

Doncaster Development Ltd

Submission on Variation 1: Housing Intensification

ATTACHMENT D

Infrastructure Options – Kerr and Partners

15 July 2022

Doncaster Developments Limited
 c/o McCracken & Associates Limited
 P O Box 2551, Christchurch, 8140

Dear Kim

DONCASTER DEVELOPMENTS: 260-282 LEHMANS ROAD AND 32 PARROTT ROAD, RANGIORA

This letter summarises the conclusions of an assessment of the infrastructure servicing options for the above Site. The assessment is to support consideration by both the landowners and the territorial and regional authorities in future zoning of the land. This is an updated version of an earlier letter (April 22) and incorporates preliminary feedback from Council.

THE SITE

The Site is at the northwest corner of Parrot Road and Lehmans Road and bounded to the north by the Rangiora Racecourse. The site is approximately 11.6 hectares and located west of Rangiora. The street address is 260-282 Lehmans Road and 32 Parrott Road, Rangiora.

CONTEXT

The site is bounded to west by rural land and to the north by the Rangiora Racecourse. Two sets of power Transmission Lines run through the property parallel to the southeast boundary of the site adjacent to Parrott Road

Access to the site is at grade from Lehmans Road or Parrott Road, noting that the latter is a paper road and unformed. Pedestrian connections can also be formed with three locations to the east to the existing urban area.

The site is relatively flat with a grade (1 in 200) from a north to southeast direction. There are two overland flow paths across the site which pass extreme flood events and denote historic riverbeds as the plains were being formed. This undulation is typical of the whole plains, with the flow paths of shallow depth and located at the north and south extremes of the site, however in this context this is particularly important as the urban area is down gradient.

Aurecon¹ have undertaken site investigations on the site and inferred the soil profile typically consists of topsoil overlying sandy silt, overlying gravel. Based on review of a limited number of test pits excavated on and nearby the site, Aurecon concluded that underlying gravel is 2- 4 metres Below



¹ Arlington Infrastructure Services Report, Aurecon, September 2021

Ground Level (BGL) and likely to be present across the site. The groundwater is approximately 6 meters BGL.

Aurecon also report on test pits and infiltration testing which were completed as part of the Westpark subdivision located directly to the south of the site and *'confirmed a measured infiltration rate of 600-720 mm/hour within the gravel layers. Infiltration testing undertaken during development of the residential areas east of the site indicated significantly higher infiltration rates where clean free draining gravels were encountered. It is anticipated that the ground conditions on the site are consistent with the neighbouring subdivisions and very well suited to a soakage-based stormwater system for the development'*.

This aligns with Kerr and Partners knowledge of the area.



SERVICING ASSESSMENT

Stormwater management

Likely approach to management of stormwater

The ground conditions beneath the site are well suited to a soakage based stormwater management system with relatively shallow and free draining gravels. This aligns with the many previous studies undertaken in the area, mapped soil types and the systems installed in neighbouring developments. It is likely that a stormwater system with the following characteristics would be most suitable for the site:

- Stormwater from hardstand areas from individual properties discharged to ground via individual soakpits for up to the 10% AEP storm event in accordance Building Code E2 Acceptable Solutions.
- Stormwater reticulation servicing the internal roads designed in accordance with the Waimakariri District Council (WDC) Code of Practice (CoP) (ie underground pipelines and sumps to convey the 20% AEP event)
- A Stormwater Management Area (SMA) designed to hold and allow soakage of the first flush flow in accordance with the WDC Global Stormwater Discharge Consent (CRC184601). Note that this would likely be a single SMA for the whole site except for the northern extent.
- This would be designed to mimic pre-development runoff flow rates across multiple storm frequencies up to and including the 2% AEP
- Bypass of infiltration basin for detention to rapid soakage via chambers or similar devices for over-design events
- Secondary flow paths along roadways throughout the development as well as to existing roadways and reserve links will intercept and direct overland flow to the proposed SMA
- The existing major flow path immediately to the north of the site may be able to be enhanced and further protected by the development. There is a small area in the north-east of the site that may be necessary to preserve this flow path.

- Similarly, overland flows paths replicate the existing overland flows paths and convey runoff from the west of Lehman’s Road towards the existing dry channels, and sufficient to avoid lots being inundated in the 0.5% AEP event.
- A total land area of 6,000-7,000m² will be required to accommodate the SMA. This is approximately 6% of the site which is the normal range of land required for stormwater management for a residential development.

