

BEFORE THE HEARING COMMISSIONER

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a subdivision to create 242 residential lots within the C2 Growth Cell, and associated lots for public assets by 3MS OF CAMBRIDGE GP LIMITED (SP/0179/20)

**STATEMENT OF EVIDENCE OF LIAM PATRICK MCCAFFREY
(Engineering)**

Dated: 11 May 2021

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INTRODUCTION

1. My full name is Liam Patrick McCaffrey.
2. I have been engaged by 3Ms of Cambridge GP Limited (“**3Ms**”) to provide three waters engineering advice in respect of the applications by 3Ms to subdivide and develop its property on Cambridge Road for residential purposes (“**the proposal**”).
3. I have prepared this statement of evidence at the request of 3Ms.
4. In preparing this evidence I have read the Council’s section 42A report prepared by Mr Mark Batchelor (and all associated technical reports) and, at the time of drafting this evidence, the draft evidence that will be presented by other witnesses to be called by 3Ms, namely:
 - (a) Mark Apeldoorn – Traffic;
 - (b) Stuart Mackie – Urban Design; and
 - (c) Mark Chrisp – Planning.

Qualifications and Experience

5. I am a Civil Engineer specialising in land development, stormwater and roading design. My formal qualifications are:
 - (a) Bachelor of Engineering (BE) with honours specialising in civil engineering from Auckland University (2005); and
 - (b) Masters of Engineering Studies (MEngSt) with honours specialising in transportation from Auckland University (2009).

6. I have 17 years' experience in the design and construction of civil engineering projects in both New Zealand and overseas. I spent four years working for a civil contractor, Fulton Hogan, working on the construction of various roading and land development projects. More recently I spent nine years with the professional services firm Beca Ltd where I was responsible for the design and management of several large land development projects in New Zealand and Singapore. Relevant land development projects I have been involved with locally are:
- (a) St Kilda subdivision, Cambridge; an 80Ha \ 285 lot residential subdivision;
 - (b) Greenhill Park subdivision, Hamilton; a 120Ha \ 1200 lot residential subdivision.
 - (c) Bardowie Industrial Precinct development, Cambridge; 59.3 industrial development.
 - (d) C1 & C2/C3 Residential Growth Cells, Cambridge; infrastructure master planning. I have been engaged by 3Ms as well as Waipa District Council in relation to the Master Planning for these growth cells.
7. In October 2017 I set-up my own civil engineering consultancy, McCaffrey Engineering Consultants ("MEC"). In 2017 MEC was commissioned by 3Ms to lead the infrastructure designs for its development within the C2 Growth Cell.

CODE OF CONDUCT

8. I have read, and agree to comply with, the Code of Conduct for Expert Witnesses contained in the Environment Court's Practice Note 2014. This evidence is within my area of expertise, except where I state that I am

relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

PURPOSE AND SCOPE OF EVIDENCE

9. In my evidence I will:
 - (a) Provide an overview of my involvement in Plan Change 7 and the Master Planning for the C1 and C2/C3 Structure Plan area;
 - (b) Address the water supply requirements for the site, and confirm that the site can be serviced from a water supply perspective;
 - (c) Address the wastewater reticulation requirements for the site, and confirm that the site can be serviced from a wastewater reticulation perspective;
 - (d) Describe the proposed stormwater management approach for the 3Ms development;
 - (e) Provide an overview of alternative layouts for north/south public infrastructure corridor in the C1 and C2/C3 Growth Cells;
 - (f) Provide my opinion as to the nature of refinements that could be made to the public stormwater swale infrastructure as a result of the 3Ms development; and
 - (g) Present an overall conclusion.

