

**BEFORE AN INDEPENDENT HEARINGS PANEL
OF THE WAIKATO DISTRICT COUNCIL**

IN THE MATTER of the Resource
Management Act 1991

AND

IN THE MATTER of the proposed Waikato
District Plan (Stage 1)
Hearing 25

**EVIDENCE OF CAMPBELL JAMES MCGREGOR ON BEHALF OF HYNDS PIPE
SYSTEMS LIMITED AND THE HYNDS FOUNDATION IN OPPOSITION TO
REZONING REQUESTS**

STORMWATER

17 March 2021

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1. INTRODUCTION

1.1 My full name is Campbell James McGregor.

1.2 I hold a Bachelor of Surveying from University of Otago, Master of Engineering Studies (Honours) and Post Graduate Diploma in Business from Auckland University. I am a Chartered Professional Engineer and chartered member of Engineering New Zealand. I am a member of the Institute of Directors and Water NZ.

1.3 I have worked in New Zealand, Australia and the United Kingdom over the past 20 years within various engineering consultancies, providing infrastructure planning and design advice for residential, commercial and industrial developments as well as large scale infrastructure projects.

1.4 My experience includes:

(a) Design of residential, commercial and industrial development infrastructure, including bulk earthworks, roading, drainage (wastewater and stormwater management), and utilities.

(b) Project or civil/utility design leads on numerous projects over the past 10 years including City Rail Link, Huia Replacement Water Treatment Plant, Tamaki Implementation Plan, Brickworks at Lynn Mall and New Zealand Transport Agency's Northern Corridor Improvements.

1.5 I am currently a Technical Director at Harrison Grierson.

1.6 I have previously worked for Cook Costello Limited (New Zealand), Aurecon (New Zealand) and Arup (United Kingdom) and have been a director of my own business, Infracivil Limited.

1.7 I have previously prepared and presented evidence in Council hearings and the Environment Court on behalf of clients covering areas relating to utilities and drainage infrastructure.

1.8 I advise that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and have complied with it in preparing this evidence. I confirm that the issues addressed in this evidence are

within my area of expertise and I have not omitted material facts known to me that might alter or detract from my evidence.

2. SCOPE OF EVIDENCE

2.1 I have been asked to provide evidence on behalf of Hynds Pipe Systems Limited and the Hynds Foundation in relation to their submission/further submissions on the Proposed Waikato District Plan (**Proposed Plan**). Hynds Pipe Systems Limited and the Hynds Foundation are referred to collectively as **Hynds** in this evidence unless the distinction is made between the two organisations.

2.2 The focus of this evidence is on the submissions lodged by other parties, in particular Havelock Village Limited (**HVL**), seeking that the elevated land above Hynds' site be rezoned from Rural (notified Proposed Plan) to Residential. My evidence relates to the stormwater implications of these rezoning proposals.

2.3 My evidence will cover the following matters:

- (a) Stormwater works proposed as part of Plan Change 24 (**PC24**);
- (b) Stormwater works proposed and carried out as part of the development of the industrial park, and amendments to those works sought through subsequent consents;
- (c) A summary of the current status of stormwater assets within the Hynds sites' catchments;
- (d) Comments on other submitters' rezoning proposals;
- (e) Comments on HVL's approach to stormwater;
- (f) Comments on the Council Reporting Officer's s42A Framework Report;
- (g) Comments on the evidence of Mr Ryan Pitkethley filed on behalf of HVL; and
- (h) Conclusions.

3. PC24

3.1 PC24 related to a proposed structure plan for the development of Pokeno township and the surrounding area. The structure plan was adopted in 2008.

3.2 As part of PC24, a Stormwater Catchment Management Plan (**SCMP**) was prepared (dated September 2008). The SCMP covered the future Pokeno growth area identified by the structure plan that was prepared as part of PC24, an area of around 440ha.

3.3 The catchment which drains from the PC24 growth area is approximately 1,500ha and consists of two sub-catchments: Tanitewhiora (1270ha) and Helenslee (230ha). This is illustrated in Figure 1 below and by the catchment plan provided in Appendix 1 of my evidence.

3.4 The SCMP recommended several stormwater treatment devices (i.e. wetlands and attenuation ponds) to mitigate the effects of development in the Pokeno growth area and showed the extents of the existing 1% Annual Exceedance Probability (**AEP**) flood plain.

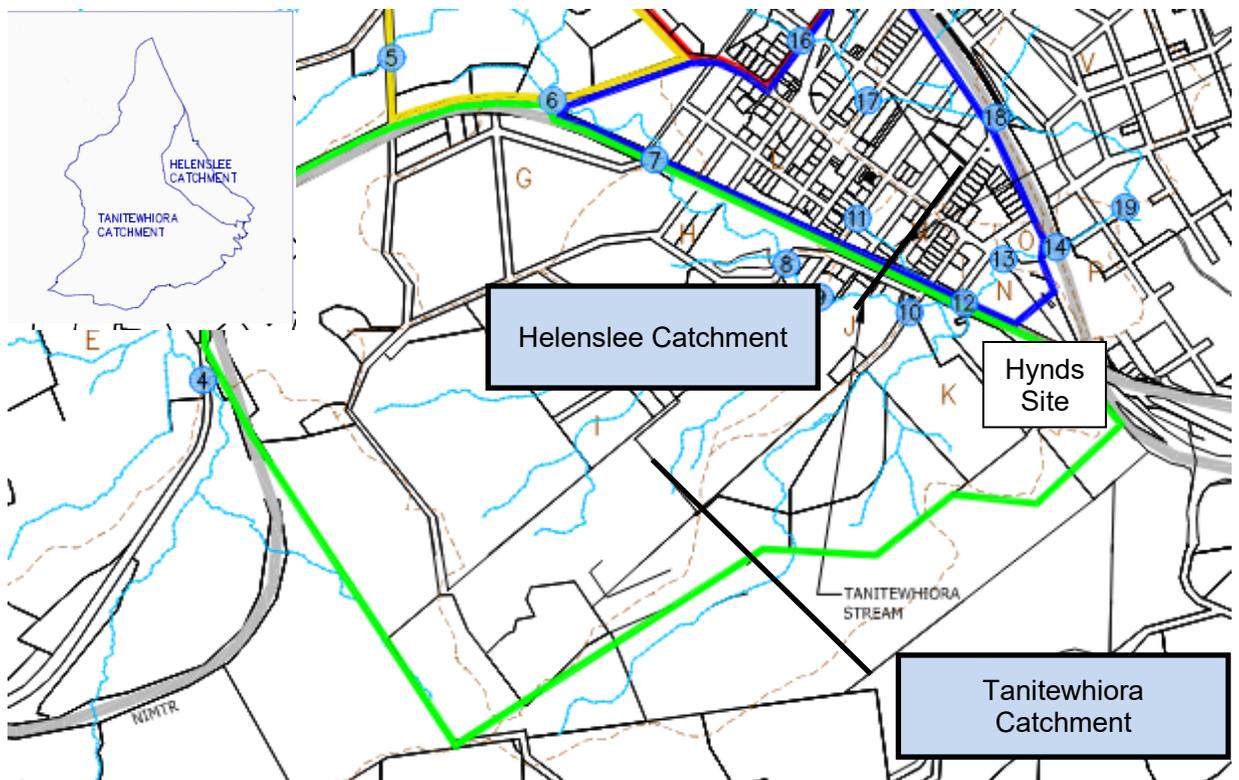


Figure 1 - Stormwater Catchments (Source: SCMP – PC24)

Water Quantity

- 3.5** As part of the SCMP a hydrological model was developed using HEC-HMS¹ for storm durations ranging from 10 minutes to 24 hours and for rainfall intensities between 50% and 1% AEP including allowances for climate change in the 1% AEP event.
- 3.6** HEC-RAS² modelling was undertaken to assess streams' ability to convey the 1% AEP flows.
- 3.7** A number of stormwater management outcomes were identified by the SCMP in section 8.1. I have noted the outcomes relevant to my evidence below which include:
- (a) Maintain Peak Flows/Levels Post development to less than or equal to predevelopment;
 - (b) Existing Crossing upgraded to meet current service criteria, acknowledging some historical structures will not be appropriately sized to meet current urban engineering design standards;
 - (c) Modifications of floodplain allowed where impact (flood level) can be managed;
 - (d) Potential climate change effects managed by freeboard allowance; and
 - (e) Stormwater Management devices offline (not to be located within existing waterways or wetland features), except where existing features can be enhanced.
- 3.8** The modelling results indicated that stormwater attenuation of post development flows, including those in events up to the 1 in 100-year with climate change, was not required unless it was deemed that existing flood levels were unacceptable.

