Appendix 1: s53(2)(a) Fast Track Approvals Act 2024, Technical Advice- Groundwater

Date	1 September 2025
To	Joanne Mitten, Principal Consents Planner, Environment Canterbury
From	Marta Scott, Senior Scientist – Water Quality Science, Environment Canterbury
Project advice provided for	Ryans Road Industrial Development
Documents referred to	Assessment of Groundwater Effects – 104 Ryans Road" prepared by PDP and dated August 2025
Qualifications	I am a Senior Scientist and have been employed at the Canterbury Regional Council (CRC) since 2011. I hold a Master of Environmental Engineering from The University of Melbourne. I also have a Bachelor of Science degree from The University of Adelaide and a PhD in Organic Chemistry from The Australian National University. My work at Canterbury Regional Council includes investigating, monitoring, data analysis and reporting on the chemical and microbiological quality of groundwater in the region. I also provide technical advice for a variety of consents where discharges may lead to contaminants entering groundwater such as stormwater, farming and wastewater consents.
Code of Conduct	I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This technical report has been prepared in accordance with that Code. In particular, unless I state otherwise, the opinions I express are within my area of expertise, and I have not omitted to consider material facts that might alter or detract from the opinions that I express.

Executive summary/overview

1. Carter Group Limited have applied for a resource consent relating to the Rynas Road industrial development to discharge construction and operational phase stormwater to land. No other discharges of wastewater to land are covered by this application.

2. The aquifer underlying the site is unconfined and comprises alluvial gravel. The groundwater flow direction is to the southeast.

3. Roof runoff may be discharged to ground via soak pits without treatment.

4. First flush stormwater from hardstand areas on individual lots will be treated through proprietary treatment devices before disposal to ground via soak pits installed to a maximum depth of 7 m below ground level.

5. First flush stormwater generated from roads, footpaths and berm areas will be treated in one of two infiltration basins before discharging to soak pits.

Agreement with the Applicant

6. There are no nearby Community Drinking Water Protection zones that overlap with the property. For the contaminants described by the applicant, I do not anticipate that the stormwater discharges will impact on the closest downgradient community supply wells, particularly because of their greater depth.

7. There are shallower private drinking water wells that are downgradient and closer to the site that could be impacted by the stormwater discharges. Treatment systems are not typical on private supply wells in Canterbury so it is quite likely that they are currently untreated.

8. The applicant assessed expected stormwater quality based on median values from NIWA Urban Runoff Quality Information System for light industrial land use. The mean and maximum values are higher than the median values which have been presented and may also need to be considered. The expected median chromium and lead concentrations are close to the Schedule 8 LWRP limits and may need to be monitored in nearby domestic wells.

9. The conditions propose to exclude sites that carry out activities listed in Schedule 3 of the Land and Water Regional Plan from the consent. These activities have potential to introduce more contaminants into groundwater than has been assessed by the applicant. However, these activities are not prohibited on these sites but they would only require individual stormwater consents. Cumulative effects of such stormwater discharges may be difficult to assess under individual consents.

10. Construction phase stormwater should not be high risk. However, there is some potential for turbidity to increase in groundwater if the fines are not effectively filtered out through the unsaturated zone. Any areas that discharge construction phase stormwater should be located away from private domestic supply wells.

Benefits of the project

11. Stormwater generated from hardstand areas will be directed to a proprietary treatment device prior to discharge to soak pits.

12. Runoff from roads, footpaths and berm areas will be treated in an infiltration basins before discharge to ground.

13. Excluding activities that attract birds, such as fish processing and abattoirs will reduce the risk of *E.coli* contamination in stormwater discharging to ground.

14. Use of low-zinc and low-copper generating material will minimise these contaminants entering groundwater from untreated roof runoff.

15. Excluding activities listed in Schedule 3 of the Land and Water Regional Plan from the consent will minimise risks to the groundwater from this consent.

Outstanding areas of contention and significance of these

16. The applicant has estimated the depth to groundwater at the site to between 11.5 and 19 m below ground level (mBGL) although they acknowledge uncertainty. The depth to groundwater contours available indicate a depth between about 10 and 15 mBGL. This however does not consider highest groundwater levels and only considers depth to groundwater with respect to ground surface at a point in time of each survey. The data indicates that the shallowest groundwater may occur in the northeast part of the property. The applicant has considered the long-term monitoring well M35/1111 however, they did not consider the long-term monitoring well M35/3614, which had highest groundwater level of 8.12 mBGL. This well is closer to the northeastern corner of the property than well M35/1111. The depth to groundwater contours indicate that near M35/3614 the depth is about 11 mBGL, which is about 3 m lower than its highest recorded level. Similarly, the depth to groundwater contours indicate that near M35/1111 the depth is about 15 mBGL which is also about 3 m lower than the highest recorded level (of 11.89 mBGL). By that logic the highest groundwater level in the northeast corner could be about 10 mBGL. However, I cannot exclude a groundwater depth which is closer to 8 mBGL. A more detailed survey of land surface and highest groundwater levels recorded in all nearby wells would be needed to develop a more detailed depth to groundwater map across the site. This may be necessary if the soak pits are installed to a depth of 7 mBGL and mounding occurs. The depth to groundwater also impacts on the Microbial Risk Assessment which was carried out.

