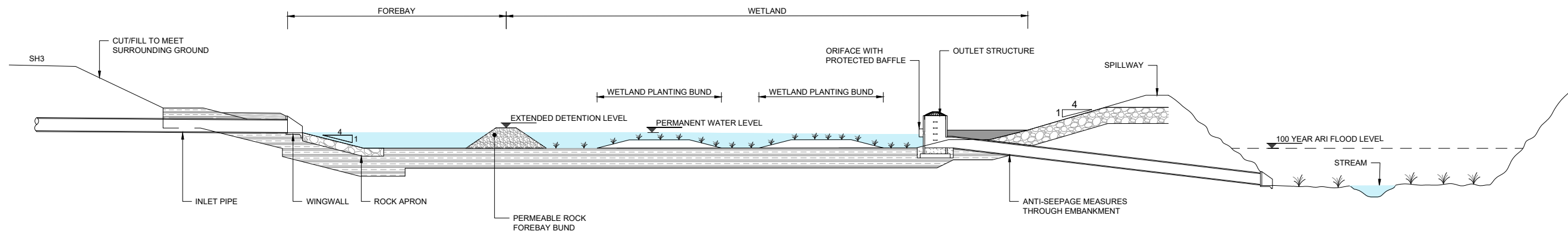


**PLAN - TYPICAL WETLAND**  
NOT TO SCALE

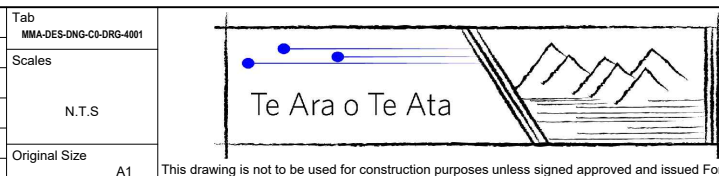


**SECTION - TYPICAL WETLAND**  
NOT TO SCALE

Wetland Schedule				
Wetland ID	Impervious Catchment Area (m <sup>2</sup> )	Pervious Catchment Area (m <sup>2</sup> )	Total Catchment Area (m <sup>2</sup> )	Functions
W1	11900	20570	32470	Water Quality Treatment & Extended Detention
W2	18600	39500	58100	Water Quality Treatment & Extended Detention
W3	11580	20400	31980	Water Quality Treatment & Extended Detention

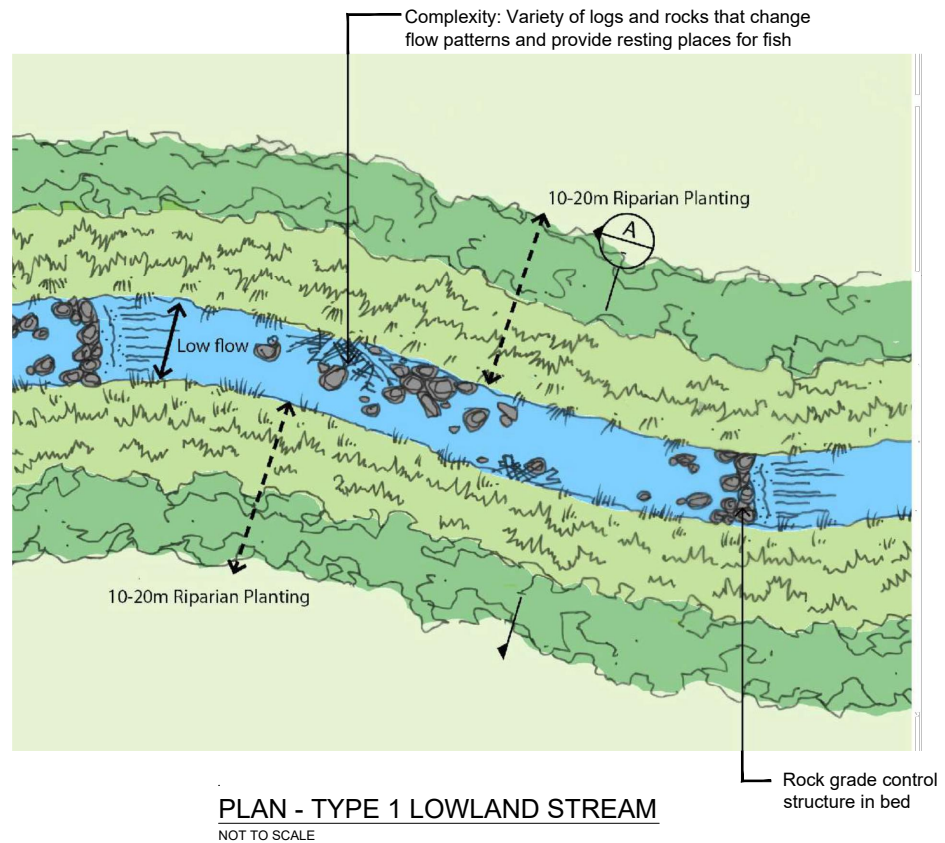
NOTE: INDICATIVE CATCHMENT AREAS ONLY, SUBJECT TO DETAILED DESIGN

Tab	MMA-DES-DNG-C0-DRG-4001						
Scales	N.T.S						
Original Size	A1						
Rev	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017
Rev	Revision Description	Drawn	Drawing Checked	Designed	Design Checked	Approved	Date

