

**To**

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**From**

*Woods*

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*Reviewer: Brian Flood*

*Revision 1*

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## Memorandum - Covid-19 Fast Track Consent Referral - Civil Infrastructure

### Weiti Bay Village 1, Ara Weiti Road, Redvale

#### 1. Introduction

This memo has been prepared to support the Weiti Bay Village 1 Development for the referral process for a Covid-19 Fast Track Consent with the respect of civil infrastructure activities.

##### 1.1. Development Description

The Weiti Bay Village 1 Development consists of the earthworks and civil works in order to form 220 residential lots, a retirement village and a small commercial centre to support the development.

##### 1.2. Site Description

The site is located at Lot 172 DP513840 Ara Weiti Road, Redvale 0794 and is approximately 34.5 Ha in area.

The site is currently covered by wilding pines and other regrowth (slash zone) following removal of the commercial forestry previously in place on the site several years ago. There are two watercourses within the property boundary on the eastern and western sides which discharge into the Karepiro Stream and eventually the Karepiro Bay which is noted as a sensitive receiving environment as part of the Long Bay – Okura Marine Reserve.

The site has access to Ara Weiti Road along the sites frontage. A now defunct forestry road runs through the middle of the site and connects to the forestry road network at the top of the site.

The site levels vary between mRL 10 at Ara Weiti Road to mRL 73 at the highest point of the site in the south western area.

##### 1.3. Civil Infrastructure Activities

The civil infrastructure will comprise of the following activities:

- Roding – formation of roads between 16-20m in road reserve width, a new tee intersection with Ara Weiti Road, and Joint Owned Access Lots (JOAL)
- Pedestrian, Cycle and Bridal routes
- Stormwater – including primary and secondary networks, water quality treatment and flood considerations

- Wastewater – including the site network and a connection to the public network utilising a pump station and rising main.
- Water Supply – including the site network, a connection to the public network, a reservoir with either a booster pump station or a pressure reducing valve
- Utilities – including common service trenches in the roads with telecommunications and power



Figure 1: Site Location & Description (Auckland Council Geomaps)

## 1.4. Anticipated Consents

It is anticipated that the following consents or approvals will be required for this works:

- Earthworks Consent
- Subdivision Consent
- Stormwater Discharge Consent
- Engineering Overflow Point Approval – Managers Approval under Watercare’s Network Discharge Consent

## 2. Roding

### 2.1. Existing Infrastructure

The existing roading for the Weiti area consists of:

- Intersection at East Coast Road
- Ara Weiti Road, including a portion built on the Penlink designation as part of that future carriageway
- Public carpark with access to walking tracks to Weiti’s Karepiro Bay beach
- Private roads as part of sub-Precinct A/150 lots in Karepiro Bay

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## 2.2. Proposed Roding

Approximately 2.3 km of roads are proposed in order to service the Weiti Village 1 development. These consist of:

- 20.0 m wide Collector Roads
- 16.0 m wide Local Roads
- Joint Owned Access Lots as part of superlots

One of the collector roads allows for a future connection to the Village 2 area located to the west of the site.

## 2.3. Walking, Cycling & Bridal Paths

A network of walking, cycling and bridal paths are proposed for the Village 1 development to connect to the existing network constructed as part of the Karepiro Bay 150 lot development and the future Village 2 development.

# 3. Stormwater

## 3.1. Stormwater Management Plan Strategy

Weiti Bay Village 1 development discharges to Karepiro Bay which is noted to be a sensitive receiving environment (Long Bay-Okura Marine Reserve). The site does not fall within a Stormwater Management Area Flow (SMAF) overlay as per Auckland Unitary Plan: Operative in Part. The site is classified as a 'greenfields' development under Schedule 4 of the Network Discharge Consent. Therefore a Stormwater Management Plan will be prepared with the following stormwater management approach, with an emphasis on the water quality due the receiving environment:

- Achieve equivalent hydrology (infiltration, runoff volume, peak flow) to pre-development (grassed state) levels:
  - Provide retention (volume reduction) of a minimum of 5mm runoff depth for all impervious surfaces; and
  - Provide detention (temporary storage) with a drain down period of 24 hours for the difference between pre-development (grassed state) and post-development runoff volumes from the 95th percentile, 24-hour rainfall event minus the retention volume for all impervious areas.
- Treatment of impervious areas by a water quality device designed in accordance with GD01/TP10 for relevant contaminants. Water quality treatment is not proposed for roofed areas as those are proposed to be constructed of inert materials.

A stormwater management approach is considered to be a best practice approach.

## 3.2. Primary Network

There are currently no piped stormwater networks within the Village 1 development area. The proposed network will be designed in accordance with the Auckland Council Stormwater Code of Practice Version 3 with primary stormwater runoff to be conveyed through stormwater networks up to 10-year ARI stormwater events.

