Appendix A – Davie Lovell-Smith Infrastructure Report

Infrastructure Report

D J & S J Anderson
Proposed Private Plan Change

April 2013

DAVIE LOVELL·SMITH

PLANNING SURVEYING ENGINEERING

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Revision History

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1	David Maclean		09/04/13

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1. GENERAL

1.1 Introduction

This infrastructure report addresses servicing of the proposed rural residential development located at the north-eastern corner of Trents and Shands Roads, Prebbleton as described in the Plan Change Request by David and Suzanne Anderson. The plan change area is approximately 9.2 hectares. The proposed Plan Change seeks Living 3 zoning for this area, which is expected to provide approximately 16 rural residential lots with sizes ranging from 5000m^2 and 6000m^2.

This report primarily addresses the servicing of the proposed development that would follow the rezoning of the site including stormwater treatment and disposal, sewage reticulation and disposal, water supply, earthworks, groundwater, roading, pavements, power and telecommunications. In addition, the suitability of the soils over the site to accommodate rural residential development is addressed.

Considerable consultation has occurred with Selwyn District Council regarding the infrastructure requirements for the site. This consultation has included preliminary correspondence and meetings with individual staff. Consultation has been undertaken with Orion and Chorus to ensure the coordinated provision of these services.

While the request being made is for rezoning of the land, on the basis of the size and orientation of the property and the proposed Outline Development Plan, it is considered that the layout in the Davie Lovell-Smith Plan P.16845 'Possible Subdivision of Lot 2, D.P. 51743' Option D dated May 2012, is a logical subdivision of the land. It has therefore been used as the basis of the infrastructural needs of the site and this assessment. It is understood that the mixture of lot sizes could vary from that under the proposed subdivision. However, in our opinion, any variances are unlikely to change the conclusions reached in the proposed servicing of the site or this assessment.

1.2 The Site

The Plan Change site is located at the eastern side of Shands and Trents Roads' intersection. The site currently contains a dwelling and buildings/outdoor areas ancillary to horse training purposes. Kingcraft Drive Existing Development Area (EDA) is located to the southeast of the application site. This EDA currently allows for rural residential allotments with a minimum area of 1ha.

A request to ECan for information on the Listed Land Use Register reveals that the site is not listed.

2. SITE CONDITIONS

2.1 Soils

The Canterbury Plains consist of intermingled alluvial and glacial fans composed of clays, silts, sands, gravels and graded combinations of these soils. The geotechnical assessment carried out for the development of this site describes the general geological profile of this site as:

- topsoil (0.2-0.25m deep) consisting of dark brown silty fine to medium sand with some organic materials
- fine alluvium consisting of sandy silt to silty fine sand ranging from 0.35m to 1.6m in depth

- Q1a alluvium deeper than 15m (estimated to be up to 100-300m deep), typically consisting of sandy gravel with some to minor silt with local cobbles up to 0.2m in length.

The Environment Canterbury GIS database indicates that the soils underlying the site are Templeton deep and moderately deep silt loam and Templeton deep sandy loam on sand of variable depths and proportions. Further information on the soil profile is included in the geotechnical report prepared by Riley Consultants Ltd and included in **Appendix C** of the Plan Change report.

2.2 Geotechnical Assessment

General Conclusions
Riley Consultants Ltd carried out a geotechnical assessment on the basis of a future subdivision for rural residential development for this site. This report titled *311 Trents Road, Prebbleton, Canterbury – Geotechnical Assessment for Subdivision Consent* dated 28 February 2013 is attached as **Appendix C** of the main Plan Change documentation. As part of this assessment of geotechnical conditions and hazards ta desktop study of available data, walkover inspection of the site, subsurface investigation including mechanically dug inspection pits to 5m, dynamic probe profiles (refusal at 4.5m and 7.5m), and infiltration tests were undertaken.

The Geotechnical Assessment Report concludes that
a. The ground has performed well during the recent earthquake sequence
b. Ground conditions consist of topsoil underlain by generally loose silty sand to a maximum depth of 1.95m over competent gravel with subordinate sand, silt and cobbles.
c. Design groundwater level of 7m is appropriate
d. The ground is suitable stratum for any foundation type (fine alluvium with variable bearing capacity approx. 200kPa, gravel with geotechnical ultimate bearing capacity of at least 300kPa)
e. Based on the interpreted geology and design groundwater conditions, there is minor risk of liquefaction from future design earthquake events. The risk of liquefaction induced ground damage is consistent with a TC1 zoning.

Liquefaction Potential
Riley Consultants consider that the information from their desktop study of regional geology provided and adequate basis for assessment of site geology and liquefaction risk, as such they did not propose or undertake deep investigations. The deep sequence of competent gravel under the near-surface soils, combined with deep groundwater table suggests that liquefaction is not a significant hazard to this site (Section 2 of the geotechnical report).