¹ HEC-HMS is a hydrologic modelling software designed to simulate the hydrologic process and watershed from land.

² HEC-RAS similar to HEC-HMS is hydrologic modelling software designed to simulate river performance and analysis.

3.9 However, the following relevant infrastructure upgrade works were identified as required and are listed and illustrated below:

- (a) Replace the McDonald Road bridge;
- (b) Widen the waterway under the Great South Road Bridge to remove the constriction to flow; and
- (c) Upgrade the Tanitewhiora Stream transition entry and exit to the State Highway 1 (SH1) culvert.

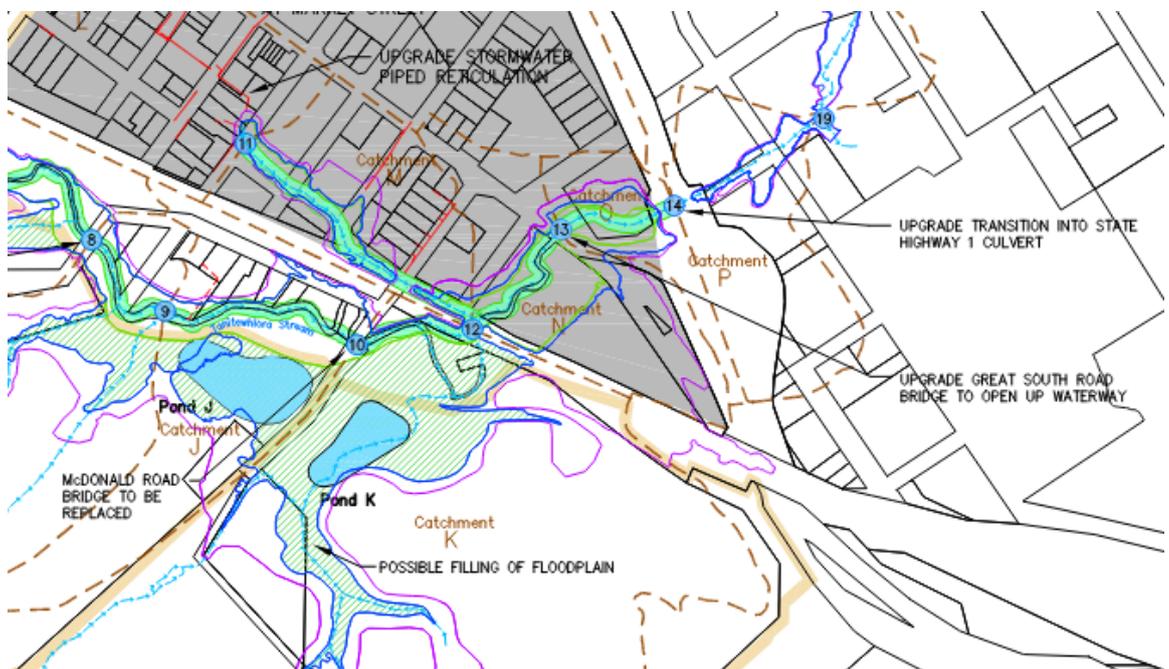


Figure 2 – Proposed infrastructure upgrades (Source: extracted from SCMP drawing 121412-SW-103)

Water Quality

3.10 The Hynds Factory Site at 9 McDonald Road resides within Catchment K of the Pokeno structure plan proposed under PC24. As part of the SCMP it was proposed that all water quality requirements within Catchment K be met by Wetland K (see Figure 2).

GATEWAY INDUSTRIAL PARK DEVELOPMENT - STORMWATER

3.11 Included in the original consented works for the Gateway Industrial Park development were several infrastructure assets that were to be constructed by developers and then vested into Waikato District Council (**WDC**) ownership. I understand that on adoption of PC24 key infrastructure assets were incorporated into the WDC's capital works schedules and formed part of their development contributions income and budgeting for the WDC's Long-Term Plans. This is evidenced by entries in the WDC 2008 Capital Works Schedule.

3.12 In addition to the assets identified in paragraph 3.9 above, this included:

- (a) Pond K for stormwater treatment and retention; and
- (b) Pipeline A to allow for the filling and development of the south side of McDonald Road (previously Winstone Land) within the Industrial Park.

3.13 Fletcher, Stuart PC (Hynds) and Dines Fulton Hogan (**DFH**) reached agreement with WDC that DFH would develop the road realignment of McDonald Road and the Tanitewhiora Stream Bridge Crossing (the McDonald Road Bridge referred to at paragraph 3.9 above). As part of the road realignment DFH constructed a 1 in 10-year rainfall stormwater pipeline adjacent to McDonald Road. While the pipeline to service the road has been completed, it was originally proposed with a water quality treatment device at the end of the street and this work is still outstanding.

Wetland K

3.14 The subsequent sale and purchase of Fletcher's land to Stonehill Trustees, led to changes in the stormwater management approach, with Stonehill to provide their own stormwater treatment (instead of relying on Wetland K). Stonehill would still require connection access to the stream across Hynds' land to outlet stormwater flows via Pipeline A.

3.15 An amended consent was obtained by Hynds from the Waikato Regional Council (**WRC**) for the revision to the stormwater treatment arrangement. A condition of this consent was that Wetland K would be retained in private ownership, on the proviso that works downstream (items (b) and (c) referred to in paragraph 3.9

above) were completed to ensure the wetland could operate as intended and was not inundated by floodwaters (see paragraph 3.29 – 3.32 below).

3.16 The Stonehill land was subsequently sold to Synlait.

Stormwater Pipeline A

3.17 At the time Hynds commenced development of its land to include a new access road from McDonald Road, no collective stormwater solution had been constructed for the upstream catchment. Hynds therefore looked to design the missing stormwater solution.

3.18 Work on the four pipelines (collectively referred to as Pipeline A) was commenced by Hynds in good faith given its identification as an LTP capital work, which was consistent with other development activity in Pokeno. The pipeline was required not only to convey the 1 in 10-year flow but also 1 in 100-year storm events, due to land modification on the Synlait site and the construction of McDonald Road creating a low point east of the roundabout and intersection with Gateway Park Drive.

3.19 Engineering Approval was granted for the pipeline in October 2017 subject to acceptance by the WDC three waters Manager.

3.20 When it became apparent that neither Synlait nor WDC were willing to reimburse costs for the pipeline, Hynds ceased work on Pipeline A. Discussions to establish a Developer's Agreement with WDC are ongoing.

3.21 The pipeline to convey the 1 in 100-year storm through the existing industrial development (Pipeline A) is therefore incomplete and remains in private ownership. This pipe requires vesting and extension/connection to service both the Synlait development and any form of proposed development located upstream of the Synlait Factory (HVL land).

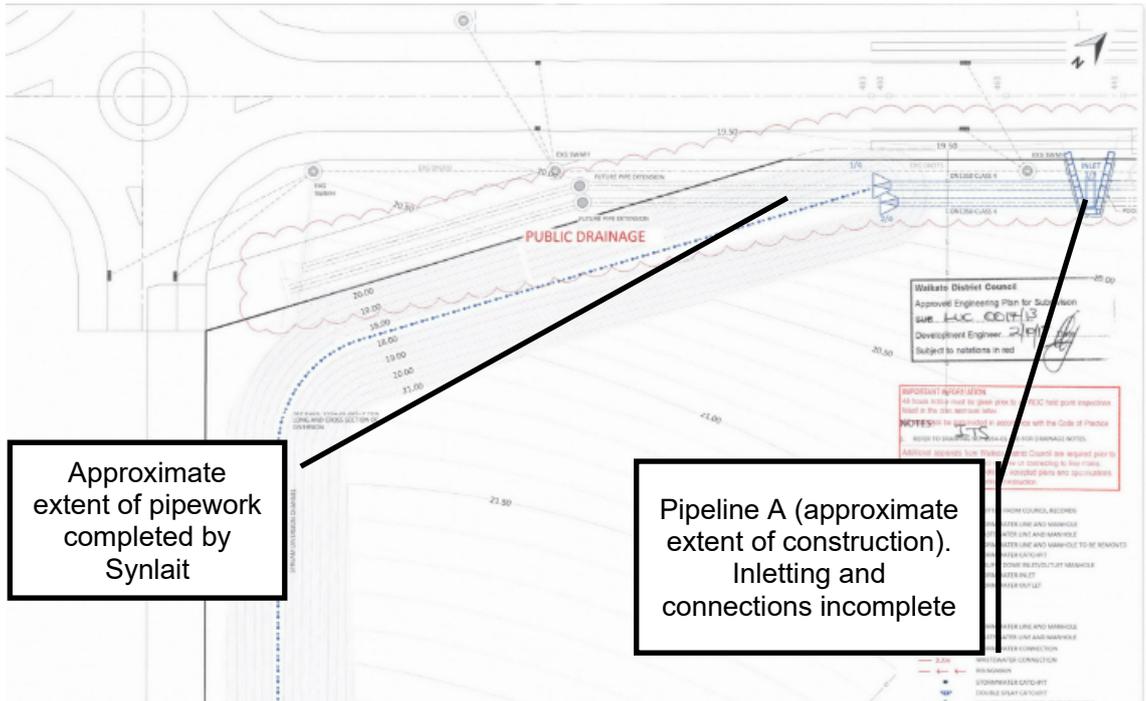


Figure 3 – Extent of Pipeline A

3.22 The following catchment plan (Figure 3) illustrates the proposed catchment the pipe was to service. A copy of this plan is also provided in Appendix 1 of my evidence.

