BEST FOR AUCKLAND STORMWATER OUTCOMES FOR EASTERN BUSWAY

P. May

Jacobs
Challenging today.
Reinventing tomorrow.

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Stormwater 2024
15–17 May | Tākina Wellington Te Whanganui-a-Tara

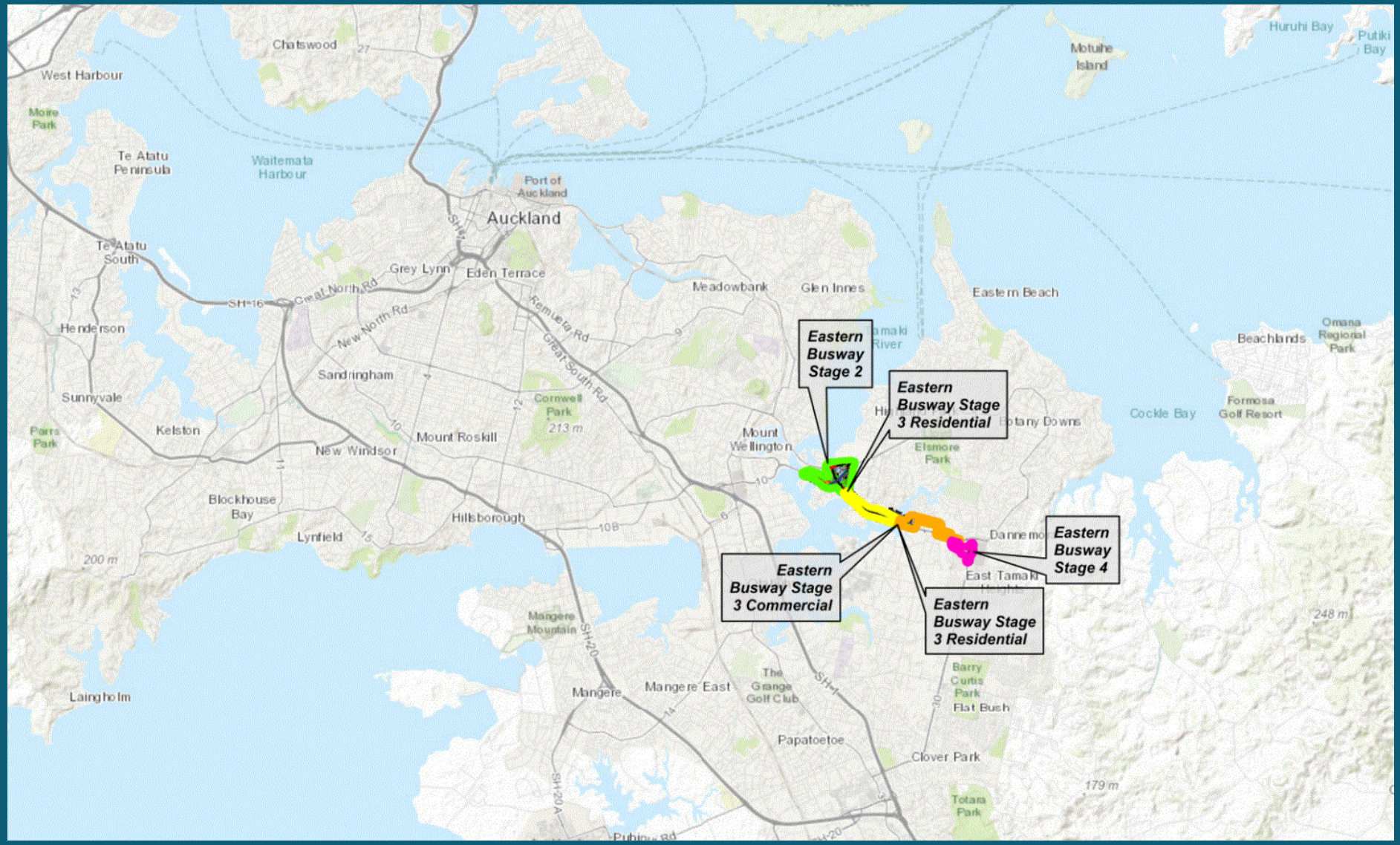
INTRODUCTION

- PROJECT DESCRIPTION
- STORMWATER DESIGN PHILOSOPHY
- NETWORK DISCHARGE CONSENT
- BPO SELECTION
- DESIGN DEVELOPMENT
- OVERLAND FLOW PATHS AND FLOODING
- SUMMARY

PROJECT DESCRIPTION

Eastern Busway:

- Is an integrated, multi-modal transport system to support population and economic growth in southeast Auckland and to decarbonise transportation.
- will enable investment in intensification along the busway corridor.
- Is projected to accommodate 18,000 passengers per day by 2028 (4 x pre-Covid 19) and 24,000 passengers per day by 2048.
- Will provide 5 km of busway between Pakūranga and Botany fully separated from other traffic allowing reliable bus trips along with five new bus stations.
- Will also provide 12 km of separated walking and cycling routes
- Will connect travelers to Panmure station for train connections to Central Auckland.