Background – Plan Change 7 and the C1 and C2/C3 Structure Plan Master Planning

10. I was engaged by 3Ms in October 2017 to review the proposed C1 and C2/C3 Structure Plan notified under Plan Change 7 and develop refinement options for the structure plan layout. Through this process a number of technical deficiencies¹ within the notified Structure Plan layout were identified and, through engagement with Waipa District Council, refinements were proposed. 3Ms worked closely with WDC to implement changes to the structure plan layout to mitigate these issues and deliver improved outcomes for the structure plan.
11. I led the development of a full 3D infrastructure model of the Structure Plan area to provide a detailed assessment of the infrastructure requirements within the structure plan area which supported a detailed assessment of stormwater network (with technical support from Harrison Grierson Consultants) for the structure plan. This work resulted in significant optimisation of the stormwater solutions for the C1 and C2/C3 Structure Plan and the confirmation of a feasible solution.
12. I had input into the updating and drafting of the final Structure Plan layouts approved under Plan Change 7.
13. In August 2018 I was engaged by Waipa District Council (“**WDC**”) to assist in the delivery of the overarching stormwater consents required for the implementation of the C1 and C2/C3 Structure Plan and led the development of technical and planning solutions for the application to Waikato Regional Council (“**WRC**”). This work also involved significant engagement with affected parties to develop solutions for the benefit of the wider structure plan area.

¹ The notified structure plan included significant geotechnical technical risks associated with liquefaction and unassessed impacts on the Transpower overhead lines

14. Following the stormwater consenting phase in September 2019, I was re-engaged by WDC to assist in completion of infrastructure master planning and initial stages of implementation for infrastructure projects to facilitate development within the C1 and C2/C3 Structure Plan. As part of this role, I have had significant involvement in the development of technical solutions for stormwater, roading, wastewater and water supply infrastructure. My role also included supporting the WDC Property team by providing technical inputs to support land acquisition discussions with affected landowners.
15. In November 2019 I was engaged by 3MS to lead the delivery of the engineering solutions associated with proposed residential subdivision at 1865, 1863, 1871, and 1881 Cambridge Road, Cambridge (henceforth referred to as "**the 3MS development**"). Through my current role with 3MS I have had significant involvement in the stormwater, roading, wastewater and water supply infrastructure solutions to service the proposed subdivision.

Water Supply

16. The proposed water supply solution to service the 3MS development is as follows:
 - a) Two new water connections to be installed on existing bulk water main recently installed on Cambridge Road; and
 - b) A network of principle water mains within the 3MS development to be installed to service the requirements of the subdivision.
17. The proposed network within the 3MS development also includes a north-south bulk water main and east-west bulk water main which forms part of the wider water supply network required to service the wider C1 and C2/C3

Structure Plan area. These bulk water mains have been designed under instruction by WDC².

18. Based on the technical assessments completed to date I can confirm the following in relation to the proposed water supply network associated with the 3MS development;
 - a) The proposed water supply network meets the requirements to service the 3MS development; and
 - b) The proposed water supply network integrates with the infrastructure requirements of the wider C1 and C2/C3 Structure Plan.

Wastewater Reticulation

19. The wastewater strategy put forward to service the 3MS development is as follows:
 - a) Collect wastewater within the development area using a gravity pipe network to convey flows to a central wastewater pump station within the development; and
 - b) The central wastewater pump station will convey all wastewater generated by the development via an existing rising main on Cambridge Road which outlets into the existing WDC public wastewater network on Vogel Street.
20. The central wastewater pump station has been identified as a 'terminal pump station' for the C2 growth cell within the C1 and C2/C3 Structure Plan area. This pump station, and associated rising main, have been designed under instruction by WDC².

² Refer to Consultancy Contract for Design Services in Relation to 3MS Land dated 31st March 2020

21. Several sections of the proposed gravity network within the 3Ms development have been 'up-sized' to accommodate wastewater flows from future development across the wider C2 growth cell .
22. The technical assessment completed by Harrison Grierson³ confirms the 3Ms development can be serviced by the proposed wastewater network and integrates with the infrastructure requirements of the wider C1 and C2/C3 Structure Plan area.

Stormwater Management Approach

23. The stormwater strategy put forward to service the 3MS development is as follows:
 - a) Collect stormwater within the development area using a gravity pipe network to convey flows to a central stormwater soakage basin. All runoff generated by the development will be captured and discharged to ground via this system;
 - b) The existing open drain that passes through the 3Ms development site, from east to west, is to be diverted through the site to enable this to be retained. The approach will ensure that catchments upstream of the 3Ms development are unaffected by the subdivision; and
 - c) The 3Ms development is also proposing a requirement for the installation of water re-use systems within the individual lots across the subdivision as a source control measure within the development.
24. The central forebay's used to treat runoff prior to entering the central stormwater soakage basin will also provide a future east-west link within the wider stormwater network required to service the wider C1 and C2/C3 Structure Plan area.

