

Project: MACKAYS TO PEKA PEKA EXPRESSWAY

Title: GROUND WATER MONITORING LOCATIONS SHEET 6 OF 11

State: FOR CONSENTING

Document ID: M2PP-AE5-DWG

Drawn By: GT-GW-106

Rev: 1



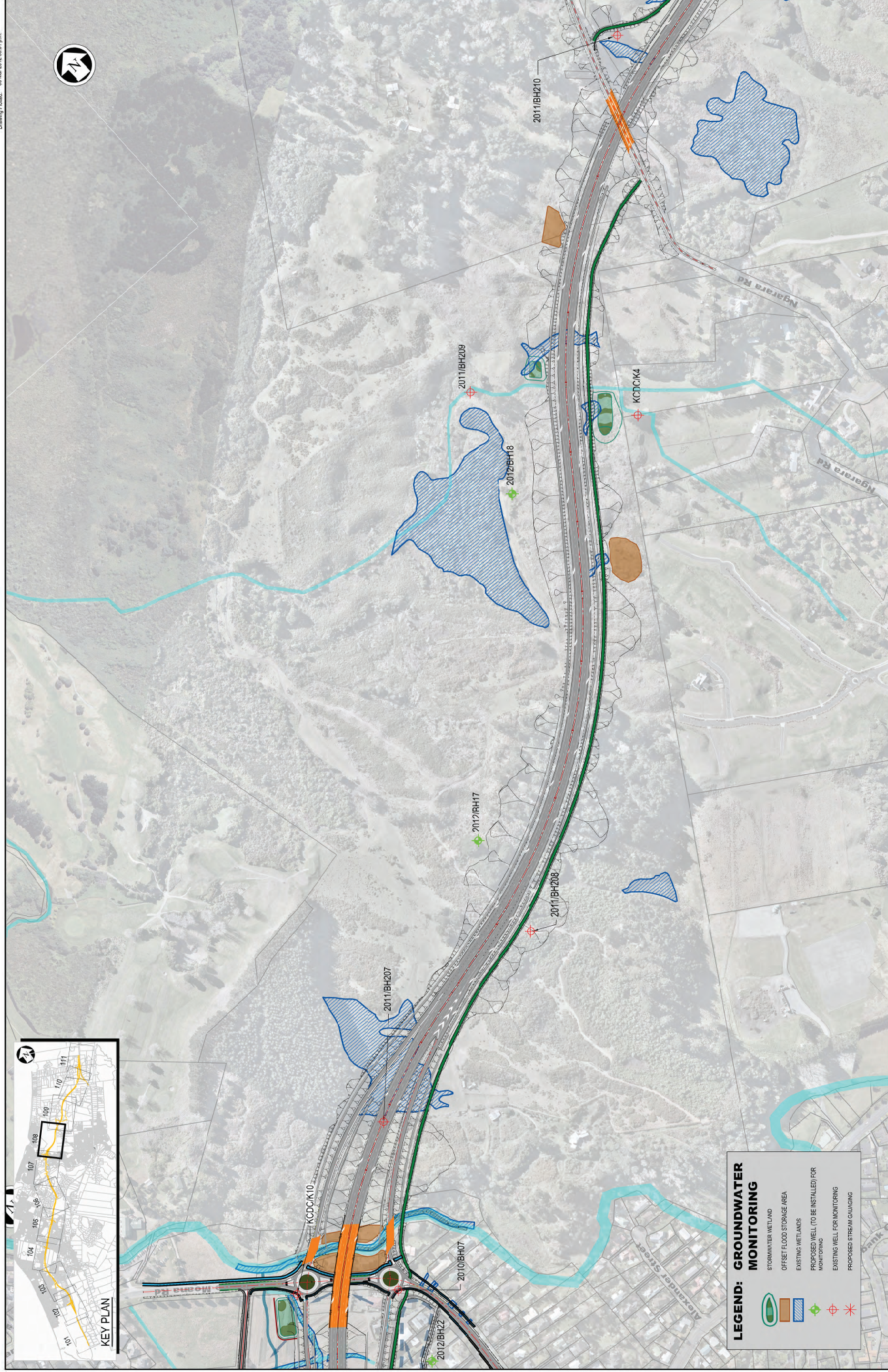
Revision	Description	Author	Date
1	AREE LODGEMENT	INPN	15.03.12

