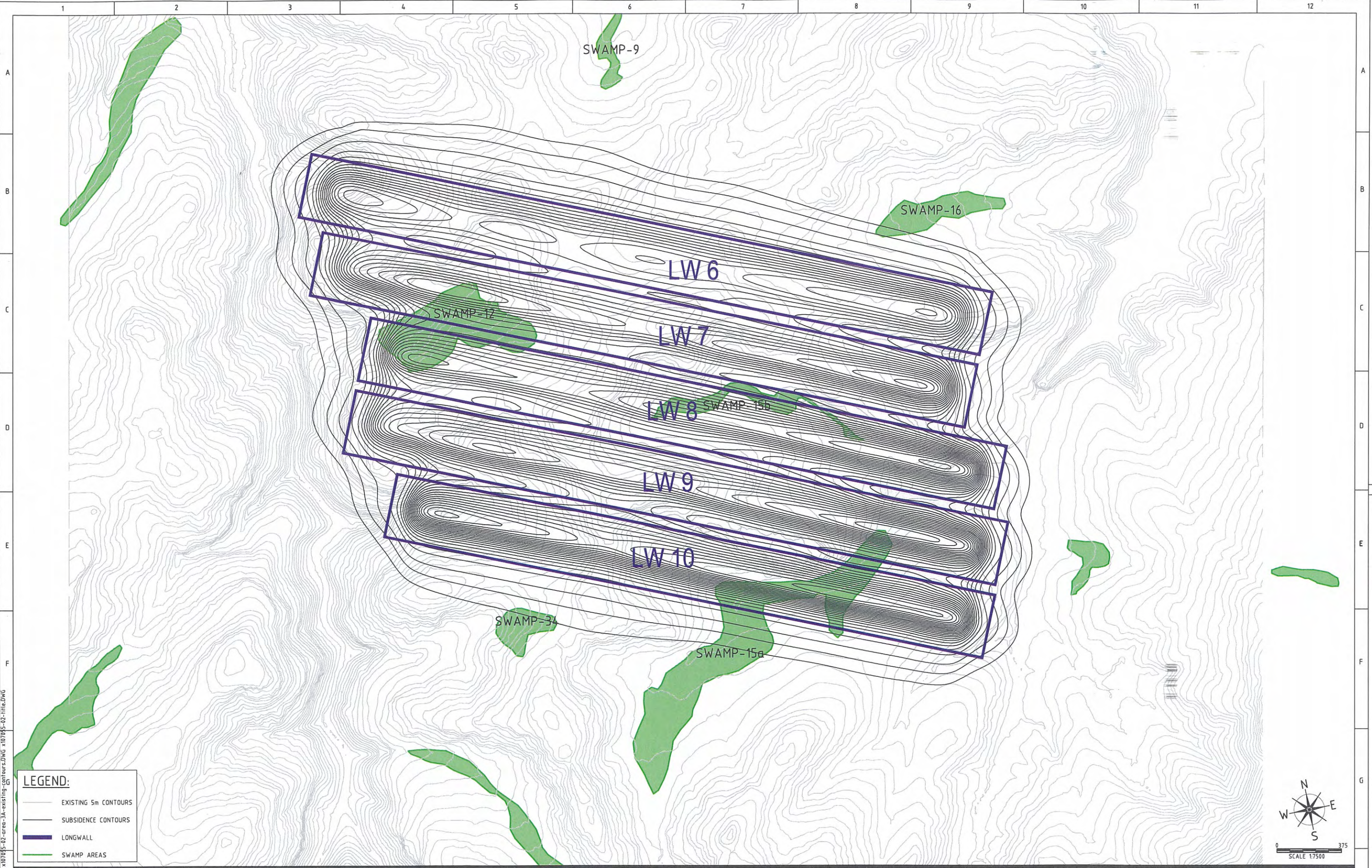


**A
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P
E
N
D
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X**

A

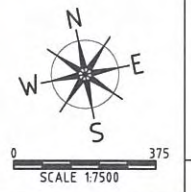
DRAWINGS

DO NOT SCALE IF IN DOUBT ASK



LEGEND:

- EXISTING 5m CONTOURS
- SUBSIDENCE CONTOURS
- LONGWALL
- SWAMP AREAS



File Path: U:\2007\07-05-07 - DENDROBIUM AREA 3 - LANDSCAPE IMPACT ASSESSMENT\DRAWING\BUILD\SK14 - AREA 3A SUBSIDENCE CONTOURS PLANNING
 Date: 19/08/2007 10:10:09
 Xrefs: x107055-02-swamp-areas.dwg x107055-02-area-3a-existing-contours.dwg x107055-02-11ite.dwg

REV	DATE	BY	APP.	DETAILS

DRAWING STATUS			
DESIGN BY	CJM	15/08/07	
DRAWN BY	CJG	15/08/07	
DRAFTING CHECK	<i>[Signature]</i>	18/10/07	
DESIGN CHECK	<i>[Signature]</i>	18/10/07	
FINAL APPROVAL	<i>[Signature]</i>	18/10/07	

INFORMATION

SCALE:
(on A1 Original)
1:7500

HEIGHT DATUM
AHD

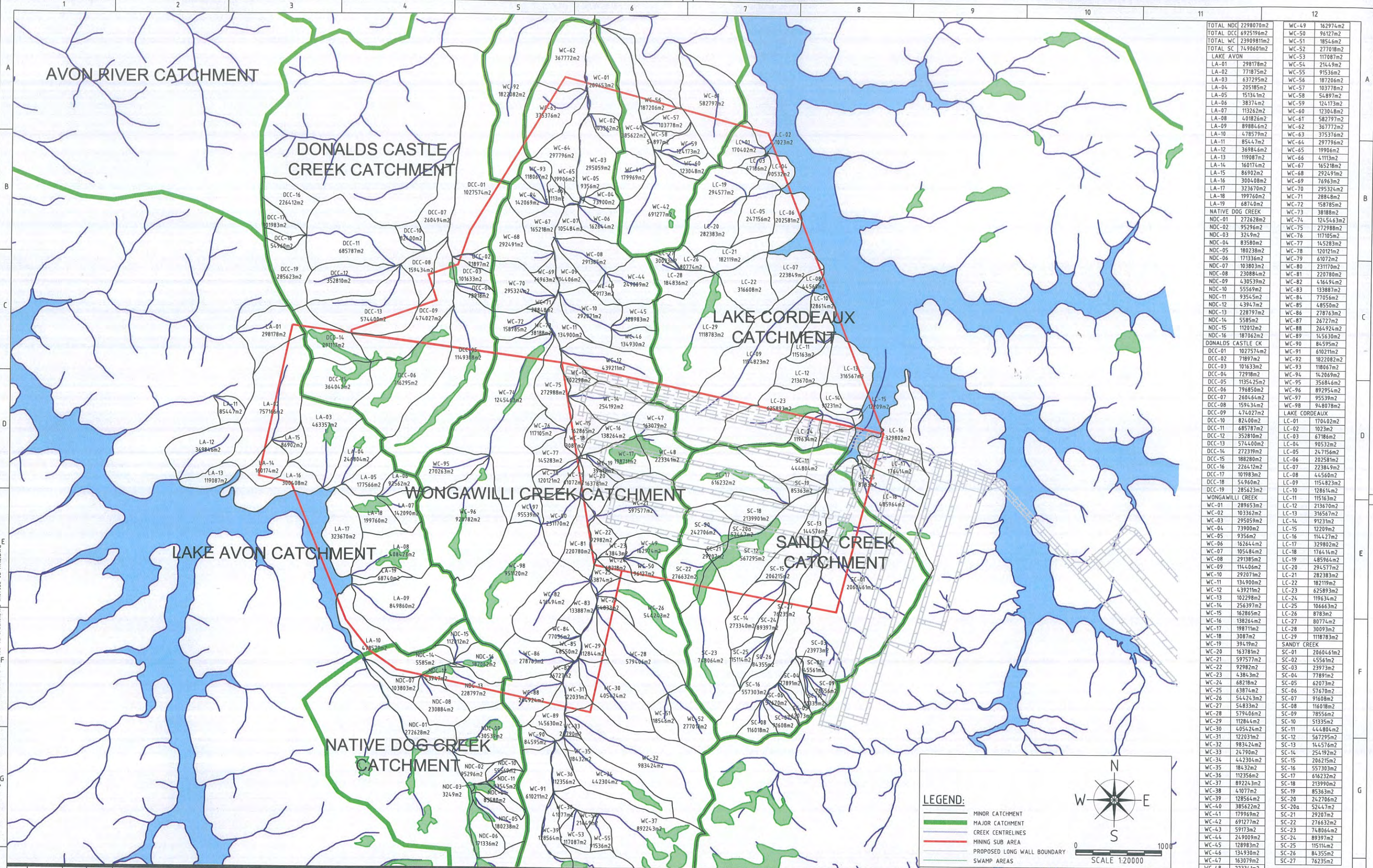
**Cardno
Forbes Rigby**

278 KEIRA STREET, WOLLONGONG, NSW 2500
 Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACN: 051 074 992
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PROJECT TITLE
 LANDSCAPE IMPACT
 ASSESSMENT
 DENDROBIUM AREA 3
 for
 BHPBILLITON ILLAWARRA COAL

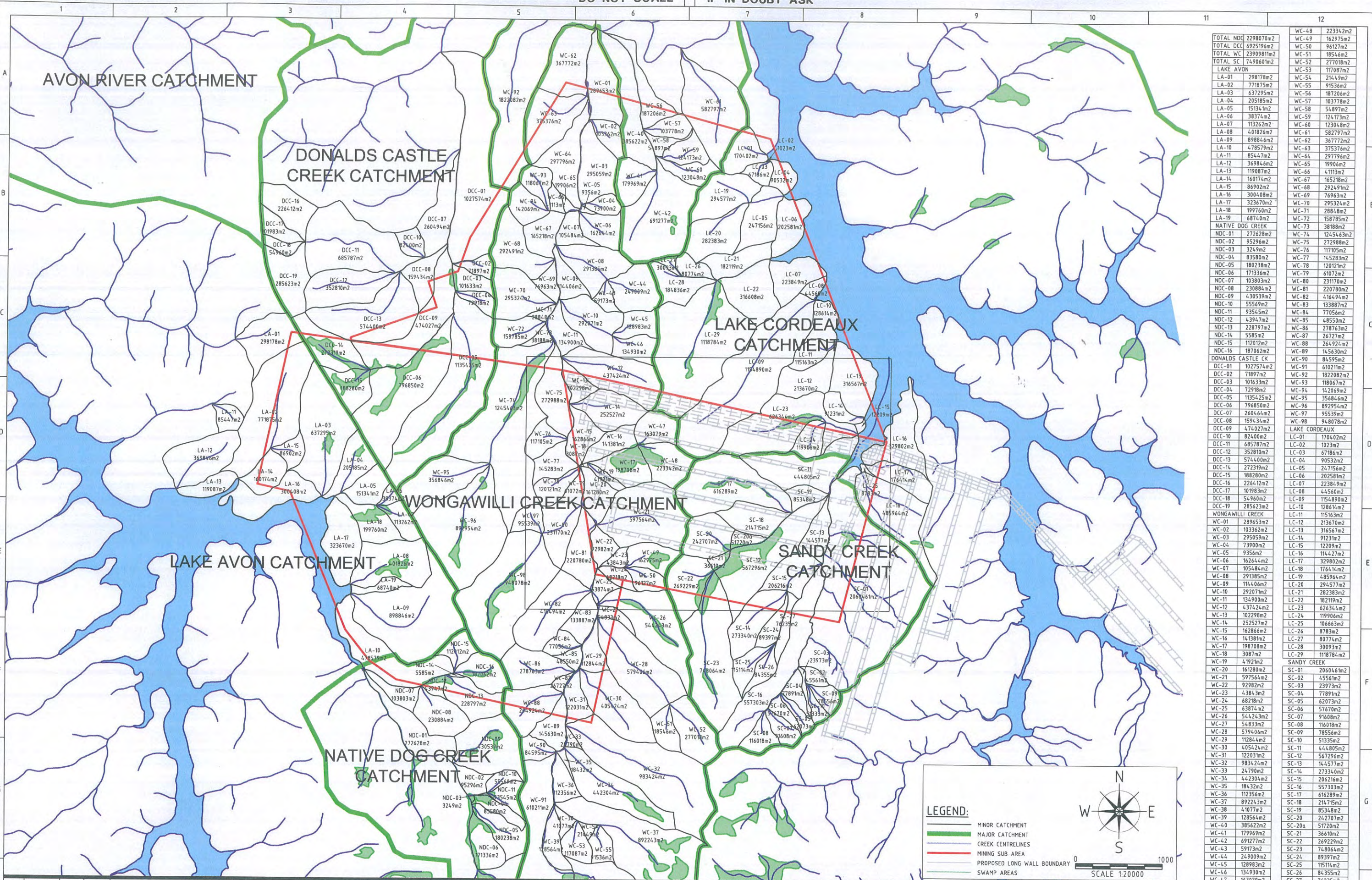
DRAWING TITLE SUBSIDENCE CONTOUR LAYOUT PLAN			
Project No.	Com No.	Drawing No.	REV
107055	2	SK14	0

