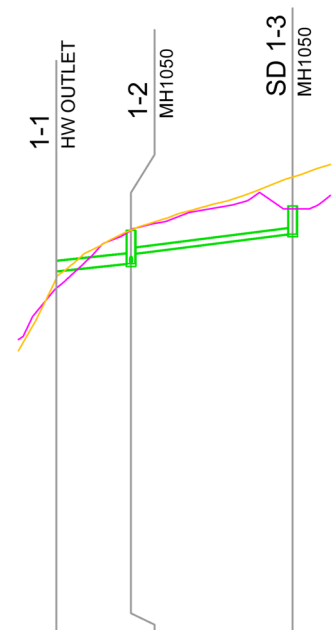


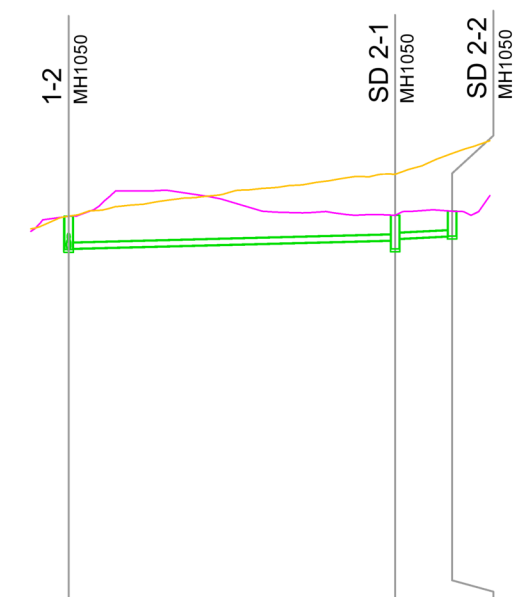
**LEGEND:**

- EXISTING GROUND —
- PROPOSED GROUND —
- STORMWATER LINE —



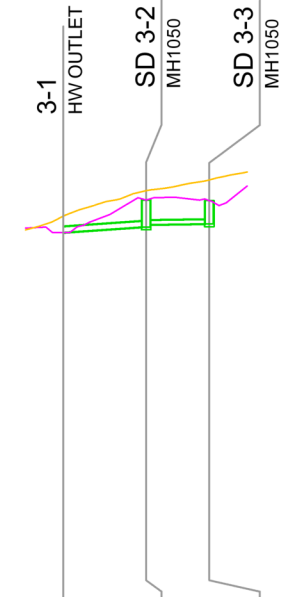
DATUM = 54.0	
FINISHED LEVEL	73.59
DEPTH TO INVERT	-0.91
INVERT LEVEL	74.50
EXISTING SURFACE	74.12
PIPE DETAILS	4.0% 525mm RCRRJ Class 2
LENGTH	9.9m
	4.8% 300mm RCRRJ Class 2
	21.38m

SW LINE 1



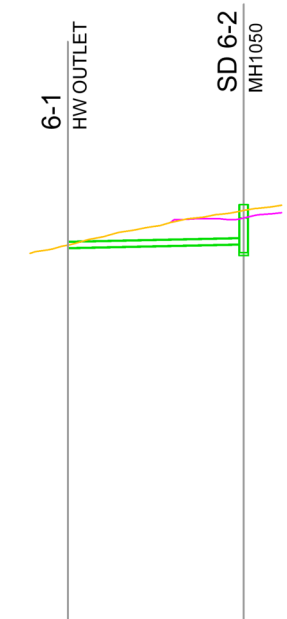
55.0	
FINISHED LEVEL	76.66
DEPTH TO INVERT	1.76
INVERT LEVEL	74.90
EXISTING SURFACE	76.66
PIPE DETAILS	1.0% 300mm RCRRJ Class 4
LENGTH	43.19m
	1.7% 300mm RCRRJ Class 2
	7.54m

SW LINE 2



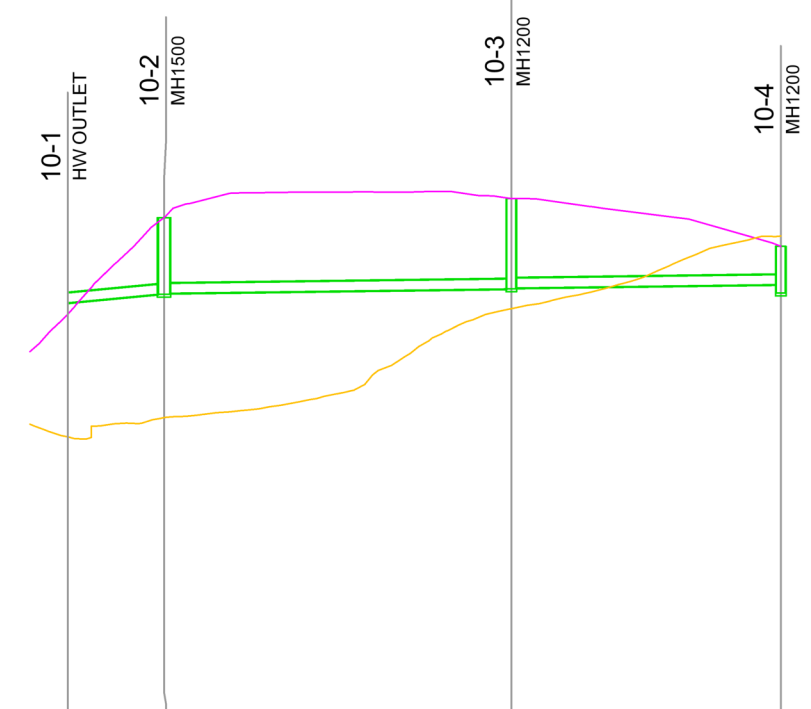
57.0	
FINISHED LEVEL	77.80
DEPTH TO INVERT	0.00
INVERT LEVEL	77.80
EXISTING SURFACE	78.66
PIPE DETAILS	2.6% 300mm RCRRJ Class 4
LENGTH	10.95m
	0.5% 225mm RCRRJ Class 2
	8.36m

SW LINE 3



84	
FINISHED LEVEL	105.29
DEPTH TO INVERT	150.14
INVERT LEVEL	105.15
EXISTING SURFACE	105.15
PIPE DETAILS	0.8% 300mm RCRRJ Class 4
LENGTH	23.26m

SW LINE 6



29.0	
FINISHED LEVEL	51.39
DEPTH TO INVERT	-0.61
INVERT LEVEL	52.00
EXISTING SURFACE	44.91
PIPE DETAILS	3.6% 525mm RCRRJ Class 4
LENGTH	12.75m
	0.5% 525mm RCRRJ Class 2
	45.93m
	0.5% 525mm RCRRJ Class 2
	35.65m

SW LINE 10

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
D	S92 RESPONSE	MO	CIM	JSD	04/03/22
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

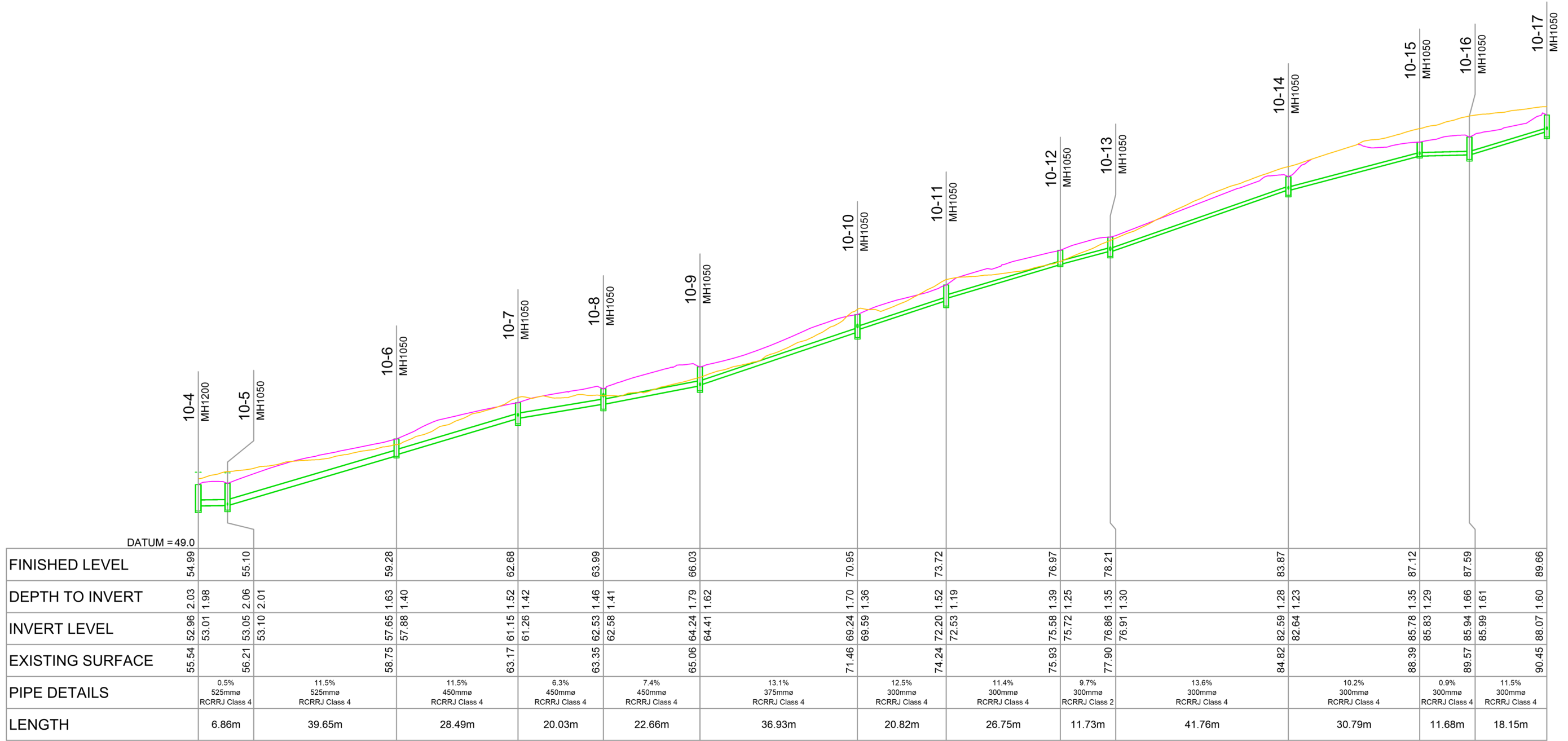
PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: PROPOSED DRAINAGE  
STORMWATER LONGSECTIONS  
SHEET 1

PURPOSE OF ISSUE: FOR CONSENT  
SCALE: HOR=1:1000, VER=1:400  
DRAWING NO: 1976-1-420  
REV: D

**LEGEND:**

- EXISTING GROUND —
- PROPOSED GROUND —
- STORMWATER LINE —



SW LINE 10

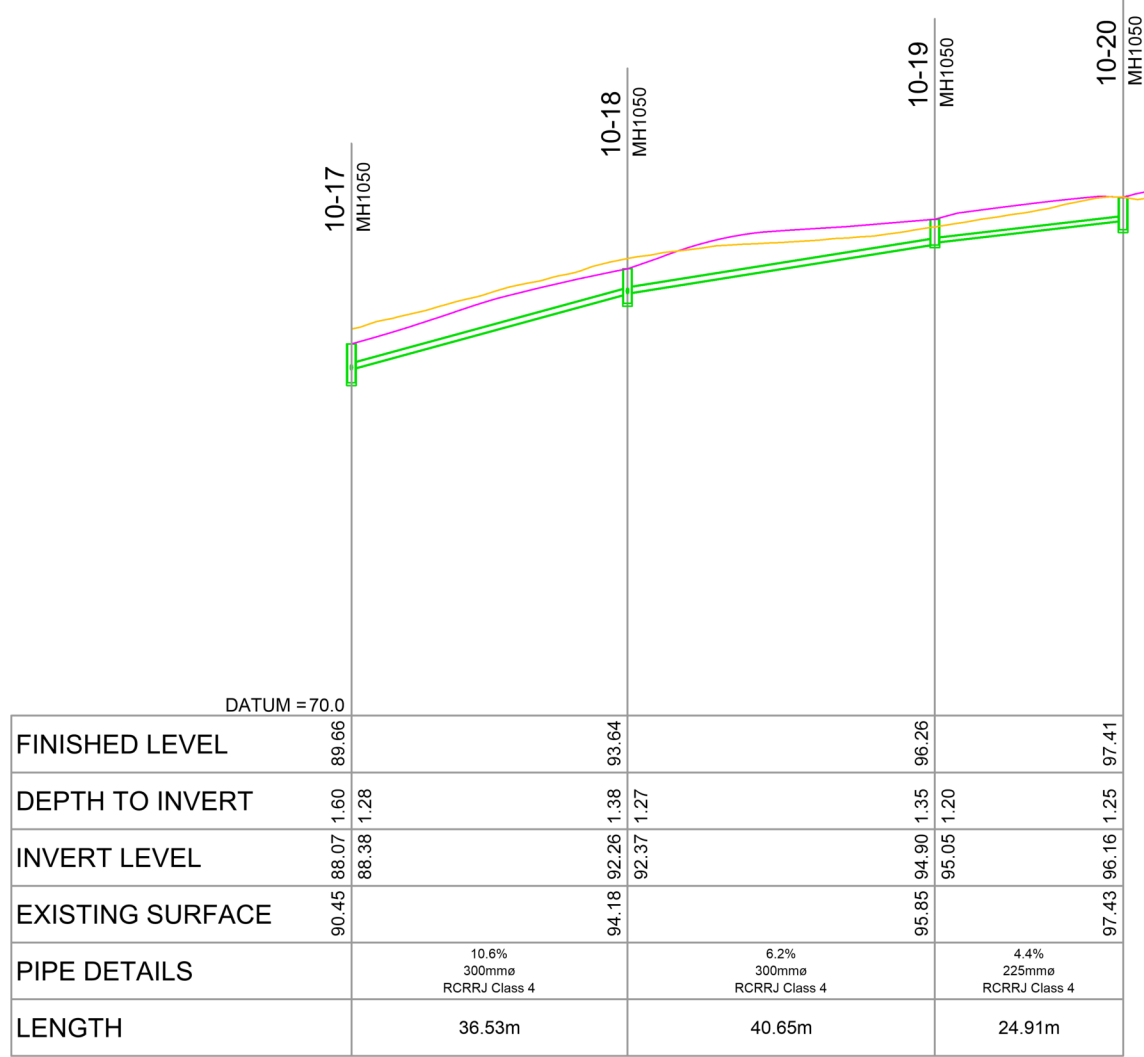
REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
D	S92 RESPONSE	MO	CIM	JSD	04/03/22
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