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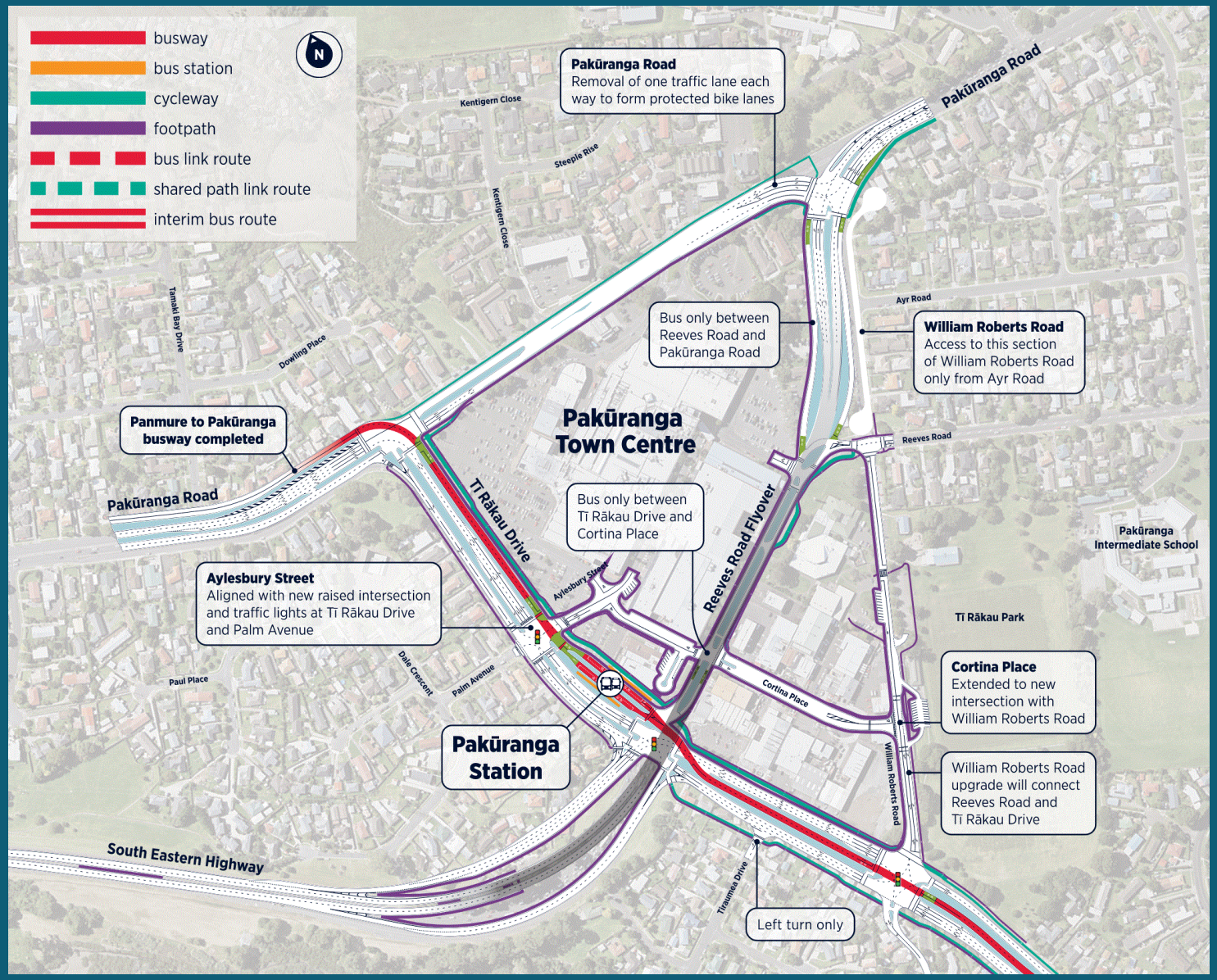

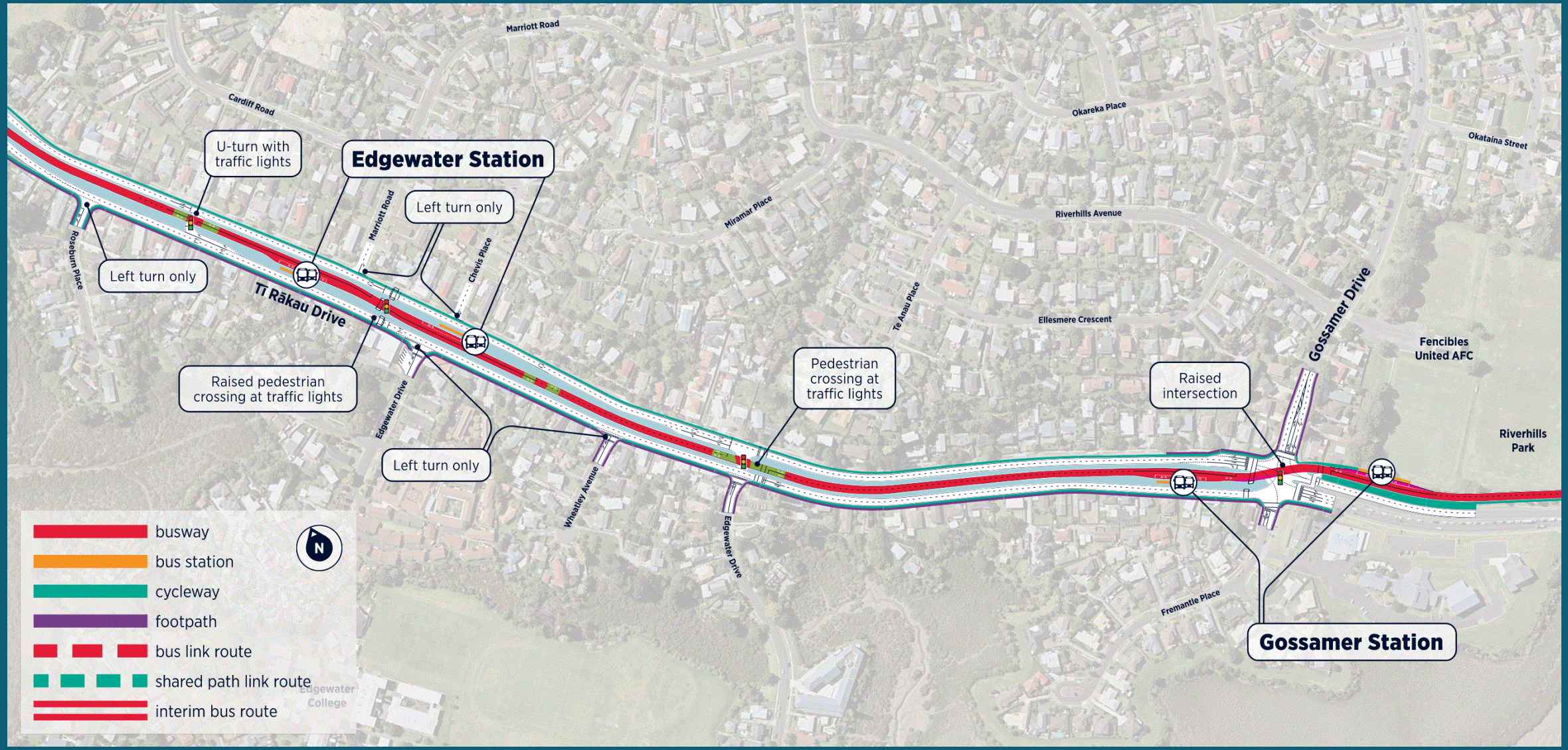

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DESIGN PHILOSOPHY

- A ‘maintenance-led’ approach (MR) seeking to reduce maintenance and operational costs
- MR require BPO approach under the Network Discharge Consent framework for stormwater treatment and does not follow GD01 as the default position.
- A risk-based approach, providing treatment efficiencies that are proportional to the contaminant generating risk.
- The use of a BPO approach is balanced by the target of achieving an overall reduction in existing contaminant contributions from carriageway.
- Mana whenua is a project partner of the Eastern Busway Alliance
- Weekly technical discussions with Healthy Waters.
- Collaboration led to the opportunity for best-for-Auckland solutions
- The project corridor is highly constrained

NETWORK DISCHARGE CONSENT

Schedule 4: Connection requirements

Regionwide stormwater network discharge consent

Auckland Council
Te Kaunihera o Tāmaki Makaurau

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Connection requirements

AT/NZTA/Railways transport projects

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AT/NZTA/Railways transport projects[13]

Connection requirements[14]