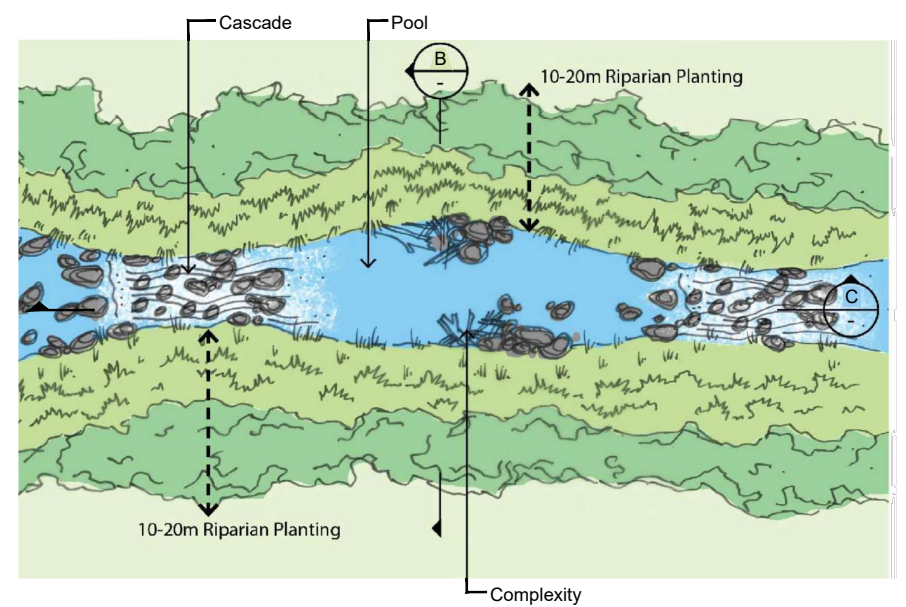
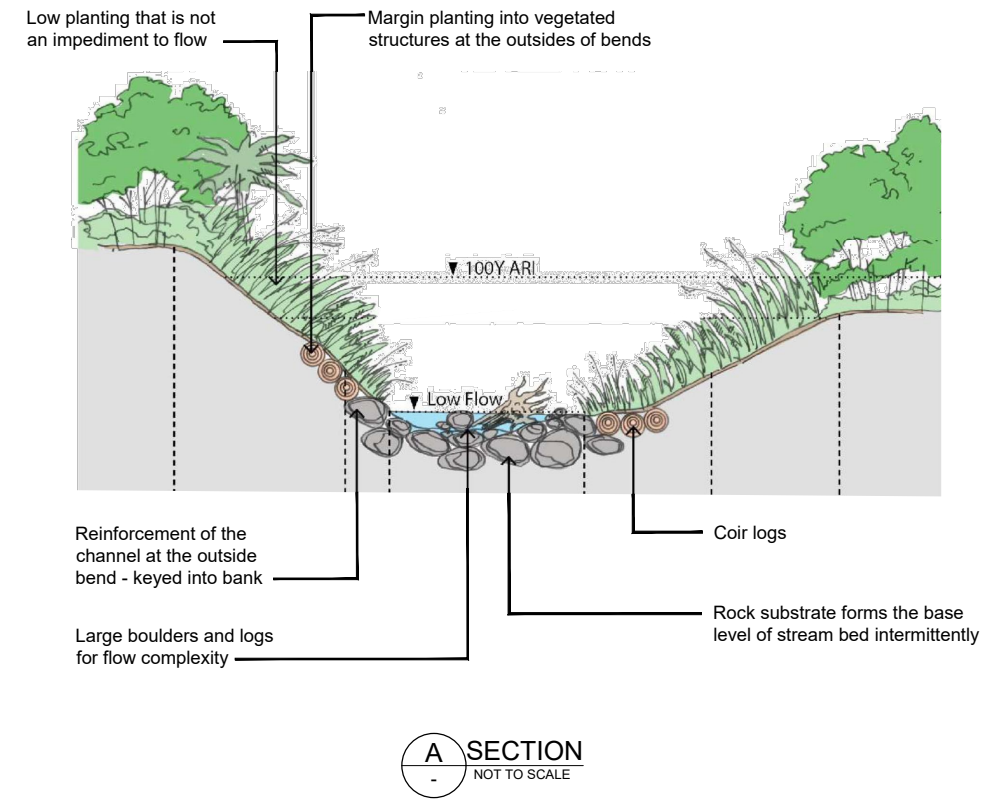


**MT MESSENGER BYPASS**  
**DRAINAGE**  
**TYPICAL DRAINAGE DETAILS**  
**TYPICAL WETLAND DETAILS AND SCHEDULE**

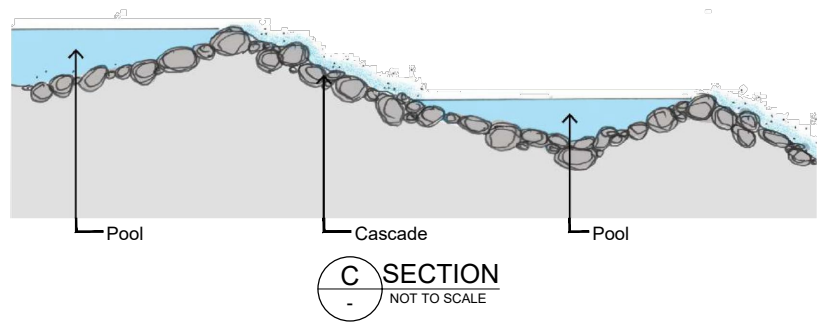
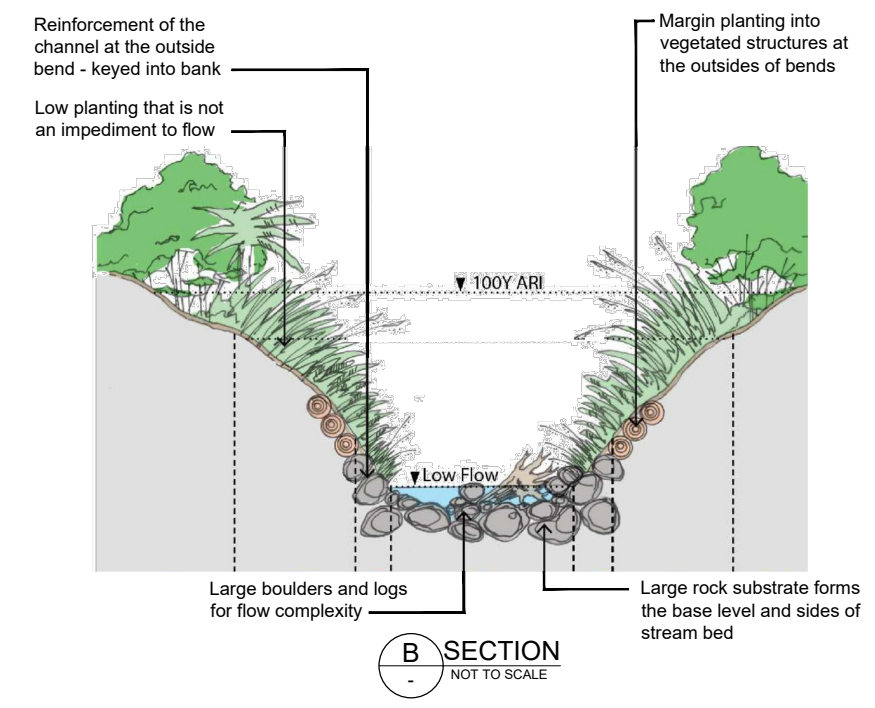
Approved  
**D.KENDERDINE**  
Status  
**FOR CONSENT**  
Drawing Number  
**MMA-DES-DNG-C0-DRG-4001**  
Revision  
**A**