DO NOT SCALE IF IN DOUBT ASK



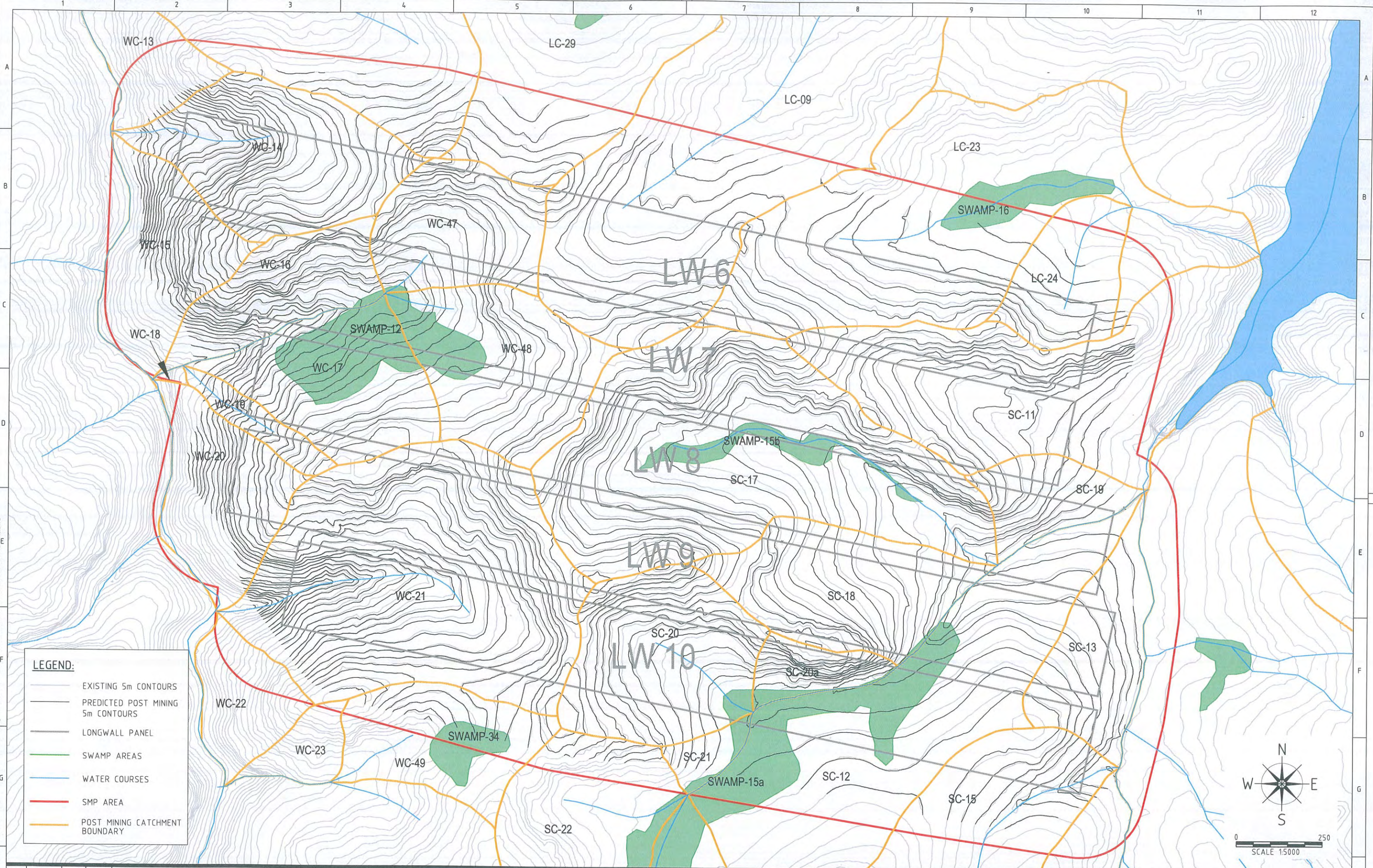
TOTAL NDC	2298070m2	WC-49	162974m2
TOTAL DCC	6295196m2	WC-50	96127m2
TOTAL WC	23909811m2	WC-51	18546m2
TOTAL SC	7490601m2	WC-52	277018m2
LAKE AVON			
LA-01	298178m2	WC-53	117087m2
LA-02	771875m2	WC-54	21449m2
LA-03	637295m2	WC-55	91536m2
LA-04	205185m2	WC-56	187206m2
LA-05	151341m2	WC-57	103778m2
LA-06	38374m2	WC-58	54897m2
LA-07	113262m2	WC-59	124173m2
LA-08	401826m2	WC-60	123048m2
LA-09	898846m2	WC-61	582797m2
LA-10	478579m2	WC-62	367772m2
LA-11	85447m2	WC-63	375376m2
LA-12	369846m2	WC-64	297796m2
LA-13	119087m2	WC-65	19906m2
LA-14	160174m2	WC-66	41113m2
LA-15	86902m2	WC-67	165218m2
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LA-18	199760m2	WC-70	295324m2
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LA-215	119087m2	WC-267	1023m2
LA-216	119087m2	WC-268	1023m2
LA-217	119087m2	WC-269	1023m2
LA-21			

DO NOT SCALE IF IN DOUBT ASK



TOTAL NDC	2298070m ²	WC-48	223342m ²
TOTAL DCC	6925196m ²	WC-49	162975m ²
TOTAL WC	23909811m ²	WC-50	96127m ²
TOTAL SC	7490601m ²	WC-51	18546m ²
LAKE AVON			
LA-01	298178m ²	WC-52	277018m ²
LA-02	771875m ²	WC-53	117087m ²
LA-03	637295m ²	WC-54	21449m ²
LA-04	205185m ²	WC-55	91536m ²
LA-05	151341m ²	WC-56	187206m ²
LA-06	38374m ²	WC-57	103778m ²
LA-07	113262m ²	WC-58	54897m ²
LA-08	401826m ²	WC-59	124173m ²
LA-09	898846m ²	WC-60	123048m ²
LA-10	478579m ²	WC-61	582797m ²
LA-11	85447m ²	WC-62	367772m ²
LA-12	369846m ²	WC-63	375376m ²
LA-13	119087m ²	WC-64	297796m ²
LA-14	160174m ²	WC-65	199062m ²
LA-15	86902m ²	WC-66	41133m ²
LA-16	300408m ²	WC-67	165218m ²
LA-17	323670m ²	WC-68	292491m ²
LA-18	199760m ²	WC-69	76963m ²
LA-19	68740m ²	WC-70	295324m ²
NATIVE DOG CREEK			
NDC-01	272628m ²	WC-71	28848m ²
NDC-02	95296m ²	WC-72	158785m ²
NDC-03	3249m ²	WC-73	38188m ²
NDC-04	83500m ²	WC-74	1245463m ²
NDC-05	180238m ²	WC-75	272988m ²
NDC-06	171336m ²	WC-76	171105m ²
NDC-07	103803m ²	WC-77	145283m ²
NDC-08	230884m ²	WC-78	102121m ²
NDC-09	430539m ²	WC-79	61072m ²
NDC-10	55569m ²	WC-80	23170m ²
NDC-11	93545m ²	WC-81	220780m ²
NDC-12	43947m ²	WC-82	416494m ²
NDC-13	228797m ²	WC-83	133887m ²
NDC-14	5585m ²	WC-84	77056m ²
NDC-15	112012m ²	WC-85	48550m ²
NDC-16	112012m ²	WC-86	278763m ²
NDC-17	101983m ²	WC-87	26727m ²
NDC-18	54960m ²	WC-88	264924m ²
NDC-19	285623m ²	WC-89	145630m ²
DONALDS CASTLE CK			
DCC-01	1027574m ²	WC-90	84595m ²
DCC-02	71897m ²	WC-91	61021m ²
DCC-03	101633m ²	WC-92	182208m ²
DCC-04	101633m ²	WC-93	118067m ²
DCC-05	113545m ²	WC-94	142069m ²
DCC-06	79650m ²	WC-95	356846m ²
DCC-07	260464m ²	WC-96	892956m ²
DCC-08	159434m ²	WC-97	95539m ²
DCC-09	474027m ²	WC-98	948078m ²
DCC-10	82400m ²	LAKE CORDEAUX	
DCC-11	685787m ²	LC-01	170402m ²
DCC-12	352810m ²	LC-02	10232m ²
DCC-13	574400m ²	LC-03	67186m ²
DCC-14	272319m ²	LC-04	90532m ²
DCC-15	188280m ²	LC-05	247156m ²
DCC-16	226412m ²	LC-06	202581m ²
DCC-17	101983m ²	LC-07	223849m ²
DCC-18	54960m ²	LC-08	44560m ²
DCC-19	285623m ²	LC-09	1154890m ²
LAKE AVON CATCHMENT			
LA-01	298178m ²	LC-10	128614m ²
LA-02	771875m ²	LC-11	115163m ²
LA-03	637295m ²	LC-12	213670m ²
LA-04	205185m ²	LC-13	316567m ²
LA-05	151341m ²	LC-14	12209m ²
LA-06	38374m ²	LC-15	11427m ²
LA-07	113262m ²	LC-16	11427m ²
LA-08	401826m ²	LC-17	32980m ²
LA-09	898846m ²	LC-18	176414m ²
LA-10	478579m ²	LC-19	485964m ²
LA-11	85447m ²	LC-20	294577m ²
LA-12	369846m ²	LC-21	282383m ²
LA-13	119087m ²	LC-22	182119m ²
LA-14	160174m ²	LC-23	437424m ²
LA-15	86902m ²	LC-24	119906m ²
LA-16	300408m ²	LC-25	106663m ²
LA-17	323670m ²	LC-26	8783m ²
LA-18	199760m ²	LC-27	80774m ²
LA-19	68740m ²	LC-28	30093m ²
LA-20	300408m ²	LC-29	1118784m ²
WONGAWILLI CREEK			
WC-01	299453m ²	WC-99	18564m ²
WC-02	103778m ²	WC-100	117087m ²
WC-03	295059m ²	WC-101	117087m ²
WC-04	73900m ²	WC-102	117087m ²
WC-05	9356m ²	WC-103	117087m ²
WC-06	162844m ²	WC-104	117087m ²
WC-07	105484m ²	WC-105	117087m ²
WC-08	29138m ²	WC-106	117087m ²
WC-09	11406m ²	WC-107	117087m ²
WC-10	292071m ²	WC-108	117087m ²
WC-11	134900m ²	WC-109	117087m ²
WC-12	437424m ²	WC-110	117087m ²
WC-13	102298m ²	WC-111	117087m ²
WC-14	252527m ²	WC-112	117087m ²
WC-15	62866m ²	WC-113	117087m ²
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WC-21	10727m ²	WC-119	117087m ²
WC-22	220780m ²	WC-120	117087m ²
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WC-33	24790m ²	WC-131	117087m ²
WC-34	442304m ²	WC-132	117087m ²
WC-35	18432m ²	WC-133	117087m ²
WC-36	112356m ²	WC-134	117087m ²
WC-37	892243m ²	WC-135	117087m ²
WC-38	41077m ²	WC-136	117087m ²
WC-39	128564m ²	WC-137	117087m ²
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WC-41	179969m ²	WC-139	117087m ²
WC-42	691277m ²	WC-140	117087m ²
WC-43	59173m ²	WC-141	117087m ²
WC-44	249009m ²	WC-142	117087m ²
WC-45	128983m ²	WC-143	117087m ²
WC-46	134930m ²	WC-144	117087m ²
WC-47	163079m ²	WC-145	117087m ²
WC-48	223342m ²	WC-146	117087m ²
WC-49	162975m ²	WC-147	117087m ²
WC-50	96127m ²	WC-148	117087m ²
WC-51	18546m ²	WC-149	117087m ²
WC-52	277018m ²	WC-150	117087m ²
WC-53	117087m ²	WC-151	117087m ²
WC-54	21449m ²	WC-152	117087m ²
WC-55	91536m ²	WC-153	117087m ²
WC-56	187206m ²	WC-154	117087m ²
WC-57	103778m ²	WC-155	117087m ²
WC-58	54897m ²	WC-156	117087m ²
WC-59	124173m ²	WC-157	117087m ²
WC-60	123048m ²	WC-158	117087m ²
WC-61	582797m ²	WC-159	117087m ²
WC-62	367772m ²	WC-160	117087m ²
WC-63	375376m ²	WC-161	117087m ²
WC-64	297796m ²	WC-162	117087m ²
WC-65	199062m ²	WC-163	117087m ²
WC-66	41133m ²	WC-164	117087m ²
WC-67	165218m ²	WC-165	117087m ²
WC-68	292491m ²	WC-166	117087m ²
WC-69	76963m ²	WC-167	117087m ²
WC-70	295324m ²	WC-168	117087m ²
WC-71	28848m ²	WC-169	117087m ²
WC-72	158785m ²	WC-170	117087m ²
WC-73	38188m ²	WC-171	117087m ²
WC-74	1245463m ²	WC-172	117087m ²
WC-75	272988m ²	WC-173	117087m ²
WC-76	171105m ²	WC-174	117087m ²
WC-77	145283m ²	WC-175	117087m ²
WC-78	102121m ²	WC-176	117087m ²
WC-79	61072m ²	WC-177	117087m ²
WC-80	23170m ²	WC-178	117087m ²
WC-81	220780m ²	WC-179	117087m ²
WC-82	416494m ²	WC-180	117087m ²
WC-83	133887m ²	WC-181	117087m ²
WC-84	77056m ²	WC-182	117087m ²
WC-85	48550m ²	WC-183	117087m ²
WC-86	278763m ²	WC-184	117087m ²
WC-87	26727m ²	WC-185	117087m ²
WC-88	264924m ²	WC-186	117087m ²
WC-89	145630m ²	WC-187	117087m ²
WC-90	84595m ²	WC-188	117087m ²
WC-91	61021m ²	WC-189	117087m ²
WC-92	182208m ²	WC-190	117087m ²
WC-93	118067m ²	WC-191	117087m ²
WC-94	142069m ²	WC-192	117087m ²
WC-95	356846m ²	WC-193	117087m ²
WC-96	892956m ²	WC-194	117087m ²
WC-97	95539m ²	WC-195	117087m ²
WC-98	948078m ²	WC-196	117087m ²
WC-99	18564m ²	WC-197	117087m ²
WC-100	117087m ²	WC-198	117087m ²
WC-101	117087m ²	WC-199	117087m ²
WC-102	117087m ²	WC-200	117087m ²
WC-103	117087m ²	WC-201	117087m ²
WC-104	117087m		

DO NOT SCALE IF IN DOUBT ASK



LEGEND:

- EXISTING 5m CONTOURS
- PREDICTED POST MINING 5m CONTOURS
- LONGWALL PANEL
- SWAMP AREAS
- WATER COURSES
- SMP AREA
- POST MINING CATCHMENT BOUNDARY

REV	DATE	BY	APP.	DETAILS

DRAWING STATUS		
DESIGN BY	CJM	07/08/07
DRAWN BY	CJM	07/08/07
DRAFTING CHECK	<i>[Signature]</i>	18/10/07
DESIGN CHECK	<i>[Signature]</i>	18/10/07
FINAL APPROVAL	<i>[Signature]</i>	18/10/07

INFORMATION

SCALE:
(on A1 Original)
1:5000

HEIGHT DATUM
AHD

Cardno Forbes Rigby

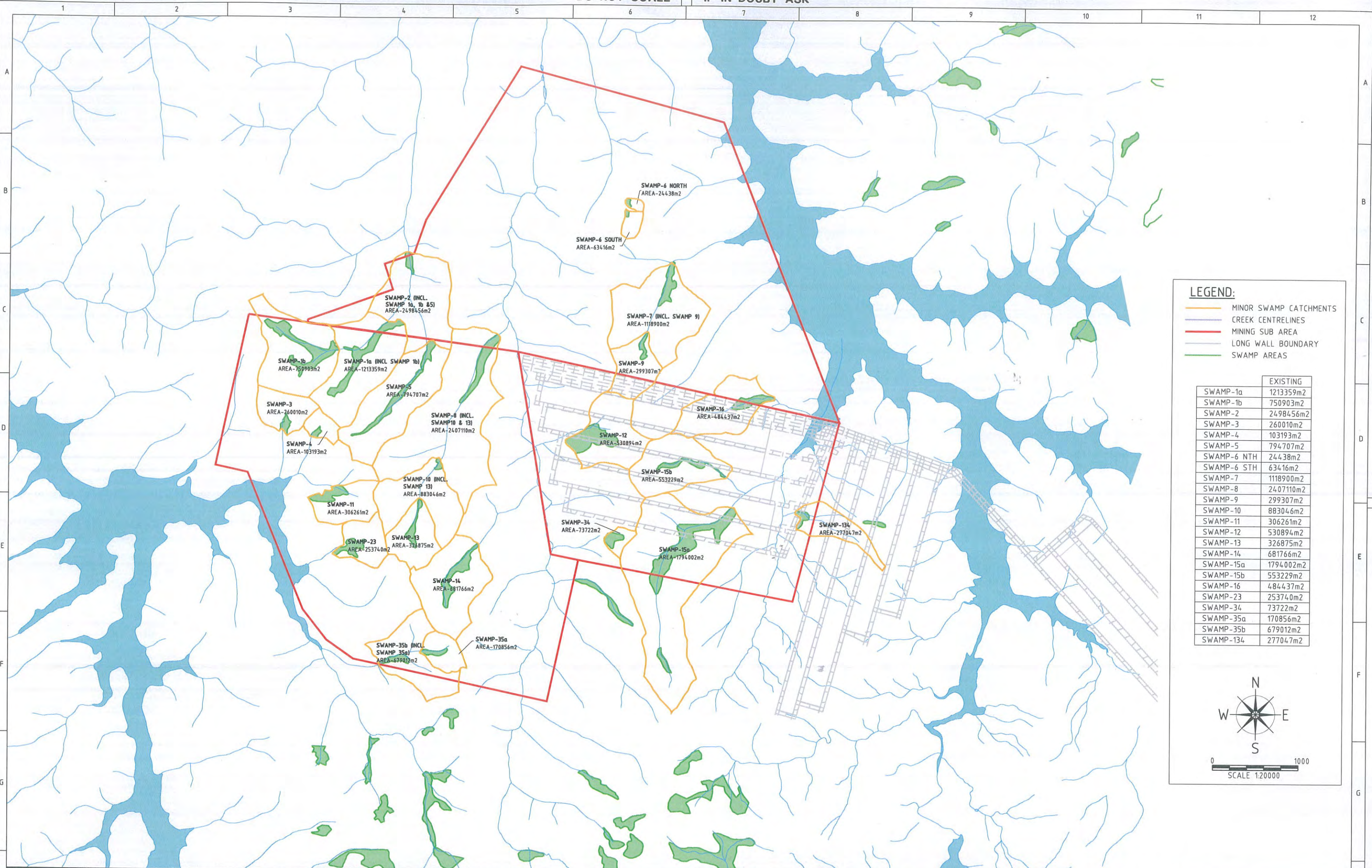
278 KEIRA STREET, WOLLONGONG, NSW 2500
Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACN: 051 074 992
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PROJECT TITLE
**LANDSCAPE IMPACT ASSESSMENT
DENDROBIUM AREA 3
for
BHPBILLITON ILLAWARRA COAL**