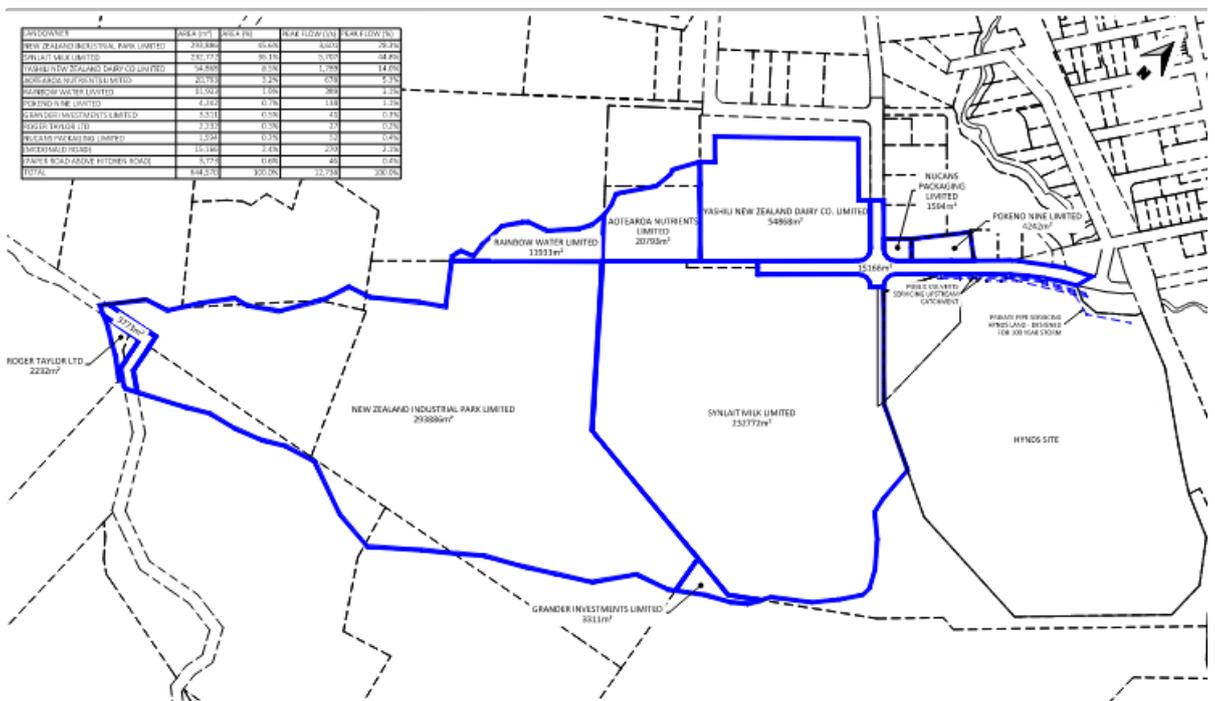


Figure 4 – Pipeline A Catchments (Source: Plan prepared by Civilplan on behalf of Hynds)

- 3.23** The sizing of Pipeline A assumed catchments remained in their current state as allowed for under the Operative District Plan and that any additional attenuation requirements resulting from each development were met onsite.
- 3.24** I note flow from the land shown in figure 3 as owned by New Zealand Industrial Park Limited (that is now owned by HVL to the west of Synlait), although identified as a contributing catchment in the sizing of Pipeline A, has no direct connection to the pipeline as part of the partially constructed or approved Pipeline A design.
- 3.25** However, completion of part of a stormwater conveyance path is evident onsite and is assumed to have been recently completed by Synlait.
- 3.26** I am unaware of the current status or ownership of the works completed by Synlait, but consider either public ownership or easements will be required in order to provide for the overland flow path corridor. No record of easements or public connectivity to the HVL land is currently evident on review of LINZ records. In my opinion further consideration is required regarding to the continued safe conveyance of flows through the Synlait site to McDonald Road and Pipeline A.
- 3.27** In the absence of these pipe networks (Pipeline A) being completed, flow currently discharges to a unconsented ditch on Hynds' land but also overflows back into McDonald Road. The ditch on Hynds' land is to be imminently filled in (pursuant to an earthworks consent) to allow for Hynds' continuing development.
- 3.28** I provide the following photographic evidence of what has currently been constructed onsite in terms of flow conveyance from HVL's land towards Pipeline A. I took these photos during a site visit on 12 March 2021.



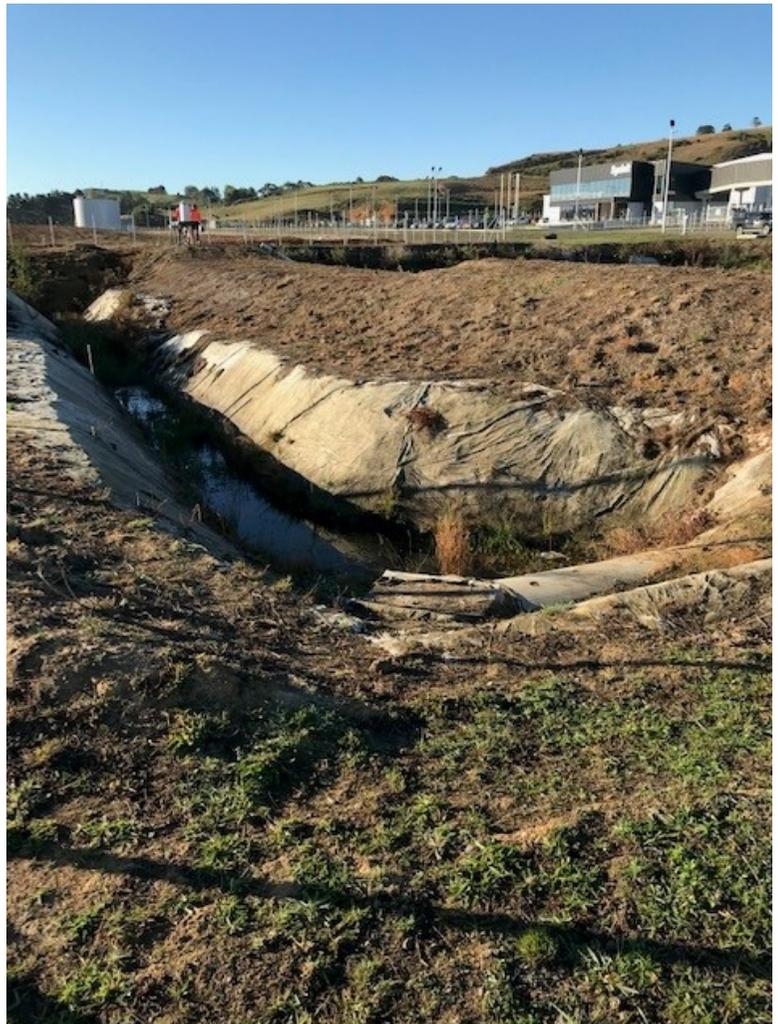
Ditch along Synlait western boundary to headwall



Outlet from pipe on western boundary to ditch in Synlait land along McDonald Road



Inlet under entrance to the Synlait site (end of ditch along McDonald Road west of roundabout)



Temporary outlet from Synlait/HVL rural land which fills ditch and then floods Hynds Land

SUMMARY OF CURRENT STORMWATER STATUS

- 3.29** Wetland K is in operation but remains a private asset (designed and approved to public standard) servicing the Hynds Factory Site (9 McDonald Road). In good faith this has been retained as a private asset on the understanding that the downstream flow constrictions will be removed by WDC as required under the 2008 SCMP.
- 3.30** The work to remove flow constrictions at Great South Road and upgrades to the transition to the SH1 culvert as proposed by the 2008 SCMP have not commenced.
- 3.31** Access to the Hynds Factory Site has been impacted by flood waters twice since its establishment 7 years ago.
- 3.32** Pipeline A remains in private ownership and is incomplete, even though it is work which was required by PC24. Therefore no 1 in 100-year conveyance path is currently provided for the HVL\Synlait land without the completion of this work.

