

**Appendix 1      Stormwater evidence - WDC 3 Waters Manager**

## WAIMAKARIRI DISTRICT COUNCIL

### REPORT

**FILE NO:** DDS-06-05-01-26-04 / 150429068422

**HEARING DATE:** 3-5 June 2015

**REPORT TO:** Hearings Panel

**FROM:** 3 Waters Manager – Kalley Simpson

**SUBJECT:** Evidence on Stormwater Servicing and Flood Risk Issues Relating to Private Plan Change P026 – Westpark, Lehmans Road, Rangiora

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### **INTRODUCTION**

1. The purpose of this evidence is to provide to the Hearings Panel comment on stormwater servicing and flood risk matters relating to Private Plan Change P026 – Westpark, Lehmans Road, Rangiora.
2. My name is Kalley Simpson and I am the 3 Waters Manager for the Waimakariri District Council. In this position I have responsibility for the water supply, wastewater and drainage assets for the Council.
3. I hold a Degree in Natural Resources Engineering from the University of Canterbury and have 16 years of experience in civil engineering. This experience includes design of stormwater systems and flood risk assessment and hydraulic modelling work.
4. I have been requested to provide comments to the Hearings Panel on stormwater servicing and associated flood risk matters relating to Plan Change P026 – Westpark, Lehmans Road, Rangiora, which requests rezoning of approximately 15.0 hectares of rural land at the corner of Lehmans Road and Oxford Road from Rural to Residential 2.
5. The Westpark Private Plan Change request would provide for residential and comprehensive residential development.
6. In my evidence, I will cover the following specific matters:
  - i. Appropriateness of the proposed stormwater infrastructure.
  - ii. Implications of flood risk on the development.
  - iii. The suitability of the Outline Development Plan as submitted.

### **STORMWATER INFRASTRUCTURE**

7. Stormwater System
8. The Applicant has proposed that the stormwater system will comprise of onsite soak pits to discharge roof water to ground, stormwater pipes to collect runoff from hardstanding and road areas and swales and basins to treat and attenuate the runoff. In general this approach is considered to be appropriate but will need to be confirmed as part of the subdivision consent stage.

9. The discharge to ground at the lower part of the site is considered to be appropriate given the depth of the groundwater is in excess of 7 m deep and the depth to the gravel layers is approximately 2.7 m. While no information has been provided on the potential soakage rate in the Infrastructure Assessment or the Geotechnical Investigation Report, it is expected, based on the bore logs provided and the soakage rate in surrounding developments, that adequate soakage would be available at this site.
10. The indicative sizing of the stormwater management areas of approximately 12,800 m<sup>2</sup> comprising of Swale A (2,400 m<sup>2</sup>), Swale B (2,200 m<sup>2</sup>), Basin A (6,400 m<sup>2</sup>) and Basin B (1,800 m<sup>2</sup>) appears to be appropriate based on the conceptual sizing provided in Table 4 of the Infrastructure Assessment. While stormwater calculations have not been provided at this stage the area set aside on the Outline Development Plan for stormwater management appears to be adequate.
11. It is noted that some of the design parameters documented in the Infrastructure Assessment, such as the batter slopes, freeboard and offsets from boundaries, are less than what is accepted by Council. However these are unlikely to have a significant effect on the area set aside for stormwater management.
12. The actual size of the proposed stormwater management areas will need to be confirmed at the subdivision consent stage once the extent of contributing impervious area is known and soakage rate has been determined.
13. The Infrastructure Assessment suggests that secondary flow from the stormwater management area could occur into either the old water race channel (refer section 3.6 of the Infrastructure Assessment) or the existing drainage path (refer section 3.7 of the Infrastructure Assessment). It is preferable that secondary flow from both Basin A and Basin B occur into Oxford Road then into the North Brook, rather than through private property. This route for the secondary flows better aligns with the proposed secondary flow route to the south, shown on the stormwater plan in the West Rangiora Structure Plan (refer Attachment ii). Again this matter can be addressed as part of the subdivision consenting stage.
14. Other Drainage Features
15. There is an existing water race and dry drainage path through the lower section of the site (refer Appendix C of the Infrastructure Assessment).
16. It is proposed to terminate the water race that runs through the site and through the properties downstream of Lehman's Road. Consent from downstream properties owners will need to be obtained from these landowners before this race can be closed. It is understood that the developer is hopeful of securing consent from all landowners but it is not known if this has been obtained at this stage.
17. Council is supportive of closing the existing water race as it acts as an artificial channel that can direct surface flow into the urban area of Rangiora during large rainfall events. For this reason Council is considering closing the water race to the south of Oxford Road in the near future.
18. If consent is not obtained by the developer from all landowners then the water race will need to be continued through the development, on an alignment that avoids private property. This could be addressed at the subdivision consenting stage should it be necessary.

