APPENDIX A

SUBMISSIONS SUMMARY

Appendix A

Submission summary

A.1 Submissions summary

Row Labels	Location	Amenity	Aquatic	Beyond_scope	Bio	Economic	Heritage	Land	Merits	Mitigation	Other	Process	Project	Social	Transport	Water	Grand Total
ACT Conservator of Flora and Fauna	Dickson		3													2	5
Alan Outhred	Summer Hill	1	1			1			7	1		3	2			2	18
Alison Crawley	Googong	1	1						3	1		1	2				9
Allan Lehepuu	Tinderry								4		1						5
Ampcontrol	Tomago					1								1			2
Andrew Lenart	Northmead												1				1
Anna Normyle	Acton		1						3	3						3	10
Anne Dickson	Glebe	1	1			1	1		8			2	3			2	19
Ashley Bowden	Croydon								1								1
Australian Association of Bush Regenerators	Haymarket					1				1			1				3
Australian Brumby Board Inc	Mannering Park			1					2				1			1	5
Australian Society for Fish Biology	West Wodonga		9									1					10
Australian Wildlife Society	Narellan	1	1			1			8	1		2	3			2	19
Barbara Bryan	Dundas	1	1			1			8	1		2	3			2	19
Bernadette Zanet	Yarangobilly													1	1		2
Brendon Graham	Grays Point								2								2
Brigid Dowsett	Gladesville	1	1			1			4				2				9
Bronwen Campbell	Balmain				1	1			2							1	5
Bruce Diekman	Enmore	1	1			1			3				2			1	9
Bruce Donald AM	Waverton					1			2								3
Bruce Robbins	Glebe	1	1			1			8	1		2	2			2	18
Catherine Crittenden	Summer Hill	1	1			1			7	1		3	2			3	19
Cathy Merchant	Hunters Hill	1			1	1			3			2					8
Centre for Applied Water Science, University of Canberra	Evatt		3									1	4			3	11
Charlotte McCabe	Tighes Hill	1	1			1		1	4				2			2	12
Chriss Ross	Helensburgh	1	1			1			8	1		2	3			2	19
Christine Cooper	Helensburgh	1	1			1			8	1		2	3			2	19
Damian Rudd	Dangelong													1			1
Damian Rudd2	Dangelong													1			1
David Dash	Chatswood								2		1						3
David G Stead Memorial Wild Life Research Foundation of Australia	Manly					1			1								2
David Gray	South Hobart								3				1				4
David Simons	Paddington		1						3				1			3	8
Denise Turner	Bundanoon	1							2		1					2	6
Department of Primary Industries																	
Diane Butt	Blakehurst	1	1			1			2				1			2	8
Division of Resources & Geoscience	Maitland																

Row Labels	Location	Amenity	Aquatic	Beyond_scope	Bio	Economic	Heritage	Land	Merits	Mitigation	Other	Process	Project	Social	Transport	Water	Grand Total
Don White	Woollahra	1	1			1			8	1		2	3			2	19
DPIE Water and NRAR													1			7	8
Elisabeth Dark	Annandale	1	1			1			6			1	2			2	14
Elizabeth Searle	Mollymook Beach	1	1			1			8	1		2	2			3	19
Emma Rooksby	Mount Pleasant	1	1			1			8	1		2	3			2	19
Environment Protection Authority	Queanbeyan	5	1						1							36	43
Environment, Energy and Science Group of the Department of Planning, Industry and Environment	Sydney	2	1		1		3	1		1	2	1	6	2	2	6	28
Esther Gallant	Cook	1	1			1			8	1		2	3			2	19
Frank Dennis	North Shore	1	1			1			3				1			1	8
Friends of Currango	Myrtleford		1									1	1	3			6
Friends of Grasslands	Jamison Centre				1					3		1					5
Geraldine Ryan	Ivanhoe								3								3
Gippsland Environment Group Inc	Wy Yung		1		1	1			5			1	4			1	14
Graeme Batterbury	Lillian Rock	1	1			1			6				2			1	12
Graeme Worboys	Gilmore			2	1		1		1	3		1	1				10
Helen Gibson	Lilyfield								1								1
Helen Nugent	North Nowra	1	1			1			9	1		2	2			2	19
Henry Vaughan	Panorama													1			1
Heritage Council of NSW	Parramatta						4										4
Ian Hill	Otford	1	2			2			13	2		4	4			2	30
Ian Scott	Woodend		1					1	2		1		1	2		2	10
Ian Tanner	Lawson								1								1
Illawarra Horse Trail Riders	Albion Park Rail													1			1
Ineke Stephens	Adaminaby	1	3			1			5			3	1	11	1	3	29
Ingrid Strewe	Bronte								1								1
Inland Rivers Network	Pyrmont		1						1	1						3	6
Jacob Grossbard	Strathfield South					4			8		2	2		2			18
James Clarke	Bundanoon					1			4								5
James Smith	Talbingo							3						2	1		6
Jamie Pittock	Acton		1						3	3						3	10
Jane Morgan	Hamilton				1	1			1								3
Jane Ulman	Blackheath						1					1				1	3
Janet Mayer	Foxground	1	1			2			8	1		2	3			3	21
Jen Powers	Dudley					1			2								3
Jennifer Gill	West Ryde	1	1			1			8	1		2	3			2	19
Jennifer Kent	Dulwich Hill	1	1			1			7	1		3	2			3	19
Jennifer Slavec	Avalon Beach				1				2							1	4
Jenny Medd	Nashdale	1	1			1			7	1		3	2			2	18

Row Labels	Location	Amenity	Aquatic	Beyond_scope	Bio	Economic	Heritage	Land	Merits	Mitigation	Other	Process	Project	Social	Transport	Water	Grand Total
Jillian Salz	Leura	1	1			1			3				2			1	9
John Brush	Wanniassa	1			1	1	1	1	3			1	2			1	12
John Burman	Port Macquarie	1	1		2	1			4				2			1	12
John Chapman	Oatlands	1	1			1			8	1		2	3			2	19
Jonathan Smith	Metung	1	1			1			7	1		3	2			2	18
Jonathon Howard	Albury	1	1			1			8	1		3	2			2	19
Judith Turley	Bungendore								2		2						4
Judy Kelly	Aranda	1	1			1			8	1		2	3			2	19
Kate Boyd	Armidale								3		1	1				1	6
Kay Shields	Keilor Downs								3								3
Keith Muir	Sydney				1				1	1		1	2		1		7
Khye Abbott	Urunga	1	1			1			8	1	1	3	2			2	20
Kosciuszko Huts Association	Cootamundra													3			3
Leif Lemke	Darkwood			1	1				1								3
Lybus Hillman	Carwoola													1			1
Lynton Hurt	Kingscliff	1	1			1			7			1	3			2	16
Malcolm Fisher	Manly Vale	1	1			1			3				2			1	9
Marion Glover	Nundah	1	1			1			7			1	3			2	16
Mark Fleming	Mollymook Beach				3	1			3			1	2				10
Mark Lintermans	Canberra		7							2	1	5				1	16
Marko Lehikoinen	Macgregor		2			1			2				1	2		1	9
Martin Borri	North Ryde					1			3				1			2	7
Mary Irvin	Artarmon	1	1			1		1	6				2			2	14
Matthew Pye	North Avoca	1	1		1	1		1	5				1			1	12
Maureen Flowers	Hunters Hill	1	1		1	1		1	4				2			1	12
Merren Hughs	North Bondi	1	1			1			8	1		2	3			2	19
Michael Bull	North Turramurra	1	1			1			8	1		2	3			2	19
Michael Harewood	Kiah								3				1				4
Monaro Acclimatisation Society Inc	Tathra		4							1				1		2	8
Mora Main	Waverley	1			1		1		3		2			1			9
Murray Scott	Heathcote			1		1			1								3
Name Withheld	Minnamurra	16	24	1	5	13		2	100	13		27	38	9	1	24	273
Name Withheld10	Leura								1								1
Name Withheld11	Farrer								1								1
Name Withheld12	Yattalunga													1			1
Name Withheld13	East Corrimal													1			1
Name Withheld14	Evatt								1								1
Name Withheld15	Termeil								1								1
Name Withheld16	Dalgety										1						1

Row Labels	Location	Amenity	Aquatic	Beyond_scope	Bio	Economic	Heritage	Land	Merits	Mitigation	Other	Process	Project	Social	Transport	Water	Grand Total
Name Withheld17	Albury								1								1
Name Withheld18	Albury					1											1
Name Withheld19	Bronte											1					1
Name Withheld2	Adaminaby												1				1
Name Withheld20	Carwoola									1							1
Name Withheld21	Thornleigh								1								1
Name Withheld22	Glebe														1		1
Name Withheld23	Coogee													1			1
Name Withheld24	Mount Victoria			1													1
Name Withheld25	Turramurra														1		1
Name Withheld26	Narwee								1								1
Name Withheld27	Glengarry								1								1
Name Withheld28	Bundeena													1			1
Name withheld29	Rhine Falls								1								1
Name Withheld3	Kambah								1								1
Name Withheld30	Old Adaminaby								1								1
Name Withheld31	The Ponds								1								1
Name Withheld32	Hornsby								1								1
Name withheld33	Hornsby				1												1
Name withheld34	East Jindabyne								1								1
Name withheld35	Epping								1								1
Name withheld36	Box Hill										1						1
Name withheld37	Port of Melbourne								1								1
Name Withheld4	Bolaro								1								1
Name Withheld5	Woolooware								1								1
Name Withheld6	The Ponds											1					1
Name Withheld7	East Albury													1			1
Name Withheld8	Wallaga Lake											1					1
Name Withheld9	Kareela								1								1
Nancy Pallin	Milsons Point					1			2				1			1	5
National Parks Association of NSW	Pyrmont	4	3		7		1	3	8	2		1	4		1	4	38
National Parks Association of the ACT	Fisher	1	1			1			4				3			1	11
National Parks Australia Council	Canberra	1	1				1		8			2	2			2	17
Nature Conservation Council	Sydney	1	2		3		1	1	4	1		3	2			2	20
Noeline Franklin	Brindabella			1					1								2
Oatley Flora and Fauna Conservation Society	Mortdale		1		2				6			1	1			1	12
Office of the Commissioner for Sustainability and the Environment	Bruce		1		1		1			2	1					1	7
Pamela Reeves	Gladesville				1	1			3				1				6
Patricia McKelvey	Arrawarra								2								2

Row Labels	Location	Amenity	Aquatic	Beyond_scope	Bio	Economic	Heritage	Land	Merits	Mitigation	Other	Process	Project	Social	Transport	Water	Grand Total
Paul Bourne	Woolloomooloo								5							1	6
Paul Ticli	Haberfield	1				1			3								5
Penelope Figgis AO	Waverton		1						4	1		1	3			2	12
Peter Anderson	Cooma		4						1			4	1			1	11
Peter Coorey	Cooma	1	1			1			7			1	3	2		2	18
Peter Prineas	Kingsford	1	1			1			7	1	1	1	2			2	17
Peter Youll	Darlington								2								2
PL & JM Cochran t/a Cochran Horse Treks	North Epping	1												4			5
Queanbeyan Anglers Club	Yaouk		4	1						1						2	8
Rachel Cassidy	Crestwood	1	1			1			5			1	1			1	11
Rachel Fitzhardinge	Bardon	1	1			1			4	1		3	3			2	16
Ralph Cartwright	Blakehurst		1						5				3			1	10
Rebecca Kenny	Engadine	1	1			1			8	1		2	3			2	19
Regina Roach	Bruce	1	1			1			8	1		2	3			2	19
Reynella Rides	Cooma	3								1		1		10	1	1	17
Roads and Maritime Services	Adaminaby														3		3
Rob Pallin									1								1
Robert Burns	Milsons Point	1	1			2			4			2	3			2	15
Robert Holley	Bronte								8		1		2				11
Robert Jenkins	Port Macquarie														4		4
Robert Michie	Cooma					1			2		2			1			6
Robert Pearson	Kentlyn	1	1						7			1	3			2	15
Robyn Wrenford	Ulladulla												1	1			2
Rod McKelvey	Bombala	1	1			1			7	1		3	2			2	18
Ron Salz	Arrawarra	1	1			1			3				2			1	9
Rosie White	Leura					1			3		1			1		1	7
Ross Jeffree	Woollahra		1			1		1	5		1		3			1	13
Roy Deane	Alfords Point								1								1
Ryde Gladesville Climate Change Action Group	Manly				1	1			3				1				6
Sean McSharry	Gladesville					1			3								4
Snowy Monaro Regional Council	Mosman	1	1		1						1		4		9	1	18
Snowy Mountains Bush Users Group	Cooma									1				1			2
Snowy River Alliance	Tumut		12						3	2		5	2			2	26
STEP Inc	Dalgety		1		1	2			5	1		1	2			1	14
Stephanie Knox	Warrawee		1		1				1				1				4
Stephanie Rushton	West Ryde													1			1
Sue Anderson	Chisholm				1				2							1	4
Suraya Coorey	Clareville	1	1			1			8	1		2	3			2	19
Susan Steggall	Woy Woy	1	1			1			7			1	3			2	16
Suzanne Olsson	Manly	1	1			1			8	1		2	3			2	19

Row Labels	Location	Amenity	Aquatic	Beyond_scope	Bio	Economic	Heritage	Land	Merits	Mitigation	Other	Process	Project	Social	Transport	Water	Grand Total
Tamworth Namoi Branch, National Parks Association of NSW	Nelson Bay	1	1			1			8	1		2	3			2	19
Ted Woodley	North Tamworth	1	1			2		1	7	1			2			1	16
The Colong Foundation for Wilderness Ltd	Chatswood	2		1	2	2			5	1		5	1			1	20
The Nature Conservation Society of South Australia	Sydney								2								2
Upper Murrimbidgee Demonstration Reach	Hindmarsh		4							2		1	1				8
Vincent D'Alessandro	Cooma												2				2
William Sexton	Albury	1	1			2			6			1	2			1	14
Grand Total	Constitution Hill	100	161	10	46	107	16	18	695	83	25	166	251	71	27	240	2016

APPENDIX B

REGISTER OF SUBMITTERS

Appendix B

Register of submitters

B.1 Register of submitters

Type	Submitter	Location	Local/regional
Public authority	ACT Conservator of Flora and Fauna	Dickson	Regional
Public	Alan Outhred	Summer Hill	Regional
Public	Alison Crawley	Googong	Local
Public	Allan Lehepuu	Tinderry	Local
Special interest	Ampcontrol	Tomago	Regional
Public	Andrew Lenart	Northmead	Regional
Public	Anna Normyle	Acton	Regional
Public	Anne Dickson	Glebe	Regional
Public	Ashley Bowden	Croydon	Regional
Special interest	Australian Association of Bush Regenerators	Haymarket	Regional
Special interest	Australian Brumby Board Inc	Mannering Park	Regional
Special interest	Australian Society for Fish Biology	West Wodonga	Regional
Special interest	Australian Wildlife Society	Narellan	Regional
Public	Barbara Bryan	Dundas	Regional
Public	Bernadette Zanet	Yarangobilly	Local
Public	Brendon Graham	Grays Point	Regional
Public	Brigid Dowsett	Gladesville	Regional
Public	Bronwen Campbell	Balmain	Regional
Public	Bruce Diekman	Enmore	Regional
Public	Bruce Donald AM	Waverton	Regional
Public	Bruce Robbins	Glebe	Regional
Public	Catherine Crittenden	Summer Hill	Regional
Public	Cathy Merchant	Hunters Hill	Regional
Special interest	Centre for Applied Water Science, University of Canberra	Evatt	Regional
Public	Charlotte McCabe	Tighes Hill	Regional
Public	Chriss Ross	Helensburgh	Regional
Public	Christine Cooper	Helensburgh	Regional
Public	Damian Rudd	Dangelong	Local
Public	Damian Rudd	Dangelong	Local
Public	David Dash	Chatswood	Regional
Special interest	David G Stead Memorial Wild Life Research Foundation of Australia	Manly	Regional
Public	David Gray	South Hobart	Regional

Type	Submitter	Location	Local/regional
Public	David Simons	Paddington	Regional
Public	Denise Turner	Bundanoon	Regional
Public authority	Department of Primary Industries		Regional
Public	Diane Butt	Blakehurst	Regional
Public authority	Division of Resources & Geoscience	Maitland	Regional
Public	Don White	Woollahra	Regional
Public authority	DPIE Water and NRAR		Regional
Public	Elisabeth Dark	Annandale	Regional
Public	Elizabeth Searle	Mollymook Beach	Regional
Public	Emma Rooksby	Mount Pleasant	Regional
Public authority	Environment Protection Authority	Queanbeyan	Local
Public authority	Environment, Energy and Science Group of the Department of Planning, Industry and Environment	Sydney	Regional
Public	Esther Gallant	Cook	Regional
Public	Frank Dennis	North Shore	Regional
Special interest	Friends of Currango	Myrtleford	Regional
Special interest	Friends of Grasslands	Jamison Centre	Regional
Public	Geraldine Ryan	Ivanhoe	Regional
Special interest	Gippsland Environment Group Inc	Wy Yung	Regional
Public	Graeme Batterbury	Lillian Rock	Regional
Public	Graeme Worboys	Gilmore	Regional
Public	Helen Gibson	Lilyfield	Regional
Public	Helen Nugent	North Nowra	Regional
Public	Henry Vaughan	Panorama	Regional
Public authority	Heritage Council of NSW	Parramatta	Regional
Public	Ian Hill	Otford	Regional
Public	Ian Scott	Woodend	Regional
Public	Ian Tanner	Lawson	Regional
Special interest	Illawarra Horse Trail Riders	Albion Park Rail	Regional
Public	Ineke Stephens	Adaminaby	Local
Public	Ingrid Strewe	Bronte	Regional
Special interest	Inland Rivers Network	Pyrmont	Regional
Public	Jacob Grossbard	Strathfield South	Regional
Public	James Clarke	Bundanoon	Regional

Type	Submitter	Location	Local/regional
Public	James Smith	Talbingo	Local
Public	Jamie Pittock	Acton	Regional
Public	Jane Morgan	Hamilton	Regional
Public	Jane Ulman	Blackheath	Regional
Public	Janet Mayer	Foxground	Regional
Public	Jen Powers	Dudley	Regional
Public	Jennifer Gill	West Ryde	Regional
Public	Jennifer Kent	Dulwich Hill	Regional
Public	Jennifer Slavec	Avalon Beach	Regional
Public	Jenny Medd	Nashdale	Regional
Public	Jillian Salz	Leura	Regional
Public	John Brush	Wanniassa	Regional
Public	John Burman	Port Macquarie	Regional
Public	John Chapman	Oatlands	Regional
Public	Jonathan Smith	Metung	Regional
Public	Jonathon Howard	Albury	Local
Public	Judith Turley	Bungendore	Local
Public	Judy Kelly	Aranda	Regional
Public	Kate Boyd	Armidale	Regional
Public	Kay Shields	Keilor Downs	Regional
Public	Keith Muir	Sydney	Regional
Public	Khye Abbott	Urunga	Regional
Special interest	Kosciuszko Huts Association	Cootamundra	Regional
Public	Leif Lemke	Darkwood	Regional
Public	Lybus Hillman	Carwoola	Local
Public	Lynton Hurt	Kingscliff	Regional
Public	Malcolm Fisher	Manly Vale	Regional
Public	Marion Glover	Nundah	Regional
Public	Mark Fleming	Mollymook Beach	Regional
Public	Mark Lintermans	Canberra	Regional
Public	Marko Lehikoinen	Macgregor	Regional
Public	Martin Borri	North Ryde	Regional
Public	Mary Irvin	Artarmon	Regional
Public	Matthew Pye	North Avoca	Regional
Public	Maureen Flowers	Hunters Hill	Regional
Public	Merren Hughs	North Bondi	Regional
Public	Michael Bull	North Turramurra	Regional

