed that building platforms be constructed to elevate the dwellings and achieve a minimum freeboard of 0.4 m from the 0.5% AEP event…" and "The minimum finished floor level will need to be determined during the detailed design phase and then confirmed by SDC or ECan as part of the subdivision consent…". The applicant's proposal also includes provision for compensatory flood storage. Calculated volumes in the applicant's proposal are based on a flood level of 6.9 m AMSL based on pre-earthquake flood modelling. The applicant's proposal to mitigate the risk of future dwellings from inundation is appropriate. It is agreed that the applicant should consider the effects the earthquake may have had on extreme flood levels in the area. This is consistent with the applicant's proposal and it is appropriate for this, more detailed, engineering investigation to be conducted and approval sought from ECan, during the subdivision consent process.
D8.4	This requested decision would prejudice the submitter's D8.1 request. Specifying an absolute level, as requested by the submitter, would not take into account any changes caused by the recent seismic activity. The applicant's proposed rule, 4.1.1(A) is an appropriate wording that can endure any changes that may be required to mitigate against increased predicted flood levels.
D8.5	It is a requirement that the stormwater infrastructure is operated in accordance with a discharge consent from ECan. It will be ECan's responsibility to monitor conformance with the requirements of this consent and take any necessary enforcement action regarding non-conformance. Whether the stormwater infrastructure is privately/publically owned and maintained is not relevant to the performance of the system.
D8.7	I agree that the individual wastewater pumps should be located within the elevated building platforms. The applicant should demonstrate compliance with this during the subdivision consent process.
D8.8	The applicant's proposal includes provision for compensatory flood storage. The exact details of the sizes and locations are required in order to obtain the required ECan consents and subdivision consent. These statutory requirements provide

Decision Number	Submission response
	the mechanisms for delivering sufficient provision before development can proceed.
D9.5	The 2004 ECan report is a factual report detailing the information held about the site at that time. The applicant's proposal to mitigate flood risk is appropriate. I agree that the applicant should consider additional information and/or changes in the environment that may have changed flood risk. This is consistent with the applicant's proposal and it is appropriate for this, more detailed, engineering investigation to be conducted during the subdivision consent process.
D9.6	The applicant's proposal includes provision for compensatory flood storage and attenuation of stormwater runoff. Provided the applicant's proposed infrastructure is appropriately designed the effect on the surrounding area's ability to manage stormwater will be less than minor.
D9.7	Individual wastewater tanks with small pumps is a method of discharging wastewater that is well developed and used extensively throughout the region and around the world. The tanks are not located above ground. Controlling the pumps to pump during certain periods of the day is not technically difficult and provided the applicant's infrastructure is appropriately designed, will be able to achieve the outcomes proposed. Provided the applicant's proposed infrastructure is appropriately designed the township's existing wastewater reticulation system can accommodate the additional demand.
D9.12	This appears to be an error in the applicant's proposal.
D10.1	The wastewater tanks proposed by the applicant are installed below ground. There is no information in the applicant's proposal about the location of water supply tanks. The affect an above ground water supply tank may have on visual amenity is outside the scope of this response. The type of wastewater pump proposed is a small submersible unit that will not be audible beyond a very short distance. On site storage tanks, especially enlarged ones, increase retention times and provide conditions that encourage biological processes that can generate odours. A well ventilated storage tank would have a similar risk of generating unpleasant odours as a septic tank. Given the size of the proposed lots,

Decision Number	Submission response
	neighbouring properties are unlikely to be adversely affected by odours emanating from the individual storage tanks.
D10.4	It is a requirement that the stormwater infrastructure operate in accordance with an ECan approved discharge consent. It will be ECan's responsibility to monitor conformance with the requirements of this consent and take any necessary enforcement action regarding non-conformance. Whether the stormwater infrastructure is privately/publically owned and maintained is not relevant to the performance of the system.
D11.2	The applicant's proposal can be accommodated without causing the requirements of Council's agreement with CCC to be exceeded provided the applicant's proposed infrastructure is appropriately designed.
D11.3	The applicant's proposal includes provision for compensatory flood storage and attenuation of stormwater runoff. Provided the applicant's proposed infrastructure is appropriately designed, the effect on the surrounding area's ability to manage stormwater will be less than minor.
D11.4	Investigation of Tai Tapu's water supply confirms that the existing source can accommodate the plans identified by the applicant. The applicant should demonstrate during the subdivision consent process that the additional demand on the existing water supply pipe lines will not reduce available pressure during peak demand to less that Council's policy of 350 kPa at each connection.

9. Conclusions

9.1. In conclusion, it is my opinion that:

(a) PC49 necessitates 'orphan' water and wastewater services infrastructure, which would result in increased costs of operation, maintenance and renewal over the asset life compared with accommodating the same number of households within the metropolitan urban limits. Large rural residential developments do not therefore generally result in an efficient servicing network when compared to the consolidated and coordinated management of residential growth. Such increased costs are inherent in rural-residential typologies and as such are not unique to this plan change but rather are a natural consequence of large-lot development comparted with servicing the same number of households at more intensive suburban densities.

(b) Council accepts low-pressure sewerage systems. The council would expect that pump station and any infrastructure on private property (through to the connection with the sewerage main in Hauschilds Road) remains the responsibility of the property owner(s).

(c) The metropolitan water supply currently does have sufficient capacity to meet the demand of predicted growth across Tai Tapu. Options are available for delivering the water supply requirements to support PC49, which necessitate further refinement during the Subdivision Consenting Process, as well as discussion and agreement with the Council.

(d) The Council would seek for the provision of a restricted water supply approach of $2m^3$ per property per day to help mitigate the potential impacts of unrestricted large residential development lot size on water demand.

(e) The wastewater reticulation and pumping station network within Tai Tapu appears to have the sufficient capacity to meet the demand of predicted growth in the PC49 area.

(f) Stormwater treatment and disposal approaches identified are suitable, providing that the meet any ECan consent conditions.

(g) The matters raised by submitters pertaining to the provision of waters infrastructure are addressed (appropriate to the Council). The remaining can be appropriately investigated through the consenting process with ECan.

(h) Provision of 16 lots of rural residential development, as would be permitted by proposed Plan Change 49, to the existing water and waste water infrastructure would be appropriate and subject to agreement with the Council over ongoing 'headworks' to help fund the community infrastructure required to help service the

proposals.

(i) Subsequent to agreement with the Council over subdivision servicing, there would be no adverse effects on the efficient and cost effective provision of such infrastructure and utility services.

Liam Foster
Principal Environmental Consultant
Opus International Consultants Ltd