4. PROPOSED ZONE CHANGES

- 4.1** As part of the WDC District Plan review, several submitters have requested changes to the notified rural zoning surrounding the Heavy Industrial zoned land (including the Hynds Factory Site). These submissions request that a residential zone be applied instead of the proposed rural zoning, with the exception of Clem and Alison Reeve who seek business zoning and Steve and Teresa Hopkins who seek village zoning.
- 4.2** Submissions of relevance to Hynds from a stormwater perspective are listed and illustrated below:
- (a) Submission 598.25 Withers Family Trust (Label 13);
 - (b) Submission 668.1 Clem & Alison Reeve (Label 14);
 - (c) Submission 524.35 Anna Noakes (Label 9);
 - (d) Submission 250.1 Rainbow Water Limited (Label 4);
 - (e) Submission 451.1 Steven & Teresa Hopkins (Label 6); and
 - (f) Submission 862.1 Havelock Village Limited (Label 16).

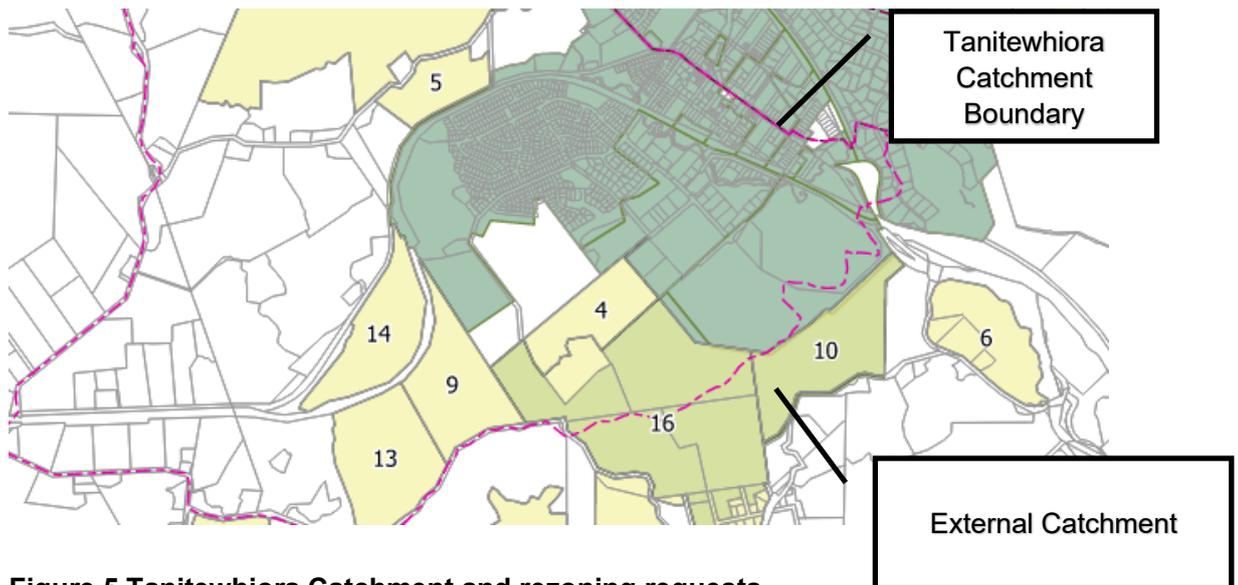


Figure 5 Tanitewhiora Catchment and rezoning requests

- 4.3** While the land under labels 9, 13 and 14 resides within the wider Tanitewhiora catchment, flows from these areas contribute to a different sub-catchment to that of the Hynds Factory Site, with flows naturally conveyed in a northeasterly direction. Ultimately flows then discharge to Tanitewhiora stream.
- 4.4** Flows from label 4 (Rainbow Water Limited) and part of label 16 (HVL) are directly upstream of the Hynds Factory Site and therefore not only contribute to the Tanitewhiora catchment but require conveyance of flows through the existing industrial development area of the original structure plan.

External Catchment

- 4.5** Part of labels 16 (HVL), 10 (62 Bluff Road, which is also owned by Hynds) and part of label 6 (owned by the Hopkins') discharge to the stormwater catchment directly south of the Tanitewhiora catchment.
- 4.6** Records indicate that this catchment which is located in the gully between the Hynds site and Pioneer Road, is serviced by two pipe culverts (1050dia and 300dia culverts illustrated in Figure 6 below). However, site investigations have only been able to locate a single 1200dia. culvert.

Steven & Teresa Hopkins (Label 6)

- 4.7** Steven and Teresa Hopkins are seeking Village zoning for their land (label 6). The submitter's land is outside the Tanitewhiora catchment boundary but predominantly falls to a localised gully which is then piped beneath the State

Highway 1 corridor. NZTA records show a 525dia. pipe services this catchment (see figure 7 below). A further 450dia. culvert east of the main gully, services the eastern extent of the land. A small northerly portion of the site (2ha) falls towards Pioneer Road and Bluff Road and will ultimately discharge to the 1200dia. culvert that conveys flows from 62 Bluff Road.

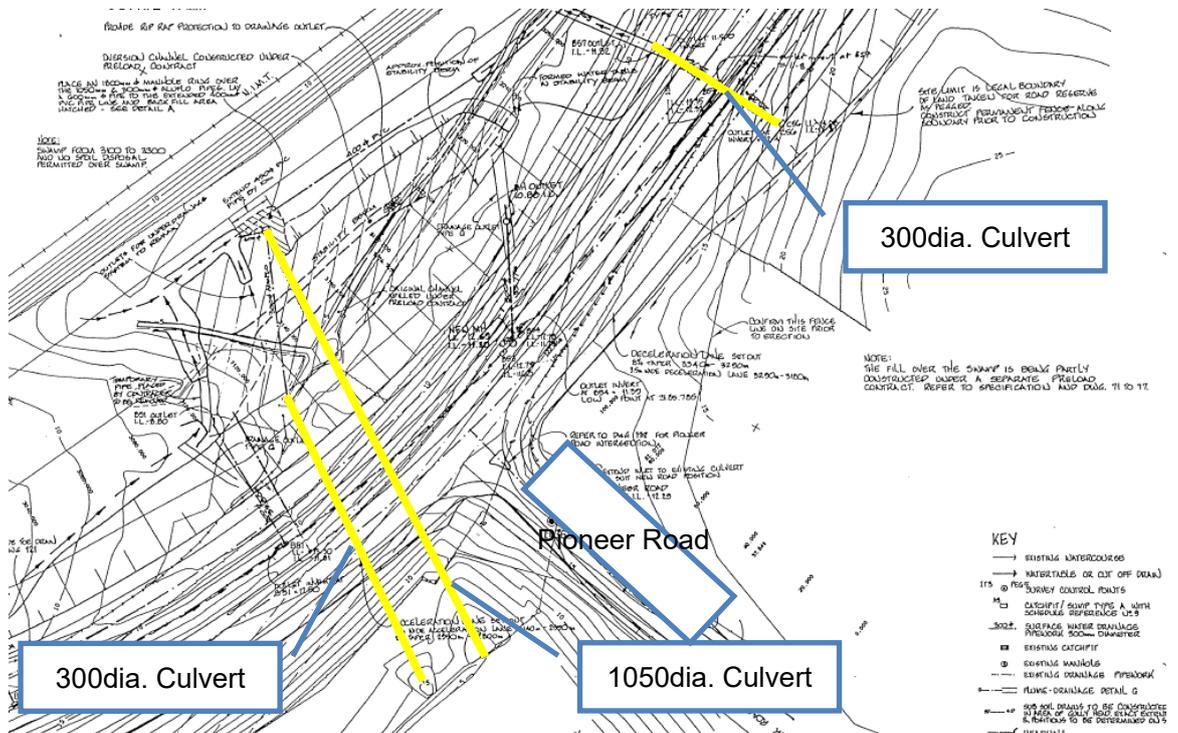


Figure 6 - Pioneer Road – External Catchment SH1 Stormwater Culverts (62 Bluff Road). Source: Waka Kotahi As built records.