As part of the Village 1 development, cesspits, pipes and manholes shall be installed in order to collect the 10 year stormwater flows within the development area and convey these flows to the treatment devices.

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### 3.3. Secondary Flow Paths

Secondary flow paths shall be designed in accordance with the Auckland Council Stormwater Code of Practice Version 3 and shall be largely restricted to roads. Where outlets are required, stabilised flow paths shall be designed to ensure that no erosion occurs to the stream banks where they discharge.

### 3.4. Stormwater Treatment

Due to steep slopes associated with the existing topography of the site, many of the proposed roads consist of slopes greater than 7% and therefore at source bioretention or green infrastructure devices are not deemed to be efficient.

Exceptions for providing retention can be made in cases where soil infiltration rates preclude disposal to ground and rainwater reuse is not possible. Where retention cannot be met, devices are to be lined with the retention volume being treated as detention through bioretention devices.

Therefore the development proposes to incorporate the use of large communal bioretention devices sized based in accordance with GD01. These devices are proposed to receive flows from JOALs and public roads with the flows proposed to be treated via Gross Pollutant Traps (GPT) or similar prior to entering the large devices.

It is proposed that private lots are managed at source and a stormwater management toolbox to be prepared to provide guidance on devices that can be adopted.

Locations of outfalls from treatment devices shall be located so that they do not adversely effect the base flow or ground water in relation to the existing waterways and wetlands.

### 3.5. Flood Considerations

Due to the elevation of the site, flooding of the watercourses are unlikely to affect developable areas. Flood and habitable floors are to be developed in accordance with Auckland Council Stormwater Code of Practice Version 3. The flood modelling undertaken for the site indicates that stormwater flows could be passed forward due to the discharge location's proximity to the coast.

### 3.6. Stormwater Discharge

It is understood that a stormwater discharge consent will be required for this project and this will be enabled through the Stormwater Management Plan formulated for the site. The SMP would meet the requirements for the Auckland Council Network Discharge Consent for large greenfield sites.

The stormwater discharge strategy is to pass flows forward ahead of other flows within the existing waterway's catchment. It is proposed that erosion and scour protection measures are put in place including armouring banks and providing planting to secure the banks.

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## 4. Wastewater

### 4.1. Existing Infrastructure

There is no public wastewater infrastructure within the Weiti area. The 150 lot Karepiro Bay village has a private pump station and rising main to Stillwater managed by the body corporate

### 4.2. Consultation with Watercare

Consultation was undertaken with Watercare Services Ltd (WSL) as part of this Fast Track referral to determine where a public connection could be achieved. The discussions outlined several achievable options for both the pump station location and arrangement, and rising main routes, and the preferred solution was a pump station located adjacent to the site with the rising main route through Stillwater to Stanmore Bay. WSL agreed that a servicing solution can be achieved for the Village 1 development and that further discussions will continue and the preferred solution shall be advanced ahead of the next stage of consultation.

### 4.3. Infrastructure Requirements

The following infrastructure items will be required in order to service wastewater for the proposed site:

- A wastewater pumping station capable to pump to Stanmore Bay WWPS or another specified site. This will include:
  - A wet well and valve chamber with pumps and other valves as required
  - 8 hours emergency storage
  - An Engineered Overflow Point to allow for emergency discharges into the stream
  - Automated washing systems
  - A connection to the site's gravity drainage
- A rising main to convey flows to Stanmore Bay WWPS or another specified site including
  - air valves at the high points
  - scour valves at the low point
  - pipe bridge or drilled pipeline or similar at Stillwater estuary
  - connection to the gravity network leading to Stanmore Bay WWPS.

There has not been any indication that the pump station at Stanmore Bay or the infrastructure/Army Bay Treatment plant need any upgrades to service the development.

#### 4.3.1. Network

The proposed network for wastewater shall be a gravity network to the new intersection created on Ara Weiti Road and the collector road for Village 1. The approximate design flows are outlined in the table below.

Table 1: Wastewater Design Flows

Catchment	Lots or Area	Design Flow (l/s)	Self-Cleansing Design Flow (l/s)	Peak Design Flow (l/s)
Residential Lots	220	1.5	4.5	10.1
Retirement Village	142	0.9	2.7	5.9
Commercial	1200	0.1	0.2	0.6
Total		2.5	8.4	16.6

#### 4.3.2. Delivery Infrastructure

The preferred option for the pump station and rising main route as part of the discussions with WSL was a pump station located on/adjacent to site with a rising main route to Stanmore Bay via Stillwater:

- Pump Station Arrangement - Provide a new pump station within the site area adjacent to Ara Weiti Road
- Rising Main Route - To Stanmore Bay via Stillwater by installing new public wastewater infrastructure

Should there be a change to WSL's regional servicing strategy before this is advanced, then another solution may be implemented.