DRAWING TITLE			
AREA 3A - PRE & (PREDICTED) POST MINING CONTOUR PLAN			
Project No.	Com No.	Drawing No.	REV
107055	2	SK13	0

File Path: U:\2007\107_055-02 - DENDROBIUM AREA 3 - LANDSCAPE IMPACT ASSESSMENT\DRAWING\BUILD\SK13 - CONTOUR LAYOUT PLANDWG
 Date: 18/10/2007 12:03:25
 Xrefs: x:\107055-02-areas\DWG\107055-02-area-3a-existing-contours.dwg; x:\107055-02-substance-contours.dwg; x:\107055-02-111c.dwg

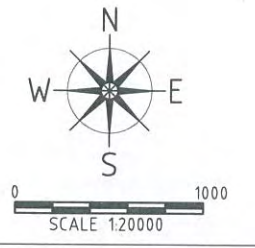
DO NOT SCALE IF IN DOUBT ASK



LEGEND:

- MINOR SWAMP CATCHMENTS
- CREEK CENTRELINES
- MINING SUB AREA
- LONG WALL BOUNDARY
- SWAMP AREAS

	EXISTING
SWAMP-1a	1213359m2
SWAMP-1b	750903m2
SWAMP-2	2498456m2
SWAMP-3	260010m2
SWAMP-4	103193m2
SWAMP-5	794707m2
SWAMP-6 NTH	24438m2
SWAMP-6 STH	63416m2
SWAMP-7	1118900m2
SWAMP-8	2407110m2
SWAMP-9	299307m2
SWAMP-10	883046m2
SWAMP-11	306261m2
SWAMP-12	530894m2
SWAMP-13	326875m2
SWAMP-14	681766m2
SWAMP-15a	1794002m2
SWAMP-15b	553229m2
SWAMP-16	484437m2
SWAMP-23	253740m2
SWAMP-34	73722m2
SWAMP-35a	170856m2
SWAMP-35b	679012m2
SWAMP-134	277047m2



REV	DATE	BY	APP.	DETAILS

DRAWING STATUS			
DESIGN BY	CJM	23/07/07	
DRAWN BY	CJB	23/07/07	
DRAFTING CHECK	<i>[Signature]</i>	18/10/07	
DESIGN CHECK	<i>[Signature]</i>	18/10/07	
FINAL APPROVAL	<i>[Signature]</i>	18/10/07	

SCALE:
(on A1 Original)
1:20000
HEIGHT DATUM
AHD

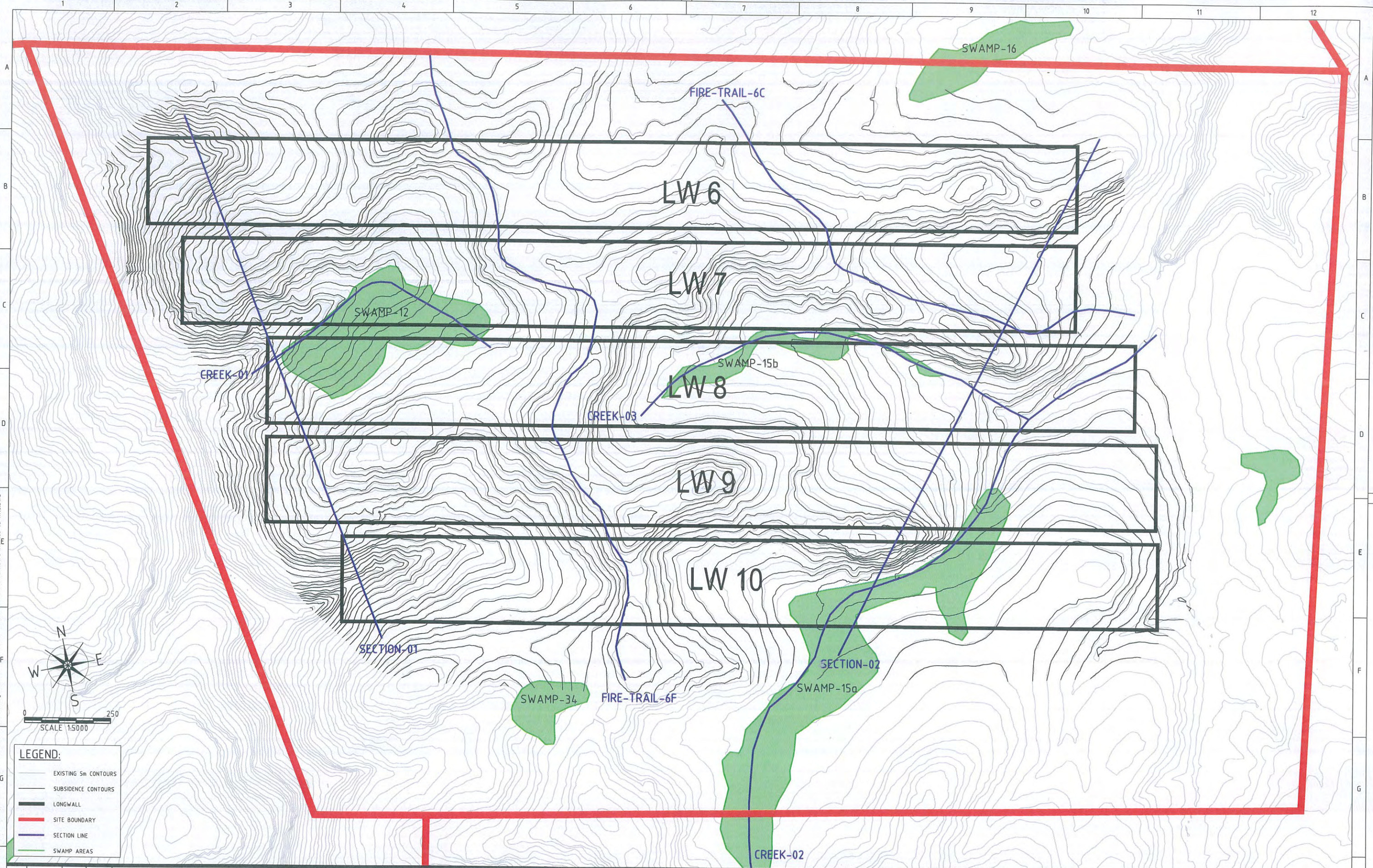
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PROJECT TITLE
LANDSCAPE IMPACT ASSESSMENT
DENDROBIUM AREA 3
for
BHPBILLITON ILLAWARRA COAL

DRAWING TITLE			
PRE-MINING SWAMP CATCHMENTS PLAN FOR AREA 3			
Project No.	Com No.	Drawing No.	REV
107055	2	SK15	0

DO NOT SCALE IF IN DOUBT ASK



LEGEND:

- EXISTING 5m CONTOURS
- SUBSIDENCE CONTOURS
- LONGWALL
- SITE BOUNDARY
- SECTION LINE
- SWAMP AREAS

REV	DATE	BY	APP.	DETAILS

DRAWING STATUS		
DESIGN BY	CJM	26/07/07
DRAWN BY	CJM	26/07/07
DRAFTING CHECK	<i>[Signature]</i>	18/10/07
DESIGN CHECK	<i>[Signature]</i>	18/10/07
FINAL APPROVAL	<i>[Signature]</i>	18/10/07

INFORMATION

SCALE: (on A1 Original) 1:5000
HEIGHT DATUM AHD

Cardno Forbes Rigby

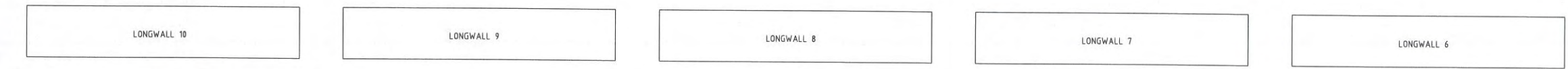
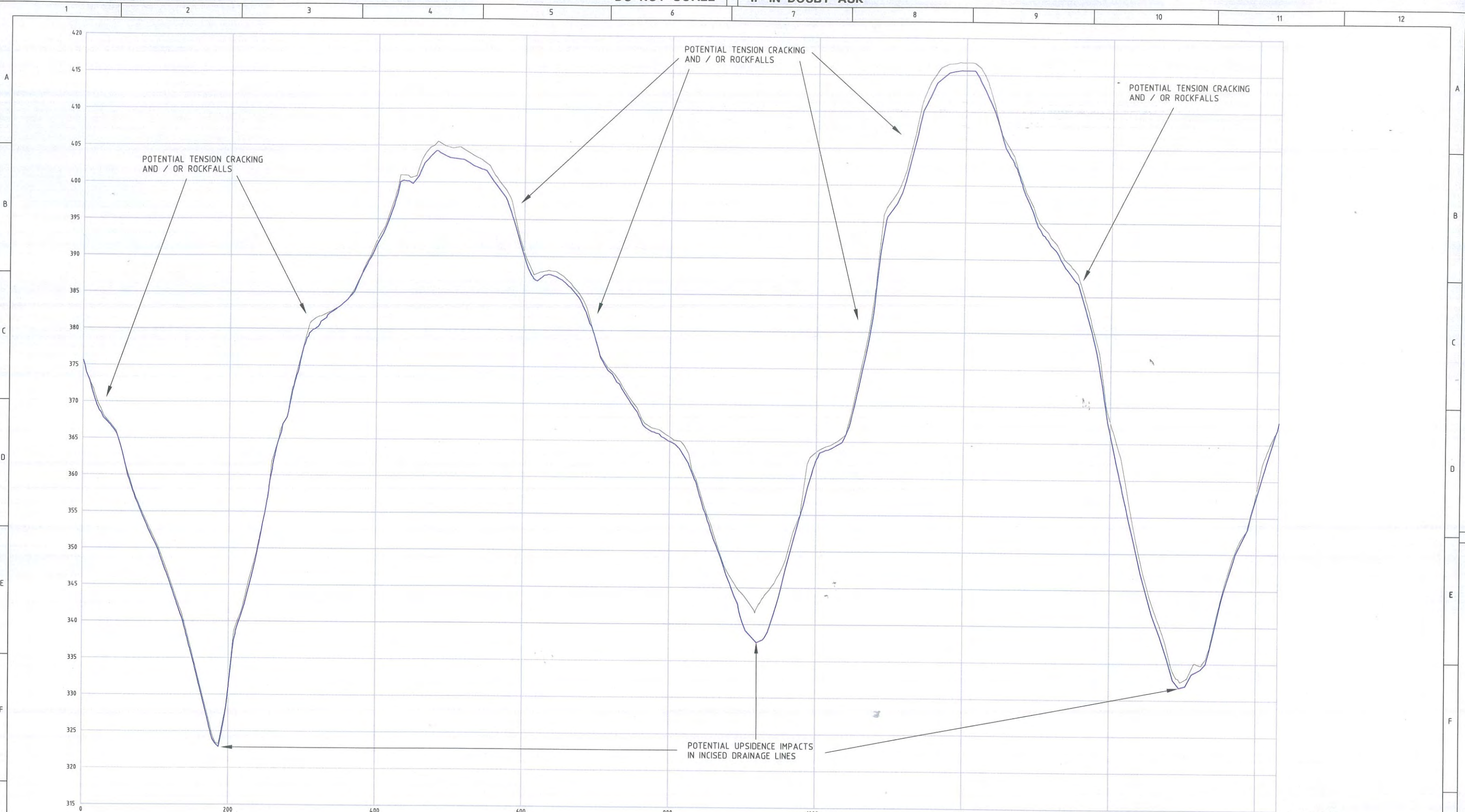
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 Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACN: 051 074 992
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PROJECT TITLE
 LANDSCAPE IMPACT ASSESSMENT
 DENDROBIUM AREA 3
 for
 BHPBILLITON ILLAWARRA COAL

DRAWING TITLE			
SECTION LAYOUT PLAN			
Project No.	Com No.	Drawing No.	REV
107055	2	SK03	0

File Path: U:\2007\107-055-02 - DENDROBIUM AREA 3 - LANDSCAPE IMPACT ASSESSMENT\DRAWING\BUILD\SK03 - SUBSIDENCE LAYOUT PLAN.DWG
 Date: 26/07/2007 15:59:49
 User: x107055-02-site-engineer.DWG x107055-02-area 3A-existing-contours.DWG x107055-02-subsidence-contours.DWG x107055-02-lrhc.DWG

DO NOT SCALE IF IN DOUBT ASK



SECTION-01

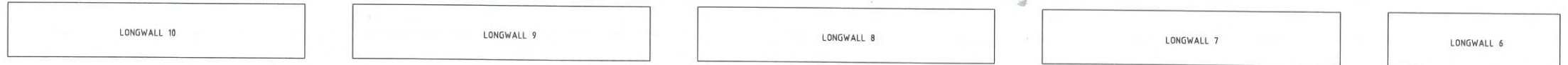
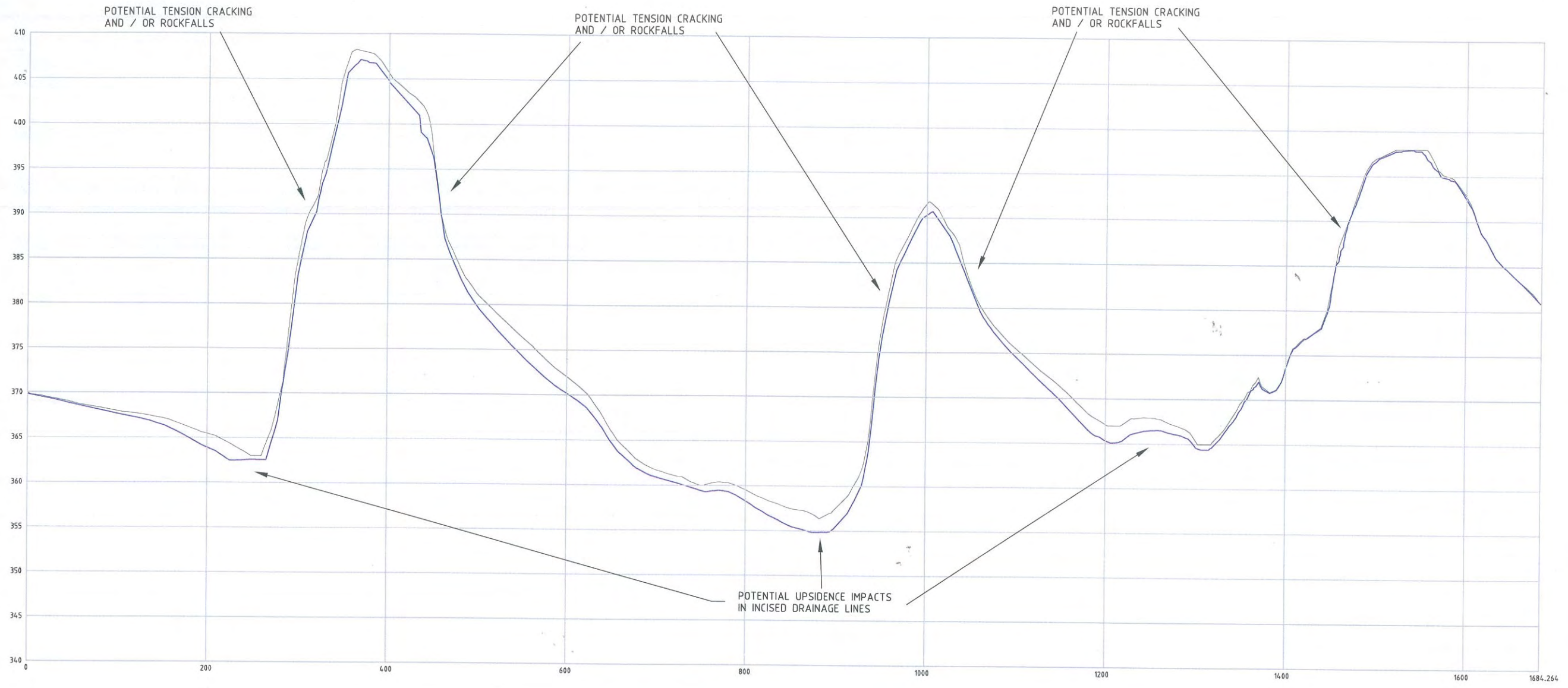
LEGEND:

- PRE MINING GROUND SURFACE (FROM 1m CONTOURS DERIVED FROM ALS DATA)
- - - POST MINING GROUND SURFACE (DERIVED FROM MSEC SUBSIDENCE CONTOURS)

0 125
SCALE 1:2500

REV	DATE	BY	APP.	DETAILS	DRAWING STATUS			SCALE:		PROJECT TITLE LANDSCAPE IMPACT ASSESSMENT DENDROBIUM AREA 3 for BHPBILLITON ILLAWARRA COAL	DRAWING TITLE					
					DESIGN BY	CJM	26/07/07	(on A1 Original)				278 KEIRA STREET, WOLLONGONG, NSW 2500 Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACN: 051 074 992 This drawing is subject to COPYRIGHT. It remains the property of Cardno Forbes Rigby Pty Ltd	SECTION 1	Project No.	Com No.	Drawing No.
					DRAWN BY	CJG	26/07/07	1:2500N			SHEET 1 OF 7		107055	2	SK04	0
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					INFORMATION											

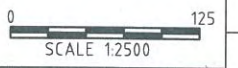
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 October 18, 2007 2:28:07 PM
 Xrefs: x:\107055-02-Hite.dwg



SECTION-02

LEGEND:

- PRE MINING GROUND SURFACE (FROM 1m CONTOURS DERIVED FROM ALS DATA)
- POST MINING GROUND SURFACE (DERIVED FROM MSEC SUBSIDENCE CONTOURS)



REV	DATE	BY	APP.	DETAILS

DRAWING STATUS		
DESIGN BY	CJM	26/07/07
DRAWN BY	CJC	26/07/07
DRAFTING CHECK	<i>[Signature]</i>	18/10/07
DESIGN CHECK	<i>[Signature]</i>	18/10/07
FINAL APPROVAL	<i>[Signature]</i>	18/10/07

INFORMATION

SCALE:
(on A1 Original)
1:2500N

HEIGHT DATUM
AHD

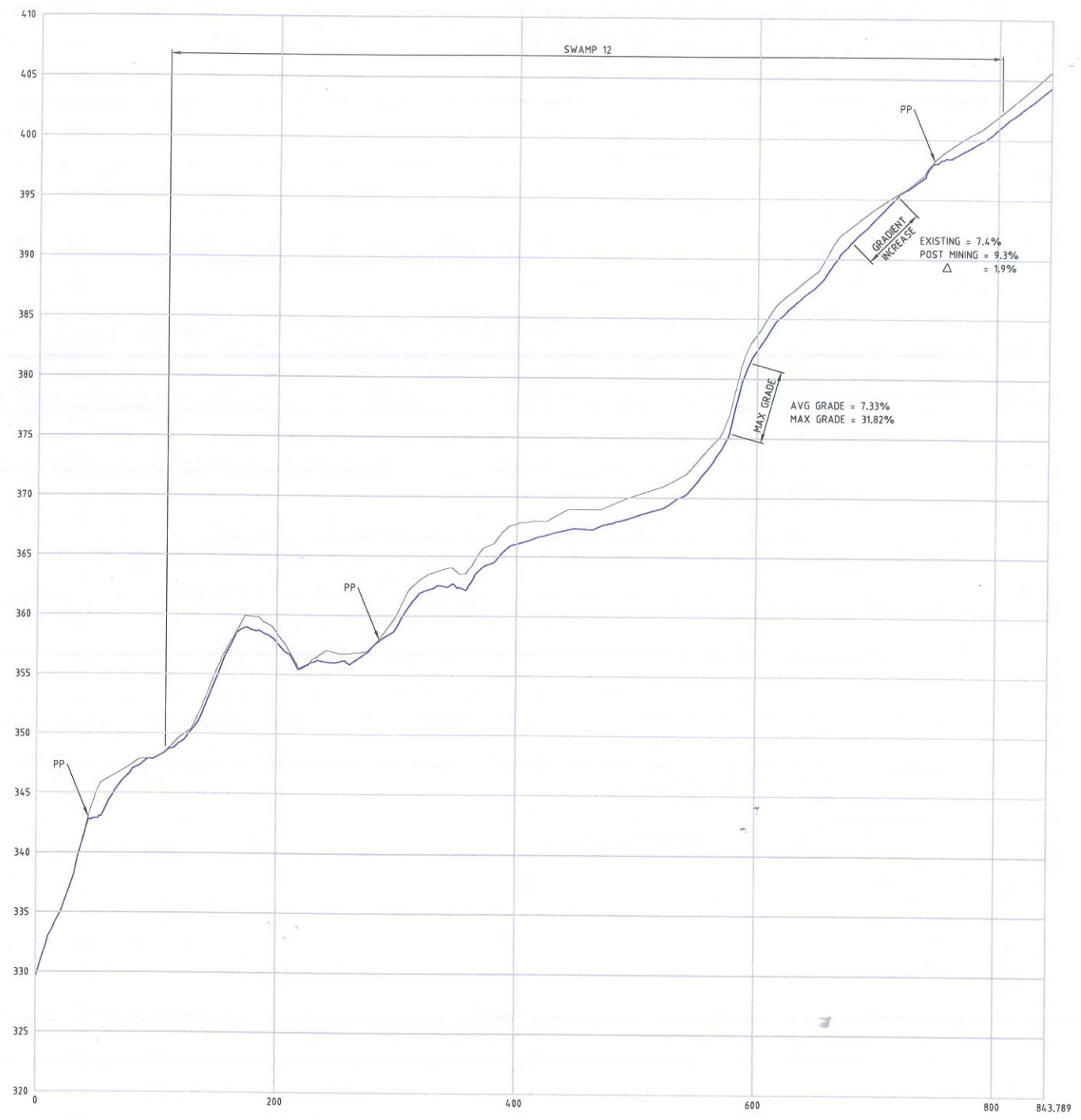
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PROJECT TITLE
LANDSCAPE IMPACT ASSESSMENT DENDROBIUM AREA 3
for
BHPBILLITON ILLAWARRA COAL

DRAWING TITLE			
SECTION 2 SHEET 2 OF 7			
Project No.	Com No.	Drawing No.	REV
107055	2	SK05	0

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October 18, 2007 2:29:52 pm
User: x107055-02-rtrc



CREEK-01

LEGEND:

- PRE MINING GROUND SURFACE (FROM 1m CONTOURS DERIVED FROM ALS DATA)
- - - POST MINING GROUND SURFACE (DERIVED FROM MSEC SUBSIDENCE CONTOURS)
- PP POTENTIAL LOCATION OF WATER POOLING DUE TO GRADIENT DECREASE



REV	DATE	BY	APP.	DETAILS

DRAWING STATUS		
DESIGN BY	CJM	26/07/07
DRAWN BY	CJG	26/07/07
DRAFTING CHECK	<i>[Signature]</i>	15/10/07
DESIGN CHECK	<i>[Signature]</i>	15/10/07
FINAL APPROVAL	<i>[Signature]</i>	15/10/07

INFORMATION

SCALE:
(on A1 Original)
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HEIGHT DATUM
AHD

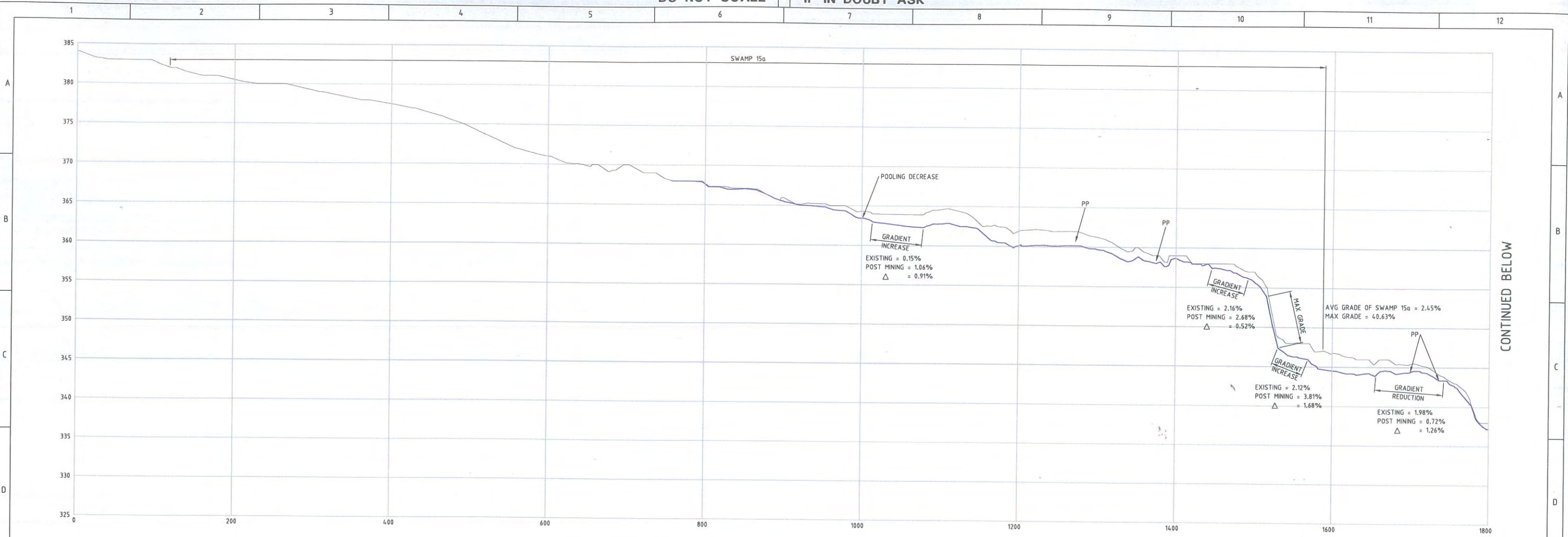


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PROJECT TITLE
LANDSCAPE IMPACT ASSESSMENT
DENDROBIUM AREA 3
for
BHPBILLITON ILLAWARRA COAL

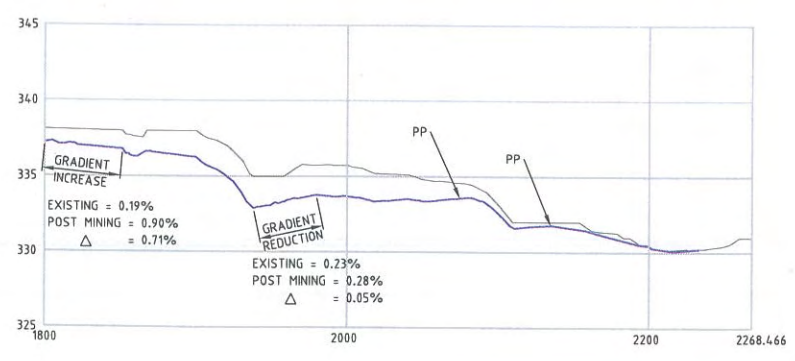
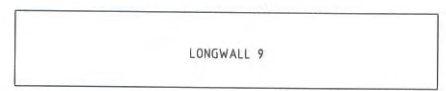
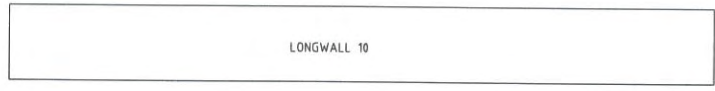
DRAWING TITLE			
CREEK - 01 SECTION SHEET 3 OF 7			
Project No.	Com No.	Drawing No.	REV
107055	2	SK06	0

DO NOT SCALE IF IN DOUBT ASK



CONTINUED BELOW

CREEK-02



CREEK-02

LEGEND:

- PRE MINING GROUND SURFACE (FROM 1m CONTOURS DERIVED FROM ALS DATA)
- POST MINING GROUND SURFACE (DERIVED FROM MSEC SUBSIDENCE CONTOURS)
- PP POTENTIAL LOCATION OF WATER POOLING DUE TO GRADIENT DECREASE



REV	DATE	BY	APP.	DETAILS	DRAWING STATUS
					DESIGN BY CJM 26/07/07
					DRAWN BY CJE 26/07/07
					DRAFTING CHECK [Signature] 18/10/07
					DESIGN CHECK [Signature] 18/10/07
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SCALE:
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HEIGHT DATUM
AHD