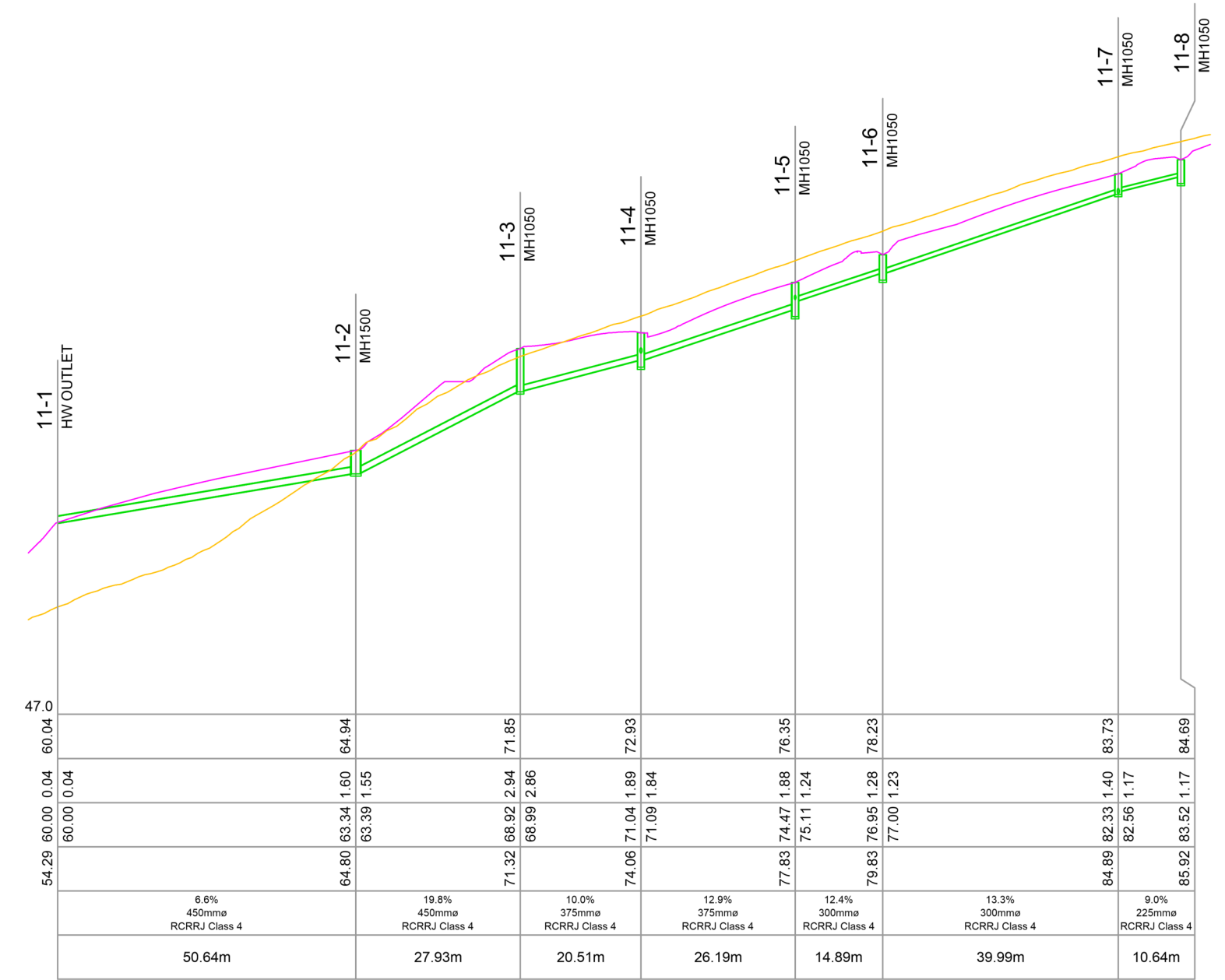
CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 TITLE: PROPOSED DRAINAGE STORMWATER LONGSECTIONS SHEET 2  
 PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: HOR=1:1000, VER=1:400  
 DRAWING NO: 1976-1-421  
 REV: D

**LEGEND:**

- EXISTING GROUND —
- PROPOSED GROUND —
- STORMWATER LINE —



SW LINE 10



SW LINE 11

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	S92 RESPONSE	MO	CIM	JSD	04/03/22
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



CLIENT:  
**THE BEARS HOME  
PROJECT MANAGEMENT LTD**

PROJECT:  
**MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY**

TITLE:  
**PROPOSED DRAINAGE  
STORMWATER LONGSECTIONS  
SHEET 3**

PURPOSE OF ISSUE:  
**FOR CONSENT**

SCALE:  
**HOR=1:1000, VER=1:400**

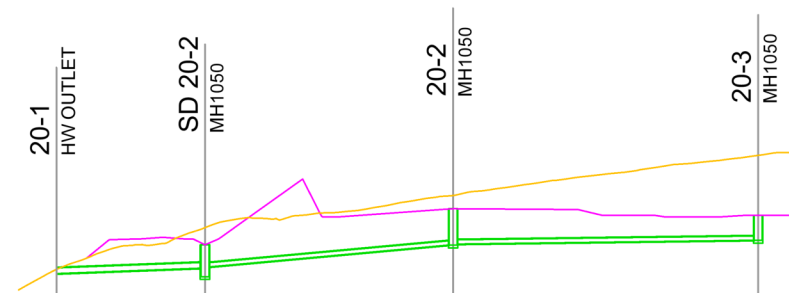
DO NOT SCALE

DRAWING NO: **1976-1-422**

REV: **D**

**LEGEND:**

- EXISTING GROUND —
- PROPOSED GROUND —
- STORMWATER LINE —



DATUM = 69.0	
FINISHED LEVEL	89.22
DEPTH TO INVERT	0.22
INVERT LEVEL	89.00
EXISTING SURFACE	89.22
PIPE DETAILS	1.5% 300mm RCRRJ Class 4
LENGTH	19.65m

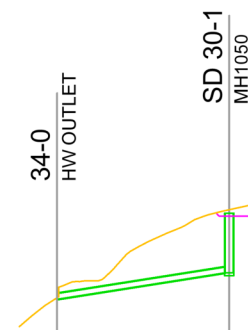
  

INVERT LEVEL	90.52
DEPTH TO INVERT	1.23
INVERT LEVEL	89.29
EXISTING SURFACE	91.43
PIPE DETAILS	3.5% 225mm RCRRJ Class 2
LENGTH	32.82m

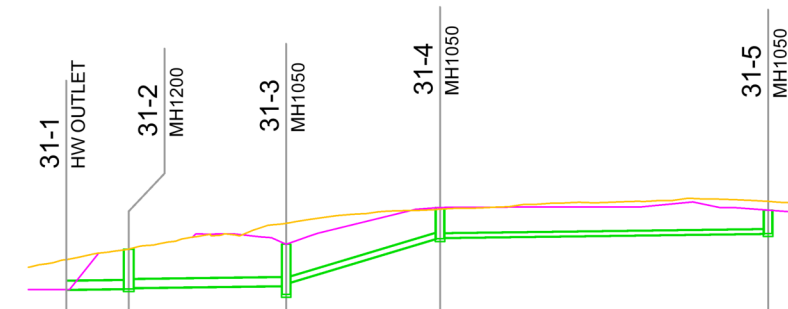
INVERT LEVEL	92.43
DEPTH TO INVERT	1.87
INVERT LEVEL	90.56
EXISTING SURFACE	93.13
PIPE DETAILS	0.5% 225mm RCRRJ Class 2
LENGTH	40.36m

SW LINE 20



INVERT LEVEL	88.00
DEPTH TO INVERT	3.00
INVERT LEVEL	85.00
EXISTING SURFACE	88.33
PIPE DETAILS	6.2% 300mm RCRRJ Class 2
LENGTH	22.76m

SW LINE 30



INVERT LEVEL	90.14
DEPTH TO INVERT	2.10
INVERT LEVEL	88.04
EXISTING SURFACE	89.59
PIPE DETAILS	0.5% 450mm RCRRJ Class 4
LENGTH	8.27m

INVERT LEVEL	90.40
DEPTH TO INVERT	2.05
INVERT LEVEL	88.09
EXISTING SURFACE	88.00
PIPE DETAILS	0.5% 450mm RCRRJ Class 4
LENGTH	20.82m

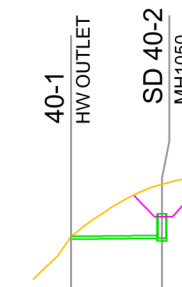
  

INVERT LEVEL	90.40
DEPTH TO INVERT	2.02
INVERT LEVEL	88.20
EXISTING SURFACE	91.50
PIPE DETAILS	11.4% 300mm RCRRJ Class 2
LENGTH	20.35m

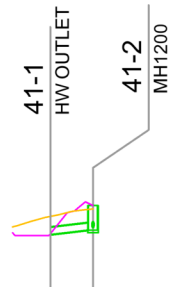
INVERT LEVEL	92.34
DEPTH TO INVERT	1.65
INVERT LEVEL	90.69
EXISTING SURFACE	92.25
PIPE DETAILS	0.5% 225mm RCRRJ Class 2
LENGTH	43.4m

SW LINE 31



INVERT LEVEL	90.70
DEPTH TO INVERT	1.15
INVERT LEVEL	89.55
EXISTING SURFACE	89.65
PIPE DETAILS	0.4% 150mm uPVC SN16
LENGTH	12.01m

SW LINE 40



INVERT LEVEL	92.28
DEPTH TO INVERT	1.29
INVERT LEVEL	90.99
EXISTING SURFACE	91.71
PIPE DETAILS	4.2% 375mm RCRRJ Class 2
LENGTH	5.64m

SW LINE 41

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
D	S92 RESPONSE	MO	CIM	JSD	04/03/22
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