The report further notes that similar soils in Canterbury have performed well under recent seismic loading and no land damage was observed on site. The site is not likely to be subject to any lateral spreading. Refer to Section 5 of the Geotechnical Report for more detail.

A geotechnical per review for Selwyn District Council was undertaken by Ian McCahon of Geotech Consulting Ltd, who agreed that investigation philosophy as suitable for the anticipated ground conditions.

Ground Suitability
Riley Consultants consider that the site is likely to have ground conditions similar to Technical Category 1 as classified by Department of Building and Housing (DBH). The regional geology and site investigations suggest that the site meets the bearing capacity criteria for 'good ground'

according to NZ3604. They suggest that as top soil is not a suitable stratum for dwelling foundations it should be removed prior to building. Due to variability of finer alluvium further investigations are recommended at time of individual building development to ascertain the most appropriate, cost-effective solution for each building platform.

2.3 Contaminated Soil Risk

An assessment has been made by Davie Lovell-Smith Ltd as to whether the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 apply. This Preliminary Soil Investigation Report is attached to the Plan Change Report as **Appendix D.** As this proposal is for a change in land use, ultimately resulting in subdivision, it is considered that the future activity is covered by the Regulations. An assessment was then carried out to determine if the land was covered. Pursuant to Section 6 of the Regulations, a desktop investigation was carried out to establish whether or not a piece of land is more likely than not to have had a HAIL (Hazardous Activities and Industries List) activity or industry undertaken on it.

The report reveals that the site has been used generally for horse breeding and pastoral farming purposes since 1900s and since at least 1982 as a horse training facility/stud. It is believed that there was little, if any, use of agrichemicals on the land, based on local knowledge of the farming practices of the owner prior to 1980s. Since then, the use of agrichemicals has been limited to well known, non-persisting products such as “Round-Up”.

The preliminary site investigation has found that the presence of a small aboveground diesel storage tank in the eastern corner of the site has had the potential to contaminate the land. It is recommended that further investigation around the diesel storage tank be conducted. There is low risk of contamination for the remaining land, and it is recommended that further investigation is not warranted.

2.4 Groundwater

The site is located over the unconfined/semi confined aquifer. The local groundwater depths vary between 7 to 11 metres based on calculated minimum ground water depths on the ECan GIS database and some actual records on ECan well data. Site inspections carried out by Riley Consultants as part of their geotechnical testing did not reveal any shallow groundwater.

2.5 Surface Water

There is no localised flood risk applicable to this site. There are no notable surface waterways on or near this site. A small pond exists in the northwest of the site at the Shands Road boundary and a water race runs along the Trents Road berm adjoin the site.

3. EARTHWORKS

The site is essentially flat and bulk earthworks will not be required. However there will be general site shaping and excavation of the topsoil layers to form pavements and foundations.

The general earthworks operation will involve the clearing of the site and then the incremental stripping of the topsoil and engineered cut and fill. The site will not be fully stripped in one

operation but will be stripped and finished in stages to ensure better control of the sediment and dust from the site.

Any dust generated on the site will be mitigated with the use of water dampening by sprinkler or water cart. The sediment control will be dealt with in terms of the Environment Canterbury Erosion and Sediment Management Guidelines.

All earthworks will be undertaken in accordance with NZS4431:1989.

4. ROADING

Shands Road is an arterial route and Trents Road is deemed to be a local road. It is proposed that all lots are accessed from Trents Road, avoiding any direct access from Shands Road. There is currently direct access from Trents Road to the existing buildings. The allotment located at the corner of Shands and Trents Roads may either obtain direct access via Trents Road or access the internal road via a right of way. Note that the possible subdivision plan on which this infrastructure report is based is an indicative layout only.

All roads created as part of development of this block will be vested in Selwyn District Council. This comprises of an 18m wide main internal road allotment and another allotment of the same width connecting to the property to the north. The latter provides for any future roading connections to the north should they be required.

Unless otherwise approved by Council, the roads will be constructed in terms of the Selwyn District Council Engineering Code of Practice, to a rural/residential standard the same as or similar to the Living 3 cross section in Appendix 41 to proposed Plan Change 32. The carriageway formation width will be 6.0 – 7.0 metres in width with swales both sides and a berm for walking. Stormwater running off the roads and any proposed rights of way can be collected by a swale and disposed of via a soak pit.

The additional traffic generated by this development is expected to be approximately 130 trips per day on the basis of the commonly accepted trip generation of rural residential households of about 8 trips per day. This increase in traffic can safely be accommodated on Trents Road without the need for upgrading.