Type	Submitter	Location	Local/regional
Public	Michael Harewood	Kiah	Local
Special interest	Monaro Acclimatisation Society Inc	Tathra	Local
Public	Mora Main	Waverley	Regional
Public	Murray Scott	Heathcote	Regional
Public	Name Withheld	Minnamurra	Regional
Public	Name Withheld2	Leura	Regional
Public	Name Withheld3	Farrer	Regional
Public	Name Withheld4	Yattalunga	Regional
Public	Name Withheld5	East Corrimal	Regional
Public	Name Withheld6	Evatt	Regional
Public	Name Withheld7	Termeil	Regional
Public	Name Withheld8	Dalgety	Local
Public	Name Withheld9	Albury	Local
Public	Name Withheld10	Albury	Local
Public	Name Withheld11	Bronte	Regional
Public	Name Withheld12	Adaminaby	Local
Public	Name Withheld13	Carwoola	Local
Public	Name Withheld14	Thornleigh	Regional
Public	Name Withheld15	Glebe	Regional
Public	Name Withheld16	Coogee	Regional
Public	Name Withheld17	Mount Victoria	Regional
Public	Name Withheld18	Turramurra	Regional
Public	Name Withheld19	Narwee	Regional
Public	Name Withheld20	Glengarry	Regional
Public	Name Withheld21	Bundeena	Regional
Public	Name Withheld22	Rhine Falls	Local
Public	Name Withheld23	Kambah	Regional
Public	Name Withheld24	Old Adaminaby	Local
Public	Name Withheld25	The Ponds	Regional
Public	Name Withheld26	Hornsby	Regional
Public	Name Withheld27	Hornsby	Regional
Public	Name Withheld28	East Jindabyne	Local
Public	Name withheld29	Epping	Regional
Public	Name Withheld30	Box Hill	Regional
Public	Name Withheld31	Port of Melbourne	Regional
Public	Name Withheld32	Bolaro	Local

Type	Submitter	Location	Local/regional
Public	Name withheld33	Woolooware	Regional
Public	Name withheld34	The Ponds	Regional
Public	Name withheld35	East Albury	Local
Public	Name withheld36	Wallaga Lake	Local
Public	Name withheld37	Kareela	Regional
Public	Nancy Pallin	Milsons Point	Regional
Special interest	National Parks Association of NSW	Pyrmont	Regional
Special interest	National Parks Association of the ACT	Fisher	Local
Special interest	National Parks Australia Council	Canberra	Regional
Special interest	Nature Conservation Council	Sydney	Regional
Public	Noeline Franklin	Brindabella	Local
Special interest	Oatley Flora and Fauna Conservation Society	Mortdale	Regional
Public authority	Office of the Commissioner for Sustainability and the Environment	Bruce	Regional
Public	Pamela Reeves	Gladesville	Regional
Public	Patricia McKelvey	Arrawarra	Regional
Public	Paul Bourne	Woolloomooloo	Regional
Public	Paul Ticli	Haberfield	Regional
Public	Penelope Figgis AO	Waverton	Regional
Public	Peter Anderson	Cooma	Local
Public	Peter Anderson	Cooma	Local
Public	Peter Coorey	Kingsford	Regional
Public	Peter Prineas	Darlington	Regional
Public	Peter Youll	North Epping	Regional
Special interest	PL & JM Cochran t/a Cochran Horse Treks	Yaouk	Local
Special interest	Queanbeyan Anglers Club	Crestwood	Local
Public	Rachel Cassidy	Bardon	Regional
Public	Rachel Fitzhardinge	Blakehurst	Regional
Public	Ralph Cartwright	Engadine	Regional
Public	Rebecca Kenny	Bruce	Regional
Public	Regina Roach	Cooma	Local
Special interest	Reynella Rides	Adaminaby	Local
Public authority	Roads and Maritime Services		Regional
Public	Rob Pallin	Milsons Point	Regional
Public	Robert Burns	Bronte	Regional

Type	Submitter	Location	Local/regional
Public	Robert Holley	Port Macquarie	Regional
Public	Robert Jenkins	Cooma	Local
Public	Robert Michie	Kentlyn	Regional
Public	Robert Pearson	Ulladulla	Regional
Public	Robyn Wrenford	Bombala	Local
Public	Rod McKelvey	Arrawarra	Regional
Public	Ron Salz	Leura	Regional
Public	Rosie White	Woollahra	Regional
Public	Ross Jeffree	Alfords Point	Regional
Public	Roy Deane	Manly	Regional
Special interest	Ryde Gladesville Climate Change Action Group	Gladesville	Regional
Public	Sean McSharry	Mosman	Regional
Public authority	Snowy Monaro Regional Council	Cooma	Local
Special interest	Snowy Mountains Bush Users Group	Tumut	Local
Special interest	Snowy River Alliance	Dalgety	Local
Special interest	STEP Inc	Warrawee	Regional
Public	Stephanie Knox	West Ryde	Regional
Public	Stephanie Rushton	Chisholm	Regional
Public	Sue Anderson	Clareville	Regional
Public	Suraya Coorey	Woy Woy	Regional
Public	Susan Steggall	Manly	Regional
Public	Suzanne Olsson	Nelson Bay	Regional
Special interest	Tamworth Namoi Branch, National Parks Association of NSW	North Tamworth	Regional
Public	Ted Woodley	Chatswood	Regional
Special interest	The Colong Foundation for Wilderness Ltd	Sydney	Regional
Special interest	The Nature Conservation Society of South Australia	Hindmarsh	Regional
Special interest	Upper Murrimbidgee Demonstration Reach	Cooma	Local
Public	Vincent D'Alessandro	Albury	Local
Public	William Sexton	Constitution Hill	Regional

APPENDIX C

REVISED MITIGATION MEASURES

Appendix C

Mitigation measures table

C.1 Revised mitigation measures

Following public exhibition of the Main Works EIS revisions to the mitigation measures included in the EIS have been identified. Mitigation measures have been revised in order to further minimise environmental impacts, improve the constructability of Main Works and meet the expectations and requirements of stakeholders. A complete and comprehensive list of updated mitigation measures including mitigations that have been revised following public exhibition is provided in Table C.1 below.

The mitigation measures provided in Table C.1 below were prepared in consideration of the DPIE draft guidelines for Preparing and Environmental Impact Statement and Approach to Setting Conditions. Accordingly, the mitigation measures adopt a risk based approach and are considered to be the key measures required to achieve the appropriate environmental outcomes outlined in the Main Works EIS and the PIR-RTS. These revised mitigation measures represent the commitments of the project through delivery and operation.

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Water					
General	WM01	A Water Management Plan will be developed for Snowy 2.0 Main Works that includes: • proposed mitigation and management measures for all construction water management categories; • spill management and response; • a surface and groundwater monitoring program; • water quality trigger levels; • reporting requirements; • corrective actions; • contingencies; and • responsibilities for all management measures. The WMP will be prepared in consultation with DPIE, EPA, WaterNSW and key local stakeholders, and would consider concerns raised during the exhibition and approvals process for the project.	A Water Management Plan will be developed for Snowy 2.0 Main Works that includes: • proposed mitigation and management measures for all construction water management categories; • spill management and response; • a surface and groundwater monitoring program; • water quality trigger action response plan; • reporting requirements; • corrective actions; • contingencies; and • responsibilities for all management measures. The WMP will be prepared in consultation with DPIE, EPA, WaterNSW and key local stakeholders, and would consider concerns raised during the exhibition and approvals process for the project.	Construction	Contractor
General	WM02	A water monitoring program will be developed as part of the water management plan to monitor quality and quantity impacts to surface water, groundwater and reservoirs. The water monitoring program will incorporate and update the existing monitoring network and detail monitoring frequencies and water quality constituents.	No change	Construction and operation	Contractor
Water quality impacts from stormwater runoff	WM03	Where practical, clean water will be diverted around or through construction areas. Runoff from clean water areas that cannot be diverted will be accounted for in the design of water management systems.	No change	Construction	Contractor

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Water quality impacts from stormwater runoff	WM04	An Erosion and Sediment Control Plan (ESCP) will be prepared for each construction area that will include relevant information presented in the water management report (Annexure D to water assessment)	No change	Construction	Contractor
Water quality impacts from stormwater runoff	WM05	A suitably qualified erosion and sediment control professional(s) will be engaged to: • oversee the development of ESCPs; • inspect and audit controls; • train relevant staff; and progressively improve methods and standards as required.	A suitably qualified erosion and sediment control professional(s) will be engaged to: • oversee the development of ESCPs; • inspect and audit controls; • train relevant staff; and • provide advice regarding erosion and sediment control.	Construction	Contractor
Groundwater modelling	WM06	The groundwater model developed for Snowy 2.0 Main Works will be validated and, if necessary, recalibrated to new groundwater monitoring data as the monitoring record increases throughout construction. It is recommended that assessment of the monitoring record and groundwater affecting activities, along with model updates, be undertaken at least annually throughout construction and into operation until it is evident that the update frequency can be reduced.	No change	Construction and operation	Contractor Snowy Hydro
Groundwater inflow / drawdown	WM07	Where discrete high flow features are intercepted, pre-grouting and secondary grouting from the TBM may be undertaken to enable tunnel construction.	No change	Construction	Contractor

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Water supply	WM08	A water supply system will be established to supply water for potable water use and construction activities. The system will most likely source water from regional groundwater resources, but may also source water from either Tantangara or Talbingo Reservoirs provided licences are available. Extraction from watercourses will be avoided. The most suitable extraction locations and water sources will be established during detailed design	A water supply system will be established to supply water for potable water use and construction activities. The system will most likely source water from regional groundwater resources, but may also source water from either Tantangara or Talbingo Reservoirs provided licences are available. Extraction from watercourses will be avoided where practicable. The most suitable extraction locations and water sources will be established during detailed design.	Construction	Contractor Snowy Hydro
Reservoir water quality (wastewater management)	WM09	A wastewater management system will be established to manage effluent from construction compounds and accommodation camps. All wastewater will be treated to meet the water quality specifications provided in the water management report (Annexure D to water assessment) and will be discharged to reservoirs. Wastewater discharges to watercourses will be avoided.	No change	Construction	Contractor
Reservoir water quality (process water management)	WM10	A process water management system will be established to manage water from subsurface excavations and large surface excavations during construction; and to supply water to construction activities. All surplus process water will be treated to meet the water quality specifications provided in the water management report (Annexure D to water assessment) and will be discharged to reservoirs. Process water discharges to watercourses will be avoided.	A process water management system will be established to manage water during construction; and to supply water to construction activities. All surplus process water will be treated to meet the water quality specifications provided in the water management report (Annexure D to water assessment) and will be discharged to reservoirs. Process water discharges to watercourses will be avoided.	Construction	Contractor

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Changes to reservoir water quality due to plug removal within the reservoirs	WM11	The specifications and locations of the proposed environmental measures will be determined as part of detailed design, including the installation of silt curtains. They will be designed such that water quality criteria is agreed with the regulators, with the application of a mixing zone if required.	No change	Construction	Contractor
Reservoir bed sediments are disturbed by commissioning water flows	WM12	Investigations to minimise the disturbance of bed sediments due to water flows during commissioning will be undertaken as part of detailed design. Potential measures to minimise the disturbance of bed sediments include: • investigate mitigated design measures; • dredging sediments from the potential disturbance zones and placing them in another part of the reservoir; and/or • armouring the sediments in the potential disturbance zones. These options are currently being assessed.	No change	Construction	Contractor Snowy Hydro
Flooding	WM13	Further consideration of flooding conditions and impacts, including flood modelling where necessary, will be undertaken to support future detailed design of both temporary and permanent works.	No change	Construction Operation	Contractor Snowy Hydro
Flooding	WM14	Flood emergency response plans will be developed for both construction and operational phases	No change	Construction Operation	Contractor Snowy Hydro

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Terrestrial ecology					
Fauna strike to Smoky Mouse and Eastern Pygmy possum	ECO1	Management measures to mitigate the potential impacts of fauna strike are currently being considered. These measures include: • reduced speed limit along Lobs Hole Ravine Road and Marica Trail at night, when fauna species are likely to be most active; • fencing of these roads to prevent access to the road surface; and • construction of fauna underpasses. The adopted measures will be agreed in consultation with DPIE.	Management measures to mitigate the potential impacts of fauna strike are currently being considered. These measures may include: • reduced speed limit along Lobs Hole Ravine Road and Marica Trail at night, when fauna species are likely to be most active; • fencing of these roads to prevent access to the road surface; and • construction of fauna underpasses. The adopted measures will be agreed in consultation with DPIE.	Construction	Contractor
Spread of weeds	ECO2	A weed and pathogen monitoring program will be implemented, with a weed control program to be implemented if weeds are identified along road verges. This will include wash-down stations will be constructed at a suitable location, with wash down for weeds as well as *P.cimmamomi*.	A weed and pathogen monitoring program will be implemented, with a weed control program to be implemented if weeds are identified along road verges. This may include wash-down stations to be constructed at a suitable location, with wash down for weeds as well as *P.cimmamomi*.	Construction	Contractor Snowy Hydro
Impacts to GDEs	ECO3	A GDE monitoring program will be implemented to ensure actual impacts are within prediction. If actual impacts are greater than predicted, adaptive management will be implemented.	A GDE monitoring program will be implemented to assess actual impacts against predicted. If actual impacts are greater than predicted, adaptive management will be implemented.	Construction	Contractor

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Removal of native vegetation and threatened species habitat	ECO4	A Biodiversity Management Plan will be prepared and implemented during construction. It will include the following measures: • establishment of exclusion zones around retained vegetation, including fencing and signage; • pre-clearing surveys conducted prior to clearing, including translocation of fauna into areas of retained vegetation; • vegetation clearing undertaken in accordance with the two-stage process; • mulching and stockpiling of cleared native vegetation for use during rehabilitation; • retention of hollows logs and limbs for placement within retained vegetation and reuse during rehabilitation; • regional surveys for the Smoky Mouse to demonstrate presence of a significant regional population; • collection of native seeds and alpine sod for propagation; and establishment of native plant nursery and propagation of endemic native species for use in rehabilitation works.	A Biodiversity Management Plan will be prepared and implemented during construction. It will include the following measures: • establishment of exclusion zones where required around retained vegetation, including fencing and signage; • pre-clearing surveys conducted prior to clearing, including translocation of fauna into areas of retained vegetation; • vegetation clearing undertaken in accordance with the two-stage process; • mulching and stockpiling of cleared native vegetation for use during rehabilitation; • retention of hollows logs and limbs for placement within retained vegetation and reuse during rehabilitation where practicable; • collection of native seeds and alpine sod for propagation; and • establishment of native plant nursery and propagation of endemic native species for use in rehabilitation works.	Construction	Contractor Snowy Hydro
	ECO5	A threatened species monitoring program will be designed and implemented to ensure impacts arising from clearing are within prediction.	A threatened species monitoring program will be designed and implemented to assess impacts arising from clearing.	Construction and operation	Contractor Snowy Hydro
Increase in predatory and pest species	ECO6	A pest and predator monitoring program will be designed and implemented to ensure Main Works does not result in a significant increase in numbers of pest and predatory species and impacts to threatened species remain within prediction.	No change	Construction and operation	Contractor Snowy Hydro

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Aquatic ecology					
Impacts to aquatic habitats	AE01	An Aquatic Habitat Management Plan will be prepared and implemented to guide management of impacts to aquatic habitat. The plan will: • be prepared in consultation with NPWS and DPI-Fisheries; • include a description of measures that would be implemented to: – protect aquatic habitat outside the approved disturbance areas; – minimise the loss of key aquatic habitat; – minimise the impacts of the development on threatened fauna species; – minimise the impact of the development on fish habitat; – relocate Murray crayfish from the shallower parts of the approved disturbance area in Talbingo Reservoir prior to disturbing these areas – notify DPI-Fisheries of any fish kills; • include a trigger action and response plan for the Murray crayfish, which would be implemented if monitoring shows the development is adversely affecting the species;	An Aquatic Habitat Management Plan will be prepared and implemented to guide management of impacts to aquatic habitat. The plan will: • be prepared in consultation with NPWS and DPI-Fisheries; • include a description of measures that would be implemented to: – minimise impacts to aquatic habitat outside the approved disturbance areas; – minimise the loss of key aquatic habitat; – minimise the impacts of the development on threatened fauna species; – minimise the impact of the development on fish habitat; – relocate Murray crayfish from the shallower parts of the approved disturbance area in Talbingo Reservoir prior to disturbing these areas – notify DPI-Fisheries of any fish kills; • include a trigger action and response plan for the Murray crayfish, which would be implemented if monitoring shows the development is adversely affecting the species;	Construction and operation	Contractor Snowy Hydro
		• include a program to restore and enhance the aquatic habitat of the approved disturbance area expect for the intake and their approach areas as soon as practicable following the completion of development in these areas; • include a program to monitor and report on the effectiveness of these measures.	• include a program to restore and enhance the aquatic habitat of the approved disturbance area except for the intakes and their approach areas as soon as practicable following the completion of development in these areas; • include a program to monitor and report on the effectiveness of these measures.		

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
	AE02	Bridges or culverts would be designed and constructed in accordance with NSW DPI fish passage requirements for waterway crossings (Fairfull & Witheridge 2003).	Bridges or culverts would be designed and constructed in accordance with NSW DPI fish passage requirements for waterway crossings (Fairfull & Witheridge 2003) where practicable.	Construction	Contractor
	AE03	Construction works within the channel of a permanent waterway with type 1 or 2 key fish habitat would allow some flow to maintain fish passage at all times and be staged to minimise the total disturbance at any given time.	No change	Construction	Contractor
Spread of weeds pest fish and pathogens	AE04	A Weed, Pest and Pathogen Management Plan will be prepared and implemented to minimise and manage the spread of weeds, pest fish and pathogens. The plan will: • be prepared in consultation with NPWS and DPI-Fisheries; • include a description of measures that would be implemented to: – minimise the spread of weeds and pest via vehicle and plant movements; – remove aquatic macrophytes appropriately where required to do so to enable construction activities; • include a program to monitor and report distribution of pest fish within the project area; • include a surveillance plan for EHNV in key locations within the project area.	No change	Construction and operation	Contractor Snowy Hydro
Underwater blasting impacts	AE05	Designated blast limits and other management measures to minimise impacts to aquatic ecology will be outlined in the Blast Management Plan.	No change	Detailed design and construction	Contractor

Table C.1 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Controls	AE06	Install the following: • fish barrier on Tantangara Creek designed to prevent upstream migration of Climbing galaxias; and • fine mesh screens to prevent transfer of key species through releases from the Tantangara Dam River Outlet Works and the Murrumbidgee – Eucumbene tunnel.	No change	Construction	Snowy Hydro

Table C.2 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Land					
Rehabilitation	REHAB01	A Rehabilitation Management Plan will be prepared for the new landforms at Tantangara Reservoir, Lobs Hole and Talbingo Reservoir. The plan will: • include a detailed plan for rehabilitation of the site; • include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the sites, and triggering any remedial action (if necessary); • describe the measures that would be implemented to: – comply with the rehabilitation objectives and associated performance and completion criteria; – progressively rehabilitate the site; – include a program to monitor and report the effectiveness of these measures.	No change	Construction	Contractor
Creation of new landforms	REHAB02	New landforms will: • be safe, stable and non-polluting; maximise surface drainage to the natural environment	No change	Construction	Contractor

Table C.2 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Assessment of surface disturbance and excavation areas	CONTAM01	Targeted investigations will be undertaken prior to construction along the surface disturbance areas using a risk-based approach. The results of these targeted investigations will determine the level of management to be implemented.	No change	Pre-construction	Contractor
Assessment of imported Virgin Excavated Natural Material (VENM)	CONTAM02	Prior to the importation of any VENM during construction, the VENM source(s) will be identified and assessed against the definition of VENM in the *Waste Classification Guidelines* (NSW EPA 2014) and POEO Act. The VENM source(s) will be assessed by an appropriately qualified contaminated land consultant.	No change	Construction	Contractor
Contaminated soil management during construction	CONTAM03	Protocols for the management of contaminated soil during construction will be included in the CEMP.	Protocols for the management of contaminated soil during construction will be included in the CEMP or EMS.	Construction	Contractor

