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GENERAL

TABLE OF PROVISIONS

Advertisers Please Note

As from 21 January 2021

The last Special Gazette was No. 33 dated 20 January 2021.

The last Periodical Gazette was No. 1 dated 3 June 2020.

How To Submit Copy

- See our webpage www.gazette.vic.gov.au
- or contact our office on 8523 4601 between 8.30 am and 5.30 pm Monday to Friday

PUBLICATION OF THE VICTORIA GOVERNMENT GAZETTE (GENERAL)
AUSTRALIA DAY HOLIDAY 2021

Please Note:
The Victoria Government Gazette (General) for AUSTRALIA DAY HOLIDAY week (G4/21) will be published on **Thursday 28 January 2021**.

Copy Deadlines:

Private Advertisements	**9.30 am on Friday 22 January 2021**
Government and Outer Budget Sector Agencies Notices	**9.30 am on Friday 22 January 2021**

Office Hours:

The Victoria Government Gazette Office is open during normal office hours over the holiday period, i.e. 8.30 am to 5.30 pm Monday to Friday, excluding public holidays.

Where urgent gazettal is required after hours, arrangements should be made with the Government Gazette Officer on 0419 327 321.

KIM BURNESS
Government Gazette Officer

PRIVATE ADVERTISEMENTS

EMILIA JAKSETIC, late of 17 Jackman Crescent, Keilor, Victoria 3036, retired, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the abovenamed deceased, who died on 27 August 2020, are required by the trustees, Tania Kilbane and William Branko Jaksetic, to send particulars of their claims to the undermentioned firm by 26 March 2021, after which date the said trustees may convey or distribute the estate, having regard only to the claims of which they then have notice. Probate was granted in Victoria on 12 January 2021.

ARGENT LAW,
2 Stawell Street, Richmond, Victoria 3121.
Ph: (03) 9571 7444. Contact: Helen Adoranti.

DIMITRA NEDELKOS, late of 390 Main Road, Lower Plenty, in the State of Victoria, pensioner, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 10 August 2020, are required by the executrix, Leah Gunn, care of Arthur J. Dines & Co., Solicitors, 2 Enterprise Drive, Bundoora, in the said State, to send particulars to her by 22 March 2021, after which date the executrix may convey or distribute the assets, having regards only to claims to which she has notice.

Dated 18 January 2021

ARTHUR J. DINES & CO., property law advisors,
2 Enterprise Drive, Bundoora 3083.

KRSTE PETROVSKI, late of 23 Kingsway Drive, Lalor, in the State of Victoria, pensioner, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 1 July 2020, are required by the executrices, Tina Jovanovski and Menka Servinis, care of Arthur J. Dines & Co., solicitors, 2 Enterprise Drive, Bundoora, in the said State, to send particulars to them by 22 March 2021, after which date the executrices may convey or distribute the assets, having regards only to claims to which they have had notice.

Dated 18 January 2021

ARTHUR J. DINES & CO., property law advisors,
2 Enterprise Drive, Bundoora 3083.

STEFANA SAMARTZIS, late of 25 Willandra Drive, Epping, in the State of Victoria, pensioner, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 4 August 2020, are required by the executor, Chris Samartzis, care of Arthur J. Dines & Co., solicitors, 2 Enterprise Drive, Bundoora, in the said State, to send particulars to him by 22 March 2021, after which date the executor may convey or distribute the assets, having regards only to claims to which he has had notice.

Dated 18 January 2021

ARTHUR J. DINES & CO., property law advisors,
2 Enterprise Drive, Bundoora 3083.

LEE ANDERSEN BALDWIN, late of 25 Charles Street, Cheltenham, Victoria, retired, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 24 February 2020, are required by Australian Unity Trustees Limited, ACN 162 061 556 of 15/271 Spring Street, Melbourne, Victoria, having been duly authorised by the executor, Mark Alan McKechnie, in the Will called Mark McKechnie, to send particulars to it by 21 March 2021, after which date it may convey or distribute the assets, having regard only to the claims of which it then has notice.

AUSTRALIAN UNITY TRUSTEES
LEGAL SERVICES,
15/271 Spring Street, Melbourne, Victoria 3000.

BRUCE WILLIAM McORMOND, late of Finchley Court SRS, 1168 Dandenong Road, Carnegie, Victoria, pensioner, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 23 January 2020, are required by Australian Unity Trustees Limited, ACN 162 061 556, of 15/271 Spring Street, Melbourne, Victoria, the administrator, having been duly authorised by Diane Longstaff, being the niece of the deceased, to send particulars to it by 21 March 2021, after which date it may convey or distribute the assets, having regard only to the claims of which it then has notice.