³ *3MS Residential Development – 3-Waters Assessment Technical Memo* (Harrison Grierson, December 2020)

25. The technical assessment completed by Harrison Grierson⁴ confirms the 3Ms development can be serviced by the proposed stormwater network and meets the minimum number of points required under the WRC scoring system as outlined within the C1 and C2/C3 Stormwater Management Plan (SMP)⁵.
26. I met with representatives from WRC on 24th February 2021 to discuss the proposed stormwater approach for the 3MS development and compliance with the WRC approved consent for the C1 and C2/C3 Structure Plan area. No technical issues were raised regarding the proposal and I was advised that the solution would require a s127 variation to the current WDC consent which could be applied for along with the technical submission for the central stormwater soakage basin.
27. At the time of application infiltration rates for the central stormwater soakage were based on an assumed soakage rate provided within the Stormwater Management Plan. Site infiltration testing has now been completed and indicates that soakage is viable within the nominated basin area confirming the viability of the central stormwater soakage basin.

Alternative Structure Plan Layouts

28. In November 2020, I was engaged by 3Ms to look at possible alternative arrangements for the provision of the public infrastructure (roading and stormwater) within the C2 growth cell to facilitate the delivery of development based on a more conservative investment strategy by WDC.
29. From my assessment and previous experience working on the development of the C1 and C2/C3 structure plan infrastructure, the main

⁴ *3MS Residential Development – 3-Waters Assessment Technical Memo* (Harrison Grierson, December 2020)

⁵ The SMP forms part of the approved Waikato Regional Council discharge consent for the C1 and C2/C3 Structure Plan (AUTH141099.01.01)

physical and design constraints governing the alignment of the central Collector Road and Central Stormwater Swale within C2 growth cell are the alignment of the downstream infrastructure within the C3 growth cell to the south. Constraints limiting the position of these elements within the C3 growth cell are;

- a) The existing Te Awa development to the east;
 - b) An existing stream and gully to the west; and
 - c) Alignment with the consented central stormwater outfall structure location to the south.
30. The location of the new school site also provides an additional constraint limiting the position of these links at the northern end of the C2 growth cell.
31. When these key constraints are plotted it results in a ~400m wide corridor within the C2 growth cell where the central C2 Collector Road and C2 Central Stormwater Swale can be located within the C2 growth cell (refer to Figure 1 below).