Table C.2 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Excavated rock waste management and transport	CONTAM04	Material which has been assessed as not suitable for reuse on land or for subaqueous disposal or cannot be reused will be classified in accordance with the *Waste Classification Guidelines* (NSW EPA 2014). The excavated rock would be transported to an appropriate excavated rock disposal area. Approval would be obtained prior to transport and would require an estimate of the likely volume of excavated rock to be disposed.	Material which has been assessed as not suitable for reuse on land or for subaqueous disposal or cannot be reused will be classified in accordance with the *Waste Classification Guidelines* (NSW EPA 2014). Depending on the classification of the material, a licensed waste transport company will be used to transport material which is required to leave the project, to an appropriately licensed facility. Excavated material may be subject to treatment and application on site.	Construction	Contractor
Asbestos management	CONTAM05	An Asbestos Management Plan (AMP) will be developed for areas and items identified during pre-construction investigations as containing Asbestos Containing Materials ACM (ACM), areas suspected of containing ACM (such as historical buildings) and to address unexpected finds of ACM during construction. Specifically, protocols will be stipulated for separation, monitoring, validation and clearance of asbestos.	An Asbestos Management Plan (AMP) will be developed if areas and items are identified during pre-construction investigations as containing Asbestos Containing Materials ACM (ACM), or areas are suspected of containing ACM (such as historical buildings). The AMP will address unexpected finds of ACM. Specifically, protocols will be stipulated for separation, monitoring, validation and clearance of asbestos.	Construction	Contractor
Asbestos management	CONTAM06	An Occupational Hygienist (Hygienist) will be on-site for the duration of the excavation works where ACM has been identified from pre-construction or where unexpected finds of ACM are encountered.	No change	Construction	Contractor

Table C.2 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
PAF rock	CONTAM07	An Excavated Rock Management Plan would be developed which would include measures identified in the Preliminary Site Investigation – Contamination (Appendix N.1).	An Excavated Rock Management Plan would be developed which would include measures identified in the Preliminary Site Investigation – Contamination (Table 9.1, Item 4 of Appendix N.1).	Pre-construction	Contractor
Unexpected finds	CONTAM08	An unexpected finds procedure will be included in the CEMP. Workers will be trained to identify potential contamination that may be encountered during construction.	No change	Pre-construction and construction	Contractor
Alpine humus soils and peat bogs/fens	SOIL01	Mitigations will be included in the Rehabilitation Management Plan to minimise impacts to Alpine humus soils and peat bogs/fens.	No change	Construction	Contractor
Loss of soil resource	SOIL02	Preservation of the soil resource including quantity and quality to be managed through the implementation of soil management measures incorporated within the rehabilitation management plan which includes: • an inventory of soils to be stripped, including depths and volumes; • a topsoil stripping and stockpiling procedure; • subsoil management measures; and • a soil reinstatement methodology which includes a topsoil application procedure.	Development and implementation of soil management measures to assist in the preservation of the quantity and quality of the soil resource including: • an inventory of soils to be stripped, including depths and volumes; and • topsoil management measures including stripping and stockpiling procedure.	Construction	Contractor

Table C.2 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Soil erosion and sedimentation	SOIL03	Site-based Erosion and Sediment Control Plans (ESCPs) will be prepared by a Certified Professional in Erosion and Sediment Control (CPESC) for the construction works with controls addressing the sensitivity and the proximity of the receiving environment and attention will be given to areas where there is an increased risk of erosion, such as, dispersive soils and steep slopes and subalpine landscapes.	Site-based Erosion and Sediment Control Plans (ESCPs) will be prepared by a suitably qualified erosion and sediment control specialist.	Construction	Contractor
Soil capability	SOIL04	The Rehabilitation Management Plan (refer to REHAB01) will be implemented and will include measures to minimise: • loss of soil; • loss of organic matter and nutrient decline; • soil structural decline; and • compaction. The plan will include measures for subsoil management.	The Rehabilitation Management Plan (refer to REHAB01) will be implemented and will include measures to minimise: • loss of soil; • loss of organic matter and nutrient decline; • soil structural decline; and • compaction. Regular rehabilitation monitoring will be undertaken to identify any defects, such as slumping, erosion or poor vegetation establishment. Identified defects will be rectified.	Constructionand operation	Contractor Snowy Hydro
Geodiversity – Ravine block streams	GEO1	Design principles identified in the Cenozoic Geodiversity Report will be implemented to minimise impacts to the Ravine block streams during detailed design.	No change	Design and construction	Contractor Snowy Hydro

Table C.2 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Geodiversity – Ravine tufa	GEO2	Design principles identified in the Cenozoic Geodiversity Report will be implemented to minimise impacts to the Ravine tufa during detailed design.	No change	Design and construction	Contractor Snowy Hydro
Geodiversity – Lick Hole Formation fossil locality	GEO3	Final road design will consider incorporating interpretive signage and safe stopping space within the proposed road and disturbance footprint where practical.	No change	Construction	Contractor
Geodiversity – Kellys Plain Volcanics Type Locality	GEO4	During construction, ensure that the former Traces Knob quarry is not in-filled.	No change	Construction and operation	Contractor and Snowy Hydro
Geodiversity – Kellys Plain Volcanics agglomeratic porphyry	GEO5	Identify outcrops of agglomeratic porphyry prior to construction at Tantangara portal. Excavated rock placement should leave some of the best examples of the agglomeratic porphyry uncovered.	Identify outcrops of agglomeratic porphyry prior to construction at Tantangara portal. Excavated rock placement should leave some of the best examples of the agglomeratic porphyry uncovered where reasonable and feasible to do so.	Pre-construction, construction and operation	Contractor and Snowy Hydro
Geodiversity	GEO6	A management plan will be prepared that includes measures that minimise impacts to known geodiversity sites and potential undocumented geodiversity sites identified in accordance with the recommendation in the Cenozoic and Paleozoic Geodiversity reports.	No change	Construction	Contractor

Table C.2 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Geodiversity	GEO7	Consult with NPWS regarding opportunities to enhance the geotourism potential of impacted geodiversity sites through the development of the masterplan for recreational use.	No change	Operation	Snowy Hydro

Table C.3 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Aboriginal Cultural heritage					
Impact to known and unknown heritage sites and items	HER01	An Aboriginal Heritage Management Plan (AHMP) will be prepared and implemented to guide the process for management and mitigation of impacts to Aboriginal objects. The AHMP will: • be prepared in consultation with RAPs and DPIE; • describe survey units in which impacts are allowable; and • include procedures relating to the conduct of additional archaeological assessment, if required.	No change	Pre-construction and construction	Contractor Snowy Hydro

Table C.3 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Loss of Aboriginal cultural heritage	HER02	Specific management and mitigation measures are listed for each individual survey unit and Aboriginal object locale in Appendix P.1 and will be included in the AHMP. Management measures to be included in the AHMP are: • for survey units within the project disturbance footprint which are assessed to be of higher significance values, impact mitigation measures will be implemented. These would comprise salvage in the form of archaeological excavation and archaeological analysis prior to impacts; and • the AHMP is to include measures for the management of any Aboriginal objects that may be found during construction.	Specific management and mitigation measures are listed for each individual survey unit and Aboriginal object locale in Appendix P.1 and will be included in the AHMP or salvage strategy. Management measures to be included are: • for survey units within the project disturbance footprint which are assessed to be of higher significance values, impact mitigation measures will be implemented. These would comprise salvage in the form of archaeological excavation and archaeological analysis prior to impacts. Salvage will be undertaken prior to impacts occurring to the relevant item and will be documented in a separate report; and • the AHMP is to include measures for the management of any Aboriginal objects that may be found during construction. • Areas within the project disturbance footprint that warrant further field assessment will be managed under the AHMP or salvage strategy after project approval. These areas are documented in the heritage addendum report (Appendix N).	Pre-construction and construction	Contractor Snowy Hydro

Table C.3 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Historic Heritage					
Loss of historic heritage	HER03	Salvage and/or archival recording of potential and known heritage items to be conducted in respect of certain items that warrant that level of impact mitigation.	No change	Pre-construction and construction	Snowy Hydro

Table C.3 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
	HER04	Specific management and mitigation measures are listed for each individual heritage item in Appendix P.2 and will be included in a cultural heritage management plan (CHMP). A series of management recommendations will be presented. In some instances, no impact mitigation is required. For others a range of measures are recommended ranging the establishment of no-zones to ensure the protection of items, salvage of movable heritage to salvage excavation and archival recording. Appropriate avoidance measures will be taken for Washington Hotel (site R20) and Ravine Cemetery (R118). A minimum 20 m project construction avoidance buffer will be applied to the Washington Hotel (site R20) structure. No ground disturbance will occur within the cadastral boundary of Ravine Cemetery as shown on Figure 6.20 in the EIS. Some non-ground invasive vegetation clearance will be required at the western and northern boundaries of the cadastral boundary of Ravine Cemetery (refer to bush fire risk and hazard assessment, Appendix T).	Specific management and mitigation measures are listed for each individual heritage item in Appendix P.2 and will be included in a cultural heritage management plan (CHMP). A series of management recommendations will be presented. In some instances, no impact mitigation is required. For others a range of measures are recommended ranging the establishment of no-zones to ensure the protection of items, salvage of movable heritage to salvage excavation and archival recording. Salvage will be undertaken prior to impacts occurring and will be documented in a separate report. Appropriate avoidance measures will be taken for Washington Hotel (site R20) and Ravine Cemetery (R118). A minimum 20 m project construction avoidance buffer will be applied to the Washington Hotel (site R20) structure. No ground disturbance will occur within the cadastral boundary of Ravine Cemetery as shown on Figure 6.20 in the EIS. Some non-ground invasive vegetation clearance will be required at the western and northern boundaries of the cadastral boundary of Ravine Cemetery (refer to bush fire risk and hazard assessment, Appendix T).	Pre-construction, construction	Contractor

Table C.3 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
			Areas within the project disturbance footprint that warrant further field assessment will be managed under the HHMP or salvage strategy after project approval. These areas are documented in the heritage addendum report (Appendix N)		

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Transport					
Speed limit reductions	TRA01	At locations where minimum sight distances cannot be achieved, due to the existing road alignments, the posted speed limits adjacent to the intersections will be reduced to satisfy the sight distance requirements and maintain safe manoeuvring conditions for motorists. These intersections and the proposed speeds are: • Snowy Mountains Highway/ Tantangara Road – 60 km/hr • Snowy Mountains Highway/ Rock forest – 80 km/hr • Link Road / Lobs Hole Ravine Road – 60 km/hr • Link Road / Snowy Mountains Highway – 80 km/hr • Based on feedback from community consultation speed limit reductions are also being considered for Snowy Mountains Highway through the township of Adaminaby to 60 km/h. Any speed limit changes will be discussed with the relevant roads authority and documented in the construction traffic management plan as required.	No change	Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Intersection upgrades	TRA02	Based on the consideration of construction activities as well as intersection capacity assessment following intersections will be upgraded: • **Snowy Mountains Highway / Marica access -** establish **n**ew construction access (BAR / BAL); and • **Snowy Mountains Highway /Rock Forest access -** establish **n**ew construction access (BAR / BAL).	Based on the consideration of construction activities as well as intersection capacity assessment following intersections will be upgraded: • **Snowy Mountains Highway / Marica access -** establish **n**ew construction access (Basic Right-turn (BAR) / Basic Left-turn (BAL)); and • **Snowy Mountains Highway /Rock Forest access -** establish **n**ew construction access (Basic Right-turn (BAR) / Basic Left-turn (BAL)).	Construction	Contractor
OSOM vehicle movements	TRA03	The TMPs will be prepared, submitted and approved by the RMS under permit, prior to the commencement of any deliveries considered 'high risk' OSOM movements in accordance with RMS guidelines.	No change	Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Road maintenance	TRA04	Road maintenance will be managed through the following measures: • a Road Dilapidation Report will be prepared and approved prior to and following Snowy 2.0 Main Works; • routine defect identification and rectification of the internal road network will be managed as part of the project maintenance procedure; and • internal access roads will be designed in accordance with the relevant vehicle loading requirements.	Road maintenance will be managed through the following measures: • a Road Dilapidation Report will be prepared and approved prior to and following Snowy 2.0 Main Works; • routine defect identification and rectification of the internal road network will be managed during construction as part of the project maintenance procedure; and internal access roads will be designed in accordance with the relevant vehicle loading requirements.	Construction and operation	Contractor
Traffic control	TRA05	Road works associated with pavement widening, such as those associated with intersection upgrades, that require temporary occupation of traffic lanes or working adjacent to the road, a Traffic Control Plan (TCP) will be prepared identifying the traffic control measures.	No change	Construction	Contractor
Community consultation	TRA06	Affected communities, visitors and emergency services will be notified in advance of any disruptions to traffic and restriction of access to areas of KNP impacted by project activities.	No change	Pre-construction, construction, operations	Snowy Hydro/ Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Construction traffic management	TRA07	A Construction Traffic Management Plan will be prepared and will include guidelines, general requirements and procedures to be used when construction activities have a potential impact on existing traffic arrangements.	No change	Pre-construction	Contractor
Marine transport	NAV01	The following measures will be implemented to manage interactions between marine transport and public boating activities during construction: • public exclusion zones will be established around all in-reservoir construction areas; • an aquatic license will be obtained from RMS for all in-reservoir construction activities and exclusion zones; • all work vessels will be limited to 4 knots; • all vessels and barges will be fitted with Automatic Identification System and comply with all licensing requirements of Australian Maritime Safety Authority and Roads and Maritime Services including specific requirements for Alpine Waters; • any fixed obstruction such as marker buoys and moorings will comply with Roads and Maritime Services requirements and are adequately lit at night; and	The following measures will be implemented to manage interactions between marine transport and public boating activities during construction: • public exclusion zones will be established around all in-reservoir construction areas; • an aquatic licence will be obtained from RMS for in-reservoir construction activities and exclusion zones in accordance with Section 12 and 18 of the *Marine Safety Act 1998*; • all work vessels will be limited to 4 knots; • all vessels and barges will be fitted with Automatic Identification System and comply with all licensing requirements of Australian Maritime Safety Authority and Roads and Maritime Services including specific requirements for Alpine Waters;	Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
		• notification signs advising of the works and public closures at: – the intersection of Snowy Mountains Highway and Tantangara Road; – the intersection of Snowy Mountains Highway and Long Plain Road; and, – Tantangara Boat Ramp.	• any fixed obstruction such as marker buoys and moorings will comply with Roads and Maritime Services requirements and are adequately lit at night; and • notification signs advising of the works and public closures at: – the intersection of Snowy Mountains Highway and Tantangara Road; – the intersection of Snowy Mountains Highway and Long Plain Road; and Tantangara Boat Ramp.		
Amenity					
Visual and landscape impacts resulting from permanent placement of excavated material	LCV01	The placement of excavated material in Talbingo, Lobs Hole and Tantangara Reservoir will be rehabilitated as guided by the Rehabilitation Strategy and in consultation with NPWS.	No change	Detailed design	Contractor Snowy Hydro

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Visual and landscape impacts resulting from permanent infrastructure	LCV02	Detailed design is to consider: • materials and finishes that complement or where possible recede into the surrounding landscape; • the use of vegetation to screen project elements and re-vegetation of disturbed areas in line with the Rehabilitation Strategy; and • lighting to avoid spill that might affect sensitive areas or receivers.	No change	Detailed design	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Construction impacts	NV01	Prepare a construction noise and vibration management plan (CNVMP) that will address noise and vibration management and mitigation options (where required). The CNVMP will include as a minimum: • identification of nearby residences and sensitive land uses; • a description of approved hours of work and what work will be undertaken; • a description of what work practices will be applied to minimise construction noise, in particular how construction noise levels will be managed where predicted noise levels above the NMLs have been identified; • a description of what work practices will be applied to minimise vibration; • a description of the complaints handling process; and • a description of monitoring that is required.	No change	Construction	Contractor
Exceedance of day and night-time criteria at assessment location: R6	NV02	Affected landholders should be consulted prior to and during construction and should be notified of proposed mitigation measures that will be used to manage construction noise levels to below Interim Construction Noise Guideline (EPA 2009) NMLs where practicable.	No change	Pre-construction Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Vibration impacts in the vicinity of heritage items	NV03	If the safe working distances are encroached vibration monitoring will be carried out at nearby heritage items. If required, the monitoring system will be fitted with an auditory and visual alarm that triggers when vibration levels reach the nominated criteria. This would indicate if and when alternate work practices should be adopted (such as decrease vibratory intensity, alternate equipment selection, or other measure).	No change	Construction	Contractor
Blasting in the vicinity of sensitive receptors and heritage items	NV04	A Blasting Management Plan will be prepared including specific details to: • address the potential for wet drill and blast activities at Talbingo and Tantangara intakes to ensure potential impacts are managed; • allow for blast practices to be reviewed as needed when blasting occurs in the vicinity of significant heritage items; and allow for blast practices to be reviewed and adapted if complaints are received from residents due to night blasting.	A Blasting Management Plan will be prepared including specific details to: • address the potential for wet drill and blast activities at Talbingo and Tantangara intakes to ensure potential impacts are managed; • allow for blast practices to be reviewed as needed when blasting occurs in the vicinity of significant heritage items; and allow for blast practices to be reviewed and adapted if complaints are received.	Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Operational noise	NV05	The design of operational structures, plant and equipment is to consider: • All operational plant and equipment including ventilation, pumps, generators, transformers, variable speed drives or other plant associated with the surface structures of Snowy 2.0 shall be subject to detailed acoustic review prior to final specification. • Design shall be assessed against the requirements of the Noise Policy for Industry (EPA 2017) and consider the amenity criteria for passive recreation. • Building and equipment shall be designed to satisfy the Snowy Hydro design limits of L_{Aeq} 80dB(A) internal.	No change	Operation	Contractor Snowy Hydro
Hazards					
APZs	HAZ01	APZs are established for all Snowy 2.0 Main Works sites to achieve BAL 29.	No change	Construction and operation	Contractor Snowy Hydro
	HAZ02	Vegetation is managed within operational APZs in perpetuity.	No change	Construction and operation	Contractor Snowy Hydro
Construction Standards	HAZ03	All buildings proposed within each development site shall comply with BAL-29 construction standards of Australian Standard AS3959-2018 'Construction of buildings in bush fire-prone areas' or NASH Standard (1.7.14 updated) 'National Standard Steel Framed Construction in Bush fire Areas -2014' as appropriate.	No change	Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
On-site Refuge	HAZ04	All On-site Refuge buildings will be within the centre of each Snowy 2.0 Main Works Accommodation site, constructed to BAL-29 construction standard, be of appropriate capacity, signposted and mapped.	All On-site Refuge buildings will be within each Snowy 2.0 Main Works Accommodation site, constructed to BAL-29 construction standard, be of appropriate capacity, signposted and mapped.	Construction	Contractor
Access	HAZ05	Primary and secondary access is maintained, upgraded and/or constructed to comply where possible with performance criteria and/or acceptable solution requirements of PBP 2018 and NSWRFS Fire Trail Standards (NSWRFS 2019). Consultation with the NSW RFS will be undertaken where compliance is constrained.	No change	Construction	Contractor
Water supply	HAZ06	Water supply requirements for firefighting, including the provision of hydrants and hose reels, is designed, constructed in accordance with the relevant Standards and PBP 2018.	No change	Construction	Contractor
Electricity supply	HAZ07	Electricity supply and distribution is provided in accordance with the requirements of PBP 2018 and the relevant standards.	No change	Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Emergency management and response	HAZ08	A Bushfire Emergency Management Plan is prepared for the project area and includes responsibilities associated with and details of: • site specific hazards and risk at each Snowy 2.0 Main Works site; • procedures to maintain bushfire awareness; • bushfire mitigation measures; • fire preparedness actions; • fire response actions including responses to Emergency Alerts issued by emergency services; and bushfire recovery requirements.	No change	Pre-construction	Contractor
	HAZ09	Each main works accommodation camp shall have a full time, onsite Emergency Response Team (ERT), with an appropriate level of training and equipment to respond to potential bushfire and initial structural fire events.	No change	Construction	Contractor
Air					
Exceedances of air quality criteria for PM_{10} and $PM_{2.5}$	AQ01	Sealed treatment of roads 1 km each side of the Lobs Hole and Tantangara accommodation camps	Management of Air Quality in the vicinity of the Lobs Hole and Tantangara accommodation camps to ensure compliance with PM10 and PM2.5 criteria. Management measures will be developed as part of the Air Quality Management Plan prior to commencement of construction and may include: • Targeted watering of unpaved roads in the	Pre-construction and construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
			vicinity of the accommodation camps; • Installation of appropriate Air Quality monitoring equipment at both accommodation camps; • Development of concentration triggers to alert construction personnel when dust concentrations could result in an exceedance of criteria; • Development of management response measures to be implemented in the event of alarms		
Social					
General	SOC1	Refine and implement the Social Impact Management and Monitoring Plan (SIMMP) provided in the SIA (Appendix X.1).	No change	As specified by the SIMMP	Contractor Snowy Hydro

