

Memorandum

To Blair Devlin

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From Amy Prestidge

Office Christchurch Environmental Office

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Subject Glenpanel 3 Waters EOI Review Summary

Glenpanel is a housing development located within the Ladies Mile HIF area (in Area 1.1, refer Figure 1). The infrastructure design is only loosely based on the Ladies Mile HIF report produced by WSP Opus in June 2018. Most of the design options presented consider how to use the existing infrastructure instead. The reviewed documents are the Glenpanel SHA EOI March 2019, Three Waters Assessment Report March 2019 (electronically called 12576L_03a_Services Report Feb 2019 Rev_01), and the Glenpanel EOI Appendices Part 1 March 2019.

The Three Waters Assessment Report by Clark Fortune McDonald & Associates includes some basic design information to support the concepts being proposed in the Glenpanel development.

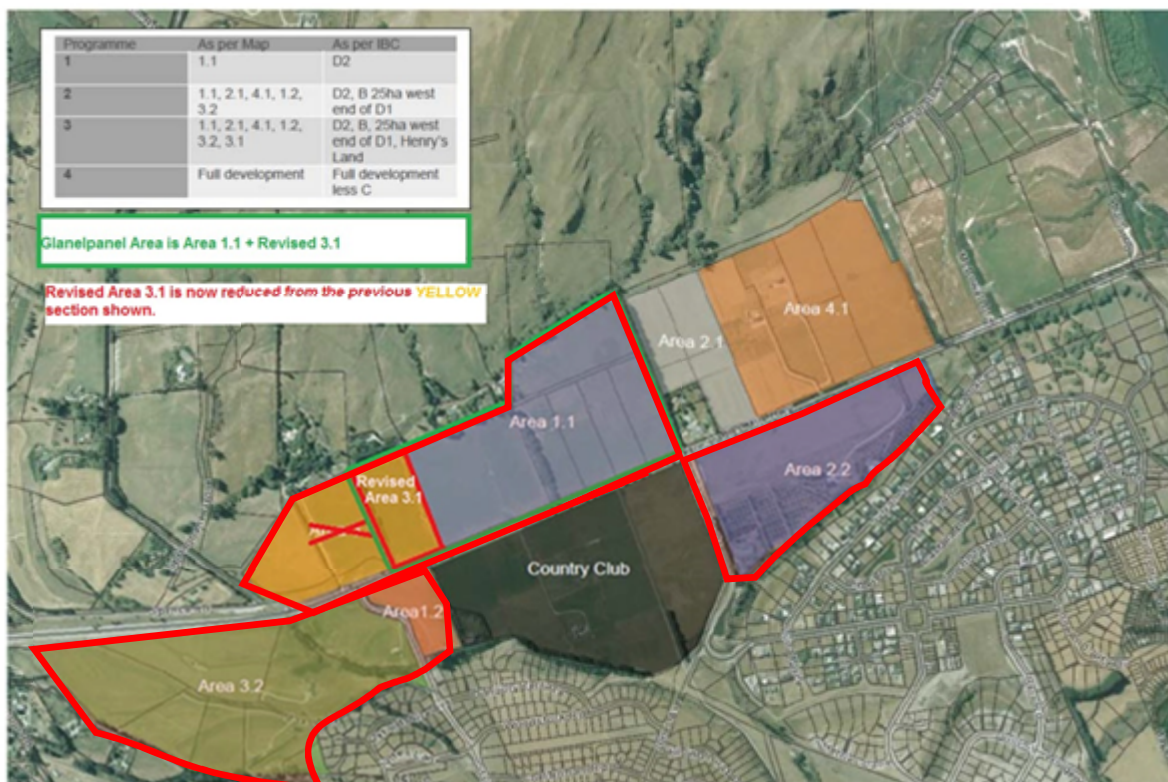


Figure 1 – Development areas included in the QLDC Ladies Mile HIF submission



Figure 2 – Glenpanel development area from the EOI

Wastewater

Section 5 of the Three Waters Assessment Report details the design flows, which are in accordance with the QLDC Code of Practice (CoP).

There appear to be three options being put forward, two based on using existing infrastructure (in Stalkers Road and Howards Drive), the other utilising new infrastructure provided by the HIF project.

Items raised in review include:

1. Agree that the assumptions being made about the remaining capacity of the existing DN375 pipe in SH1 need confirming through flow monitoring and modelling, as the reason the HIF proposal allowed for a pumped main through to the bridge was concerns about the actual capacity of the pipes around the Stalker Road Intersection.
2. If infrastructure is to be vested in QLDC, finding a solution that can service the whole area (including Flint's Park etc.) would be best, so that a single wastewater pump station servicing the whole area is constructed. This would assist QLDC in minimising ingoing operations and maintenance costs.
3. The concept to discharge to the DN125 at Stalker Road is not in keeping with the HIF concept which assumed discharge would be to the pipe over the Shotover Bridge.
4. Storage for the pump station will need to be a minimum of 9 hours based on Appendix G of the QLDC Code of Practice (CoP). QLDC may have a requirement for additional storage based on the level of service (or importance) it provides to the Ladies Mile area. Consideration as to where additional storage is accommodated should be given when identifying appropriate pump station sites.
5. The existing wastewater pump station in Howards Drive is not sized to take additional flows, but was earmarked as a potential solution for the HIF Area 2.2 (the area immediately adjacent to Howards Drive). It was thought the pressure main may be able to accommodate additional flow from Area 2.2 only but that the pumps would require

upgrading. There would be an extensive length of new pressure main required if the pump station was to be upgraded to take both areas into it. This option would appear to be a more difficult solution than the building of a new pump station within Area 1.1 (Glenpanel and Flint's Park) and should only be considered if no other solution is acceptable.