19. The dry drainage path originates in the rural land to the west of Lehmans Road and flows into the development site via a large (1200 mm x 950 mm) culvert under Lehmans Road. While the channel is normally dry it can take large flow during long duration rainfall events.
20. It is proposed to maintain the existing drainage path through the development via a swale and pipe system to the proposed SMA. Any secondary flow from the SMA should occur into Oxford Road (rather than into the existing drainage path located on private land as indicated in the infrastructure report) and eventually into the head of the North Brook.
21. While this is an appropriate solution, Council is also considering diverting the rural flow down Lehmans Road to the South Brook to prevent the urban system becoming overloaded. This potential diversion is discussed further in the following section on flood risk.
22. Stormwater Servicing Summary
23. From my evidence, I offer the following summarising statements:
  - (a) There are no significant impediments to providing stormwater services to the proposed development. The actual sizing and design of the stormwater system can be addressed at the subdivision or development stage.
  - (b) I am satisfied that there are no major stormwater services issues to prevent this development proceeding.

## **FLOOD RISK**

24. Implications of flood risk
25. The site is potentially at risk of flooding from three sources:
  - i. Breakout flooding from the Ashley River.
  - ii. Flooding from the upstream localised catchment (i.e. rural area).
  - iii. Flooding from within the development site.
26. The Applicant has appropriately considered flooding from within the development site and proposed stormwater management measures to mitigate any increase in flooding. The final sizing of the onsite measures is subject to further assessment and design that can be addressed at the subdivision consent stage.
27. The Applicant has assessed the pre-development flooding for both the Ashley River breakout flooding based on the Environment Canterbury model and the localised catchment flooding based on the Waimakariri District Council model. While both models generally predict low hazard flooding (i.e.: < 300 mm depth), it was determined that the Ashley River breakout flooding was more critical for this site.
28. Post-development modelling has been undertaken for both the Ashley River breakout flooding and the localised catchment flooding. The modelling work has predominantly focussed on the Ashley River breakout flooding as this is more critical for the site with two main flow paths entering this site from the west and the north. The results predict that the proposed development will increase flooding to the north east and south west of the site by up to 100 mm.

