BASELINEGROUP

Ref: 6129

Selwyn District Council
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Sent via email to: *jocelyn.lewes@selwyn.govt.nz*

7 November 2019

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Dear Jocelyn

LEESTON PLAN CHANGE - RFI RESPONSE

Thank you for your letter dated 19 September requesting further information regarding Plan Change PC190062: Private Plan Change Leeston. Baseline Group has prepared the following response.

National Policy Statement on Urban Development Capacity

1. *Please provide an assessment of the proposed plan change against the NPS-UDC, and in particular Policy PA3.*

Response:

The National Policy Statement on Urban Development Capacity (NPS-UDC) is designed to focus local authorities to enable development to occur when there is demand for development in our fast growing cities. Importantly this policy directs local authorities to undertake assessments to determine if there are development pressures and to enable development where it is found that development pressures exist. The aim of the NPS- UDC is to enable growth and market driven development to meet the housing and business land necessary to provide for current and future needs. There is direction in the policy statement for local authorities to ensure that in high growth urban environments there is sufficient land with development capacity (i.e. infrastructure and zoning etc) for the short term, medium term and long term needs.

The NPS-UDC defines an Urban Environment as "means an area of land containing, or intended to contain, a concentrated settlement of 10,000 people or more and any associated business land, irrespective of local authority or statistical boundaries." The Ellesmere Area Plan (EAP) projects the population of Leeston to grow to 3,402 by 2031[1], which is less than 10,000 as defined in urban environments with the NPS-UDC.

Objectives OA1-OD2 in the NPS-UDC are applicable to urban environments and decision making by local authorities. As the plan change site is within an area which does not meet the definition of urban environments, the objectives of the NPS-UDC are not applicable to the plan change site.

The NPS-UDC includes a range of policies that apply only to urban environments (PA1-PA4), and decision making by local authorities (PB1-PD4). By specifically limiting Policies PA1-PA4 to apply only to urban environments, the NPS-UDC places greater importance on assessment when development is proposed or occurs in urban environments. As Leeston is not an urban environment (as defined by the NPS-UDC), these policies are not applicable to the plan change.

[1] Selwyn District Council. Ellesmere Area Plan. Accessed 17/10/2019

Policies PB1-PD4 require local authorities to carry out and publish assessments on housing and business development capacity. This research carried out by local authorities ensures planning decisions are evidence based and provide land for future development, if the evidence shows additional land is required.

Given Leeston is not classified as an urban environment, and the NPS-UDC is silent on development outside urban environments, and medium or high growth areas, the plan change does not need to be assessed against the objectives and policies of the NPS-UDC. For clarity, Leeston is not classified as a high or medium growth area.

Stormwater

While the identified stormwater detention areas, enhancement of Leeston Creek and provision for Council's proposed Leeston North Stormwater Bypass are supported, the uplifting of the existing deferrals and rezoning of the application site relies heavily on the proposed bypass to address the known stormwater (and flooding) issues across the site. The plan change documentation suggests that a rule be included in the plan to require the vesting of the necessary land on Lot 2 DP 365379 at the time of the first subdivision. However, concerns exist regarding the timing of the construction of the proposed bypass in relation to the development of the site.

2. *Therefore, please provide details of how the site will be protected from stormwater issues should the bypass not be constructed.*

Response:

The rule regarding Lot 2 DP 365379 has been removed to enable the bypass to be constructed before (or after) the plan change site is developed. The following rule is proposed:

Add the following rule after Rule 4.11:

Any dwelling located in the Living 1 or 2 zone in the Leeston ODP in Appendix XX shall have a minimum floor level 400 mm above the 0.5% Annual Exceedance Probability (AEP) flood event.

Amend Rule 4.1.2 to read:

Under Rule**s** 4.1.1 **and 4.1.2** the Council shall restrict the exercise of its discretion to:

4.1.2.1 The nature of any flooding or land instability and whether this makes the site unsuitable to erect the proposed building or undertake the proposed earthworks.

4.1.2.2 Any effects of buildings or earthworks in displacing or diverting floodwaters and increasing the potential risk of flooding elsewhere.

4.1.2.3 Any mitigation measures proposed.

The proposed rule will ensure any new dwellings will be protected from flood events, should any new dwellings be constructed prior to the stormwater bypass is constructed.

3. *Please also advise how stormwater in the area shaded in pink below is to be managed in terms of water quality and quantity.*

Response:

The site does not hold any specific characteristics that would preclude stormwater quantity or quality being managed appropriately at the time of subdivision. The area is subject to the requirements of the ODP. Therefore, at such time the site is to be developed, subdivision would need to comply with the requirements of the ODP, requiring stormwater to be appropriately managed and discharged. At the time of development, stormwater from the area shaded in pink could be discharged into the network on Spring Place or the stormwater management area in the southern section of the plan change site.

Flooding

Presently part of the site is deferred for residential development as it is subject to surface flooding, and the information provided from Environment Canterbury in Appendix 6 indicated that the wider site is also subject to surface water runoff and ponding during local rainfall events.

4. *Please confirm that the 2015 LiDAR data provided in Appendix 6 is the latest data available, and that the balance of the advice from Environment Canterbury in 2017 is still current.*

Response:

ECan have confirmed the 2015 LiDAR data is the most up to date. Email confirmation is attached to this letter in Appendix 1. In addition, ECan have provided the draft results from flood modelling of the 200 and 500 year return period (0.5 and 0.25% AEP), which are also attached in Appendix 1. Note these are draft versions and final results of the modelling have not been released.

The results of the draft modelling show parts of the plan change site being subject to surface flooding and provides evidence of specific areas within the plan change site that are more susceptible to flooding and ponding. This information is helpful to Council and any future developer of the site as it shows the areas that are not affected by the 200 year flood event which could be developed first and before the stormwater bypass is constructed. It shows there are areas in the plan change site that could be developed and would not be subject to inundation in flood events.

5. *Please provide an assessment of the proposal again CRPS Policy 11.3.2 Avoid development in an area subject to inundation.*

Response:

The ECan flood modelling attached in Appendix 1 shows parts of the site being subject to inundation in a 0.5% AEP flood. The policy seeks to avoid development in areas subject to inundation by the 0.5% AEP unless there is no increased risk to life. The policy states development can occur where the development meets the criteria listed in clause 3(a) and (b) of the policy inferring that by meeting these conditions there will not be an increased risk to life. The proposed additional rule (see response to question 2 above) requiring minimum floor levels will ensure any development of the site will meet subclause (a) of the policy. With regards to subclause (b), no hazardous substances are anticipated to be stored on site as a result of any

future residential development, thus will not be inundated during flooding. Taking into account the above, the plan change is considered to be consistent with Policy 11.3.2.