- 4.13** The original structure plan required the development of a SCMP. I consider the SCMP should be updated to reflect the proposed rezoning and that this should be completed prior to rezoning occurring. This should include all catchments associated with proposed rezoning.
- 4.14** While it is common to provide this assessment as part of a particular resource consent, in this instance I consider it would be more appropriate to address the stormwater management mitigation requirements prior to rezoning given the specific risks (significant downstream development and absence of secondary flow path connectivity) and scale of the proposed rezoning area.
- 4.15** I elaborate on my reasons for recommending this approach further below but consider this is the key point of difference in terms of the approach I would support as opposed to that suggested by the evidence of Mr Pitkethley on behalf of HVL.
- 4.16** As required by WDC's Regional Infrastructure Technical Specifications (**RITS**) stormwater discharge from any catchment greater than 8ha in area should be determined using an acceptable hydrological or hydraulic model in accordance with WRC's stormwater runoff guidelines. While hydrological modelling is not my specific area of expertise, from experience I would expect this should consider:
- (a) Maximum Probable Development scenarios based on the proposed zoning (impervious area land use to reflect district plan); and
 - (b) Climate change effects for both the primary (generally 1 in 10-year) and secondary storm events up to and including the 1 in 100-year event as required by the RITS.
- 4.17** In my opinion this is the only effective way to consider stormwater flows in all events up to the 1 in 100-year storm event (including climate change) and to assess and apply mitigation appropriately so to avoid the highlighted timing issues.

4.18 This would also allow the WDC to assess what triggers might be necessary to correlate identified infrastructure upgrades and improvements to the level of development occurring within the catchment.

5. HVL REZONING PROPOSAL

5.1 In addition to the general stormwater considerations discussed above, this section of my evidence makes some additional observations in relation to HVL's proposed rezoning, particularly focusing on those aspects which may impact Hynds' sites (both the Hynds Factory Site and 62 Bluff Road).

5.2 As part of the rezoning proposal included in HVL's submission, they have provided a masterplan layout (Construkt) and Three Waters Infrastructure report prepared by Civilplan Consultants.

5.3 I note the masterplan submitted in evidence by HVL (attached to Karl Ye's evidence) differs from that submitted originally and it is this masterplan which is referenced by Mr Pitkethley's evidence. The proposed rezoning now allows for a mix of residential and rural zoning resulting in a reduction in the proposed housing yield from 1000 units to an estimate of 600 units. While this is a significant reduction in the yield and consequential impervious area that is created, the stormwater issues I have identified are equally relevant to both the proposal shown in the original submission and revised masterplan provided in evidence.

5.4 The areas I will elaborate further on are:

a) Underlying soil types; and

b) Attenuation of Flows

5.5 I include some additional comments on Mr Pitkethley's evidence for HVL later in my evidence.

Soil Type

5.6 The soil classifications utilised by Civilplan are for Type C soils which utilise soil Curve Numbers of 70 to 74. Civilplan have stated the curve numbers have been used based on previous experience with similar soils in the area and that this

will be confirmed by geotechnical investigations. Materials specified by the underlying geology maps prepared by Harrison Grierson for the original structure plan (which are also referenced by the Lander Geotechnical report prepared on behalf of HVL) suggest much of the proposed site area is underlain by either Ash, Lapilli and Lithic Tuff or Basalt Rock as part of the South Auckland Volcanic Field.

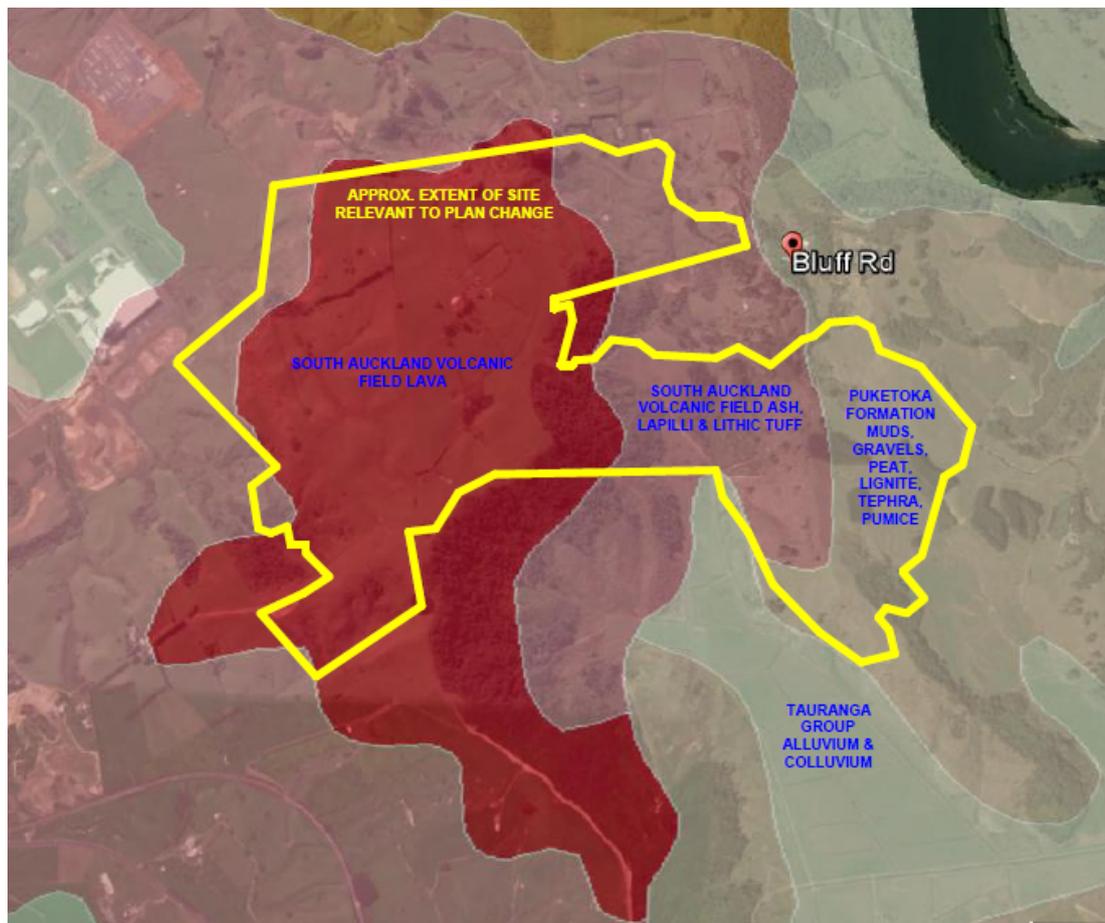


Figure 8: HVL Geology – Source Lander Geotechnical Report, 3rd October 2018

- 5.7** For these soil types you might typically expect a curve number of 50-60. In relevant terms using the Civilplan specified predevelopment runoff volume for the 10-year predevelopment event (109.7mm), the difference in runoff volume between one hectare of land (time of concentration of 10min) with a curve number of 50 to 74 is 30.6mm to 56.5mm. The runoff from an impervious one-hectare catchment (curve number 98) is 119.2mm. This is significant as this effectively increases the runoff volume difference between the pre- and post-development catchments by approximately 40%.

5.8 While it is likely that a curve number of 50 is perhaps overly conservative given the presence of overlying surficial soil layers, there is still a risk that the attenuation volumes calculated by Civilplan are understated and could therefore require much more significant storage volumes than currently identified. Civilplan suggests site testing will be conducted to confirm the assigned curve numbers, however, given the implications of significantly increasing what are already significant storage requirements (storing up to the 1 in 100-year event), in my opinion this information needs to be obtained now to test the feasibility of the proposed scale of development. This should be done before any change in zoning can be considered.

Attenuation of Flows

5.9 The report prepared by Civilplan has adopted an approach to keep all stormwater discharge to predevelopment levels in all storm events up to the 1 in 100-year storm including an allowance for climate change.

5.10 No identification of existing 1 in 100-year flow paths or their ability to cater for existing flooding has been provided. In my opinion this level of assessment should be provided to not only confirm the adequacy and position of flow paths, but also to ensure there are no existing flooding constraints that might be exacerbated as a result of the development.

5.11 Civilplan have outlined how stormwater retention and detention requirements will be met but also flood attenuation. It is the flood attenuation volumes which I wish to focus on. Civilplan have provided two options to meet the site attenuation requirements:

(a) Providing offline storage through numerous tank systems and/or increased storage within raingardens; and

(b) Providing online storage within the existing stream flood plains

5.12 I note Mr Pitkethley's evidence suggests the offline storage option is the option now being pursued, all be it a mixture of onsite and communal devices (ponding areas).

