

Stream				Cross Drainage						Stream Diversion		
Catchment	Stream	Ecological Status	Fish Type	Culvert / Bridge <sup>1</sup> *2	Diameter (mm)	Length <sup>3</sup> (m)	Designed Fish Passage	Debris Management	Energy Dissipation Structure	Type 1 (m)	Type 2 (m)	Type 3 (m)
Pūhoi	ON INDICATIVE MOTORWAY ALIGNMENT											
	P1	Estuarine	"Swimming"	BRIDGE - OKAHU VIADUCT	-	-	-	-	-	76		
	P2	Intermittent	None	Culvert 63800	1600	165	None	Relief Inlet	SAF Stilling Basin			61
	P3	Intermittent	None	Culvert 63500	1800	262	None	Relief Inlet	SAF Stilling Basin			163
	P3a	Intermittent	None	Culvert 63000	1350	92	None	None	SAF Stilling Basin			90
	P4	Estuarine	"Swimming"	BRIDGE - PŪHOI VIADUCT	-	-	-	-	-			
	P5	Intermittent	None	Culvert 61900	1600	99	None	None	Riprap Basin			660
	P6	Intermittent	None	Culvert 61600	1800	62	None	None	SAF Stilling Basin			621
	P6a	Permanent	None	Culvert 61300	1200	75	None	None	SAF Stilling Basin			28
	P7	Permanent	None	Culvert 61100	1350	81	None	Relief Inlet	SAF Stilling Basin			20
	P8	Intermittent	None	Culvert 60800	2550	127	None	Debris Rack and culvert sized to pass 100Y ARI	SAF Stilling Basin			42
	P9	Permanent	"Climbing"	Culvert 60200 ARCH	Arch (7315 Span, 3658 Height)	104	Natural Bed	Debris Rack and culvert sized to pass 100Y ARI	Riprap Basin		32	
	P9b	Intermittent	None	Culvert 59900	1200	65	None	None	SAF Stilling Basin			20
	P9a	Intermittent	None	Culvert 59800	1600	121	None	Relief Inlet	SAF Stilling Basin			20
	P10	Permanent	None	BRIDGE - HIKAUAE VIADUCT	-	-	-	-	-			
	P10a	Intermittent	None	Culvert 59400	1200	55	None	None	SAF Stilling Basin			20
	P11	Permanent	"Swimming"	BRIDGE - SCHEDEWYS VIADUCT	-	-	-	-	-			
	P11a	Intermittent	None	Culvert 58700	1600	116	None	None	SAF Stilling Basin			122
	P11b/c	Permanent	None	Culvert 58400	1600	146	None	Relief Inlet	SAF Stilling Basin			226
	P11f	Intermittent	None	Culvert 57600	1600	137	None	Relief Inlet	SAF Stilling Basin			439
	P11g	Intermittent	None	Culvert 57400	1350	96	None	None	SAF Stilling Basin			304
	P12	Intermittent	None	Culvert 57200	1600	235	None	Relief Inlet	SAF Stilling Basin			447
Mahurangi	M13	Intermittent	None	Culvert 56700	1600	123	None	None	SAF Stilling Basin			20
	M13a	Intermittent	None	Culvert 56400	1200	97	None	Relief Inlet	SAF Stilling Basin			44
	M13b	Intermittent	None	Culvert 56100	1200	84	None	None	SAF Stilling Basin			42
	M13d	Permanent	"Climbing"	Culvert 55300	2550	81	Baffle	Relief Inlet	Modified SAF Stilling Basin		1486	
	M15	Permanent	"Climbing"	Culvert 54700 ARCH	Arch (8534 Span, 4267 Height)	258	Natural Bed	Debris Rack and culvert sized to pass 100Y ARI	Riprap Basin		20	