As discussed above in relation to stormwater, concerns exist that the proposed bypass may not be constructed (in full or in part) by the time of development of the site, or that the bypass may be sufficient to ameliorate any flooding issues at the densities proposed.

6. *Please identify what measures may be necessary to protect the proposed residential development from flooding should the bypass not be constructed (in full or in part) or be of insufficient capacity to fully ameliorate the effects of potential flooding. Such measures may include the stipulation of minimum finished floor levels or established of building platforms.*

Response:

Minimum floor levels are now proposed. Please refer to the response and new rule for question 2.

7. *If the applicant should wish to proceed with development of the site in advance of the full construction of the bypass, a flood assessment would need to be carried out by a suitability qualified engineer.*

Response:

This is acknowledged by the applicant.

Wastewater

8. *The servicing report notes that the proposed plan change area will have the potential to accommodate approximately 380 new lots, however the plan change seeks a total of 410 lots (380 Living 1 and 30 Living 2). Do the additional 30 lots impact on the advice provided in the servicing report?*

While the servicing report correctly identifies that upgrades are likely to be required to the trunk sewer downstream of the plan change area and the existing wastewater treatment plant, Council's Asset Manager has raised concerns regarding the ability of the wastewater treatment system to dispose of treated waste at the densities proposed.

It is advised that options to address the stormwater, flooding and waste water issues raised above are discussed with Council's Asset Manager – Water Services.

Response:

The additional 30 lots do not impact on the advice provided in the servicing report. A meeting was held with Council's Asset Manager regarding the capacity of the wastewater network. The main concern is the capacity and land required to dispose of the treated wastewater, for the densities proposed.

To alleviate concerns regarding the capacity of wastewater disposal, the following rule is proposed after Rule 12.1.3.20:

In relation to the Living 1 and Living 2 zones in the Leeston Outline Development Plan in Appendix XX, no subdivision for the purpose of residential use shall occur after the 80th residential allotment until such time that the Ellesmere Wastewater Treatment Plant has been upgraded and capable of servicing the lots within the ODP.

Council have confirmed that if the deferral was to be lifted and no zones were changed, the deferred Living 1 and 2 zones wastewater network and treatment plant could accommodate development of up to 80 allotments. Given this, some development of the potential 410 lots can proceed, however development cannot exceed the capacity of the wastewater treatment and disposal systems.

The Ellesmere Treatment Plant is scheduled to be upgraded in the Wastewater Activity Management Plan (Volume 3, 2018) (section 6, page 115) and the Long Term Plan 2018-2028, Volume 2 – 30 Year Infrastructure Strategy (page 56). The Wastewater Activity Management Plan (Volume 3, 2018) outlines funding for projects and capital projects in 2019/2020, and capital projects in 2022-2024. For clarity, projects are investigations, decisions and planning activities which exclude capital works; and capital projects are activities involving physical works. Therefore, upgrades are projected within five years. At the time where Council are carrying out investigations and making decisions about upgrades, the plan change site can be taken into account and upgrades could accommodate the plan change site (over and above the 80 lots which the system can currently accommodate). This rule does not preclude developers of the Plan Change site working with Council and providing funds for necessary upgrades.

Roading

9. *The Transportation Assessment does not provide a level of service assessment of the Market Street/High Street intersection resulting from the likely increase in traffic from the west (and likely north from Leeston Dunsandel Road) as a result of the proposed plan change. There are presently concerns within the community regarding the existing level of traffic using this intersection. Therefore, given that the Transportation Assessment indicates that there will be a significant increase traffic volumes east along High Street, the assessment needs to be extended to cover the Market Street/High Street intersection and any issues identified need to be addressed, to allay or mitigate these issues.*

Response:

Please see attached response from Traffic Engineer Andy Carr, attached in Appendix 2 to this letter. The response concludes the High Street / Market Street intersection will continue to operate with a good level of service with the additional vehicles as a result of the plan change based on the traffic survey data undertaken. The intersection fits within a Level of Service category C during the peak hour. The traffic assessment concludes a Level of Service C is not unreasonable for an urban intersection during the peak hours.

10. *A key transport connection relies on access to Spring Place. It is noted that not all land owners affected by the proposed plan change are party to the plan change, particularly the owners of Lot 3 DP 50527, being that portion of the site fronting Spring Place. Given that this is shown as an indicative primary road, what contingency is in place if this connection cannot be secured?*

Response:

The Outline Development Plan (ODP) has been amended so that the secondary road is not located in the legal boundaries of Lot 3 DP 50527. Therefore, should this allotment not be developed, vehicles are able to utilise the primary roads to access the site, rather than the connection with Spring Place.

The traffic response (Appendix 2) includes an assessment of the vehicle movements should the connection to Spring Place cannot be secured and concludes that the intersection of High Street and the Plan Change area would function at a Level of Service A category in the morning and evening peak hours.

11. *While a future roading connection is shown from the northern part of the site to the east, into the adjoining land known as the 'Martin Block', the approved plan of subdivision for the 'Martin Block' does not appear to allow for this. Similarly, the indicative plan of subdivision included in the Transportation Assessment also does not appear to provide for this. As such, access to the northern block would likely operate as a cul de sac, the overall length of which is inconsistent with the provisions of the operative district plan. Please provide an alternative road layout for the northern portion of the site that would increase the resilience of the network, should one access be blocked for any reason.*

Response:

While the above question refers to the subdivision plan for the 'Martin Block' (subdivision consent RC 065414, and application for extension of time RC 135022), Council have confirmed this consent has lapsed (Appendix 3). Therefore, the possible future roading connection in the northern part of the site can be retained and any future development of the Martin Block should connect with the ODP.

12. *As highlighted in yellow below, the ODP should show a specific pedestrian/cycle link along the main reserve/water course alignment. The ODP should also show a pedestrian/cycle link from the northern part of the to the future stormwater reserve area along the northern boundary of the site.*

Response:

These have been added to the ODP and a revised copy of the ODP is attached in Appendix 4.