29. To mitigate against the increase it is proposed to form a raised bund along the road to the north of the site, create a swale along the western boundary of the site and to construct a new box culvert under Oxford Road.
30. These proposed works will address the increase in flooding to the east of the site, but not the increase in flooding to the north or south west of the site. Reference is made to the increase in flooding at the Rangiora Vet Clinic at 181 Lehmans Road and to the bunding that has recently been formed by the property owner. However no reference is made to the predicted increase in flooding on the Residential 4A land at 260 Lehmans Road to the north of the development or the predicted increase in flooding of houses at 201 Lehmans Road or 161 Lehmans Road to the south east of the development.
31. In principle Council supports the proposed mitigation measures; in particular it is supportive of the diversion of flood flows away from the urban area of Rangiora. However it is considered that additional measures are required to mitigate the offsite effects of the proposed development. In particular consideration needs to be given to the following:
- i. Provision a flow link to intercept the flow path to the north of the site and direct it into the north south road (refer Attachment i). This could be provided in the form of a greenspace access way.
  - ii. Extension of the swale to the south of Oxford Road.
32. The flow link to the north south road would manage flood flows within the development, rather than divert flows and increase flooding on neighbouring properties. The road corridor and proposed swale have conveyance capacity for flood flow but this is not being fully utilised as shown in Figure 003 and 006 in Appendix A of the Infrastructure Assessment. As flood flow into the development is a rare event mainly related to breakout flooding from the Ashley River, this additional flow link is not likely to have an effect on the functioning of the stormwater system up to the 50 year event.
33. The merit of these measures needs to be considered against the actual effect on the habitable floor levels of the houses at 201 Lehmans Road or 161 Lehmans Road and the development impact on the Residential 4A land at 260 Lehmans Road.
34. As mentioned above, Council is considering the potential to divert rural flows from the localised rural catchment to the west down Lehmans Road to the South Brook to prevent the urban system becoming overloaded. This potentially could extend from Oxford Road to the South Brook so could compliment and integrate with the mitigation measures proposed as part of the Westpark development. Budget provisions have been included in 2016/17 and 2019/20 of the Council's draft Long Term Plan for construction of this works in two stages. Further investigation, assessment and consultation work is required to confirm if this diversion is feasible.
35. The Council cannot guarantee if and when this work will proceed therefore the Applicant may need to consider extending the swale to the south of Oxford Road as part of their proposed works if it is necessary to offset the offsite effects of increased flooding.
36. The Applicant has proposed a modification to Rule 27.1.1.24 to make this development site subject to the requirement to set the floor levels a minimum of 350 mm above the 200 year flood event (0.5% AEP flood event). This is considered to be an appropriate measure to mitigate against flood risk within the development site.

37. In addition Council has requested an additional rule as part of their submission that requires residential allotments to have a finished ground level that avoids inundation in the 0.5% AEP flood event.
38. Flood Risk Summary
39. From my evidence, I offer the following summarising statements:
- (a) The Applicant has not appropriately considered the potential increase in offsite flooding and the potential measures to offset this increase.