The wastewater network and pump station will be designed and constructed so that all the following is achieved:

- a) capacity is provided for at least five times the average dry weather flow from the maximum probable development of the serviced network area at the time the network is constructed.
- b) The pump station will be provided with an emergency overflow as required by Watercare's Network Discharge Consent requirements and standards to minimise the risk to public health risks associated with wastewater system failure.
- c) the pump station will be designed with a minimum of eight hours emergency storage with an overflow baffle plate and/or a milli screen;
- d) the pump station will be continuously monitored by telemetry so that the wastewater network operator is immediately informed of any pump station failure or fault that may result in an overflow.
- e) land will be bunded to provide additional secondary emergency storage or will be accessible by a sucker truck to allow for clean-up. If due to topography/design constraints land cannot be bunded, a additional storage underground will be provided.
- f) electrical connection for generators in the event of power failure; and
- g) electrical and control system alarms to Watercare's SCADA system for continuous monitoring and control purposes.
- h) The network and pump station will be vested to Watercare and will be operated in accordance with Watercare's (network operator) operational and maintenance programme and procedures.

It is anticipated that the risk of emergency wastewater discharges entering the receiving environment will be extremely low due the implementation of the above controls and measures.

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## 5. Water Supply

### 5.1. Existing Infrastructure

A pipeline sized for the full future development has been installed on Ara Weiti Road to the start of sub-Precinct B where it connects to a private booster pump station which conveys water to the reservoirs that serve the 150 lot Karepiro Village.

### 5.2. Consultation with Watercare

Consultation was undertaken with Watercare Services Ltd (WSL) as part of this Fast Track referral to determine where a public connection could be achieved. WSL confirmed that extending the public network to the site and providing a reservoir on the site to service the village was an acceptable solution. Several options were discussed, and WSL indicated their preference was to service as much of the development with gravity from the reservoir. Further consultation with WSL will be required to develop this design.

### 5.3. Infrastructure Requirements

The following infrastructure items will be required in order to service potable water for the proposed site

- Connection and extension of the existing watermains located on Ara Weiti Road
- Construction of a reservoir or reservoirs sized to service the proposed development
- Construction of pressure reducing valves where the head exceeds recommended levels
- Construction of booster pump sets where the head does not meet minimum requirements

There has not been any indications from Watercare that the upstream infrastructure needs any upgrades to service the development.

#### 5.3.1. Reservoir

A reservoir shall be provided on site in order to provide water supply and firefighting for the Village 1 area.

The preferred option is:

- Reservoir located at the top of the site with potentially a booster pump to service the reservoir, then a booster pump to service the top of the site, gravity to service the rest of the site and potentially PSV for the lower part of the site.

This will need to be developed further to confirm the final arrangement along with further consultation with WSL.

#### 5.3.2. Network

The network shall be sized for the demand based on WSL standards and firefighting requirements.

Table 2: Water Supply Design Demands

Catchment	Lots or Area	Design Demand (l/day)	Peak Daily Demand (l/hr)	Peak Hourly Demand (l/s)
Residential Lots	220	160,000	13,000	9.2
Retirement Village	142	93,000	8,000	5.4
Commercial	1200	7,000	600	0.4
Total		260,000	21,600	15.0

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## 6. Utilities

### 6.1. Existing Infrastructure

Provision has been made as part of the first 150 lots installed in Karepiro Bay Village for services up to 900 lots for power and telecommunications within Ara Weiti Road.

### 6.2. Common Service Trenches

Common service trenches shall be installed in the service berms of the roads and JOALs and shall include:

- Communications – Fibre ribbonet
- Power – Low voltage and high voltage
- Watermain

### 6.3. Other Services

There is currently no gas available to connect to the site, nor is it proposed. Should individual residents want to install gas, then this can be achieved via gas tanks installed per property.

## 7. Conclusion

The proposed civil infrastructure works required to complete the Weiti Village 1 development works includes:

- 2.3 km of new roads
- Stormwater network including a piped network sized for the 10 year storm, secondary network consisting of overland flow paths within the roads, and treatment in communal rain gardens and GPT's
- Wastewater network and a pump station and rising main to provide a connection to the public system at Stanmore Bay via Stillwater
- Water Supply network and a reservoir located at the top of the site
- Power and telecommunications

There are no undue civil infrastructure constraints which would limit the development of this site. For the water and wastewater infrastructure elements that are still being finalised with Watercare Services Ltd, we are confident that the Weiti Bay Village 1 development will be able to be appropriately serviced.

Yours sincerely



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Ben Pain

*Associate Engineer*



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Brian Flood

*Director*