13. *Please note that Council's Asset Manager- Transportation has advised that, in addition to the improvements suggested to Spring Place and High Street, the following frontage and other roading upgrades are likely to be required at the time of subdivision consent:*

- *The installation of a roundabout at the intersection of the southern primary road, High Street and Clausen Avenue. Corner splays on the Clausen Avenue end already exist to enable this. A roundabout is seen as a better solution at this key cross roads, rather than a priority intersection, as it provides a southern urban threshold to the township and the expanded urban area fronting on High Street, with the additional lots and intersections. This would better manage vehicles speeds along the development frontage.*

- *High Street is likely to require existing road/street frontage upgrades, including widening, kerbing, lighting and footpaths at least west to Clausen Avenue.*

- *As there is no connecting footpath from the plan change area east to the town centre on the north side, it will be a requirement that approximately 275m of footpath is provided by the developer, to cater for pedestrians and to encourage this sustainable transport mode.*

- *Similar upgrades and connections to existing footpaths will also be required on Leeston Dunsandel Road.*

- *A perimeter footpath along Harmans Road and the remainder of High Street adjoining the rural residential is also likely to be required.*

Response:

The above matters are more appropriately considered during assessment of any subdivision of the plan change site. Therefore, have not been added to the ODP.

Reserves

14. *Formation of a reserve around Leeston Creek is desirable, however the width of this, along the whole length of the water body, appears to be excessive at 50-65 metres approximately. Advice from Council's Manager – Open Space and Property is that the reserve area around the creek should be narrower (20-30 m) but have a wider area in a central location that could provide for a play space. If the width is required for flood attenuation, it will not be accepted as recreation reserve and should be identified as Local Purpose (Drainage) Reserve.*

    The plan change documentation also makes reference to the reserve providing amenity, a buffer and walking links but there is no specific rationale or assessment as to why it is so wide or what it will provide for. Generally, the provision of green space is not covered well within the plan change documentation. Accordingly, please clarify the purpose of the proposed width of any reserve around Leeston Creek.

Response:

The width of the reserve around Leeston Creek has been amended to be between 20-30 m wide, with a wider play area in a central location. The area to be used as flood attenuation is identified in blue and as a Local Purpose (Drainage) Reserve.

15. *Please note that Council's Manager – Open Space and Property has advised that, based on a yield of 410 households, there will be an ultimate population of around 1,100 generated from the development. The Council's standard for reserve provision is 1.2 ha per 1,000 population for neighbourhood reserves so this would equate to a requirement of around 1.32 hectares of reserve to be provided to meet the needs of the growth population. The areas shown as recreation reserve in the ODP provide approximately 2.9 ha, which is in excess of the requirement. It is also noted that, currently, there is not an overall deficit in neighbourhood open space in Leeston (around 1.5 ha/1000 pop.).*

    As such, the Manager – Open Space and Property has advised that the extent of recreation reserve that is currently being signalled would not attain full reserve credit for reserve development contributions as it exceeds the provision requirements.

Response:

The above information regarding reserves and credits may be amended as a result of the reserve around Leeston Creek being reduced. Any reserve contribution and credits will be appropriately negotiated at the time of subdivision.

Outline Development Plan (ODP)

16. *To address CPTED issues, the proposed reserve along the creek should have extensive road frontages, rather than being behind houses, as reflected in the indicative subdivision plan included in the Transportation Assessment.*

Response:

The ODP (see appendix 4) has been amended so the reserve along the creek has road frontage with the secondary road.

17. *There are small inconsistencies between the overall ODP and the transport network in terms of the pedestrian/cycle links. Please resolve these. It is noted that a continuous alignment is preferred.*

Response:

The ODP has been amended to resolve the inconsistencies between the overall ODP and the transport network plan and is attached in Appendix 4.

18. *A future roading connection is also desirable from the northern Living 2 residential portion of the site to the west and south, connecting into the balance Rural (Outer Plains) Zone, to future proof accessibility within this locality.*

Response:

A future road connection has been provided on the ODP from the northern Living 2 portion to the west. Three roading connections to the block of land west of the plan change site is considered sufficient to future proof any development. It is noted the site to the west is zoned Outer Plains, so any future residential development would require a plan change and an outline development plan.

19. *The names of the surrounding roads should also be shown on the ODP.*

Response:

Road names have been added to the ODP plans in Appendix 4.

20. *Please annotate the ODP (or supporting text) to include any measures appropriate to address reverse sensitivity matters between the residential zone and the existing business zone in the south eastern corner of the site. Please also indicate how any interface issues between the two residential zones are to be addressed.*

Response:

The site currently contains Living 1 (deferred) and living 2 (deferred) zones adjoining the Business 1 zone at 125 High Street. The business located at 125 High Street is an agricultural machinery business 'Cochranes'. The Selwyn District Plan does not currently require mitigation or interface measures for Living zoned sites which adjoin a Business zone, with the exception of the Living Z zone adjoining the Business 2B zone, Springs Road, Lincoln and in Appendix 37 of the Township Volume, which requires a landscape buffer and acoustic fencing. It is noted however, this reverse sensitivity mitigation is between a Living Z zone and a Business 2B zone.

The deferred zoning of the plan change site shows future development is anticipated in this area. The Selwyn District Plan (Township Volume) notes under Objectives and Policies B3 Health Safety and Values, B3.4 Quality of the Environment "Business 1 zones are noisier and busier than Living zones. They are still pleasant areas for people to gather, live or work in, with good aesthetic values and few nuisance effects". Therefore, the Business 1 zone and Living zones are compatible without the need for reverse sensitivity measures.

In addition, the surrounding Leeston environment shows the Business 1 zone and Living 1 zone are compatible without the need for interface for mitigation measures. This can be seen along High Street where the Business 1 zone north of high street directly backs onto the Living 1 zone on Selwyn Street; on the corner of Market Street and High Street, and on Pennington Street Business 1 zone.

Notwithstanding the above, residential development adjoining the activity at 125 High Street could increase the chances of reverse sensitivity effects due to the with regards to visual amenity, given the higher densities surrounding 125 High Street. Therefore, the following rule requiring landscaping is proposed after Rule 4.2.2:

Where the Living 1 zone adjoins the Business 1 zone on the Leeston ODP in Appendix XX, any principal building shall be permitted where a 2 m landscape strip is provided along any boundary that adjoins the business 1 zone. The landscape strip shall be a minimum of 2 m wide and contain a minimum of one tree per meter. The trees shall be a minimum height of 1.5 m at the time of planting and shall be capable of reaching a minimum height of 3 m at maturity.