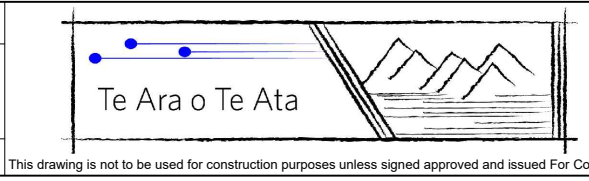
**PLAN - TYPE 1 LOWLAND STREAM**  
NOT TO SCALE



**PLAN - TYPE 2 STEEP STREAM**  
NOT TO SCALE



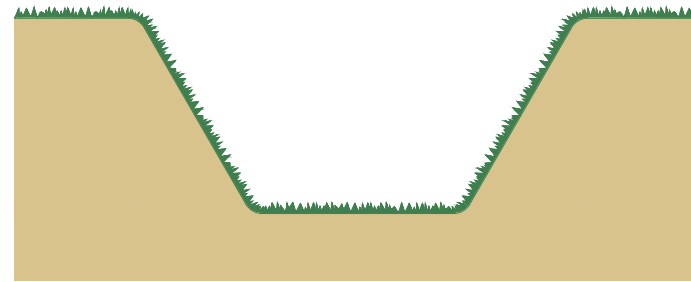
Tab	MMA-DES-DNG-C0-DRG-4002						
Scales	N.T.S						
Original Size	A1						
Rev	Revision Description	Drawn	Design Checked	Designed	Design Checked	Approved	Date
A	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017



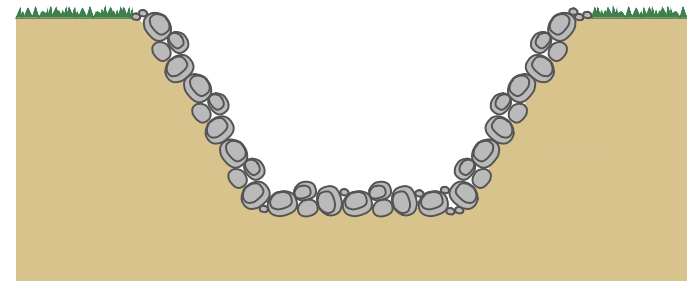
**MT MESSENGER BYPASS**

**DRAINAGE  
TYPICAL DRAINAGE DETAILS  
STREAM DIVERSION DETAILS**

Approved	D.KENDERDINE
Status	FOR CONSENT
Drawing Number	MMA-DES-DNG-C0-DRG-4002
Revision	A



VEGETATED CHANNEL FOR LOW FLOW AND/OR FLAT GRADIENTS

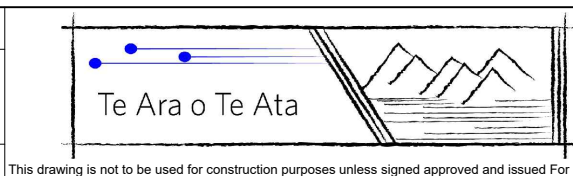


ROCK-LINED CHANNEL FOR HIGH FLOW AND/OR STEEP GRADIENTS

**TYPICAL SECTIONS - CONVEYANCE CHANNELS**  
NOT TO SCALE

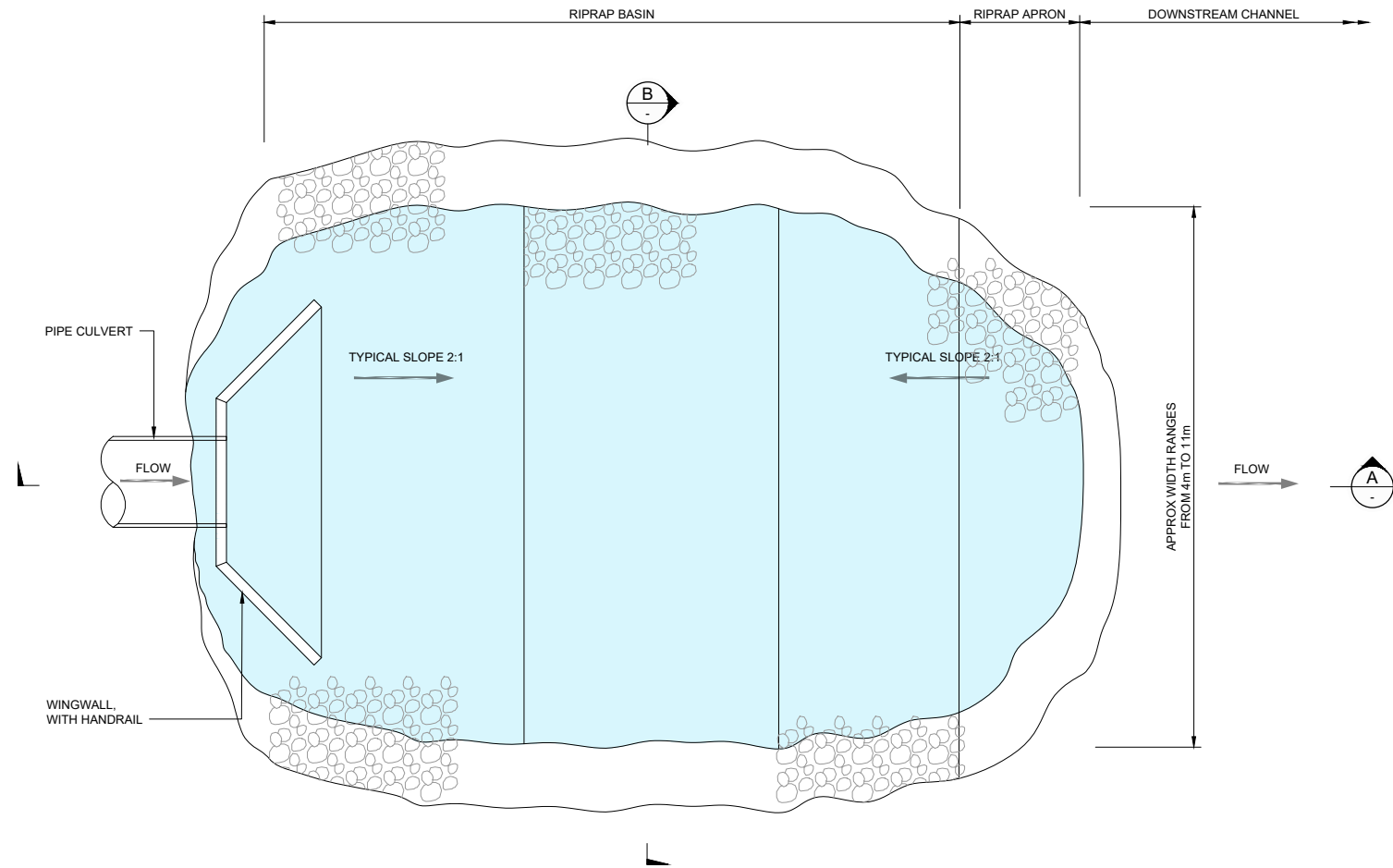
Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
A	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017

