

<b>COMPANY NAME</b>	Halberd Holdings Ltd
<b>ATTENTION</b>	Ian & Julie Humphrey
<b>SUBJECT</b>	Surface Water Supply Assessment for Fast Track Consenting

**1. INTRODUCTION**

Halberd Holdings Limited (HHL) has engaged Wallbridge Gilbert Aztec (WGA) to provide hydrological services to support the assessment of water availability for a residential and commercial development at Waimauku West. The proposed Waimauku West development is located approximately 31.5 km north-west of Auckland CBD at 1080 State Highway 16, Waimauku, and is to form a western extension to the existing Waimauku township.

An application has been lodged for acceptance of this project into a fast-track consents approval process. This application is seeking authorisation for the development of approximately 200 ha of rural land into an estimated 1500 to 2020 residential lots, a neighbourhood centre, light industrial areas, and associated infrastructure (Figures A1 and A2 attached in Appendix A). Following lodgement of the application, the applicant received a request for an assessment of water availability from the Kaipara River, which was one of the supply options identified in the application.

This memorandum provides a high-level summary of the potential availability of water from the Kaipara River for the proposed development. WGA understands this memorandum is to be used to support the application to have the development consented through the fast-track process. A substantive water supply and effects assessment report would need to be produced in the future to support the consent application.

**2. WATER REQUIREMENTS**

An initial assessment of water demand for Waimauku West has been undertaken by Bear Enterprises (Bear, 2025). The projected average daily water demands for the development are summarised in Table 1, with a peak daily flow calculated using a peak factor.

**Table 1: Projected Waimauku West Water Demand**

SUPPLY COMPONENT	WATER DEMAND	
	(m <sup>3</sup> /day) <sup>(1)</sup>	(L/s)
Residential	1,188	
Wet retail	42	
Dry industry	64	
Average daily demand	1,294	15.0
Peak daily demand		22.4
Peak hourly demand		56.0

**Note:** 1) Values rounded to nearest cubic metre.

Watercare has provided preliminary potable water servicing advice as part of the pre-application process. At present, Watercare's position is that there is no capacity to service Waimauku West within the public potable water supply network. Therefore, the site will need to be serviced by private infrastructure (Crang Civil, 2025).

Options available to service the required supply include groundwater and surface water sources:

1. Groundwater from the Kaipara Sand Aquifer
2. Surface water from the Kaipara River

The availability of groundwater to supply water for Waimauku West has been considered in a separate memorandum (CWM 2025).

### 3. AUCKLAND COUNCIL RULES AND POLICIES

Auckland Council policies applying to the taking of surface water from the Kaipara River are presented in Appendix 2. From the perspective of fast track consenting of the proposed abstraction for the Waimauku West development, the key matters are as follows.

Policy E2.3(6). Require proposals to take and use water from lakes, rivers, streams, springs or wetlands to demonstrate all of the following:

- a. The taking of surface water from any river or stream is within the guideline in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow and availability, except in accordance with Policy E2.3(11).
- b. Appropriate water levels and downstream flow regimes will be maintained, including:
  1. low flows in rivers and streams to protect in-stream values
  2. flow variability in rivers, streams and springs
  3. existing lawfully established taking of water is not adversely affected

Policy E2.3(10). Allow takes that exceed the guidelines in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow and availability . . . . . in the following circumstances:

- a. For guidelines in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow and availability, when the river or stream flow is greater than the median flow, provided the total take does not exceed 10 per cent of the flow in the river or stream at the time of abstraction, and natural flow variability is maintained;

A complete assessment of the proposed abstraction against the Auckland Unitary Plan policies and rules would be provided as part of the substantive report evaluating the effects of the proposed surface water take.

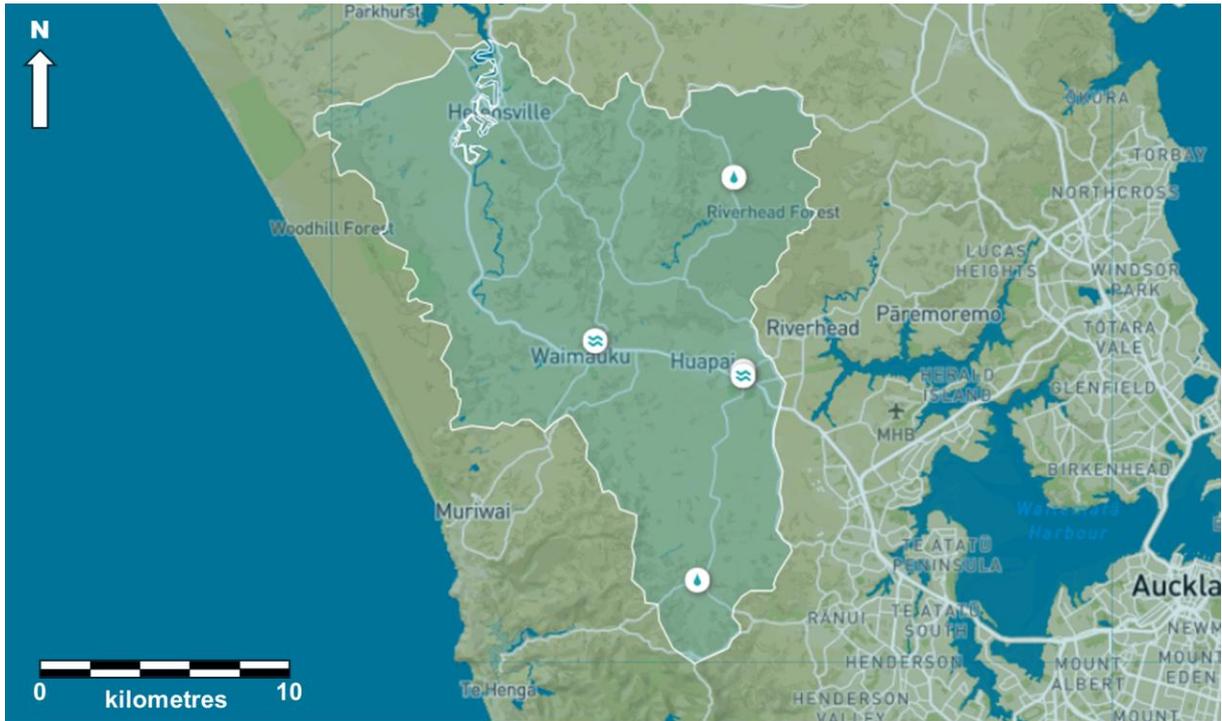
As referred to in the above policies, Table 1 River and stream minimum flow and availability indicates:

- The **minimum flow for the Kaipara River**, which is not a specifically defined waterway in the table, is 85% of the Mean Annual Low Flow (MALF).
- The **availability of water from the Kaipara River** is 30% of the MALF.

### 4. SURFACE WATER RESOURCE

#### 4.1 Water Resource Summary

The Kaipara River flows from east to west along the northern edge of the Auckland to Helensville railway line, which marks the northern edge of the proposed residential development area (Figures A1 and A2), before flowing to the northwest to discharge into the Kaipara Harbour. The Kaipara River catchment is defined by Auckland Council as the Kaipara Surface Water Zone (Figure 1).