Original Scale (K/S): 1:5000

NOTES:

LEGEND: GROUNDWATER MONITORING

- STORMWATER WETLAND
- OFFSET FLOOD STORAGE AREA
- EXISTING WETLANDS
- PROPOSED WELL (10 DEEPS ALLEY) PUMP MONITORING
- EXISTING WELL FOR MONITORING
- PROPOSED STREAM GAUGING



LEGEND: GROUNDWATER MONITORING

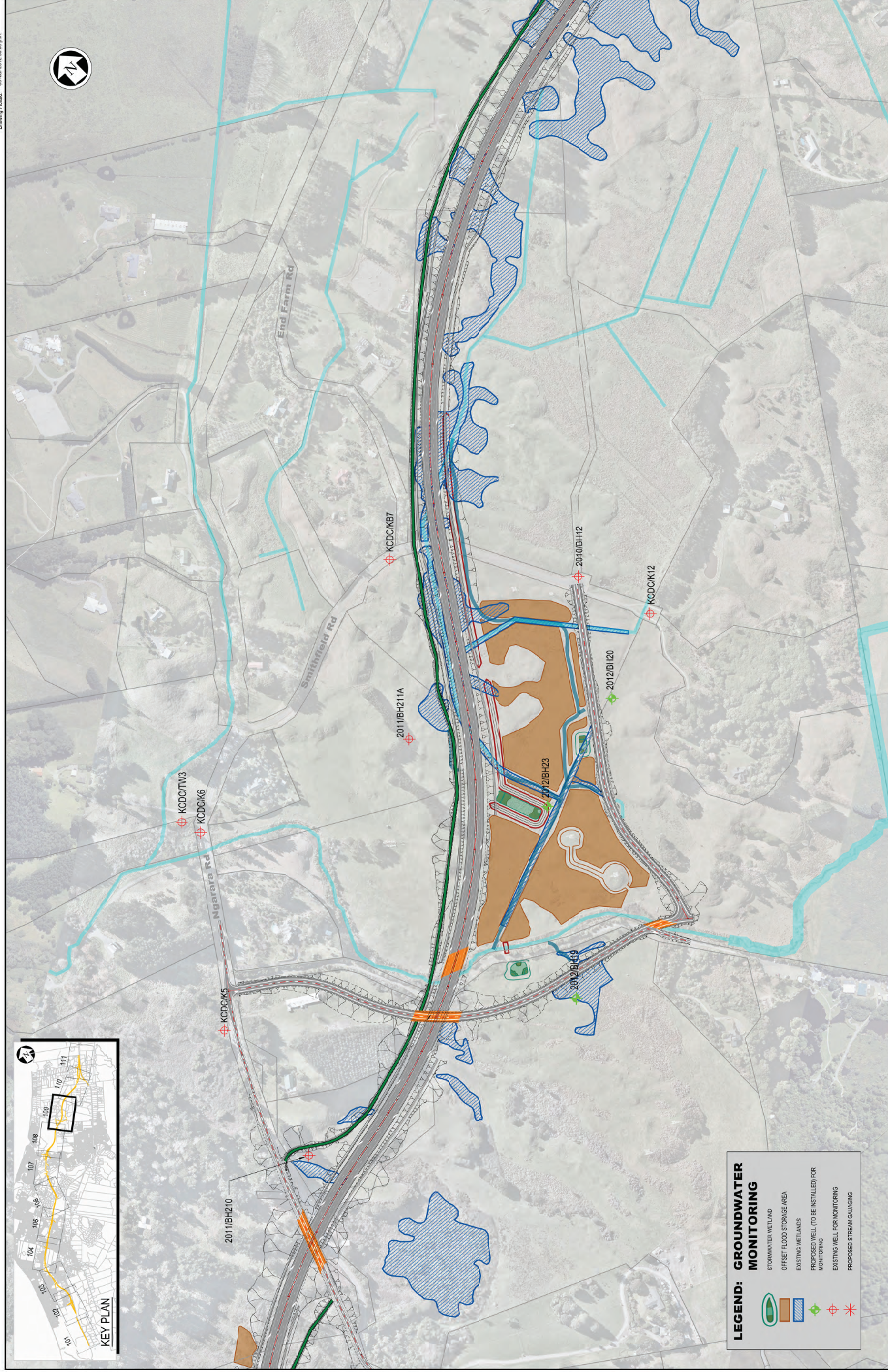
- STORAGE WATER WETLAND
- OFFSET FLOOD STORAGE AREA
- EXISTING WETLANDS
- PROPOSED WELL (TO BE INSTALLED) FOR MONITORING
- EXISTING WELL FOR MONITORING
- PROPOSED STREAM GAUGING