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
General	SOC2	As part of the CSMPs being prepared for Snowy 2.0 Main Works and to support implementation of the SIMMP, incorporate ongoing liaison activities with representatives from Snowy Valleys Council and Snowy Monaro Regional Council to assist monitoring and reporting of change in indicators relating to: • population change; • housing availability and affordability; • local employment and training rates; • incidences of traffic congestion; • recreation user visitation; • demand for health, education and welfare services; and • cumulative impacts of Snowy 2.0 Main Works.	No change	Bi-annual	Contractor SVC SMRC

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Recreational user impacts	REC01	A recreational plan is to be prepared for sites impacted by the project and should: • be prepared in consultation with NPWS • detail recreational offsets to be provided by the project such as: – permanent boat launch areas in Talbingo and Tantangara Reservoirs – Lobs Hole campground • describe measures to be implemented to minimise impacts during construction, including a process for advance communication to stakeholders and visitors when closures are expected	A recreational plan is to be prepared for recreation sites and their access impacted by the project and should: • be prepared in consultation with NPWS • detail recreational offsets to be provided by the project such as: – permanent boat launch areas in Talbingo and Tantangara Reservoirs – Lobs Hole campground • describe measures to be implemented to minimise impacts during construction, including a process for advance communication to stakeholders and visitors when closures are expected	Pre-construction	Snowy Hydro
Economics					
Positive local employment	ECON1	Provision of employment opportunities for local workers where they have the necessary skills and experience.	Employment opportunities will be provided to local workers where they have the necessary skills and experience.	Construction	Snowy Hydro and contractor
Positive local employment	ECON2	Providing and/or collaborating with local education facilities to provide, ongoing training and certification opportunities for local workers to ensure they have the necessary skills to work on the project.	The project will provide and/or collaborate with local education facilities to provide ongoing training and certification opportunities for local workers to ensure they have the necessary skills to work on the project.	Construction	Contractor

Table C.4 Mitigation measures

Impact/risk	ID#	Original measure(s)	Revised measure(s)	Timing	Responsibility
Positive business opportunities	ECON3	Collaborating with SMRC, SVC, economic development organisations, local chambers of commerce and State Government to: • inform local businesses of the goods and services required of the project, service provision opportunities and compliance requirements of business to secure contracts; • encourage and provide local businesses on how to meet the requirements of the project for supply contracts; and develop relevant networks to assist qualified local and regional businesses tender for provision of goods and services to support the project.	The project will collaborate with SMRC, SVC, economic development organisations, local chambers of commerce and State Government to: • inform local businesses of the goods and services that may be provided by the project, service provision opportunities and compliance requirements of business to secure contracts; • encourage and provide local businesses on how to meet the requirements of the project for supply contracts; and develop relevant networks to assist qualified local and regional businesses tender for provision of goods and services to support the project.	Construction	Contractor

APPENDIX D

EPA RESPONSE

Response to EPA submission on Snowy 2.0 Main Works

Prepared for Snowy Hydro
February 2020

EMM Sydney
Ground floor, 20 Chandos Street
St Leonards NSW 2065

T 02 9493 9500
E info@emmconsulting.com.au

www.emmconsulting.com.au

1 Detailed response to EPA submission

This appendix provides a detailed response to the submission received from the Environment Protection Authority (EPA) on the Snowy 2.0 Main Works Environmental Impact Statement (EIS). The matters raised by the EPA are categorised and responded to in Table 1.1 below.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
1. Talbingo Reservoir excavated rock placement	
A) Given the nature, extent and duration of the potential impacts it is recommended that the proponent provides clarity that no further reasonable and feasible options to minimize water quality impacts are available. These could include, but are not limited-to: • using a fall pipe for placement- this could potentially have a dual benefit of placing material in cooler water where aluminium dissolution rates are lower and trapping material below the thermocline • an additional silt curtain/s installed closer to the placement area and repositioned as placement progresses • measures to minimise resuspension of settled sediment during construction and operation.	Information on the revised approach to the management of excavated rock and minimisation of water quality impacts has been included in Section 3.2.2 and Section 4.4.1(ii) of the PIR-RTS.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
B) Provide details of the mitigations options that might be used in combination with the 'hybrid' excavated rock placement method i) Specify the area of the proposed excavated rock placement footprint, detailing how this was determined with reference to the bulked volume of excavated material proposed to be placed. ii) Provide details of the construction stage monitoring and management triggers and actions that would be implemented to manage the water quality impacts of the excavated rock placement in Talbingo Reservoir. Consistent with the recommendations of Appendix L, Annexure C, the monitoring program should include, at a minimum • continuous monitoring of general water quality parameters, including pH, electrical conductivity, temperature and turbidity • monitoring of dissolved aluminium concentrations iii) Following identification of additional management and mitigation measures, provide a revised impact assessment based on the final excavated materials management method, including assessment of potential water quality impacts on Talbingo Reservoir and downstream waterways	Information on the revised approach to the management of excavated rock and mitigation options has been included in Section 3.2.2 and Section 4.4.1(ii) of the PIR-RTS.
C) It is recommended that the proponent provides further information to demonstrate that the modelled assumptions reflect the actual conditions that will be encountered during excavated rock emplacement. This includes, but is not limited to, further information and sensitivity testing regarding the: • particle size distribution of the excavated material • placement rate • 'source term' • mitigation measures such as the design specifications and management of the silt curtains. The modelling and impact assessment should be revised where model assumptions are inconsistent with the proposal (e.g. excavated rock placement method; silt curtain design specifications and placement).	Information on the revised approach to the management of excavated rock and mitigation options has been included in Section 3.2.2 and Section 4.4.1(ii) of the PIR-RTS.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
2. Tantangara Reservoir excavated rock placement	
D) It is recommended that the applicant: • provides details of the proposed excavated rock placement methods and mitigation measures for Tantangara Reservoir • assesses the potential for release of sediment and other pollutants (e.g. aluminium) associated with wetting and drying of the Tantangara Reservoir rock emplacement as the level of the reservoir rises and falls. If a risk is identified, the potential impact on water quality should be assessed and any appropriate mitigation measures identified. This assessment should be supported by appropriate hydrodynamic modelling of plume behaviour under a range of scenarios	Information on the revised approach to the management of excavated rock and mitigation options has been included in Section 3.2.2 and Section 4.4.1(ii) of the PIR-RTS.
3. Characteristics of excavated rock/reservoir water mixtures	
E) Consistent with the recommendations of Appendix L, Annexure C, it is recommended that the following testing is conducted: • longer-term release of substances from fine (<2-6.3µm) excavated rock particles • effects of cycling water exposure to excavated rock materials (wetting/drying) • longer-term effects of water pH on attenuation of dissolved aluminium release, including potential cycling from dissolved and precipitated forms if pH cycles up and down. The results of the testing should be used to inform appropriate management of potential water pollution risks.	Information on the revised approach to the management of excavated rock and mitigation options has been included in Section 3.2.2 and Section 4.4.1(ii) of the PIR-RTS.
4. Settlement testing	
F) Clear justification for not adopting the potential measures identified to mitigate impacts associated with placement of excavated material in both Talbingo and Tantangara Reservoirs Laboratory Assessment-Settlement Characteristics of Fine Crushed Rock report should be provided	Information on the revised approach to the management of excavated rock and mitigation options has been included in Section 3.2.2 and Section 4.4.1(ii) of the PIR-RTS.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
5. Ecotoxicology of excavated rock/reservoir water mixtures	
G) Given the potential for ecotoxicity and the level of uncertainty in the predictions of impacts it is recommended that clear justification for not adopting further measures to mitigate and minimise water quality impacts is provided. Specific measures for each reservoir are discussed in the Talbingo and Tantangara sections above.	Information on the revised approach to the management of excavated rock and mitigation options has been included in Section 3.2.2 and Section 4.4.1(ii) of the PIR-RTS.
6. Process water, wastewater and groundwater discharges	
H) It is recommended that for each proposed discharge point the proponent provide details of treatment and other practical measures that will be implemented to avoid and minimise potential impacts. When all options to avoid and reduce discharge to receiving waters have been exhausted and options for improving discharge quality through additional treatment have been explored and exhausted, the applicant should demonstrate that the NSW WQOs will be met by the edge of the near-field mixing zone for any-discharges. The discharge impact assessment for each proposed discharge point must include, at a minimum: • a characterisation of the expected quality of the discharge in terms of the concentrations and loads of all pollutants present at non-trivial levels • predictions of water quality at the edge of the near-field mixing zone under a range of operational conditions, including typical and worst-case scenarios • an assessment of the potential impact of the proposed discharge on the environmental values of the receiving waterway with reference to the relevant Australian and New Zealand Guidelines for Fresh and Marine Water Quality guideline values. Combined discharges (e.g. mixed process water and wastewater discharged at one location) are a single discharge and should be characterised and assessed accordingly.	Further information on process water and wastewater minimisation and discharge, including a discharge impact assessment is included the revised Water Management Report (PIR-RTS Appendix J) and summarised in the PIR-RTS Section 4.4.1(iii and iv). In summary, all practical measures to avoid and minimise potential impacts from process water and wastewater have been and will continue to be investigated. A discharge impact assessment has been included in the revised Water Management Report (PIR-RTS Appendix J) that addresses EPA requirements.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
7. Process water emergency storage	
I) It is recommended that the proponent considers alternative emergency storage options to allow process water to be managed separately and appropriately. If emergency discharges to stormwater basins are proposed the applicant should demonstrate how this will not adversely impact on capacity to appropriately manage stormwater.	Further information on emergency storage options and contingency measures for process water is included in the PIR-RTS Section 4.4.1(iv) and the revised Water Management Report (PIR-RTS Appendix J). Snowy Hydro can confirm that process water emergency discharges to stormwater basins are not proposed and therefore will not impact on the capacity of stormwater basins or the ability to manage stormwater. Snowy Hydro can also confirm that after the process water treatment plants will also be designed to minimise the risk of failure and any potential issues will be managed through a combination of water minimisation and water transfer between treatment plants of available storages.
8. Process water re-use	
J) It is recommended that the proponent provide details of how process water re-used outside the process water system (e.g. dust suppression) will be managed to ensure it is of a suitable quality and does not pose a risk to waterways or soils. Details should include: • a characterisation of the quality of process water proposed for re-use outside the process water system • treatment and other practical measures that will be implemented • management of the proposed re-use to avoid potential impacts on waterways and soils	Further information process water reuse is included in the PIR-RTS Section 4.4.1(iv) and the revised Water Management Report (PIR-RTS Appendix J). In summary, Snowy Hydro can confirm that all process water will be treated, and no process water will bypass the treatment process. The expected water quality of treated process water is provided in the revised Water Management Report (PIR-RTS Appendix J) and the use of treated process water for dust suppression is considered appropriate, particularly when considering the improvement of water quality compared to stormwater runoff from existing disturbed areas. Snowy Hydro can confirm that no treatment by-products resulting from the treatment of process water will be disposed via dust suppression.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
9. Groundwater drawdown	
K) It is recommended that the applicant: • confirms that the tunnel will be fully lined and provides details of the circumstances in which will pre- and post-grouting will be implemented • models groundwater inflow and drawdown under the proposed scenario (i.e. with groundwater inflow mitigation measures) • assesses the potential water quality impacts of reduced flows due to groundwater drawdown (e.g. potential eutrophication of disconnected pools) • identifies management triggers and responses to manage groundwater inflows and drawdown.	Further information on the revised groundwater modelling, tunnel lining and pre and post grouting is included in the revised Modelling Report (PIR-RTS Appendix I) and a summary provided in the PIR-RTS Section 4.4.1(iii). Snowy Hydro can confirm that the power waterway will be fully lined and this has been represented in the revised modelling scenario. The impact assessment based on this revised modelling has been presented in the revised Modelling Report (PIR-RTS Appendix I) and summarised in Section 4.4.1(iii) of the PIR-RTS. The groundwater inflows and associated baseflow and streamflow impacts have reduced from the unlined and unmitigated tunnel scenario presented in the EIS. The process for grouting has also been detailed in the revised Modelling Report (PIR-RTS Appendix I).
10. Management of groundwater inflows	
L) Further information is requested from the proponent regarding the treatment and discharge of groundwater created during the construction and operation phases of the project.	Further information on the treatment and discharge of groundwater during both construction and operation is included in the PIR-RTS Section 4.4.1(iv) and in the revised Water Management Report (PIR-RTS Appendix J).
11. Baseline groundwater data	
M) Further sampling and monitoring event information be undertaken to establish a more representative baseline groundwater characteristic in the project vicinity.	Details on the adequacy of the monitoring networks and baseline groundwater data is included in the PIR-RTS Section 4.4.1(v). In summary, the frequency and duration of monitoring is considered sufficient to address seasonal fluxes in groundwater levels and quality, having captured monitoring data over two summer periods. In addition, the Stage 1 groundwater network consisted of 20 groundwater monitoring bores at 11 sites and was completed between January and April 2018 across the extent of the project and data has been continuously collected since that time. There is therefore over 2 years of baseline data for many of these sites. Monitoring is continuing.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
12. Dredging, channel excavation and underwater blasting	
N) It is recommended that the proponent provides further information on the management of the proposed dredging, channel excavation and underwater blasting to demonstrate that the water pollution risks will be appropriately managed. This should include: • the proposed locations and methods of dredging, channel excavation and underwater blasting • the specific measures that will be implemented to mitigate the water pollution risks of these activities (e.g. specifications and locations of silt curtains, monitoring and management responses) • details of the sediment quality assessment. The proponent should carry out an assessment of the potential impact of these proposed activities after mitigation measures have been implemented. This assessment should include predictions of the level and extent of water quality changes, the potential impact of these changes on the environmental values and uses of the reservoirs (with reference to the relevant guideline values) and potential sedimentation impacts.	Details on the proposed dredging, channel excavation and underwater blasting is included in the PIR-RTS Section 4.4.1(ii), including proposed locations and methods, mitigation measures and a sediment quality assessment.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
13. Construction stage stormwater management	
0) It is recommended that the proponent: • clarifies the methodology used to characterise the quality of construction stage stormwater discharges • provides justification for the sediment retention basin sizing with reference to Managing Urban Stormwater, Soils and Construction Volume 2 (DECC, 2008) and in the context of site constraints and enhanced erosion controls • where stormwater is expected to contain pollutants other than 'clean' sediment at non-trivial levels (e.g. metals), considers additional or alternative treatment measures to mitigate potential water pollution risks.	It is also noted that the EIS Water Characterisation Report (Annexure A to the EIS Water Assessment) provides detail on the methodology used to characterise the quality of construction stage discharges. Further information on construction stage stormwater management is included in the PIR-RTS Section 4.4.1(iv) and the revised Water Management Report (PIR-RTS Appendix J), including: • a refined water management approach that incorporates all practical measures that are considered feasible and reasonable to implement; • a commitment to an ongoing design refinement process to minimise potential disturbance (as demonstrated by significant reduction in disturbance footprint from EIS to PIR-RTS); • justification for sediment retention basin sizing; • a risk based approach, with controls to be tailored to prioritise locations with relatively higher sensitivity or risk of harm; and • continuation of proven water management strategies from Exploratory Works.
14. Resuspension associated with commissioning and operation stage transfers	
P) It is recommended that the proponent: • Confirms demonstrates that the inlet/outlet works will be designed to minimise scour and erosion issues in both pump and generation mode (including sediment mobilisation and Computational Fluid Dynamics studies) • provides details of mitigation measures to minimise sediment mobilisation, erosion and scour associated with operation stage transfers and assesses residual impacts after mitigation.	Details on the resuspension associated with commissioning and operation stage transfers is included in the Main Works EIS Appendix L, Annexure H Excavated Rock Placement – Reservoir Modelling – Commissioning Phase Operation report.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
15. Wastewater storages	
Q) It is recommended that the proponent clarifies that design specifications of wastewater storages including liners (i.e. liner type, permeability, thickness) and design storm sizing are sufficient to prevent seepage and minimise spills.	Details on the design of process and wastewater systems and associated storage is included in the PIR-RTS Section 4.4.1(iv) and in the revised Water Management Report (PIR-RTS Appendix J). In summary, Snowy Hydro can confirm that all wastewater and chemical storages will be designed and constructed to prevent leaks and seepages, including the installation of liners or other appropriate measures as required.
16. Water quality assessment	
R) It is recommended that the proponent: • potential impacts on the environmental values of waterways downstream of Tantangara and Talbingo reservoirs • the potential cumulative water quality impacts associated with all construction activities.	Further information on the potential cumulative water quality and downstream impacts is included in the PIR-RTS Section 4.4.1(ii).
17. Surface water monitoring	
S) It is recommended that the proponent: • provides details of the proposed surface water monitoring program, including sampling sites, timing and frequency and parameters • identifies management triggers and responses to manage potential water quality impacts	Further details on the objectives and commitments of the surface water monitoring proposal are included in the PIR-RTS Section 4.4.1(v). In summary, a surface water monitoring program will be implemented over the duration of the Main Works, extending on the current program that has been implemented for Exploratory Works as well as ongoing baseline monitoring. Consistent with the approach adopted for Exploratory Works, it is proposed that monitoring program is developed post-approval, during preparation of management plans and in consultation with key stakeholders.
18. Temporary waste rock stockpiles	
T) The proponent provide further information on Leachate formed from the temporary waste rock stockpiles.	Further information regarding the potential for contamination to water due to management of excavated rock stockpiles is provided in Section 3.2.2(iv) and 4.4.4(i) of the PIR-RTS.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
19. Blasting activities	
U) The proponent should also assess in the NVIA ground vibration effects from proposed blasting to establish whether they will meet relevant human perception thresholds at surrounding sensitive locations, to justify proposed 24/7 blasting activities.	Potential vibration impacts of the construction of Snowy 2.0 were assessed in the Noise and Vibration Impact Assessment (NVIA), at Appendix R in the Main Works EIS. The assessment assumed that construction blasting activities would occur on a 24 hour per day, 7 day per week basis. Unrestricted times and frequency of blasting were justified in part by the remoteness of the construction sites (where the blasting would occur) with respect to potential noise sensitive sites (see Section 4.5.3 and Section 5.2.2 of the NVIA). This is in accordance with the provisions of ANZEC (1990) that otherwise recommends restricting blasting activities to 9am to 5pm Monday to Saturday and to generally one blast per day. Notwithstanding this the EPA has requested an assessment of ground vibration effects from proposed blasting to establish whether they meet relevant human perception thresholds at surrounding sensitive locations. This matter was discussed in Section 4.4.1 of the NVIA where it was noted that humans can detect vibration levels which are well below those causing any risk of damage to a building or its contents and where it was noted that an individual's response to that perception depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. This human tactile perception of random motion, as distinct from human comfort or structural considerations, has been addressed in German Standard DIN 4150 Part 2 1975 where the threshold of perception of motion (vibration) is given as 0.15mm/s and that motion becomes "noticeable" at a level of approximately 1 mm/s (see NVIA Table 4.8). The NVIA confirmed a representative MIC of 40kg for intake, portal and early tunnel excavation. Considering an MIC of up to 40 kg and a K factor of 1140 (for average rock) the human perception limit of 0.15mm/s would be satisfied at a distance of 1,700 metres, whilst for an 80 kg MIC would satisfy the limit for human perception at a distance of 2,400m.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
	Blasting is required for the construction of the intakes (required at Talbingo and Tantangara reservoirs) and portal and early tunnel excavations, applications that are less suited to the use of tunnel boring machines (see NVIA Section 5.2.2). There are no residences or communities close to these construction locations. The nearest residences to these locations are at Talbingo, located north of the Tumut 3 Power Station at the northern end of Talbingo Reservoir. The distances between the residences at Talbingo and the locations at which blasting is proposed (at the southern end of Talbingo Reservoir and at Tantangara) are well outside the separation thresholds stated above. As no residential assessment locations are located within these distances from envisaged blasting activities, the limit for human perception is satisfied and would not restrict potential for 24/7 blasting if required.
20. Exceedance of construction noise at Rock Forest logistics	
V) As outlined in Section 6.1.1 of the NVIA, the EPA recommends that the proponent implements all feasible and reasonable noise mitigation and management measures, including those outlined in Section 6.1.1 and Table 7.1 of the NVIA.	Section 6.1 of the Noise and Vibration Impact Assessment (NVIA) at Appendix R in the Main Works EIS sets out predicted noise levels for most construction activities and notes that most construction activities, including spoil haulage, will occur 24/7. Therefore, predicted noise levels given in Table 6.1 are the same for standard and out-of-hours periods and for both calm and noise-enhancing weather conditions. As stated in the NVIA, construction noise levels from the project are predicted to satisfy the noise management levels (NMLs) as given in the Interim Construction Noise Guidelines (ICNG) at all assessment locations (with the exception of one property being R6 6560 Snowy Mountains Highway, Adaminaby). The NVIA recommends the implementation of the noise and vibration measures as set out at Table 7.1 as a means of reducing construction noise levels, as far as practicable, to NMLs. As for the property referred to above, on the Snowy Mountains Highway at Adaminaby, where an exceedance of 6 dB above the sleep-disturbance screening criteria for night-time construction has been modelled. This is due to its proximity to the proposed Rock Forest logistics site.