Tab MMA-DES-DNG-C0-DRG-4003
Scales N.T.S
Original Size A1

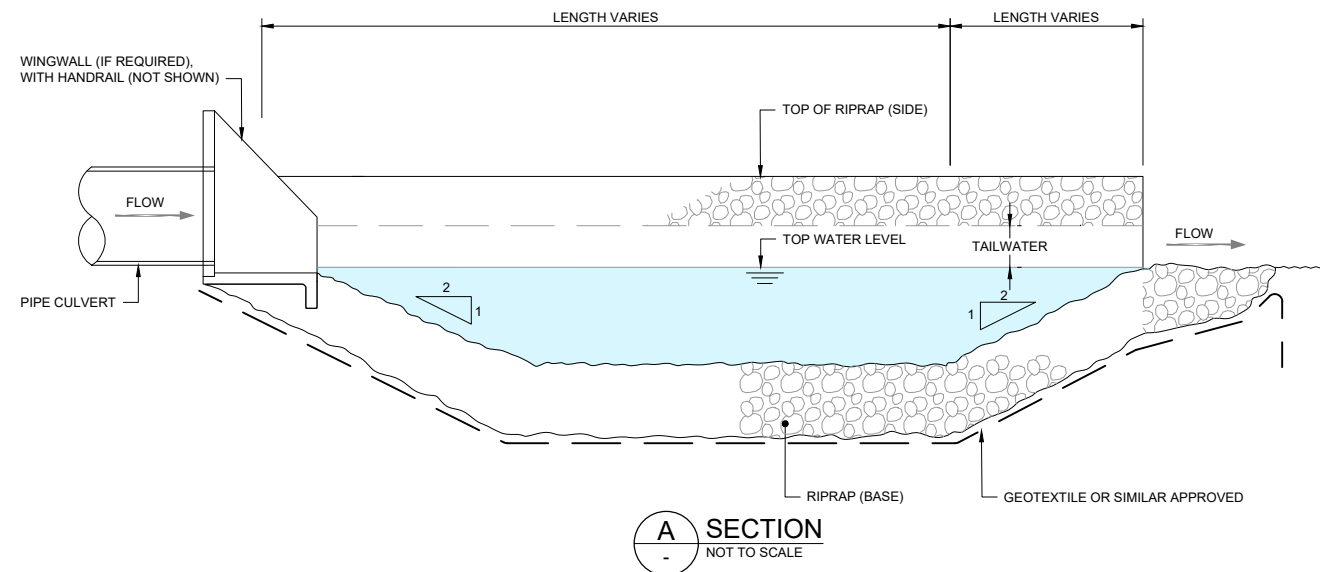


**MT MESSENGER BYPASS**  
**DRAINAGE**  
**TYPICAL DRAINAGE DETAILS**  
**TYPICAL CHANNEL CROSS SECTIONS**

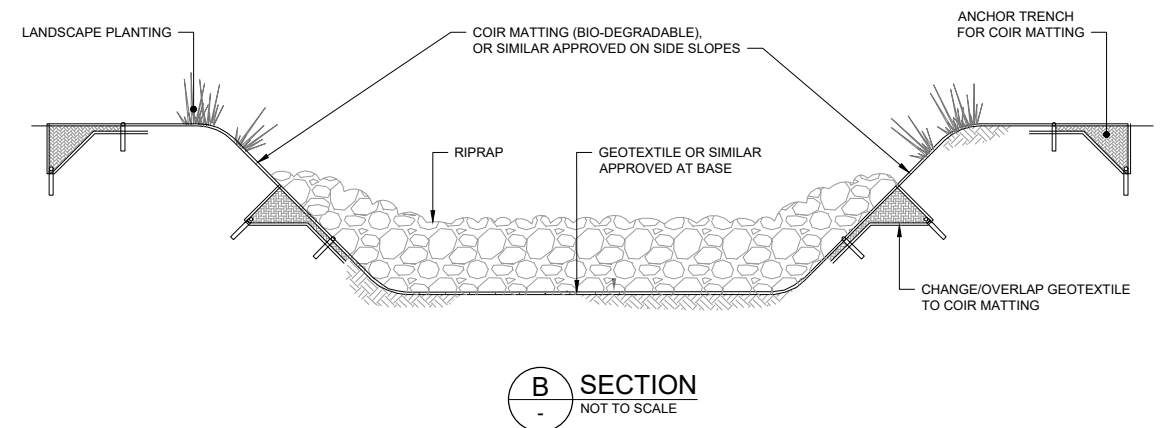
Approved <b>D.KENDERDINE</b>
Status <b>FOR CONSENT</b>
Drawing Number <b>MMA-DES-DNG-C0-DRG-4003</b>
Revision <b>A</b>