Insert new matters of discretion after 4.2.6 as follows:

4.2.7 Any activity which does not comply with Rule 4.2.X shall be a restricted discretionary activity. Council shall restrict the exercise of its discretion to the consideration of:

4.2.7.1 The extent to which the proposed landscaping provides visual screening from the Business 1 zone.

4.2.7.2 Whether other methods of visual screening are proposed and are effective to visually screen the Business 1 zone.

The interface between Living 1 and Living 2 zones will be addressed through the Living 2 fencing rules as outlined in section 3 of the Plan Change Request. The rule requires fences to be 1.2 m in height, at least 50% transparent and be typical rural style fencing. The rule exempts rural style fencing on Living 2 boundaries that adjoin the Living 1 zone, ensuring Living 1 sites are able to have 1.8 m fences typical in residential environments. The Living 1 and 2 zones will be in essence 'back to back', meaning the interface will be at the rear of the property boundaries.

21. *It is also noted that while the proposed ODP is, subject to the above, generally adequate for the purpose of a plan change, there appears to be a number of area of inconsistency with that of the subdivision plan discussed with Council staff in July 2019 and included in the Transportation Assessment.*

Response:

The main purpose of the potential subdivision plan used at the Council meeting and in the Transport Assessment was to understand the potential lot yield of the site and where lots may be located if development of the site was to occur. A potential subdivision plan was required to fully understand the potential vehicle movements as a result of any development for the Transport Assessment. The ODP is considered to be appropriate for the Plan Change and the potential subdivision plan used in meetings can be disregarded.

22. The ODP should be amended to reflect any matters raised in the points above, particularly regarding roading and reserves.

Response:

The ODP plans have been amended and are attached to this letter in Appendix 4.

Consultation with Rūnanga

23. It is noted that the plan change application has been provided to Mahaanui Kurataiao Limited for their comment. Please provide a copy of any feedback received.

Response:

A copy of the consultation had with local Rūnanga is attached to this letter in Appendix 5. All the matters raised from the consultation can be managed at the time of subdivision.

Peer review of Geotechnical Investigation Report

24. The Geotechnical Investigation Report has been referred for peer review. Any matters arising from this review will be forwarded for your attention as soon as possible.

Response:

The geotechnical peer review has been received and is attached to this letter in Appendix 6. No issues were raised.

If you have any questions, please feel free to contact the writer on 03 339 0401 or via email *adrianne@blg.nz*.

Yours faithfully,

Baseline Group

Adrianne Tisch
Planner

Appendix 1: ECan Confirmation

Adrianne Tisch

From: Callum Margetts <Callum.Margetts@ecan.govt.nz>
Sent: Wednesday, 25 September 2019 8:24 AM
To: Adrianne Tisch
Cc: Alice Butler
Subject: RE: [BLG-6129] Flood Hazard Assessment for Leeston
Attachments: NW Leeston - 200 year flood model results.pdf; NW Leeston - 500 year flood model results.pdf

Hi Adrianne

As discussed on the phone, the 2015 LiDAR is the most up to date LiDAR

I have attached two maps showing flood depths for a modelled 200 and 500 year return period district wide rainfall runoff event.

Note that these are results from draft modelling commissioned by Selwyn District Council, and this is not published information. Based on my ongoing involvement in calibrating this modelling, I would suggest that the final results are unlikely to change dramatically at this location.

Let me know if you have any further questions.

Regards
Callum

NW Leeston - 200 year flood model results

Legend

Land Parcels

0 125 250 500 Metres

N

Legend

SDC_10m_200yr_RCP8pt5_maxWD

Depth (m)

- < 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.0
- > 1.0

NW Leeston - 500 year flood model results

Legend

Land Parcels

0 125 250 500 Metres

N

Legend

SDC_10m_500yr_RCP8pt5_maxWD

Depth (m)

- < 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.0
- > 1.0

Appendix 2: Traffic Response

CCL Ref: 14379-171019-tisch

17 October 2019

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Adrianne Tisch
Baseline Group Limited

By e-mail only: adrianne@blg.nz

Dear Adrianne

Proposed Plan Change, Leeston: Response to Council Request for Further Information

Further to e-mails and our discussions, we have reviewed the Request for Further Information (**RFI**) issued by Selwyn District Council dated 19 September 2019. There are two matters relating to traffic issues, and we respond to both below.

Assessment of Market Street / High Street Intersection

In the Transportation Assessment, we noted that the traffic volumes generally fell below the threshold at which a formal intersection assessment was justified, even with the plan change area fully developed. However in view of the RFI, we have undertaken a more detailed assessment of the Market Street / High Street intersection.

To determine the existing traffic volumes, we surveyed the intersection during October 2019, and the results are shown below.

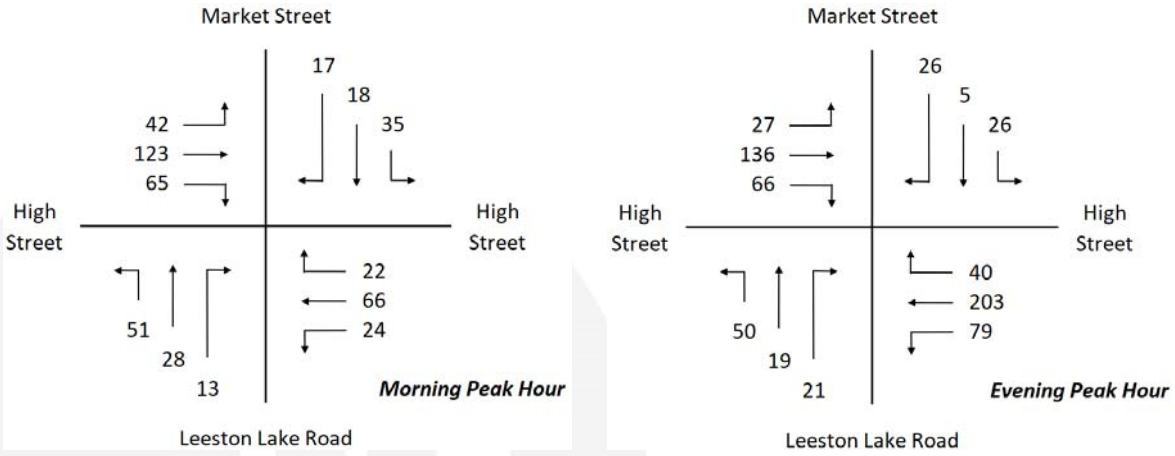


Figure 1: 2019 Peak Hour Traffic Volumes at Market Street / High Street Intersection

By way of a check, in the Transportation Assessment we identified that the traffic flows on High Street (west) were expected to be around 610 vehicles in the peak hour. The survey showed 508 vehicles in the peak hour, indicating that the Transportation Assessment used conservatively high values.