Table 1.1 Matters raised in EPA submission

Matters raised	Response
	The NVIA recommended that the proponent notify the owner/occupier of R6 6560 of the proposed Rock Forest construction works and potential noise impacts and discuss options for mitigating impacts. Noise monitoring during the initial stages of construction will be undertaken to determine if actual construction noise levels are above NMLs. If this initial testing identifies exceedances, the NVIA recommends that the proponent: • identify feasible and reasonable mitigation measures that reduce construction noise levels as far as practicable to NMLs; • restrict use of the Rock Forest site to ICNG standard hours only where feasible; • consider Section 7.2.2 of the ICNG and option of a negotiated agreement with the property owner/s identified to be impacted that may include: • at receiver mitigation; • relocation; • compensation. The above will be determined depending on the measured level of exceedance and the availability of feasible and reasonable noise mitigation and management measures. This is discussed further in Section 7 of the NVIA.
21. Road traffic noise calculations	
W) The proponent should review this data and amend if necessary, otherwise provide an explanation for the results shown in the Table 6.6 of the NVIA.	The road traffic noise calculations shown in Table 6.6 of the NVIA indicate an Increase in daytime noise level due to the project of 49.6 dB at location ID 8, however it appears that the noise level from existing movements is 30.6 dBA and the noise level from existing plus project movements is 53.4 dBA at this location, a difference of 22.8 dB. Although this is a significant increase over existing road traffic noise levels, it is less than the applicable Road Noise Policy criteria. Table 6.6 was reviewed for transcription errors, with the review of calculations confirming existing LAeq,15hr 30.6dBA and existing + development LAeq,15hr 53.4dBA, resulting in 22.8 dB increase, but less than applicable RNP baseline criteria.

APPENDIX E

EES RESPONSE

Response to EES submission on Snowy 2.0 Main Works

Prepared for Snowy Hydro
February 2020

EMM Sydney
Ground floor, 20 Chandos Street
St Leonards NSW 2065

T 02 9493 9500
E info@emmconsulting.com.au

www.emmconsulting.com.au

Response to EES submission

This appendix provides a detailed response to the form letter submission received from the Environment, Energy and Science Group (EES) on the Snowy 2.0 Main Works Environmental Impact Statement (EIS). The matters raised by the NPA are categorised and responded to in Table 1 below.

1.1 General requirements

Issues raised	Response
Issue: 1. SEARs require a full description of the project. The MW EIS Section 2.2.2 states" *that a detailed design process is now underway*". **Recommended action/conditions of approval:** 1. a) clarification be provided for all construction and operational features, through detailed descriptions, visual representations and figures. b) clarification be provided on the total area of new landforms by zone, including details of those areas that will not be able to be rehabilitated (e.g. areas with high slope angle such as Talbingo portal area and road batters), thus leaving a permanent impact. c) clarification be provided on disturbance areas shown in MW EIS Figure 2.9 on Nungar Creek Trail. These appear to show the installation of utilities deviating from the current track alignment. d) CoA requires all utility installation to occur along current road and track alignments. e) clarification be provided on the extent and methodology of upgrading Tantangara Creek Trail across Nungar Creek (refer MW EIS Figure 2.9). f) CoA requires the Essential Energy powerlines from Providence Portal to Tantangara Dam to be removed and the easement rehabilitated once a permanent underground power source is constructed from Lobs Hole to Tantangara.	1. a) The project description provided in the EIS included a table that identified each of the elements proposed to be constructed and operated as part of the project. A series of maps/figures were provided to support these descriptions. Visualisations were prepared for permanent infrastructure assessed to be publicly visible during operation based on the proposed access arrangements during operation. Chapter 3 of the Main Works response to submissions (RTS) provides details of any changes to the proposed construction and operational features of the Main Works. b) Information regarding the revised approach to management of excavated rock is provided in Section 3.2 of the RTS. c) and d) The installation of utilities near Nungar Creek Trail deviate from the current track at times where the existing track is considered to provide unsuitable conditions. A revised disturbance footprint has been determined following further design refinement by the project team and is provided with the RTS. e) The extent of potential disturbance in this area is provided in the revised disturbance area and construction envelope provided in Section 3.2 of the RTS. The methodology for upgrading this road section will be determined through the detailed design phase. f) Further information regarding the proposed rehabilitation strategy is provided in Section 4.2.5 and Appendix M of the RTS. Specific matters regarding rehabilitation will be discussed with NPWS through the consultation completed as part of the rehabilitation strategy.

Issues raised	Response
Issues: 2. MW EIS Section 2.2.3 identifies "fish control structures in proximity to Tantangara Dam". 3. MW EIS Figure 2.3 identifies that there will be permanent utilities in KNP. 4. MW EIS Section 2.2.3 indicates further geotechnical investigations are to be undertaken. **Recommended action/conditions of approval** (numbers directly link to Issues identified above – this is consistent throughout the table)**:** 2. a) CoA requires ongoing monitoring program and TARP for Stocky Galaxias and Climbing Galaxias. b) CoA requires ongoing responsibility and maintenance of the fish control structures to be assigned to the proponent. 3. a) clarification be provided on detail in Appendix N.2 Soils and Land Assessment Section 6.6 p.103, which indicates permanent communications cable routes between "Tantangara Intake to Lake Eucumbene and Lake Eucumbene to Cabramurra via Three Mile Dam". There are no descriptions of these new permanent utilities or the proposed routes. b) CoA requires under-stream boring be used for installation of utilities for all stream order classifications, and that no current NPWS road infrastructure (e.g. culvert) is removed and replaced to install utilities. 4. clarification be provided on the extent of new geotechnical drilling investigations identified within the MW EIS, in comparison to the investigations already completed. Response to include details of any impacts required to previously rehabilitated trails and drill pads used during Feasibility Study.	2. a) and b) This matter is addressed in Section 4.4.3 of the RTS. 3. a) As detailed in Table 2.2 of the Main Works EIS the proposed Main Works will include the establishment of utilities infrastructure. The locations for the proposed utilities are provided in Figure 2.3 of the Main Works EIS. No other utilities infrastructure are proposed other than those detailed in Chapter 2 of the Main Works EIS. b) As described in the Main Works EIS, construction methods for utilities will comprise a combination of overhead, trenching and underboring, depending on the identified constraints (such as geology and watercourse crossings) or where there are opportunities to minimise disturbance of new areas. The methodology for utilities installation will be determined on a site by site basis through the detailed design phase. 4. The proposed geotechnical drilling as part of the Main Works will be undertaken entirely within the Main Works disturbance footprint provided in this RTS. All geotechnical drilling works have therefore been assessed as part of the revised technical assessments provided as part of this RTS. As previously mentioned all works previously approved for Exploratory Works, including geotechnical drilling works, will be continued throughout Main Works.

1.2 Biodiversity

Issues raised	Response
1. The BDAR Appendix M has been reviewed against the SEARs for biodiversity. DPIE ESS acknowledge that EMM have undertaken a significant amount of biodiversity survey across the project area in consultation with agency staff. This work has resulted in significant additions to our knowledge of biodiversity values in the northern section of KNP. DPIE also acknowledge that this has influenced Snowy Hydro's design of certain project elements to avoid impacts to areas of high biodiversity value. Overall the BDAR by EMM provides a high-quality assessment of biodiversity values given the scope and demands of such a large- scale project, and project area. However, the following are considered key biodiversity issues that require further consideration to support the NSW BC Act requirements and avoid significant impacts to high risk biodiversity values in KNP. These issues were discussed at a site meeting on 17-18 October 2019 between representatives of NPWS, B&C, Snowy Hydro and EMM: a) Significant Impact to Smoky Mouse (Critically endangered EPBC Act, Endangered BC Act): EMM have determined that the proposed impacts to >174ha of Smoky Mouse habitat will exceed the EPBC significant impact criteria for Smoky Mouse. EMM's assessment against the BC Act Serious and Irreversible Impact (SAII) assessment criteria also supports this conclusion. EES are of the understanding that direct impacts as assessed in the current BDAR are likely to reduce subject to review of a final detailed design (which may reduce the proposed disturbance areas). b) Review of final direct impact footprint may affect the impact assessment (Stage 2 BAM) and alter credit obligation: The BDAR assessment is not based on a final detailed design. It is acknowledged that the BDAR has compensated for this by assuming direct impacts to a full potential disturbance footprint, and that the final footprint is intended to have less direct impact on biodiversity values. c) Predicting uncertain impacts to highly sensitive groundwater dependent ecosystems and potential for further offsetting: As required by the BAM, EMM have identified a high but uncertain risk of indirect impacts to biodiversity values within groundwater dependant ecosystems including Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregion EEC. In a potential worst-case scenario of groundwater drawdown, a total area of 28ha of groundwater dependant ecosystems, including approximately 17.5ha of Alpine Bogs and Fens, would be impacted. These impacts are well identified in the BDAR but, as the BAM allows, do not contribute to the current credit obligation. Snowy Hydro propose to minimise impacts to a large degree by pre-grouting the concrete tunnel in line with groundwater modelling guidelines and	1. Specific and detailed comments made by EES on the BDAR have been considered and a revised BDAR has been prepared with the RTS (see Appendix G of RTS). The revised BDAR includes: • assessment of habitat suitability for threatened species as required by the NSW BAM Section 6.4, including revision of any candidate species, excluded from the current assessment without detailed justification against BAM requirements; • undertaking additional plots in vegetation zones to meet the minimum BAM requirement; • plot proximity to impact area; • additional flora and fauna surveys in impact area to cover acknowledged gaps in survey data; • results from the additional surveys and any additional BAM assessment requirements that might apply, including re-consideration of avoid and minimise, and any adjustments to species credit species polygons, credit calculations and SAII considerations; • revised mapping that identifies the location and extent of TEC's and any other threatened species detected as a result of the additional surveys, including EEC Montane peatlands (BC Act), Alpine Bogs and Fens (EPBC Act) and, if determined to be present, CEEC Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion in the Rock Forest area (SAII); and • further documentation on the justification why PCT 1225 has been excluded from the Bogs and Fens EPBC EEC listing in terms of potential impacts. 2. Further information regarding the proposed recreational offsets is provided in Section 4.4.8 of the RTS. 3. The disturbance area for Snowy 2.0 Main Works has been revised and provided with the RTS. Details of the disturbance area refinement are provided in Section 3.2 of the RTS. 4. and 5 As outlined in the mitigation measure ECO3 a GDE monitoring program will be implemented to ensure actual impacts are within prediction. If actual impacts are greater than predicted, adaptive management will be implemented.

Issues raised	Response
to mitigate residual risks by implementation of a monitoring program designed to ensure that post approval, actual impacts are within or less than predicted. Nothwithstanding this, DPIE are concerned about the currently identified high level of risk and uncertainty regarding the residual level of impact. Without review of an adaptive management strategy to identify, measure and potentially offset this risk in accordance with BAM Section 9.4.2 and DPIE Upland Swamp Policy, any change to species composition as a result of drawdown impact could be considered as a total loss of the community. d) Gaps in mapping, survey and assessment data and revised credit obligation for Alpine She-oak Skink: Review of the BAM calculations in BOAMs and EMM spatial data shows some gaps in the survey data. EMM have acknowledged some of these gaps in the BDAR. e) Other improvements required for the BDAR: items that will need to be addressed upon finalisation of direct impact footprint and revision of calculator. Specific comments on the BDAR against BAM requirements and related sections in the EIS are included in Attachment B: Detailed BDAR review against BAM requirements. 2. Appendix M.3 outlines Recreational Offset Strategies 3. MW EIS Section 2.3.1 identifies "hazardous tree assessment of trees that are outside the disturbance boundary but within close proximity, and removal of any trees deemed to be hazardous or at- risk to ensure the safety of workers." 4. BDAR Baseline Stygofauna Study p. 3 recommendations 5. MW EIS p.6-52 identifies that in relation to 17.51 ha of TEC (Alpine Sphagnum Bogs and Fens) "the scale and extent of these impacts are unknown and will be subject to ongoing monitoring." 6. MW EIS Table 6.6 and Appendix G Table G.1 addresses biodiversity mitigation measures 7. MW EIS Table 6.10 identifies impacts on aquatic habitat due to "The crossing site at Talbingo Reservoir". MW EIS Table 6.12 and Appendix M.2 Aquatic Ecology, identify Aquatic Ecology mitigation measures which require clarification	A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS. 6. Further details on the development of these mitigation measures are provided in the revised BDAR in Appendix G of the RTS. A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS. 7. The crossing site referred to occurs on the Talbingo excavated rock emplacement access road and can be seen on Figure 2.6 of the Main Works EIS. A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS.

Issues raised	Response
Recommended action/conditions of approval: 1. a) a revised project design that demonstrates a reduced impact to Smoky Mouse habitat would need to be provided prior to any commencement of works in Smoky Mouse habitat. A revised BDAR needs to provide a revised assessment of direct, indirect, prescribed and uncertain impacts on the species in accordance with BAM and EPBC assessment criteria b) once the final design is determined, DPIE is of the understanding that Snowy Hydro will seek to alter the credit obligation. Further consideration of direct, indirect, prescribed impacts and uncertain impacts will be required upon submission of final design and should inform a revised BDAR. c) for the bogs and fens EEC - the BDAR needs to detail an adaptive management strategy to measure and respond to these impacts, and to secure and deliver potential offsets in line with BAM S9.4.2 and DPIE upland swamp policy. The policy requires that offset liability is based on the maximum predicted groundwater drawdown. d) revised consideration of credit obligation for the Alpine She-oak Skink. The credit calculations should include all areas mapped as species polygons within PCT 1225 vegetation zones, as reflected by the spatial data provided and as required by BAM Section 11.2.4.2. This is supported by DPIE given the proximity of records to this PCT, and known records in this type of habitat in Nungar Plain and other locations in KNP (pers observations – M Schroder) e) a revised BDAR needs to include: • assessment of habitat suitability for threatened species as required by the NSW BAM Section 6.4, including revision of any candidate species, excluded from the current assessment without detailed justification against BAM requirements • undertaking additional plots in vegetation zones to meet the minimum BAM requirement • plot proximity to impact area • additional flora and fauna surveys in impact area to cover acknowledged gaps in survey data • results from the additional surveys and any additional BAM assessment requirements that might apply, including re-consideration of avoid and minimise, and any adjustments to species credit species polygons, credit calculations and SAII considerations	

Issues raised	Response
• revised mapping must identify location and extent of TEC's and any other threatened species detected as a result of the additional surveys, including EEC Montane peatlands (BC Act), Alpine Bogs and Fens (EPBC Act) and, if determined to be present, CEEC Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion in the Rock Forest area (SAII) • further documentation on the justification why PCT 1225 has been excluded from the Bogs and Fens EPBC EEC listing in terms of potential impacts	
2. provide clarification (after consultation with NPWS) of a comprehensive Recreational Offset Strategy addressing impacts, mitigation measures and offsets to recreational use and facilities during construction and operation of the project.	
3. the CoA requires that the disturbance area includes all foreseen impacts, which are assessed in the BDAR.	
4. the CoA requires that the extent of the commitment to groundwater dependent ecosystems (GDE) and stygofauna outlined in the baseline study in the MW EIS (p. 26) and mitigation measure ECO3, "developing a more detailed understanding of the connectivity of alpine bogs/fens and fractured rock aquifers to determine the likely risks to alpine bogs and fens and stygofauna as a result of impacts to aquifers associated with the Snowy 2.0 Project" be described. This commitment should be across the construction phase and into operation and include mitigation measures.	
5. the CoA requires ongoing monitoring of Alpine Sphagnum Bogs and Fens and other PCT's that may be impacted by groundwater drawdown during construction and operation. If unavoidable impacts occur to biodiversity values, then an offset is provided at the time the impact is recognised.	
6. a) clarification be provided on the extent of fencing identified in EC01 and EC04 and the assessment of impacts on other species and NPWS operations such as wildfire management. b) the CoA extend mitigation measures EC02/ECO6 (weed/pest control programs) to include all the disturbance footprint (not only the road verges) beyond construction to operations. c) the CoA requires the retention of logs and tree limbs for rehabilitation outlined in EC04. NPWS has raised this issue during Exploratory Works and it has been indicated that due to limited space, there are restrictions on the ability to store these materials for use in rehabilitation.	

Issues raised	Response
d) the CoA requires that the project use the rock material proposed to be excavated from the block stream during rehabilitation. e) the CoA restricts the collection of native seeds and alpine sod for propagation EC04, from within the identified disturbance footprint. 7. clarification be provided as to the nature of the "crossing site at Talbingo Reservoir" as this infrastructure is not described or shown in any mapping. due to uncertainty relating to biosecurity risks, the CoA requires measures AE01, AE04, to be expanded to include the operation phase of the project for all identified pest and translocated native species and include appropriate TARP.	

1.3 Heritage

Issues raised	Response
Issues: 1. MW EIS Table 6.22 (Plateau) identifies that not all the disturbance footprint has been surveyed. 2. MW EIS Table 6.23 HER03 identifies heritage mitigation measures 3. commitments outlined in correspondence from SHL to NPWS on the 15 June 2018 (DOC18/483690-3) relating to 'terms of agreement for provision of compensation for predicted impacts on Kosciuszko National Park from the Snowy 2.0 Exploratory Works' **Recommended action/conditions of approval:** 1. that the RTS provide assessment of heritage values for all disturbance areas. 2. that the CoA prohibits intended vegetation clearing within the boundary of the Ravine cemetery identified in HERO4. Vegetation clearing within the boundaries of the cemetery does not meet the conclusions and recommendations of Appendix P.2 Heritage Assessment p.607 which states, "*The boundaries of the Cemetery should be identified on the ground and the area should be marked as a no go zone so as to ensure that no inadvertent impacts occur in that area*." 3. that the CoA requires uncovered moveable heritage items from both Exploratory Works and Main Works to be safely stored and incorporated into a display at the recreation area at Lobs Hole Ravine post construction of Snowy 2.0, with the aim to interpret and protect agricultural and mining artefacts. This action to be completed by the proponents cost and undertaking. A consultant should be engaged to develop and produce an interpretative heritage plan of the Lobs Hole Ravine area for incorporation into the display and that this be duplicated in the Tantangara area of the project.	In response to recommendation 1), in November 2019 during the RTS phase, NSW Archaeology completed additional archaeological survey and assessment of potential Snowy 2.0 Main Works impact areas that were committed to in the Snowy 2.0 Main Works Aboriginal Cultural Heritage Assessment Report (ACHAR). This comprised archaeological Survey Unit (SU) CCSU20 (at Rock Forest) and NCTSU37 (at proposed Fish Weir at Nungar Creek Trail) (NSW Archaeology 2019b). In response to recommendation 2), Snowy Hydro would like to clarify that the "no-go zone" to ensure no inadvertent impacts intended for Ravine Cemetery relates to activities involving ground disturbance as these would be the only activities to present risk impacting heritage items related to the cemetery (eg graves). Table 129 in the Historical Heritage Assessment and Statement of Heritage Impact (HHA&SoHI) document details this matter and specifies that no ground disturbance within the cadastral boundary of Ravine Cemetery will occur but non-invasive vegetation removal will be required for bushfire hazard reduction measures (NSW Archaeology 2019b). In response to recommendation 3), Snowy Hydro supports this recommendation for uncovered moveable heritage items from both Exploratory Works and Main Works. Further details on the recreational offsets developed for the Main Works are provided in Section 4.4.8 of the RTS.