**PLAN - RIPRAP BASIN AND APRON**  
NOT TO SCALE



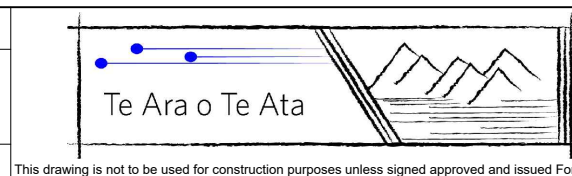
**A SECTION**  
NOT TO SCALE



**B SECTION**  
NOT TO SCALE

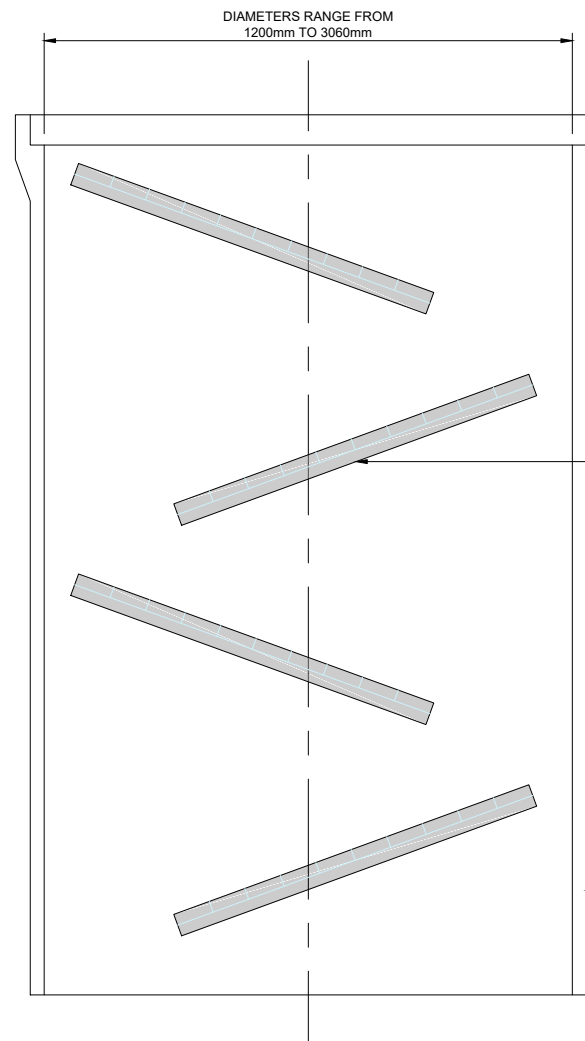
Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
A	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017

Tab	MMA-DES-DNG-C0-DRG-4004
Scales	N.T.S
Original Size	A1



**MT MESSENGER BYPASS**  
**DRAINAGE**  
**TYPICAL DRAINAGE DETAILS**  
**RIPRAP BASIN DETAILS**

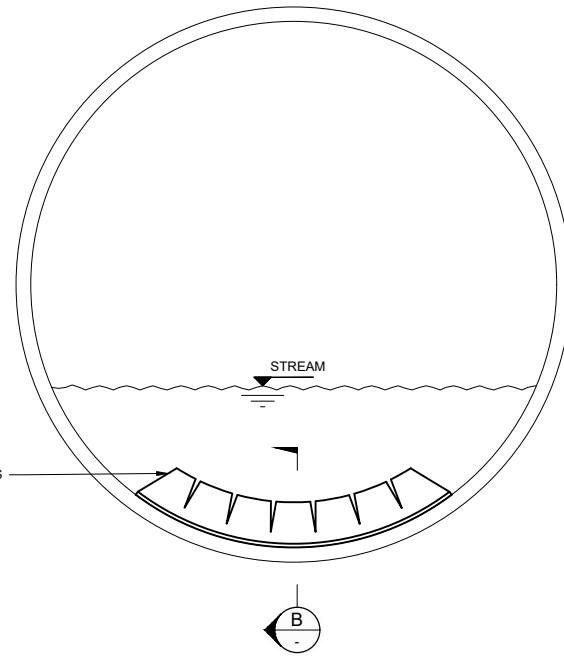
Approved	D.KENDERDINE
Status	FOR CONSENT
Drawing Number	MMA-DES-DNG-C0-DRG-4004
Revision	<b>A</b>



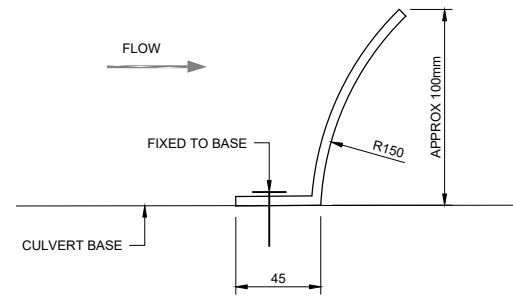
**PLAN - FISH PASSAGE BAFFLES**  
NOT TO SCALE