**Figure 1: Kaipara Surface Water Zone (LAWA Website)**

Flow data for the Kaipara River at Waimauku is available for an Auckland Council monitoring station #45311<sup>1</sup>. The Kaipara River catchment upstream from this monitoring point is 155.40 km<sup>2</sup> in area (McKean et al 2007). A reasonably complete daily flow record for this monitoring station covering a period of approximately 47 years has been downloaded from the LAWA website to support this assessment (Table 2).

**Table 2: Kaipara River Daily Flow Record Summary for Waimauku #45311 Monitoring Station**

PARAMETER	VALUE
First record	7 October 1978
Latest record	20 September 2025
Record length	Approximately 47 years
Dataset interval	Daily
Total record count (excluding gaps)	16869
Data gaps <sup>(1)</sup>	282
Percentage data gaps	1.6 %

**Note:** 1) Values entered as 0 assumed to be a data gap.

<sup>1</sup> <https://www.lawa.org.nz/explore-data/auckland-region/water-quantity/surface-water-zones/kaipara-surface-water>

It is important to note that the Waimauku #45311 Monitoring Station is located approximately 2.8 km upstream from the point at which the river approaches the proposed wastewater treatment plant for the Waimauku West development. It has been assumed for this assessment that the wastewater treatment plant area would also be an appropriate point for a river off-take. A tributary stream catchment (Wharauoa Stream) of approximately 8.6 km<sup>2</sup> contributes to the Kaipara River flows between these two locations. Assuming the two catchments are hydraulically similar, the flows passing Waimauku West are likely to be approximately 6% greater than those passing the Waimauku #45311 Monitoring Station.

There is an additional significant catchment contributing to the Kaipara River between the Waimauku monitoring station and the river mouth on the Kaipara Harbour. This additional contributing catchment increases the annual average river discharge from approximately 96 Mm<sup>3</sup> at Waimauku to 160 Mm<sup>3</sup> at the river mouth (Table 3). Therefore, surface water takes downstream from Waimauku have access to greater flows in the river.

**Table 3: Kaipara River Daily Average Flow Statistics, Monitoring Station #45311**

FLOW PARAMETER	FLOW (m <sup>3</sup> /s)	FLOW (L/s)	VOLUMES (Mm <sup>3</sup> )
Minimum recorded flow	0.034	34	
7 day MALF	0.18 <sup>(1)</sup>	180	
Median flow	1.26	1,260	
Mean flow	3.1	3,100	
Mean annual flood flow	83.8 <sup>(1)</sup>	83,800	
Highest recorded flow	292.31	292,310	
Average annual discharge			96.3
Average annual discharge at Kaipara River mouth			160 <sup>(1)</sup>

**Note:** 1) Sourced from LAWA website<sup>1</sup>.

The 7 Day MALF for the Kaipara River at the Waimauku #45311 Monitoring Station provided by the LAWA website is 0.18 m<sup>3</sup>/s, with the minimum recorded flow being 0.034 m<sup>3</sup>/s (Table 3). Based on Table 1 River and stream minimum flow and availability from the AUP (Section 3):

- The minimum flow for the Kaipara River is 85% of the Mean Annual Low Flow (MALF), which equates to **0.153 m<sup>3</sup>/s (153 L/s)** at the Waimauku monitoring station.
- The availability of water from the Kaipara River is 30% of the MALF, which equates to **0.054 m<sup>3</sup>/s (54 L/s)** at the Waimauku monitoring station.

Daily flows recorded at the Waimauku #45311 Monitoring Station from 1978 to 2025 are presented in Figure C2, Appendix C to this memorandum.

Kaipara River flows at Waimauku are strongly seasonal. Analysis of the full dataset indicates the median daily average flows in the Kaipara River at Waimauku are above 3 m<sup>3</sup>/s for the period June to September (Figure C3). Conversely, median daily flows for the months from November to April are below 1 m<sup>3</sup>/s.

Minimum daily average flows in the Kaipara River at Waimauku have been above the defined minimum flow rate in the AUP (85% of the MALF) in every month from June to November (Figure C4). Furthermore, the median daily flow rates from May to November are similar to or above a rate four times the defined minimum flow rate, or 0.612 m<sup>3</sup>/s (Figure C4). However, the median daily flow rates from January to March are similar to or less than twice the defined minimum flow rate for the river at Waimauku. These observations become important when considering surface water availability (Section ).

The daily flow exceedance curve for the Waimauku #45311 Monitoring Station incorporating all data from 1978 to 2025 is presented in Figure C6. A comparison with the flow duration curve for the same monitoring station (data from 1978 to 1999) presented in Figure 6-1 of the Auckland Council (2001) Kaipara River allocation strategy report (Figure C7, Appendix C) indicates the two curves are almost identical. This preliminary assessment suggests any increase in upstream surface water takes since 1999 has not significantly affected flows in the river.

The exceedance curve (Figure C6) indicates the flow in the river exceeds the defined minimum flow rate (0.153 m<sup>3</sup>/s) approximately 93% of the time. When the exceedance curves are considered on a monthly basis, flows during June to November exceed twice the defined minimum flow rate for the river at Waimauku about 95% of the time (Figure C8). This observation will be considered further in Section 4.3 of this memorandum.

Overall, before current allocations have been taken into account, the historical minimum flows in the Kaipara River could comfortably accommodate an additional peak hourly water take of 0.056 m<sup>3</sup>/s for the months July to October (Figure C6). Outside these months, the abstraction rate may need to be managed to comply with policy E2.3(6)a of the AUP (Section 3).

## 4.2 Allocated Water

Consented surface water takes from the Kaipara Surface Water Zone, as provided by the LAWA website, are listed in Appendix D.

### 4.2.1 Upstream Takes

Sixteen existing consented takes are located on the Kaipara River upstream from the Waimauku #45311 Monitoring Station, or on upstream tributaries of the river (Appendix D). Of these, all but one are takes for irrigation purposes. Surface water volumes allocated under these existing consents total 233,775 m<sup>3</sup>/year. The LAWA website indicates only five of these consents have maximum instantaneous flow rates defined for the consent, totalling 0.0253 m<sup>3</sup>/s. A detailed check on the conditions attached to each consent has not been undertaken as part of this assessment to verify the information accessed through the LAWA website.

A preliminary estimate for instantaneous abstraction rates has been derived from the allocated volumes (Table 4) based on the assumptions that:

1. The allocated volumes would be used within a three month summer irrigation period, totalling 90 irrigation days. For simplicity this also applies to the one take consented for industrial use.
2. All water use takes place during the same 8 hour period daily.
3. If the existing take has a maximum consented flow rate, this rate is applied.