1.4 Water

Issues raised	Response
Issues: 1. the SEARs require an assessment of the impacts on "key water features on site, including potential impacts on riparian land and the Tantangara and Talbingo Reservoir; and a description of the likely changes to the hydrological regime of the existing water storages of the Snowy Hydro Scheme up to the authorised full supply level and any associated biodiversity impacts". 2. the EIS p.6-52 identifies that in relation to 17.51 ha of TEC (Alpine Sphagnum Bogs and Fens) "the scale and extent of these impacts are unknown and will be subject to ongoing monitoring." This unknown scale and extent of impact may also impact an unnamed tributary of Gooandra Creek which is the only water source adjacent to Bullocks Hill campground in KNP. 3. the EIS Table 6.2 and Appendix G Table G.1 identify mitigation measures for water impacts. **Recommended action/conditions of approval:** 1. a) an assessment be made of the impacts and risks to riparian land along the Tantangara and Talbingo Reservoirs due to the changes in hydrological regime up to full supply level. b) the CoA requires mitigation measures to address increased wave erosion on reservoir edges and emplacement areas - to avoid or minimise associated water, land and biodiversity impacts. NPWS, B&C and DPI to be consulted in development of mitigation measures. 2. the CoA requires the Water Management Plan WM01 and Water Monitoring Program WM02 to identify ongoing monitoring of the unnamed tributary adjacent to Bullocks Hill camp ground and provide for mitigation or offset if groundwater drawdown impacts on the quality and or quantity of this recreational water source. 3. a) the Water Management Plan is prepared in consultation with NPWS, as well as the other identified agencies. b) the CoA requires the Water Monitoring Program WM02 be conducted during both construction and operational phases and include proposed mitigation and management measures for any developing or unforeseen impacts to surface water, groundwater and reservoirs.	1. A and B Addressed in Section 4.2.4 of the RTS. 2. As outlined in the mitigation measure WM02 a water monitoring program will be developed as part of the water management plan to monitor quality and quantity impacts to surface water, groundwater and reservoirs. A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS. 3. This comment is noted. As stated in the mitigation measure WM02 a water monitoring program would be implemented for both construction and operation. A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS.

1.5 Land

Issues raised	Response
1. the EIS proposes permanent on land and reservoir emplacement of spoil within KNP. 2. the EIS proposes the use of Tunnel Boring Machines for tunnelling. 3. the EIS Figure 2.5 indicates that final rehabilitation will be completed in 6 months. 4. the EIS and Appendix F Rehabilitation Strategy, indicates rehabilitated land will be returned to NPWS. 5. the EIS indicates retaining utilities for operations. 6. the EIS p. 6-79 identifies that Lobs Hole Ravine Road will have an indicative disturbance footprint of up to 80 m wide. 7. the EIS Table 6.14 and Appendix G Table G.1 identifies mitigation measures for land impacts. Recommended action/conditions of approval: 1. a) the CoA requires that the design, rehabilitation, long-term use, monitoring and maintenance liability of all disturbed areas in KNP is completed to the satisfaction of NPWS. b) if spoil emplacement in KNP is approved, that the CoA requires that as much uncontaminated suitable tunnel spoil as possible be reused by either the proponent or NPWS, both at the proponent's expense (crushed, screened, hauled, stockpiled and applied through gravel patching and re-sheeting) for upgrading of roads and trails within KNP to the satisfaction of NPWS. 2. that the CoA requires the Tunnel Boring Machines to be decommissioned and removed from KNP post construction. 3. clarification is provided on the level of rehabilitation expected to be completed within 6 months of completing construction program. 4. a) the CoA requires REHAB01 Appendix G, relating to the Rehabilitation Management Plan, to include all disturbance areas not only "A Rehabilitation Management Plan will be prepared for the new landforms at Tantangara Reservoir, Lobs Hole and Talbingo Reservoir" and that the plan be prepared to the satisfaction of NPWS. b) the CoA requires monitoring, maintenance and management (e.g. rehabilitation, stability, contamination) of all impacted areas to be the responsibility of the proponent and carried out to the satisfaction of NPWS.	1. Details of the revised excavated rock management strategy are provided in Section 3.2 of the RTS. 2. As discussed in the Main Works EIS, Snowy Hydro will liaise closely with NPWS to determine the extent of decommissioning of temporary construction facilities and rehabilitation activities to be carried out during and following the construction of Snowy 2.0 Main Works. Specific matters regarding decommissioning will be discussed with NPWS through the consultation completed as part of the rehabilitation strategy. 3. Responses to matters raised regarding rehabilitation are provided in Section 4.2.5 of the RTS. 4. Responses to matters raised regarding rehabilitation are provided in Section 4.2.5 of the RTS. 5. Details of the proposed utilities are provided in Section 4.2.1 of the RTS. 6. and 7 Responses to matters raised regarding geodiversity are provided in Section 4.4.4 of the RTS.

Issues raised	Response
c) the CoA outlines clear bench marks/measures of success/completion criteria to the satisfaction of EES for rehabilitation (e.g. recognisable and demonstratable self- sufficient PCTs) with provisions for monitoring and TARP by SHL for disturbance areas during operation. d) clarification is provided through final landform design drawings and cross sections for all disturbed area (e.g. Talbingo construction portal appears to be retained with significant cut and batters and not returned to a state "commensurate with the surrounding topography of the area" Appendix X p.32). e) the CoA requires that if an area is unable to be returned to a state "commensurate with the surrounding topography" then these areas are to be included within the operational footprint. 5. the CoA requires all operational utilities be underground. 6. a) EES preference is that the CoA does not allow further impact on the geodiversity features on Lobs Hole Ravine Road. b) if further impact is approved, the CoA should require the minimum footprint possible for Lobs Hole Ravine Road, with appropriate justification provided (eg design drawings, in particular the detail relating to exact extent of impacts to geodiversity features). c) the CoA requires the measures outlined in Appendix O.2 Cenozoic Geodiversity Assessment GEO4 p.63 to include all known Tufa deposits as already outlined and conditioned in Figure 4.6 of the Infrastructure Approval for Exploratory Works. d) the CoA place ongoing responsibility for maintaining stability of the block streams and Lobs Holes Ravine Road on the proponent. 7. a) the CoA requires that GEO3 include key recommendations at Appendix O.1 p. 33-34, 'Ensure new cuttings are stable by ensuring a suitable angle and incorporate a stepped design. Avoid any use of shotcrete or vegetation seeding that would cover new exposures.'. b) the CoA requires that GEO6 management plans include all recommendations in the Cenozoic and Palaeozoic Geodiversity reports, not only those that minimise impacts for known and potentially undocumented sites. Specifically, that parking and viewing areas at geodiversity features on Lobs Hole Road, rather than being 'considered where practical' (GOE03), are incorporated into road design, and are completed to the satisfaction of NPWS.	

1.6 Transport

Issues raised	Response
1. the EIS indicates Tantangara Road will be available to the public through facilitated access. 2. the EIS indicates permanent access roads and tracks. 3. the EIS Figure 2.23 indicates primary transport routes only 4. the EIS 6.9.1 describes the existing road network in KNP 5. Appendix Q (Traffic and Transport) Section 4.2 identifies cumulative impacts. 6. Appendix Q Section 4.9 identifies OSOM critical constraints. 7. Appendix Q and G identify traffic mitigation measures. Recommended action/conditions of approval: 1. a) the CoA require that Tantangara Road remains open to the public once the 9-month upgrade is complete with facilitated access during the upgrade period. b) the CoA provide for NPWS to have operational access to all areas of KNP, at all times, to the satisfaction of NPWS. c) that NPWS will not be burdened with additional expenses, such as In Vehicle Monitoring Systems (IVMS), in order to move through the site to gain access to KNP for operational activities. If required, temporary IVMS units are to be provided by the proponent. 2. a) the CoA requires that the classification, long term use, rehabilitation and maintenance of all access within KNP (e.g. MW EIS Figure 2.26 shows a section of Lobs Hole Ravine Road north within the operational footprint of the tailrace, MW EIS Table 2.17 has some incorrect statements relating to long term access) be finalised to the satisfaction of NPWS. b) the CoA require the finalisation of a Roads Maintenance Agreement between NPWS and SHL prior to pre-construction. 3. a) clarification is provided with an assessment of all transport routes utilising NPWS managed roads/tracks and that they are subject to dilapidation surveys and rehabilitation CoA. b) clarification is provided on detail in Appendix Q section 3.2.4.5 relating to the use of Lobs Hole Ravine Road north as SHL has already amended its use to be more than for emergency access under Exploratory Works.	1. a) The closure of Tantangara Road is addressed in Section 4.4.8ii of the RTS. b) and c) Snowy Hydro will consult closely with NPWS throughout the project and will agree suitable access and safety arrangements. 2. a) Further information regarding the proposed rehabilitation is provided in Section 4.2.5 of the RTS. Snowy Hydro will consult closely with NPWS throughout the project and will agree suitable access and safety arrangements. a) [SHL to review suggested response below] Snowy Hydro will continue to consult closely with NPWS. The Roads Maintenance Agreement between NPWS and SHL will be updated prior to construction. 3. a) The proposed transport routes for the Main Works were provided in Figure 2.23 of the Main Works EIS. The proposed impacts of the project on public access within the KNP during construction and operation is provided in Figure 2.32 and Figure 2.33. Impacts to NPWS roads would be managed in accordance with the roads maintenance agreement to updated and agreed prior to construction. b) Lobs Hole Ravine Road North will be used consistent with the use and traffic volumes proposed under Modification 2.No additional impacts are expected. c) This comment is noted. As previously mentioned the Roads Maintenance Agreement between NPWS and SHL will be updated prior to construction. 4. a)

Issues raised	Response
d) c) that the CoA confirms that no financial impost will be placed on NPWS operations, such as snow clearing, as a result of increased traffic from the project.	It is not proposed that construction traffic would use Elliot Way as part of the primary transport route. As traffic volumes using this route are expected to be low further assessment of this route has not been undertaken.
4.	As Tantangara Road would be subject to facilitated access during construction it was considered as part of the internal road network for the project and not as part of the external road network subject to the traffic and transport impact assessment (TIA).
a) clarification is provided as to why Elliot Way and Tantangara Road are not described within the existing KNP road network.	
b) that the CoA requires that an 'Intersection warrants review according to Austroads (2017)' assessment for the intersections within KNP in MW EIS Table 6.24 be completed as has been done in Table 6.25 for key intersections outside of KNP.	b) An intersection warrants review was undertaken as part of the TIA provided in the Main Works EIS. Section 4.5.1 of the TIA provided the intersection warrants review that included consideration of key intersections within KNP including Link Road/Lobs Hole Ravine Road, Snowy Mountains Highway / Link Road, Snowy Mountains Highway / Tantangara Road and Snowy Mountains Highway / Marica Access. Additional information regarding proposed intersection upgrades is provided in Section 3.2.7 of the RTS.
c) recommend Link Road be included in the list of "Roads to be upgraded' MW EIS p.6-122.	c) Snowy Hydro has continued to consult with NPWS in the period since exhibition. While the Link Road is not considered to require upgrades as a result of the proposed Main Works construction traffic, existing deficiencies in this road section are proposed to be addressed through a separate application to be approved by the National Parks and Wildlife Service (NPWS) under a separate review of environmental factors environmental impact assessment carried out under the NSW National Parks and Wildlife Act 1974 (NPW Act) and its regulation.
d) clarification is provided on details in MW EIS Table 6.26 and Appendix Q Table 4-1 as to the traffic volumes along the length of Link Road between Snowy Mountains Highway and Ravine Road. The table appears to indicate that there will be significant project LV and HV using Kings Cross Road. Why is this the case as it is assumed that all project HV and the majority of LV will be travelling from Snowy Mountains Highway into Ravine Road. To what extent will project traffic utilise Kings Cross Road?	d) The tables referenced in the MW EIS and the traffic and transport assessment (TTA) mistakenly referenced Kings Cross Road. These tables should instead have referenced the intersection of Link Road and Lobs Hole Ravine Road where the intersection of Link Road and Kings Cross Road were referenced. This has been corrected in the revised TTA provided as Appendix K of the RTS.
e) clarification is provided on Link Road "suitable management measures" indicated in MW EIS Table 6.27.	e) As mentioned previously, while the Link Road is not considered to require upgrades as a result of the proposed Main Works construction traffic, existing deficiencies in this road section are proposed to be addressed through a separate application to be approved by the National Parks and Wildlife Service (NPWS) under a separate review of environmental factors environmental impact assessment carried out under the NSW National Parks and Wildlife Act 1974 (NPW Act) and its regulation.
f) the CoA requires that TRA04 MW EIS Table 6.31 include all KNP roads to be used for the project.	f) Mitigation measure TRA04 provides road maintenance measures including management measures applicable to both the internal and external road network. This would apply to roads within and outside the KNP.
g) that NAV01 MW EIS Table 6.31 and mitigation measures in Appendix W (Navigation) 5.4.4 include consultation with NPWS in relation to notification signage at Tantangara and Talbingo Reservoir access points, and measures to be implemented during operations.	
5. clarification is provided on why the cumulative impacts of the Transgrid Shallow Connection Project have not been considered in the assessment scenarios.	
6. recommendation CoA require a review of critical constraints of transporting OSOM for Link Road.	
7.	
a) the CoA requires that mitigation measures at the Snowy Mountains Highway / Tantangara Road intersection TRA02 include channelised turning lanes and loop detection electronic speed signalling for this intersection as outlined in the Road Safety Audit Appendix Q.	
b) the CoA requires that the recommendations for Link Road in the Road Safety Audit p.18 Appendix C of Appendix Q are implemented.	

Issues raised	Response
c) the CoA requires mitigation measure TRA03 to include NPWS as a relevant road authority approving OSOM permits on Link Road.	g) Snowy Hydro will consult with NPWS regarding any notification signage within KNP as described in NAV01. 5. Further information on the assessment of cumulative impacts including this matter are provided in Section 4.1.5 of the RTS. 6. As per mitigation measure TRA03 TMPs will be prepared, submitted and approved by the RMS under permit, prior to the commencement of any deliveries considered 'high risk' OSOM movements in accordance with RMS guidelines. A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS. 7. a) Further information regarding the proposed intersection upgrades is provided in Chapter 3 of the RTS. b) As mentioned previously, while the Link Road is not considered to require upgrades as a result of the proposed Main Works construction traffic, existing deficiencies in this road section are proposed to be addressed through a separate application to be approved by the National Parks and Wildlife Service (NPWS) under a separate review of environmental factors environmental impact assessment carried out under the NSW National Parks and Wildlife Act 1974 (NPW Act) and its regulation. c) Snowy Hydro will consult with NPWS and agree suitable arrangements for review of TMPs for OSOM movements prepared as per TRA03 where relevant.

1.7 Amenity

Issues	Response
1. MW EIS Table 6.34 mitigation measures for amenity do not address noise impacts to NPWS campgrounds along the Snowy Mountains Highway (Rocky Plain campground) and Link Road (3 Mile Dam campground). MW EIS Section 6.10.6 identifies "While noise levels are within NML's for identified recreational sites within KNP, they will be audible and may affect the amenity of recreational user experience." 2. Appendix S (Landscape and Visual Impact Assessment) identifies items that require clarification. 3. Appendix S p.90 identifies "It is possible that the operation of the project may also lead to a deterioration of the condition of the Tantangara Reservoir shoreline due to the overall operating water level range of approximately 22 vertical metres with associated horizontal fluctuations of the shoreline of up to 50 metres". Recommended action/conditions of approval: 1. a) the CoA requires the provision of mitigation measures to reduce noise impacts from increased traffic at NPWS campgrounds on Snowy Mountains Highway (Rocky Plain) and Link Road (3 Mile Dam). b) the CoA requires that the Construction Noise and Vibration management plan NV01 incorporate monitoring of traffic noise at NPWS campgrounds that may be impacted. 2. a) Appendix S identifies the landscape character sensitivity of LCZ4: Gooandra Plateau as only moderate. Clarification needs to be provided as to why Gooandra Plateau has the same landscape character sensitivity as Rock Forest which is an operational farming landscape. NPWS view is that Gooandra Plateau should have the same sensitivity as Talbingo Reservoir, Talbingo Rugged Woodland, Tantangara Woodland or Tantangara reservoir and foreshore. b) the 'Visual Impact Assessment', include assessment and photomontages that include cumulative impacts from Exploratory Works roadworks and Transgrid Connection Project particularly from expanding viewpoints 4, 5 and 6. c) that viewpoint 7 is reassessed from a location approximately 1- 2 km's south of its current position along Wallace Creek Trail where there is a clear view of Lobs Hole Ravine valley rather than the current obscured view.	1. a) The Noise and Vibration Impact Assessment (NVIA) confirmed that predicted levels at Three Mile Dam campground (A12) and Rocky Plain campground (A13) were predicted to be less than 30 dBA, significantly below the NSW EPA Interim Construction Noise Guideline (ICNG) requirement of 60 dBA for passive recreation. Accordingly, no mitigation measures were proposed. It is acknowledged that construction noise may be audible at these locations. b) The NVIA demonstrated that predicted traffic noise levels were well below the NSW EPA Road Noise Policy baseline level of LAeq,15hr 55 dBA for open space (passive use) at a reference distance of 75m from the edge of the road. Accordingly, no mitigation measures were proposed. Monitoring of traffic noise will be conducted as required by CoA. 2. a) Section 5.1.4 of the LCVIA (Appendix S) of the Main Works EIS provides a details of the assessment of landscape character sensitivity. This assessment found that The ability of the zone to absorb visual change is varied due to its large size and combination of uses within it. As mentioned above, the presence of infrastructure that supports recreational use, transmission lines and transport movements are seen throughout the zone and have an effect on the character sensitivity. For these reasons, the overall landscape sensitivity for LCZ4 is moderate. b) A response addressing the assessment of cumulative impacts is provided in Section 4.1.5 of the RTS. c) Viewpoint 7 provides a viewpoint looking west from Wallaces Creek Fire Trail towards Talbingo Reservoir and is viewpoint with high landscape sensitivity. It is considered a suitable assessment location. d) Viewpoint 05 provides an assessment location for visual impacts at Lobs Hole. This viewpoint is considered to have high sensitivity for observers. The quaint, grassy area

Issues	Response
d) clarification is provided as to the view provided in Appendix S Plate 6-13, the description of the view is not correct in that it does not show the location for the substation.	beside Yarrangobilly River is a popular tourist location for camping and one of the main reasons for visitation to the area. 3.
3. the CoA requires the provision of mitigation measures to reduce this visual impact and improve the amenity and biodiversity values of this impact zone. These measures should be to the satisfaction of NPWS.	Further information regarding mitigation of visual impacts is provided in Section 4.4.7 of the RTS.

1.8 Air

Issues	Response
1. MW EIS Table 6.38 identifies "Adoption of mitigation similar to sealing 1km each side of the camps to minimise dust impacts to acceptable levels will achieve health-based criteria for the accommodation camp." However, similar mitigation measures have not been included for Wares Yards campground where exceedances of air quality are expected. **Recommended action/conditions of approval:** 1. the CoA require that mitigation measure AQ01 include similar measures, namely sealing of Tantangara Road 1km each side of and at the entrance to Wares Yards campground.	1. No mitigation or management measures are proposed for air impacts at the Wares Yards campground. Details regarding the management of access to Tantangara Road and mitigation of impacts to recreational users of KNP are provided in Section 4.4.8 of the RTS.