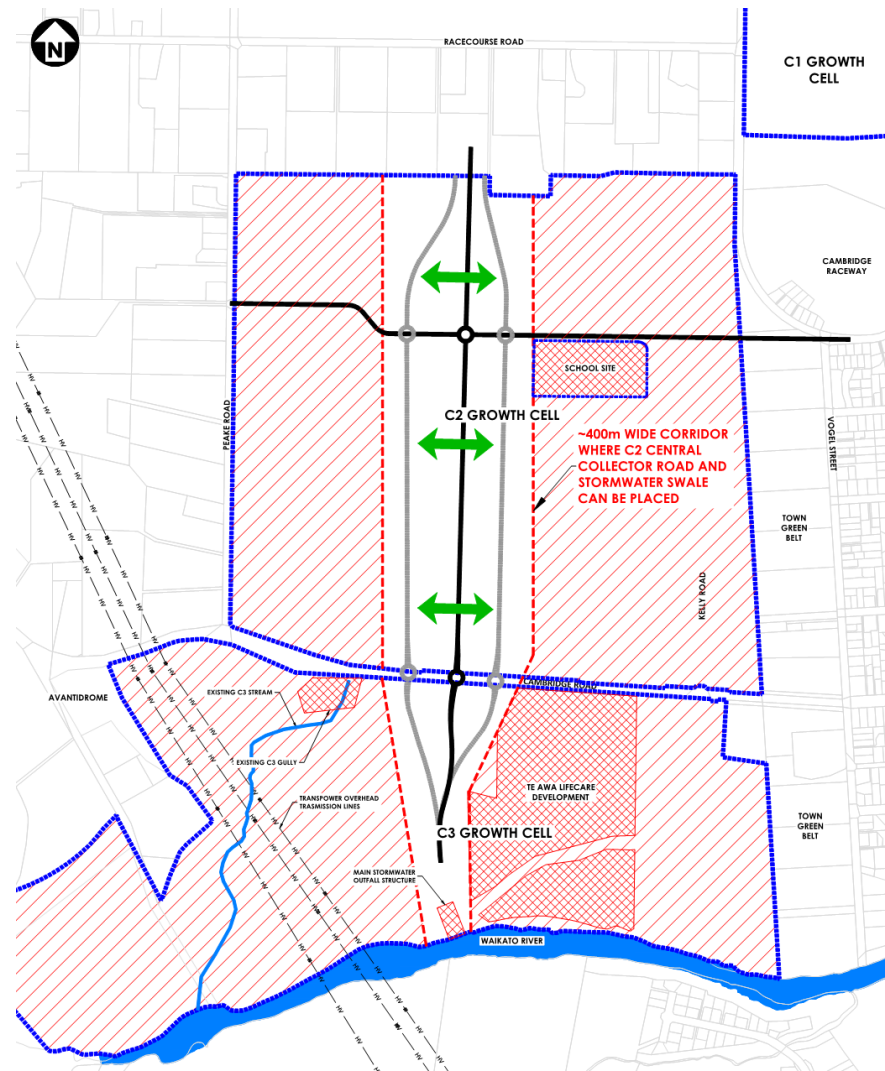


Figure 1 - Constraints Plan for C2 Central Collector Road and Stormwater Swale

32. Other considerations in the placement of infrastructure are:
- a) Minimising the impact on existing dwellings within the planned corridor; and
 - b) Alignment with existing property boundaries to simplify the WDC land acquisition requirements (where practical).

These considerations are more subjective and require engagement with landowners to understand specific implications for each property affected.

33. The following updated structure plan layout (refer to Figure 2 below) was developed as part of the 3MS subdivision consent application to demonstrate how the required C1 and C2/C3 infrastructure could be delivered and integrated with the proposed 3Ms development layout.