**MCKENZIE & CO.**

CLIENT:  
**THE BEARS HOME  
PROJECT MANAGEMENT LTD**

PROJECT:  
**MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY**

TITLE:  
**PROPOSED DRAINAGE  
STORMWATER LONGSECTIONS  
SHEET 4**

PURPOSE OF ISSUE:  
**FOR CONSENT**

SCALE:  
**HOR=1:1000, VER=1:400**

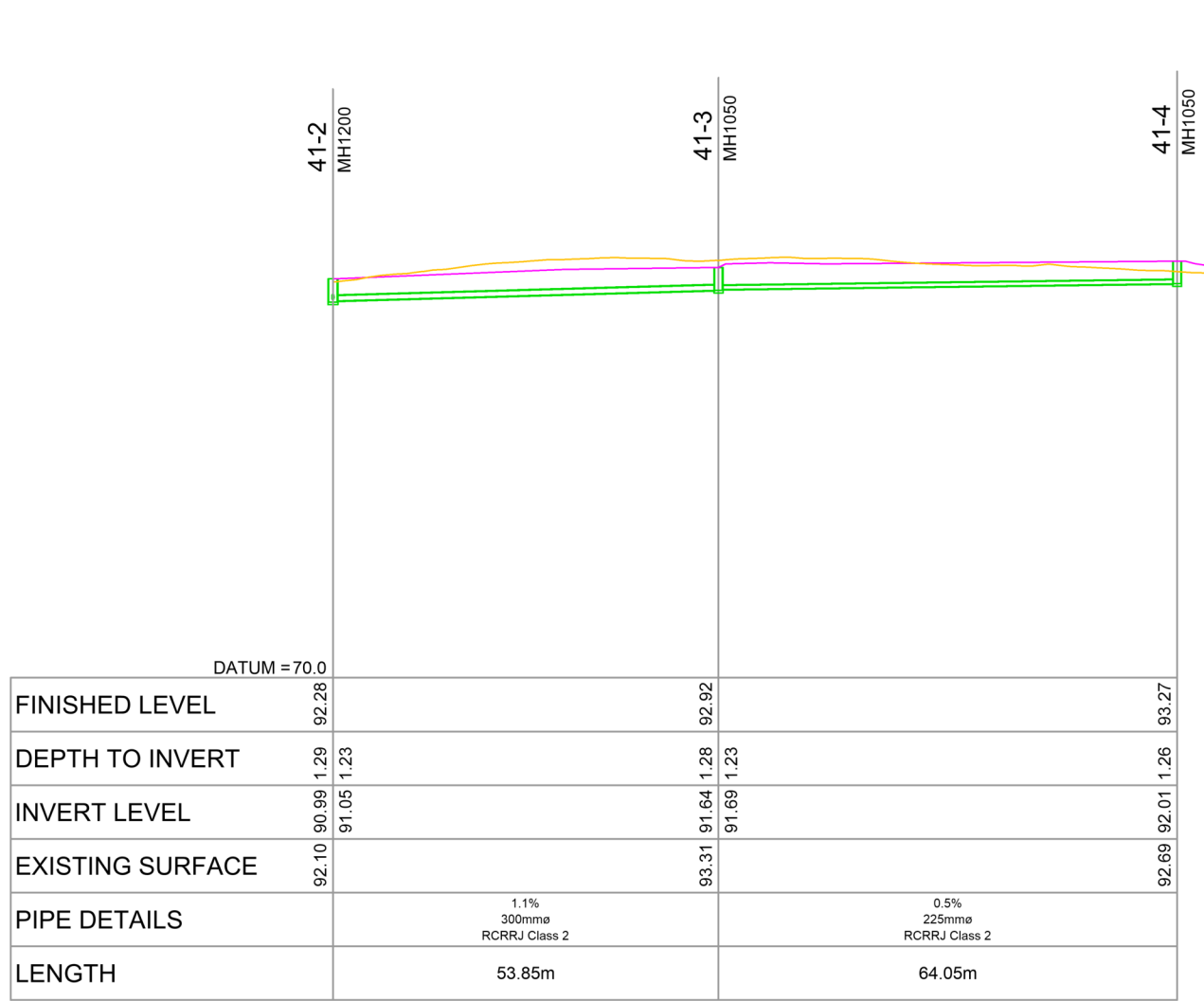
DO NOT SCALE

DRAWING NO:  
**1976-1-423**

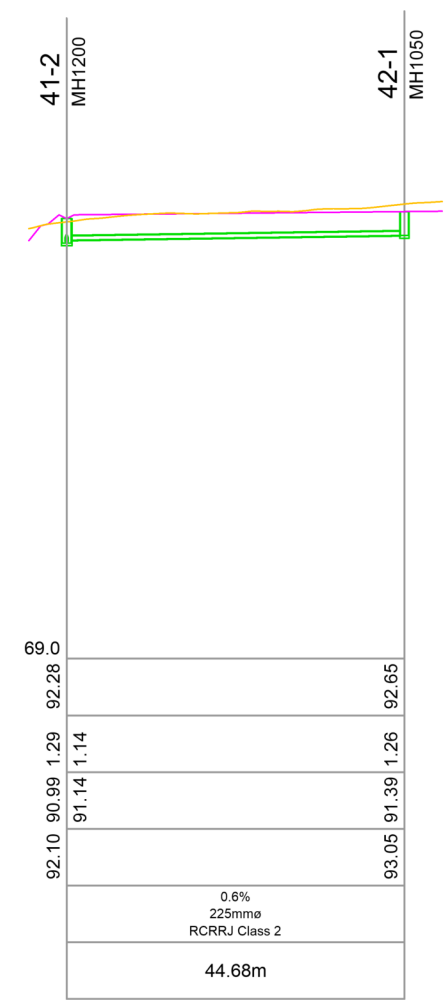
REV:  
**D**

**LEGEND:**

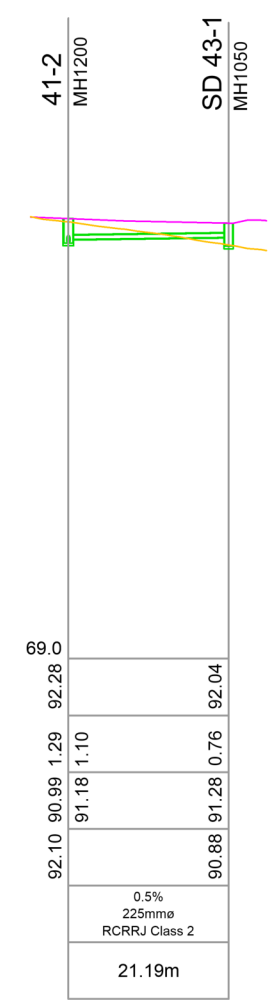
- EXISTING GROUND —
- PROPOSED GROUND —
- STORMWATER LINE —



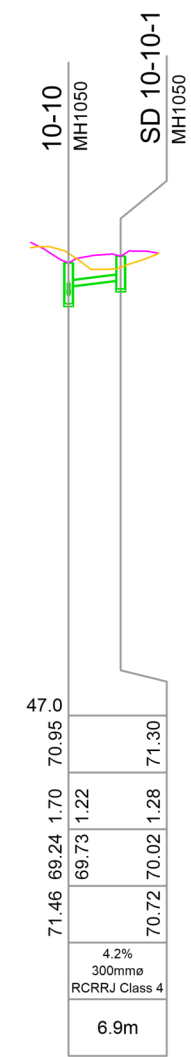
SW LINE 41



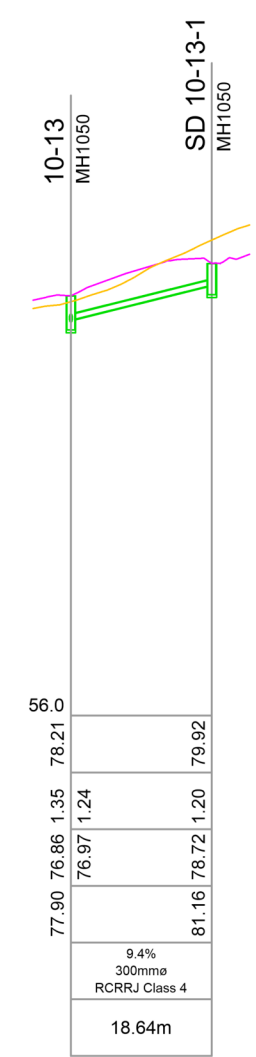
SW LINE 42



SW LINE 43



SW LINE SD 10-10



SW LINE SD 10-13

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
D	S92 RESPONSE	MO	CIM	JSD	04/03/22
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



CLIENT:  
**THE BEARS HOME  
PROJECT MANAGEMENT LTD**

PROJECT:  
**MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY**

TITLE:  
**PROPOSED DRAINAGE  
STORMWATER LONGSECTIONS  
SHEET 5**

PURPOSE OF ISSUE:  
**FOR CONSENT**

SCALE:  
**HOR=1:1000, VER=1:400**

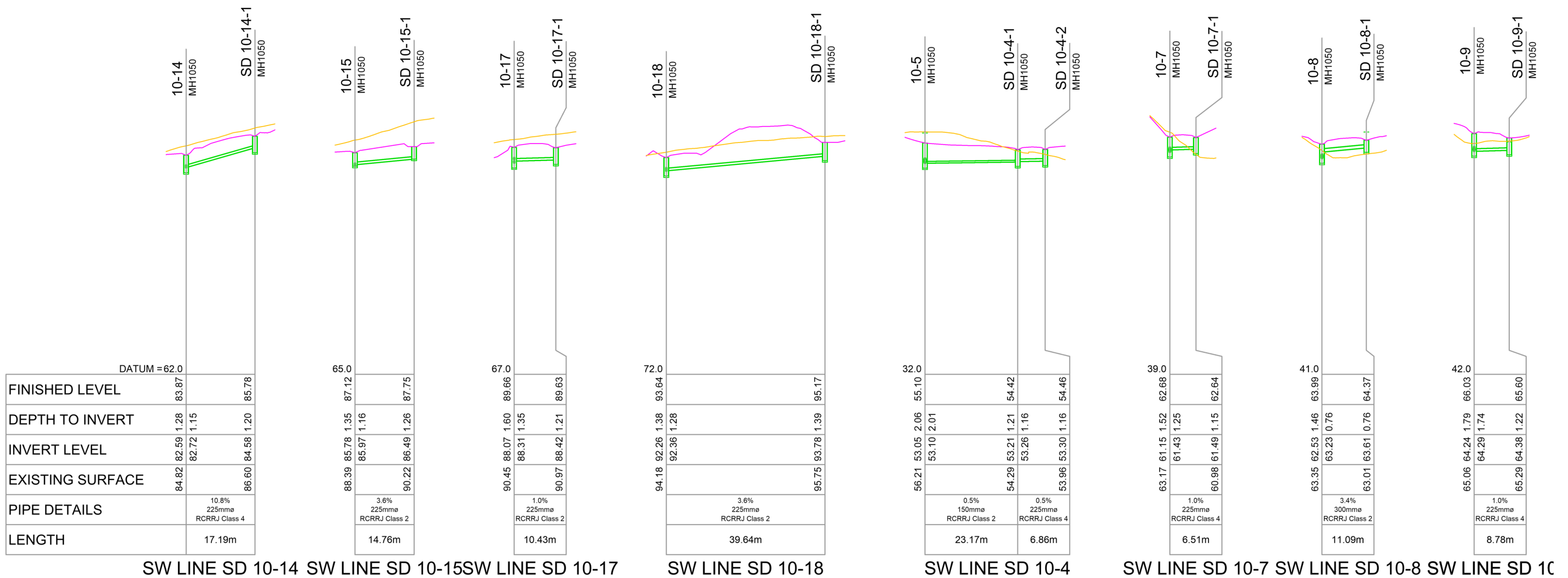
DO NOT SCALE

DRAWING NO.: **1976-1-424**

REV: **D**

**LEGEND:**

- EXISTING GROUND —
- PROPOSED GROUND —
- STORMWATER LINE —



REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
D	S92 RESPONSE	MO	CIM	JSD	04/03/22
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



CLIENT:  
**THE BEARS HOME  
PROJECT MANAGEMENT LTD**

PROJECT:  
**MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY**

TITLE:  
**PROPOSED DRAINAGE  
STORMWATER LONGSECTIONS  
SHEET 6**

PURPOSE OF ISSUE:  
**FOR CONSENT**

SCALE:  
**HOR=1:1000, VER=1:400**

DO NOT SCALE

DRAWING NO.: **1976-1-425**

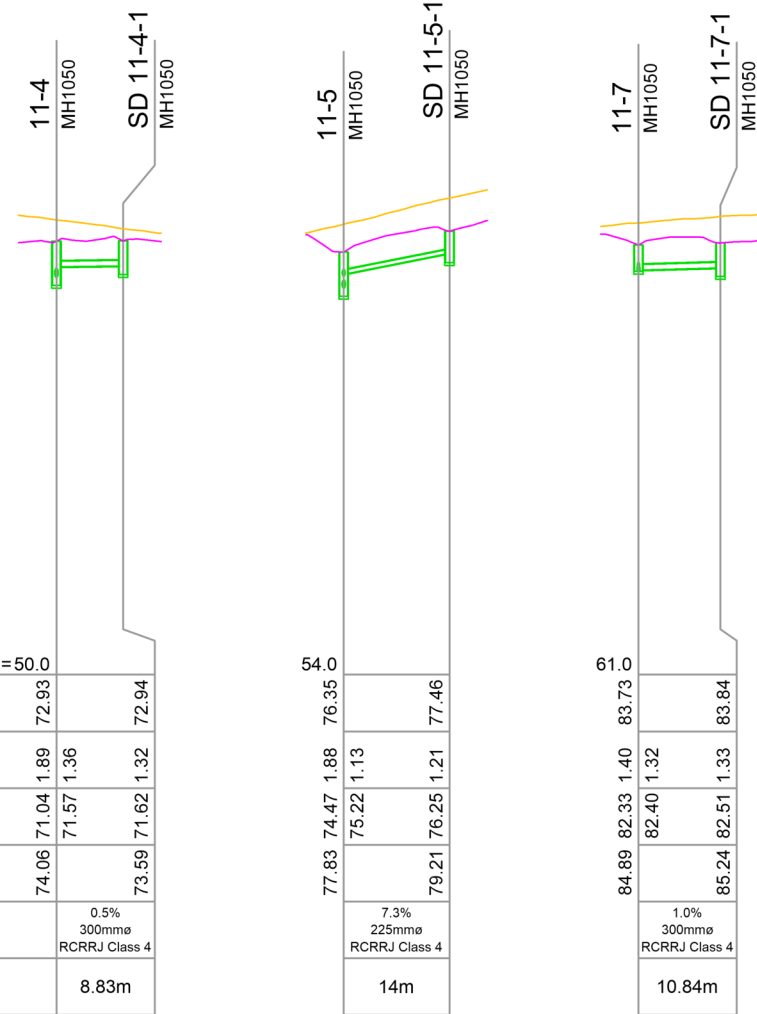
REV: **D**

**LEGEND:**

EXISTING GROUND 

PROPOSED GROUND 

STORMWATER LINE 



DATUM = 50.0	
FINISHED LEVEL	72.93
DEPTH TO INVERT	1.89
INVERT LEVEL	71.04
EXISTING SURFACE	74.06
PIPE DETAILS	0.5% 300mm RCRRJ Class 4
LENGTH	8.83m

54.0	
FINISHED LEVEL	76.35
DEPTH TO INVERT	1.88
INVERT LEVEL	74.47
EXISTING SURFACE	77.83
PIPE DETAILS	7.3% 225mm RCRRJ Class 4
LENGTH	14m

61.0	
FINISHED LEVEL	83.73
DEPTH TO INVERT	1.40
INVERT LEVEL	82.33
EXISTING SURFACE	84.89
PIPE DETAILS	1.0% 300mm RCRRJ Class 4
LENGTH	10.84m

SW LINE SD 11-4 SW LINE SD 11-5 SW LINE SD 11-7

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
D	S92 RESPONSE	MO	CIM	JSD	04/03/22
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