The intention of the design to collect wastewater via gravity mains within the site and discharge into a pump station is generally sound. However, further work around the pump station and pressure main solution needs to be undertaken by the developer if using the existing reticulation. If the intention to use the HIF-installed pipe with a new pump station is the recommendation, then the only major issue is how this will be developed in conjunction with neighbouring developments.

Stormwater

Section 6 of the Three Waters Assessment Report, and the Lowe Environmental Impact report from the Infrastructure Review in EOI Appendices covers the stormwater assessment completed for the Glenpanel development.

The report recommends discharging primary stormwater flows to ground, with secondary stormwater flows (overflows) being directed to the existing DN1050 pipe within Howards Drive. Collection is via road drainage, swales and detention ponds.

However, there are some concerns about the assumptions and design calculations given.

Items raised in review include:

1. As seen in Figure 2, the area of development has increased from that assessed in the HIF project. This is unlikely to make a large difference to the flow that the existing infrastructure can accept, but given the defined capacity of the pipe, understanding the allowable stormwater discharge from this area identified in the original design of the DN1050 pipe would help define the maximum allowable flow it can carry. This in turn will inform the amount of attenuation required within the development.
2. It is stated that there are hillside cut off drains that capture runoff, preventing flow from entering the development. This seems inconsistent with the information given in the Lowe report, which recommended a proposed cut off drain and infiltration basin to collect all stormwater from the hillside. It is not clear if this has been constructed, and if not, who would be responsible and when this would be complete.
3. Whilst it appears that the Fluent-designed DN1050 pipe in Howards Drive has been designed to accommodate the 1% ARI post-development flow for the Glenpanel SHA area, with the recent changes to the HIRDS rainfall data, it may be that more attenuation on site will be necessary. It would be appropriate to follow the QLDC CoP for discharge and keep the 1% ARI discharge to pre-development levels. This is because the new flowrates for the 1% ARI are now higher and likely to exceed the flow the pipe was designed for, and there are more areas than just the Glenpanel SHA area needing to discharge to this pipe.
4. Gross pollutant traps and filters as proposed are a method of stormwater treatment, but they require frequent maintenance and can lead to surface flooding when clogged. This is a matter for QLDC to accept or otherwise.

It is anticipated that these issues will be addressed in detailed design. Detailed drawings and design calculations were not provided so could not be checked. However, it appears in principle that the proposed concepts are appropriate.

Water Supply

Section 7 of the Three Waters Assessment Report covers the water supply assessment undertaken.

There is a fundamental issue with the proposed concept's assumptions about average daily demand resulting in the concept not being able to meet the minimum requirements for both potable and firefighting supply.

Items raised in review include:

1. The QLDC CoP requires the average daily demand to be 700 L/p/d unless modelling/metering approved by QLDC can be used to confirm a lower value. There is no information to confirm that any modelling was done, or that QLDC has approved a lower value. It appears that the lower value of 250 L/p/d has been selected because it is the method given in NZS 4404. This is not in keeping with the modelling work QLDC has been doing in determining the necessary supply for Ladies Mile, and therefore may not be acceptable.
2. Irrigation is used as a reason for a lesser daily demand, however it is unclear that the Arrow Irrigation Race will definitely be providing water to the public areas. It is also unclear how irrigation of private dwellings will be restricted. Whilst it appears some of the dwellings will be higher density, there are still plenty of dwellings with space for gardens.
3. The peak water demand is stated as 9 l/s but the firefighting demand will exceed the domestic demand. The minimum requirement for firefighting is 12.5 l/s within 135 m of the fire risk with an additional 12.5 l/s available within 270 m of the fire risk, i.e. a total of 25 l/s, plus a concurrent background consumer demand of two thirds of the annual peak consumer demand (SNZ PAS 4509:2008, Appendix K).
4. The static pressure of approximately 150 kPa in the existing pipe is not an indication that there will be enough running pressure while supplying fire demand. SNZ PAS 4509:2008 states "the minimum running pressure in the water main should not be less than 100 kPa while the water main is flowing the required amount of water from the maximum number of fire hydrants".
5. It is not clear whether there will be other activities (such as the storage yard, which appears to have buildings) that require a larger fire flow to be provided (i.e. have a fire water classification higher than FW2).
6. The reservoir proposed has a minimum elevation of 423 m. This is higher than the 407 m level QLDC is now proposing for their reservoirs. It is unclear whether this will have an impact on the development, as the report does not discuss these changes.

If there is going to be a large delay between the completion of the first houses within the Glenpanel SHA and the provision of the new water supply by QLDC, solutions involving temporary reservoirs and booster pumps may be required. However, if the QLDC HIF supply is available, there will be no need for these works.

From our work with QLDC we are aware that it is possible that the rising and falling mains for the new QLDC Ladies Mile reservoir will pass through the road reserve north of Howards Drive (the new reservoir location has changed since the HIF report was written, with a corresponding change to the pipe route), which will need consideration in the design of the layout in the Glenpanel proposal.

Conclusion

The existing infrastructure available is not particularly suitable, and does not allow for service to an area wider than the Glenpanel SHA. Multiple wastewater pump stations would be necessary if each development area is designed in isolation from each other.

Further consideration of utilising the HIF infrastructure may simplify the design.

Items for QLDC to confirm for design based on utilising the HIF infrastructure include:

- The discharge rate for stormwater into the Howards Drive DN1050 pipe (should it be restricted to 1% ARI pre-development flow?)
- The average daily demand for water supply (can it be reduced from 700 L/p/d?)