Cardno Forbes Rigby

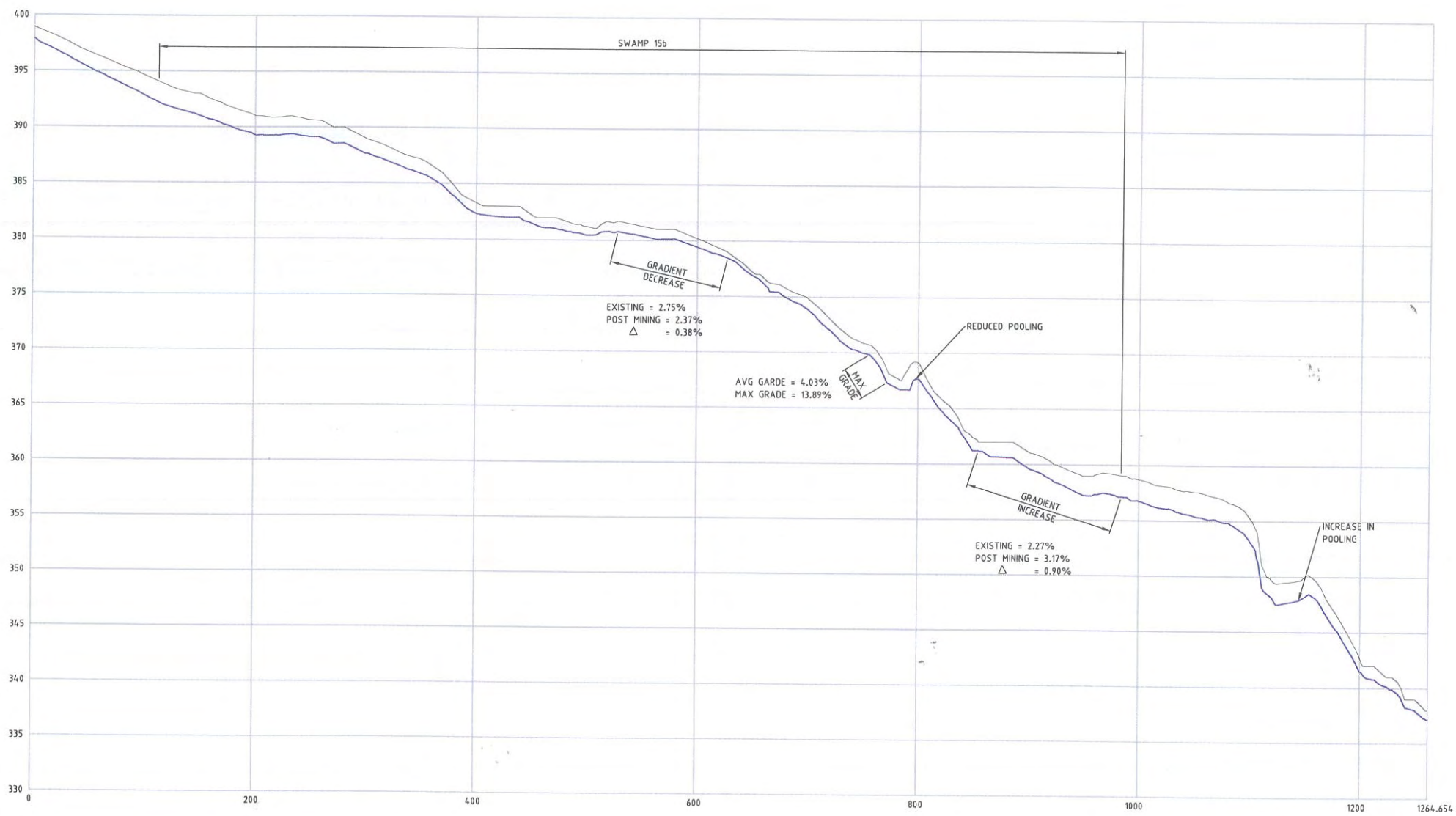
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Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACN: 051 074 992
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PROJECT TITLE
LANDSCAPE IMPACT ASSESSMENT DENDROBIUM AREA 3 for BHPBILLITON ILLAWARRA COAL

DRAWING TITLE			
CREEK - 02 SECTION SHEET 4 OF 7			
Project No.	Com No.	Drawing No.	REV
107055	2	SK07	0

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Date: 18/10/2007 05:55:55
User: x107055-02-fhring

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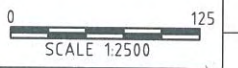


LONGWALL 8
CREEK-03

LONGWALL 8

LEGEND:

- PRE MINING GROUND SURFACE (FROM 1m CONTOURS DERIVED FROM ALS DATA)
- POST MINING GROUND SURFACE (DERIVED FROM MSEC SUBSIDENCE CONTOURS)



REV	DATE	BY	APP.	DETAILS

DRAWING STATUS		
DESIGN BY	CJM	26/07/07
DRAWN BY	CJM	26/07/07
DRAFTING CHECK	<i>[Signature]</i>	15/10/07
DESIGN CHECK	<i>[Signature]</i>	18/10/07
FINAL APPROVAL	<i>[Signature]</i>	19/10/07

INFORMATION

SCALE:
(on A1 Original)
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HEIGHT DATUM
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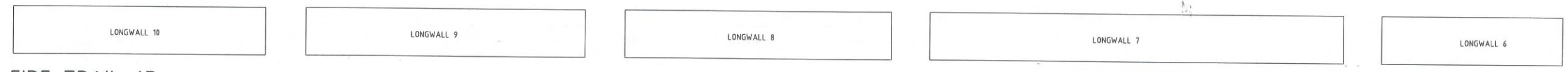
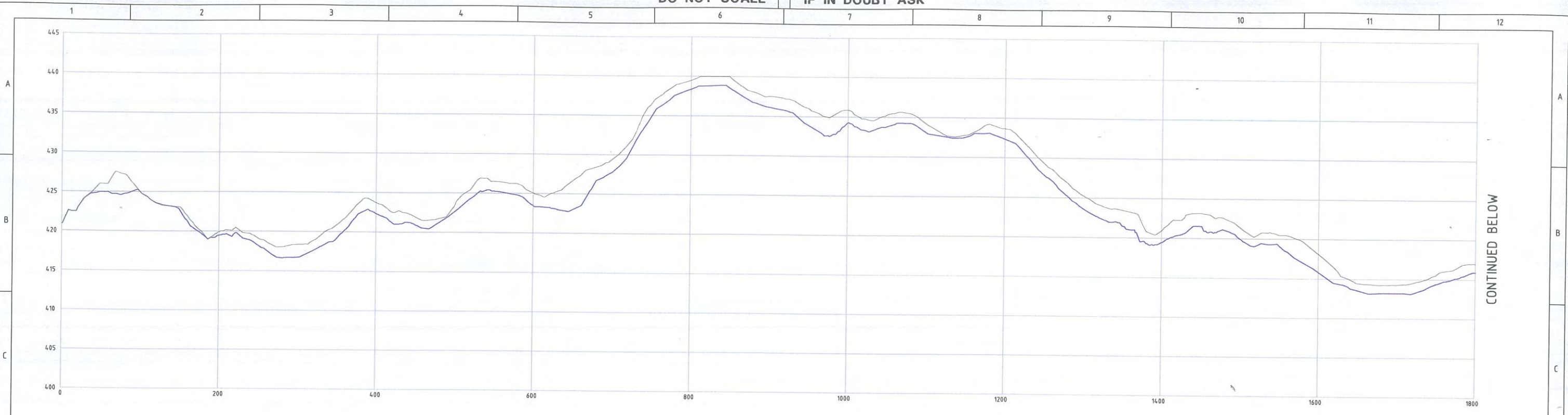
278 KEIRA STREET, WOLLONGONG, NSW 2500
Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACN: 051 074 992
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PROJECT TITLE
LANDSCAPE IMPACT ASSESSMENT DENDROBIUM AREA 3
for
BHPBILLITON ILLAWARRA COAL

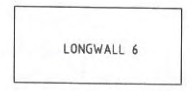
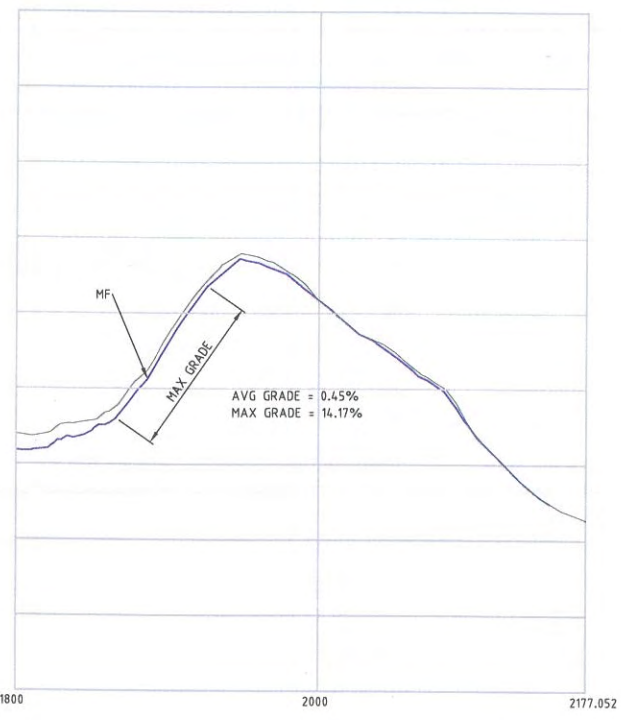
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CREEK - 03 SECTION SHEET 5 OF 7			
Project No.	Com No.	Drawing No.	REV
107055	2	SK08	0

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October 18, 2007 2:52:27 PM
User: x107055-02-fhr.dwg

DO NOT SCALE IF IN DOUBT ASK



FIRE-TRAIL-6F



FIRE-TRAIL-6F

LEGEND:

- PRE MINING GROUND SURFACE (FROM 1m CONTOURS DERIVED FROM ALS DATA)
- - - POST MINING GROUND SURFACE (DERIVED FROM MSEC SUBSIDENCE CONTOURS)



REV	DATE	BY	APP.	DETAILS

DRAWING STATUS		
DESIGN BY	CJM	26/07/07
DRAWN BY	CJS	26/07/07
DRAFTING CHECK	<i>[Signature]</i>	15/10/07
DESIGN CHECK	<i>[Signature]</i>	15/10/07
FINAL APPROVAL	<i>[Signature]</i>	15/10/07

INFORMATION

SCALE:
(on A1 Original)
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HEIGHT DATUM
AHD

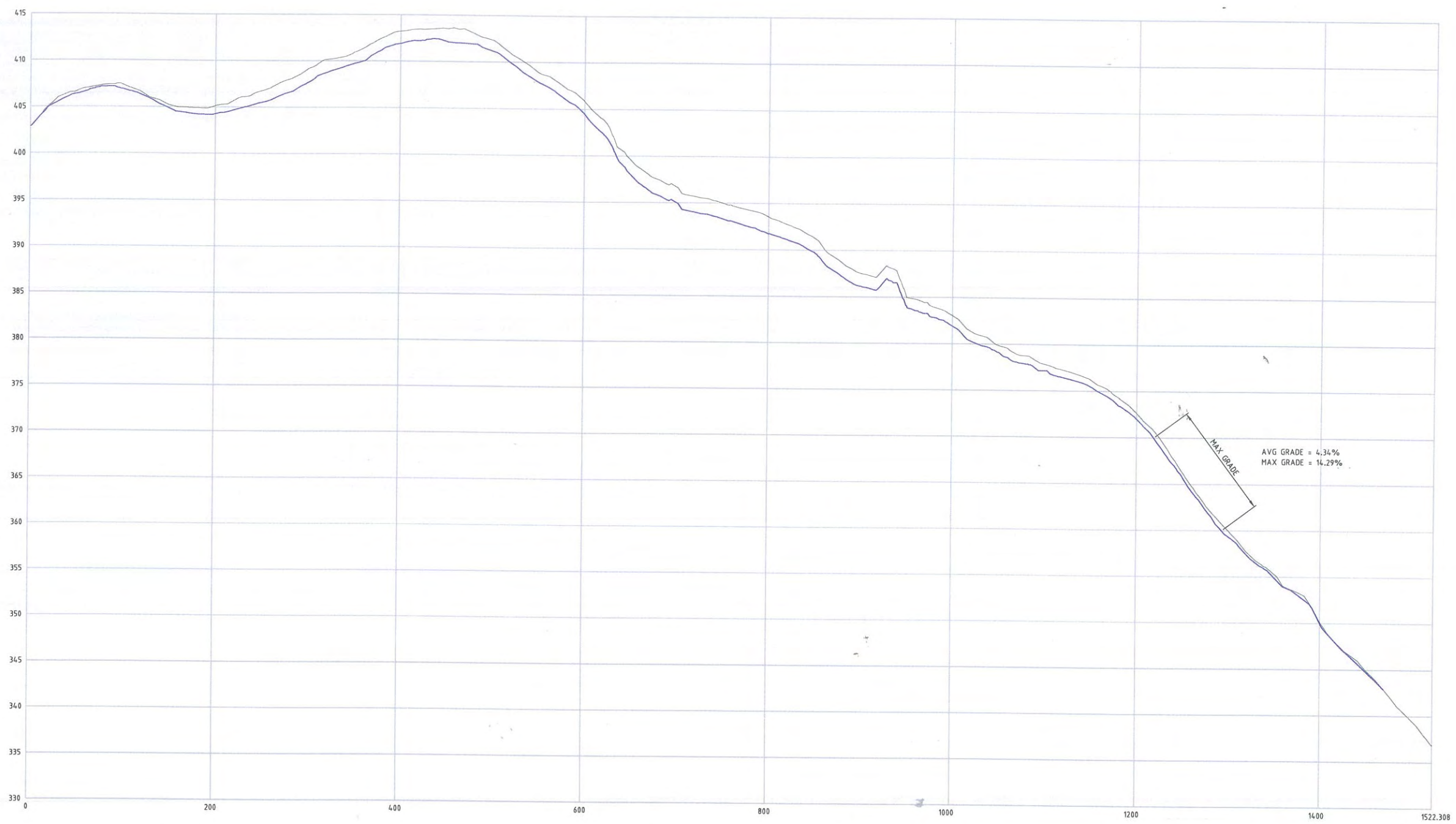
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 Ph: (02) 4228 4133 Facsimile: (02) 4228 6811 ACN: 051 074 992
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PROJECT TITLE
LANDSCAPE IMPACT ASSESSMENT DENDROBIUM AREA 3
 for
 BHPBILLITON ILLAWARRA COAL

DRAWING TITLE			
FIRE-TRAIL 6F SECTION SHEET 6 OF 7			
Project No.	Com No.	Drawing No.	REV
107055	2	SK09	0

File Path: U:\2007A\107_055-02 - DENDROBIUM AREA 3 - LANDSCAPE IMPACT ASSESSMENT\DRAWING\BUILD\SK09 - PRELIMINARY SUBSIDENCE CROSS SECTIONS SHEET 6 OF 7.dwg
 October 18 2007 15:24:25
 Xrefs: x:\107055-02-11111.dwg

DO NOT SCALE IF IN DOUBT ASK



FIRE-TRAIL-6C

LEGEND:

- PRE MINING GROUND SURFACE (FROM 1m CONTOURS DERIVED FROM ALS DATA)
- - - POST MINING GROUND SURFACE (DERIVED FROM MSEC SUBSIDENCE CONTOURS)



REV	DATE	BY	APP.	DETAILS

DRAWING STATUS		
DESIGN BY	CJM	26/07/07
DRAWN BY	CJC	26/07/07
DRAFTING CHECK	<i>[Signature]</i>	18/10/07
DESIGN CHECK	<i>[Signature]</i>	18/10/07
FINAL APPROVAL	<i>[Signature]</i>	19/10/07

INFORMATION

SCALE:
(on A1 Original)
1:2500N

HEIGHT DATUM
AHD

278 KEIRA STREET, WOLLONGONG, NSW 2500
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PROJECT TITLE
LANDSCAPE IMPACT ASSESSMENT DENDROBIUM AREA 3
for
BHPBILLITON ILLAWARRA COAL