1.9 Hazards

Issues	Response
1. the EIS identifies a significant quantity of excavated spoil will be placed on land in KNP. The contamination assessment conceptual site model for Lobs Hole Figure 6.22 also indicates possible pathways impacting on recreational users. 2. MW EIS p.6-82 identifies impacts to the Traces Knob quarry site as part of the project. 3. MW EIS Table 6.36 secondary access options. 4. MW EIS Table 6.37 identifies hazard mitigation measures which require clarification. 5. Appendix T Bushfire assessment requires clarification. **Recommended action/conditions of approval:** 1. the CoA obligate SHL to ongoing monitoring/ maintenance and contamination removal (during both construction and operational phases) if required of any spoil emplacement. 2. the CoA place obligations on SHL for ensuring the stability and safety at Traces Knob quarry to address "*potential safety issues concerning unstable rock walls at the quarry*" raised in Appendix O.2 Section 4.2. 3. *a)* clarification is provided as to the secondary access for Marica as being "*North on Lobs Hole Ravine Road to Snowy Mountains*	1. Additional information regarding the revised excavated rock management strategy is provided in Section 3.2 of the RTS. 2. The Traces Knob quarry will be avoided throughout both construction and operation. This is shown in the revised disturbance area provided with the RTS. 3. a) and b A response to these matters is provided in Section 4.4.10ii of the RTS. 4. A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS. 5. a) An FDI of 80 for Marica Accommodation was chosen based on conservative provisions of APZs, and this is provided throughout the bushfire assessment (Appendix T of the EIS). The FDI of 50 in Table 7 of this report has not been used to determine APZs as part of the bushfire assessment. An FDI of 80 will be applied during detailed design for this site. b)

Issues	Response
Highway". This access option is not feasible from Marica. Therefore prior to construction of Marica Road west to Mines Trail, PBP 2018 requirements cannot be met as there will be no secondary access for Marica. b) that the secondary access for Tantangara intake specifically nominate the secondary access east for clarity, a number of trails in this area have locked gates and many require access to private property which could hinder efficient egress. 4. the CoA require HAZ05 be to the satisfaction of NPWS for all NPWS owned roads used for primary or secondary access. 5. a) clarification is provided on detail in Appendix T Table 7 that identifies the FDI for Marica Accommodation as 50. This contrasts with the detail in Section 4.2 recommending an FDI of 80 for the Marica Accommodation site. b) clarification is provided as to why Marica Accommodation camp is not addressed in Table 49: performance criteria an acceptable solution for water, electricity and gas.	Marica Accommodation camp was unintentionally left off Table 49 of the bushfire assessment. The proposed utilities for Marica Accommodation camp will comply with the performance criteria and acceptable solutions for water, electricity and gas in accordance with the RFS Planning for Bushfire Protection 2019 (PBP) guideline.

1.10 Social

Issues	Response
1. the SEAR requires an assessment of the social impacts of the project on users of KNP, including recreational fishing, bushwalking, camping and boating. 2. the SEAR requires a strategy to offset the recreational impacts of the project on users of the KNP. Due to limitations in the level of design detail available, there has been limited discussion with NPWS in relation to any strategy or mitigation measures for recreational users. 3. MW EIS Table 6.43 identifies social and recreational mitigation measures which require clarification. 4. commitments outlined in correspondence from SHL to NPWS on the 5. 15 June 2018 relating to 'terms of agreement for provision of compensation for predicted impacts on Kosciuszko National Park from the Snowy 2.0 Exploratory Works'. **Recommended action/conditions of approval:** 1. MW EIS 2.4.2 p.2-62 states due to previous approval no further assessment is required for Tantangara Reservoir. Recommend that due to a significant change in water fluctuations and impacts on established recreational use, an assessment of impacts should be made in order to meet the SEAR and assist in developing a strategy to offset the impacts on users of KNP.	1. A response to this matter is provided in Section 4.2.4i of the RTS. 2. a) and d Further details regarding offsets for recreational impacts are provided in Section 4.4.8 of the RTS. b) and c) Navigation exclusion zones will be established around the intakes prior to operation and will be determined during the detailed design process. 3. a) and b Consultation will be undertaken in accordance with the CoA and mitigation measures. A table providing a comprehensive list of revised environmental mitigation measures is provided in Appendix C of the RTS. 4. Further details regarding the proposed recreational offsets are provided in Section 4.4.8 of the RTS.

Issues	Response
2. a) the CoA require that opportunities for future recreational use in KNP be identified and undertaken by the proponent to the satisfaction of NPWS. b) clarification is provided on detail shown in MW EIS Figure 2.26 which presents the operational footprint in Talbingo Reservoir, this is different to the exclusion zone in Appendix C (Bathymetry and indicative navigation exclusion zone) of Appendix W. (Navigation). c) the CoA require that all operational navigation exclusion zones are clearly mapped and included within the defined operational footprint. d) the CoA require that a strategy to offset the recreational and social impacts of the project in KNP and the rehabilitation strategy are completed to the satisfaction of NPWS. That the design and implementation timeframe are included in the CoA. Issues for consideration are but not limited to: i) proposed new landforms. ii) reservoir access for boating due to exclusion zones. iii) changed accessibility and resulting patterns of use. iv) impacts on commercial operations. v) that an interpretative plan addresses social, heritage, recreational, biodiversity and geodiversity values of KNP. That offsets incorporate the interactive use of archival recordings and removable heritage items salvaged from the project into displays within the project area. 3. a) the CoA require mitigation measure SOC2 to include NPWS in discussions on incidence of traffic congestion, recreational visitation and cumulative impact of Snowy 2.0 Main Works. b) the CoA require that all management plans directly related to KNP be completed and implemented to the satisfaction of NPWS. 4. the CoA require that parking facilities at Wallace Creek Lookout are incorporated into road design on Lobs Hole Ravine Road to the satisfaction of NPWS.	

1.11 Consultation

Issues	Response
1. provision of data gathered during the construction and operations phase of the project. Recommended action/conditions of approval: 1. the CoA requires all information relating to Kosciuszko National Park gathered during development of the EIS, during construction and operation of the project to be provided to NPWS within 6 months of being gathered.	Snowy Hydro will consult with NPWS regarding the availability of data gathered through the Main Works EIS investigations. Relevant data and information associated with the EIS investigations (eg geology, groundwater, ecology and heritage) will be provided to NPWS and will contribute to providing an improved understanding of the environment and values of the KNP.

1.12 Aboriginal cultural heritage

Issues	Response
1. the proponent has demonstrated a consideration of potential impacts to ACH and provided an Aboriginal Cultural Heritage Assessment Report (ACHAR) consistent with the SEARs. 2. the ACHAR includes extensive archaeological field survey and archaeological test excavation program components across the northern part of KNP. It has significantly added to the number of recorded Aboriginal sites and the cultural heritage knowledge of the area. 3. as a large infrastructure project across an iconic national park there will be a considerable loss of heritage values. The management and mitigation actions of the report will be essential in minimising the impacts of the project to acceptable levels. 4. EES notes due to some recent additions to the project footprint some survey units are yet to be surveyed. Where necessary, un- surveyed areas must be investigated prior to project approval and assigned updated management and mitigationstrategies. 5. it is noted that the ACHAR outlines that RAP consultation did not identify any specific socio-cultural information to the project area, but the identified Aboriginal sites have high cultural value to the local Aboriginal community through the tangible link they provide with their ancestral past. 6. EES supports the conclusions and recommendations in Chapter 10 of the ACHAR report. **Recommended actions/conditions of approval:** 1. a Cultural Heritage Management Plan (CHMP) is prepared and implemented to the satisfaction of EES. 2. the CHMP must be prepared in consultation with RAPs, NPWS and EES. It must include: a) describe Survey Units in which impacts areallowable. b) clearly map all areas of recorded Aboriginal sites within the project impact footprint. c) include procedures relating to the conduct of additional archaeological assessment, if required.	1. and 2. Snowy Hydro is committed to developing a CHMP in accordance with the EES submission recommendations. 3. In November 2019 during the RTS phase, NSW Archaeology Pty Limited (NSW Archaeology) completed additional archaeological survey and assessment of potential Snowy 2.0 Main Works impact areas that were committed to in the Snowy 2.0 Main Works ACHAR (2019a). This comprised archaeological Survey Unit (SU) CCSU20 (at Rock Forest) and NCTSU37 (at proposed Fish Weir at Nungar Creek Trail). The assessment is detailed in the amendment report to the ACHAR (NSW Archaeology 2019a) provided in Appendix N of the RTS.

Issues	Response
d) include management and mitigation measures for all areas to be impacted by the project footprint such as • impacts to ground surfaces must be kept to an absolute minimum • for Survey Units which are assessed to be of higher significance values, impact mitigation measures • will be implemented. These would comprise salvage • in the form of archaeological excavation and • archaeological analysis prior to impacts; and • the AHMP is to include measures for the • management of any Aboriginal objects that may be • found during construction. 3. unsurveyed Survey units that will be impacted as part of the design of the final footprint must be assessed and management/ mitigation recommendations provided to DPIE as part of the RTS phase	

1.13 Flooding

Issues	Response
1. the Flood Study prepared by GRC Hydro, which supports the Flood Risk Assessment, has been prepared in a manner consistent with current best practice and guidelines and isfit-for-purpose. 2. at most at flooding risk is the temporary and permanent accommodation camps proposed at both Lobs Hole and at Tantangara (adjacent to Kelly's Plain Creek) which have been assessed as largely flood free from riverine flooding. It also seems that the accommodation camp areas are entirely flood free in the 1% AEP event with only a small portion of the Lobs Hole camp marginally affected by less frequent flood events e.g. PMF. 3. there are flood refuge areas proposed well above the PMF at both accommodation camps which could be used during flash flooding events, but this needs to be detailed in the proposed Flood Emergency Response plans that are yet to be developed. These need to be developed in consultation with the NSW SES. 4. flood impacts of the various new and upgraded structures that cross major waterways has also been assessed. Although the impacts can be considered significant (localised up to 0.5m) they do not impact on any areas of significance and hence the risks are considered minor. 5. in regard to the operational phase impacts, the flood risk assessment concludes that there will be no significant change to the flooding characteristics of either Talbingo or Tantangara reservoirs due to the relatively small amount of rock emplacement being proposed in each. Although this has not been modelled it is accepted that any impact to downstream communities is likely to be minor. Recommended action/conditions of approval: The final project design should include: 1. the appropriate design of infrastructure to minimise flood impacts and risks; and 2. the development of an appropriate Flood Emergency Response Plan for the protection of all personnel and the public during future flood events.	The EES comments regarding flooding are noted and do not require further clarification. As outlined in mitigation measure WM14 flood emergency response plans will be developed for both construction and operational phases.

1.14 Surface hydrology and groundwater impacts

Issues	Response
3. the data and modelling presented in the EIS suggests that the project potentially will have a: • significant loss of groundwater dependent vegetation including bogs and fen community • significant water loss through groundwater drawdown and inflow to the works tunnel. • significant baseflow losses to streams above areas of groundwater depressurisation • significant changes to the surface hydrology due to swamp/bog/fen and stream impacts. 2. these issues were raised and discussed at the site meeting 17-18 October 2019 between representatives from NPWS, B&C, SHL and EMM. It was identified that the data and modelling presented in the EIS was based on the worst-case scenario of hydrological impacts. According to EMM and SHL, this scenario does not take account the many mitigation aspects of the current project design. They stated that further modelling data information is available that could be provided to EES to more accurately reflect likely impacts. **Recommended actions/conditions of approval:** 1. that further data, modelling and description of mitigation measure be provided. 2. that EES Science Division have an opportunity to comment on the updated water assessment information and provide comments at later date.	Additional information regarding surface hydrology and groundwater impacts is provided in Section 4.4.1 of the RTS.

APPENDIX F

NPA FORM SUBMISSION RESPONSE

Response to NPA submission on Snowy 2.0 Main Works

Prepared for Snowy Hydro Limited
February 2020

EMM Sydney
Ground floor, 20 Chandos Street
St Leonards NSW 2065

T 02 9493 9500
E info@emmconsulting.com.au

www.emmconsulting.com.au

Response to NSW National Parks Association submission

This appendix provides a detailed response to a form letter submission made available for the general public by the NSW National Parks Association (NPA) on their website for the Snowy 2.0 Main Works Environmental Impact Statement (EIS). Some 64 submissions (61 from individuals and three from special interest groups) used the information contained within this form letter (refer to Chapter 2 of the RTS). The matters raised by the NPA are categorised and responded to in Table 1 below.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
I/we {INSERT NAME}, wish to indicate our strong opposition to the Snowy 2.0 project as described in the Main Works Environmental Impact Statement (EIS). The scale and intensity of environmental impact described in the EIS is inappropriate in any sensitive sub alpine region, let alone Kosciuszko National Park (KNP), one of our nation's most iconic, National Heritage Listed national parks.	The EIS contained detailed descriptions of the environment and values of KNP and many of the technical studies have significantly contributed to better understanding these values. An assessment of Snowy 2.0 on the National heritage listed values of the Australian Alps (of which KNP is part) was carried out as part of the heritage assessment in the EIS. Throughout the project, an aim of the design has been to avoid and minimise environmental impacts as much as possible. This process has continued following the exhibition of the EIS. While there will continue to be a need for a permanent footprint for operational infrastructure, the disturbance footprint needed for construction has been further refined and ultimately significantly reduced (by more than 50 percent). A revised description of the project is provided in Chapter 3 of the EIS.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
In addition to the unacceptable environmental impacts on KNP, the fractured assessment process seems designed to conceal the catastrophic extent of environmental impacts and there is a distinct lack of credible consideration of less expensive, lower impact alternatives.	Snowy Hydro recognises the sensitive environment in which Snowy 2.0 and its existing assets are located. The Snowy Scheme has been operating in the KNP for decades and Snowy 2.0 is an expansion of the existing Scheme so it cannot be built anywhere else. There are no alternative projects or locations which can feasibly replicate the functions and benefits of Snowy 2.0. In a number of important ways, this project and its particular benefits are the product of its location and environment. Most importantly, Snowy 2.0 relies on its alpine geography for inflows into its reservoirs. Crucially, Snowy 2.0 takes advantage of two existing reservoirs and has proposed most infrastructure to be underground to avoid permanent impacts to the park. It is also strategically located between the two major load centres of the National Electricity Market (NEM) - Sydney and Melbourne. The application and assessment process for Snowy 2.0 has followed the robust and well-established procedures for CSSI projects under the *Environmental Planning and Assessment Act 1979* (NSW). The NSW and Commonwealth environment and planning systems allow for multiple major project applications to be submitted and assessed. Within this, cumulative impacts of projects are to be addressed where relevant. The EIS process for any major project of this size will take a number of years to complete in order for the appropriate design and environmental surveys, modelling and assessments to be undertaken with rigour and in line with best practice. The staged delivery of CSSI projects is not unique to Snowy 2.0 and has been applied in other projects in NSW, namely the WestConnex, and Sydney Metro projects. While these projects are within urban areas, they share similarities to Snowy 2.0 in that they are both complex engineering and tunnelling infrastructure within a constrained environment. The staging strategy for Snowy 2.0 was first outlined in the 2017 Feasibility Study which is available on Snowy Hydro's website, as well as the business case (or Financial Investment Decision).

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
Claims about energy storage potential are dubious and the excessive cost will be paid for by the Australian public, the ultimate owners of the Snowy Hydro scheme.	As with many electricity markets around the world, the National Electricity Market (NEM) is undergoing a decarbonisation, driven by significant shifts in energy efficiency, rapidly decreasing costs of wind and solar generation (known as variable renewable energy (VRE)), coal power station retirements, increasing coal and gas costs, and Australia's participation in global commitments to reduce carbon emissions (i.e. Paris Agreement). In their Draft 2020 Integrated System Plan (Draft ISP), AEMO forecast that Australia will need to invest in a further 30,000-47,000MW of new, large-scale VRE to replace retiring plants and meet peak demand, and that this will in turn require the support of up to 21,000 MW of new dispatchable capacity, and up to 15,000 MW of storage capacity. Without alternatives, gas-fired power stations would be required to provide much or all of this firming capacity, but such gas-fired power plant cannot provide storage, resulting in an increased carbon footprint, higher consumer costs and a wastage of surplus renewable energy. The NEM modelling conducted by independent expert Marsden Jacob Associates (MJA) evidenced that Snowy 2.0 is the cheapest option for the NEM to gain access to both the necessary firm capacity and large-scale storage within a single project. Batteries, on a $/MWh storage basis, are at least 60 times more expensive than Snowy 2.0, will be replaced many times within Snowy 2.0's lifetime (a 100-year design life) and are small scale in the context of storing bulk energy in the NEM. Matching the storage of Snowy 2.0 would necessitate 2,700 South Australia big batteries. Gas plants provide MW of capacity but cannot provide storage. • Snowy 2.0 provides both capacity and storage, and thereby underpins cheaper NEM prices by capping price peaks and bringing new wind and solar into the system by providing 'firming'. As well as responding to the NEM's requirement for price-period (5 minute) to intra-day firming, Snowy 2.0's large-scale capacity and world class technology enables the plant to respond to the NEM's requirement for 'deep storage' that must deal with seasonal and longer climatic cycles (expected and unexpected).