FLEXIBLE PLASTIC MOULDED CULVERT BAFFLES

PIPE CULVERT

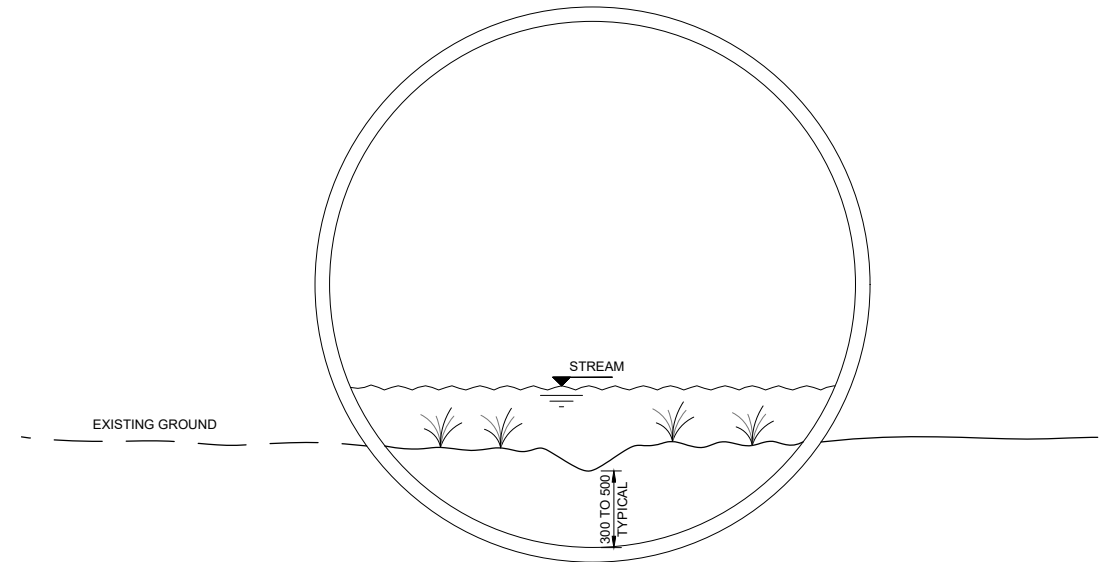


**A SECTION - FISH PASSAGE BAFFLES**  
NOT TO SCALE



**B SECTION - FISH PASSAGE BAFFLES**  
NOT TO SCALE

**FISH PASSAGE DETAIL - TYPE 1**  
CULVERT BAFFLES FOR STEEP GRADIENT CULVERT

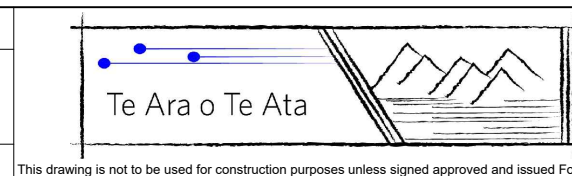


**TYPICAL SECTION - FISH PASSAGE**  
NOT TO SCALE

**FISH PASSAGE DETAIL - TYPE 2**  
EMBEDDED CULVERT BAFFLES FOR SHALLOW GRADIENT CULVERT

Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
A	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017

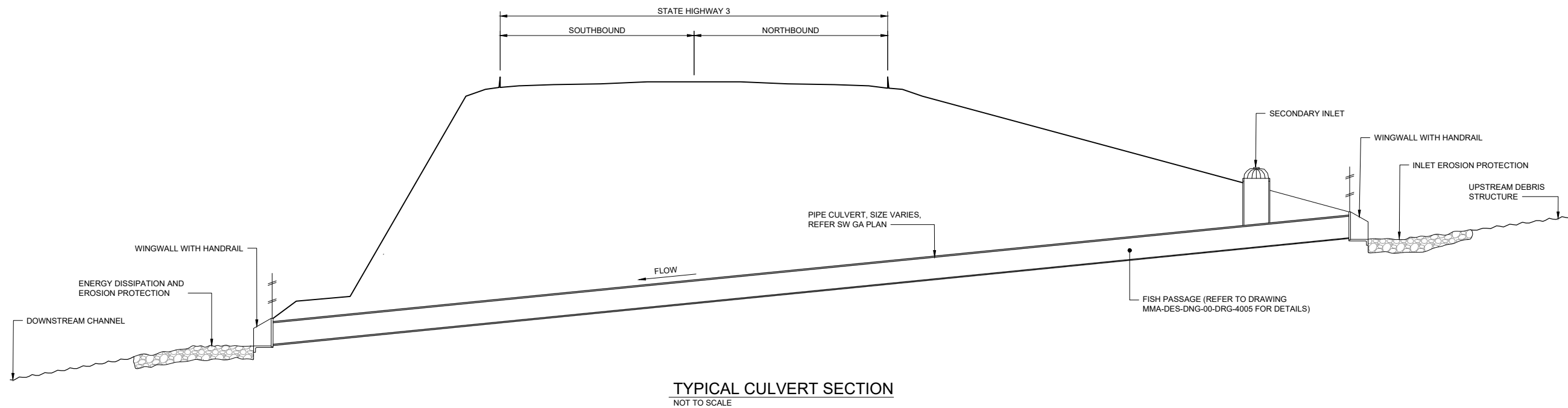
Tab	MMA-DES-DNG-C0-DRG-4005
Scales	N.T.S
Original Size	A1



MT MESSENGER BYPASS

**DRAINAGE  
TYPICAL DRAINAGE DETAILS  
FISH PASSAGE DETAILS**

Approved	D.KENDERDINE
Status	FOR CONSENT
Drawing Number	MMA-DES-DNG-C0-DRG-4005
Revision	A



Culvert Schedule									
Culvert #	Rd Chainage	Catchment (Ha)	Diameter (mm)	Length (m)	Cover (m)	Grade (%)	Fish Passage	Base Flow	Debris Fence
1	240	3.82	1050	24	1.2	1	Type 1	N	None
2	325	1.80	825	26	1.2	1	None	N	None
3	570	9.31	1500	36	1.2	1	Type 2	N	None
4	750	1.91	1500	32	1.2	1	Type 2	Y	None
5	870	9.41	1350	38	1.2	3	Type 2	N	Debris Fence
6	1310	6.82	1350	27	1.2	1	Type 2	N	Debris Fence
7	1520	5.78	1200	36	1.2	3	Type 2	N	Debris Fence
8	1690	7.95	1200	35	1.2	4	Type 1	N	Debris Fence
9	1860	66.78	4x1350	56	2	0.5	Type 2	Y	Debris Fence
10	2220	1.99	750	37	1.2	1	None	N	Debris Fence
11	2310	1.55	900	25	4	17	Type 2	N	Debris Fence
12	2400	9.84	1200	74	12	7	Type 1	Y	Debris Fence
13	2690	1.65	600	15	1.2	14	None	N	Debris Fence
14	2880	4.72	900	122	16	6.2	Type 1	Y	Debris Fence
15	2960	50.49	2550	263	26	1	Type 2	Y	Debris Fence
16	3800	13.64	1500	115	11	3	Type 1	Y	Debris Fence
17	4400	3.04	900	22	1.2	14	Type 1	Y	Debris Fence
18	4750	25.54	2100	29	1.2	1	Type 2	Y	None
19	4750	25.54	2100	24	1.2	1	Type 2	Y	None
20	5140	13.55	1650	40	1.2	1	Type 2	N	None
21	5750	11.90	1350	34	1.2	1	Type 2	Y	None