	M15			STREAM DIVERSION								605
	M15a	Intermittent	None	Culvert 53800	1600	70	None	None	Riprap Basin			335
	M16	Permanent	"Climbing"	BRIDGE - PERRY ROAD VIADUCT	-	-	-	-	-			
	M16a	Intermittent	None	Culvert 53000	1600	175	None	Relief Inlet	SAF Stilling Basin			155
	M18/19	Permanent	"Swimming"	BRIDGE - KAURI ECO VIADUCT	-	-	-	-	-	289		
	M19a	Intermittent	None	Culvert 51900	1200	77	None	None	SAF Stilling Basin			20
	M19b	Intermittent	None	Culvert 51600	1200	84	None	Relief Inlet	SAF Stilling Basin			111
	M19c	Intermittent	None	Culvert 51300	1800	172	None	Relief Inlet	SAF Stilling Basin			20
	M21a	Intermittent	"Climbing"	Culvert 51000	1600	124	Baffle	Relief Inlet	Modified SAF Stilling Basin		37	
	M21b	Permanent	None	Culvert 50800	1200	94	None	Relief Inlet	SAF Stilling Basin			20
	M21c	Intermittent	"Swimming"	Culvert 50500	1200	92	Baffle	None	Modified SAF Stilling Basin	20		
	M21d	Intermittent	"Swimming"	Culvert 50200	1600	109	Baffle	Relief Inlet	Riprap Basin	73		
	M21e	Intermittent	"Swimming"	BRIDGE - WYLLIE ROAD OVERPASS	-	-	-	-	-			
	M22	Permanent	"Swimming"	Culvert 49500 ARCH	Arch (7315 Span, 3658 Height)	104	Natural Bed	Debris Rack and culvert sized to pass 100Y ARI	Riprap Basin	31		
	M23/24	Permanent	"Swimming"	BRIDGE - WOODCOCKS ROAD VIADUCT	-	-	-	-	-			
	-	Permanent	"Swimming"	BRIDGE - CARRAN ROAD FLOOD RELIEF BRIDGE	-	-	-	-	-	344		
	M23a	Permanent	"Swimming"	Culvert 48000	1350	45	None	None	Riprap Basin	220		
	M23b	Permanent	"Swimming"	Culvert 47700	1350	71	None	None	Riprap Basin	145		
	M23c	Permanent	"Swimming"	Culvert 47400	1600	60	Baffle	None	Riprap Basin	51		
	M23d	Intermittent	"Climbing"	Culvert 47200	1200	61	Baffle	None	Modified SAF Stilling Basin	191		
	ON PROPOSED EASTERN LINK TO WARKWORTH											
	SH1-700	Intermittent	None	Culvert 700SH1S	1600	69	None	None	SAF Stilling Basin			40
	ON PROPERTY ACCESS ROAD (WYLLIE ROAD)											
	PA100A	Intermittent	"Swimming"	Culvert 100A	1050	22	Baffle	None	Riprap Basin	20		
	PA200A	Intermittent	"Swimming"	Culvert 200A	900	21	Baffle	None	Riprap Basin	20		
	PA500A	Intermittent	"Swimming"	Culvert 500A	900	33	Baffle	Relief Inlet	Riprap Basin	20		
	PA900A	Permanent	"Swimming"	MINOR BRIDGE - PROPERTY ACCESS ROAD	-	-	-	-	-			
Pūhoi	ON EXISTING STATE HIGHWAY 1											
	P6	Intermittent	None	SH1-P6	1200	22	None	None	To be detailed in design phase			
	P8	Intermittent	None	SH1-P8	825	43	None	None	To be detailed in design phase			
	P9	Permanent	"Climbing"	SH1-P9	1600	30	Baffle	None	To be detailed in design phase			