**Table 4: Summary of Consented Surface Water Takes Upstream from Waimauku**

PARAMETER	UNITS	VALUES
Total annual allocation	m <sup>3</sup>	233,775
Total daily allocation	m <sup>3</sup> /day <sup>(1)</sup>	2,598
Peak estimated abstraction rate	L/s <sup>(2)</sup>	80.3
	m <sup>3</sup> /s	0.08

**Notes:** 1) Assumes all allocations are used within a 90 day summer period.  
2) Assumes all water is used within the same 8 hour period daily unless there is a consented maximum rate of take, in which case the consented rate has been used in calculating the peak abstraction rate.

The estimated peak abstraction rate of approximately 0.08 m<sup>3</sup>/s under existing consents exceeds the availability of water from the Kaipara River under the AUP (0.054 m<sup>3</sup>/s, Section 3). This is consistent with the Kaipara River upstream from Waimauku (also called the Kumeu River) being considered as a high-use management stream by AC (McKean et al 2007). However, it should be noted that conditions attached to the existing consents may include restrictions to the rate of take under a range of circumstances. As the consent documents have not been reviewed as part of this assessment, the peak abstraction rate provided above may be an over-estimate.

#### 4.2.2 Downstream Takes

Seven existing consented takes are located on the Kaipara River downstream from the Waimauku #45311 Monitoring Station, or on downstream tributaries of the river (Appendix D). Of these, the two main takes are for the municipal supply for Helensville, totalling 655,000 m<sup>3</sup> annually. The remaining five takes are all for irrigation purposes and total 177,400 m<sup>3</sup>/year.

The two takes for the Helensville municipal water supply are on tributaries to the Kaipara River and would not be physically affected by the proposed water take. Furthermore, these municipal takes appear to be from streams that discharge to a tidally influenced section of the Kaipara River, meaning the proposed take would have minimal influence on water levels and flows in the river at that point.

A further assessment of the potential effects of the proposed take on existing consented take downstream from Waimauku has not been undertaken for the purposes of this memorandum. Bearing in mind the allocation status for the Kaipara River upstream from Waimauku, if a consent is granted for a new water take the conditions applied to manage impacts on river flows at Waimauku are likely to equally protect the allocated volumes under existing downstream consented takes.

#### 4.3 Available Water

Based on the information provided in Sections 4.1 and 4.2, water from the Kaipara River should be available for allocation and could provide a reliable source for supply to Waimauku West through the winter months of **June to November**. The minimum recorded daily average flows passing the Waimauku monitoring station during these months have not dropped below the minimum flow rate, as defined by AC at 0.153 m<sup>3</sup>/s (153 L/s), since record keeping began in 1978 (Figure C4). It may be assumed that all of the consented surface water takes were fully active during dry years, and their effects are automatically incorporated in this flow dataset.

#### An additional peak water take of 0.056 L/s (Table 1: Projected Waimauku West Water Demand)

SUPPLY COMPONENT	WATER DEMAND	
	(m <sup>3</sup> /day) <sup>(1)</sup>	(L/s)
Residential	1,188	
Wet retail	42	
Dry industry	64	
Average daily demand	1,294	15.0
Peak daily demand		22.4
Peak hourly demand		56.0

**Note:** 1) Values rounded to nearest cubic metre.

During an extreme dry year could result in flows in the river dropping below the minimum flow of 0.153 m<sup>3</sup>/s during either June or November. However, such an extreme event could be managed through consent conditions and the use of groundwater to supply Waimauku West.

During the month of **May** water should be available in the river for allocation under the AUP (Figure C5), at a lower reliability of supply. Again, compliance with the AUP policies should be achievable through the application of appropriate resource consent conditions to protect flows in the river.

During the months of **December and April** water from the river may be available for allocation under the AUP. However, the capacity to meet peak demands and the overall reliability of supply during these months should be considered low.

During the summer months of **January to March** the availability of water from the river to supply Waimauku West is likely to be limited or sporadic under the AUP. The unreliable use of river water during these months may also prove operationally problematic as a feed to a water treatment plant due to the likely difference in water quality between groundwater and river water.

Overall, the Kaipara River should be able to be used as the primary source of water to Waimauku West during the period from June to November annually, while operating within the objectives of the AUP. Outside these months the reliability of supply is expected to decline and the river should be considered as a back-up to a groundwater supply.

## 5. WATER QUALITY

The quality of water in the Kaipara River at Waimauku has not been considered in detail in this memorandum. A detailed assessment of water quality would be needed to support the design of a water treatment plant for the supply of potable water to Waimauku West.

Auckland Council monitors water quality in the Kumeu River, upstream from Waimauku, with the data available through the LAWA internet portal. The catchment for this monitoring site is largely comprised of rural pastures with some horticultural production. For preliminary guidance, the AC data indicates:

- *E. coli* counts (years 2006 – 2025) are highly variable with a peak value of 36,000 detected in 2021. The trend is declining in quality. Under the NZ drinking water standards the maximum acceptable value is <1 per 100mL.
- Turbidity is also variable, but is generally below 25 NTU.
- Total nitrogen (years 2015 to 2025) is stable and consistently below 2 mg/L. For comparison, the NZ drinking water standard for nitrate nitrogen is 11.3 mg/L as NO<sub>3</sub>-N.
- Ammoniacal nitrogen concentrations are generally below 0.06 mg/L and the trend may be improving.
- Dissolved reactive phosphorus (years 2015 to 2025) is generally below 0.025 mg/L.

## 6. METHODOLOGY FOR SURFACE WATER RESOURCE ASSESSMENT

The preliminary assessment documented in this memorandum is provided for guidance. Detailed water supply planning should not be undertaken on the basis of the information provided within. A detailed assessment of the daily and seasonal availability of water from the river to the Waimauku West development needs to be undertaken to support a water take consenting process. Similarly, a detailed assessment is required to support the design of a water off-take for the river, and the required delivery and treatment infrastructure.

The following methodology is recommended as a basis for further assessment and the production of a substantive report to support consenting of a water take under a fast-track consenting process:

1. Update the surface water flow assessment to include flows from the Wharauoa Stream to the catchment upstream from a defined Waimauku West off-take point.

2. Undertake a further statistical assessment of the river flows to improve the evaluation of river water availability and reliability of supply throughout the year, with a particular focus on the months of April, May and December. Review this updated assessment against the requirements of the AUP.
3. Confirm the lack of effects on downstream users with regards water availability and overall security of supply.
4. Undertake an assessment of the effects of the proposed take on variability of flows downstream from the off-take point.
5. Evaluate the overall reliability of supply when considering a combination of groundwater and surface water sources for potable water to Waimauku West.
6. Consult with Auckland Council regarding water availability for allocation in the catchment and appropriate conditions of consent that the Council could approve.
7. Undertake a preliminary design for a water treatment plant, taking into account the presumed difference in water quality between the groundwater and surface water sources.

## 7. CONCLUSION

In conclusion, this preliminary assessment indicates:

- Water from the Kaipara River should be available for allocation and could provide a reliable source for supply to Waimauku West through the winter months of June to November.
- Water should be available for allocation during the month of May at a lower reliability of supply.
- Water may be available for allocation under the AUP during the months of December and April water. However, the river's capacity to meet peak demands and the overall reliability of supply during these months should be considered low.
- During the summer months of January to March the availability of water from the river to supply Waimauku West is likely to be limited or sporadic under the AUP.