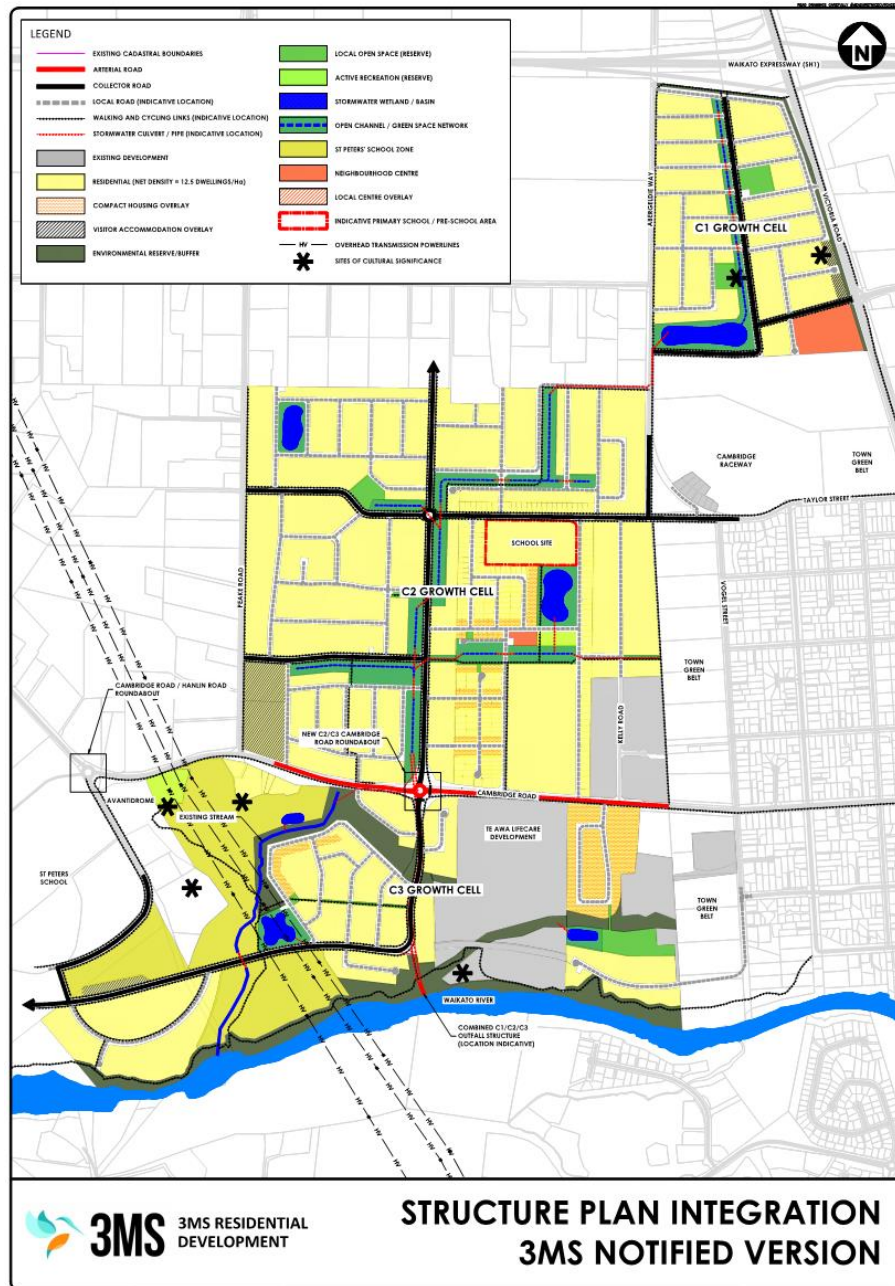


Figure 2 - Structure Plan Layout (3MS Notified Version)

34. Following engagement with neighbouring landowners during the consenting process, a further refinement was made to the updated structure plan layout put forward in the 3Ms consent application (refer to Figure 3 below) to further demonstrate how the requirements of adjacent

landowners can be incorporated in the final layout (where practical). This further revision assumes refinements are made to the sections of the stormwater network through piping sections of the open swale (discussed in more detail below). The potential benefits of this 3MS Refined Version are;

- a) It reduces the amount of infrastructure required to service the initial stages of development within the wider C1 and C2/C3 Structure Plan area reducing the initial investment required by WDC (and corresponding interest costs to developers); and
- b) It allows land required for strategic infrastructure to be acquired to facilitate later stages of over a longer timeframe. This outcome reduces the property risks associated with enabling development within the wider C1 and C2/C3 Structure Plan area.

35. A comparison of land required⁶ for WDC infrastructure between the Current Structure Plan and the 3MS Refined Version indicates the following;

- a) There is a ~15% (or ~3.3Ha) reduction in the total land required to be acquired by WDC within the C2 growth cell under the 3MS Refined Version;
- b) There is a ~20% (or ~1.2Ha) reduction in the total land required to be acquired by WDC within the C3 growth cell under the 3MS Refined Version; and
- c) The amount of land required to enable the delivery of first residential sections within the C2 growth cell is reduced by ~85% (or

⁶ Comparison based on roading, stormwater, wastewater, and general reserve areas only. Excludes active reserves and potential mitigation land required for lateral spread risks associated with proposed stormwater swales.

~7.8Ha) under the 3MS Refined Version.

The above comparison further supports the conclusion that costs required to service the initial stages of development will be significantly less under the 3MS Refined Version. This outcome will also provide better alignment between WDC infrastructure costs and the collection of associated Development Contributions.