\*1 Excludes Moirs Hill Road and other access roads/tracks where no design has been completed at this stage.  
\*2 Only bridges associated with streams are included.  
\*3 Lengths (m) are measured in plan (horizontally). Actual lengths will differ and are longer due to slopes.

0	30/08/13	TF	MW	TI	ISSUE FOR NOR / CONSENT	
AMD	DATE	DESIGN REVIEW	REVD D. MGR	APPD A. MGR	PURPOSE OF ISSUE / AMENDMENT	



**DISCLAIMER**  
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ARA TŪHONO - PŪHOI TO WELLSFORD			
PŪHOI TO WARKWORTH - FOR RMA APPROVALS			
DRAWN SP / AN	DRAFTING CHECK DS	REVIEWED DISCIPLINE MANAGER MW	APPROVED ALLIANCE MANAGER TI
DESIGNED DS	DESIGN REVIEW TF		

OPERATIONAL WATER MANAGEMENT SUMMARY OF BRIDGES, CULVERTS & STREAM DIVERSIONS			
SCALE NOT TO SCALE	CONTRACT No PA3748	DRAWING No SW-150	AMDT 0

Catchment	Treatment Device	Catchment Area (ha) <sup>*1</sup>				Water Quality Treatment	Extended Detention	Outlet Erosion Protection	Discharge Location
		Pervious	Rock	Road	Total	Y/N	Y/N	Y/N	Ecological Reference
Pūhoi	Wetland 64500	0.20	0.00	0.45	0.65	Y	N	Y	P1 <sup>*2</sup>
	Wetland 63600	1.07	0.00	3.13	4.19	Y	N	Y	P3 <sup>*2</sup>
	Wetland 62900	3.29	0.00	4.70	7.99	Y	N	Y	P4 <sup>*2</sup>
	Wetland 62600	4.12	0.00	1.82	5.94	Y	N	Y	P4 <sup>*2</sup>
	Wetland 61600	2.40	0.09	2.87	5.35	Y	Y	Y	P6
	Wetland 61400	3.07	0.01	1.80	4.89	Y	Y	Y	P6a
	Wetland 60600	3.77	0.11	2.03	5.91	Y	Y	Y	P8
	Wetland 60200	2.53	0.00	1.95	4.48	Y	Y	Y	P9
	Wetland 59600	0.51	0.00	1.15	1.66	Y	Y	Y	P10
	Wetland 59200	0.00	0.00	3.70	3.70	Y	Y	Y	P11
	Wetland 58800	2.89	0.34	2.36	5.59	Y	Y	Y	P11a
	Wetland 58200	0.56	0.01	4.62	5.18	Y	Y	Y	P11b/c
	Wetland 57300	3.13	0.43	2.59	6.15	Y	Y	Y	P11g
Mahurangi	Wetland 56200	3.24	0.19	1.45	4.89	Y	Y	Y	M13b
	Wetland 55500	5.10	0.76	2.53	8.39	Y	Y	Y	M13d
	Wetland 54500	1.80	0.39	2.94	5.13	Y	Y	Y	M15
	Wetland 53600	3.59	2.60	3.11	9.29	Y	Y	Y	M16
	Wetland 53100	0.00	0.00	1.32	1.32	Y	Y	Y	M16
	Wetland 52200	3.90	0.42	3.20	7.51	Y	Y	Y	M18/19
	Wetland 51300	1.90	0.00	2.95	4.85	Y	Y	Y	M19c
	Wetland 50300	2.34	0.11	3.09	5.54	Y	Y	Y	PA500A
	Wetland 49900	0.00	0.00	1.14	1.14	Y	Y	Y	PA100A
	Wetland 49400	0.00	0.00	2.89	2.89	Y	Y	Y	M22
	Wetland 48900	2.01	0.00	1.11	3.12	Y	Y	Y	M23/24
	Wetland 48400	0.00	0.00	1.01	1.01	Y	Y	Y	Carran Road Flood Relief Bridge
	Wetland 47700	1.49	0.00	4.14	5.63	Y	Y	Y	M23b
	Wetland 800SH1S	0.00	0.00	1.20	1.20	Y	Y	Y	SH1-700

\*1 Areas (ha) are plan areas  
\*2 Short stream connecting to CMA

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ARA TŪHONO - PŪHOI TO WELLSFORD			
PŪHOI TO WARKWORTH - FOR RMA APPROVALS			
DRAWN SP / AN	DRAFTING CHECK DS	REVIEWED DISCIPLINE MANAGER MW	APPROVED ALLIANCE MANAGER TI
DESIGNED DS	DESIGN REVIEW TF		

OPERATIONAL WATER MANAGEMENT SUMMARY OF WETLANDS			
SCALE NOT TO SCALE	CONTRACT No PA3748	DRAWING No SW-151	AMDT 0