Assessment of stormwater servicing

The site is well suited for efficient and effective management of the additional stormwater runoff created by any development of the site. The system type required are well established and understood by the network manager (WDC) and Regional Council (ECan) and hence stormwater management should not form an impediment to development of the site.

Wastewater Servicing

Likely approach to management of wastewater

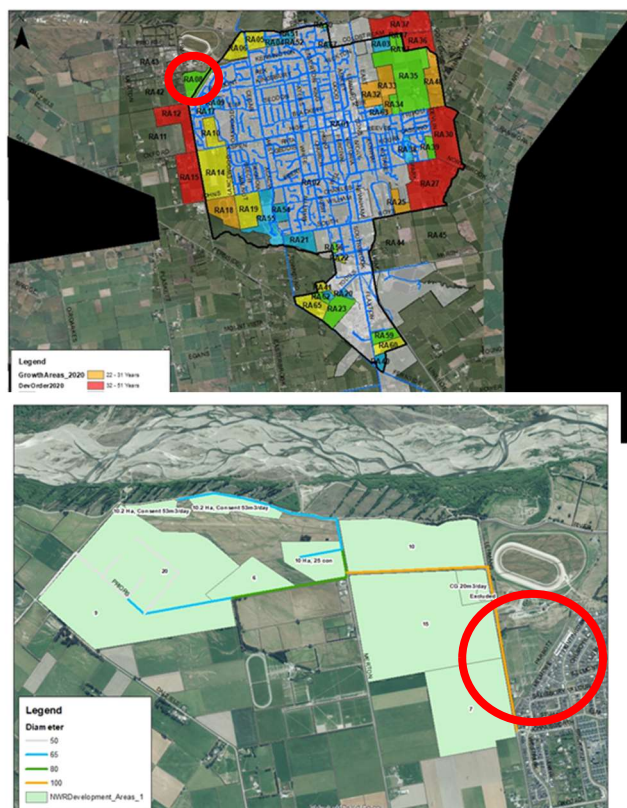
The site is adjacent to the existing Rangiora wastewater network. The gradual sloping nature of the site together with a review of the levels of the adjacent infrastructure indicate that development will be able to be served by traditional gravity wastewater reticulation draining to the east. Principal points of connection are Sandown Boulevard and Pimlico Place.

Council have undertaken several assessments on the capacity of the network. This includes the 50 year Water and Sewer Growth Forecast (WDC, 2020) (see top diagram on right) and ‘North West Rangiora Water and Sewer Servicing (Nov 2021).

The latter addresses rural residential development to the north and west of the site, including the airfield and eco-holiday park. The bottom diagram on the right shows the scenario for servicing the western area and the extent of additional pipe required if it needs to bypass the Site.

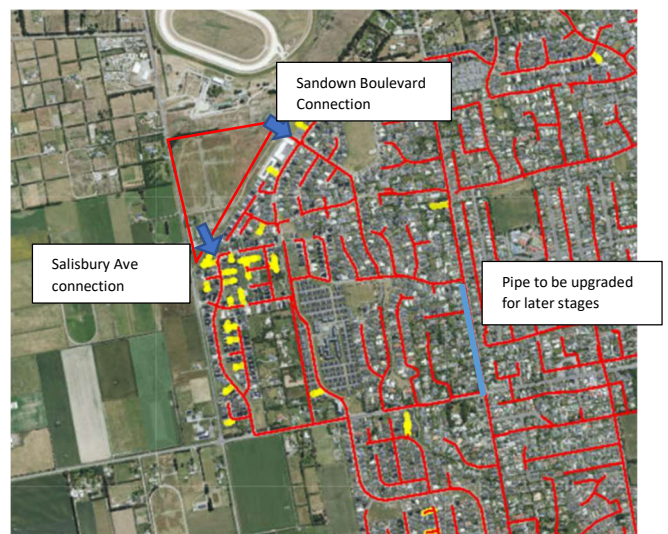
Each assessment by WDC have allowed for the site to be developed however we understand from Council that the reticulation in Pimlico Place and Sandown Boulevard may have been designed for Rural Residential only upstream.