AUSTRALIAN UNITY TRUSTEES
LEGAL SERVICES,
15/271 Spring Street, Melbourne, Victoria 3000.

Re: the estate of the late CARROLL JAMES O'CONNOR, also known as Jim O'Connor, late of Opal Paynesville, 3–5 Fort King Road, Paynesville, Victoria 3880.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 20 June 2020, are required by the executor, Leigh James O'Connor, to send particulars to him, care of the undersigned solicitors, by a date not later than two months from the date of publication hereof, after which date the trustee may convey or distribute the assets, having regard only to the claims of which the trustee then has notice.

BEAUMARIS LAW, legal practitioners,
6/1 North Concourse, Beaumaris 3193.

Trustee Act 1958

SECTION 33 NOTICE

Notice to Claimants

MARGARET FRANCES RUDD, late of Bluecross Chelsea Manor, 7–11 Beardsworth Avenue, Chelsea, Victoria, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 12 March 2020, are required by George Allan Rudd, care of 1/48 Aitchison Avenue, Ashburton, Victoria, the executor of the Will of the deceased, to send particulars of their claims to him, care of the undermentioned solicitor, by 30 March 2021, after which date the executor may convey or distribute the assets, having regard only to the claims of which he then has notice.

BRETT MORRIS, solicitor,
1/48 Aitchison Avenue, Ashburton,
Victoria 3147.

MARY AILEEN ELIZABETH IRWIN, late of 9 Jackson Street, Croydon, Victoria, retired nurse, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 18 September 2020, are required by the executor, Equity Trustees Wealth Services Limited, ACN 006 132 332, of Level 1, 575 Bourke Street, Melbourne, Victoria to send particulars to it by 24 March 2021, after which date it may convey or distribute the assets, having regard only to the claims of which it then has notice.

DAVID DAVIS & ASSOCIATES,
Suite 2, 733 High Street, Thornbury,
Victoria 3071.

YVONNE LOUISA MELGAARD-DUNSTAN (also known as Yvonne Louisa Melgaard and Yvonne Louisa Dunstan), late of Unit 272, Salford Park Nursing Home, 100 Harold Street, Wantirna, Victoria, retired, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 29 November 2020, are required by the acting executor, Ronald Gregory Melgaard, to send particulars of their claims to the undermentioned solicitors, within 60 days from the date of publication of this notice, after which date the acting executor may convey or distribute the assets, having regard only to the claims of which the acting executor then has notice.

DEVENISH, lawyers,
23 Ringwood Street, Ringwood, Victoria 3134.

Re: GARY GEORGE ROBERTSON, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 5 October 2020, are required by the trustee, Neil Bruce Robertson, care of Featherbys Lawyers of 14 Ninth Avenue, Rosebud, Victoria, to send particulars to the trustee by 23 March 2021, after which date the trustee may convey or distribute the assets, having regard only to the claims of which the trustee has notice.

FEATHERBYS LAWYERS, solicitors,
14 Ninth Avenue, Rosebud 3939.

Trustee Act 1958

SECTION 33 NOTICE

Notice to Claimants

GRAEME SIDNEY HILSON, late of Unit 3, 275 Springvale Road, Nunawading, Victoria 3131, company director, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 20 May 2020, are required by Kenneth George Carland, care of Hartwell Legal of 8/1 Milton Parade, Malvern, Victoria 3144, the executor of the estate of the deceased, to send particulars of their claims by 22 March 2021, after which date the executor may convey or distribute the assets, having regard only to the claims of which he then has notice.

HARTWELL LEGAL,
8/1 Milton Parade, Malvern, Victoria 3144.

Re: Estate of HARMINA MIEKE VANDERSTADT, also known as Mike Harmina Vanderstadt.

Creditors, next-of-kin and others having claims against the estate of Harmina Mieke Vanderstadt, late of 25 Barrington Drive, Ashwood, Victoria, home duties, deceased, who died on 13 August 2020, are requested to send particulars of their claims to the executor, care of the undermentioned lawyers, by 21 March 2021, after which date they will distribute the assets, having regard only to the claims of which they then have notice.

HICKS OAKLEY CHESSELL WILLIAMS,
lawyers,
PO Box 2165, Mount Waverley, Victoria 3149.