Offline Storage

- 5.13** From the Civilplan report providing offline storage equates to providing 12m³ of storage for every 450m² lot. This equates to a 12000L tank on each site. If buried, network configurations to allow for gravitational discharge will need to be considered or pumps provided.
- 5.14** In addition to the onlot storage, for the catchments that are upslope of the Hynds Factory Site (Catchments 1 and 2) a further 25 tanks with a combined storage volume of 3,755m³ are proposed to meet the road attenuation requirements.
- 5.15** While technically feasible this does raise several concerns, namely:
- (a) Providing sufficient inletting capacity to ensure the surface water actually enters the attenuation devices. Given the existing gradients of the site in my opinion this will be a significant challenge (i.e., water bypassing inlet structures);
 - (b) The location/size of the tanks. Given the size and scale of the tanks, ongoing access and the space to accommodate the tanks in what are generally congested road corridors in my opinion could be problematic. Tanks up to 435m³, with several between 100m³ and 200m³ are proposed;
 - (c) Access to the Tanks. Given the size and scale of the proposed tank systems, access to maintain tanks needs further consideration;
 - (d) Maintenance. Maintenance of systems to ensure satisfactory controls of flow is achieved; and
 - (e) Lack of an emergency or back-up system should the tank system become blocked.
- 5.16** In my opinion these issues need to be resolved now, before any rezoning is approved.

Online Storage

5.17 The second option identified in the Civilplan report (although Mr Pitkethley's evidence suggests this is no longer being pursued) suggests that storage could be provided through a series of terraced basins. For comparison with the above offline storage option, the option suggests the same two catchments (Catchments 1 & 2) would require the formation of 15 basins. To form the basin and required storage area a bund is proposed across the existing stream alignment. The bunds do vary in height, but a review of the provided plans suggests the following:

BUND/DAM HEIGHT	NUMBER OF BUNDS/DAMS
<4m	8
>4m	7

5.18 The level difference across the water bodies on the stream within catchment 1 is 15m, while catchment 2 is in the order of 40m.

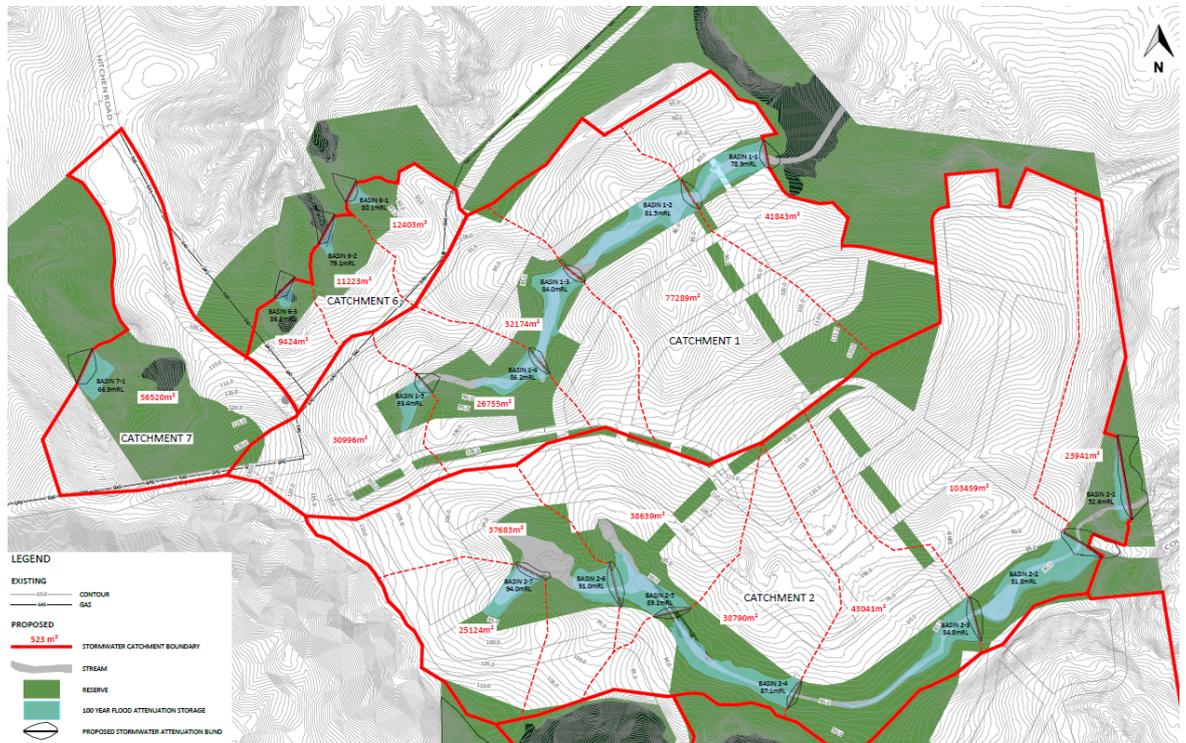


Figure 9: Stormwater devices proposed by HVL (Civilplan Report)

- 5.19** I note that these plans related to the previous version of HVL's masterplan. No updated plans have been provided to indicate how this option could work in the revised masterplan.
- 5.20** While not my specific area of expertise, I consider specialist inputs are required to determine suitable design criteria and safety mitigation to classify the impact on the downstream impact should the bund/dams fail. I believe recent work by the Ministry of Business Innovation and Employment (**MBIE**) has been done in this regard and needs to be considered, including a Potential Impact Classification (**PIC**) of the dams considered.
- 5.21** While potentially a more practical option from a stormwater perspective, the bunding and more regular inundation of the flood plain area will have other effects in terms of stormwater management of the flood plain area and bund/dam maintenance.
- 5.22** Access to the basins and inspections of the dams would need to occur on a semi-regular basis to ensure the low flow controls are operational along with emergency spillways.
- 5.23** Accounting for flows should the emergency spillway be required, in my opinion, would also need detailed consideration as there is no flow path which can currently accommodate these flows should the capacity of the system be overcome. As outlined previously there is no direct public road or linkage to the downstream 100-year pipeline (Pipeline A) or McDonald Road to allow for the discharge of overland flows without crossing private property (the Synlait block).
- 5.24** While Civilplan suggest the online option would reduce both maintenance and construction costs, the size and scale of the basins and damming requirements in my opinion would attract different but not insignificant operational, maintenance and construction costs.
- 5.25** I note Civilplan also state both WDC and iwi have expressed a preference for only offline devices to be utilised. This view would also align with section 8.1 of the underlying existing SCMP and the subsequent provisions of section 4.81 of PC24.

- 5.26** Given the scale of the bunds and ponding proposed, the developed nature of the immediate downstream catchment and lack of a suitably sized flow path to convey emergency flows should the proposed system fail, in my opinion a much more detailed analysis of the proposed Stormwater Management System is required to support the rezoning proposal.
- 5.27** While Mr Pitkethley's evidence suggests (by omission) this option is no longer being pursued, some of the risks associated with bunding/damming and containment of water on what is difficult (steep) topography in my opinion are still relevant for the revised approach discussed in evidence. While these are common stormwater management approaches, the storage of 1 in 100-year flows and absence of identified emergency/secondary flow paths is something that in my opinion needs further definition.

Flow Attenuation Summary

- 5.28** While both offline and online storage options are technically feasible, both options result in requirements to store significant volumes of surface runoff.
- 5.29** The required storage volume also has the potential to increase by up to 40% should the underlying soils be found to be more permeable than currently assumed.
- 5.30** The storage of the surface water volumes under either of the proposed options; the original option and in the updated option outlined by Mr Pitkethley's evidence all result in significant engineering challenges.
- 5.31** In my opinion these challenges do also bring into question the appropriateness of a residential zoning allowing the proposed density of development across the full site area. While this is potentially addressed in part through the lower residential yield now sought, further consideration is required to determine an appropriate stormwater management outcome in advance of any rezoning being approved in order to better understand and/or mitigate these challenges.

Flow to External Catchment (South Gully to Mangatawhiri Wetland)

- 5.32** As identified by Civilplan sketch 2020-06-SK01-1 approximately 31.07ha (catchment 2) of the proposed development discharges to the gully to the southeast of the Hynds Factory Site.

5.33 While as outlined previously, flows will be attenuated to predevelopment flows, my calculations suggest the downstream culvert beneath SH1 is undersized to convey the full 1 in 100-year event.

5.34 In my opinion consideration of the actual site constraints and inclusion of this catchment in a hydrological model would be appropriate measures to ensure the proposed mitigation achieves the desired outcomes in terms of peak flow and volume control of all design storms up to the 1 in 100-year event. This should be undertaken in advance of any rezoning requests by HVL or the Hopkins being approved so that the stormwater effects can be properly understood.

6. SUMMARY OF FINDINGS

6.1 I provide the following summary of findings based on a review of Hynds' sites and the land surrounding it, the previously approved SCMP and the proposed zone changes sought by submitters.