## **OUTLINE DEVELOPMENT PLAN**

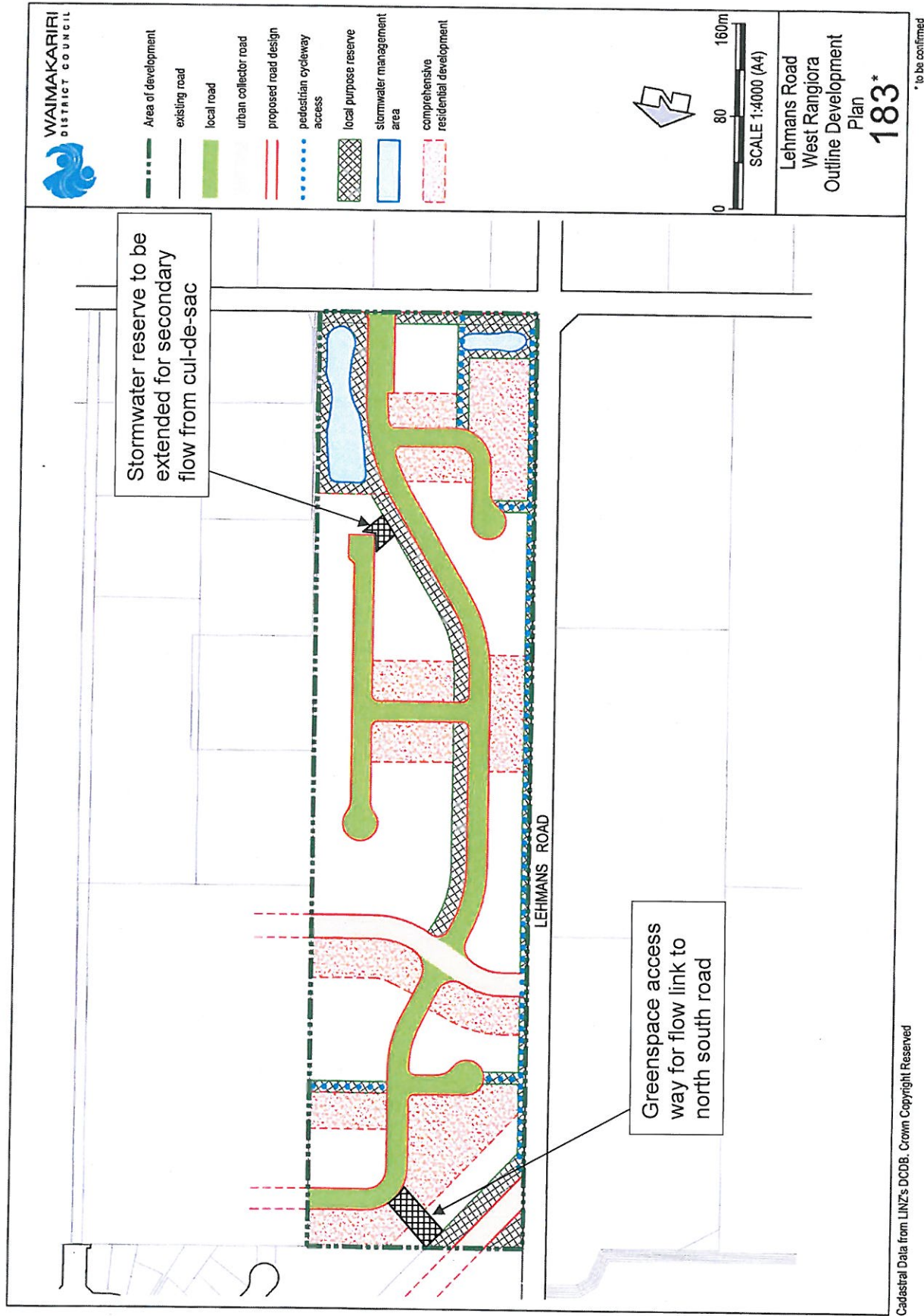
40. The layout of the roads on the Outline Development Plan are generally appropriate from a drainage perspective, however the southern cul-de-sac to the east of the north-south local road has no provision for secondary flow (refer Attachment i).
41. The indicative stormwater system shown on the plan in Appendix B of the Infrastructure Report shows a proposed stormwater reserve for the piped system and secondary flow. However, this has not been included in the proposed Outline Development Plan.
42. ODP Layout Summary
43. From my evidence, I offer the following summarising statements:
- (a) The Applicant has not appropriately provided for secondary flow in the layout of the proposed Outline Development Plan.

## **SUMMARY**

### ***Recommendations***

44. From my evidence, I consider the request for plan change should be declined as applied for as the flood risk for this site has not adequately addressed the offsite flooding effects.
45. For the plan change to be approved, the Applicant must address the following stormwater and flood risk matters:
- i. Firstly, revise the flood risk assessment to address the offsite effects of increased flooding, in particular the increase of flooding on the habitable floor levels of the houses at 201 Lehmans Road and 161 Lehmans Road and the development impact on the Residential 4A land at 260 Lehmans Road.
  - ii. Secondly, amend the proposed Outline Development Plan to include:
    - (a) A greenspace access way to the north of the development to provide a flow link to the north south road for flood flow management.
    - (b) A stormwater reserve connection from the southern cul-de-sac to the east of the north-south local road to make provision for stormwater infrastructure and secondary flow.