WILLIAM THOMAS BRADFORD, late of Doutta Galla, Somerville Road and Fairlie Street, Yarraville, Victoria 3013, retired, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 12 August 2020, are required by the personal representative, Kerrye Anne Bradford, to send particulars of such claim to her, care of the undersigned, by 22 March 2021, after which date the personal representative may convey or distribute the assets, having regard only to the claims of which she then has notice.

HUTCHINSON LEGAL,
38 New Street, Ringwood, Victoria 3134.

Re: AYMAN BARBARESCO, late of Victoria, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 19 June 2020, are required by the trustees, Anna Maria Barbaresco and Christopher Leo Mier, care of Level 4, 600 Bourke Street, Melbourne, Victoria, to send particulars to the trustees, care of the undermentioned solicitors, by 23 March 2021, after which date the trustees may convey or distribute the assets, having regard only to the claims of which the trustees then have notice.

KHQ LAWYERS,
Level 4, 600 Bourke Street, Melbourne,
Victoria 3000.

Re: CLIVE GRAHAM PEIRSON, late of 10 Carrolls Lane, Shepherds Flat, Victoria, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 17 January 2019, are required by the trustee, Equity Trustees Wealth Services Limited, ACN 006 132 332, of 1/575 Bourke Street, Melbourne, Victoria, to send particulars to the trustee, care of the undermentioned solicitors, by 22 March 2021, after which date the trustee may convey or distribute the assets, having regard only to the claims of which the trustee then has notice.

KHQ LAWYERS,
Level 4, 600 Bourke Street, Melbourne,
Victoria 3000.

Re: JAMES SCOTT, deceased, late of 5/105 Athol Road, Springvale South, Victoria, retired, deceased.

Creditors, next-of-kin and others having claims in the respect of the estate of James Scott, deceased, who died on 3 August 2020, are required by the trustee, Linda Jane Sim, to send particulars of their claim to the undermentioned firm, by a date not later than two months from the date of publication hereof, after which date the trustee will convey or distribute assets, having regard only to the claims of which she then has notice.

KINGSTON LAWYERS PTY LTD,
barristers and solicitors,
8 Station Road, Cheltenham, Victoria 3192.

STOJAN STANKOVIC, late of 12 Beach Road, Hampton, in the State of Victoria, business person, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the abovenamed deceased, who died on 24 June 2019, are required by Mark Albert Maier, the administrator of the estate of the said named deceased, to send particulars of their claims to him, care of McNab McNab & Starke, Level 10, 552 Lonsdale Street, Melbourne 3000, by 21 April 2021, after which date he may convey or distribute the assets of the estate, having regard only to the claims of which he then has notice.

McNAB McNAB & STARKE,
Level 10, 552 Lonsdale Street, Melbourne,
Victoria 3000.
Ph: 9670 9691, Fax: 9670 2219.
Ref: MAM:200944.

LAWRENCE JAMES SALERNO, late of 45 Charlton Crescent, Reservoir, Victoria, labourer, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 6 September 2020, are required by the trustees, Sharleen Ann May, of 6 Eppalock Drive, Wyndham Vale, Victoria, home duties, and Joanne Maree Hazeldene, of Level 7, 600 Bourke Street, Melbourne, Victoria, Australian legal practitioner, to send particulars of their claims to them, care of the undersigned, by 21 March 2021, after which date they may convey or distribute the assets, having regard only to the claims of which they then have notice.

MACPHERSON KELLEY PTY LTD,
Level 7, 600 Bourke Street, Melbourne 3000.

Re: STEPHEN PATRICK DYSON, late of Unit 202, 60 Siddeley Street, Docklands, Victoria.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 6 October 2020, are required by the administrator, Leah Golias, to send particulars of such claims to her, at the undermentioned address, by 24 March 2021, after which date the administrator may convey or distribute the assets, having regard only to the claims of which she then has notice.

Leah Golias, care of
MAURICE BLACKBURN LAWYERS,
Level 21, 380 La Trobe Street, Melbourne 3000.
Tel: (03) 9605 2700. Ref: AEJ/5576930.

Re: BARRY JAMES GORMAN, late of 7 Peterson Avenue, Coburg North, Victoria.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 22 June 2020, are required by the administrator, Raymond Trevor Gorman, to send particulars of such claims to him at the undermentioned address by 24 March 2021, after which date the administrator may convey or distribute the assets, having regard only to the claims of which he then has notice.

Raymond Trevor Gorman, care of
MAURICE BLACKBURN LAWYERS,
Level 21, 380 La Trobe Street, Melbourne 3000.
Tel: (03) 9605 2700. Ref: AEJ/5551255.

PETER JAMES ROCHE, late of 4 Howey Road, Pakenham, Victoria.