Tab	MMA-DES-DNG-C0-DRG-4006						
Scales	N.T.S.						
Original Size	A1						
Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
A	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017

Te Ara o Te Ata

This drawing is not to be used for construction purposes unless signed approved and issued For Construction

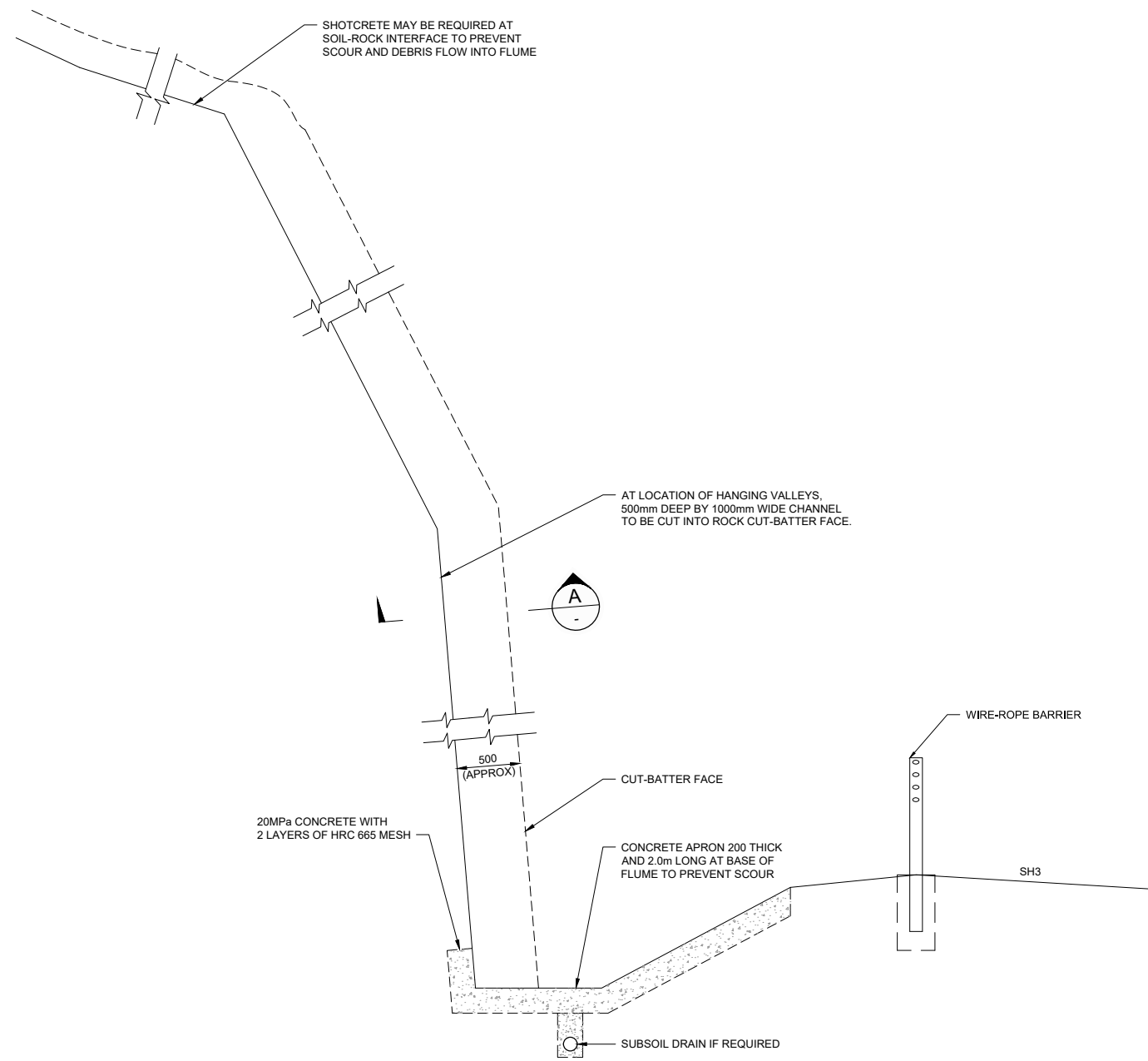
**MT MESSENGER BYPASS**

**DRAINAGE**

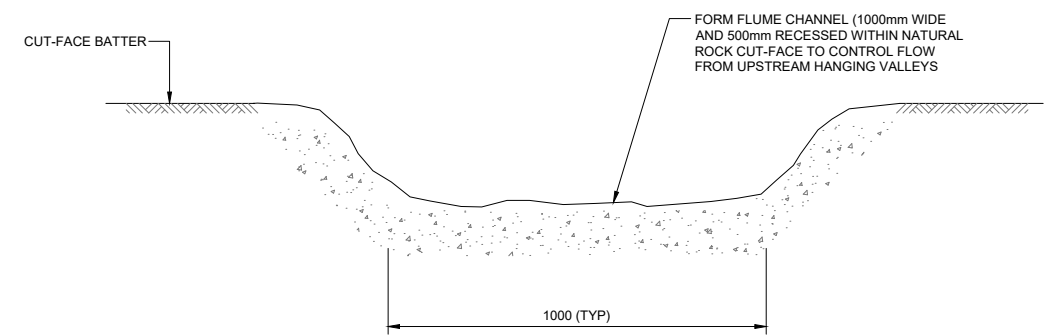
**TYPICAL DRAINAGE DETAILS**

**TYPICAL CULVERT SECTION & SCHEDULE**

Approved	<b>D.KENDERDINE</b>
Status	<b>FOR CONSENT</b>
Drawing Number	<b>MMA-DES-DNG-C0-DRG-4006</b>
Revision	<b>A</b>