6.2 There are a number of existing stormwater site constraints previously identified by the SCMP. These need to be rectified prior to any rezoning taking place in order to mitigate existing flood risk impacts.

6.3 In my opinion any proposed development that increases impervious area should look to provide adequate stormwater mitigation in all storm events up to and including the 1 in 10-year event including allowances for climate change. Consideration of flows in events up to the 1 in 100-year event may need to be considered in cases where there is no viable secondary flow path to manage the quantum of flow or the release of such flows would have an adverse impact on the downstream catchment. This is particularly relevant to catchments discharging through the McDonald Road corridor in the Tanitewhiora catchment.

6.4 An assessment of both existing systems and flow paths should be provided to identify existing constraints, and then subsequently a revised assessment of the future scenario then be provided. In my opinion a new hydrological model or amendment of the existing model is the most practical and appropriate method by which to achieve this. This should be done before any rezoning of this scale can be considered.

- 6.5** The model(s) should provide for the full catchment area (and any additional catchments including the external catchment to the south gully and Mangatawhiri Wetland) to assess the effects of any development and ensure any stormwater mitigation measures are appropriate. This will allow potential development triggers to be provided and aligned with specific infrastructure upgrades to mitigate the potential adverse impacts of the development.
- 6.6** While some development options have been considered by HVL and mitigation to predevelopment flow levels has been shown to be technically feasible, based on the existing topography and volume of storage required the viability of development of the proposed density would in my opinion create several challenges, namely:
- (a) Adequacy and ability to cater for difference in pre-development flows should pre-development runoff be shown to be lower than assumed;
 - (b) Access, operation and maintenance of the system to ensure satisfactory control of flows is achieved;
 - (c) Sufficient inletting and redundancy to ensure flows are captured and stored; and
 - (d) Sufficient redundancy or provision of emergency spillage from the stormwater system to mitigate potential adverse impacts on the developed downstream catchment.
- 6.7** While I consider the overall approaches outlined for stormwater management are technically feasible and the assessment and provision for a Stormwater Management Plan (**SMP**) is appropriate, the timing of this work in my opinion should precede rezoning occurring, in order to adequately plan and ensure the adverse effects can be adequately mitigated.
- 6.8** In my opinion the SMP should then address, as a minimum, the management of both the primary and secondary storm events as well as provide an assessment of existing flow paths (including resolution of existing constraints) and mitigation of any potential impacts resulting from the development.

7. COMMENTS ON THE COUNCIL SECTION 42A REPORT

7.1 I have been provided with a copy of the section 42A Zone Extents Framework Report.

7.2 I note the following section of relevance at paragraph 100 of the Framework Report:

Waikato Regional Policy Statement implementation method 6.1.8 g):

(g) How stormwater will be managed having regard to a total catchment management approach and low impact design methods.

7.3 Paragraph 101 of the Framework Report notes that the implementation method 6.1.8 matters need to be addressed in evidence on submissions for rezoning proposals.

7.4 While some assessment has been provided in relation to stormwater catchment management, this to date has been achieved in isolation simply by stating flows will be maintained to predevelopment levels.

7.5 In my opinion, the assessment provided to date is inadequate to demonstrate compliance with the Waikato Regional Policy Statement and further work is required to determine whether catchment management through low impact design can be readily achieved.

7.6 I also note that leaving any stormwater assessment to the resource consent stage creates a risk in terms of ensuring a total catchment management approach is taken. This again would support a SMP being developed as part of the rezoning process to ensure the total catchment and rezoning area is considered, rather than be left to individual development consents.

8. COMMENTS ON EVIDENCE SUBMITTED ON BEHALF OF HVL

8.1 I have read and reviewed the evidence of Mr Pitkethley submitted on behalf of HVL.

8.2 As I have noted above, Mr Pitkethley's evidence references changes to the underlying masterplan and a revised yield of approximately 600 lots; as opposed to the 1000 lots proposed previously.

- 8.3** Mr Pitkethley's evidence highlights several stormwater management devices along the existing stream corridors but provides no detail of the sizing or how these devices will operate, simply noting this will be addressed as part of subsequent consents following the rezoning process.
- 8.4** I note the level of detail provided by Mr Pitkethley's statement is limited and much less so than that provided for under HVL's original submission. This makes it difficult to provide a meaningful assessment of the stormwater provisions considered under the revised rezoning proposal and in my opinion is insufficient given the scale of development.
- 8.5** While, as I have noted in paragraph 5.27, the revisions and lower yield will likely resolve some of the concerns I have raised in relation to the original submission, the lack of any further detail in evidence to confirm an acceptable approach suggests further assessment and the development of a hydrological model should be undertaken prior to the rezoning being approved.

9. CONCLUSION

- 9.1** In conclusion, I have reviewed the existing stormwater infrastructure as it relates to the catchments adjacent to and upstream of the existing Hynds Factory Site at 9 McDonald Road and Hynds' site at 62 Bluff Road.
- 9.2** I have also reviewed submissions and further evidence provided by relevant submitters, but in particular HVL and the evidence of Mr Pitkethley.
- 9.3** While I consider there are likely to be technically feasible solutions from a stormwater perspective, there are several matters that in my opinion should be addressed prior to the rezoning proposed by HVL and the Hopkins' proceeding. These items (with only (c) applicable to the Hopkins' proposed rezoning) are:
- (a) Completion of infrastructure works required under the previous plan change (PC24) to ensure the safe conveyance of stormwater flows and flood waters;

- (b) Completion of Pipeline A including vesting of these assets and construction of appropriate inletting structures for the conveyance of stormwater flows from both the Synlait and HVL landholdings;
 - (c) Calculation and analysis of the proposed stormwater management plan, including hydrological modelling to ensure the anticipated outcomes are achievable. This should include all storm events up to the 1 in 100-year storm event including allowance for climate change for all catchments impacted by the proposed rezoning; and
 - (d) Confirmation of a viable secondary flow path through the Synlait site to Pipeline A and McDonald Road.
- 10.** While it has been suggested by HVL that these matters can be addressed as part of a future resource consent application, in my opinion they need to be addressed as part of, or in advance of the rezoning process, due to:
- (a) the underlying identified flood risks and incomplete mitigation projects; and
 - (b) the proposed attenuation of significant stormwater volumes (up to 1 in 100-year storms and climate change) upslope of existing development and the absence of any detail pertaining to how the suggested stormwater outcomes will be achieved.

Campbell James McGregor

17 March 2021

Appendix 1

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- LEGEND:**
- CATCHMENT BOUNDARIES
 - CATCHMENT LABEL
 - MODELLING NODE LOCATION
 - WATERCOURSE
 - HELENSLEE BLOCK
 - SCHOOL BLOCK
 - HITCHEN BLOCK
 - POKENO TOWNSHIP AREA

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A	FINAL	DTP	SEPT 08
REV	AMENDMENT	BY	DATE