We then modelled the existing performance of the intersection (that is, without the plan change area being developed) using the computer software package Sidra Intersection, and the results are summarised below.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Leeston Lake Road (south)	L	8.5	0.2	A	9.1	0.2	A
	T	10.9	0.3	B	13.5	0.4	B
	R	12.0	0.3	B	15.2	0.4	C
High Street (east)	L	5.9	0.2	A	5.9	0.4	A
	R	6.1	0.2	A	6.3	0.4	A
Market Street (north)	L	8.7	0.1	A	8.8	0.1	A
	T	10.7	0.2	B	13.9	0.3	B
	R	12.5	0.2	B	15.3	0.3	C
High Street (west)	L	5.6	0.0	A	5.6	0.0	A
	R	5.9	0.2	A	6.7	0.2	A

Table 1: Existing (2019) Peak Hour Levels of Service at the Market Street / High Street Intersection

The results show low queues and delays. This aligns with our initial assessment, and also our observations on site during the surveys.

Figures 5 and 6 of the Transportation Assessment show the extent of traffic increase on High Street (west) arising from full development of the plan change area. However no assessment was included within the Transportation Assessment of the directions that these vehicles would travel. In this regard, we consider that few vehicles will be associated with Market Street, because any driver travelling in this direction is more likely to travel through the site and use Leeston-Dunsandel Road instead. Leeston Lake Road serves relatively little development, but High Street provides a route to major employment locations. Consequently for the purposes of our assessment, we have assigned all generated traffic to the east-west route.

By way of further discussion, the greatest delays at any priority intersection arise for the right-turn movement from the minor approaches. In this case though, the plan change does not increase the volume of traffic making this turn. Consequently, the greatest effect of the plan change traffic relates to the obstruction of the existing right-turn movements, and this arises from increases in the east-west traffic flow. Overall then, assigning all generated traffic to the east-west route results in a robust (that is, worst case) assessment of the intersection.

The traffic flows arising from development of the plan change area are:

- Morning peak hour:
  - 227 vehicles eastbound;
  - 25 vehicles westbound
- Evening peak hour:
  - 88 vehicles eastbound;
  - 164 vehicles westbound

We have added these vehicles into the traffic models and the results are summarised below.

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Leeston Lake Road (south)	L	8.6	0.2	A	10.2	0.2	B
	T	14.9	0.4	B	19.3	0.6	C
	R	17.0	0.4	C	22.7	0.6	C
High Street (east)	L	6.7	0.3	A	6.1	0.5	A
	R	7.3	0.3	A	6.8	0.5	A
Market Street (north)	L	10.0	0.1	A	9.2	0.1	A
	T	14.6	0.4	B	20.0	0.5	C
	R	18.0	0.4	C	22.8	0.5	C
High Street (west)	L	5.6	0.0	A	5.6	0.0	A
	R	6.0	0.2	A	7.6	0.3	A

Table 2: Peak Hour Levels of Service at the Market Street / High Street Intersection with Full Development of Plan Change Area

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Leeston Lake Road (south)	L	+0.1	-	-	+1.1	-	A to B
	T	+4.0	+0.1	-	+5.8	+0.2	B to C
	R	+5.0	+0.1	B to C	+7.5	+0.2	-
High Street (east)	L	+0.8	+0.1	-	+0.2	+0.1	-
	R	+1.2	+0.1	-	+0.5	+0.1	-
Market Street (north)	L	+1.3	-	-	+0.4	-	-
	T	+3.9	+0.2	-	+6.1	+0.2	B to C
	R	+5.5	+0.2	B to C	+7.5	+0.2	-
High Street (west)	L	-	-	-	-	-	-
	R	+0.1	-	-	+0.9	+0.1	-

Table 3: Change in Peak Hour Levels of Service at the Market Street / High Street Intersection with and without Full Development of Plan Change Area

The modelling shows that there is very little change in queue length on any approach, and with regard to the delay, the greatest increase is 7.5 seconds. Overall, we consider that the intersection continues to operate with a good level of service, and Level of Service C (the lowest on any approach) is not unreasonable for an urban intersection in the peak hours.

Assessment of Effects if Connection to Spring Place is not Formed

The RFI queries the contingency plan if the connection through to Spring Place cannot be formed.

Based on the information provided, we understand that if the Spring Place connection is not in place, then there will be a secondary road that runs along the western side of the proposed reserve, and traffic will instead use the main north-south route through the site. As such, these vehicles would then join the external roading network at the new Feredays Road / Plan Change Area Access intersection.

One outcome of this is that this intersection would experience a greater traffic flow than set out in the Transportation Assessment (where some traffic used Spring Place). For completeness we have shown the expected traffic flows below (with full development of the plan change area):

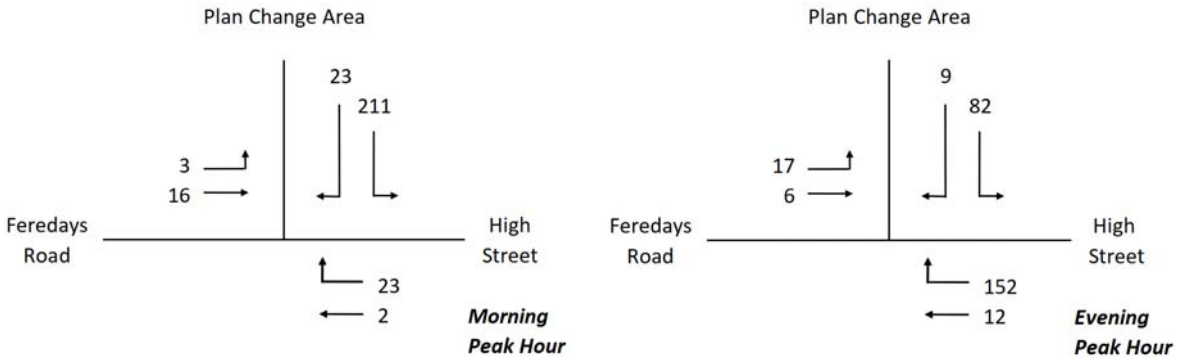


Figure 2: Traffic Generation from Plan Change Area onto Feredays Road (No Spring Place Access)

Allowing for the traffic flows on Feredays Road (as set out in Section 4.1.2 of the Transportation Assessment), this leads to the following intersection performance (assuming a priority intersection):

Road and Movement		Morning Peak Hour			Evening Peak Hour		
		Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
High Street (east)	T	0.3	0.2	A	0.6	1.3	A
	R	6.9	0.2	A	6.7	1.3	A
Plan Change Area Access	L	6.9	0.8	A	6.3	0.3	A
	R	7.9	0.1	A	8.9	0.0	A
Feredays Road (west)	L	5.6	0.0	A	5.6	0.0	A
	T	0.0	0.0	A	0.0	0.0	A

Table 4: Peak Hour Levels of Service at the Feredays Road / Plan Change Area Site Access Intersection with Full Development of Plan Change Area

The intersection provides an excellent level of service with low queues and delays, even under the expected traffic loading. In the event that the intersection was to be a roundabout (as we understand has been suggested), queues and delays would remain similarly small.