As such, preliminary calculations have been completed to understand the capacity of the downstream network to south of Oxford Road and assess the impact of additional residential connections. These calculations use the methodology set out in



the WDC Engineering Code of Practice and the findings are summarised below with further information in attachment A:

- Connecting to Salisbury Avenue
 - The network down Salisbury Ave has sufficient capacity
 - There are no downstream constraints identified
 - The majority of the site can drain by gravity to Salisbury Avenue due to the 1:100 grade across the site.
- Connecting to Sandown Boulevard
 - There is more than sufficient capacity in the network in Sandown Boulevard and streets west of Westbelt
 - WDC has advised² that a density of 15 hh/ha on the site was able to be accommodated in their hydraulic model of the system.
 - However the existing sewer in Westbelt (Sandown to Oxford) reduces in size from 225mm diameter to 150mm diameter, and is currently at or near capacity.
 - The cost to upgrade this sewer in West belt is estimated at \$560,000. A portion of this may be payable as a development contribution.
 - WDC has confirmed that this is pipeline has been programmed for renewal and advised will not be an impediment in the short term.



Assessment of wastewater servicing

There is capacity available in the reticulation downstream for the development and simple options for either upgrading the existing network to accommodate the latter stages that cannot drain to Salisbury Avenue or pumping the discharge to enable flow to drain to Salisbury Avenue.

A suitable allowance has been made for the site in the overall network and Eastern District Sewerage Scheme and there is capacity in the network with only modest upgrades required for later stages or a small pumping station. This upgrade will also resolve an existing issue in the system where the pipe size steps down.

On this basis, it is considered that wastewater servicing should not form an impediment to developing the site for urban residential use.

² Don Young/Rob Kerr email 8 July 2022

Water Supply Servicing

Likely approach to management of water supply

The existing residential areas to the east and directly to the south are currently serviced by Rangiora Town Water Supply. Potential points of connection to the existing reticulation are through extensions from Pimlico Place and Sandown Boulevard as well as through the future bypass road connection through to site.

Council have undertaken several assessments on the capacity of the network. This includes the 50 year Water and Sewer Growth Forecast (WDC, 2020) and 'North West Rangiora Water and Sewer Servicing (Nov 2021).



The above diagram shows the water model used in the assessment of services for North West Rangiora in the above mentioned study. Development of the Site has been provided for in the model, and the conclusion of the study is that there is adequate capacity for the Site to be developed for urban residential use, as well as extensive Rural residential development to the north and west.

It is likely a 200mm diameter rising main will be constructed in Lehmans Road in the future, together with some pressure booster stations required to maintain level of service. A development contribution may be sought by Council towards these works.

Again, there would be material benefits (effectively cost savings) for those to the north and west in extending the Rangiora water supply network through or past the site.

Assessment of water supply servicing

There is significant capacity available in the reticulation downstream and suitable allowance has been made in the overall network and source to accommodate development of the site. On this basis, it is considered that water supply should not form an impediment to developing the site.

POWER AND TELECOMMUNICATIONS

Aerocon³ have previously contacted utility service providers and concluded that the site can be serviced with power and communication through extensions from the surrounding developments.

³ Arlington Infrastructure Services Report, Aurecon, September 2021

FLOOD HAZARD ASSESSMENT

Characterising the flood risk

The Ashley River is located to the north of the site and flows in a west to east direction and the river presents a material risk of breakout to some areas in the lower plains. Coupled with this are the risks from localised flooding from rainfall and coastal flooding from ocean sourced water inundating the dunes and flowing onto the plains.

The Council, with Environment Canterbury, has modelled water depths modelled for a range of scenarios, and the 200-year and 500-year Average Recurrence Interval (ARI) are presented here. Note that the 200 year breakout event was modelled in conjunction with a 20 year localised rain event while the 500 year breakout was modelled with the 50 year localised rain event.

The classification for the area is Low Hazard; summarised as less than 300mm water depth.

Water is confined to the two known flow paths across the site which pass from the west towards the east. The remainder of the mapped flooding is likely to be modelling 'noise' generated from the surface model or residual shallow ponding.