PROJECT:
POKENO CATCHMENT MANAGEMENT PLAN

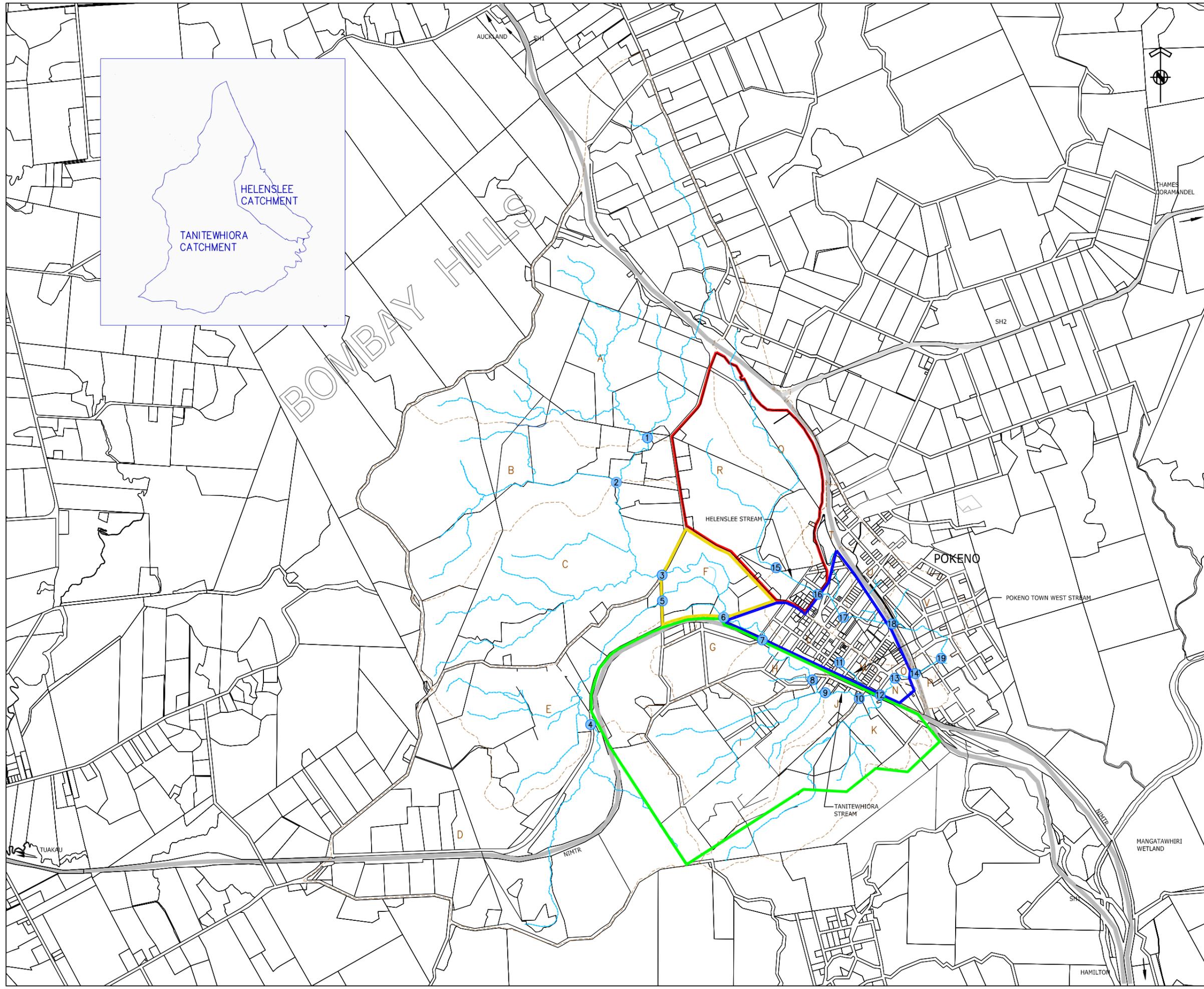
TITLE:
CATCHMENT PLAN

DESIGNED: DAR	DATE: April 07	SIGNATURE:	PLOT DATE: 10/12/08
DRAWN: PIE	DATE: 11/03/08	SIGNATURE:	CAD REF: 1150-121412-01
CHECKED: DAR	DATE: 12/03/08	SIGNATURE:	CAD XREF:
APPROVED: ATL	DATE: SEPT 08	SIGNATURE:	SURVEY BY:
			SURVEY DATE:
			SDR REF:

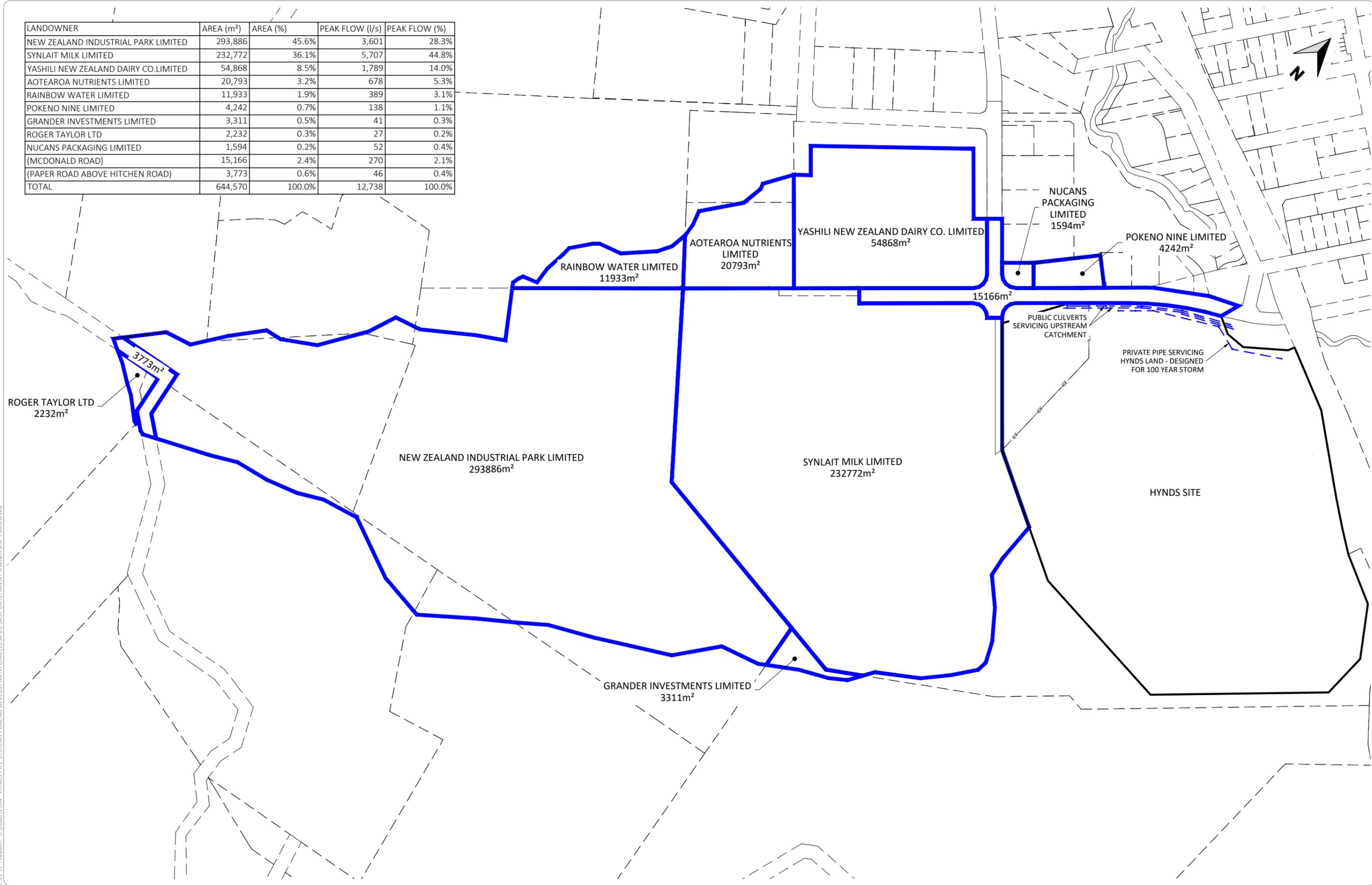
PLOT STATUS: **FINAL**

HS REF: 1150-121412-01	SCALES: 1:12500@A1 1:25000@A3	A1
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DRAWING No:
121412-SW100



LANDOWNER	AREA (m ²)	AREA (%)	PEAK FLOW (l/s)	PEAK FLOW (%)
NEW ZEALAND INDUSTRIAL PARK LIMITED	293,886	45.6%	3,601	28.3%
SYNLAIT MILK LIMITED	232,772	36.1%	5,707	44.8%
YASHILI NEW ZEALAND DAIRY CO. LIMITED	54,868	8.5%	1,789	14.0%
AOTEAROA NUTRIENTS LIMITED	20,793	3.2%	678	5.3%
RAINBOW WATER LIMITED	11,933	1.9%	389	3.1%
POKENO NINE LIMITED	4,242	0.7%	138	1.1%
GRANDER INVESTMENTS LIMITED	3,311	0.5%	41	0.3%
ROGER TAYLOR LTD	2,232	0.3%	27	0.2%
NUCANS PACKAGING LIMITED	1,594	0.2%	52	0.4%
(MCDONALD ROAD)	15,166	2.4%	270	2.1%
(PAPER ROAD ABOVE HITCHEN ROAD)	3,773	0.6%	46	0.4%
TOTAL	644,570	100.0%	12,738	100.0%



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REV	ISSUED FOR INFORMATION	BY	DATE
1	ISSUED FOR INFORMATION	AJH	26.07.2019
	REVISION DETAILS		

DRAWN:	DATE:
AJH	07.2019
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PROJECT TITLE:
**HYNDS PIPE SYSTEMS LIMITED
POKENO DEVELOPMENT
POKENO**

SHEET TITLE:
**CULVERTS 1 & 2
UPSTREAM CATCHMENT
LAND OWNERSHIP PLAN**

ISSUE STATUS: **FOR INFORMATION**

SCALE: (A1/A3) **1:2500 / 1:5000**

SCALE BAR 0 50 100 150 200 250m

DRAWING NUMBER: **1954-01-SK37-1** REV: **1**