I trust that this responds to the Council's RFI, but please do not hesitate to contact me if you require anything further or clarification of any issues.

Kind regards
Carriageway Consulting Limited

Andy Carr
Traffic Engineer | Director

Mobile 027 561 1967
Email andy.carr@carriageway.co.nz

Appendix 3: Status of RC065414 and RC135022

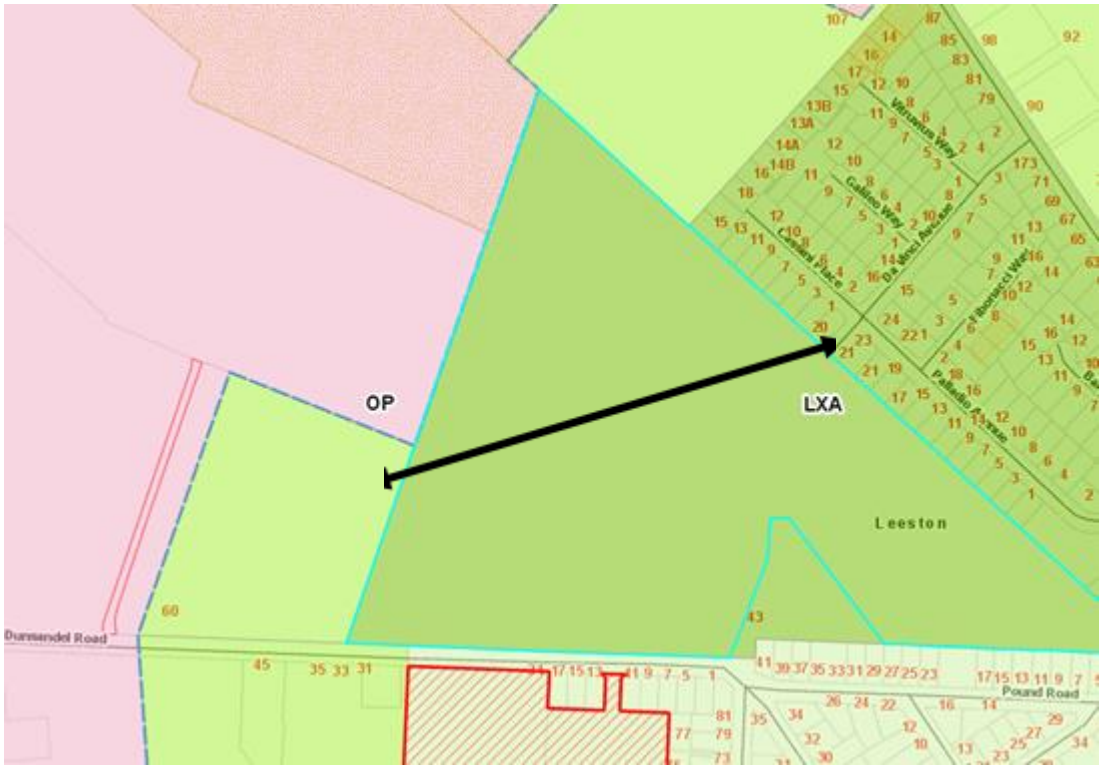
Adrianne Tisch

From: Jocelyn Lewes <Jocelyn.Lewes@selwyn.govt.nz>
Sent: Friday, 25 October 2019 11:59 AM
To: Adrianne Tisch
Subject: RE: [BLG-6129] Leeston Plan Change

Hi Adrianne,

I can confirm that the subdivision consent over the land known as the Martin Block has lapsed and therefore there is no valid consent over this land.

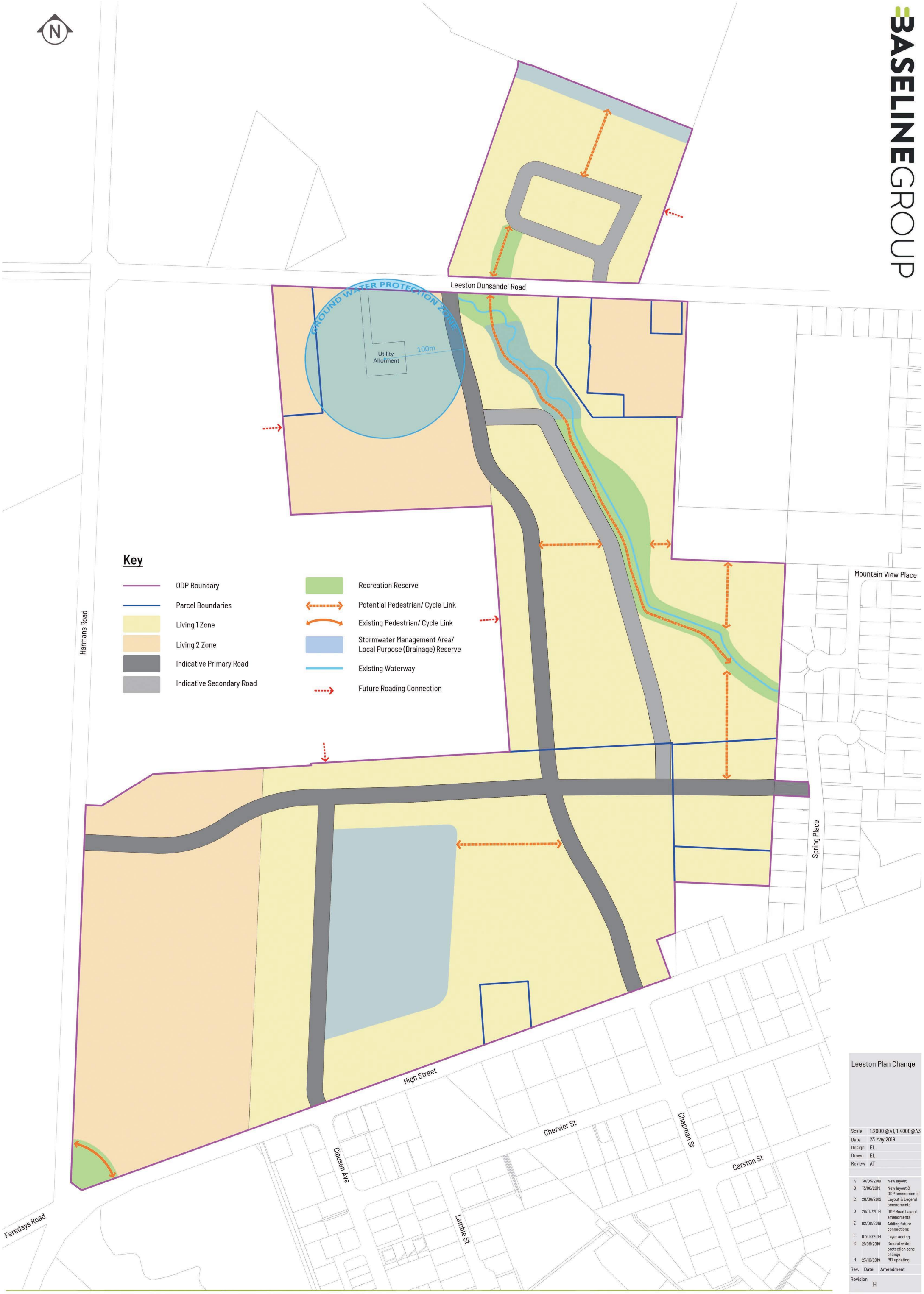
The request for further information dated 19 September 2019 requested that the transport network be reviewed in relation to the northern block, to increase the resilience of the network. Flexibility now exists to allow for a connection to the east, such that the northern block of the proposed plan change area provides for an opportunity to link through this area, over the Martin Block to Da Vinci Avenue further east, as shown below.