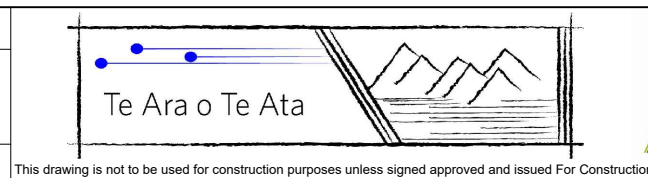
**TYPICAL HANGING VALLEY FLUME**  
SCALE 1:25



**FLUME - TYPICAL CROSS SECTION**  
SCALE 1:10

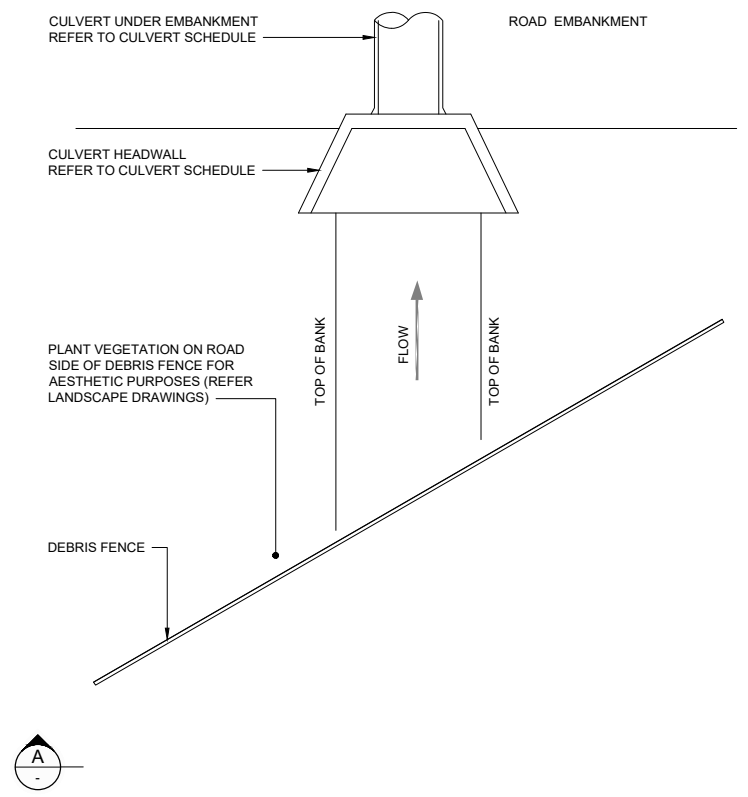
Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
A	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017

Tab	MMA-DES-DNG-C0-DRG-4007
Scales	AS SHOWN
Original Size	A1

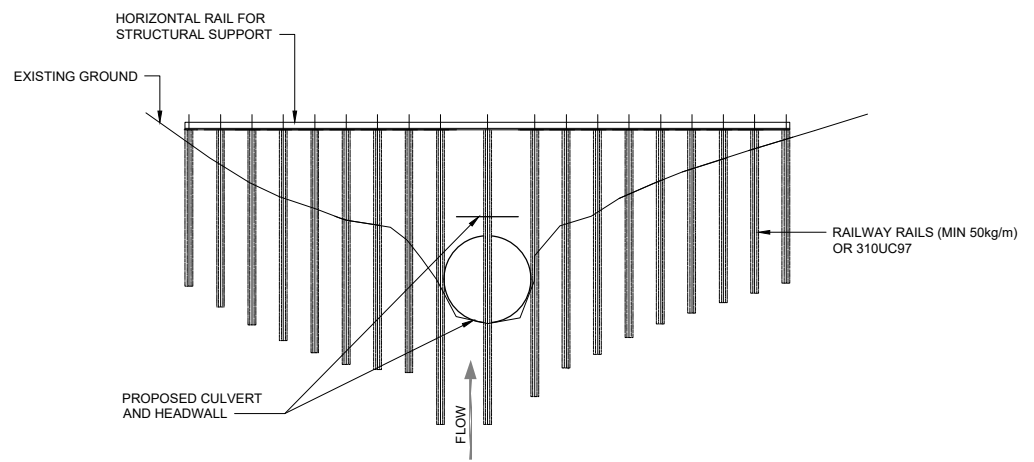


MT MESSENGER BYPASS	
DRAINAGE TYPICAL DRAINAGE DETAILS FLUME DETAILS	

Approved	D.KENDERDINE
Status	FOR CONSENT
Drawing Number	MMA-DES-DNG-C0-DRG-4007
Revision	A



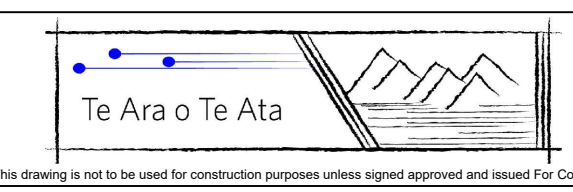
**DEBRIS FENCE UPSTREAM OF CULVERT - TYPICAL PLAN DETAIL**  
NOT TO SCALE



**DEBRIS FENCE UPSTREAM OF CULVERT - ELEVATION**  
NOT TO SCALE

Rev	Revision Description	Drawn	Checked	Designed	Design Checked	Approved	Date
A	FOR CONSENT	AJW	QDO'S	MAK	WSB	LG	14/11/2017

Tab	MMA-DES-DNG-C0-DRG-4008
Scales	N.T.S
Original Size	A1



**MT MESSENGER BYPASS**

**DRAINAGE**  
**TYPICAL DRAINAGE DETAILS**  
**DEBRIS FENCE DETAILS**

Approved	D.KENDERDINE
Status	FOR CONSENT
Drawing Number	MMA-DES-DNG-C0-DRG-4008
Revision	A