5. SEWAGE TREATMENT AND DISPOSAL

The pressure main currently situated in Trents/Shands is likely to be decommissioned when Prebbleton-Lincoln-Rolleston pipeline is commissioned. On the basis of discussions with Council officers an acceptable alternative reticulated system involves pumping sewage from the development to the Trents Road – Lindsay Drive intersection. Preliminary design shows an Ø75mm rising main will be required with an additional pump station near the site. This rising main would convey waste water from a Ø150mm gravity fed sewer system within the subdivision. The pressure main would be installed within the berm along Trents Road pumping waste water to the existing pump station at the entrance of Waratah Park. Installation of the rising main has the option of mole ploughing or chain trench digging to reduce cost and disturbance within the road reserve.

The gravity fed system within the subdivision would also have capabilities of servicing further development of land on the northern boundary. However this may not be economic, unless other landowners are involved to reduce the external reticulation costs. Nevertheless we note that Selwyn District Council has advised the applicant that they would be open to discussions regarding reticulated sewerage options for the site.

While it is proposed to connect to a reticulated system, it is noted that the site's characteristics are such that sewage could be satisfactorily be treated and disposed of to land via on-site systems and without the need for resource consent.

6. STORMWATER RETICULATION AND DRAINAGE

6.1 Local Infrastructure

It is proposed to treat and dispose of stormwater onsite. Stormwater from roofs will be directed straight to soak pits and stormwater from hardstand and roads will be collected and either treated and disposed by a soak pit or discharged directly to soak pits. The groundwater levels in this area range between 7m to 11m based on ECan records. Based on this information, no consents are required from Environment Canterbury for the proposed treatment and disposal of stormwater.

6.2 Discharge Consents

The Land and Water Regional Plan (LWRP) and Natural Resources Regional Plan (NRRP) contain rules pertaining to stormwater discharge. The proposed stormwater disposal methods comply with all of conditions under the Land and Water Regional Plan so no consent is required under this plan.

Under the NRRP, Rule WQL7 allows the discharge of stormwater to surface water subject to conditions. The roof discharges meet these conditions if it is a sealed system. Stormwater from hardstand surfaces and grassed areas within Road reserve will be collected by kerb and channel and discharged to ground via roadside soak pits. Most of the conditions can be complied with; however condition 6 limits the area of disturbed land the discharge can be from to 2ha, which can be achieved with staging of the subdivision.

6.3 Stormwater Control during Construction

Prior to earthworks and site construction an Erosion and Sediment Control Plan will be prepared and presented to both the Regional and District Councils for approval. An off line sediment retention basin or other method of silt control will be installed where required. All erosion and sediment control will be in terms of the Environment Canterbury Erosion and Sediment Control Guidelines.

It is not anticipated that dewatering will be required during the construction phase.

7. WATER RETICULATION

Currently there is an existing 150mm diameter uPVC water main which terminates at the south-eastern corner of the site. Selwyn District Council has advised that connection to the existing line can be made.

The water supply will be designed in accordance with Selwyn District Council specifications and SNZ PAS 4509:2008, New Zealand Fire Service Fire Fighting Water Supplies Code of Practice. Fire Hydrants will be placed in accordance with this standard. All watermain construction will be completed to Council standards. The watermain within the subdivision will extend to the northern boundary and provide connection for future development.

Submains will be laid along the frontage of the existing and new roads, with connections installed at the subdivision stage. The pipe sizing is subject to network analysis modelling that will be undertaken by SDC during the detailed design.

8. ELECTRICITY SUPPLY

All power cabling will be constructed underground in the berms of the street network. Subject to design, high voltage cabling will be laid to kiosk sites within the subdivision and from there, low voltage connections will be laid to the frontage of each new house site and street light.

The cable networks will be constructed and installed by Orion approved contractors and paid for by the developer.

9. TELECOMMUNICATIONS

Chorus will be requested to provide telecommunications reticulation to service the proposed development. The service will be provided via a common service trench with electricity reticulation, and in accordance with the standard guidelines for subdivisions. A service pedestal will be installed at the road frontage boundary of each lot.

10. CONCLUSION

This report has addressed the servicing of the proposed rural/residential development that would follow the rezoning of the site including stormwater treatment and disposal, wastewater treatment and disposal, water supply, earthworks, groundwater, roading, power and telecom. In addition, the suitability of the soils over the site to accommodate urban development with particular interest in liquefaction and potential contamination has been assessed.

The infrastructure proposed for this development has been investigated in association with Council Engineers and specific Utility Service Companies. The methodologies and proposals presented in this Plan Change are based on standard engineering practice.

On the basis of our investigations, preliminary calculations and consultations with Council Officers, we have concluded that the infrastructure proposed for this development is sufficient to meet all future servicing requirements.

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