Issue/receiving environment	Small projects – up to 1,000m ^{2} of new impervious area	Off-road pedestrian and cycling facilities and ferry terminal facilities. New impervious area greater than 1,000m ^{2}	Development of new/ redevelopment of impervious area for: existing high use roads [15] - that includes new impervious area greater than 1,000m ^{2} other roads that includes new impervious area greater than 5,000m ^{2} rail corridor projects with new impervious area greater than 1,000m ^{2}	Development/redevelopment of a high contaminant generating carpark [16] (new/redeveloped area greater than 1,000m ^{2})
WATER QUALITY (Note: these apply in addition to general performance requirements above) Where the existing road corridor is constrained off-setting within the same catchment may form part of the mitigation approach.				
All receiving environments	No requirements.	No requirements.	• Treatment of new road area and any existing road area directed to same point by a water quality device designed in accordance with GD01/ TP 10 for the relevant contaminants.	• Treatment of new/redeveloped area (or all carpark area where it is >50% of the site) by a water quality device designed in accordance with GD01/ TP 10 for the relevant contaminants.
All receiving environments	No requirements.	No requirements.	Or • Treatment of equivalent area of high use road within same catchment by a water quality device designed in accordance with GD01/TP 10 for the relevant contaminants Or • An alternative level of mitigation determined through a SMP that: - applies an Integrated Stormwater Management Approach (as per above); - meets the NDC Objectives and Outcomes in Schedule 2; - is the BPO for the given project.	Or • Treatment of equivalent area within same catchment by a water quality device designed in accordance with GD01/TP 10 for the relevant contaminants Or • An alternative level of mitigation determined through a SMP that: - applies an Integrated Stormwater Management Approach (as per above); - meets the NDC Objectives and Outcomes in Schedule 2; - is the BPO for the given project.

BPO SELECTION

Options Assessed Against:

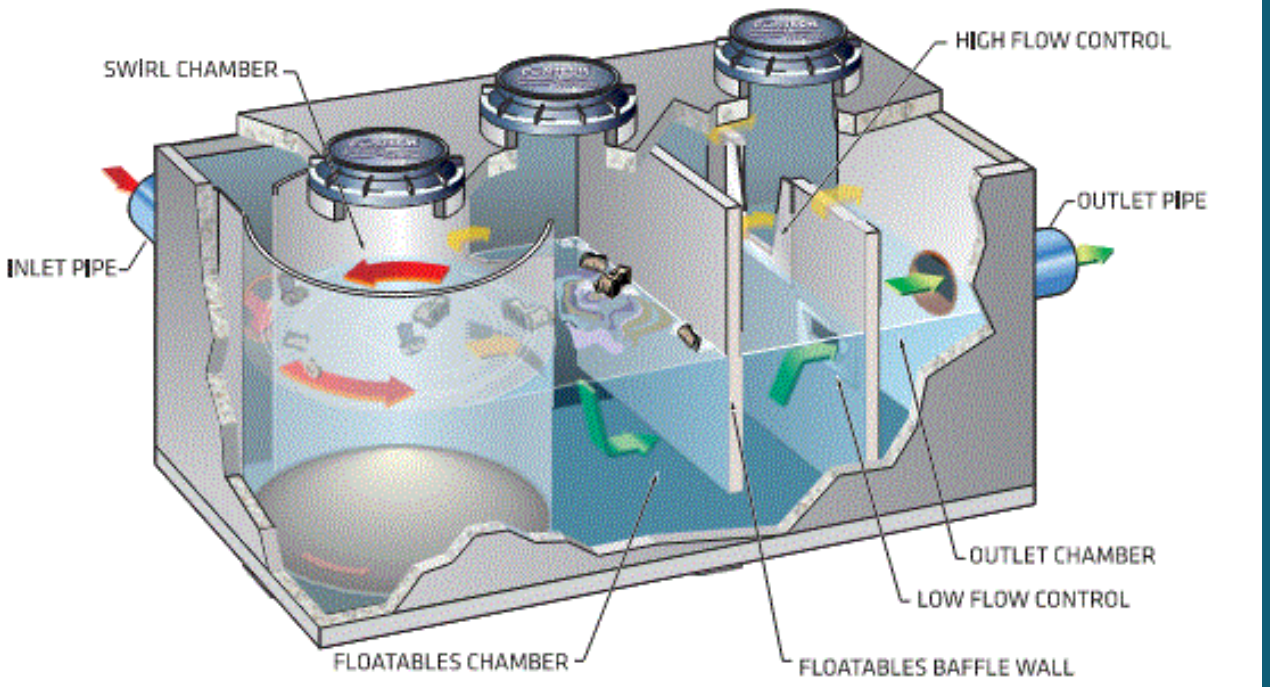
- Mana whenua
- Project Objectives
- Network Discharge Consent
- Sustainability
- Water Quality (Contaminant Load Modelling)
- Whole of Life Outcomes
- Constraints
- Safety in Design

Project-wide percent change in annual contaminant load predictions for treatment options assessed				
Scenario	**TSS**	**Zinc**	**Copper**	**TPH**
No Treatment	10%	1%	1%	1%
Option 1: Raingardens & GPT	-34%	-24%	-26%	-30%
Option 2: Large Raingardens	-16%	-13%	-16%	-19%
Option 3: Wetlands	-19%	-8%	-13%	-7%
Option 4: GPT & StormFilters	-23%	-2%	-14%	-19%

Project-wide stormwater treatment option LLC in New Zealand dollars for 2023			
Scenario	**Land Purchas**	**LLC**	**Total LLC**
Option 1: Raingardens & GPT	$0	$10,694,000	$10,694,000
Option 2: Large Raingardens	$7,595,000	$11,803,000	$21,698,000
Option 3: Wetlands	$20,115,000	$16,742,000	$35,309,000
Option 4: GPT & StormFilters	$500,000	$7,025,000	$7,705,000

EB2 PERCENT CHANGE IN ANNUAL CONTAMINANT LOAD FINAL DESIGN				
OUTFALLS	TSS	TOTAL ZINC	TOTAL COPPER	TPH
OUTFALL P98086C	-49%	-56%	-56%	-56%
OUTFALL MCC 108673	-55%	-22%	-32%	-32%
OUTFALL MCC 108680	-66%	-44%	-49%	-55%
OUTFALL MCC 108699	-30%	-33%	-35%	-38%
OUTFALL MCC 108633	-3%	-1%	-1%	-1%
TOTAL EB2	-41%	-24%	-30%	-31%