DRAWING TITLE			
FIRE-TRAIL 6C SECTION SHEET 7 OF 7			
Project No.	Com No.	Drawing No.	REV
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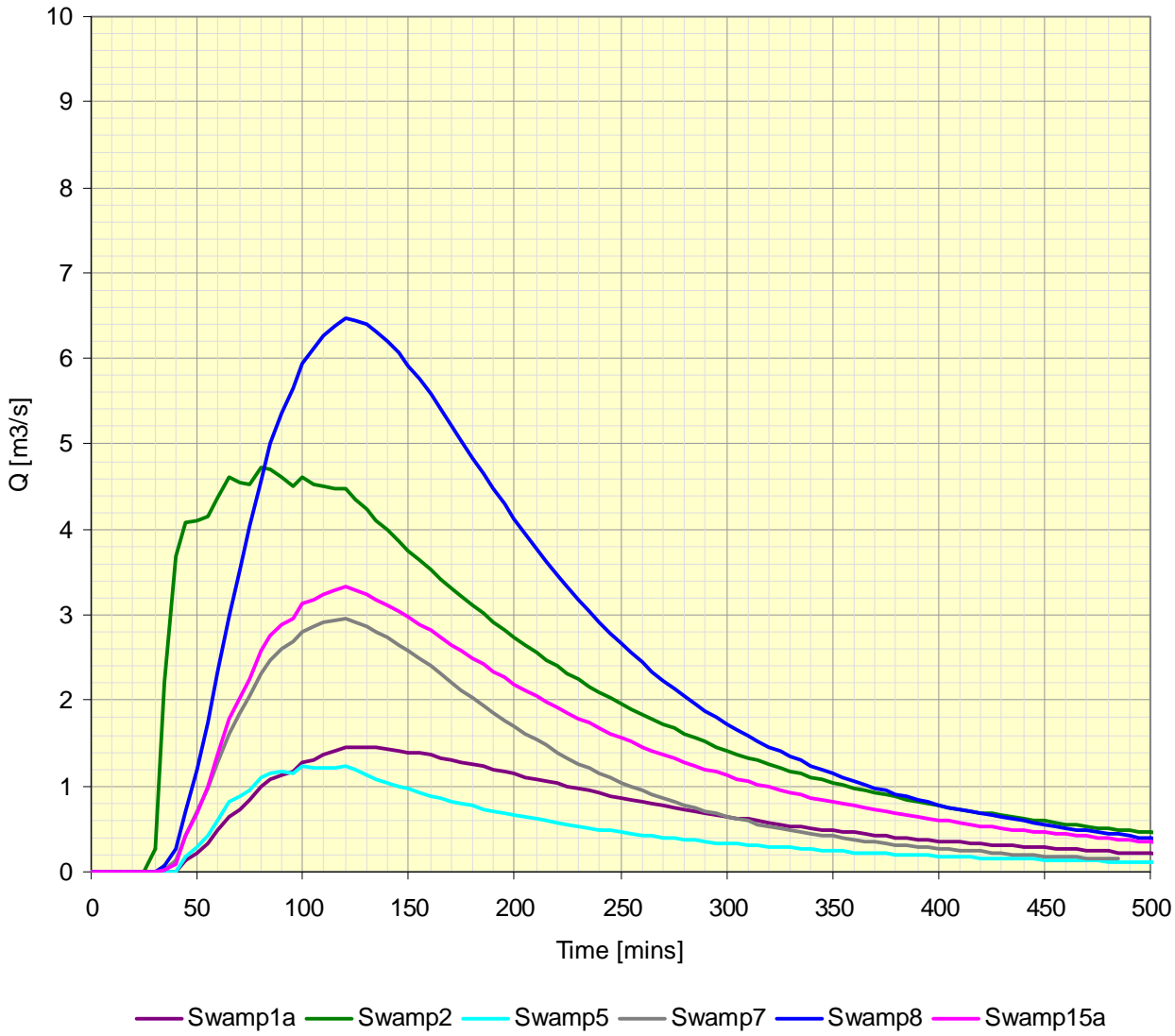
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P
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D
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X**

B

**FLOW & VELOCITY ESTIMATE
DATA**

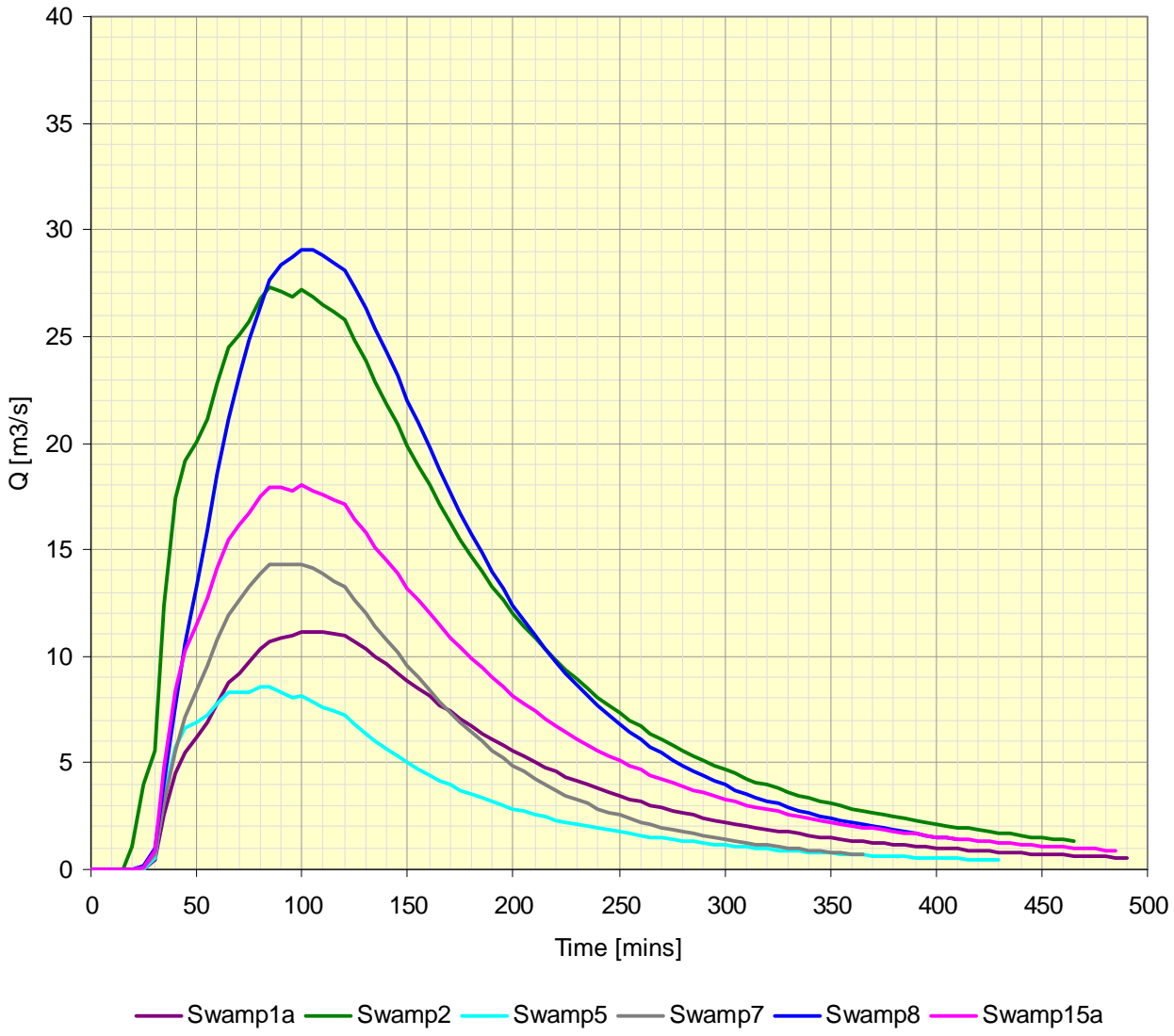
Hydrographs for a 2yr ARI, 2hr Duration Storm at Swamps 1a, 2, 5, 7, 8, and 15a



Extracted Hydrographs

	1	2	3	4	5	6
Subarea	Swamp1a	Swamp2	Swamp5	Swamp7	Swamp8	Swamp15a
Storm	DES 2 Year 120 Min	DES 2 Year 120 Min	DES 2 Year 120 Min	DES 2 Year 120 Min	DES 2 Year 120 Min	DES 2 Year 120 Min
Location	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S
Q Peak [m3/s]	1.459	4.721	1.236	2.954	6.457	3.344
T Peak [mins]	120	80	120	120	120	120

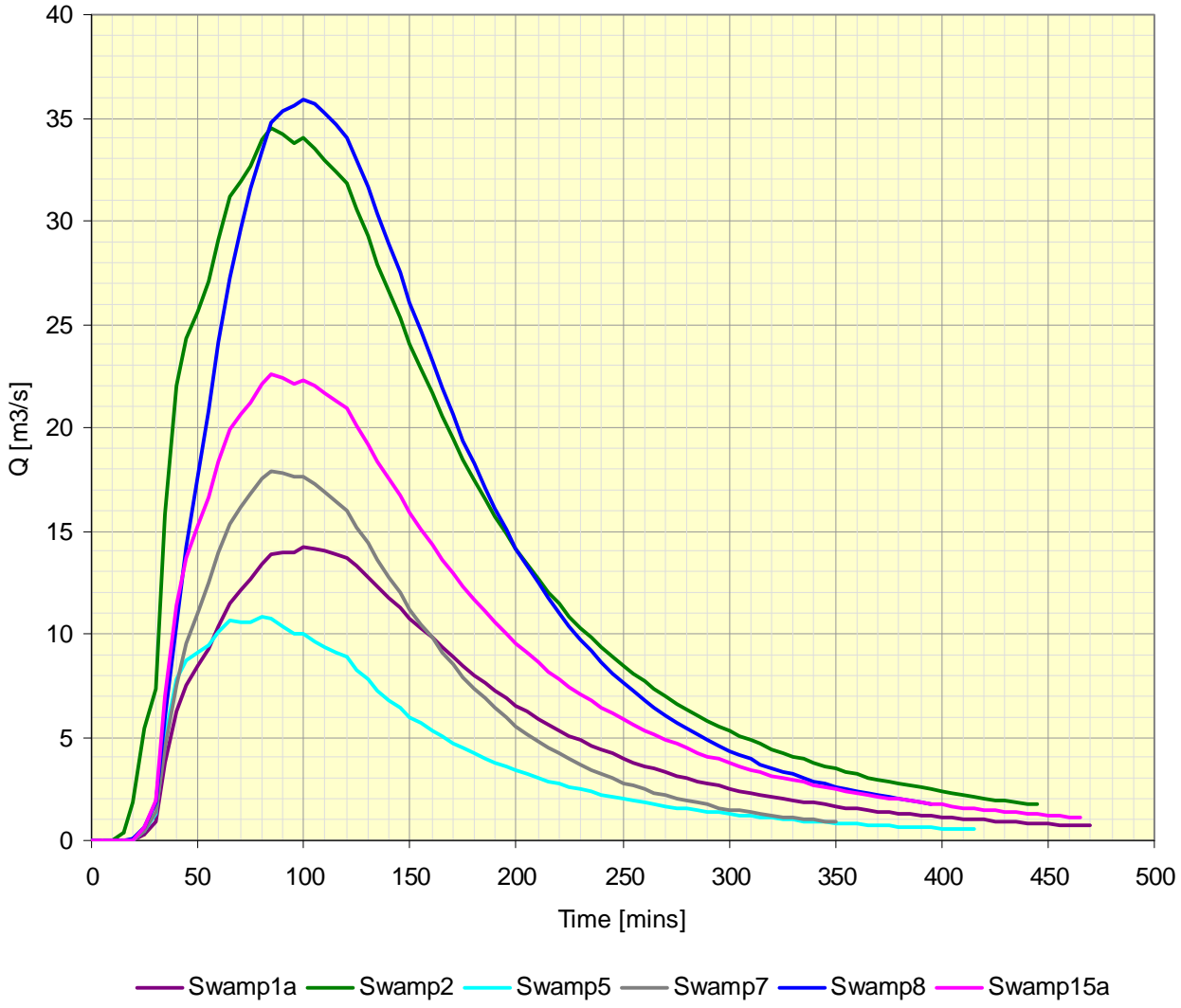
Hydrographs for a 50yr ARI, 2hr Duration Storm at Swamps 1a, 2, 5, 7, 8, and 15a



Extracted Hydrographs

	1	2	3	4	5	6
Subarea	Swamp1a	Swamp2	Swamp5	Swamp7	Swamp8	Swamp15a
Storm	DES 50 Year 120	DES 50 Year 120	DES 50 Year 120	DES 50 Year 120	DES 50 Year 120	DES 50 Year 120
Location	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S
Q Peak [m³/s]	11.167	27.303	8.594	14.339	29.046	18.001
T Peak [mins]	100	85	80	90	100	100

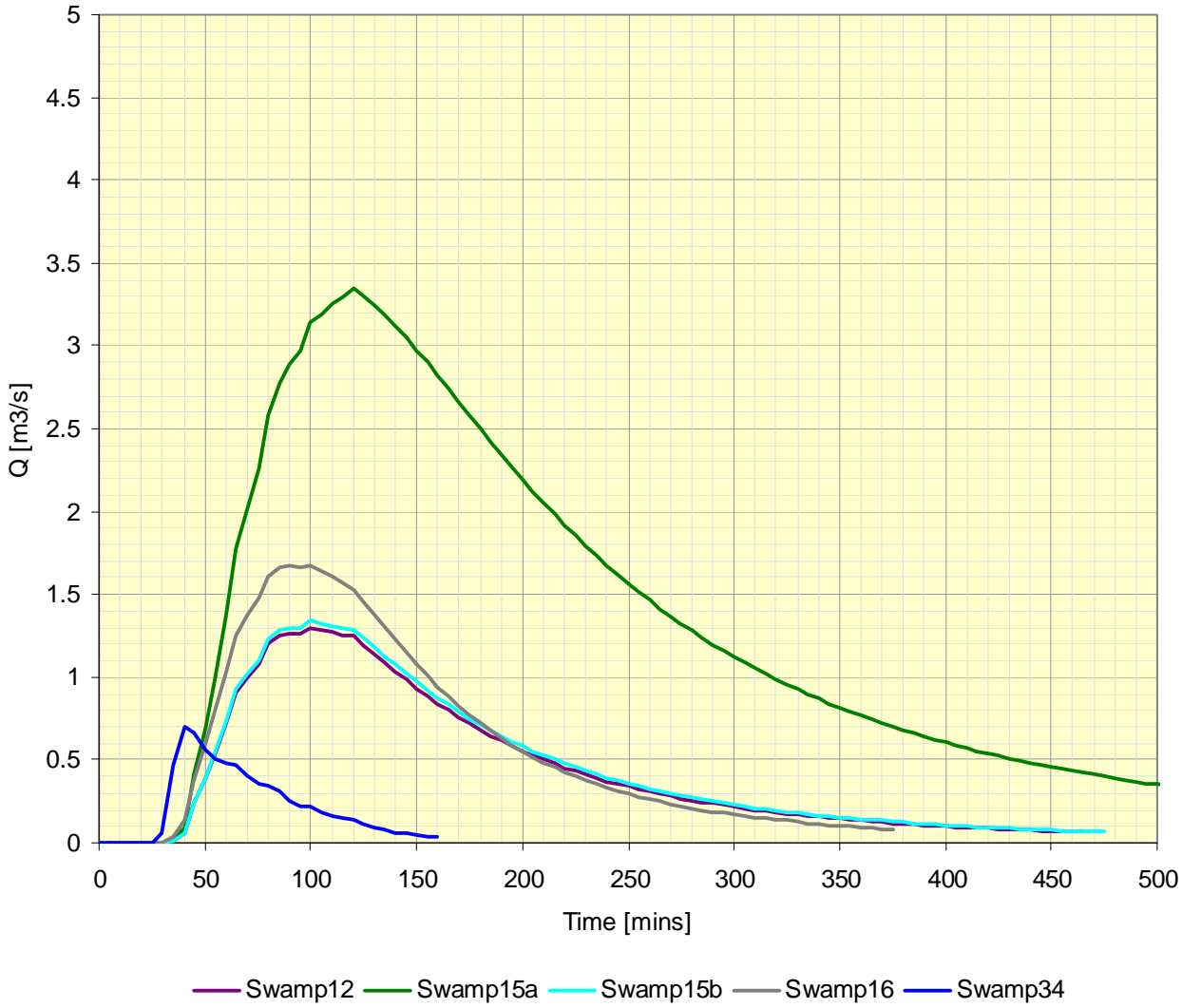
Hydrographs for a 100yr ARI, 2hr Duration Storm at Swamps 1a, 2, 5, 7, 8, and 15a