Overall, the Kaipara River should be able to be used as the primary source of water to Waimauku West during the period from June to November annually, while operating within the objectives of the AUP. Outside these months the reliability of supply is expected to decline and the river should be considered as a back-up to a groundwater supply.

A methodology has been provided as a basis for further assessment of surface water availability and variability in flows. This methodology may form the basis for the production of a substantive report to support consenting of a water take under a fast-track consenting process.

Based on WGA's experience and the information which has been received and known to date, WGA can see no reason why the Waimauku West development could not proceed under a fast-track application, as the effects on the environment with respect to a surface water take can be managed with suitable conditions.

## 8. REFERENCES

- AC 2001. Kaipara River catchment water allocation strategy 2001. Auckland Council technical publication TP146.
- Bear 2025. 1080 State Highway 16, Reweti, Waimauku. Fast track referral application. Water Supply Assessment. Report prepared for Crang Consulting Ltd by Bear Enterprises Ltd. Dated 29 July 2025.
- Crang Civil 2025. Civil engineering infrastructure summary memo. Technical memorandum from Crang Civil Consulting Engineers to Ian & Julie Humphrey. Dated 18 August 2025.
- CWM 2025. Groundwater desktop memo. 1080 State Highway 16, Waimauku West. Memorandum to Halberd Holdings Ltd from CWM Geosciences Ltd. Dated 14 August 2025.
- McKean R, Crowcroft G, Henehan D 2007. State of the Environment Monitoring. Auckland water quantity statement June 2005- May 2006. Auckland Council technical publication TP323.

Yours Sincerely



Brett Sinclair  
Senior Principal Hydrogeologist  
**WALLBRIDGE GILBERT AZTEC**

**APPENDIX A** WAIMAUKU WEST MASTERPLAN

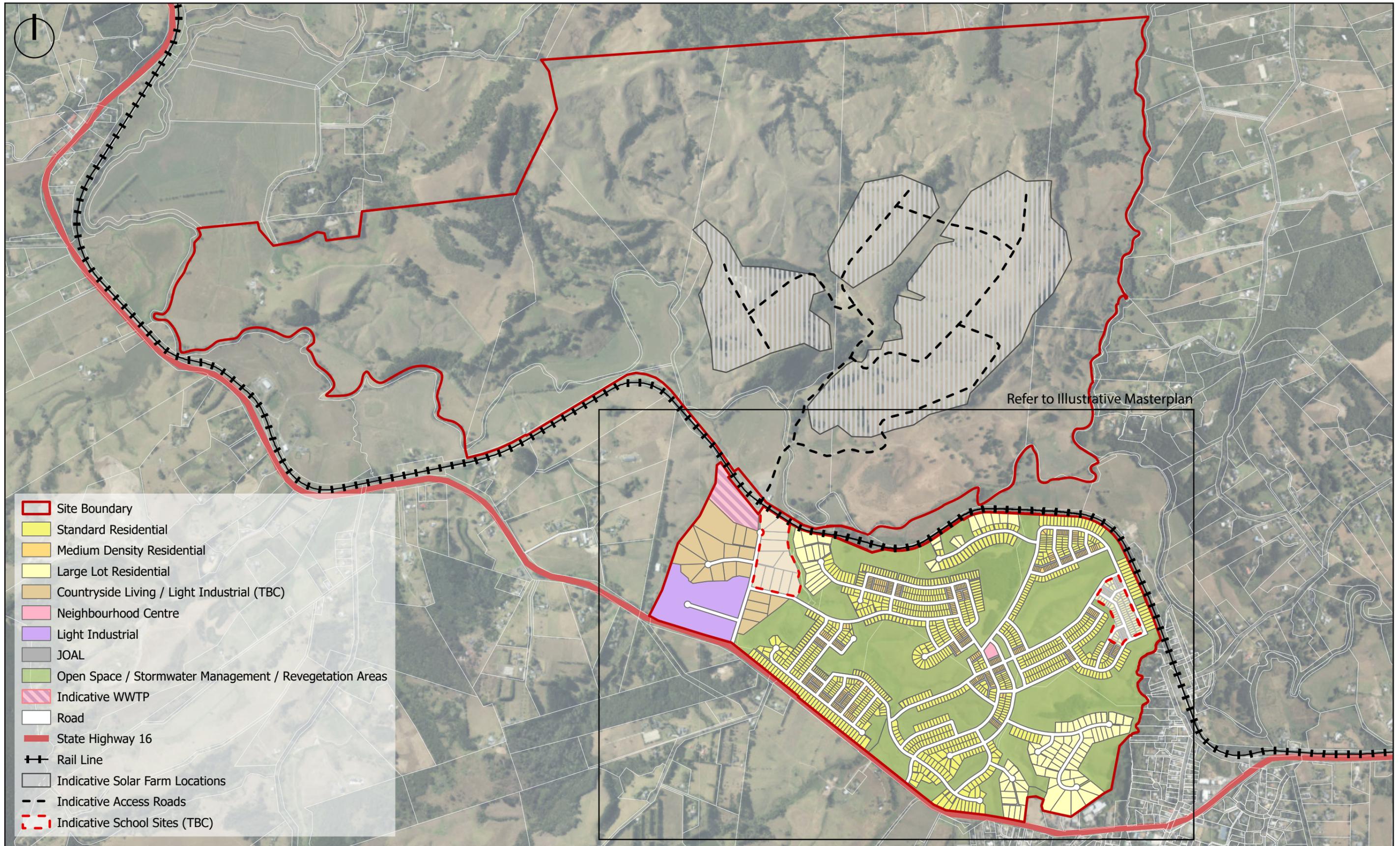
**APPENDIX B** AUCKLAND REGIONAL PLAN POLICIES AND RULES

**APPENDIX C** KAIPARA RIVER FLOWS AT WAIMAUKU #45311 MONITORING STATION

**APPENDIX D** CONSENTED SURFACE WATER TAKES

# APPENDIX A

# WAIMAUKU WEST MASTERPLAN



# Waimauku Whole Site Masterplan

Halberd Holdings Limited - Fast Track Referral Application - August 2025



- Masterplan Elements**
1. Indicative neighbourhood centre locations
  2. Indicative Collector Road / Bus Route
  3. Retention and enhancement of Significant Ecological Areas
  4. Riparian enhancement and on-site stormwater management
  5. Hilltop Park and new reservoir
  6. Potential School Locations (3ha & 5ha)
  7. Indicative light industrial area
  8. Indicative solar farm (ca. 100ha)
  9. Indicative new State Highway 16 intersections
  10. Potential on-site Wastewater Treatment Plant
  11. Additional connection to Waimauku via Right of Way
  12. Waimauku School
  13. North Auckland Rail Line
  14. Waimauku Village
  15. State Highway 16

**Indicative Yields**

Light Industrial:	8 - 20 Ha
Large Lot Residential:	50 - 120 Lots
Standard Residential:	1,100 - 1,400 lots
Medium Density Residential:	350 - 500 lots
<b>Total:</b>	<b>1,500- 2,020 lots</b>

# Waimauku Illustrative Masterplan

Halberd Holdings Limited - Fast Track Referral Application - August 2025

**APPENDIX B**  
AUCKLAND REGIONAL PLAN  
POLICIES AND RULES

The following text consists of extracts from **Policy E2.3** of the **Auckland Regional Plan**.