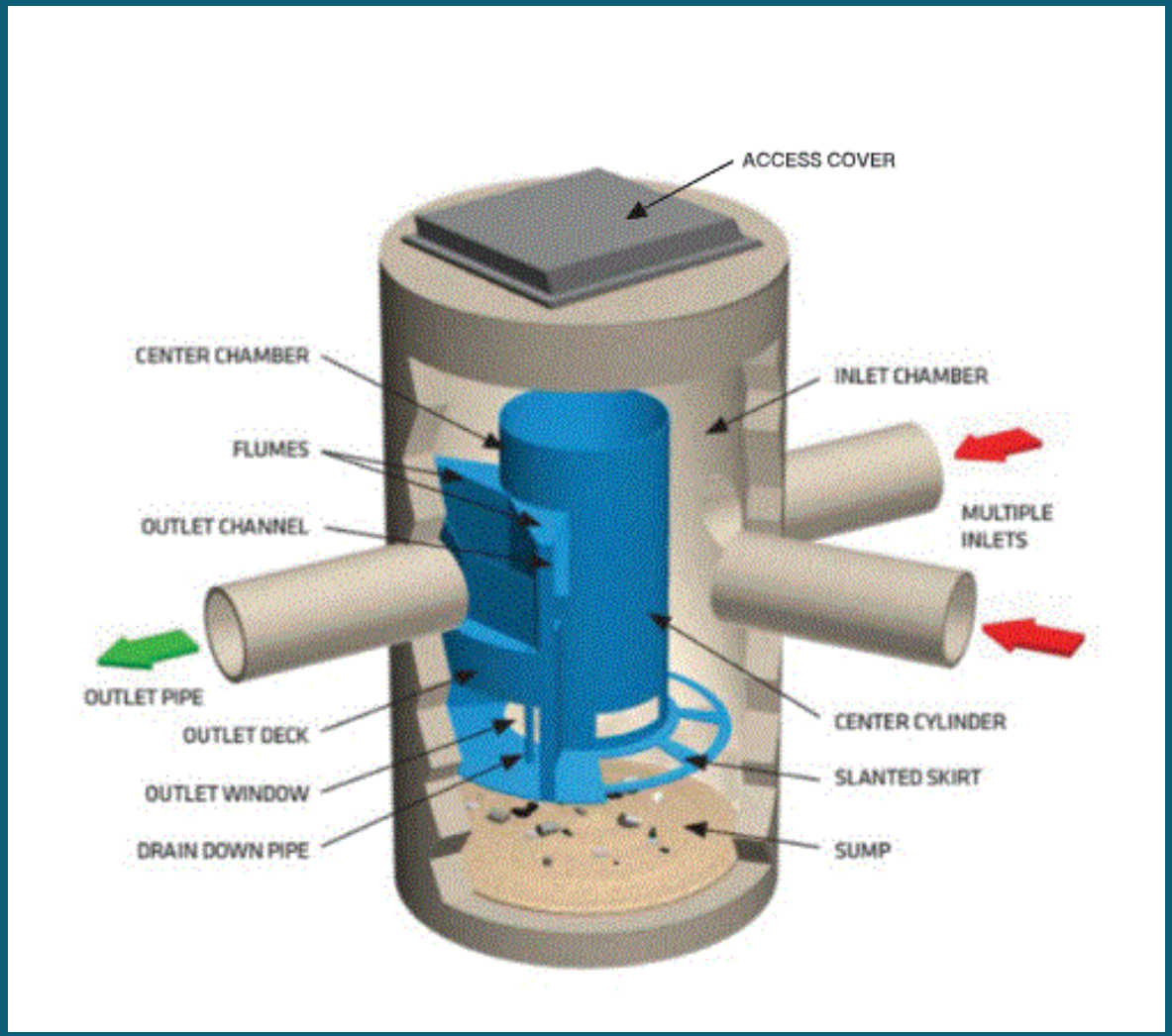
EB3R PERCENT CHANGE IN ANNUAL CONTAMINANT LOAD FINAL DESIGN				
OUTFALLS	TSS	TOTAL ZINC	TOTAL COPPER	TPH
OUTFALL MCC 108703	-75%	-76%	-79%	-81%
OUTFALL MCC 108707	6%	113%	94%	75%
OUTFALL MCC 108713	-100%	-100%	-100%	-100%
OUTFALL MCC 108718 & 108719	-19%	29%	19%	9%
OUTFALL MCC 108738	-78%	-67%	-70%	-73%
OUTFALL MCC 108748	-60%	-45%	-51%	-57%
OUTFALL MCC 108746 & 108749	-15%	4%	-3%	-7%
TOTAL EB3R	-48%	-28%	-34%	-39%



VORTECHS™ BY STORMWATER360

SIZED TO REMOVE 50% TSS ON A LONG-TERM AVERAGE

CASCADE SEPARATOR™ BY STORMWATER360



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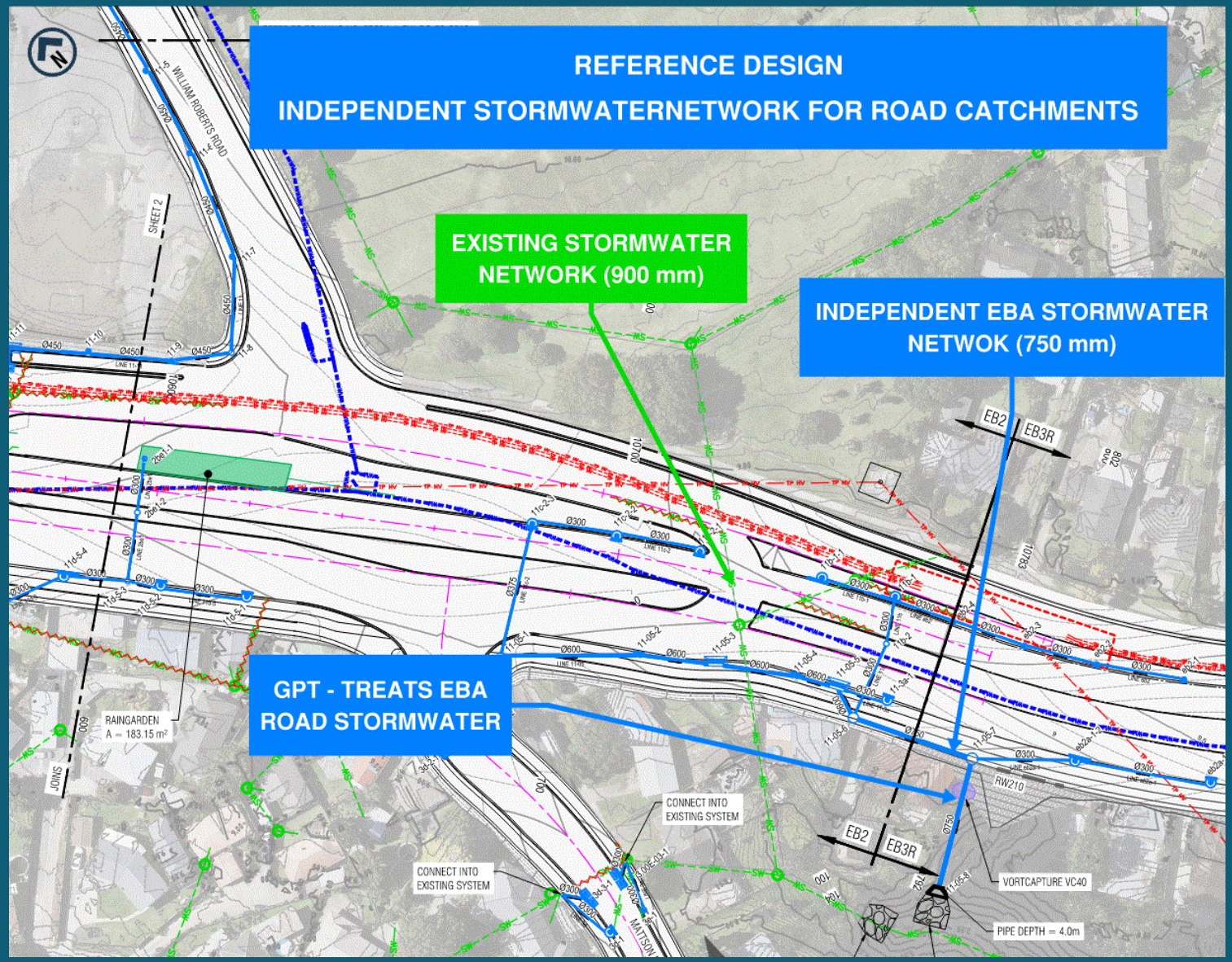
DESIGN DEVELOPMENT