CLIENT:  
**THE BEARS HOME  
PROJECT MANAGEMENT LTD**

PROJECT:  
**MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY**

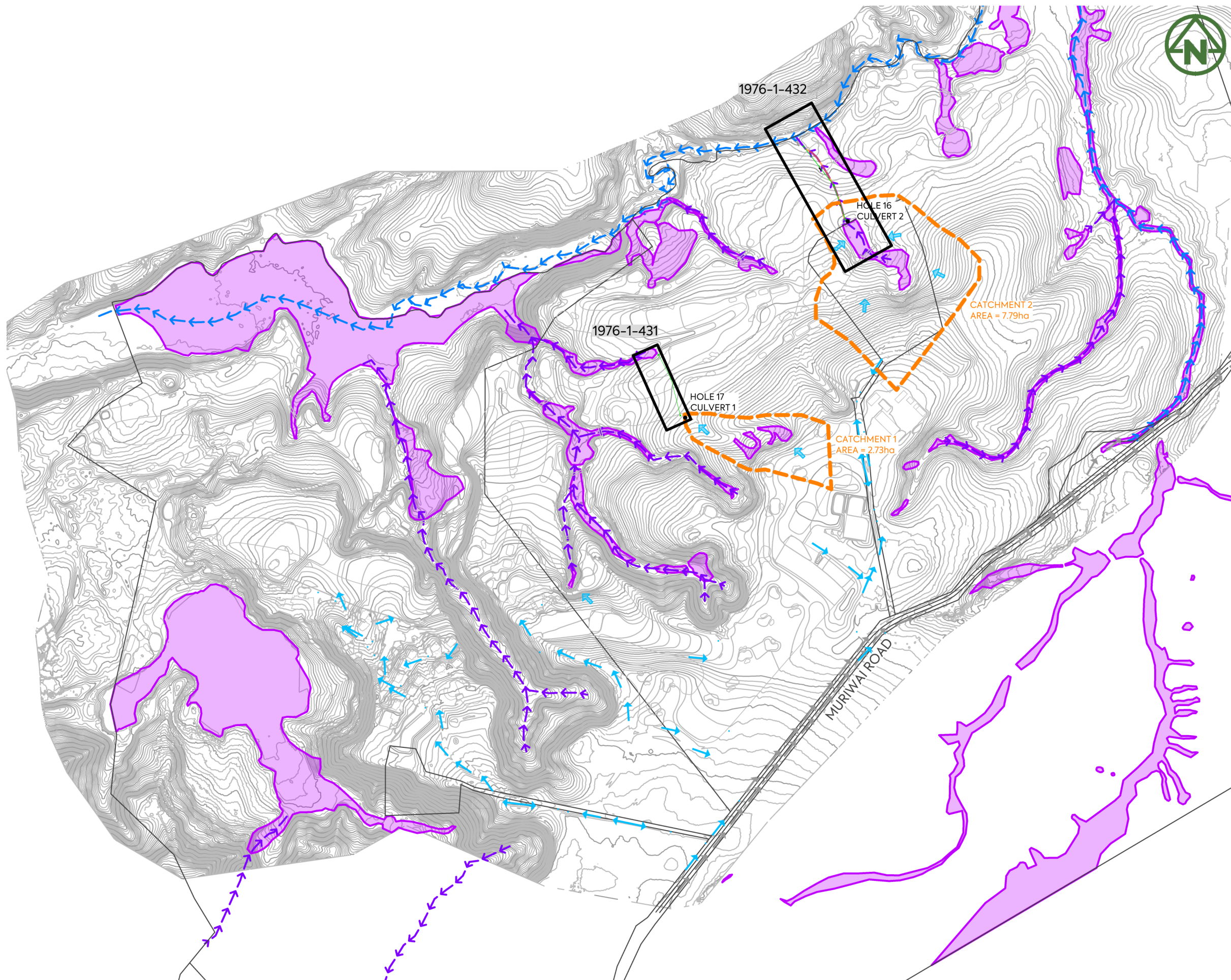
TITLE:  
**PROPOSED DRAINAGE  
STORMWATER LONGSECTIONS  
SHEET 7**

PURPOSE OF ISSUE:  
**FOR CONSENT**

SCALE:  
**HOR=1:1000, VER=1:400**

DO NOT SCALE

DRAWING NO. **1976-1-426** REV: **D**



**NOTES:**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
2. REFER TO DRAWING 431-433 FOR CULVERT DETAILS.
3. REFER TO DRAWING 435 FOR OUTLET PROTECTION DETAILS.
4. REFER TO DRAWING 450-457 FOR OVERLAND FLOW DETAILS.

**LEGEND:**

- CATCHMENT BOUNDARY ---
- PROPOSED CULVERT —
- OVERLAND FLOW PATH →
- FINISHED (5m) MAJOR CONTOUR — 75.0
- FINISHED (1m) MINOR CONTOUR —
- PERMANENT STREAM →→→→→
- INTERMITTENT STREAM →→→→→
- EXISTING WETLANDS ■

<p>CLIENT: <b>THE BEARS HOME PROJECT MANAGEMENT LTD</b></p>	<p>PROJECT: <b>MURIWAI DOWNS GOLF PROJECT 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</b></p>	<p>TITLE: <b>PROPOSED DRAINAGE STORMWATER LONGSECTIONS CULVERT CATCHMENT OVERALL PLAN</b></p>	<p>PURPOSE OF ISSUE: <b>FOR CONSENT</b></p> <hr/> <p>SCALE: <b>AS SHOWN</b></p> <p>DO NOT SCALE</p> <hr/> <p>DRAWING NO.: <b>1976-1-430</b></p> <p>REV: <b>C</b></p>
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C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21
REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE







**NOTES:**

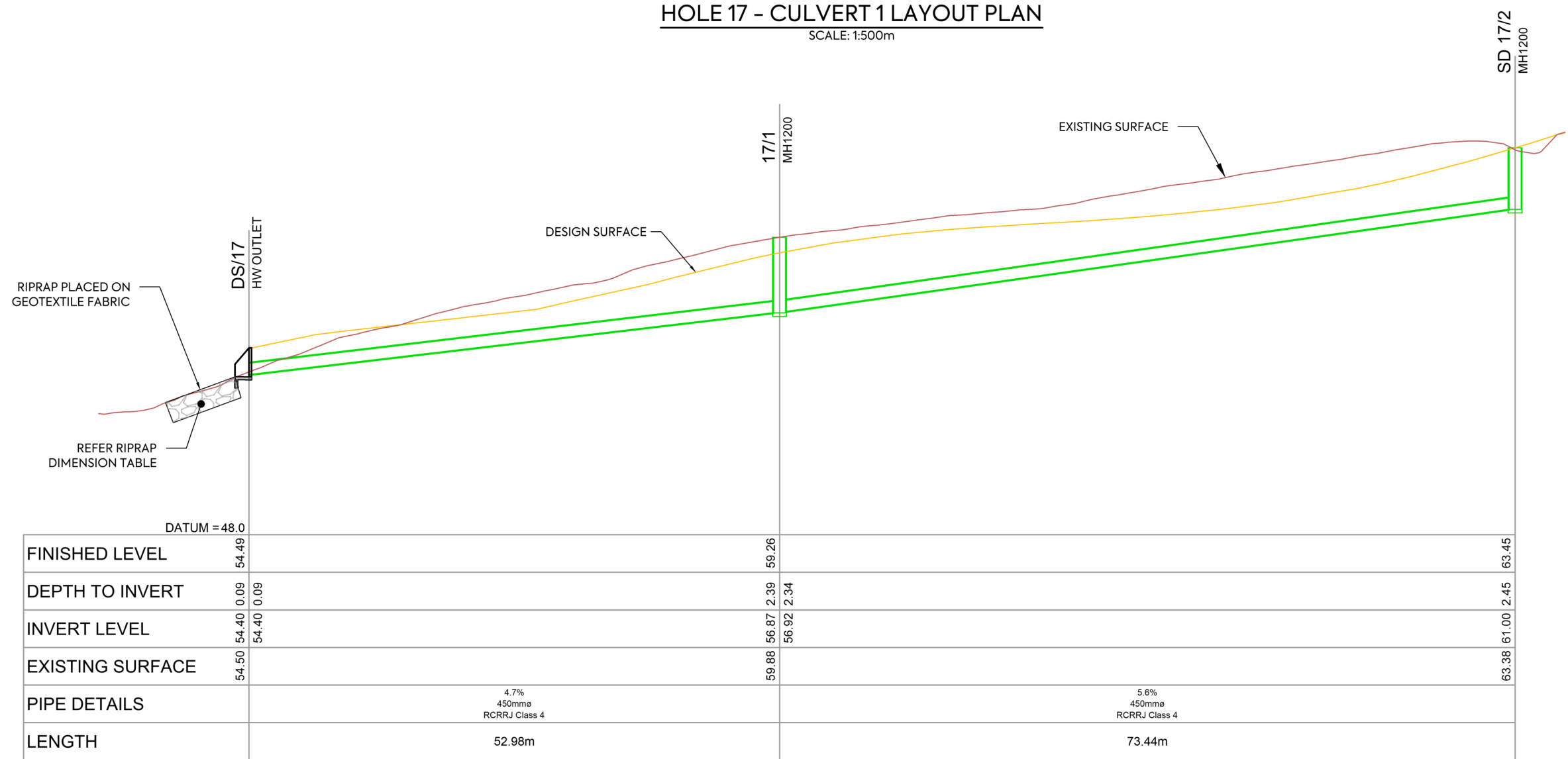
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
2. REFER TO DRAWING 430 FOR CULVERT CATCHMENT DETAILS.
3. FISH BAFFLES TO BE AT ENVIRONMENTAL FLEXI-BAFFLES OR EQUIVALENT PRODUCT.

**LEGEND:**

FINISHED (5m) MAJOR CONTOUR	———— 75.0 ————
FINISHED (1m) MINOR CONTOUR	—————
PERMANENT STREAM	→→→→→→→→→→
INTERMITTENT STREAM	→→→→→→→→→→
STREAM TO BE REMOVED	→→→→→→→→→→
EXISTING WETLANDS	▭ (Purple)
COUNCIL SEA/ONF AREA	▭ (Green Hatched)
MAPPED SEA/ONF (BY ECOLOGIST)	▭ (Blue)

**HOLE 17 - CULVERT 1 LAYOUT PLAN**

SCALE: 1:500m



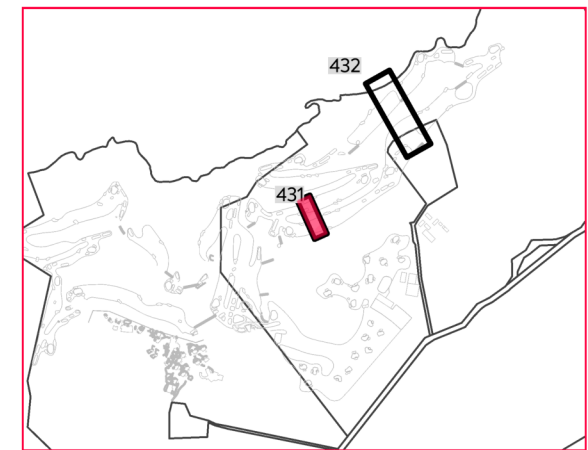
Culvert Ø	RL in	RL out	length	slope
mm	m	m	m	%
450	61	54.4	126.42	5.22

Culvert Ø	Flow Depth	Riprap Thickness	Riprap Width	Riprap Length	Riprap Diameter
mm	d <sub>p</sub> =	D <sub>A</sub> =	W <sub>A</sub> =	L <sub>a</sub> =	d <sub>s</sub> =
450	0.38	0.85	1.8	9.44	0.43

	DS/17 HW OUTLET	17/1 MH1200	SD 17/2 MH1200
FINISHED LEVEL	54.49	59.26	63.45
DEPTH TO INVERT	0.09	2.39	2.45
INVERT LEVEL	54.40	56.87	61.00
EXISTING SURFACE	54.50	59.88	63.38
PIPE DETAILS	4.7% 450mm RCRRJ Class 4		5.6% 450mm RCRRJ Class 4
LENGTH	52.98m		73.44m