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
	Snowy Hydro has a very strong track record of providing dividends and return on investment and this will continue throughout Snowy 2.0's construction period. The financing mechanism for Snowy 2.0 is typical for investments of this type, being made up of free cash flow, external debt finance and shareholder equity. • The Federal Government will inject equity in future years during the construction period. This will appear in the Company's balance sheet accordingly as shareholder capital. This is an investment, not a subsidy. Snowy Hydro will continue to pay dividends to the Federal Government during the construction period of Snowy 2.0 and thereafter. The increased dividends flowing from Snowy 2.0 are the return on the equity invested. • This is made possible by Snowy Hydro's strong balance sheet and its ongoing revenue generation. It is critical to remember that Snowy 2.0 is not a "project finance" type structure. It is simply an investment by an already strongly profitable operating company.
These failures clearly demonstrate that the **Snowy 2.0 project does not meet the standards required of Environmentally Sustainable Development** and accordingly the project should be refused by the Minister for Planning.	Consideration of Snowy 2.0 with regard to each of the principles of ecologically sustainable development is provided in section 4.1.6 of the RTS Main Report.
The project is of vast scale and the quantity of documentation makes it very difficult to address all my/our concerns about the project. Issues of particular concern are described below:	The Main Works EIS contained a Main Report (about 400 pages) which summarised technical assessments provided as Appendices to the EIS, noting that the appended technical assessments are very detailed documents and can be overwhelming in quantity. It is difficult to reduce the quantity of some of these documents due to the scientific and technical nature of the studies and their reporting requirements. However, the detailed assessments are available for the community to review if they would like to understand more about a specific key issue.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
The EIS repeatedly asserts that the Snowy 2.0 project will have a minor impact on KNP on the basis that the development footprint represents approximately 0.25% of the total area of the park. I/we consider this assessment to be utterly incorrect for the following reasons: • The "Project Area", as depicted in the EIS, covers approximately 50 km by 50 km (250,000 hectares), which is a third of KNP - an area twice the size of Greater Sydney. • While KNP is one of the largest National Parks in NSW (690,000 hectares), the portion containing sub-alpine habitats, the areas to be destroyed by Snowy 2.0, is much smaller. This sub-alpine area has some of the rarest habitat in Australia, and will prove increasingly important for the retreat of alpine species affected by the heating climate. These rare habitats provide the appropriate context for assessing the adverse environmental impacts of Snowy 2.0, not the lower altitude landscapes that characterise the majority of KNP. • This construction will be largest ever proposed loss of critically important habitats in a NSW National Park. The EIS acknowledges that the construction footprint will 'disturb' 1,680 hectares, clear 1,053 hectares of native vegetation, and destroy 992 ha of threatened species habitat (threatened fauna, threatened flora and Threatened Ecological Communities). The construction footprint acknowledged in the EIS substantially understates the full extent of permanent damage outside the heavy construction zones, including Talbingo and Tantangara Reservoirs, 100 kms of new and upgraded roads, 10 kms of transmission lines with a 120 metre-wide easement swathe, ground water depleted areas above the tunnels, construction camps (for 2,100 workers) and multiple works areas. When all these areas are taken into account, Snowy 2.0 will permanently damage more than 10,000 ha of KNP (1,000 square kms), rather than the claimed 1,680 ha.	The Main Works EIS defined the project area as the broader region within which Snowy 2.0 will be built and operated, and the extent within which direct impacts from Snowy 2.0 Main Works are anticipated. Figures were provided that identified and visually defined the project area within the regional landscape using an approximately 50 km by 50 km box. This box identifies the context of the areas in which the project was situated. It does not describe the level of disturbance to occur. As detailed in the Main Works EIS, the physical disturbance for the Snowy 2.0 Project would be limited to the surface footprint within the project area, which was noted to be approximately 1,680 ha (or 16.8 km^2). This figure equates to approximately 0.25% of KNP. This area related the absolute maximum disturbance that can be expected throughout construction of Snowy 2.0. Since the submission of the Main Works EIS, significant work has gone into refining the extent of surface disturbance. This approach and the resultant reduction in proposed surface disturbance is detailed further in Section 4.2.2 of the RTS Main Report. The disturbance area has been indicatively reduced to 640 ha (62%), to better balance the design and its construction requirements, noting that some flexibility will still be required to allow a final design process. Of the total area 640 ha to be disturbed by the Main Works, approximately 37 ha of this area is outside the KNP. The expected disturbance area within KNP therefore is approximately 603 ha, (a reduction in area of 58% from the 1,453 ha reported in the Main Works EIS). The construction footprint defines the extent of direct surface disturbance as a result of the Snowy 2.0 Main Works project and does not understate direct proposed impacts. Potential indirect impacts outside of the construction footprint, including reservoir impacts and groundwater impacts, were clearly addressed in the EIS. Potential direct, indirect and cumulative impacts resulting from separate projects (including the Snowy 2.0 Exploratory Works and Transmission Connection Project) have or will be detailed in the relevant approval documentation.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
Project – Excavated rock management The project requires tunnelling through 27 kms of rock, large scale quarrying, road building and widening and the establishment of large accommodation and construction sites. The EIS does not provide a credible account of how 14 million cubic metres of spoil, some of which is heavily contaminated by asbestos and acidic compounds, can be disposed in KNP without further significant environmental impacts. It is clear that much of the excavated materials will be used in 'landscaping' works that will further exacerbate the damage to the Park. Unbelievably, over 8 million cubic metres is to be dumped in the active storage areas of Talbingo and Tantangara Reservoirs, depleting their capacities. How could approval be given for anyone to dump waste material, some of which is contaminated, in a National Park, let alone 14,000,000 m3 - enough to cover a football field to a height of 3 km?	As discussed in Section 3.2.2 of the RTS Main Report, in response to agency feedback, in the months since exhibition of the Main Works EIS, Snowy Hydro has investigated alternative options for the management of excavated rock. Snowy Hydro has identified a preferred strategy and the proposed changes, together with supporting technical information is presented in the Main Report for DPIE assessment and determination.
Water – groundwater drawdown impacts The EIS describes extensive impacts on water dependant habitats and species through disruption to ground water systems by the tunnelling as well as in works beside 8 kms of the Yarrangobilly River. Watertable drawdown is predicted to be in excess of 50 m above the tunnel in areas of high hydraulic conductivity (Gooandra Volcanics). The drawdown at 3 km either side of the tunnel is still 0.5 m in the western plateau. This will have a catastrophic impact on the environment along sections of the 27 km tunnel, will dry up existing creeks, impact the local fish and animals and reduce inflows to the reservoirs and hence water releases. It is remarkable that Snowy Hydro would show such disregard for the protection of water dependant ecosystems not just in alpine areas but at the headwaters of our major waterways. I/we do not accept the assertion that such impacts are 'acceptable'. Experience demonstrates that once ground water systems are disrupted by mining activities the damage is irreversible and can become even more extensive over time.	As noted in Chapter 6.2 of the Main Works EIS, groundwater model predictions were considered conservative due to the design scenario assumptions (unlined excavations and no mitigation measures) and the adoption of conservative hydraulic parameters (as per field measurements). Therefore, it was considered that the predicted inflow and subsequent environmental impacts would be lower than predicted due to mitigation and management measures committed to during construction (ie pre-grouting and segmental lining). Since the Main Works EIS and in response to agency feedback, refinement of the inputs into the regional groundwater model, principally the permeability characteristics of the lining used for the tunnel, has been undertaken which has resulted in a significant reduction to the predicted groundwater drawdown, inflows and related impacts. A detailed response to all groundwater related submissions, including those of the NPA, is provided in Section 4.4.1 of the RTS Main Report, including descriptions of the magnitude of reduction in groundwater related impacts as a result of the refinement of the groundwater model.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
Aquatic – biosecurity Snowy 2.0 will disperse pest species (including redfin perch, eastern gambusia, wild goldfish, Epizootic Haematopoietic Necrosis Virus (EHNV) and elodea weed) throughout the waterways of KNP and downstream. Redfin is a Class One Noxious Pest - it is illegal to transfer Redfin between waterways in NSW. Snowy Hydro acknowledges that it is inevitable that these noxious species will be transferred from Talbingo to Tantangara. Establishment of the dominant Redfin Perch will be to the detriment of both recreational anglers and significant populations of threatened native fish. Even worse than it being accepted that these noxious species will be transferred to Tantangara, it is highly doubtful that the barrier and filtration systems proposed by Snowy Hydro will stop their eventual transfer downstream to the Murrumbidgee River and Lake Eucumbene and thence throughout the rest of the Snowy Scheme and downstream rivers (Snowy, Murrumbidgee and Murray).	An overview of relevant biosecurity legislation and proposed control measures is provided in Section 4.2.4 of the RTS Main Report. Snowy Hydro's detailed response to DPI's request for further information regarding biosecurity obligations is also attached at Appendix O of the RTS.
Amenity – Landscape and visual One of KNP's core values is the sense of wilderness and solitude unique to alpine landscapes. These aesthetic qualities, and the experience of visitors, will be seriously diminished by the increases in roads, permanent large structures and especially the transmission lines. The project will not only impact directly on the areas trashed by the project - the overall sense and experience of the Park landscape will be damaged forever. The implication in the EIS that the community will regard the proposed infrastructure as evidence of the nation's engineering prowess offers hollow recompense for the loss of the Park's unique aesthetic qualities.	The assessment of amenity impacts provided in Section 6.10 of the Main Works EIS assessed both short term (construction) and long term (operation) landscape and visual impacts. A detailed response to all amenity related submissions, including those of the NPA, are addressed in Section 4.4.7 of the RTS Main Report.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
Minimal contribution to renewable energy Snowy Hydro claims that Snowy 2.0 will play a pivotal role in stabilising the national energy market as new renewable generation is added to the grid. I/we don't not accept that such claims justify the extent and severity of environmental destruction that the project will cause to KNP, especially in the absence of a credible assessment of alternative ways of providing this service. In any case, the data provided in the EIS seriously undermines the claimed benefits of the project. Specifically: • Snowy 2.0 will be a net consumer of electricity, not a generator, with 'round-trip' losses of 30%, plus another 10% for transmission. • For the next decade or so most pumping electricity will come from coal-fired power stations, not renewables, belying the claim that Snowy 2.0 will 'store' electricity from renewable generators. • The claimed 350 GWh would only be available in the most exceptional of circumstances, requiring the top reservoir (Tantangara) to be full. If the full volume was used, at least one-third of the water couldn't 'fit' within the smaller capacity of the lower reservoir (Talbingo) and would be discharged to Blowering and 'lost' to the Snowy 2.0 system. If Talbingo were not empty (historically it is kept near full to provide for operation of the Tumut 3 pumped hydro station), then most of the water from Tantangara would be discharged to Blowering and 'lost' to Snowy 2.0. • The practical recyclable capacity of Snowy 2.0 is considerably less than the claimed 350 GWh. • Whenever Tantangara were emptied, it would then require several months of pumping to be returned to full supply. • If Snowy 2.0 ever generated its claimed 350 GWh of energy, it would take 500 GWh of pumping energy to re-charge, incurring 150 GWh of losses.	Snowy 2.0 will add 2,000 MW and 350,000 MWh of pumped hydro storage. The 2,000 MW of capacity, and the 350,000 MWh stored in Tantangara Reservoir, individually and together constitute the two key capabilities of Snowy 2.0. 2,000 MW of reliable, on-call capacity backs several of Snowy 2.0's revenue sources, including the $300/MWh cap contracts that have been a mainstay of Snowy Hydro's role in the market since the beginning of the NEM. Snowy 2.0 has a Round Trip Efficiency of approximately 72-79%, depending on how many units are running. It averages about 76% at commissioning. This means that Snowy 2.0 will require approximately 1.3 times as much energy to pump the water than it will create when it generates. Despite being a net consumer of energy, Snowy 2.0 benefits the market by providing for increased market stability and efficiency. Snowy 2.0 will utilise otherwise unused low-cost generation (surplus coal and VRE) and provide dispatchable and firm capacity that can operate for days if required, with the effect that the NEM will operate more efficiently and with lower emissions. In the absence of this less, VRE would be built and when powered by VRE, the project's carbon emissions are zero. All generating assets have transmission losses; the quantity of those losses depends on the asset's location in the electricity network and the transmission infrastructure that supports it. Whilst quantifying the transmission loss factors for Snowy 2.0 is not yet possible, there are strong indications that the loss factors will be the same, if not better, than Snowy's current hydro generation assets for the following reasons: • The proposed new transmission infrastructure supports low loss factors. – Humelink - The Project Assessment Draft Report jointly prepared by TransGrid and AEMO (August 2019) recommends 3 new 550kV lines to minimise loss factors; and – Victoria to NSW Interconnector West (VNI West) - The Project Specification Consultation Report jointed prepared by TransGrid and AEMO (December 2019) includes 550kV options that will support low loss factors. • Snowy 2.0 generation / pumping will be non-concurrent with the renewable assets utilising the same transmission infrastructure (i.e. Snowy 2.0 will be pumping when the renewable assets are generating). This will reduce transmission losses for Snowy 2.0 because the project won't be competing for capacity on the transmission infrastructure.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
	Submissions have claimed that Snowy 2.0 will not be able to generate the 350,000 MWh due to downstream hydraulic constraints in Talbingo, Jounama and Blowering dams limiting that capacity. This is incorrect for the following reasons: • Because it has a much higher elevation, Snowy 2.0 passes through water at a much lower rate when operating at full capacity than T3. In fact, one third of T3, that is 2 of the 6 units, is able to pass all the water that Snowy 2.0 passes when generating at its full 2,000 MW capacity. Given this simple fact, Snowy 2.0's ability to generate at full capacity at 2,000 MW for 175 hours will never be constrained by the operating level of Talbingo Reservoir because Snowy Hydro is able to pass water out of Talbingo Reservoir much more quickly than it flows into it. • Talbingo Reservoir level does not "almost always" operate at close to full. The 'active storage' of Talbingo Reservoir is only the top 9m of a dam that is up to 140 m deep in places. This 9 m constitutes the 160 GL of 'active storage'. Accordingly, if the water level in Talbingo Reservoir is only 4 m below Full Supply Level, and appears close to full, its active storage is actually half-empty. • The active storage in Talbingo Reservoir is also augmented by the 30 GL active storage in Jounama (from which Snowy Hydro can also pump water), which means there is 190 GL of active storage in the lower dams, which is 80% of the 240 GL storage of Tantangara Reservoir. So as a closed cycle system, Snowy 2.0 can operate at 80% of its full capacity. However, of course, Snowy 2.0 is not a fully closed system, and one of the significant advantages of adding Snowy 2.0 to the existing Snowy Scheme is that Tantangara and Talbingo reservoirs both operate as part of an integrated portfolio of 16 dams, with water capable of being stored in multiple places throughout the Scheme. In particular, both are connected to Lake Eucumbene, which has 4,400 GL of storage capacity. There are in fact three ways to recharge Tantangara Reservoir: natural inflows, which average 294 GL/annum; water passed into Talbingo from Snowy 2.0 and then pumped back up (190 GL); and water passed into Talbingo Reservoir from Lake Eucumbene through the existing T1 and T2 power stations. Accordingly, there is no question that Tantangara Reservoir can be fully recharged.

Table F.1 Matters raised in NPA form letter submission

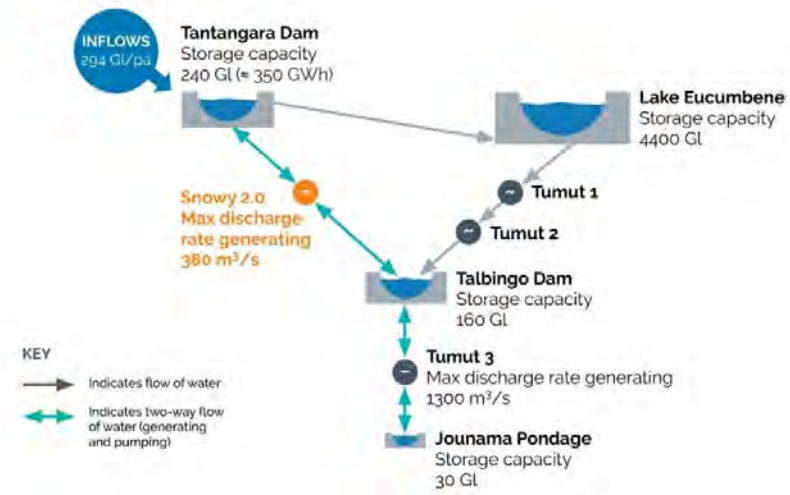
Matters raised	Response
	

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
Uneconomic It is clear that the cost of Snowy 2.0 will be many times greater than the original $2 billion and then $3.8 billion estimates – a single contract for $5.1 billion has recently been awarded. It is likely that the project, including transmission, will be $10 billion, or even more. At anything approaching this amount the project is totally uneconomic. Snowy Hydro is wholly owned by the Commonwealth Government, hence the Australian community. The ultimate bearers of the risk of Snowy 2.0 are the Australian community. In addition to its shareholding the Commonwealth increased the commitment of public funds through a $1.38 billion subsidy into the project. Why was this necessary and why is the Commonwealth Government playing favourites in the National Electricity Market?	Snowy 2.0's capital costs have not increased. The first time costs were modelled for the project was the 2017 Feasibility Study and the capital cost of Snowy 2.0 remains consistent with that estimate. Submissions that use a rough pre-feasibility study estimate figure, quoted by the then Prime Minister when announcing that ARENA was funding a feasibility study into Snowy 2.0 are misleading; the detailed analysis of the feasibility study had not yet been undertaken. Following that announcement, Snowy Hydro undertook the feasibility study and published the outcomes of that study (along with thousands of pages of supporting material) in December 2017. Any assessment of the ongoing performance of the project should be made against the publicly available feasibility study, which included a cost estimate of $3.8-4.5 billion. This estimate is in December 2017 dollars so is not inclusive of escalation. The Engineer, Procure and Construct (EPC) contract signed in April 2019 is wholly consistent with the feasibility study. The $5.1 billion contract for civil and electro-mechanical works is a lump-sum EPC contract price. The key fact is that it is expressed in nominal dollars from 2019 to the commissioning of Snowy 2.0. It therefore includes 100% of all inflation-related cost escalation for the project. It also includes the contractor contingency, foreign exchange exposure, and "interface risk", which relates to the cost of managing multiple contractors working on the same project. Snowy Hydro continues to progress the project, with consistent dollar figures at every milestone. Any claim to the contrary is false. The financing mechanism for Snowy 2.0 is typical for investments of this type, being made up of free cash flow, external debt finance and shareholder equity. Snowy Hydro has recently completed a successful, highly competitive debt-raising process. The outcome of that process was that Snowy Hydro has been overwhelmingly supported and the debt funding requirement oversubscribed. The project has been fully funded up front, with zero financing risk during construction. The Federal Government will inject equity in future years during the construction period; up to $1.38 billion in total. This will appear in the Company's balance sheet as shareholder capital. This is an investment, not a subsidy. Snowy Hydro will continue to pay dividends to the Federal Government during the construction period of Snowy 2.0 and thereafter. The increased dividends flowing from Snowy 2.0 are the return on the equity invested.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
In addition to the unacceptable environmental impacts on KNP, the fractured assessment process seems designed to conceal the catastrophic extent of environmental impacts and there is a district lack of credible consideration of less expensive, lower impact alternatives. *Flawed planning and approval process* The Main Works EIS is only part of the assessment of the broader Snowy 2.0 Project. It is over 2½ years since Snowy 2.0 was announced (March 2017). Over the intervening period the Snowy Hydro Board has authorised the Final Investment Decision, the Government has approved the project and kicked in $1.38 billion, a $5.1 billion contract has been awarded, construction commenced 8 months ago (February 2019) and major equipment is being ordered. Yet, the Main Works EIS has only just been released and the EIS for the high voltage transmission lines is yet to come. The effect of this incremental piece-meal planning and assessment process has been to deny the community a holistic view of the full scope and impacts of Snowy 2.0. This approach compromises transparency from both a proposal and assessment perspective. Given the scale of the project this approach can only be seen as designed to obscure the full extent of environmental impact on KNP.	As Snowy 2.0 has been declared to be critical state significant infrastructure, the environmental assessment and approvals process is prescribed by Part 5, Division 5.2 of the EP&A Act. Snowy Hydro has complied with all applicable environmental assessment and approvals processes under the EP&A Act. The staged process adopted for the applications and approvals is appropriate for a project of the magnitude and complexity of Snowy 2.0 and details the relevant environmental assessment and approvals process at the state level for Main Works pursuant to the EP&A Act were detailed in Section 4.4 of the EIS. Further information explaining the adequacy of the assessment process is also provided in Section 4.3 of the RTS Main Report. Snowy Hydro's strong stakeholder engagement focus, established in the local community for many decades, has been built on and maintained throughout the Snowy 2.0 project. The extensive engagement undertaken for the Snowy 2.0 project was detailed in Chapter 5 and Volume 2 Appendix I of the Main Works EIS. Snowy Hydro and FGJV have continued providing information and seeking feedback from stakeholders since EIS exhibition, as part of the commitment to ongoing, meaningful engagement with the community and the strengthening of stakeholder relationships. Further information in relation to community engagement since the exhibition of the Main Works EIS is also provided in section 3.3.2 of the RTS.
Despite the Environmental Planning and Assessment Regulation 2000 requiring *"an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure",* no such analysis has been provided. The project must be put on hold until such fundamental information is provided, especially as many alternatives have been identified with far less environmental impacts and better economics, both within and outside KNP.	Section 1.4.3 and in Volume 2 Appendix C of the EIS included a detailed assessment of project development options and alternatives. Further explanation of the consideration of options and alternatives is provided in Section 4.1.3 and 4.4.1 of the RTS Main Report. Further details on the economic benefits are detailed in Section 4.1.2 and 4.4.9 of the RTS Main Report.

Table F.1 Matters raised in NPA form letter submission

Matters raised	Response
The EIS makes multiple references to mitigating the impacts of Snowy 2.0 through promising future plans and works in consultation with NPWS or through formal offsetting processes. No appropriate offsets for the habitats that would be destroyed by Snowy 2.0 could be provided, given that all of the comparable alpine and subalpine areas of NSW are already included in KNP.	Due to the nature of the project, impacts to small parts of KNP and some of its habitats is unavoidable. However, through ongoing refinements to the design since the Main Works EIS, the project has further minimised the disturbance area and maintained as much of the existing natural environment as is reasonable and feasible. This is consistent with the broader biodiversity mitigation process to avoid, minimise and offset. Therefore, where impacts are unavoidable, an offsets strategy will be implemented to achieve long-term conservation outcomes in the park, in line with the values and mitigation strategies outlines in the KNP Plan of Management (PoM) and as determined in consultation with NPWS. The offsets strategy is expected to be implemented over time and to deliver significant benefits for the natural values of the KNP and the people who use it. Further detail on impacts within KNP and the offsets strategy is provided in Section 4.1.4, 4.4.2, 4.5.7 and 4.6 of the RTS Main Report.
The Snowy 2.0 project, as described in the Main Works EIS, does not meet the principles of Ecologically Sustainable Development as mandated in the Environmental Planning and Assessment Act. In short, the staggering scale and severity of environmental impacts are by no means commensurate with the environmental, economic and community benefits of the project.	Consideration of Snowy 2.0 with regard to each of the principles of ecologically sustainable development is given at section 4.1.6 of the RTS Main Report.