- Reference Design
- Reference Design Updated (Flood Mitigation Design)
- Reference Design Updated (MR Compliant Design)
- Preliminary Detail Design
- ACHE Betterment Scoping and Development
- Completed Detailed Design (incorporating Betterment)
- IFC/AFC



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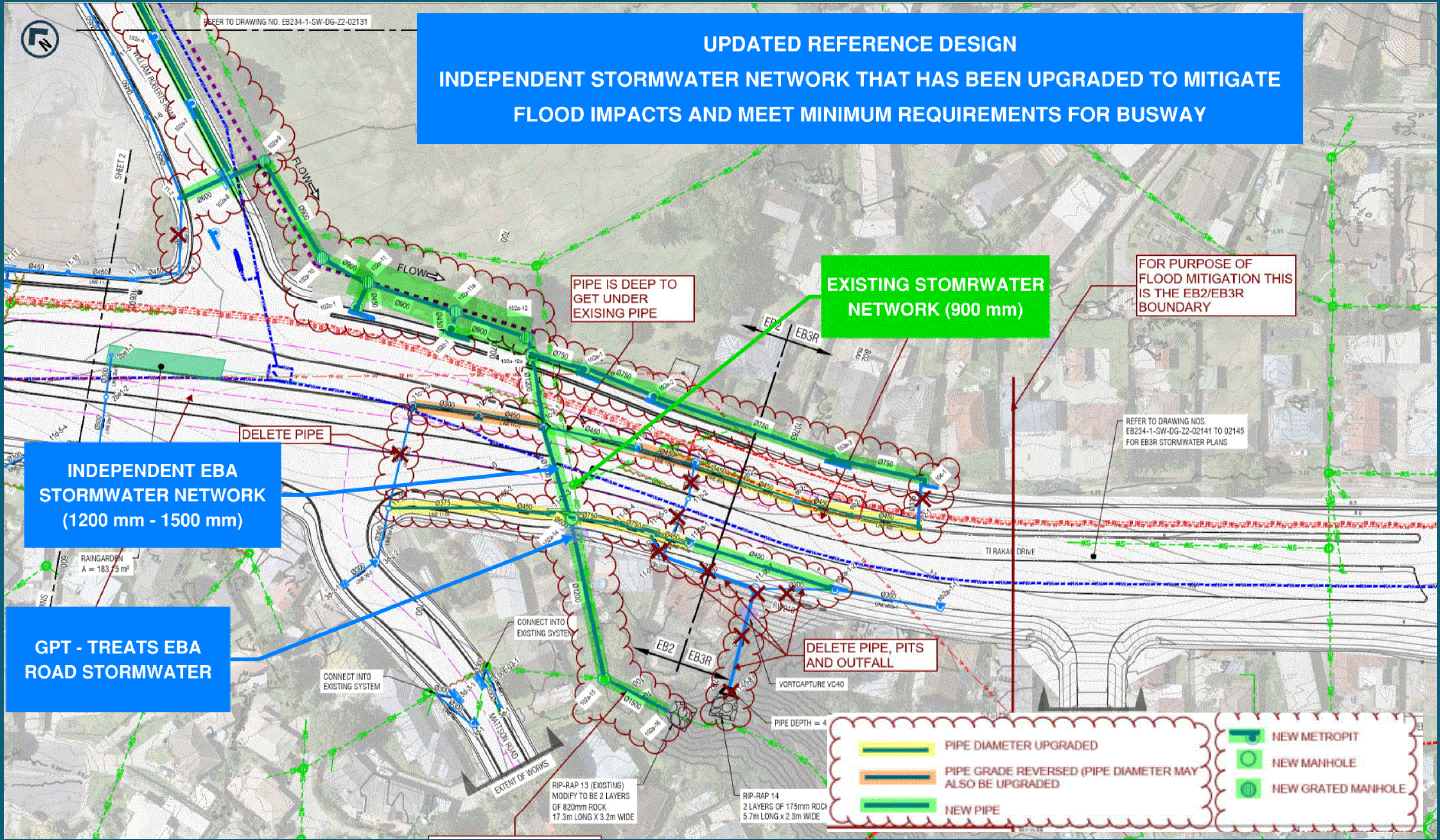
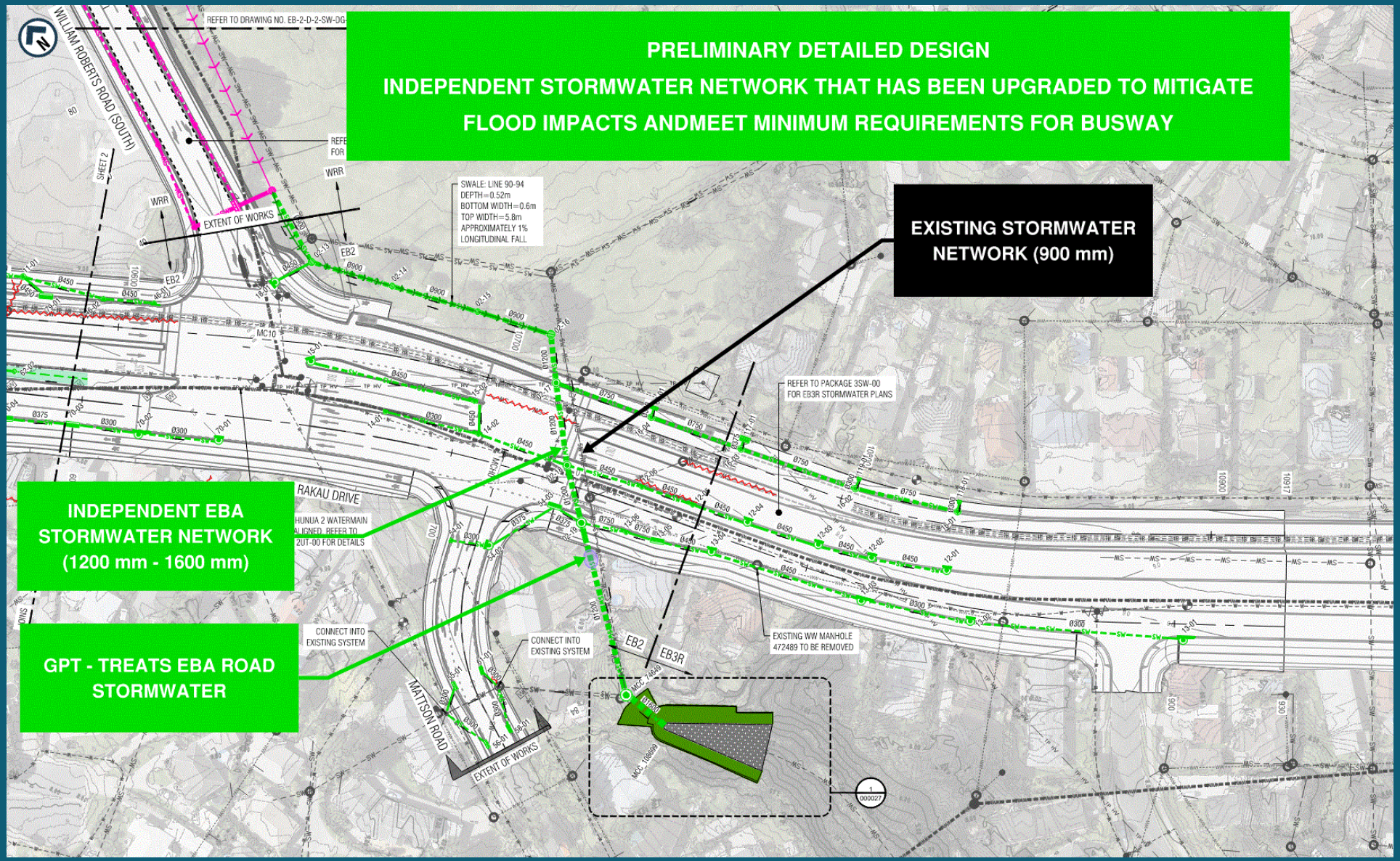
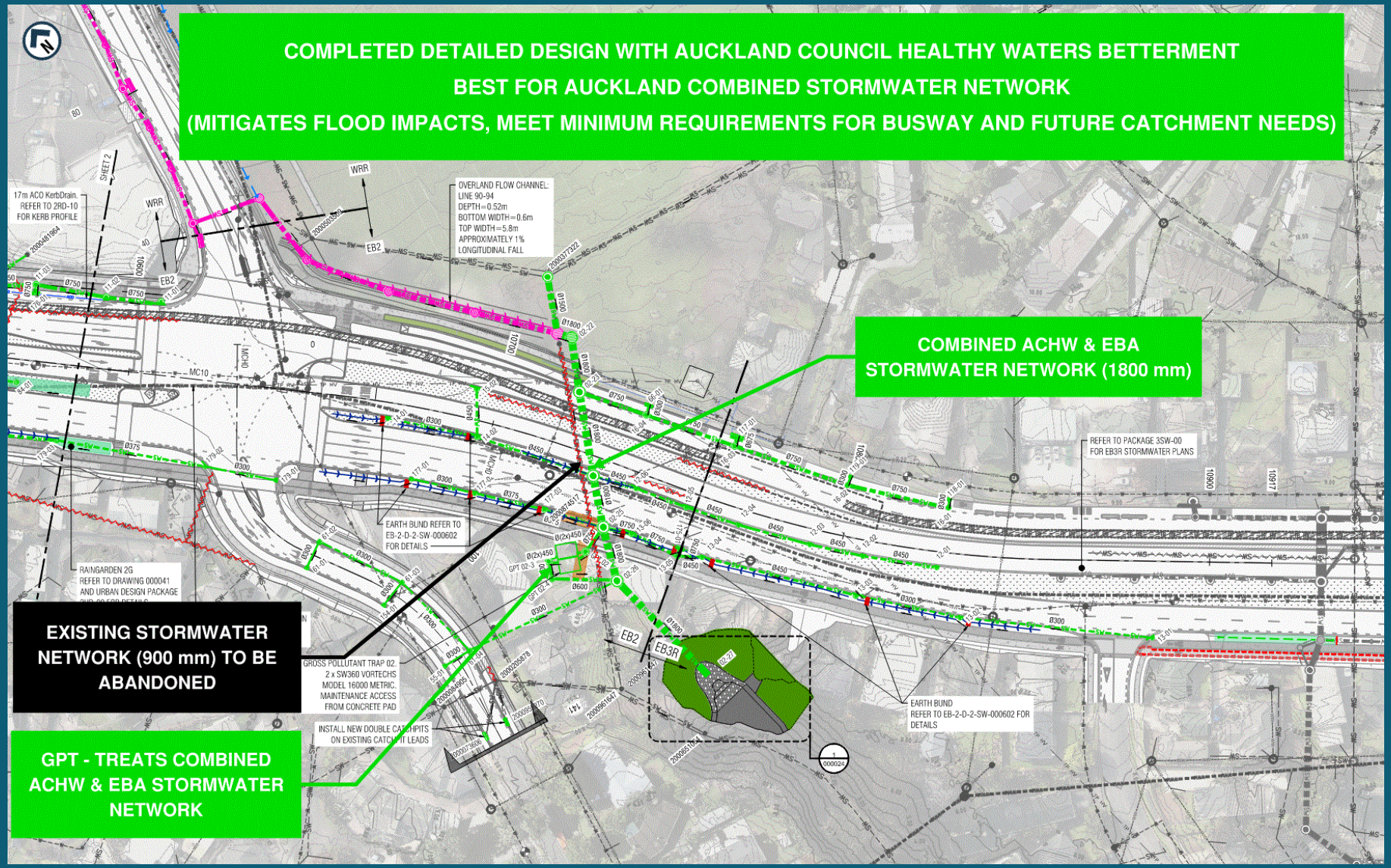