Ngā, mihi,

Jocelyn Lewes I **Strategy & Policy Planner** I Selwyn District Council
DDI: 03 347 1809 I Planning Enquiries: 03 347 2868 (internal x868)

Appendix 4: Outline Development Plan



BASELINEGROUP

Leeston Plan Change

Scale	1:2000 @A1, 1:4000@A3
Date	23 May 2019
Design	EL
Drawn	EL
Review	AT

Rev.	Date	Amendment
A	30/05/2019	New layout
B	13/06/2019	New layout & ODP amendments
C	20/06/2019	Layout & Legend amendments
D	29/07/2019	ODP Road Layout amendments
E	02/08/2019	Adding future connections
F	07/08/2019	Layer adding
G	21/08/2019	Ground water protection zone change
H	23/10/2019	RFI updating

Revision H

Sheet 1

BASELINEGROUP

Leeston Dunsandel Road

Utility Allotment

Harmans Road

Mountain View Place

Spring Place

High Street

Chervier St

Clausen Ave

Chapman St

Carston St

Lambie St

Feredays Road

Key

- ODP Boundary
- Parcel Boundaries
- Living 1 Zone
- Living 2 Zone
- Indicative Primary Road
- Inddicative Secondary Road
- Future Roading Connection

Leeston Plan Change

Scale	1:2000 @A1, 1:4000@A3
Date	23 May 2019
Design	EL
Drawn	EL
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Rev.	Date	Amendment
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G	21/08/2019	Ground water protection zone change
H	23/10/2019	RFI updating

Revision H

Sheet 2

BASELINEGROUP

N

Leeston Dunsandel Road

Harmans Road

Mountain View Place

Spring Place

High Street

Chervier St

Clausen Ave

Lambie St

Chapman St

Carston St

Feredays Road

Key

- ODP Boundary
- Parcel Boundaries
- Indicative Primary Road
- Indicative Secondary Road
- Pedestrian/ Cycle Link
- Existing Pedestrian/ Cycle Link
- Future Roading Connection

Leeston Plan Change

Scale	1:2000 @A1, 1:4000@A3
Date	23 May 2019
Design	EL
Drawn	EL
Review	AT

Rev.	Date	Amendment
A	30/05/2019	New layout
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F	07/08/2019	Layer adding
G	21/08/2019	Ground water protection zone change
H	23/10/2019	RFI updating

Revision H

Sheet 3

BASELINEGROUP

Leeston Dunsandel Road

GROUND WATER PROTECTION ZONE

100m

Utility Allotment

Harmans Road

Mountain View Place

Spring Place

High Street

Chervier St

Clausen Ave

Lamble St

Chapman St

Carston St

Feredays Road

Key

- ODP Boundary
- Parcel Boundaries
- Indicative Primary Road
- Indicative Secondary Road
- Future Roading Connection
- Recreation Reserve
- Green Link
- Stormwater Management Area
- Waterway

Leeston Plan Change

Scale	1:2000 @A1, 1:4000@A3
Date	23 May 2019
Design	EL
Drawn	EL
Review	AT

Rev.	Date	Amendment
A	30/05/2019	New layout
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G	21/08/2019	Ground water protection zone change
H	23/10/2019	RFI updating

Revision H

Sheet 4

Appendix 5: Rūnanga Consultation Report

Appendix 6: Geotechnical Report Peer Review

4415
03 October 2019

Selwyn District Council
PO Box 90
Rolleston

GEOTECH
consulting ltd

Attention: Jocelyn Lewes

Dear Ms Lewes,

RE: Plan Change – PC 190062
High Street, Leeston
Geotechnical Report Peer Review

A private plan change for about 60ha on the west side of Leeston would provide for subdivision of about 380 Living 1 houses and 30 Living 2 houses. Selwyn District Council has requested a peer review of the geotechnical report submitted with the application with respect to whether the investigations and conclusions are appropriate.

The report provided is titled *Geotechnical Investigation Report, Proposed Land Use Change, Leeston*, 6 October 2017, by Soils & Rock Consultants (S&R) for L & B Harkers. A second report has also been viewed – *Soil Contamination Risk Stage 1 – Preliminary Site Investigation report, proposed plan Change Leeston Dunsandel Road, Harmans Road and High Street, Leeston*, July 2017, by Malloch Environmental Ltd. No subsurface testing was done for this report and it adds little to the geotechnical information.

We have also referenced information from several geotechnical reports submitted for earlier subdivisions in the area and previously peer reviewed:

- RC 125345, (2012), south side of High St, opposite site
- RC 1225263, (2012), 178 High St, opposite site
- RC 135022, (2013) north side of Dunsandel Rd, adjacent to smaller block in this plan change
- RC 135086 (2013), south side Dunsandel Road, within the north end of plan change area

1 Site

The S&R report shows the site as a total area of 77.9 ha, with most of the land between Leeston-Dunsandel Road on the north, Harmans Road to the west, High St to the south, and the Leeston High school and housing to the east. A small area is included on the north side of Dunsandel – Leeston Road. We note that this is larger than the 60 ha area shown in the outline development plan.