Revision	Description	Author	Check	Date
1	ARE LODGEMENT	INPN	15.03.12	

Original Scale (A3)
1:5000



Project: **MACKAYS TO PEKA PEKA EXPRESSWAY**
 Title: **GROUND WATER MONITORING LOCATIONS SHEET 8 OF 11**
 Status: FOR CONSULTING
 Document ID: MPP-AE-DWG
 Drawing No: **GT-GW-108**
 Rev: 1



LEGEND: GROUNDWATER MONITORING

- STORAGE WETLAND
- OFFSET FLOOD STORAGE AREA
- EXISTING WETLANDS
- PROPOSED WELL (TO BE INSTALLED) FOR MONITORING
- EXISTING WELL FOR MONITORING
- PROPOSED STREAM GAUGING

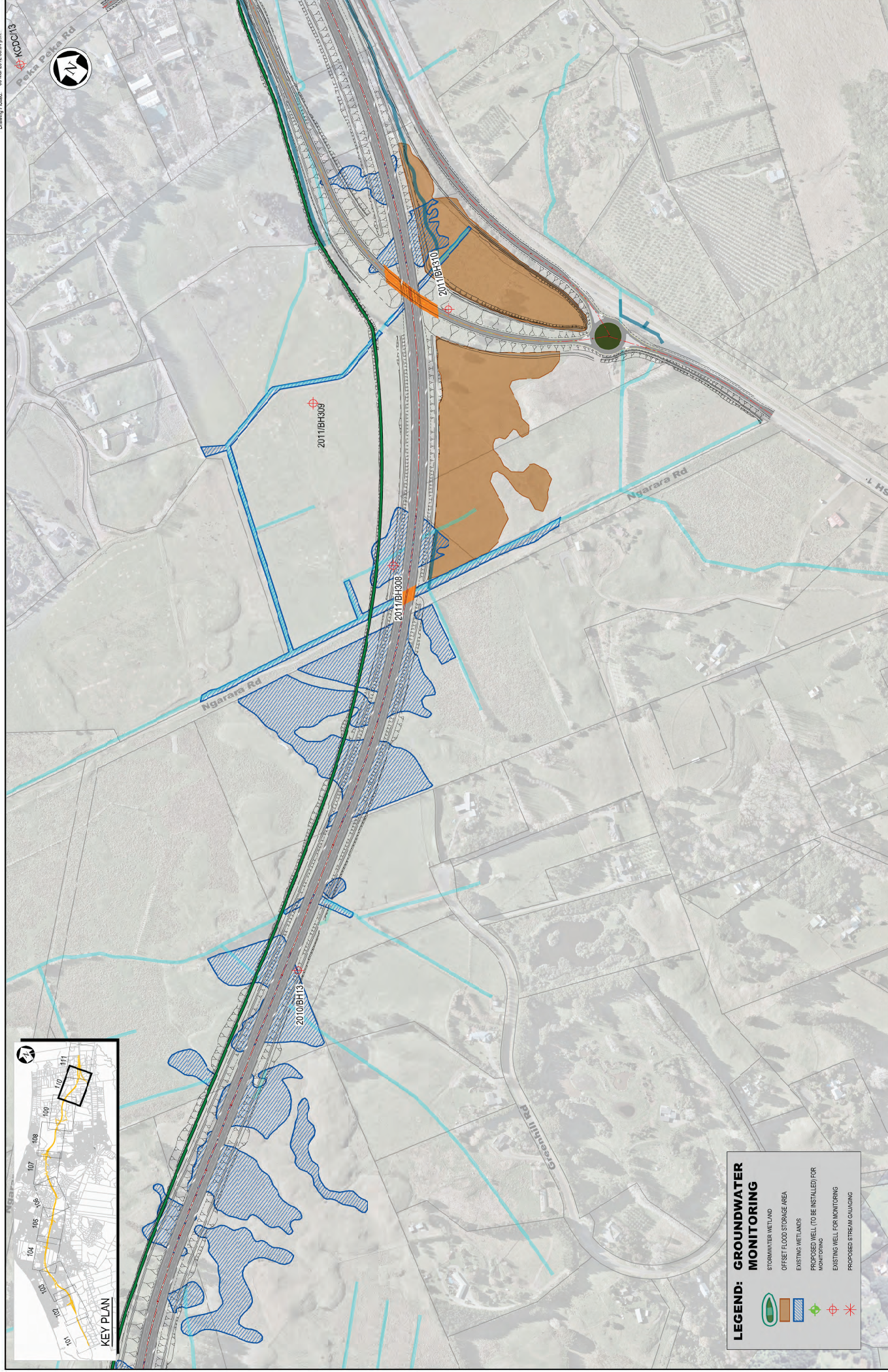
NOTES:

Revision	Description	Author	Check	Date
1	AEE LODGEMENT	INPN	15.03.12	

Original Scale (K/S)
1:5000



Project: **MACKAYS TO PEKA PEKA EXPRESSWAY**
 Title: **GROUND WATER MONITORING LOCATIONS SHEET 9 OF 11**
 Status: FOR CONSENTING
 Document ID: MZPP-AE-DWG
 Drawing No: **GT-GW-109**
 Rev: **1**



LEGEND: GROUNDWATER MONITORING

- STORAGE WATER WETLAND
- OFFSET FLOOD STORAGE AREA
- EXISTING WETLANDS
- PROPOSED WELL (TO BE INSTALLED) FOR MONITORING
- EXISTING WELL FOR MONITORING
- PROPOSED STREAM GAUGING

Project: **MACKAYS TO PEKA PEKA EXPRESSWAY**

Title: **GROUND WATER MONITORING LOCATIONS SHEET 10 OF 11**

Scale: FOR CONSENTING

Document ID: MPP-AEE-DWG

Drawing No: **GT-GW-110**

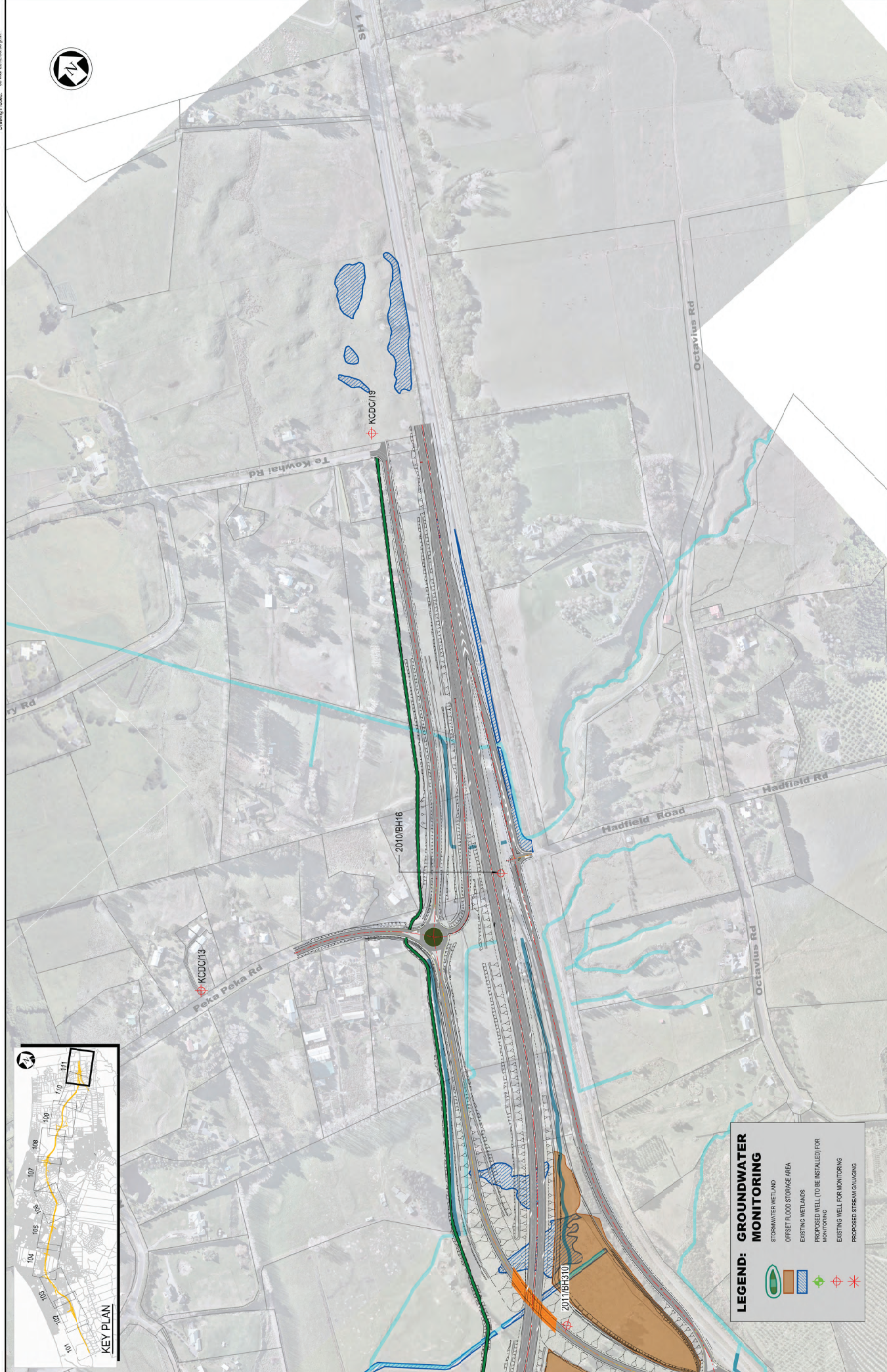
Rev: **1**

NZ TRANSPORT AGENCY
WAKA KOTAHU

Revision	Description	Author	Check	Date
1	AEE LODGEMENT	MFN	15.03.12	

Original Scale (A3): 1:5000

NOTES:



LEGEND: GROUNDWATER MONITORING

- STORAGE WETLAND
- OFFSET FLOOD STORAGE AREA
- EXISTING WETLANDS
- PROPOSED WELL (TO BE INSTALLED) FOR MONITORING
- EXISTING WELL FOR MONITORING
- PROPOSED STREAM GAUGING

Project: **MACKAYS TO PEKA PEKA EXPRESSWAY**

Title: **GROUND WATER MONITORING LOCATIONS SHEET 11 OF 11**

Date: - FOR CONSENTING

Document ID: MPP-AE-DWG

Drawing No: **GT-GW-111**

Rev: **1**

NZ TRANSPORT AGENCY
WAKA KOTAHĪ

Revision	Description	Author	Date
1	AEE LODGEMENT	MFN	15.03.12

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NOTES:

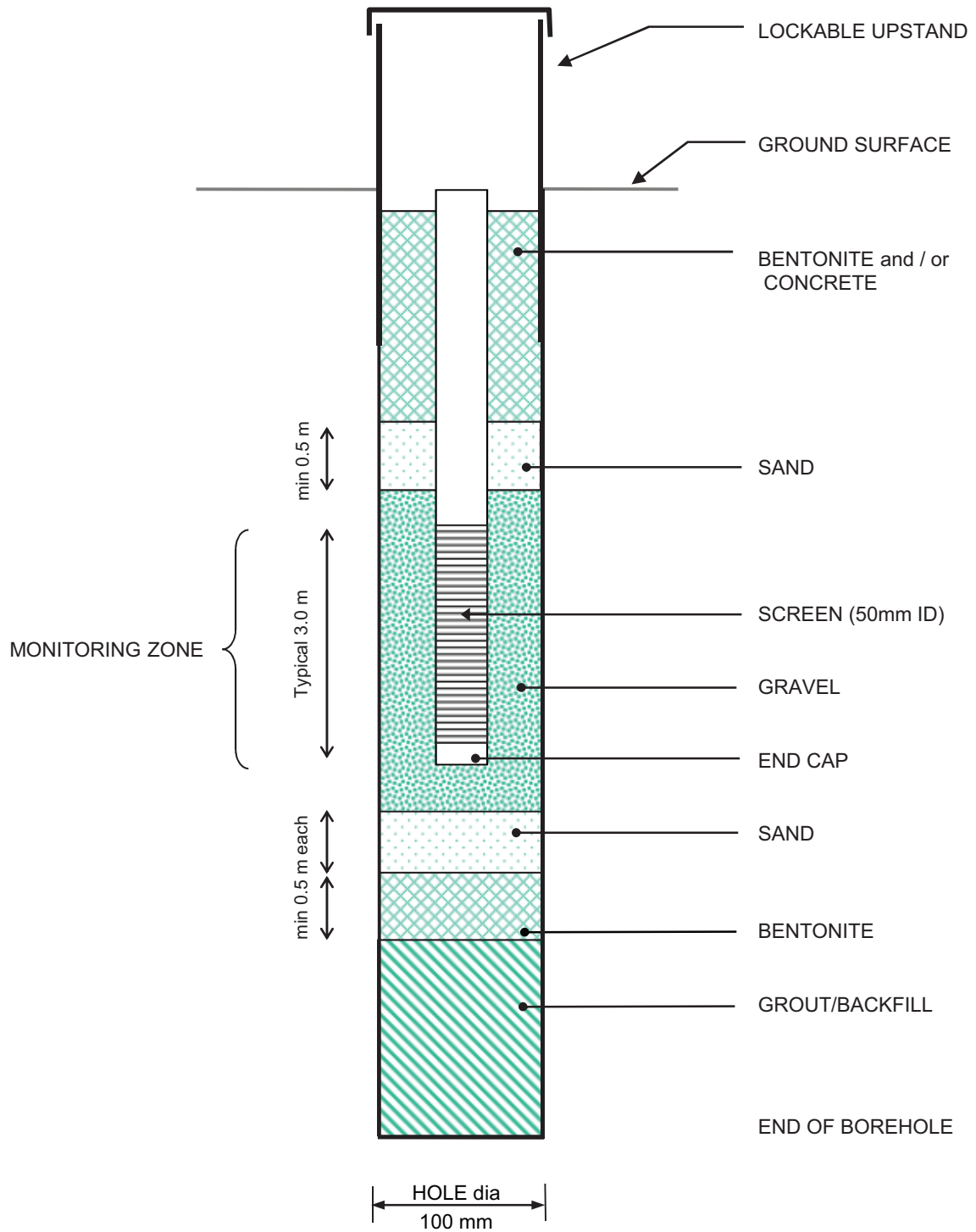
Appendix I.A
Monitoring Location Plan
Refer to Volume 5 (Part)