Creditors, next-of-kin and others having a claim in respect of the estate of the deceased, who died on 2 September 2020, are required to send particulars of their claim to the executor, care of PO Box 104, Moe, Victoria 3825, within 60 days from the date of publication of this notice, after which date the executor may convey or distribute the assets, having regard only to the claims of which he may then have notice of.

O'HALLORAN DAVIS, solicitors,
12–14 Kirk Street, Moe 3825.

PATSY TASMA OOMS, late of 47 Fourth Street, Parkdale, Victoria, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 5 July 2020, are required by the executor, Michael Francois Ooms, to send particulars to him, care of the undermentioned solicitors, by 29 March 2021, after which date

the executor may convey or distribute the assets, having regard only to the claims of which he then has notice.

STIDSTON WARREN LAWYERS,
Suite 1, 10 Blamey Place, Mornington 3931.

PAUL DAVID PHELAN, late of Benetas Corowa Court, 752 Esplanade Mornington, Victoria, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 13 August 2020, are required by the executor, Marlene June Phelan, also known as June Phelan, to send particulars to her, care of the undermentioned solicitors, by 29 March 2021, after which date the executor may convey or distribute the assets, having regard only to the claims of which she then has notice.

STIDSTON WARREN LAWYERS,
Suite 1, 10 Blamey Place, Mornington 3931.

MURIEL ALICE SCOBERG, late of 1 Aberdeen Street, Reservoir, Victoria, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died on 15 March 2020, are required by the executor, Christine Anne Harris, of care of the undermentioned solicitors, to send particulars to her by 22 March 2021, after which date the executor may convey or distribute the assets, having regard only to the claims of which she then has notice.

TIVEY & HOLLAND, solicitors,
97 Barkly Street, Ararat 3377.

Re: MOIRA HELEN WILDY, late of 5 McDonald Street, Mordialloc, Victoria 3195, retired retail assistant, deceased.

Creditors, next-of-kin and others having claims in respect of the estate of the deceased, who died 17 February 2020, are required by the executor, Joy Mary Meekings, to send particulars to her, care of the undermentioned solicitors, by 23 March 2021, after which date the executor may convey and distribute the assets, having regard only to the claims of which she then has notice.

TRAGEAR & HARRIS LAWYERS,
1/23 Melrose Street, Sandringham 3191.

GOVERNMENT AND OUTER BUDGET SECTOR AGENCIES NOTICES

Planning and Environment Act 1987

MAROONDAH PLANNING SCHEME

Notice of the Preparation of an Amendment

Amendment C137maro

The Maroondah City Council has prepared Amendment C137maro to the Maroondah Planning Scheme.

The Amendment applies to all land in the City of Maroondah.

The Amendment proposes to introduce a Local Planning Policy into the Maroondah Planning Scheme to provide policy guidance for Environmentally Sustainable Development (ESD).

Specifically, the Amendment C137maro:

- amends the Municipal Strategic Statement (MSS) at Clause 21.06 to reflect the introduction of Clause 22.15 and references sustainable development; and
- introduces a new Clause 22.15 Environmentally Sustainable Development (ESD) into the Local Planning Policy Framework.

You may inspect the Amendment, any documents that support the Amendment and the explanatory report about the Amendment, free of charge, at: the Maroondah City Council website at https://yoursay.maroondah.vic.gov.au/esd; and/or the Department of Environment, Land, Water and Planning website www.delwp.vic.gov.au/public-inspection

Any person who may be affected by the Amendment may make a submission to the planning authority about the Amendment. Submissions must be made in writing giving the submitter's name and contact address, clearly stating the grounds on which the Amendment is supported or opposed and indicating what changes (if any) the submitter wishes to make.

Name and contact details of submitters are required for Council to consider submissions and to notify such persons of the opportunity to attend Council meetings and any public hearing held to consider submissions.

Should you wish to make a submission in relation to the Amendment, the closing date for submissions is 22 February 2021. Submissions must be in writing and sent to Phil Turner, Director Strategy and Community, Maroondah City Council, PO Box 156, Ringwood, 3134 or email maroondah@maroondah.vic.gov.au

The planning authority must make a copy of every submission available at its office and/or on its website for any person to inspect, free of charge, for two months after the Amendment comes into operation or lapses.

PHIL TURNER
Director Strategy and Community

Planning and Environment Act 1987

MILDURA PLANNING SCHEME

Notice of the Preparation of an Amendment

Amendment C112mild

The Mildura Rural City Council has prepared Amendment C112mild to the Mildura Planning Scheme.