**HOLE 17 - CULVERT 1 LONGITUDINAL SECTION**

SCALE HOR=1:500m VERT=1:100m



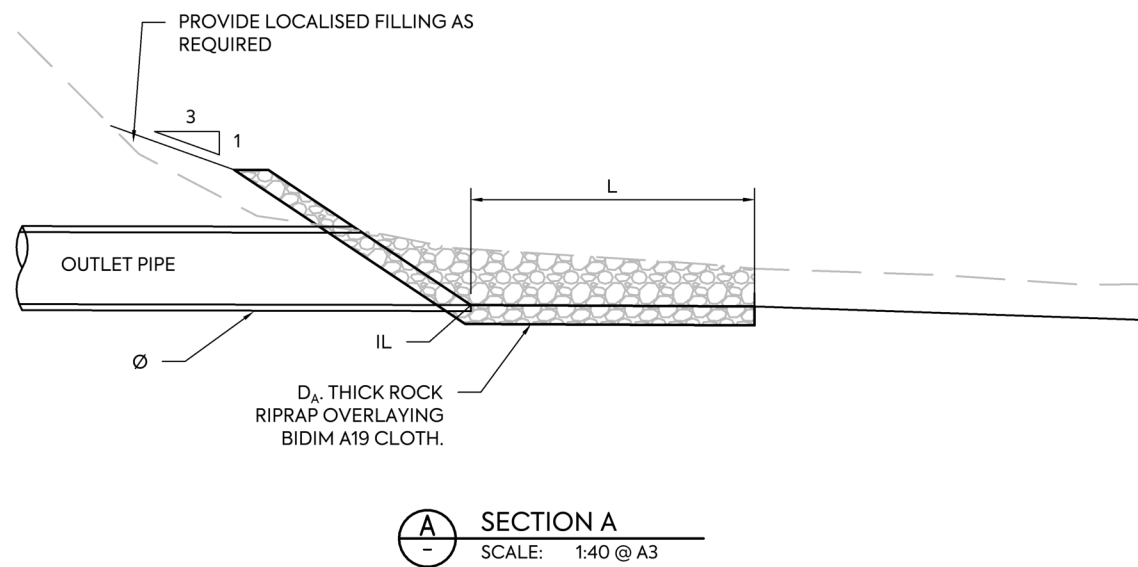
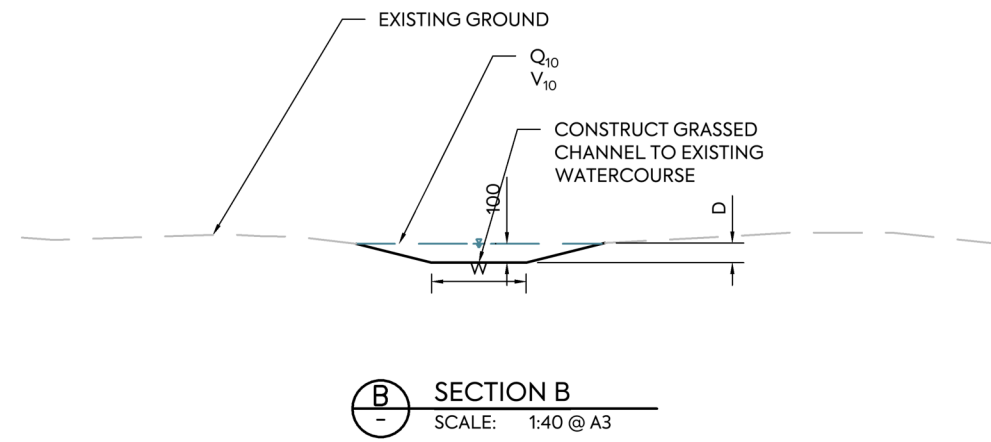
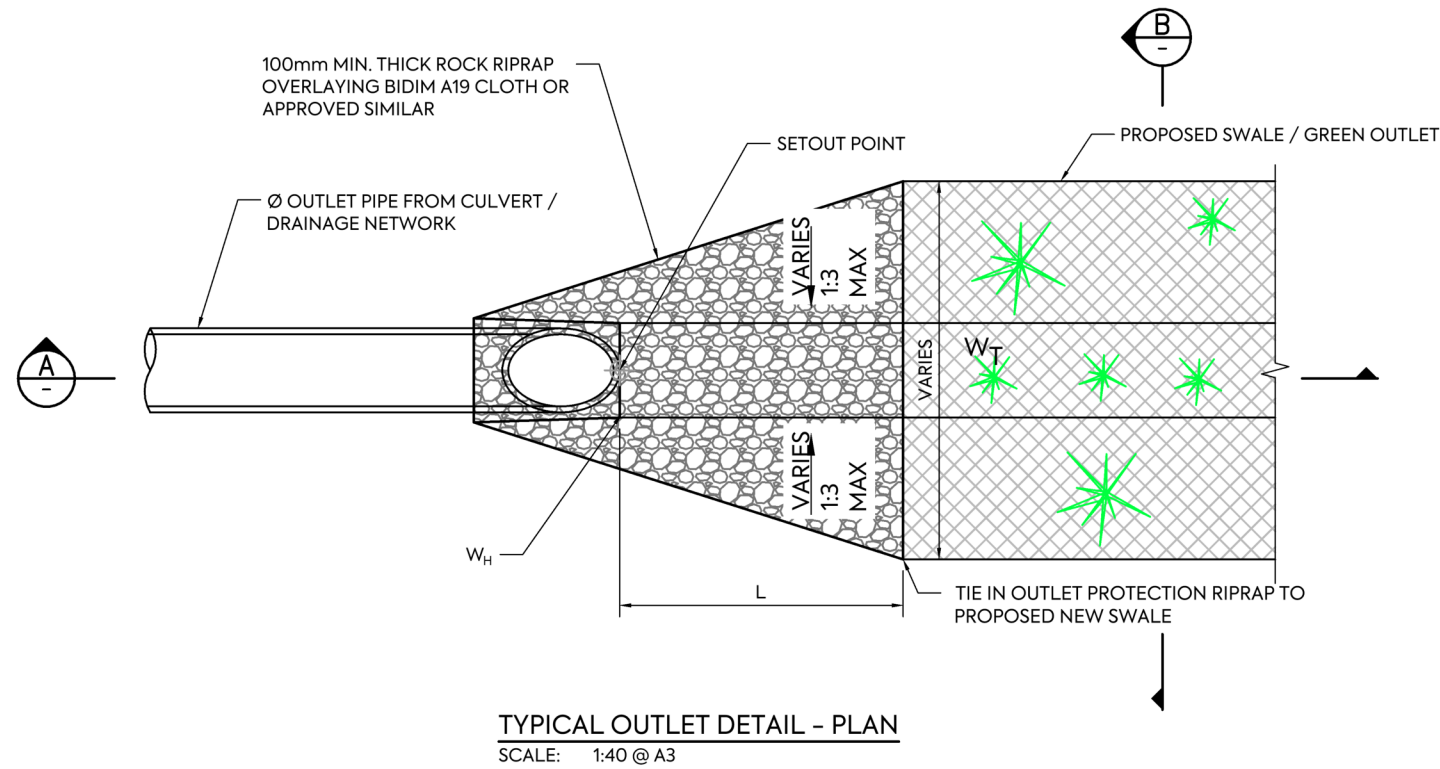
**DRAWING LAYOUT PLAN**

<p>CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD</p> <p>PROJECT: MURIWAI DOWNS GOLF PROJECT 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p> <p>TITLE: PROPOSED DRAINAGE STORMWATER NETWORK HOLE 17 CULVERT 1 DETAILS PLAN</p> <p>PURPOSE OF ISSUE: FOR CONSENT</p> <p>SCALE: AS SHOWN DO NOT SCALE</p> <p>DRAWING NO: 1976-1-431</p> <p>REV: C</p>	<p><b>MCKENZIE &amp; CO.</b></p>	<p>DATE: 26/11/21</p> <p>DATE: 05/11/21</p> <p>DATE: 24/08/21</p>	<p>MO CIM JSD</p> <p>MO CIM JSD</p> <p>MO CIM JSD</p>	<p>ISSUED FOR CONSENT</p> <p>SECOND ISSUE</p> <p>FIRST ISSUE</p>
<p>REV DESCRIPTION DRN BY CHK BY APP BY DATE</p>				



**NOTES:**

- FOR LOCATIONS OF STORMWATER OUTLET STRUCTURE, REFER TO DRAWING 400 SERIES.



OUTLET DIMENSIONS FOR CULVERTS								
OUTLET	PIPE DIAMETER 'Ø'	INCOMING GRADE '%'	INVERT LEVEL 'IL' (m)	LENGTH 'L' (m)	RIPRAP WIDTH 'W^H' (m)	RIPRAP END WIDTH 'W^T' (m)	RIPRAP THICKNESS 'D^A' (m)	RIPRAP DIAMETER 'd^s' (m)
CULVERT 1	450	4.5	54.00	6.65	0.80	1.35	0.60	0.30
CULVERT 2	900	5.0	40.00	15.00	1.30	2.70	1.45	0.75

Refer to Engineering Calculations (TP10, TR2013/018)

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD

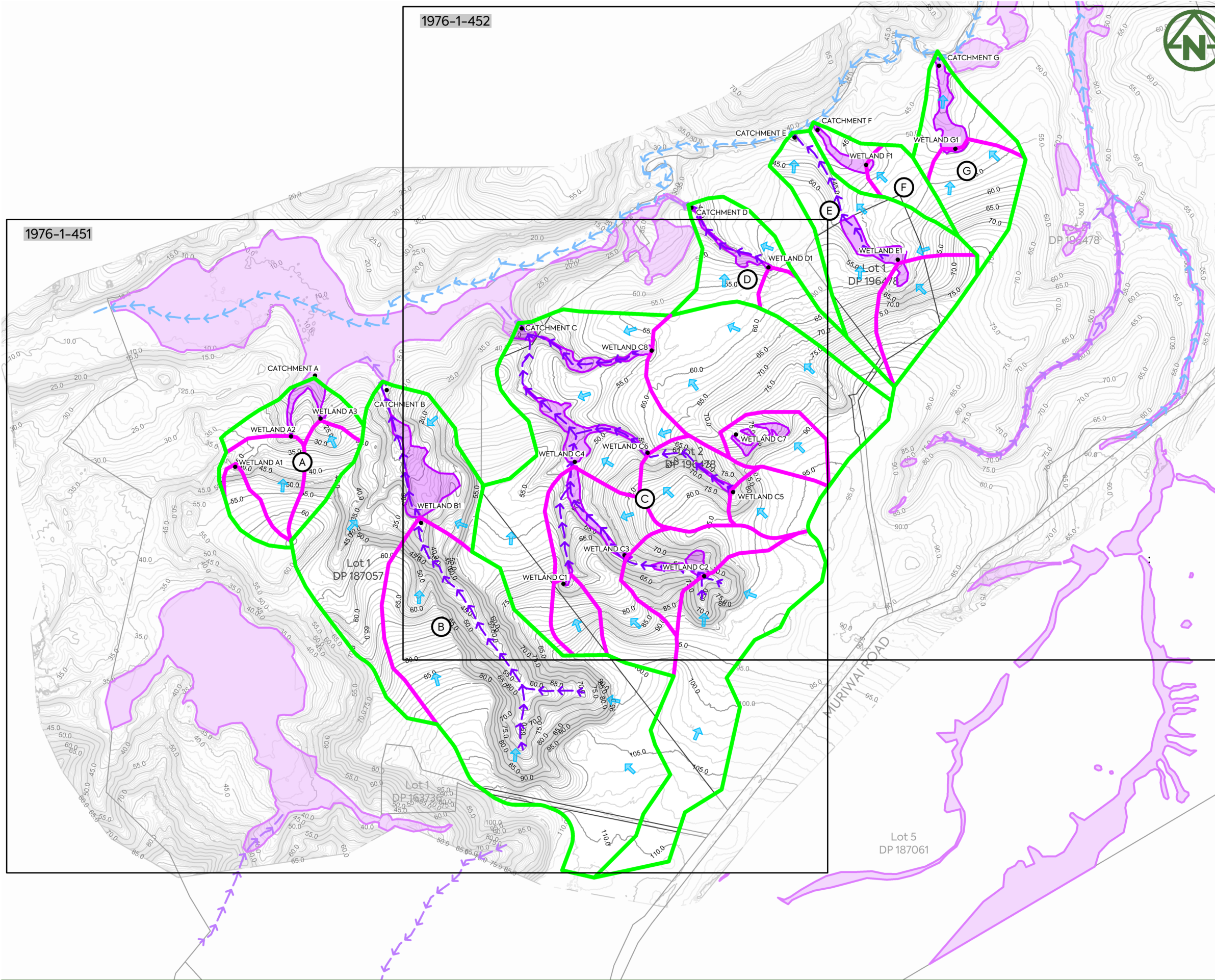
PROJECT: MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE: PROPOSED DRAINAGE STORMWATER NETWORK  
OUTLET STRUCTURES

PURPOSE OF ISSUE: FOR CONSENT  
SCALE: 1:40m  
DO NOT SCALE  
DRAWING NO: 1976-1-435  
REV: C

1976-1-452

1976-1-451



**NOTES:**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
2. REFER TO DRAWING 455-457 FOR Q100 POST-DEVELOPMENT CATCHMENTS.

**LEGEND:**

- EXTENT OF EARTHWORKS - - - - -
- CATCHMENT BOUNDARY (PRE DEVELOPMENT) —————
- SUB-CATCHMENT BOUNDARY (PRE DEVELOPMENT) —————
- OVERLAND FLOW PATH → → → → →
- CATCHMENT NAME B
- OVERLAND FLOW DESIGN POINT ●
- EXISTING (5m) MAJOR CONTOUR ————— 75.0
- EXISTING (1m) MINOR CONTOUR —————
- PERMANENT STREAM → → → → →
- INTERMITTENT STREAM → → → → →
- EXISTING WETLANDS (TO BE PROTECTED) —————

CLIENT:

THE BEARS HOME PROJECT MANAGEMENT LTD

PROJECT:

MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE:

PROPOSED DRAINAGE  
Q100 PRE DEVELOPMENT  
STORMWATER CATCHMENT  
OVERALL PLAN

PURPOSE OF ISSUE:

FOR CONSENT

SCALE:  
1:7500

DO NOT SCALE

DRAWING NO:

1976-1-450

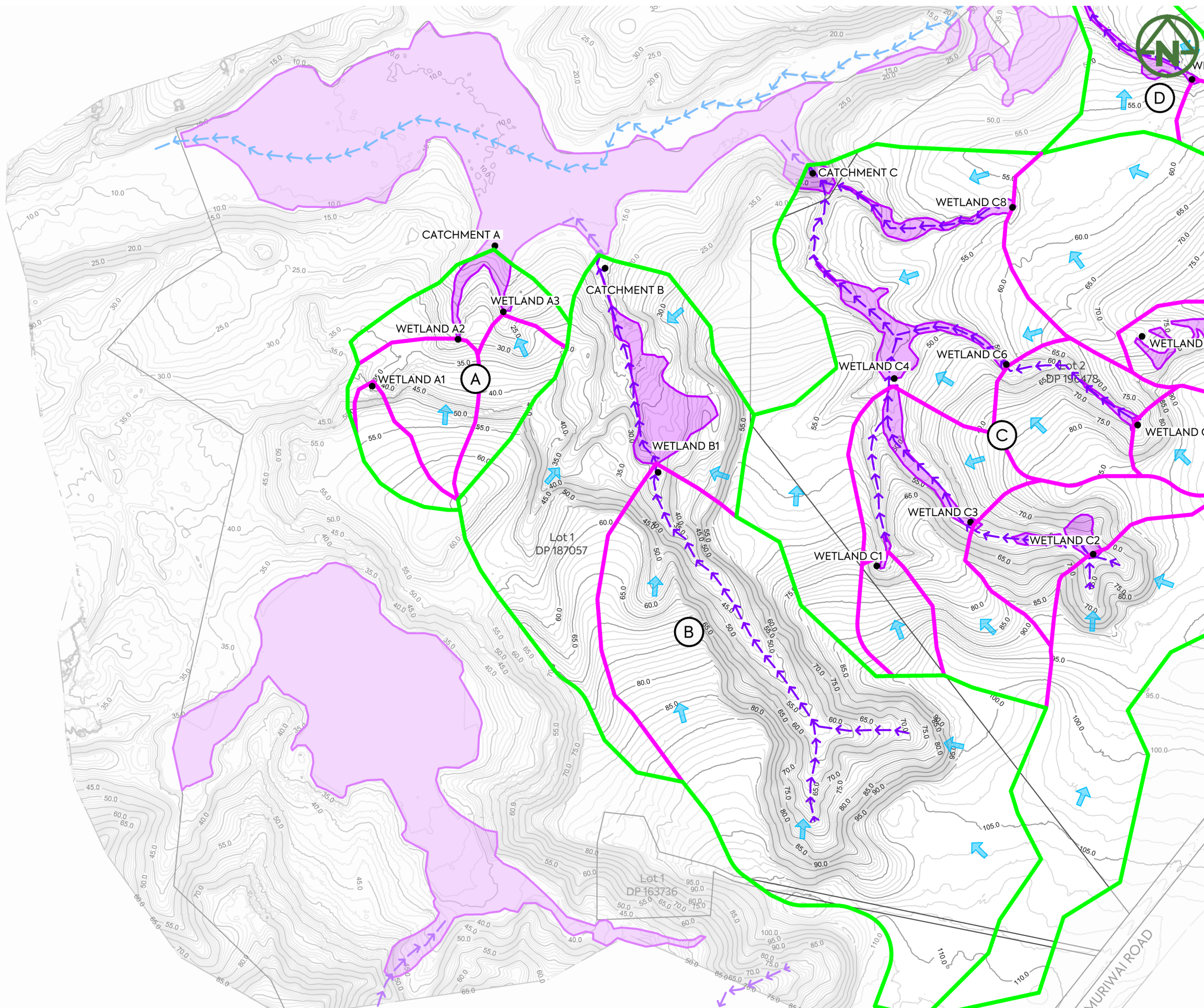
REV:

C



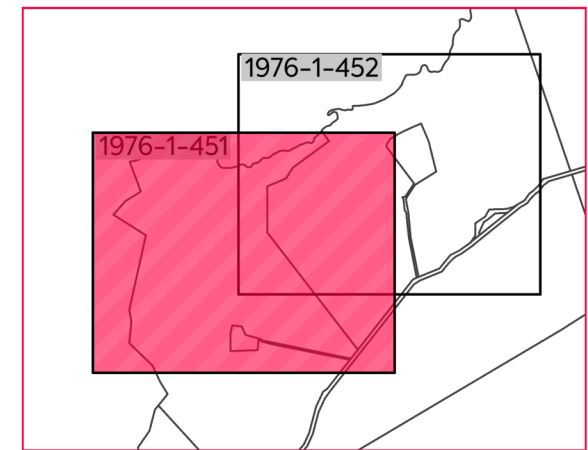
**MCKENZIE & CO.**

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



- NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
  - REFER TO DRAWING 455-457 FOR Q100 POST-DEVELOPMENT CATCHMENTS.

- LEGEND:**
- EXTENT OF EARTHWORKS:
  - CATCHMENT BOUNDARY (PRE DEVELOPMENT):
  - SUB-CATCHMENT BOUNDARY (PRE DEVELOPMENT):
  - OVERLAND FLOW PATH:
  - CATCHMENT NAME:
  - OVERLAND FLOW DESIGN POINT:
  - EXISTING (5m) MAJOR CONTOUR:
  - EXISTING (1m) MINOR CONTOUR:
  - PERMANENT STREAM:
  - INTERMITTENT STREAM:
  - EXISTING WETLANDS (TO BE PROTECTED):



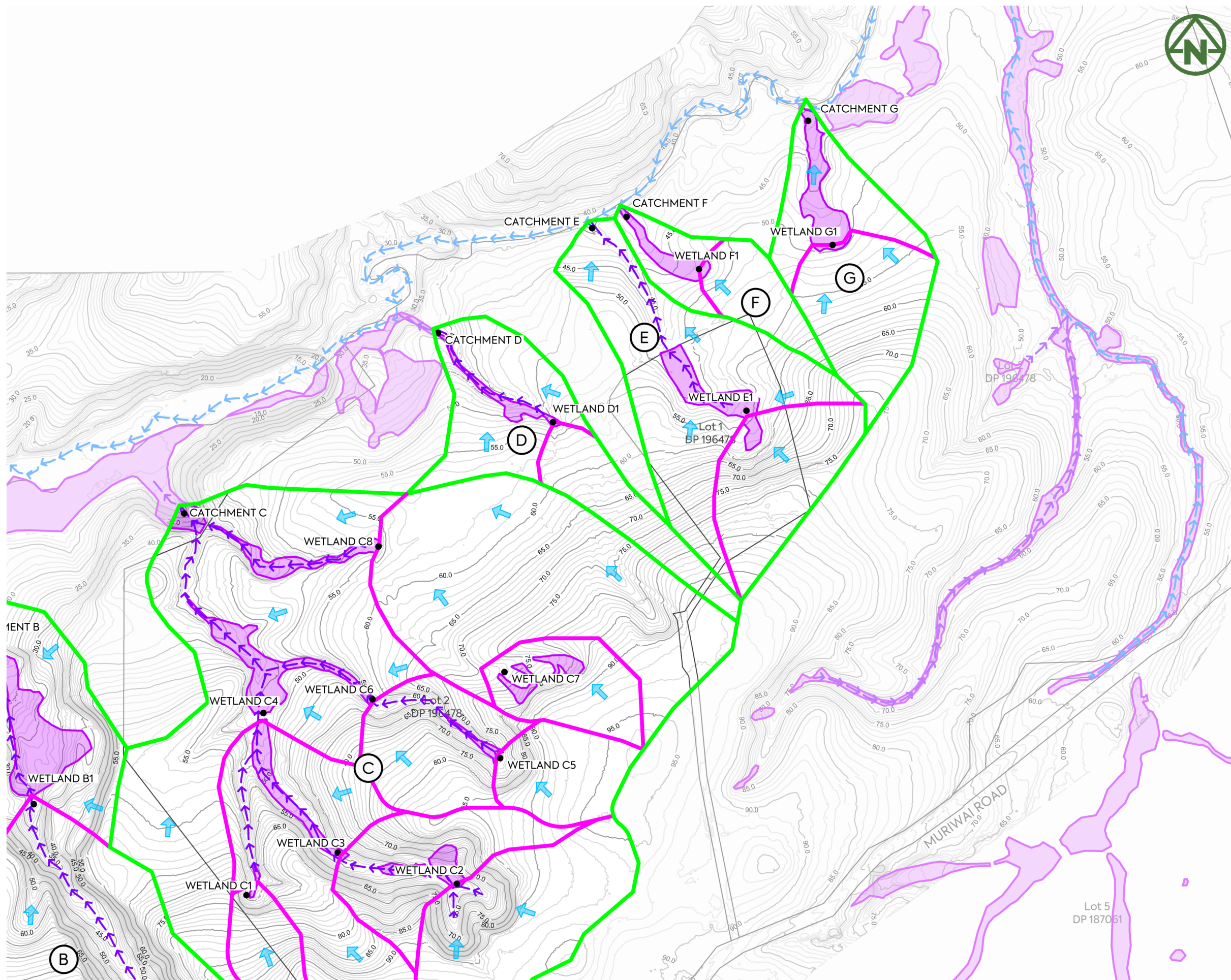
**DRAWING LAYOUT PLAN**

CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD PROJECT: MURIWAI DOWNS GOLF PROJECT TITLE: PROPOSED DRAINAGE Q100 PRE DEVELOPMENT STORMWATER CATCHMENT LAYOUT PLAN - SHEET 1 PURPOSE OF ISSUE: FOR CONSENT

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



SCALE: 1:5000  
DO NOT SCALE  
DRAWING NO: 1976-1-451  
REV: C

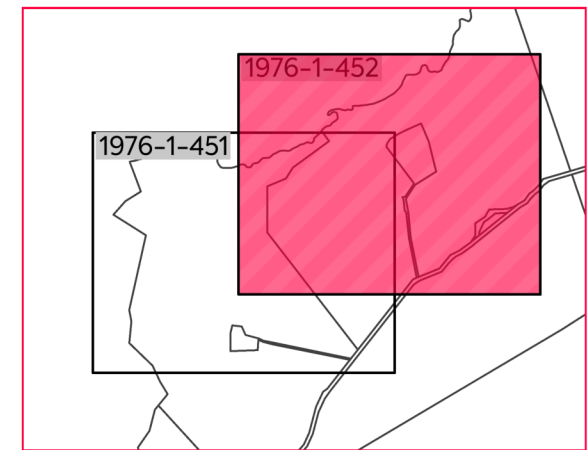


**NOTES:**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
2. REFER TO DRAWING 455-457 FOR Q100 POST-DEVELOPMENT CATCHMENTS.

**LEGEND:**

- EXTENT OF EARTHWORKS -----
- CATCHMENT BOUNDARY (PRE DEVELOPMENT) -----
- SUB-CATCHMENT BOUNDARY (PRE DEVELOPMENT) -----
- OVERLAND FLOW PATH → →
- CATCHMENT NAME B
- OVERLAND FLOW DESIGN POINT ●
- EXISTING (5m) MAJOR CONTOUR ----- 75.0
- EXISTING (1m) MINOR CONTOUR -----
- PERMANENT STREAM →→→→→
- INTERMITTENT STREAM →→→→→
- EXISTING WETLANDS (TO BE PROTECTED)



**DRAWING LAYOUT PLAN**

CLIENT: PROJECT: TITLE:

THE BEARS HOME PROJECT MANAGEMENT LTD  
 MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

PURPOSE OF ISSUE:  
**FOR CONSENT**  
 SCALE:  
**1:5000**  
 DO NOT SCALE  
 DRAWING NO.:  
**1976-1-452**

REV: **C**

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



PRE DEVELOPMENT CATCHMENT INFO

24-hour rainfall	Imperviousness	SCS Curve No.														
Depth (mm)	(%)	(mm)														
175	0%	74														
Description	Catchment Area	Contributing Catchments	Total Catchment Area	Catchment Slope	Catchment Length	Channelisation	Imperviousness	q*	Weighted curve number	Storage	la weighted	$c^*=(P24-2la)/(P24-2la+2S)$	tc	Peak Q100 Flow	Q24	V24
	(ha)		(ha)	(m/m)	(km)	C	(%)	Approx.		(S)	(mm)			(m3/s)	(mm)	(m3)
Wetland A1	0.90	A1	0.90	0.128	0.21	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.19	111.5	1003.30
Wetland A2	1.88	A1+A2	2.78	0.116	0.34	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.59	111.5	3099.10
Wetland A3	1.43	A3	1.43	0.168	0.27	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.30	111.5	1594.14
Catchment A	1.77	A1+A2+A3+A	5.98	0.113	0.47	1.00	0%	0.120	74.0	89.2	5.00	0.48	0.18	1.26	111.5	6666.40
Wetland B1	19.57	B1	19.57	0.105	0.82	1.00	0%	0.107	74.0	89.2	5.00	0.48	0.27	3.66	111.5	21816.31
Catchment B	10.44	B1+B	30.01	0.090	1.09	1.00	0%	0.098	74.0	89.2	5.00	0.48	0.34	5.15	111.5	33454.64
Wetland C1	1.20	C1	1.20	0.204	0.17	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.25	111.5	1337.74
Wetland C2	9.05	C2	9.05	0.073	0.67	1.00	0%	0.109	74.0	89.2	5.00	0.48	0.26	1.73	111.5	10088.79
Wetland C3	2.83	C2+C3	11.88	0.069	0.83	1.00	0%	0.102	74.0	89.2	5.00	0.48	0.31	2.12	111.5	13246.97
Wetland C4	5.30	C1+C2+C3+C4	18.38	0.063	1.04	1.00	0%	0.095	74.0	89.2	5.00	0.48	0.37	3.06	111.5	20493.06
Wetland C5	1.83	C5	1.83	0.129	0.20	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.39	111.5	2040.05
Wetland C6	2.80	C5+C6	4.63	0.106	0.39	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.98	111.5	5156.99
Wetland C7	2.06	C7	2.06	0.111	0.24	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.44	111.5	2296.45
Wetland C8	8.88	C7+C8	10.94	0.092	0.48	1.00	0%	0.118	74.0	89.2	5.00	0.48	0.20	2.26	111.5	12195.73
Catchment C	12.27	C4+C6+C8+C	46.22	0.072	1.37	1.00	0%	0.090	74.0	89.2	5.00	0.48	0.42	7.28	111.5	51524.16
Wetland D1	1.72	D1	1.72	0.098	0.46	1.00	0%	0.119	74.0	89.2	5.00	0.48	0.19	0.36	111.5	1917.43
Catchment D	2.88	D1+D	4.60	0.089	0.66	1.00	0%	0.110	74.0	89.2	5.00	0.48	0.25	0.89	111.5	5128.00
Wetland E1	2.85	E1	2.85	0.167	0.24	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.60	111.5	3177.13
Catchment E	5.92	E1+E	8.77	0.091	0.57	1.00	0%	0.117	74.0	89.2	5.00	0.48	0.22	1.80	111.5	9781.11
Wetland F1	1.29	F1	1.29	0.108	0.23	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.27	111.5	1432.50
Catchment F	0.94	F1+F	2.23	0.087	0.35	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.47	111.5	2480.39
Wetland G1	2.89	G1	2.89	0.127	0.21	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	0.61	111.5	3221.72
Catchment G	2.04	G1+G	4.93	0.094	0.38	1.00	0%	0.121	74.0	89.2	5.00	0.48	0.17	1.04	111.5	5495.88