Appendix I.B

Monitoring Installation Details

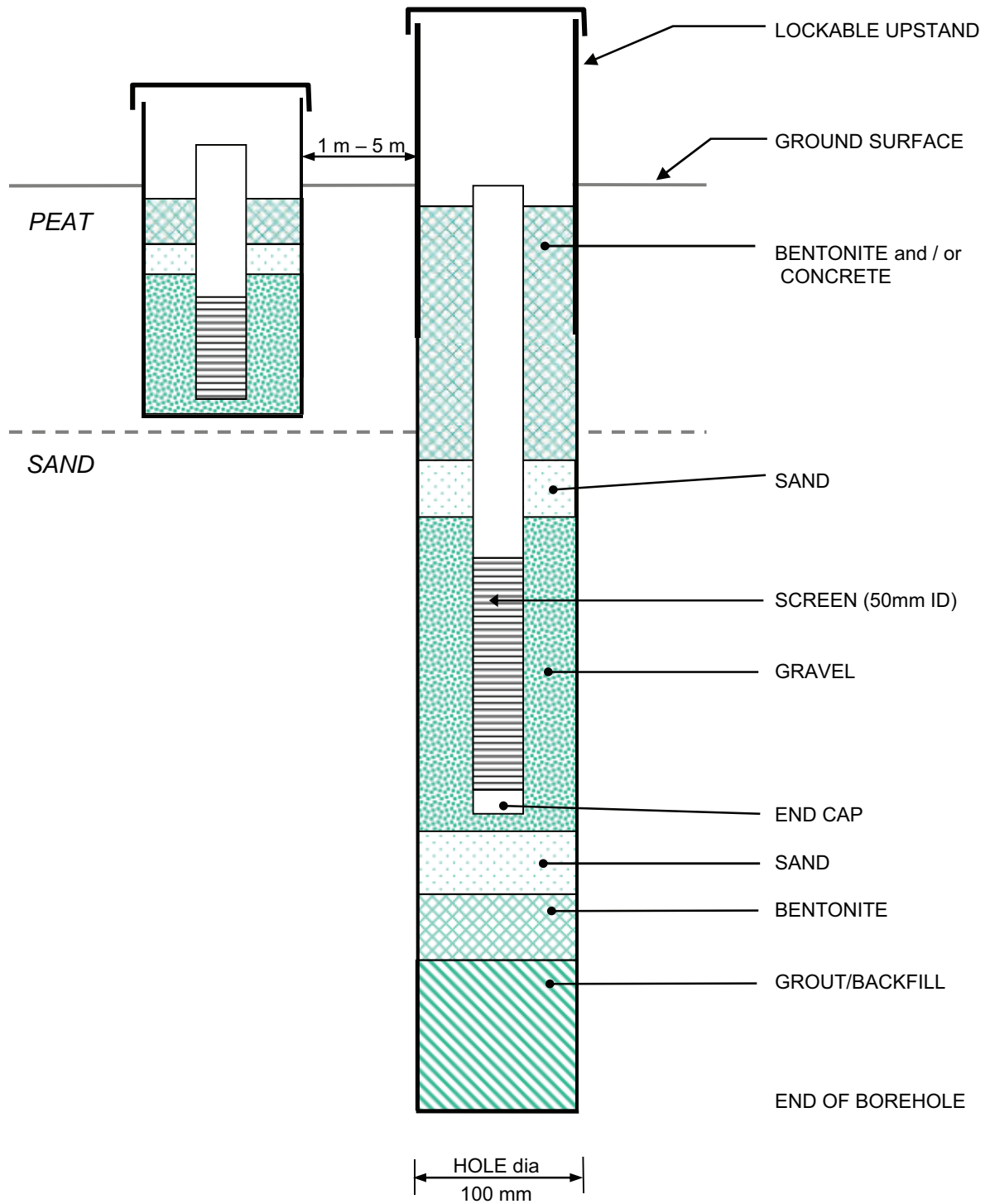
New monitoring bores/piezometers will be installed in general accordance with the following diagrams. The actual completion depths will be determined in the field based on the depth of the geological materials encountered at each location. The intent is to install and complete one shallow bore/piezometer in the overlying peat with a second bore/piezometer completed with its screen in the underlying sand. If the peat is not present at the targeted location only one bore/piezometer will be installed (in the sand). After the new (2012 series) of monitoring bores/piezometers have been installed, Appendix A will be updated with well completion details. At that time the special coordinates (eastings and southings) of all of the monitoring bores/piezometers will also be added identified.

Monitoring Bore Construction (single 50 mm standpipe)



INDICATIVE DEPTHS ONLY – FINAL
DESIGN TO BE AGREED ON SITE WITH
BECA SITE REP

Monitoring Bore Construction (50 mm standpipe pair)



INDICATIVE DEPTHS ONLY – FINAL
DESIGN TO BE AGREED ON SITE WITH
BECA SITE REP

NOT TO SCALE

Appendix I.C

Groundwater Reporting Templates

Groundwater Monitoring Report

A groundwater monitoring report will be prepared and delivered to the Greater Wellington Regional Council following the general outline below. Each monitoring report will include the information from all previously issued reports for completeness. The data collected after the previous data collection period will be presented and highlighted in data tables included as part of each report. Water level data will be compared with pre-construction data and any levels that exceed Alert or Action levels (as indicated in Section 5 of this GWMP) will be highlighted and assessed. Conclusions drawn from the entire data set will be made and included in the Executive Summary which will be updated with each report. Changes to the proposed format and Table of Contents may be made at future dates, if appropriate.