*Priority of water use*

1. Manage the allocation of fresh water within the guidelines provided by Appendix 2 River and stream minimum flow and availability . . . . . and give priority to making freshwater available for the following uses (in descending order of priority):
  - a) existing and reasonably foreseeable domestic and municipal water supply and animal drinking water requirements;
  - b) existing lawfully established water users;
  - c) uses of water for which alternative water sources are unavailable or unsuitable; and
  - d) all other uses.

*Water allocation and availability guidelines*

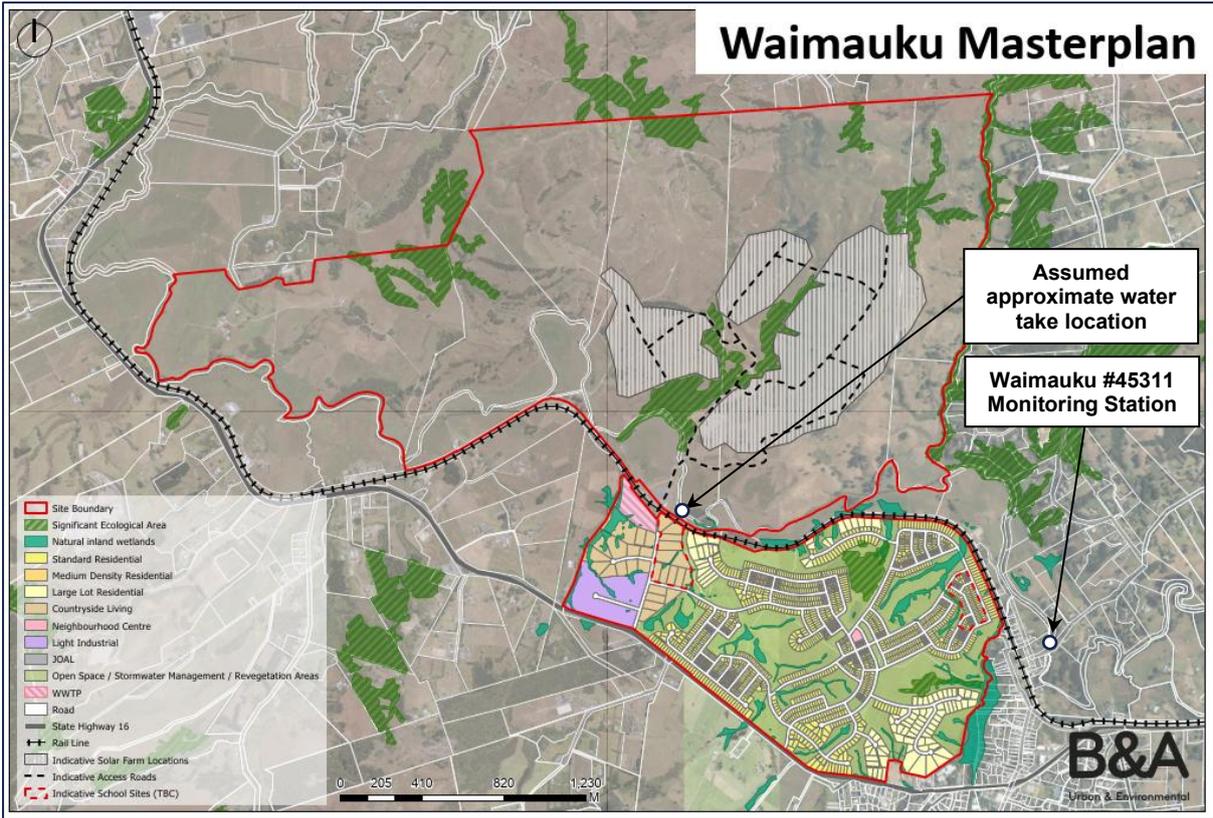
5. Manage the taking and use of surface water from rivers, streams and springs and taking and use of groundwater from aquifers to meet all of the following except where water allocation exceeds or is close to exceeding the guidelines (refer to Policy E2.3(10)):
  - a) the minimum flow and availability guidelines in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow and availability are not exceeded;

*Take and use of water*

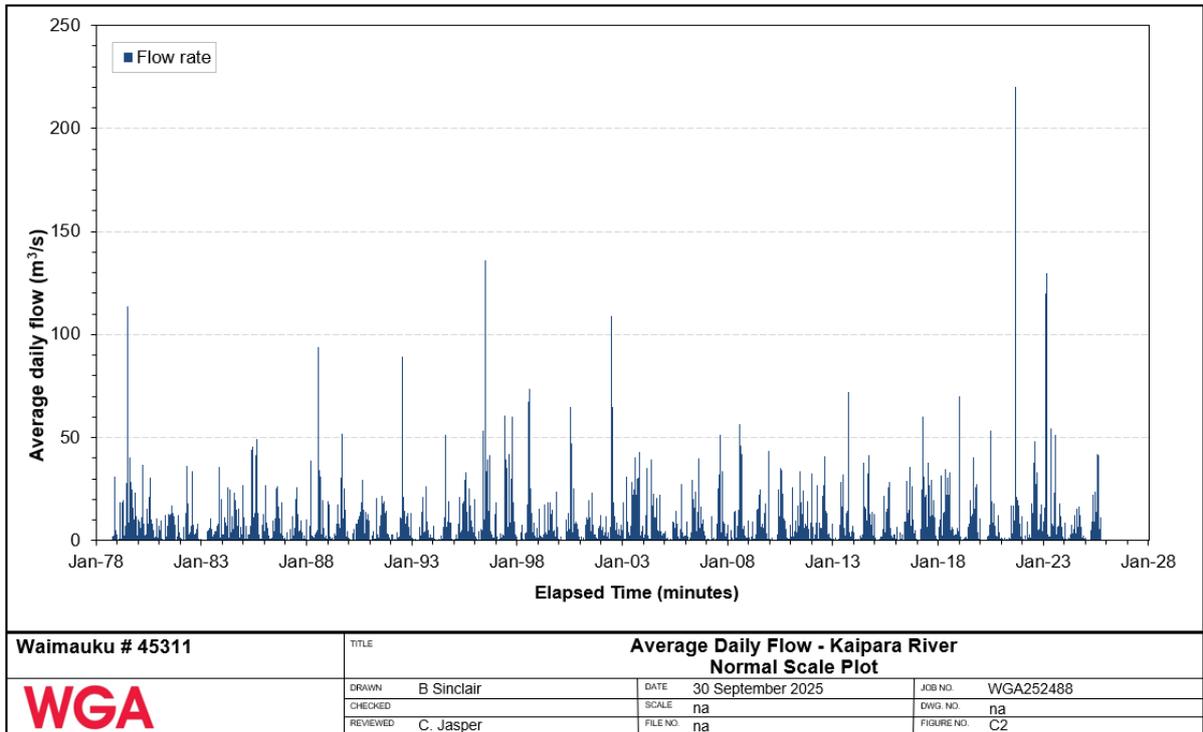
6. Require proposals to take and use water from lakes, rivers, streams, springs or wetlands to demonstrate all of the following:
  - a) the taking of surface water from any river or stream is within the guideline in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow and availability, except in accordance with Policy E2.3(11);
  - b) appropriate water levels and downstream flow regimes will be maintained, including:
    - v. low flows in rivers and streams to protect in-stream values;
    - vi. flow variability in rivers, streams and springs;
    - vii. water levels and flows in wetlands ensure vegetation and habitat values of the wetland are protected throughout the year;
    - viii. water levels in lakes maintain the ecological values and water quality of the lake and its shoreline stability, and enable recreational use; and
    - ix. existing lawfully established taking of water is not adversely affected;
10. Manage water availability, where water allocation exceeds or is close to exceeding the guidelines in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow and availability . . . . . by:
  - a) not granting new consent applications to take water except where provided for by Policy E2.3(11);
  - b) reducing existing takes over time and phasing out any over allocation by:
    - i. encouraging voluntary reductions in water allocations; and
    - ii. reviewing existing consents to align water allocations to the actual historical use of water, for horticultural operators this will be averaged across the full rotational cycle of the crops grown.
  - c) exempting existing allocations for municipal water supply under Policy E2.3(10)(b)(ii) above from review where a water management plan demonstrates a necessary increase in abstraction to cater for planned urban growth;
  - d) reviewing existing consents to require the efficient use of water; and
  - e) accounting for takes expressly permitted in this Plan, or allowed under section 14(3)(b) of the Resource Management Act 1991.
11. Allow takes that exceed the guidelines in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow . . . . . in the following circumstances:

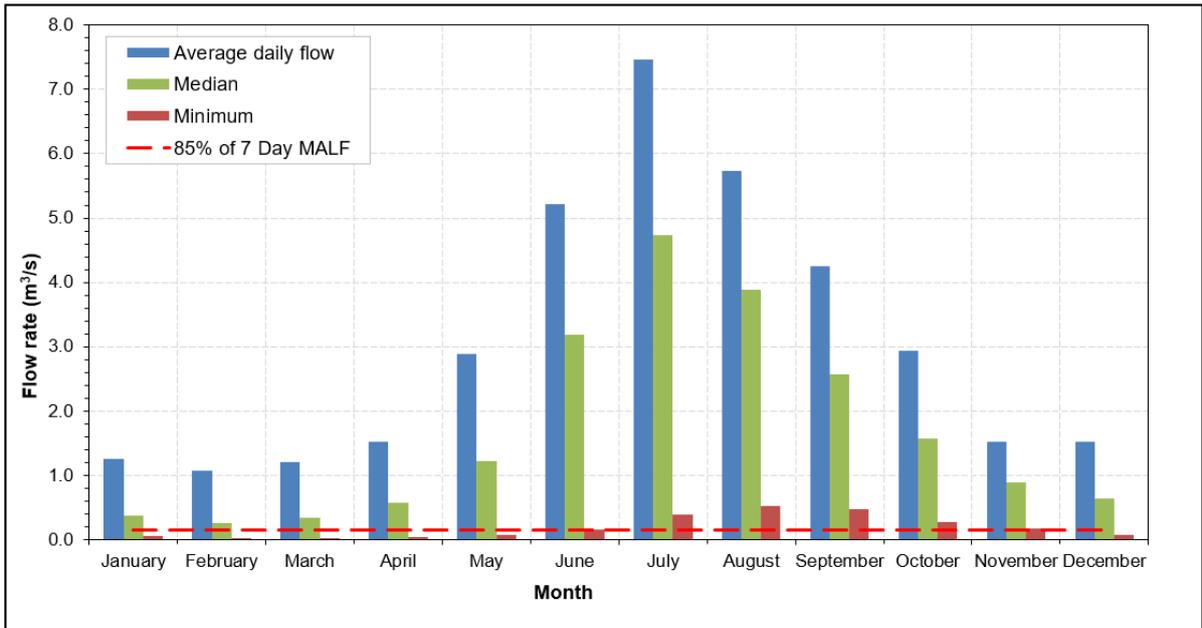
- a) For guidelines in Table 1 River and stream minimum flow and availability in Appendix 2 River and stream minimum flow and availability, when the river or stream flow is greater than the median flow, provided the total take does not exceed 10 per cent of the flow in the river or stream at the time of abstraction, and natural flow variability is maintained; or
- b) For all guidelines, where it is appropriately demonstrated in terms of the requirements of Policy of E2.3(6)(b) or Policy E2.3(7), that additional water is available for allocation.