CLIENT:  
THE BEARS HOME  
PROJECT MANAGEMENT LTD

PROJECT:  
MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE:  
PROPOSED DRAINAGE  
Q100 PRE DEVELOPMENT  
CALCULATION DATA TABLE

PURPOSE OF ISSUE:  
FOR CONSENT

SCALE:  
NTS @ A3  
DO NOT SCALE

DRAWING NO:  
1976-1-453  
REV:  
A

1976-1-457

1976-1-456

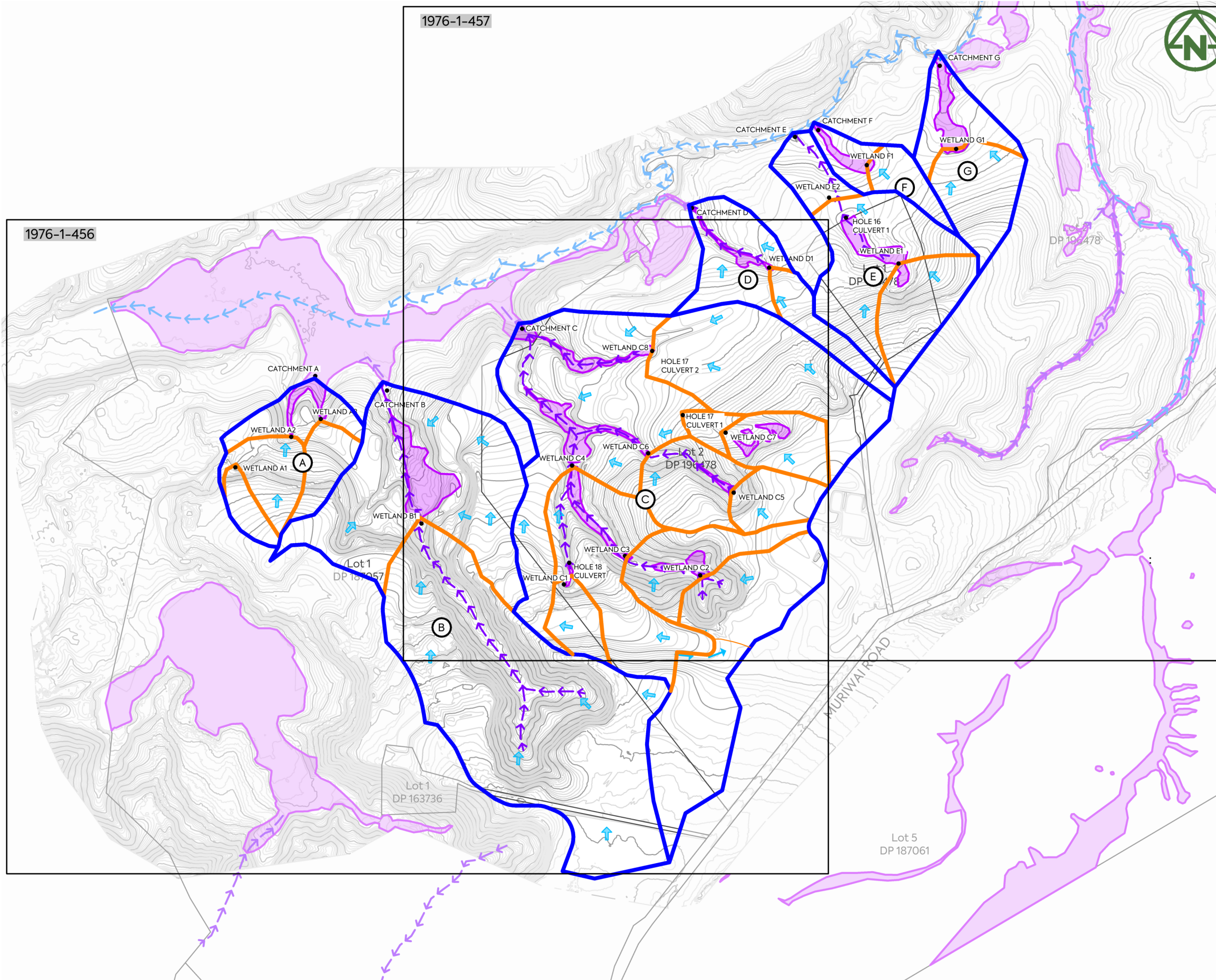


NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
2. REFER TO DRAWING 450-452 FOR Q100 PRE-DEVELOPMENT CATCHMENTS.

LEGEND:

- EXTENT OF EARTHWORKS
- CATCHMENT BOUNDARY (POST DEVELOPMENT)
- SUB-CATCHMENT BOUNDARY (POST DEVELOPMENT)
- OVERLAND FLOW PATH
- CATCHMENT NAME
- OVERLAND FLOW DESIGN POINT
- FINISHED (5m) MAJOR CONTOUR
- FINISHED (1m) MINOR CONTOUR
- PERMANENT STREAM
- INTERMITTENT STREAM
- EXISTING WETLANDS (TO BE PROTECTED)

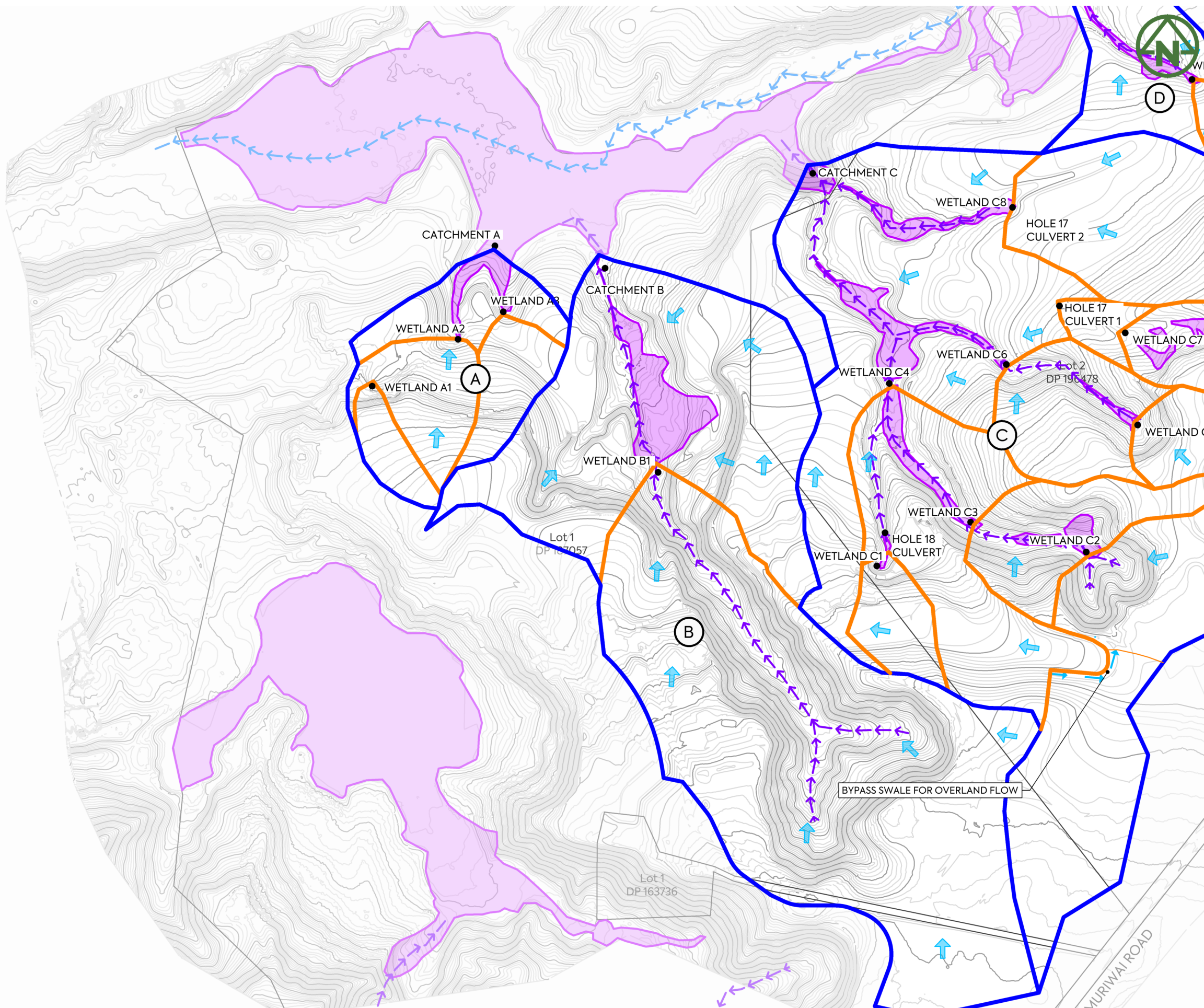


REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



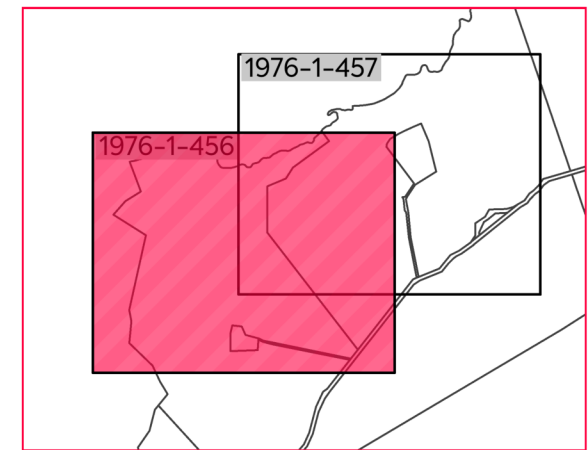
CLIENT: THE BEARS HOME PROJECT MANAGEMENT LTD  
 PROJECT: MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY  
 TITLE: PROPOSED DRAINAGE Q100 POST DEVELOPMENT STORMWATER CATCHMENT OVERALL PLAN  
 PURPOSE OF ISSUE: FOR CONSENT  
 SCALE: 1:7500  
 DO NOT SCALE  
 DRAWING NO: 1976-1-455  
 REV: C





- NOTES:**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
  - REFER TO DRAWING 450-452 FOR Q100 PRE-DEVELOPMENT CATCHMENTS.

- LEGEND:**
- EXTENT OF EARTHWORKS:
  - CATCHMENT BOUNDARY (POST DEVELOPMENT):
  - SUB-CATCHMENT BOUNDARY (POST DEVELOPMENT):
  - OVERLAND FLOW PATH:
  - CATCHMENT NAME:
  - OVERLAND FLOW DESIGN POINT:
  - FINISHED (5m) MAJOR CONTOUR:
  - FINISHED (1m) MINOR CONTOUR:
  - PERMANENT STREAM:
  - INTERMITTENT STREAM:
  - EXISTING WETLANDS (TO BE PROTECTED):



**DRAWING LAYOUT PLAN**

	<p>CLIENT: <b>THE BEARS HOME PROJECT MANAGEMENT LTD</b></p>	<p>PROJECT: <b>MURIWAI DOWNS GOLF PROJECT</b> 610 &amp; 697 MURIWAI ROAD MURIWAI VALLEY</p>	<p>TITLE: <b>PROPOSED DRAINAGE Q100 POST DEVELOPMENT STORMWATER CATCHMENT LAYOUT PLAN - SHEET 1</b></p>	<p>PURPOSE OF ISSUE: <b>FOR CONSENT</b></p>																		
<table border="0" style="width: 100%; font-size: small;"> <tr> <td style="width: 10%;">C</td> <td style="width: 60%;">ISSUED FOR CONSENT</td> <td style="width: 10%;">MO</td> <td style="width: 10%;">CIM</td> <td style="width: 10%;">JSD</td> <td style="width: 10%;">26/11/21</td> </tr> <tr> <td>B</td> <td>SECOND ISSUE</td> <td>MO</td> <td>CIM</td> <td>JSD</td> <td>05/11/21</td> </tr> <tr> <td>A</td> <td>FIRST ISSUE</td> <td>MO</td> <td>CIM</td> <td>JSD</td> <td>24/08/21</td> </tr> </table>	C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21	B	SECOND ISSUE	MO	CIM	JSD	05/11/21	A	FIRST ISSUE	MO	CIM	JSD	24/08/21	<p style="font-size: 24px; font-weight: bold; margin: 0;">MCKENZIE &amp; CO.</p>	<p>SCALE: <b>1:5000</b> DO NOT SCALE</p> <p>DRAWING NO: <b>1976-1-456</b></p>	<p>REV: <b>C</b></p>	
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21																	
B	SECOND ISSUE	MO	CIM	JSD	05/11/21																	
A	FIRST ISSUE	MO	CIM	JSD	24/08/21																	