UPDATED REFERENCE DESIGN
INDEPENDENT STORMWATER NETWORK THAT HAS BEEN UPGRADED TO MITIGATE FLOOD IMPACTS AND MEET MINIMUM REQUIREMENTS FOR BUSWAY
EXISTING STOMRWATER NETWORK (900 mm)
PIPE IS DEEP TO GET UNDER EXISING PIPE
FOR PURPOSE OF FLOOD MITIGATION THIS IS THE EB2/EB3R BOUNDARY
REFER TO DRAWING NO. EB234-1-SW-DG-Z2-02131
REFER TO DRAWING NOS. EB234-1-SW-DG-Z2-02141 TO 02145 FOR EB3R STORMWATER PLANS
FLOW
EB2
EB3R
DELETE PIPE
INDEPENDENT EBA STORMWATER NETWORK (1200 mm - 1500 mm)
GPT - TREATS EBA ROAD STORMWATER
RAINGARDEN A = 183.15 m²
CONNECT INTO EXISTING SYSTEM
CONNECT INTO EXISTING SYSTEM
DELETE PIPE, PITS AND OUTFALL
VORTCAPTURE VC40
TI RAKAU DRIVE
MATTSON ROAD
EXTENT OF WORKS
RIP-RAP 13 (EXISTING) MODIFY TO BE 2 LAYERS OF 820mm ROCK 17.3m LONG X 3.2m WIDE
RIP-RAP 14 2 LAYERS OF 175mm ROCK 5.7m LONG x 2.3m WIDE
PIPE DIAMETER UPGRADED
PIPE GRADE REVERSED (PIPE DIAMETER MAY ALSO BE UPGRADED
NEW PIPE
NEW METROPIT
NEW MANHOLE
NEW GRATED MANHOLE





OVERLAND FLOW PATHS AND FLOODING

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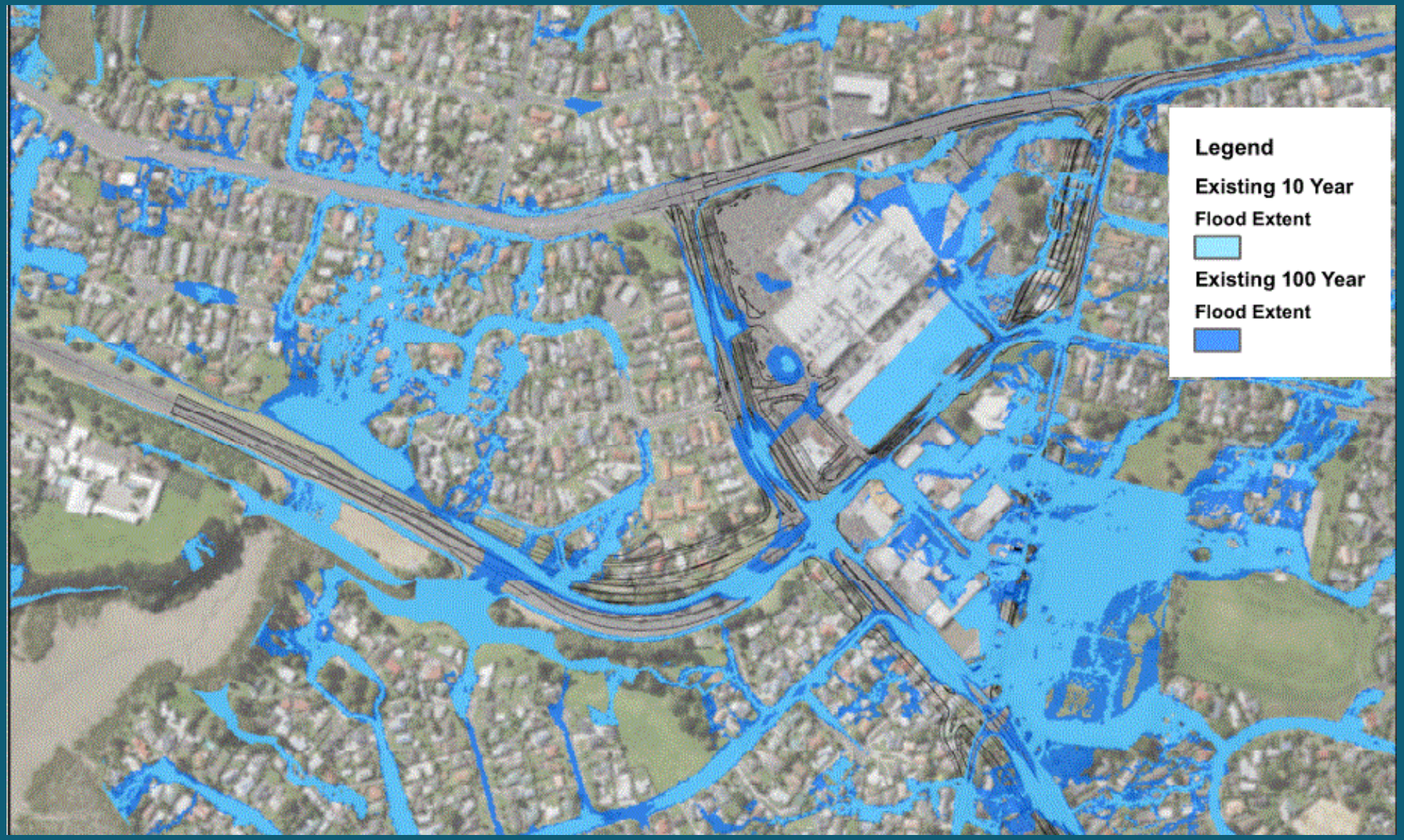
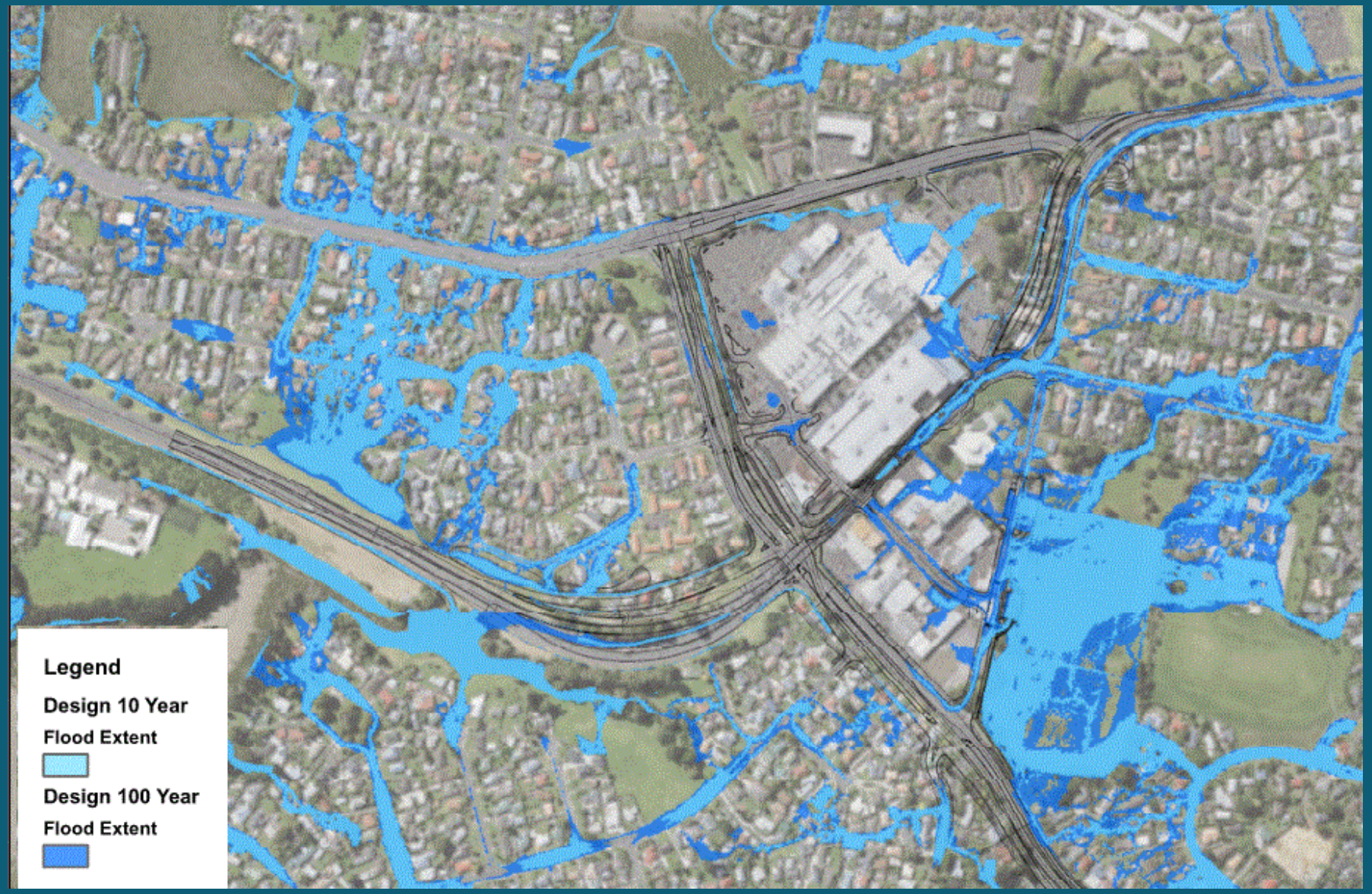
EB2 EXISTING FLOOD EXTENTS