17. The applicant's Microbial Risk Assessment (MRA) indicates that there will be a 0.04% chance of exceeding the MAV for *E.coli* at the closest private domestic well (37 m away) M35/9627. My assessment achieves a similar chance (of 0.05%) but the chance for exceeding Norovirus MAV is high at 86%. This is presumably because the model assumes some overflows or cross connections between sewage and stormwater. If these could be minimised, then the norovirus risk could be lowered. The applicant's assessment relies on 2 m of unsaturated zone which may not bee achieved if the soak pits are 7 m deep and there is mounding. If the unsaturated zone is reduced to 0 m then the chance of *E.coli* exceeding the MAV at M35/9627 increases to 84%. This indicates that the unsaturated zone is responsible for a lot of the removal achieved in the MRA tool. During rainfall events, there may not be an unsaturated zone present underneath the soak pit due to the infiltration of a large volume of water and mounding. If the discharge is only 37 away from well M35/9627 then this well may have an increased risk of *E.*coli contamination. There are multiple other domestic wells in close proximity to the subdivision.

18. The conditions specify that soak pit base can be installed to a depth of 7m BGL, which is very deep. The mounding that has been calculated at up to about a meter under individual lots and up to 3.67 m when combined with the east infiltration basin. If the treatment relies on the presence of 2m of unsaturated zone (as used in the MRA assessment) then this may not always be achieved.

19. The NIWA Urban Runoff Quality Information System indicates that for light industrial the untreated mean concentration for *E.coli* is 31,000 cfu/100mL. Inadequate treatment could result in high *E.coli* concentrations in nearby domestic wells. This could be addressed through monitoring of the closest wells and installation of treatment, if required.

20. The applicant has presented groundwater quality in well M35/1382 although most of the parameters measured in this well are not relevant to the contaminants expected in stormwater discharges. Sampling the shallow wells present onsite for parameters expected in the stormwater could be a better way of establishing current groundwater quality. If monitoring is then required in the future, this could be used as a baseline. Given the depth of the groundwater, I expect that there is a high possibility of contamination of the groundwater with *E.coli* from the stormwater discharges.

21. There is no soil monitoring of the infiltration basins for any contaminants in the proposed conditions. I recommend to monitor the soil every 5 years or more frequently if 50% of a set trigger is exceeded.

Comment on potential impacts of the proposal on groundwater recharge

22. Some of the rainfall that normally falls on farmed soils is lost due to evaporation or plant uptake and some drains through and becomes recharge. If a farmed area is converted to an industrial area, then new sealed surfaces are created. Sealed areas will generate more runoff and less evaporation and plant uptake. This can lead to higher volumes of water becoming recharge to groundwater. The recharge is concentrated over a smaller area, and it occurs in soak pits and infiltration basins rather than more evenly over the whole property. Recharge may occur more frequently than under farmed land use.

23. The nature of contaminants also changes. Contaminants from farming are from nutrient losses (macro and micro nutrients) and pathogens. There may also be some pesticides and other farming chemicals that leach to groundwater. The stormwater in the proposed development may contain higher concentrations of metals and hydrocarbons than the farmed land use. There may be areas near the soak pits where pathogens are higher. There may also be unknown contaminants that may enter from the specific industrial activities that will occur on each new lot.

Solutions and/or Conditions sought

24. A more detailed survey of land surface and groundwater levels that could be developed to inform a map of highest groundwater levels across the site. Together with the mounding calculations this could be used to specify soak pit depths in different parts of the subdivision to ensure adequate separation to groundwater.

25. The MRA tool could be used to establish the distance of potential *E.coli* effects on nearby domestic supply wells. There could then be a condition to monitor those wells for contaminants expected in the stormwater discharge and install treatment if water quality deteriorates as a result of the discharges.

26. Sampling the shallow wells present onsite for parameters expected in the stormwater would establish current groundwater conditions. If monitoring is then required in the future, this could be used as a baseline.

27. Monitor soils in the infiltration basin every 5 years for metals and hydrocarbons or more frequently if 50% of set triggers are exceeded. This would ensure that the contaminants do not start leaching to groundwater.