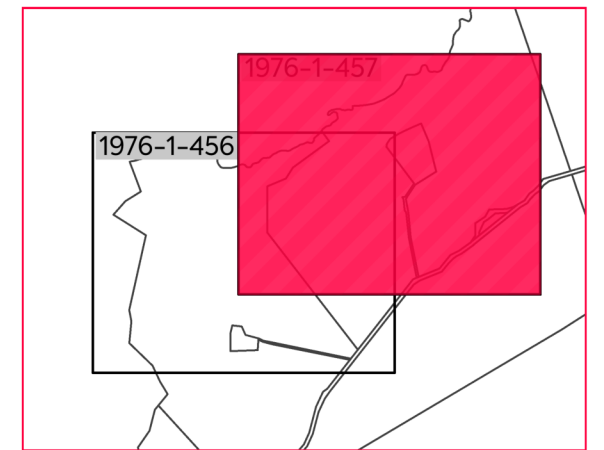
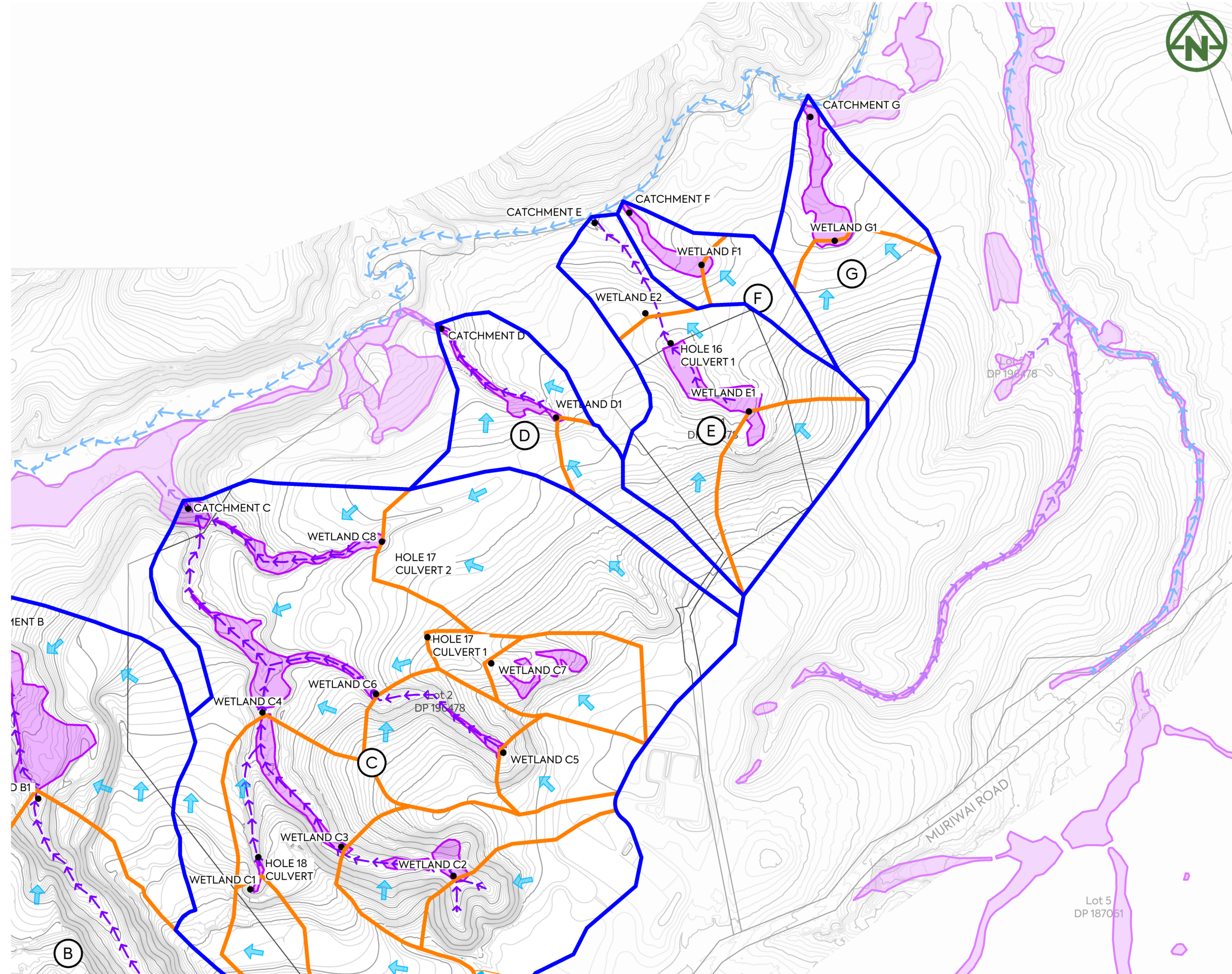


**NOTES:**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING INFRASTRUCTURE AND SERVICING REPORT.
2. REFER TO DRAWING 450-452 FOR Q100 PRE-DEVELOPMENT CATCHMENTS.

**LEGEND:**

- EXTENT OF EARTHWORKS ---
- CATCHMENT BOUNDARY (POST DEVELOPMENT) ---
- SUB-CATCHMENT BOUNDARY (POST DEVELOPMENT) ---
- OVERLAND FLOW PATH → →
- CATCHMENT NAME B
- OVERLAND FLOW DESIGN POINT ●
- FINISHED (5m) MAJOR CONTOUR --- 75.0
- FINISHED (1m) MINOR CONTOUR ---
- PERMANENT STREAM →→→→→
- INTERMITTENT STREAM →→→→→
- EXISTING WETLANDS (TO BE PROTECTED)



**DRAWING LAYOUT PLAN**

CLIENT: PROJECT: TITLE:

THE BEARS HOME PROJECT MANAGEMENT LTD  
 MURIWAI DOWNS GOLF PROJECT  
 610 & 697 MURIWAI ROAD  
 MURIWAI VALLEY

PURPOSE OF ISSUE:  
**FOR CONSENT**  
 SCALE:  
**1:5000**  
 DO NOT SCALE  
 DRAWING NO:  
**1976-1-457**

REV: **C**

REV	DESCRIPTION	DRN BY	CHK BY	APP BY	DATE
C	ISSUED FOR CONSENT	MO	CIM	JSD	26/11/21
B	SECOND ISSUE	MO	CIM	JSD	05/11/21
A	FIRST ISSUE	MO	CIM	JSD	24/08/21



## POST DEVELOPMENT CATCHMENT INFO

24-hour rainfall	Imperviousness	SCS Curve No.														
Depth (mm)	(%)	(mm)														
175	0%	74														
Description	Catchment Area	Contributing Catchments	Total Catchment Area	Catchment Slope	Catchment Length	Channelisation	Imperviousness	q*	Weighted curve number	Storage	la weighted	$c^*=(P24-2Ia)/(P24-2Ia+2S)$	tc	Peak Q100 Flow	Q24	V24
	(ha)		(ha)	(m/m)	(km)	C	(%)	Approx.		(S)	(mm)			(m3/s)	(mm)	(m3)
Wetland A1	0.87	A1	0.87	0.129	0.21	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.19	111.5	969.86
Wetland A2	1.87	A1+A2	2.74	0.110	0.34	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.58	111.5	3054.51
Wetland A3	1.40	A3	1.40	0.156	0.27	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.30	111.5	1560.70
Catchment A	1.77	A1+A2+A3+A	5.91	0.109	0.47	1.00	0%	0.118	74.0	89.2	5.00	0.48	0.19	1.22	111.5	6588.37
Wetland B1	19.35	B1	19.35	0.105	0.82	1.00	7%	0.108	75.7	81.5	4.65	0.50	0.27	3.66	115.2	22293.10
Catchment B	11.09	B1+B	30.44	0.090	1.09	1.00	0%	0.098	74.0	89.2	5.00	0.48	0.34	5.22	111.5	33934.00
Wetland C1	1.25	C1	1.25	0.172	0.17	1.00	20%	0.122	78.8	68.3	4.00	0.55	0.17	0.27	122.2	1527.20
Wetland C2	8.57	C2	8.57	0.073	0.67	1.00	2%	0.109	74.4	87.3	4.91	0.49	0.26	1.63	112.4	9632.27
Wetland C3	2.95	C2+C3	11.52	0.069	0.83	1.00	5%	0.101	75.3	83.3	4.73	0.50	0.31	2.04	114.3	13170.98
Wetland C4	5.88	C1+C2+C3+C4	18.65	0.073	1.04	1.00	0%	0.097	74.0	89.2	5.00	0.48	0.35	3.17	111.5	20790.71
Wetland C5	1.73	C5	1.73	0.129	0.20	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.37	111.5	1928.57
Wetland C6	2.83	C5+C6	4.56	0.106	0.39	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.97	111.5	5083.41
Wetland C7	2.16	C7	2.16	0.107	0.24	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.46	111.5	2402.36
Culvert 17	0.57	C7+culvert 17	2.73	0.096	0.34	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.58	111.5	3037.78
Wetland C8	7.71	C7+C8	10.44	0.072	0.60	1.00	2%	0.110	74.5	87.1	4.90	0.49	0.25	2.01	112.5	11743.58
Catchment C	10.94	C4+C6+C8+C	44.59	0.077	1.28	1.00	0%	0.091	74.0	89.2	5.00	0.48	0.40	7.10	111.5	49707.07
Wetland D1	1.65	D1	1.65	0.128	0.19	1.00	3%	0.122	74.7	85.9	4.85	0.49	0.17	0.35	113.1	1865.62
Catchment D	3.04	D1+D	4.69	0.097	0.38	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	1.00	111.5	5232.79
Wetland E1	2.86	E1	2.86	0.167	0.24	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.61	111.5	3188.28
Wetland E2	4.93	E+E1	7.79	0.167	0.24	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	1.66	111.5	8684.16
Culvert 16		E+E1	7.79	0.091	0.24	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	1.66	111.5	8684.16
Catchment E	1.34	E+E1+E2	9.13	0.091	0.45	1.00	0%	0.118	74.0	89.2	5.00	0.48	0.19	1.88	111.5	10174.63
Wetland F1	1.25	F1	1.25	0.108	0.23	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.27	111.5	1393.48
Catchment F	0.96	F1+F	2.21	0.087	0.57	1.00	0%	0.112	74.0	89.2	5.00	0.48	0.23	0.43	111.5	2465.79
Wetland G1	2.89	G1	2.89	0.127	0.21	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	0.62	111.5	3221.72
Catchment G	2.04	G1+G	4.93	0.094	0.38	1.00	0%	0.122	74.0	89.2	5.00	0.48	0.17	1.05	111.5	5495.88

CLIENT:

THE BEARS HOME  
PROJECT MANAGEMENT LTD

PROJECT:

MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE:

PROPOSED DRAINAGE  
Q100 POST DEVELOPMENT  
CALCULATION DATA TABLE

PURPOSE OF ISSUE:

FOR CONSENT

SCALE:  
NTS @ A3  
DO NOT SCALE

DRAWING NO:  
1976-1-458

REV:

A



PRE DEVELOPMENT				POST DEVELOPMENT						
Description	Contributing	Total Catchment	Peak Q100 Flow	Description	Contributing	Total Catchment	Peak Q100 Flow	Change in Impervious area	Change in Flow	Change in area
	Catchments	Area (ha)	(m3/s)		Catchments	Area (ha)	(m3/s)	(m)	(m3/s)	(%)
Wetland A1	A1	0.90	0.19	Wetland A1	A1	0.87	0.19	0	0.00	-3%
Wetland A2	A1+A2	2.78	0.59	Wetland A2	A1+A2	2.74	0.58	0	0.00	-1%
Wetland A3	A3	1.43	0.30	Wetland A3	A3	1.40	0.30	0	0.00	-2%
Catchment A	A1+A2+A3+A	5.98	1.26	Catchment A	A1+A2+A3+A	5.91	1.22	0	-0.04	-1%
Wetland B1	B1	19.57	3.66	Wetland B1	B1	19.35	3.66	13700	-0.01	-1%
Catchment B	B1+B	30.01	5.15	Catchment B	B1+B	30.44	5.22	0	0.07	1%
Wetland C1	C1	1.20	0.25	Wetland C1	C1	1.25	0.27	2500	0.01	4%
Wetland C2	C2	9.05	1.73	Wetland C2	C2	8.57	1.63	1500	-0.09	-5%
Wetland C3	C2+C3	11.88	2.12	Wetland C3	C2+C3	11.52	2.04	1600	-0.08	-3%
Wetland C4	C1+C2+C3+C4	18.38	3.06	Wetland C4	C1+C2+C3+C4	18.65	3.17	0	0.11	1%
Wetland C5	C5	1.83	0.39	Wetland C5	C5	1.73	0.37	0	-0.02	-5%
Wetland C6	C5+C6	4.63	0.98	Wetland C6	C5+C6	4.56	0.97	0	-0.01	-1%
Wetland C7	C7	2.06	0.44	Wetland C7	C7	2.16	0.46	0	0.02	5%
Wetland C8	C7+C8	10.94	2.26	Wetland C8	C7+C8	10.44	2.01	0	-0.25	-5%
Catchment C	C4+C6+C8+C	46.22	7.28	Catchment C	C4+C6+C8+C	44.59	7.10	1500	-0.18	-4%
Wetland D1	D1	1.72	0.36	Wetland D1	D1	1.65	0.35	0	-0.01	-4%
Catchment D	D1+D	4.60	0.89	Catchment D	D1+D	4.69	1.00	500	0.12	2%
Wetland E1	E1	2.85	0.60	Wetland E1	E1	2.86	0.61	0	0.01	0%
Catchment E	E1+E	8.77	1.80	Catchment E	E+E1+E2	9.13	1.88	0	0.09	4%
Wetland F1	F1	1.29	0.27	Wetland F1	F1	1.25	0.27	0	-0.01	-3%
Catchment F	F1+F	2.23	0.47	Catchment F	F1+F	2.21	0.43	0	-0.04	-1%
Wetland G1	G1	2.89	0.61	Wetland G1	G1	2.89	0.62	0	0.01	0%
Catchment G	G1+G	4.93	1.04	Catchment G	G1+G	4.93	1.05	0	0.01	0%



CLIENT:  
THE BEARS HOME  
PROJECT MANAGEMENT LTD

PROJECT:  
MURIWAI DOWNS GOLF PROJECT  
610 & 697 MURIWAI ROAD  
MURIWAI VALLEY

TITLE:  
PROPOSED DRAINAGE  
Q100 PRE VS POST DEVELOPMENT  
CALCULATION DATA TABLE

PURPOSE OF ISSUE:  
FOR CONSENT

SCALE:  
NTS @ A3  
DO NOT SCALE

DRAWING NO:  
1976-1-459

REV:  
A