**APPENDIX C**  
KAIPARA RIVER FLOWS AT  
WAIMAUKU #45311 MONITORING  
STATION

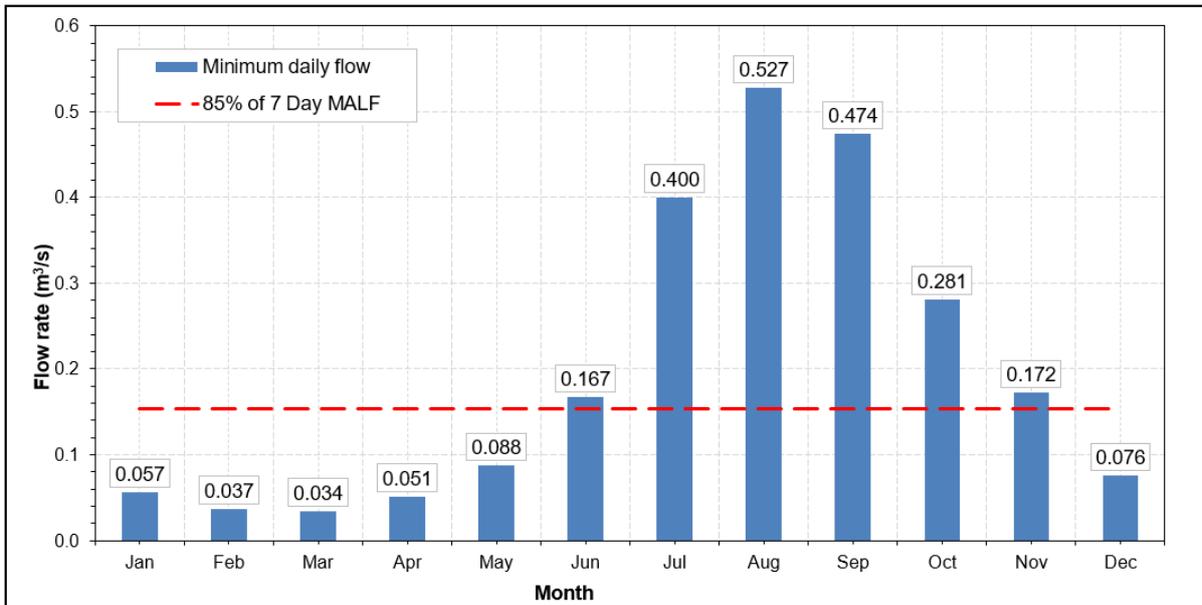


**Figure C1: Waimauku #45311 Flow Monitoring Station Location**

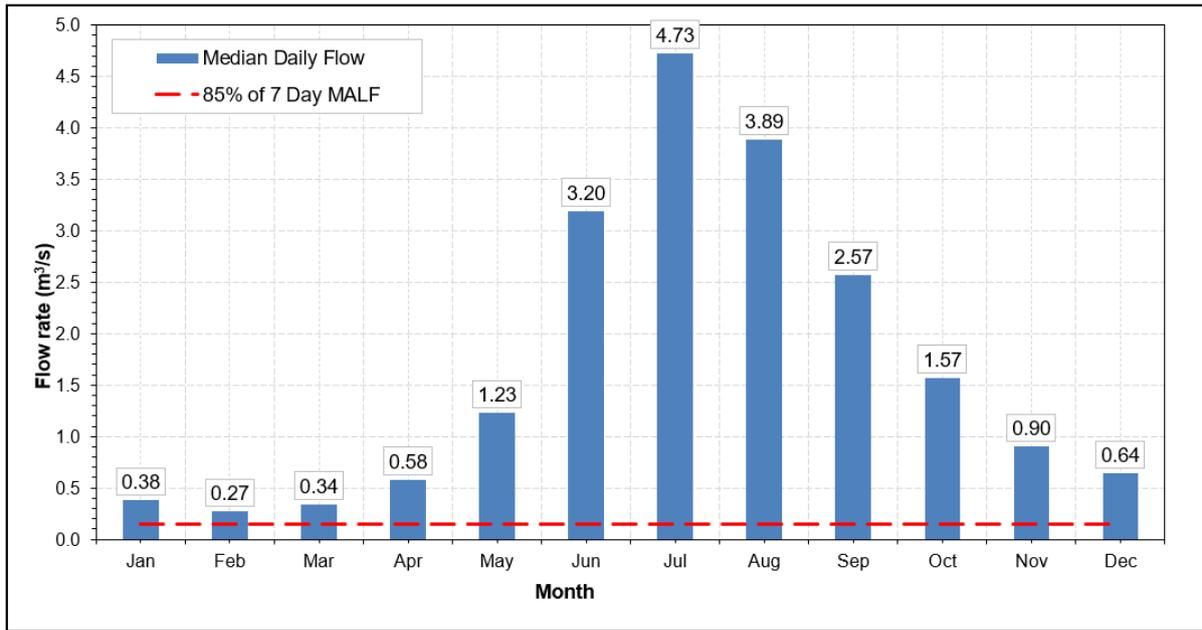




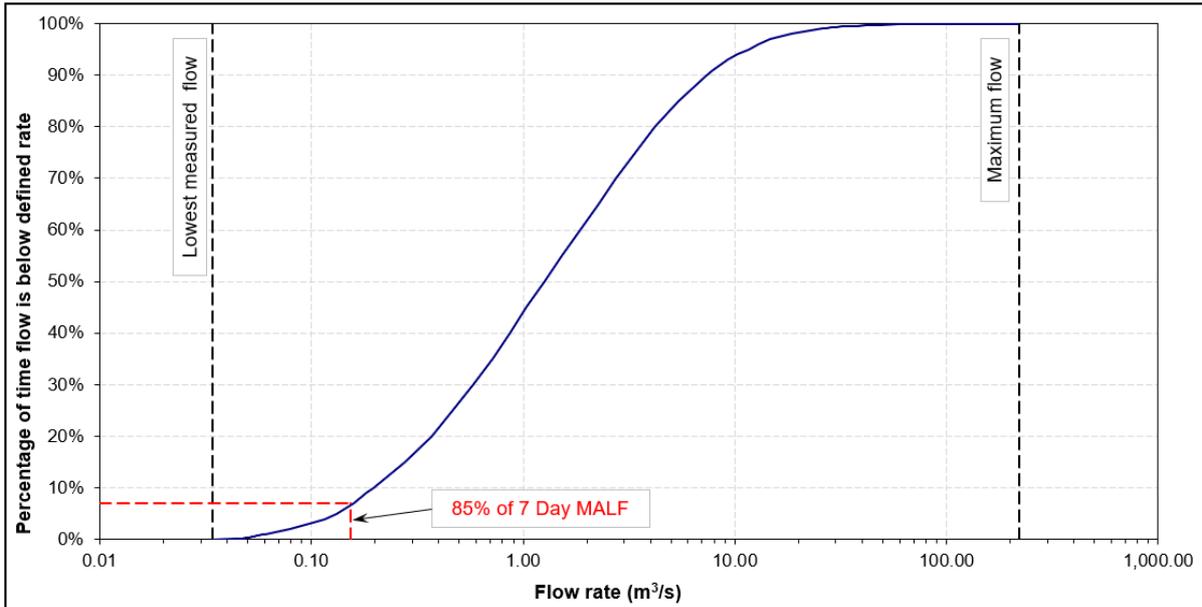
<b>WGA</b> Waimauku # 45311	<b>Waimauku # 45311</b>			<b>TitlE</b>	
	<b>Daily Flow Statistics by Month - Kaipara River</b>				
	<b>Normal Scale plot</b>				
	DRAWN: B Sinclair	DATE: 30 September 2025	JOB NO.: WGA252488		
CHECKED:	SCALE: na	DWG. NO.: na			
REVIEWED: C. Jasper	FILE NO.: na	FIGURE NO.: C3			



<b>WGA</b> Waimauku # 45311	<b>Waimauku # 45311</b>			<b>TitlE</b>	
	<b>Minimum Daily Average Flow by Month - Kaipara River</b>				
	<b>Normal Scale plot</b>				
	DRAWN: B Sinclair	DATE: 30 September 2025	JOB NO.: WGA252488		
CHECKED:	SCALE: na	DWG. NO.: na			
REVIEWED: C. Jasper	FILE NO.: na	FIGURE NO.: C4			



<b>WGA</b> Waimauku # 45311	<b>Median Daily Average Flow by Month - Kaipara River</b> Normal Scale plot		
	DRAWN: B Sinclair	DATE: 30 September 2025	JOB NO: WGA252488
	CHECKED:	SCALE: na	DWG. NO: na
	REVIEWED: C. Jasper	FILE NO: na	FIGURE NO: C5



<b>WGA</b> Waimauku # 45311	<b>Daily Average Flow Exceedance Curve - Kaipara River</b> Log - Normal Scale plot		
	DRAWN: B Sinclair	DATE: 30 September 2025	JOB NO: WGA252488
	CHECKED:	SCALE: na	DWG. NO: na
	REVIEWED: C. Jasper	FILE NO: na	FIGURE NO: C6