The land affected by the Amendment is:

- The Amendment applies to all land in the Development Contributions Plan (DCP) Overlay 001, DCP Overlay 002 and DCP Overlay 003 which corresponds to the areas of Mildura South, Irymple and Nichols point.

The Amendment proposes to:

1. Replace the yearly infrastructure delivery schedule included in Schedule 1, Schedule 2 and Schedule 3 of the Development Contributions Plan Overlay (DCPO) in the Mildura Planning Scheme with a demand trigger delivery schedule. To do so, the Amendment updates the 'Time of Provision' column and the note below each Summary of Costs table at clauses 2.0 and 3.0 in schedule 1, schedule 2 and schedule 3 of Clause 45.06 (Development Contribution Plan Overlay) and amend Clause 72.04 to include the updated incorporated documents.
2. Update the project cost and levies in Schedule 2 of the Development Contributions Plan Overlay (DCPO) arising from the State-wide low density reform introduced via Amendment VC100 in 2013 applying to Nichols Point. The costs are required to be revised only for existing projects DG030 (drainage) and OS030 (open space) which are removed and replaced with revised project costs for public open space and drainage in DG401, DG402 and DG403.

The contributions figures are revised to reflect implications arising from both the new capital costs for revised projects DG401, DG402 and DG403 and the revised demand implications from the increased development yield across all identified Nichols Point projects for Areas 40-67 inclusive.

You may inspect the Amendment, any documents that support the Amendment and the explanatory report about the Amendment, free of charge, at the following locations: Council's Madden Avenue and Deakin Avenue Service Centres [if open]; Mildura Library, Deakin Avenue [if open]; or the Department of Environment, Land, Water and Planning website at www.delwp.vic.gov.au/public-inspection from date of gazettal.

Should you not have access to the internet and the above offices are closed or not accessible during office hours, please contact Coordinator Strategic Planning on (03) 5018 8419 to make alternative arrangements to inspect this Amendment.

Any person who may be affected by the Amendment may make a submission to the planning authority. Submissions must be made in writing giving the submitter's name and postal contact address, clearly stating the grounds on which the Amendment is supported or opposed and indicating what changes (if any) the submitter wishes to make.

Name and postal contact details of submitters are required for council to consider submissions and to notify such person of any public hearing held to consider submissions.

Submissions provided are considered public documents and issues/matters raised therein (including authorship) may be reported to Council in an open Council meeting Agenda or posted on Council's website. Enquiries regarding confidential submissions may be directed to the Coordinator Strategic Planning on (03) 5018 8419.

The closing date for submissions is Friday 5 March 2021. A submission must be sent to: Mr Peter Douglas, Co-ordinator Strategic Planning, Mildura Rural City Council, PO Box 105, Mildura, Victoria 3502.

The planning authority must make a copy of every submission available for any person to inspect, free of charge, for two months after the Amendment comes into operation or lapses. You may inspect copies of submissions at the following locations: Mildura Rural City Council website www.mildura.vic.gov.au; or Council's Deakin Avenue Service Centre [if open].

Should you not have access to the internet and the above offices are closed or not accessible during office hours, please contact Coordinator Strategic Planning on (03) 5018 8419 to make alternative arrangements to view copies of submissions.

An on-line public information session for residents to find out more about the proposed changes and speak to Council staff will be held Wednesday 10 February 2021, 6.00 pm – 7.30 pm.

RSVP to planning.services@mildura.vic.gov.au by Monday 8 February 2021 for electronic link.

SARAH PHILPOTT
Chief Executive Officer

Planning and Environment Act 1987

NORTHERN GRAMPIANS PLANNING SCHEME

Notice of the Preparation of an Amendment

Amendment C60ngra

The Northern Grampians Shire Council has prepared Amendment C60ngra to the Northern Grampians Planning Scheme. The land affected by the Amendment is within the settlement of Halls Gap.

The Amendment implements the findings of the following flood investigation:

- Halls Gap Planning Scheme Amendment (Water Technology, 2020)

The Amendment applies the Floodway Overlay and Land Subject to Inundation Overlay on land which is subject to flooding in a one in 100 year flood event, and includes Halls Gap to the Schedule 1 to Clause 44.03 Floodway Overlay and Clause 44.04 Land Subject to Inundation Overlay.

You may inspect the Amendment, any documents that support the Amendment and the explanatory report about the Amendment, free of charge, at the following locations: during office hours, at the offices of the planning authority, Council Customer Service Office, Town Hall, 59–69 Main Street, Stawell, and Halls Gap Visitor Information Centre, 117-119 Grampians Road, Halls Gap. The Amendment documents can also be viewed on the Council website https://www.ngshire.vic.gov.au/Council-Services/Planning-services/Planning-Scheme-Amendments.