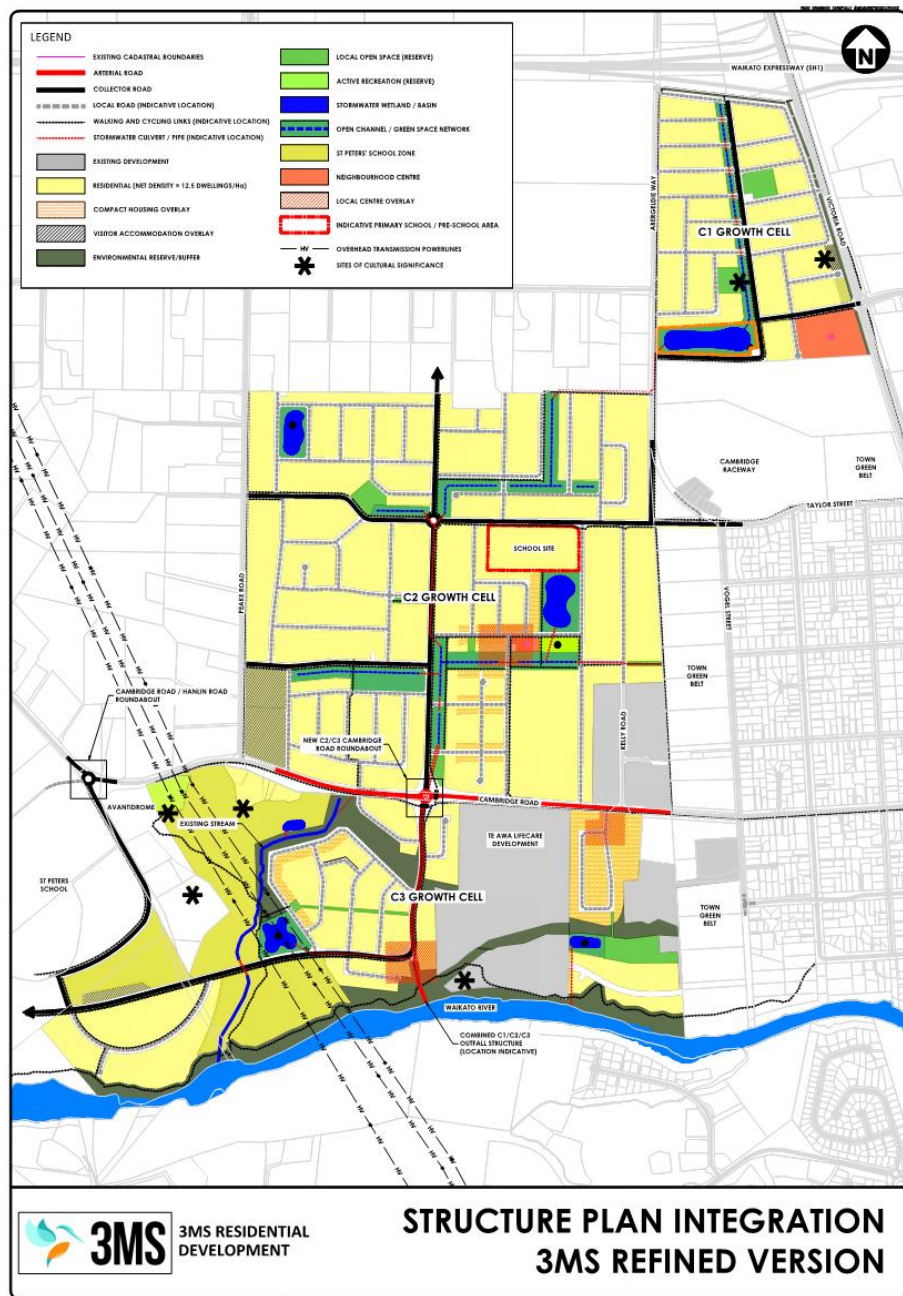


Figure 3 - Structure Plan (3MS Refined Version)

36. Based on the assessment work I have completed, I can confirm that there are no engineering reasons why the C2 Central Collector Road and Stormwater Swale must be located within the 3Ms development as shown on the current Structure Plan.