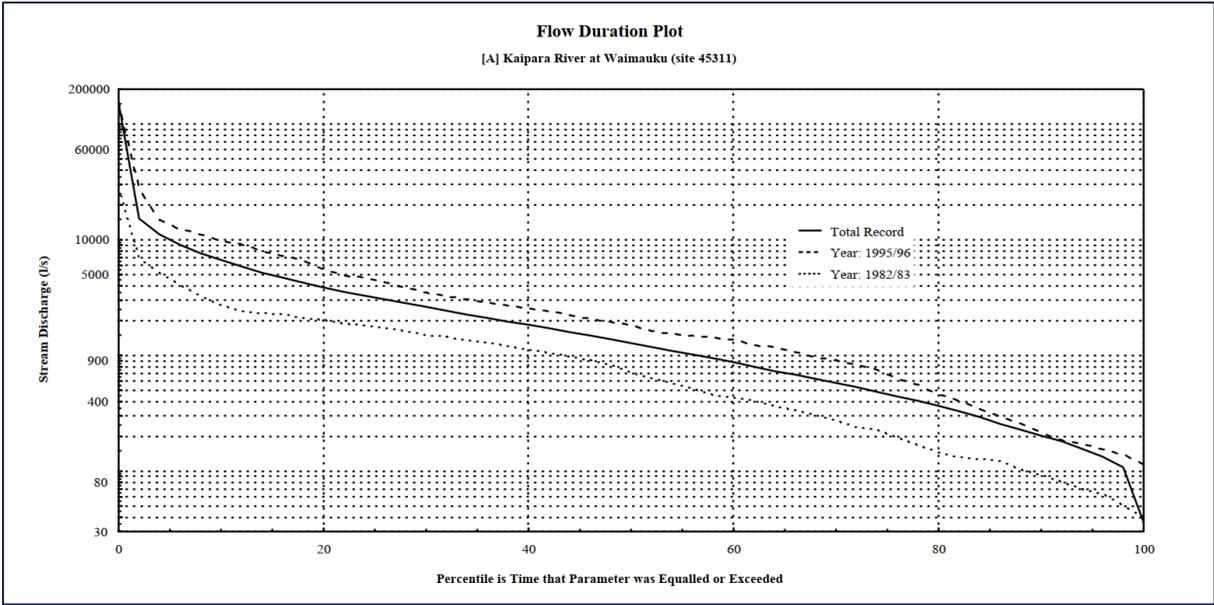
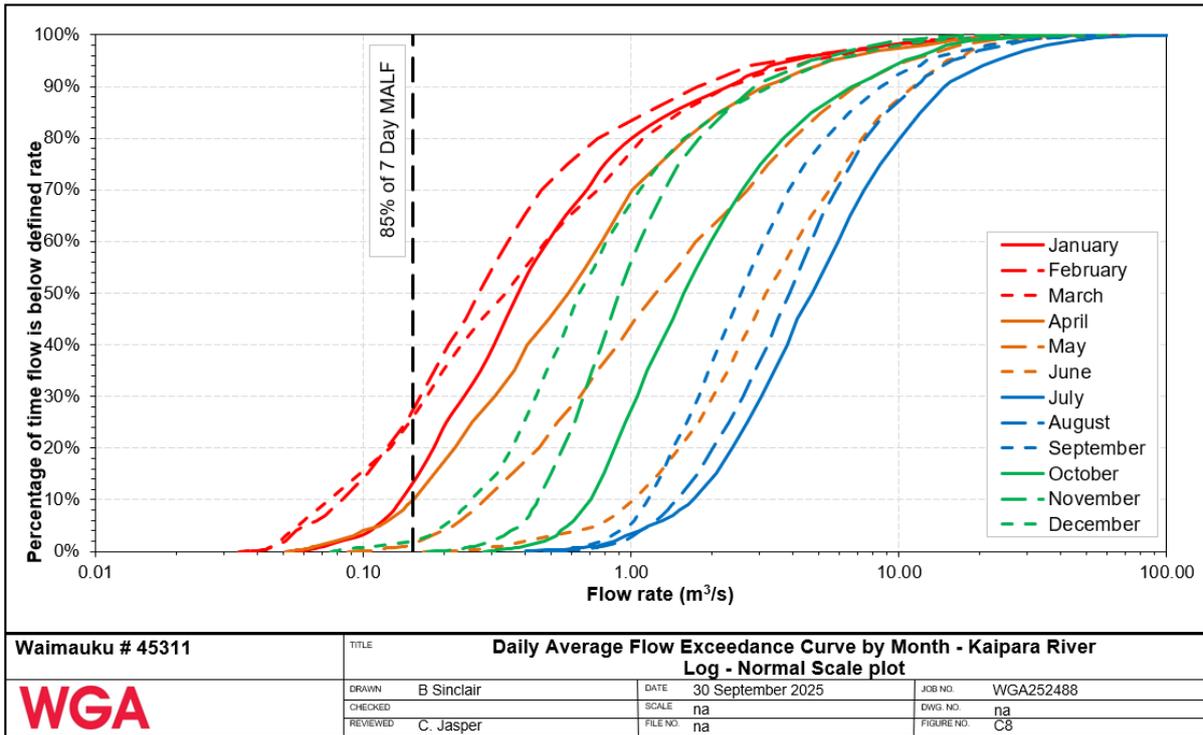


Figure C7: Kaipara River Flow Duration Curve 1978 to 1999 (AC 2001)



# **APPENDIX D**

## **CONSENTED SURFACE WATER TAKES**

**Table D1: Consented Surface Water Takes in Kapiara River Water Management Zone**

CONSENT NO <sup>(1)</sup>	TOTAL CONSENTED ANNUAL VOLUME (m <sup>3</sup> )	MAXIMUM CONSENTED RATE (L/s)	USE	SOURCE RELATIVE TO WAIMAUKU
396	330,000		Helensville municipal supply	Tributary downstream
6155	325,000		Helensville municipal supply	Tributary downstream
20823	5,700		Irrigation	Tributary downstream
20824	12,500	0.7	Irrigation	Upstream
20827	5,600		Irrigation	Tributary upstream
20828	14,250		Irrigation	Tributary upstream
20834	25,000		Industrial	Tributary upstream
20920	6,000		Irrigation	Tributary upstream
20923	25,000		Irrigation	Tributary upstream
21267	2,725	1.1	Irrigation	Tributary upstream
21268	30,000		Irrigation	Tributary upstream
21272	30,000	8	Irrigation	Tributary upstream
21280	9,500	1.4	Irrigation	Downstream
21281	38,000	9.1	Irrigation	Tributary upstream
21300	8,000	6.4	Irrigation	Upstream
21478	2,500		Irrigation	Tributary upstream
22081	5,200		Irrigation	Tributary upstream
22239	20,000	5	Irrigation	Downstream
22289	3,000		Irrigation	Tributary upstream
27021	90,000	6.5	Irrigation	Downstream
38152	52,200		Irrigation	Tributary downstream
38882	18,000		Irrigation	Tributary upstream
41630	8,000		Irrigation	Tributary upstream
Total	1,066,175	38.2 (2)		

**Note:** 1) Data sourced from <https://www.lawa.org.nz/explore-data/auckland-region/water-quantity/surface-water-zones/kaipara-surface-water>.

2) Assumes each maximum consented rate of take applies throughout the year, rather than to a specific season.