EB2 DESIGN
FLOOD EXTENTS

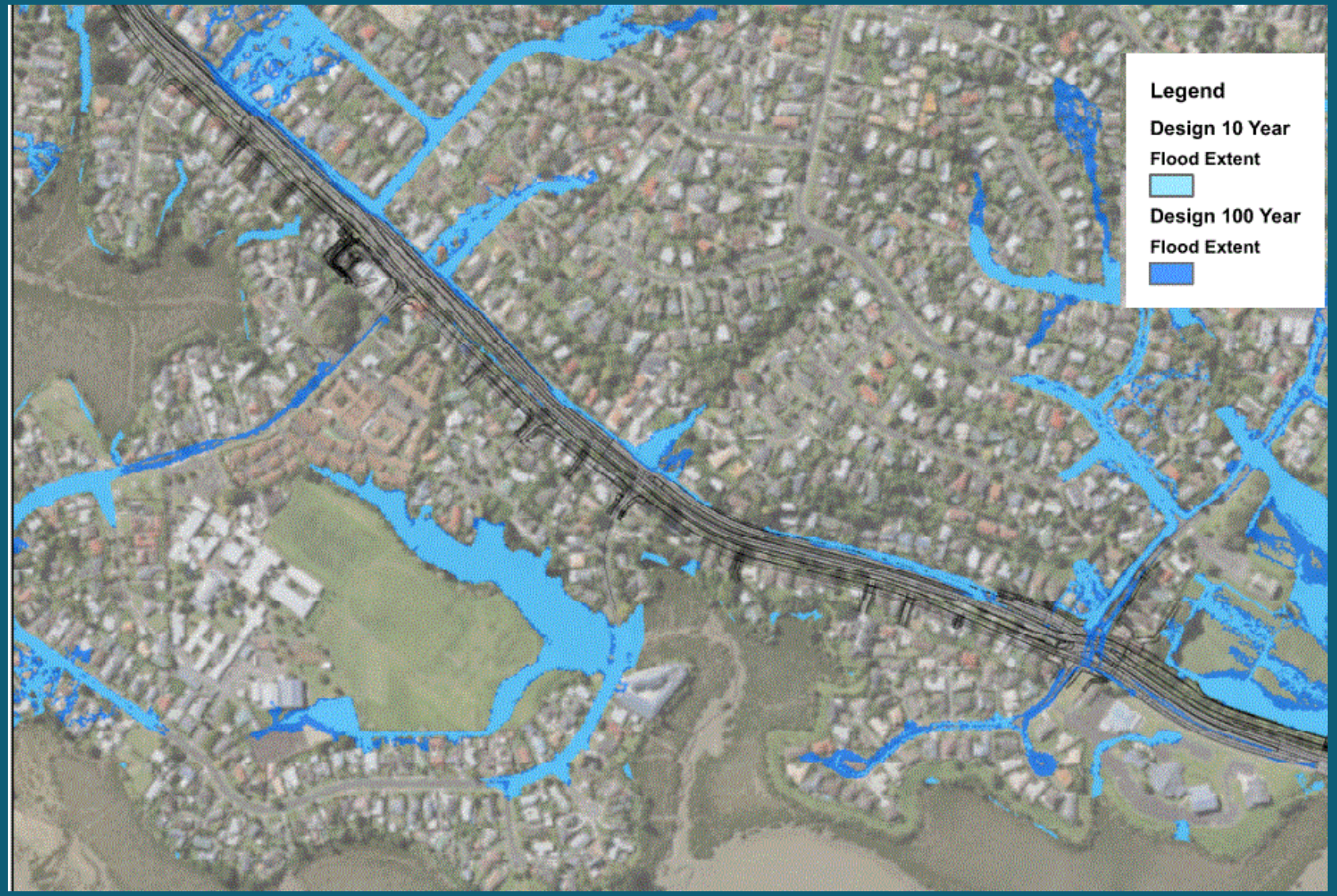


EB2 DESIGN 10-YEAR DEPTH DIFFERENCE

EB2 DESIGN 100-YEAR DEPTH DIFFERENCE

EB3R EXISTING FLOOD EXTENTS

EB3R DESIGN FLOOD EXTENTS



EB3R DESIGN 10-YEAR DEPTH DIFFERENCE

EB3R DESIGN 100-YEAR DEPTH DIFFERENCE

SUMMARY

Through collaboration with mana whenua and Auckland Council Healthy Waters, EBA is achieving:

- Lower contaminants being discharged to the outfalls than in the existing case
- A dry busway in a 10-year event and services are not disrupted in a 100-year event
- Flooding during 10 and 100-year events are significantly less through the project extents and adjacent areas
- Low maintenance stormwater networks and treatment systems
- Incorporation of Auckland Council Healthy Waters Betterment into Project works
- Best for Auckland Solutions

Thank you!
Questions? Patai?

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