Extracted Hydrographs

	1	2	3	4	5	6
Subarea	Swamp1a	Swamp2	Swamp5	Swamp7	Swamp8	Swamp15a
Storm	DES 100 Year 120 Min	DES 100 Year 120 Min	DES 100 Year 120 Min	DES 100 Year 120 Min	DES 100 Year 120 Min	DES 100 Year 120 Min
Location	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S
Q Peak [m3/s]	14.179	34.485	10.81	17.864	35.879	22.54
T Peak [mins]	100	85	80	85	100	85

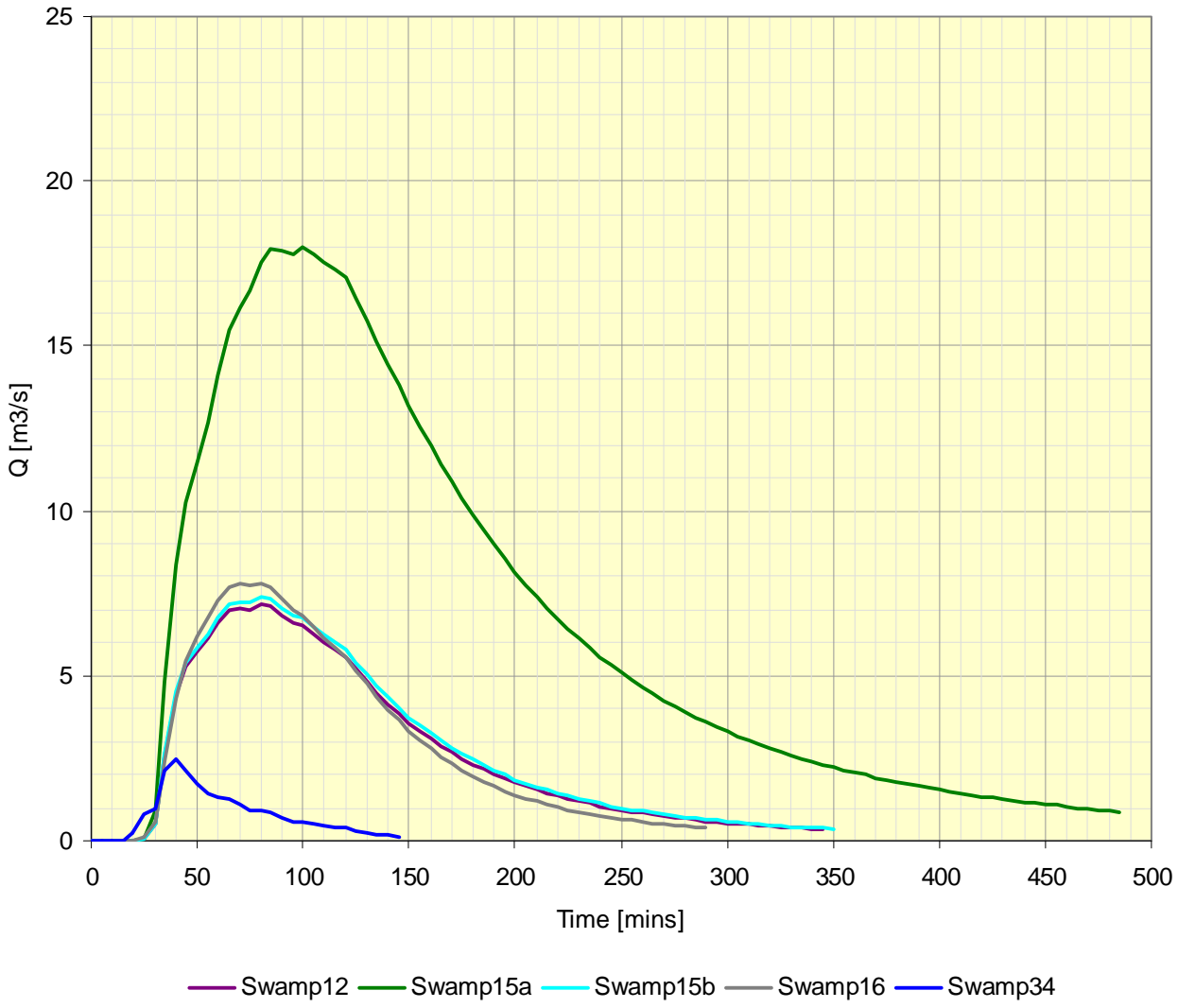
Hydrographs for a 2yr ARI, 2hr Duration Storm at Swamps 12, 15a, 15b, 16, and 34



Extracted Hydrographs

	1	2	3	4	5
Subarea	Swamp12	Swamp15a	Swamp15b	Swamp16	Swamp34
Storm	DES 2 Year 120 Min	DES 2 Year 120 Min	DES 2 Year 120 Min	DES 2 Year 120 Min	DES 2 Year 120 Min
Location	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S
Q Peak [m3/s]	1.301	3.344	1.339	1.678	0.695
T Peak [mins]	100	120	100	100	40

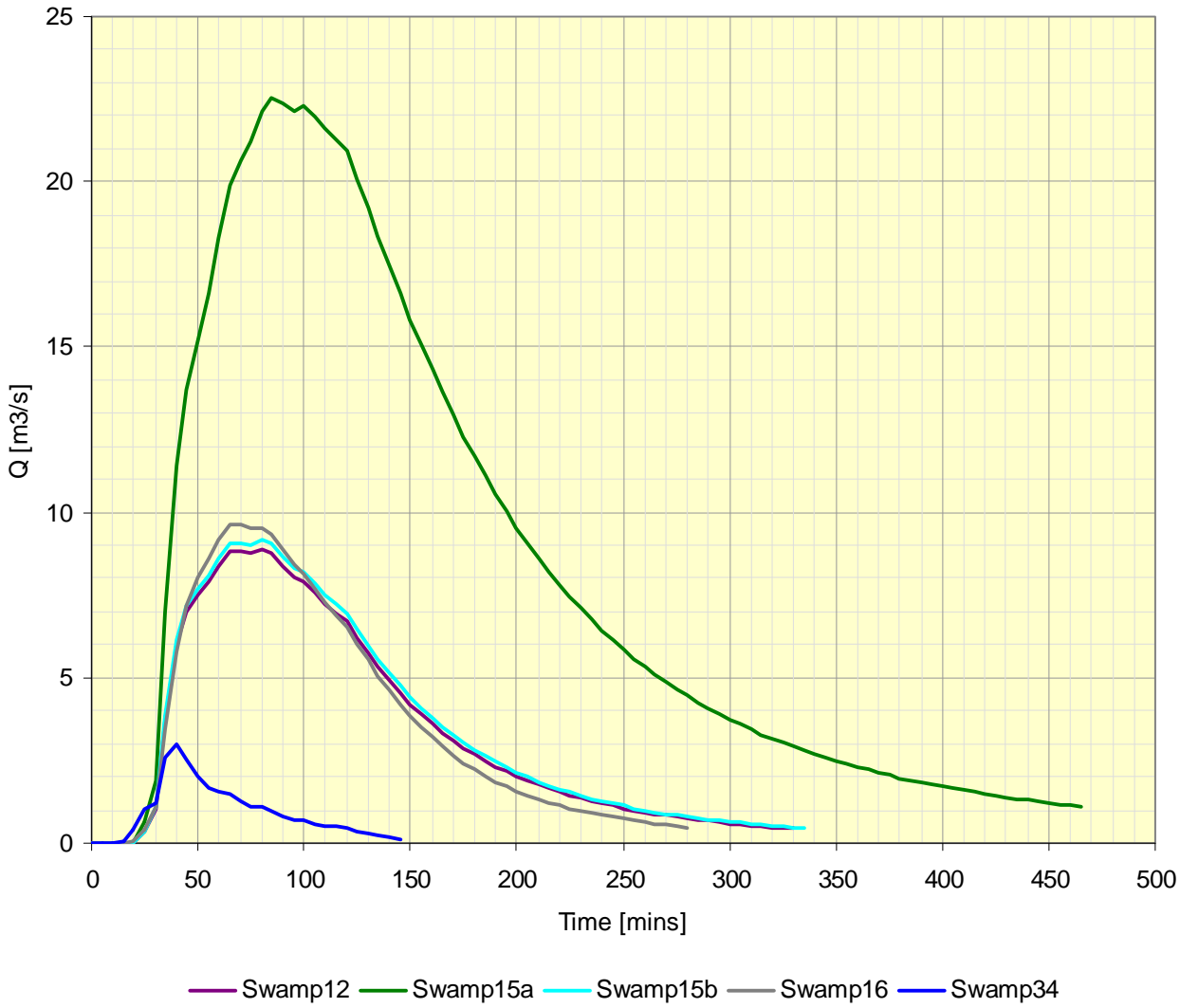
Hydrographs for a 50yr ARI, 2hr Duration Storm at Swamps 12, 15a, 15b, 16, and 34



Extracted Hydrographs

	1	2	3	4	5
Subarea	Swamp12	Swamp15a	Swamp15b	Swamp16	Swamp34
Storm	DES 50 Year 120 Min	DES 50 Year 120 Min	DES 50 Year 120 Min	DES 50 Year 120 Min	DES 50 Year 120 Min
Location	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S
Q Peak [m3/s]	7.159	18.001	7.387	7.803	2.482
T Peak [mins]	80	100	80	80	40

Hydrographs for a 100yr ARI, 2hr Duration Storm at Swamps 12, 15a, 15b, 16, and 34



Extracted Hydrographs

	1	2	3	4	5
Subarea	Swamp12	Swamp15a	Swamp15b	Swamp16	Swamp34
Storm	DES 100 Year 120	DES 100 Year 120	DES 100 Year 120	DES 100 Year 120	DES 100 Year 120
Location	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S	Q out OUT S
Q Peak [m3/s]	8.861	22.54	9.149	9.651	2.977
T Peak [mins]	80	85	80	70	40

Mannings Channel Calculations

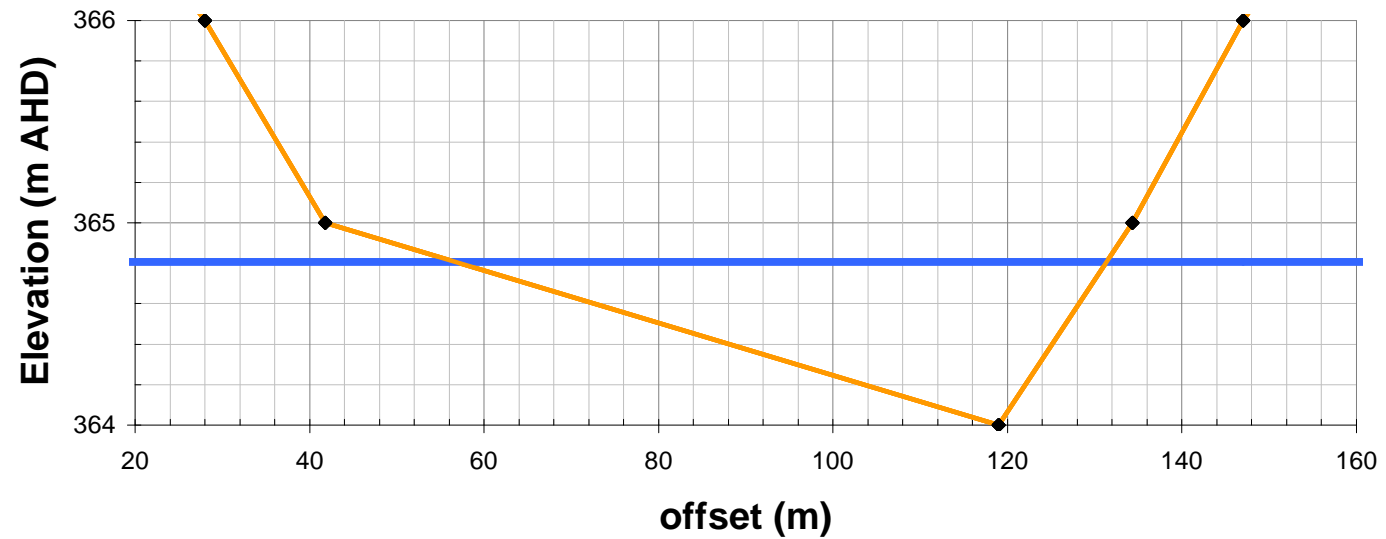
2yrARI **Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change**
Notes: for max plausible scenario

Slope 's': 0.0015 m/m
 Target Q: 3.34 m³/s
 Trial WSL: 364.81 m AHD
 Calculated Q: 3.3 m³/s

Input into YELLOW cells only

Channel Segment #	Station	Elevation	Length (L)	Channel Elevation At/ve	Water Surface Level	Av Depth in Channel (D)	Flow Area (A = D x L)	Mannings Roughness (n)	$Q = (A \times R^{1.48} \times S^{0.5}) / n$	Velocity (V)	Velocity x Depth (VxD)	Provisional Hydraulic Hazard	Description
			m	m AHD	m AHD	m	m ²		m ³ /s	m/s			
0	0	369	---	---	364.8	---	---	---	---				
	5	5.00	368.00	5.0	368.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low
	6.3	11.30	367.00	6.3	367.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low
	16.7	28.00	366.00	16.7	366.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low
	13.8	41.80	365.00	13.8	365.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low
	77.2	119.00	364.00	77.2	364.50	364.8	0.308	23.787	0.150	2.79	0.12	0.04	Low
	15.3	134.30	365.00	15.3	364.50	364.8	0.308	4.714	0.150	0.55	0.12	0.04	Low
	12.7	147.00	366.00	12.7	365.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low
	15.7	162.70	367.00	15.7	366.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low
	24.7	187.40	368.00	24.7	367.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low
	30.6	218.00	369.00	30.6	368.50	364.8	0.000	0.000	0.150	0.00	0	0.00	Low

Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change



Mannings Channel Calculations

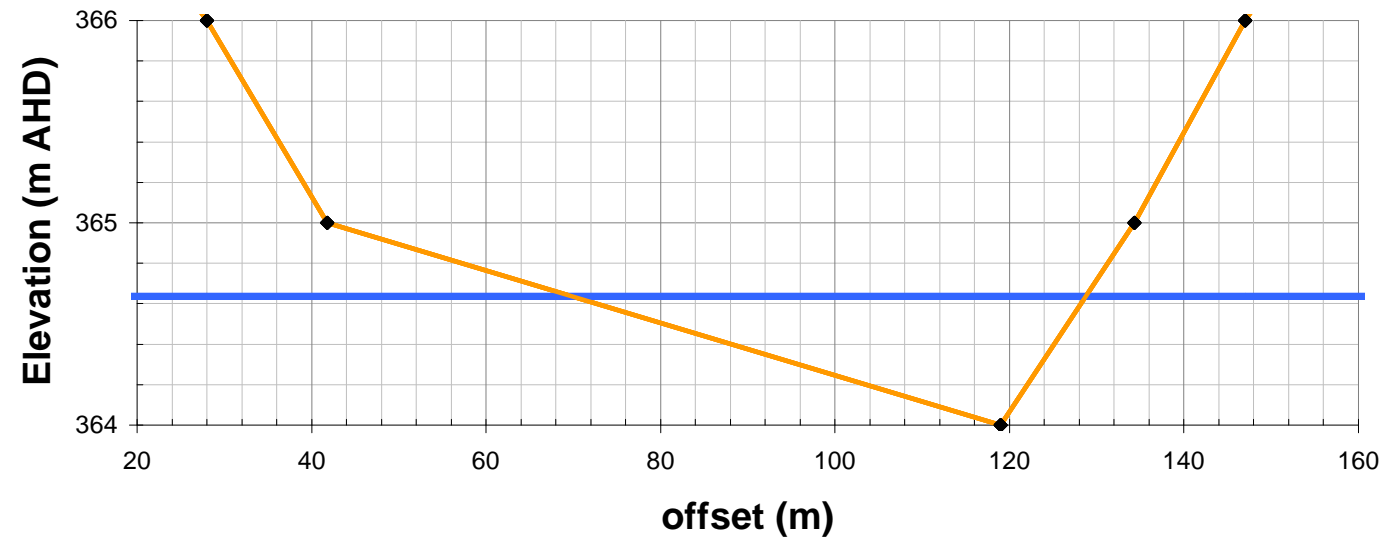
2yrARI **Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change**
Notes: for max plausible scenario