Any person who may be affected by the Amendment may make a submission to the planning authority about the Amendment. Submissions must be made in writing giving the submitter's name and contact address, clearly stating the grounds on which the Amendment is supported or opposed and indicating what changes (if any) the submitter wishes to make. Name and contact details of submitters are required for Council to consider submissions and to notify such persons of the opportunity to attend Council meetings and any public hearing held to consider submissions. The closing date for submissions is Friday 5 March 2021. A submission must be sent to: Ms Sumaya Tonny, Strategic Planner, Northern Grampians Shire Council, PO Box 580, Stawell, Victoria 3380; or by email to ngshire@ngshire.vic.gov.au

The planning authority must make a copy of every submission available at its office for any person to inspect, free of charge, for two months after the Amendment comes into operation or lapses.

LIANA THOMPSON
Chief Executive Officer

Planning and Environment Act 1987

WHITTLESEA PLANNING SCHEME

Notice of the Preparation of an Amendment

Amendment C245wsea

The City of Whittlesea has prepared Amendment C245wsea to the Whittlesea Planning Scheme.

The Amendment affects land at 90 and 100 Bindts Road, Wollert.

The Amendment seeks to apply the Heritage Overlay (HO204) to 90 Bindts Road, Wollert on a permanent basis and amend the existing Heritage Overlay (HO161) for 100 Bindts Road.

You may inspect the Amendment, any documents that support the Amendment and the explanatory report about the Amendment, free of charge at the City of Whittlesea website at https://www.whittlesea.vic.gov.au/; or Department of Environment, Land, Water and Planning website at www.planning.vic.gov.au/public-inspection

Any person who may be affected by the Amendment may make a submission to the planning authority about the Amendment. Submissions must be made in writing giving the submitter's name and contact address, clearly stating the grounds on which the Amendment is supported or opposed and indicating what changes (if any) the submitter wishes to make.

Name and contact details of submitters are required for council to consider submissions and to notify such persons of the opportunity to attend council meetings and any public hearing held to consider submissions. The closing date for submissions is 5 March 2021.

A submission must be sent to Whittlesea City Council, Locked Bag 1, Bundoora MDC, 3083.

CRAIG LLOYD
Chief Executive Officer

Creditors, next-of-kin and others having claims against the estate of any of the undermentioned deceased persons are required to send particulars of their claims to State Trustees Limited, ABN 68 064 593 148, of 1 McNab Avenue, Footscray, Victoria 3011, the personal representative, on or before 26 March 2021, after which date State Trustees Limited may convey or distribute the assets, having regard only to the claims of which State Trustees Limited then has notice.

CURRAN, Jason Robert, late of Unit 9, 25 Redan Street, St Kilda, Victoria 3182, deceased, who died on 11 November 2020.

LESTRANGE, Shannon William, late of 12 Godwin Street, Wendouree, Victoria 3355, deceased, who died on 8 October 2020.

MORGAN, Robert Charles, late of Unit 107, 2 Flockhart Street, Abbotsford, Victoria 3067, deceased, who died on 21 October 2020.

O'SHEA, Michael Joseph, late of 60/3 Agg Street, Thornbury, Victoria 3071, deceased, who died on 14 October 2020.

SHAW, Desmond John, late of Room 23, Prague House, 253 Cotham Road, Kew, Victoria 3101, pensioner, deceased who died on 10 November 2020.

Dated 15 January 2021

Creditors, next-of-kin and others having claims against the estate of any of the undermentioned deceased persons are required to send particulars of their claims to State Trustees Limited, ABN 68 064 593 148, of 1 McNab Avenue, Footscray, Victoria 3011, the personal representative, on or before 29 March 2021, after which date State Trustees Limited may convey or distribute the assets, having regard only to the claims of which State Trustees Limited then has notice.

ANDREWS, Evelyn, late of Homestyle Aged Care, Point Cook, Manor 9, Hewett Drive, Point Cook, Victoria 3030, deceased, who died on 25 June 2020.

GROOM, Keith Ronald, late of Clovelly Cottage, 16 Stewart Street, Boronia, Victoria 3155, deceased, who died on 6 October 2019. IMPORTANT: Please ensure that the notice mentioned State Trustees and Robert Quentin Groom as the executors of the estate.

RICHARDS, Robert, late of Hope Aged Care, 34 Lux Way, Brunswick, Victoria 3056, deceased, who died on 27 September 2020.