Table of Contents

Executive Summary

1. Introduction
 2. Background
 - 2.1. SH1 Mackays to Peka Peka Expressway
 - 2.2. Historical Groundwater Level Monitoring & Data
 3. Monitoring Installation Details
 4. Monitoring Methodology
 5. Groundwater Level Results
 - 5.1. Sector 1
 - 5.2. Sector 2
 - 5.3. Sector 3
 - 5.4. Sector 4
 6. Groundwater Levels Exceeding Alert or Action Levels
 7. Summary & Conclusions
-

Data collection Sheets

Water level data will be collected and recorded using one of the following data collection sheets or a similar version.

Typical Field Sheet

Groundwater Monitoring Field Sheet	
Project Name	Mackays to Peka Peka Expressway
Project No.	3320901/500
Date & Time	
Weather	fine / overcast / dry / raining / recent rainfall
Field Personnel	

2011/BH204							
Piezometer	Level (RL m)		Screened Unit	Screened Depth (m)	Time	Depth to GW (m btoc)	Depth to GW (m bgl)
	Ground	T.O.C					
2011/BH204a	4.30	4.45	Holocene Peat	1.5 – 3.0			
2011/BH204b	4.30	4.50	Holocene Sand	5.0 – 8.0			
Location Plan							
<p>boundary fence between no. 25 and 27</p> <p>20 m</p> <p>5.5 m</p> <p>Smith Road</p> <p>2011/BH204a: western piezometer</p> <p>2011/BH204b: eastern piezometer</p> <p>N</p> <p>NOT TO SCALE</p>							
Comments:							

2011/BH205							
Piezometer	Level (RL m)		Screened Unit	Screened Depth (m)	Time	Depth to GW (m btoc)	Depth to GW (m bgl)
	Ground	T.O.C					
2011/BH205a	8.20	8.60	Holocene Peat	1.5 – 3.0			
2011/BH205b	8.20	8.65	Holocene Sand	8.0 – 11.0			
2011/BH205c	8.20	8.50	Pleistocene Sand	15.0 – 18.0			
Location Plan							
Comments:							

2011/BH206							
Piezometer	Level (RL m)		Screened Unit	Screened Depth (m)	Time	Depth to GW (m btoc)	Depth to GW (m bgl)
	Ground	T.O.C					
2011/BH206a	5.10	5.50	Holocene Peat	1.5 – 3.0			
2011/BH206b	5.10	5.55	Holocene Sand	4.0 – 7.0			
Location Plan							
Comments:							

Appendix I.D

Example of Responses to Alert and Action Triggers in Wetlands

Appendix D - Example of Responses to Alert and Action Triggers in Wetlands

Groundwater Alert Level	Groundwater Alert Action		Groundwater Action Management	Ecological Adaptive Management
Wetland 9 (El Rancho)	<p>Notify the Alliance's Project Manager and the Consenting Authority (Greater Wellington Regional Council), in writing, within 3 working days</p> <p>Increase frequency of groundwater level monitoring to daily for all bores within 200 m radius of the affected monitoring bore</p>	<p>Recovery of the groundwater level at that monitoring bore to above the trigger level; OR</p> <p>A trend of increasing groundwater level over at least three (3) consecutive weeks; OR</p> <p>Analysis of the data indicates that adverse effects are not anticipated, in which case revised trigger levels would be set with approval of the Project Manager, Environmental Management Team and the Council</p>	<p>Any activity that has the potential to cause adverse effects (such as increasing drawdown) will be ceased and mitigation measures implemented. The following people will be notified:</p> <p>The Project and Site Managers; The Consenting Authority (GWRG); and The Environmental Management Team</p> <p>Works may recommence or recommence without mitigation once groundwater levels return to sub-Action levels. Alternatively, works may recommence if written notice is received from the Consenting Authority (the Council) indicating that they are satisfied that damage to buildings, structures and services, or impacts on wetlands are unlikely.</p>	<p>Establishment of an adjustable weir to control water within the existing drain through the centre of the wetland.</p> <p>Permanent infilling of the existing drain to increase groundwater levels consistent with any lowering of groundwater.</p> <p>Reductions in volume or outlet of flood storage wetland.</p> <p>Weed control of invasive weed species that have established as a result of hydrological changes deemed to arise from the Expressway construction.</p> <p>Replanting of any areas of die-back with suitable indigenous species.</p> <p>Additional mitigation opportunities at other wetlands within the study area, including restoration of the surrounding El Rancho wetlands.</p>