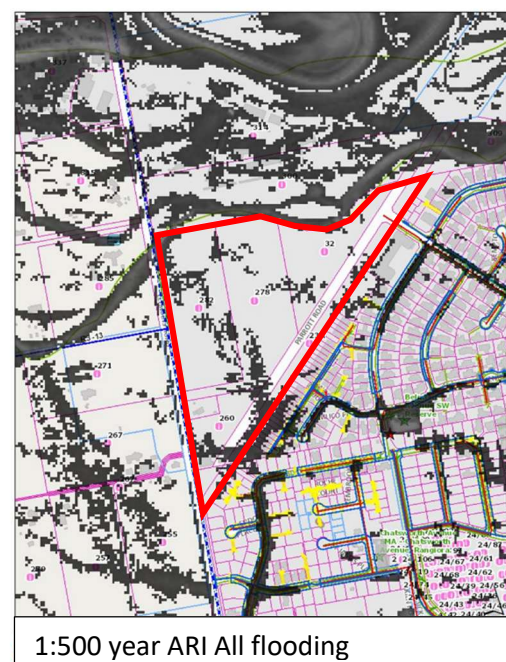
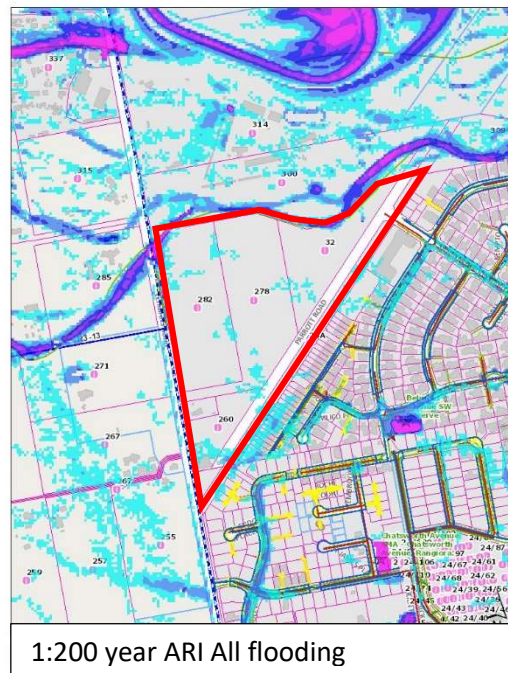
Flood risk assessment

On the basis that any development of the site does not lead to a blocking or damming of the two existing overland flow paths, then the flood hazard for the Site is considered to be low.

Normal earthworks to shape the land for residential development will remove the residual ponding (if any), notwithstanding that this will have no consequential impact on property. The flow paths could be reshaped to more effectively pass the flow and mitigate impacts on the adjacent properties to the east of the unformed Parrot Road.

Improving protection from an Ashley River breakout

WDC has advised⁴ that they are currently engaging with Environment Canterbury about how it can improve the level of service in terms of reducing breakout risks from the Ashley and that Environment Canterbury are currently working on high level plans that will establish the framework for the river, including setting the desired level of services.



⁴ Don Young/Rob Kerr email 8 July 2022

Once this has been completed, an options assessment on physical or operational options are planned to be undertaken, including considering cost estimates and funding mechanisms. The timeframe for this is uncertain.

One of the options will be construction of secondary stopbanks to return any flow that has breached the stopbank back to the river. WDC also advise that, some time ago, a map was produced by ECan staff which showed a possible alignment for a secondary stopbank being along the proposed Parrott Rd between Lehmans and River Roads. This map has no standing and has not been developed as part of a wider assessment.

WDC advise⁵ that, if this area in question was to be rezoned for residential, then that original alignment would have significant disadvantages, both in terms of failing to protect a residential portion of the town and constraints on spaces and it could be concluded that a secondary stopbank in the sketched location would be difficult to support, however until a full assessment was carried out on all options, the matter cannot be conclusively rejected.

It may be possible to consider a route for a secondary stopbank that is integrated with the northern edge of the development however this has not been explored by WDC or ECan at this stage.

As such, flood risk should not form an impediment to development of the site and development of the site may offer flood hazard benefits to the township.

CONCLUSION

Drawing on the assessment above, coupled with the information drawn from other assessments of the area, flood hazard or utility servicing should not form impediments to development of the site to any reasonable density of residential land use.

Yours sincerely



Rob Kerr
Director

⁵ Don Young/Rob Kerr email 8 July 2022

Attachment A: Forecast wastewater flows and downstream capacity