SCHULZ, Peter Horst, late of Unit 1, 17 Newton Street, Reservoir, Victoria 3073, deceased, who died on 19 November 2020.

TITLER, Florentina Johanna, also known as Tina Titler, late of Room 12, Lexington Gardens Aged Care, 18 Villa Road, Springvale, Victoria 3171, deceased, who died on 11 February 2020.

WOODHALL, Harold William, late of Arcare, 31 Hampstead Road, Maidstone, Victoria 3012, deceased, who died on 12 August 2020.

Dated 18 January 2021

Creditors, next-of-kin and others having claims against the estate of any of the undermentioned deceased persons are required to send particulars of their claims to State Trustees Limited, ABN 68 064 593 148, of 1 McNab Avenue, Footscray, Victoria 3011, the personal representative, on or before 30 March 2021, after which date State Trustees Limited may convey or distribute the assets, having regard only to the claims of which State Trustees Limited then has notice.

BUCHMASSER, Therese, late of Allity Aged Care, 475 Swansea Road Lilydale, Victoria 3140, retired, deceased, who died on 13 September 2020.

CAMPBELL, Leanne Robyn, late of 9 Reita Avenue, Wantirna South, Victoria 3152, deceased, who died on 26 August 2020.

COOKE, Peter Michael, late of Estia Aged Care, 45 Silvan Road, Wattle Glen, Victoria 3096, deceased, who died on 25 February 2020.

GUNSTON, Peter, late of Unit 4, 16 Marriot Street, St Kilda, Victoria 3182, deceased, who died on 2 November 2020.

REID, Keith, late of Boyne Russell House, 184 Victoria Street, Brunswick, Victoria 3056, deceased, who died on 27 August 2020.

SMITH, Tony Brian, late of 15 Dutton Street, Toora, Victoria 3962, deceased, who died on 5 August 2020.

THOMPSON, Trevor Allan, late of Burrumbeet Caravan Park, 1185 Remembrance Drive, Burrumbeet, Victoria 3352, deceased, who died on 1 October 2020.

Dated 19 January 2021

Electoral Act 2002

APPLICATION FOR REGISTRATION OF A POLITICAL PARTY

In accordance with section 49 of the **Electoral Act 2002** (the Act), I hereby give notice of the following application for registration of a political party.

Name of party: Migrants Party

Abbreviation of party name: Migrants

Name of proposed registered officer: Kurukulasuriya Dilshan Finton Fernando.

Address of proposed registered officer: 105 Normanby Drive, Greenvale, Victoria 3059.

Proposed party logo: 

The application is signed by the secretary of the party.

Any person who believes that the party should not be registered because:

- it is not an eligible political party under the provisions of Part 4 of the Act;
- the application is not properly completed as required under section 45 of the Act;
- the party's name is not allowable under section 47 of the Act;
- the party's logo is not allowable under section 47A of the Act.

may object by writing to the Victorian Electoral Commission, Level 11, 530 Collins Street, Melbourne, Victoria 3000, by Monday 22 February 2021.

Details of any objections will be made available to the applicant.

Enquiries to: Katrina Collins on telephone (03) 8620 1145.

Dated 18 January 2021

WARWICK GATELY, AM
Victorian Electoral Commission

Essential Services Commission Act 2001

COUNCIL RATE CAP COMPLIANCE 2020–21

The Essential Services Commission has prepared an annual report on council compliance with the rate caps for 2020–21, in accordance with section 10E(2) of the **Essential Services Commission Act 2001**.

Copies of the report are available on the commission's website at https://www.esc.vic.gov.au/local-government/council-compliance-rate-caps/council-compliance-reports. Hard copies are available by calling the commission on (03) 9032 1300. Copies of past reports are also available on the commission's website.

This notice is prepared in accordance with section 10E(5) of the **Essential Services Commission Act 2001**.

Fisheries Act 1995

FISHERIES NOTICE

I, Travis Dowling, Chief Executive Officer of the Victorian Fisheries Authority, as delegate of the Minister for Fishing and Boating and having considered the outcome of consultation in accordance with section 3A of the **Fisheries Act 1995** (the Act), make the following Fisheries Notice under section 152 of the Act:

Dated 8 January 2021

TRAVIS DOWLING
Chief Executive Officer
Victorian Fisheries Authority

FISHERIES (SPIDER CRAB) NOTICE 2021

1. Title

This Notice may be cited as the Fisheries (Spider Crab) Notice 2021.