Comment This report notes a watercourse across the northeast part of the site area, as being about 5m wide and 0.5m deep. RC 135086 describes this as about 5m wide and 1.5m deep, adjacent to the site then being inspected close to Dunsdandel Road. Inspection of the contours from LiDAR survey as included in the August 2017 Ecan letter re flooding (Appendix 6 of the application), indicates that the creek is about 1.5m deep at the top end at Dunsandel Road and 0.5m deep at the downstream end where it enters the existing residential area.

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Nick Traylen E-mail ntraylen@geotech.co.nz
Ian McCahon E-mail mccahon@geotech.co.nz

Tel (03) 9822 538
Fax (03) 3257 555
PO Box 130 122
4 / 6 Raycroft Street
Christchurch 8141 New Zealand

2 Testing and subsoil conditions

The report describes an investigation of 16 hand auger boreholes with associated scala penetrometer tests and one test pit to 1.6m depth. The hand auger bores replaced the intended test pits because of the wet and soft ground conditions restricting access. Six deep wells from the Ecan GIS database within 40m and 150m of the site (one on the site) have also been referred to.

Comment The MBIE Guidelines suggest 0.2 to 0.5test locations per hectare for plan change purposes. If the report area of about 80 ha is taken this gives 16 to 40 test locations. The 17 tests area therefore at the minimum end of the range. The tests are also all shallow. However, the uniformity of the soil profile and the general geology make the testing acceptable, in our opinion.

The site is typically covered with 0.2 – 0.7m topsoil over soft to firm silt. All the hand augers stopped at between 0.5m and 1.7m on what was inferred to be gravel. The Ecan boreholes also show 0.6m – 1.2m depth to gravel, which then extends to beyond the end of the boreholes at between 10m and 52m depth. Peat was found in one hole (AH15) at 1.2 – 1.7m; the entry in table 3 (1.5m to top and 1.5m thickness) is in error. The water table was measured at 0.6, 0.7 & 1.1m depths in three of the auger holes.

Comment This soil profile is consistent with the other records referred to. Some boreholes south of High Street, approximately south east of AH15 from this report, were logged as containing some organic silt and two holes had peat lenses immediately above the gravel. It does appear that there are some intermittent peat lenses in this area close to the south west corner. Other investigations also report water table levels at similar depths, with it being somewhat deeper in the north and shallower to the south east.

3 Geotechnical Hazards

The report comments of various geotechnical hazards:

- The shallow creek in the northeast part of the land “may potentially cause lateral spread adjacent to its banks”.
- The site “may have a potential for liquefaction on the deeper natural silts within the southwest corner.”
- Liquefaction induced land damage is expected to be within TC1 limits for most of the site, with possibly TC2 in the southwest corner
- There is potential settlement from peat in the southwest corner
- Other hazards are either non-existent or can be mitigated

The report conclusion (section 11) states that “the site is geotechnically suitable to subdivide for a residential development.”

Comment:

The liquefaction assessment is very limited and is really confined to the TC1/ TC2 categorisation without a lot reasoning presented. We note that Leeston is on the western side of the line given in the 2012 Ecan report on liquefaction hazard in the Christchurch region, which means that that it is the zone where damaging liquefaction is unlikely, normal geotechnical assessment practices apply and standard foundations will normally be adequate.

The liquefaction hazard on this site is likely to be confined to the fine grained soils below the water table but above the denser gravel, and thus about two thirds of the site area in the north and east will have minimal if any liquefaction potential given that the water table is likely to be at or below the top of the gravel. As the report identifies, there is more potential in the southwest third where the gravel is deeper at 1.5 to 1.7m depth. However, if 1m of soil is assumed to be saturated and liquefiable, maximum ground settlement is unlikely to exceed 70 – 80mm, and thus an equivalent TC2 classification is appropriate. We agree with the report that further testing is needed in this area prior to subdivision consent.

The report concludes that a potential for minor to moderate lateral movement is present along the watercourse in the northeast part. We are uncertain how this has been arrived at, as no mechanism is presented. The gravel is shallow in this area (closest bores show it at 0.4 – 0.9m depth) and it appears unlikely that there would be sufficient liquefaction to cause such movement. At the upstream end the gravel is likely to extend at least half way up the bank and the water level is lower; at the downstream end the banks are so low that it is hard to see how significant movement could be generated, especially given the limited liquefaction that might be present. In our opinion, the report conclusion is likely to be conservative in this respect.

We note that flooding has been explicitly excluded from the hazard assessment.

4 Engineering design

The report gives some general direction in terms of suitable house foundation systems and infrastructure. Further testing, including CPT tests, is required for subdivision, and lot specific assessment for TC classification and foundation design is recommended.

Comment: Many of the scala tests indicate that “good ground” as defined in NZS3604;2011 is present at relatively shallow depths over much of the site, but some tests show softer soils to up to about 0.9m depth. It is likely that specific testing and foundation design will be needed for buildings at a later stage, but this does not make the ground unsuitable to support foundations. We concur with the need for further testing at later stages of development.

5 Flood Hazard

Flood hazard is explicitly excluded from the geotechnical report. A letter from Ecan is included in Appendix 6 of the application documentation forwarded. It is noted that the land drains to the southeast in the direction of the established residential areas. The photographs appended to the Ecan letter show surface ponding after heavy rain, with flow paths in this southeast direction. Development will increase runoff from the development area, but as noted in the Outline Development Plan, suitable design of retention ponds and the like can compensate for this. If it is assumed that the existing residential areas do not experience significant flooding issues, despite being down gradient of the site, then it appears reasonable to accept that with suitable mitigation, the site area can be similarly developed without exposure to significant flooding hazard. This observation is not to be construed as a guarantee and is not based on any in depth study of the flooding hazard.

6 Conclusion

This site is geotechnically relatively "benign" and we have little issue with the conclusions reached in the report. The extent of the site testing is adequate but not generous given the size of the area. However, given the geological setting of older gravels under the site and the consistency of the soils as exposed in the tests, we accept that the testing is adequate and there remains only a small risk of unknown geotechnical aspects being present. We consider that the testing does meet the intent of the MBIE Guidance on geotechnical investigations for plan change.

The provisional equivalent TC1 / TC2 classification for liquefaction hazard is appropriate based on the currently available information. Further testing, including CPTs in the southwest portion, is needed at subdivision consent stage, and we recommend (as does the report) that further site specific testing is done at building consent stage.

Yours faithfully
Geotech Consulting Limited

Ian McCahon