Potential for Engineering Refinements

37. The inclusion of a central stormwater soakage basin within the 3Ms development will result in a notable reduction in the amount of runoff from the C2 growth cell entering the wider stormwater network for the C1 and C2/C3 Structure Plan area (refer to Figure 4 below). This reduction will allow optimisation of the final C1 and C2/C3 stormwater network and help minimise the cost/impact of the proposed system.

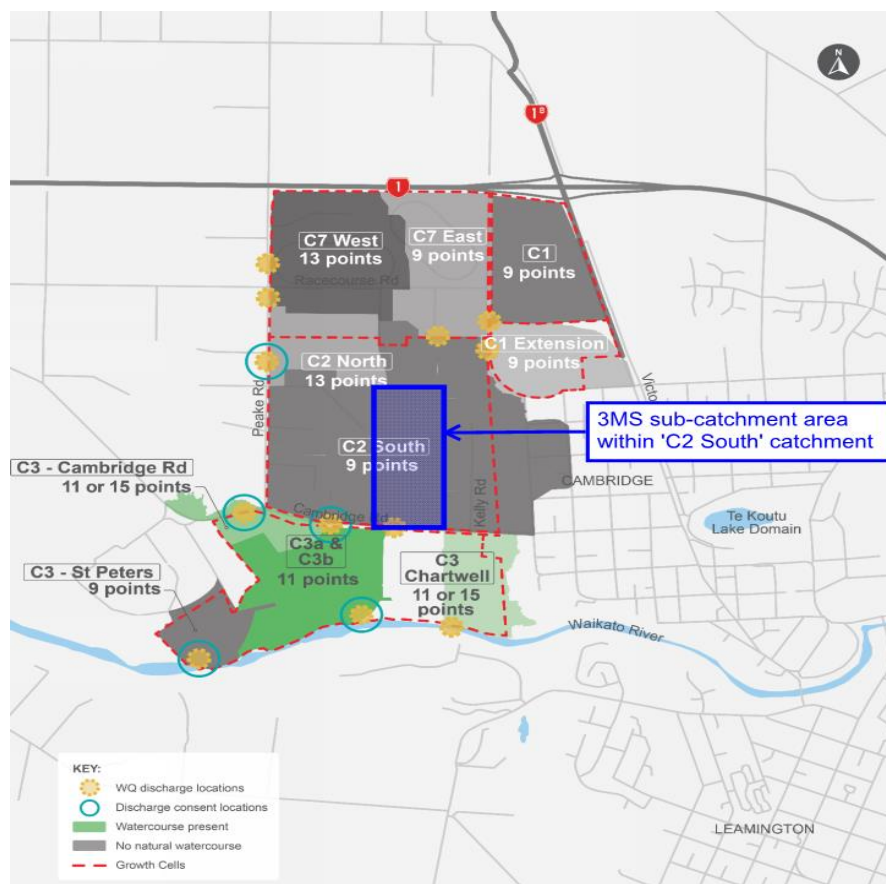


Figure 4 - Stormwater Catchments Areas (C1 and C2/C3 Stormwater Management Plan; Beca, 2019)

38. Key areas for optimisation that have been identified are;
- a) Piping several sections of the network (i.e. reducing the amount of open swale required and therefore reducing the amount of land needing to be purchased by WDC); and
 - b) Potential reduction in the diameter and number of central stormwater outlet pipelines (i.e. possible reduction in the overall cost of the central stormwater outlet).
39. The scope of the final optimisation will need to be confirmed by WDC as part of the final design of the stormwater system.

CONCLUSION

40. I hereby confirm that, based on the technical assessment work completed, the 3Ms development can be adequately serviced for stormwater, wastewater, and water supply.
41. It is also my opinion, that the 3Ms development and the wider C1 and C2/C3 Structure Plan area can be integrated. The 3Ms development does not impede the outcomes of the Structure Plan being achieved in relation to the provision of public infrastructure (i.e. roading and three waters).
42. Finally, the 3MS development will result in less land area needing to be purchased by WDC within the C2 growth cell and significantly reduce WDC investment required to deliver the first residential section within the C2 growth cell which will better match WDC infrastructure costs with the collection of Development Contributions.

Liam McCaffrey

11 May 2021