Slope 's': 0.0225 m/m
 Target Q: 3.34 m³/s
 Trial WSL: 364.64 m AHD
 Calculated Q: 3.3 m³/s

Input into YELLOW cells only

Channel Segment #	Station	Elevation	Length (L)	Channel Elevation A/rge	Water Surface Level	Av Depth in Channel (D)	Flow Area (A = D x L)	Mannings Roughness (n)	$Q = (A \times R^{1.4867} \times S^{0.5}) / n$	Velocity (V)	Velocity x Depth (VxD)	Provisional Hydraulic Hazard	Description
			m	m AHD	m AHD	m	m ²		m ³ /s	m/s			
0	0	369	---	---	364.6	---	---	---	---				
	5	5.00	368.00	5.0	368.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low
	6.3	11.30	367.00	6.3	367.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low
	16.7	28.00	366.00	16.7	366.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low
	13.8	41.80	365.00	13.8	365.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low
	77.2	119.00	364.00	77.2	364.50	364.6	0.137	10.573	0.150	2.79	0.26	0.04	Low
	15.3	134.30	365.00	15.3	364.50	364.6	0.137	2.095	0.150	0.55	0.26	0.04	Low
	12.7	147.00	366.00	12.7	365.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low
	15.7	162.70	367.00	15.7	366.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low
	24.7	187.40	368.00	24.7	367.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low
	30.6	218.00	369.00	30.6	368.50	364.6	0.000	0.000	0.150	0.00	0	0.00	Low

Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change



Mannings Channel Calculations

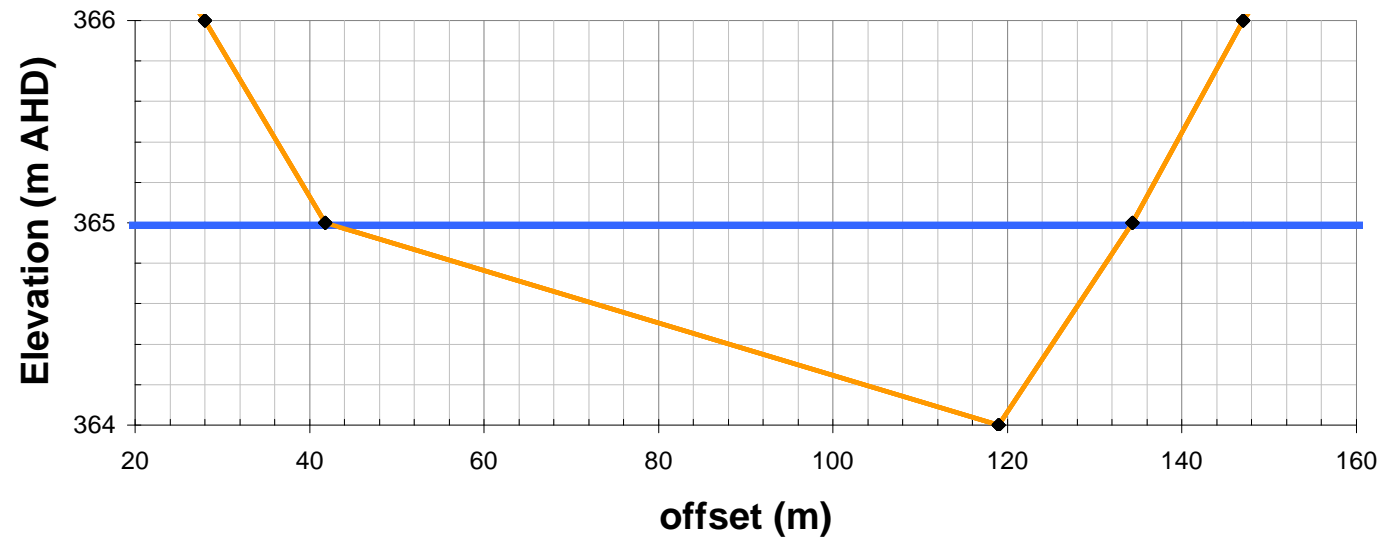
50yrARI Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change
Notes: for max plausible scenario

Slope 's': 0.0015 m/m
 Target Q: 18.00 m³/s
 Trial WSL: 364.99 m AHD
 Calculated Q: 18.0 m³/s

Input into YELLOW cells only

Channel Segment #	Station	Elevation	Length (L)	Channel Elevation At/ve	Water Surface Level	Av Depth in Channel (D)	Flow Area (A = D x L)	Mannings Roughness (n)	$Q = (A \times R^{1.4867} \times S^{0.5}) / n$	Velocity (V)	Velocity x Depth (VxD)	Provisional Hydraulic Hazard	Description
			m	m AHD	m AHD	m	m ²		m ³ /s	m/s			
0	0	369	---	---	365.0	---	---	---	---				
	5	5.00	368.00	5.0	368.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low
	6.3	11.30	367.00	6.3	367.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low
	16.7	28.00	366.00	16.7	366.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low
	13.8	41.80	365.00	13.8	365.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low
	77.2	119.00	364.00	77.2	364.50	365.0	0.488	37.652	0.060	15.02	0.40	0.19	Low
	15.3	134.30	365.00	15.3	364.50	365.0	0.488	7.462	0.060	2.98	0.40	0.19	Low
	12.7	147.00	366.00	12.7	365.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low
	15.7	162.70	367.00	15.7	366.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low
	24.7	187.40	368.00	24.7	367.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low
	30.6	218.00	369.00	30.6	368.50	365.0	0.000	0.000	0.060	0.00	0	0.00	Low

Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change



Mannings Channel Calculations

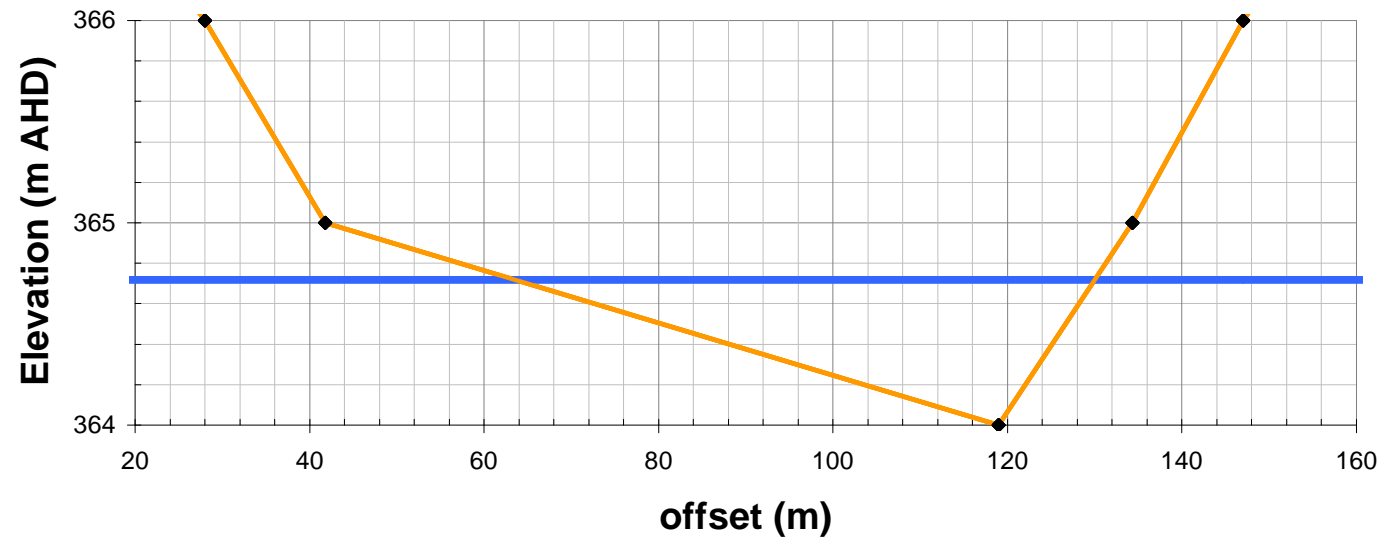
50yrARI Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change
Notes: for max plausible scenario

Slope 's': 0.0225 m/m
 Target Q: 18.00 m³/s
 Trial WSL: 364.72 m AHD
 Calculated Q: 18.0 m³/s

Input into YELLOW cells only

Channel Segment #	Station	Elevation	Length (L)	Channel Elevation At/ve	Water Surface Level	Av Depth in Channel (D)	Flow Area (A = D x L)	Mannings Roughness (n)	$Q = (A \times R^{1.4867} \times S^{0.5}) / n$	Velocity (V)	Velocity x Depth (VxD)	Provisional Hydraulic Hazard	Description
			m	m AHD	m AHD	m	m ²		m ³ /s	m/s			
0	0	369	---	---	364.7	---	---	---	---	---	---		
	5	5.00	368.00	5.0	368.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	6.3	11.30	367.00	6.3	367.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	16.7	28.00	366.00	16.7	366.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	13.8	41.80	365.00	13.8	365.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	77.2	119.00	364.00	77.2	364.50	364.7	0.217	16.737	0.060	15.02	0.90	0.19	Low
	15.3	134.30	365.00	15.3	364.50	364.7	0.217	3.317	0.060	2.98	0.90	0.19	Low
	12.7	147.00	366.00	12.7	365.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	15.7	162.70	367.00	15.7	366.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	24.7	187.40	368.00	24.7	367.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	30.6	218.00	369.00	30.6	368.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low

Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change



Mannings Channel Calculations

100yrARI Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change

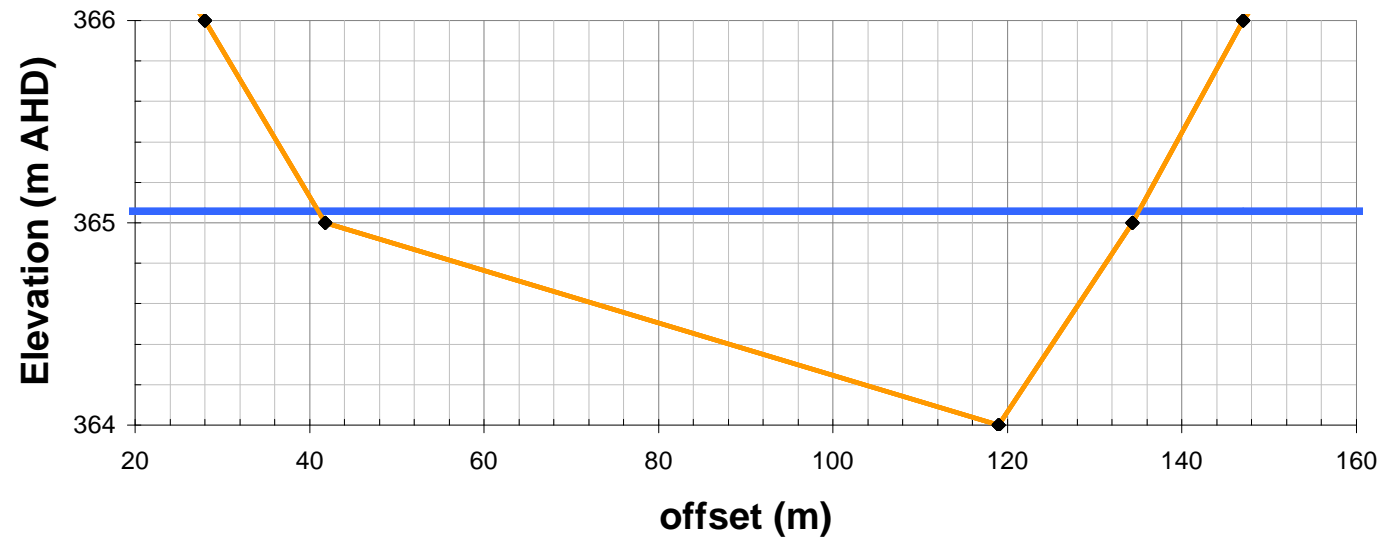
Notes: for max plausible scenario

Slope 's': 0.0015 m/m
 Target Q: 22.54 m³/s
 Trial WSL: 365.06 m AHD
 Calculated Q: 22.5 m³/s

Input into YELLOW cells only

Channel Segment #	Station	Elevation	Length (L)	Channel Elevation At Vge	Water Surface Level	Av Depth in Channel (D)	Flow Area (A = D x L)	Mannings Roughness (n)	$Q = (A \times R^{1.4876} \times S^{0.5}) / n$	Velocity (V)	Velocity x Depth (VxD)	Provisional Hydraulic Hazard	Description
			m	m AHD	m AHD	m	m ²		m ³ /s	m/s			
0	0	369	---	---	365.1	---	---	---	---	---	---	---	---
	5	5.00	368.00	5.0	368.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low
	6.3	11.30	367.00	6.3	367.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low
	16.7	28.00	366.00	16.7	366.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low
	13.8	41.80	365.00	13.8	365.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low
	77.2	119.00	364.00	77.2	364.50	365.1	0.558	43.080	0.060	18.81	0.44	0.24	Low
	15.3	134.30	365.00	15.3	364.50	365.1	0.558	8.538	0.060	3.73	0.44	0.24	Low
	12.7	147.00	366.00	12.7	365.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low
	15.7	162.70	367.00	15.7	366.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low
	24.7	187.40	368.00	24.7	367.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low
	30.6	218.00	369.00	30.6	368.50	365.1	0.000	0.000	0.060	0.00	0	0.00	Low

Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change



Mannings Channel Calculations

100yrARI Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change

Notes: for max plausible scenario

Slope 's': 0.0225 m/m
 Target Q: 22.54 m³/s
 Trial WSL: 364.75 m AHD
 Calculated Q: 22.5 m³/s

Input into YELLOW cells only

Channel Segment #	Station	Elevation	Length (L)	Channel Elevation At/ve	Water Surface Level	Av Depth in Channel (D)	Flow Area (A = D x L)	Mannings Roughness (n)	$Q = (A \times R^{1.4867} \times S^{0.5}) / n$	Velocity (V)	Velocity x Depth (VxD)	Provisional Hydraulic Hazard	Description
			m	m AHD	m AHD	m	m ²		m ³ /s	m/s			
0	0	369	---	---	364.7	---	---	---	---	---	---		
	5	5.00	368.00	5.0	368.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	6.3	11.30	367.00	6.3	367.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	16.7	28.00	366.00	16.7	366.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	13.8	41.80	365.00	13.8	365.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	77.2	119.00	364.00	77.2	364.50	364.7	0.248	19.149	0.060	18.81	0.98	0.24	Low
	15.3	134.30	365.00	15.3	364.50	364.7	0.248	3.795	0.060	3.73	0.98	0.24	Low
	12.7	147.00	366.00	12.7	365.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	15.7	162.70	367.00	15.7	366.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	24.7	187.40	368.00	24.7	367.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low
	30.6	218.00	369.00	30.6	368.50	364.7	0.000	0.000	0.060	0.00	0	0.00	Low

Flow in Swamp 15a Over Longwall 10 at Point of Maximum Predicted Gradient Change