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LINE	DESCRIPTION
A	INT. INT.
B	
C	
D	
E	



PLAN C  
STORMWATER & RECREATION  
RESERVES PLAN

**RANGIORA  
STRUCTURE PLAN**

PLAT No.	2911
LOCAL	STATE



**Appendix 2    Wastewater Evidence - WDC Project Delivery Manager**

**WAIMAKARIRI DISTRICT COUNCIL**

**REPORT**

**FILE NO:** DDS-06-05-01-26-04 / 150424067152

**DATE OF HEARING:** 3-5 June 2015

**REPORT TO:** Hearings Panel

**FROM:** Project Delivery Manager – Gary Boot

**SUBJECT:** Evidence on Wastewater Servicing Issues Relating to Private Plan Change PC026: Westpark Development, Rangiora

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**INTRODUCTION**

1. The purpose of this report is to provide evidence to the Hearings Panel on servicing matters relating to Private Plan Change 26 – Westpark Development in Rangiora (P026).
2. My name is Gary Boot. I am the Project Delivery Manager for the Waimakariri District Council. In this position I have responsibility for delivery of engineering projects for the Council.
3. Prior to January 2012, I held the position of Utilities Manager for the Waimakariri District Council for approximately nine years where I had responsibility for the management of the district's water, sewer, and solid waste activities.
4. I hold a Masters Degree in Engineering, and have 23 years' experience in civil engineering and asset management. I am a Chartered Professional Engineer.
5. I have been requested to provide comments to the Hearings Panel on the wastewater servicing aspects relating to P026, which seeks to rezone approximately 15 hectares of rural land on the west side of Rangiora into Residential 2 land, and will make provision for residential and comprehensive residential development.
6. In my evidence, I will cover the following specific matters:
  - a. The feasibility of providing wastewater services to the proposed development.
  - b. The suitability of the Outline Development Plan as submitted, from a wastewater perspective.

## **WASTEWATER SERVICING**

7. Feasibility of Providing Wastewater Services to the Development
8. The applicant proposes to provide a reticulated wastewater system to the development area by connecting to the Rangiora wastewater scheme. The Rangiora wastewater scheme forms part of the Eastern Districts Sewer Scheme (EDSS).
9. The Rangiora component of the EDSS is a gravity reticulation system that reticulates wastewater to a treatment facility at Southbrook, before pumping the treated effluent to the Kaiapoi Wetland for tertiary treatment, before being discharged through the Ocean Outfall.
10. There are currently some capacity constraints in the wastewater reticulation in the south west portion of the Rangiora gravity reticulation network. However, upgrades to cater for growth are planned, and in some instances are underway, to cater for growth in the west of Rangiora, including the Westpark development.
11. While the proposed development is of a slightly higher density than was originally anticipated when the network planning was undertaken, there is or shortly will be adequate capacity within the wastewater reticulation system to service the development that could occur as a result of P026, without adversely affecting other users or compromising the Council's levels of service.
12. The cost of upgrading the downstream sewer reticulation will be funded by development contributions received with the Westpark development, and other developments proceed.
13. The developer will be required to construct and fund all gravity reticulation required to connect into the existing wastewater network at the intersection of Acacia Ave and Oxford Road.
14. ODP Layout
15. The Council has a requirement that public mains are installed in public roads and not within private property. Therefore the proposal to link the south eastern most cul-de-sac to the public road by way of public access strip is essential to meeting

this requirement. This is shown on the Aurecon Wastewater Servicing Plan (240845-0000-DRG-SU-02-C) as presented in Appendix B of the Aurecon Servicing Report.

#### **SEWER SERVICING SUMMARY**

16. From my evidence, I offer the following summarising statements:
  - (a) There are no significant impediments to providing wastewater services to the proposed Plan Change 26.
  - (b) The proposed ODP does not create any significant impediments to efficient and effective wastewater servicing, provided a public linkage is provided between the south eastern most cul-de-sac and the main spine road, which will ensure all public mains are able to be installed within public land.