2. Objective

The objective of this Notice is to fix a reduced catch and possession limit for spider crabs by recreational fishers across Victorian waters.

3. Authorising provision

This Notice is made under section 152 of the Act.

4. Commencement

This Notice comes into operation on 1 February 2021.

5. Definitions

In this Notice –

spider crab means spider crabs from the family Majidae.

6. Catch and possession limit

For the purposes of the Act, the daily catch limit with respect to –

(a) the taking of spider crab from Victorian waters; or

(b) the possession of spider crab in, on or next to any Victorian waters – is 15 spider crabs.

Note: There are offences in sections 68A and 68B of the Act relating to taking or possessing fish of a species in excess of the catch limit in these Regulations specified for that species of fish. Various penalties apply.

7. Revocation

Unless sooner revoked, this Notice will be revoked on 31 January 2022.

Note: Section 152(3) of the Act provides that if a Fisheries Notice is inconsistent with any regulations, management plan, Ministerial direction, licence or permit, the Fisheries Notice prevails to the extent of the inconsistency.

Fisheries Act 1995

NOTICE OF ELECTION TO SURRENDER WESTERN PORT/PORT PHILLIP BAY FISHERY ACCESS LICENCE

I, Melissa Horne, Minister for Fishing and Boating and Minister responsible for administering the **Fisheries Act 1995**, give notice under Clause 6 of Part 2 of Schedule 4 of the **Fisheries Act 1995** as follows:

Each holder of a Western Port/Port Phillip Bay Fishery Access Licence, other than a licence holder who was notified by the Secretary that their election to retain their licence after 1 April 2022 was successful, may elect to surrender their licence in accordance with this notice.

To be eligible to surrender their licence, the licence holder must make their election in writing addressed to Chief Executive Officer (CEO), Victorian Fisheries Authority (VFA), 1 Spring Street, Melbourne 3000.

The election must include the name of the licence holder and the licence number which is being elected to be surrendered and must be signed by the licence holder.

The time for making an election to surrender opens on 25 January 2021 and closes on 19 February 2021. An election must be received by VFA prior to 19 February 2021.

If the election to surrender is successful, the licence holder will be notified by VFA that their election was successful.

In accordance with section 153H of the **Fisheries Act 1995**, if a licence holder is successful in their election to surrender the licence, the licence will be cancelled before 1 April 2021.

A licence holder whose licence is cancelled by the CEO of VFA under section 153H in this election period is entitled to be paid compensation calculated in accordance with, and limited to, Part 3 of Schedule 4 of the **Fisheries Act 1995**. For this election period, the amount of compensation is calculated pursuant to Table 1 in Part 3 of Schedule 4 of the **Fisheries Act 1995**.

All holders of a Western Port/Port Phillip Bay Fishery Access Licence will also be individually notified in writing of the total amount of compensation that would be payable as compensation in this election period in respect of their licence if it were to be cancelled in this election period, as calculated pursuant to Part 3 of Schedule 4 of the **Fisheries Act 1995**.

The making of this election does not entitle the licence holder to surrender their licence unless VFA notifies the licence holder in writing that the election is successful.

Dated 28 December 2020

MELISSA HORNE
Minister for Fishing and Boating

Geographic Place Names Act 1998

NOTICE OF REGISTRATION OF GEOGRAPHIC NAMES

The Registrar of Geographic Names hereby gives notice of the registration of the undermentioned place names.

Road Naming

Change Request Number	Road Name	Locality	Naming Authority and Location
134309	Hampson Lane	West Melbourne	Melbourne City Council (private road) The road traverses south from Roden Street.

Geographic Names Victoria

Land Use Victoria
2 Lonsdale Street
Melbourne 3000

CRAIG L. SANDY
Registrar of Geographic Names

Health Complaints Act 2016
Section 90

INTERIM PROHIBITION ORDER

This Interim Prohibition Order is made pursuant to section 90 of the **Health Complaints Act 2016**.

The Health Complaints Commissioner (Commissioner) has made this Interim Prohibition Order because the Commissioner reasonably believes that the general health service provider named below has contravened a code of conduct applying to the general health service being provided and is satisfied that it is necessary to make this order to avoid a serious risk to the health, safety or welfare of the public.

Name of the general health service provider on whom the Interim Prohibition Order is imposed:	Aliaa Mohammed Elmetwally Ismaeil Sherif, also trading as the 'Feel Young Again Clinic' and the 'Good Life Antiaging Company Pty Ltd'
Date this Interim Prohibition Order is made:	18 December 2020
Date on which this Interim Prohibition Order expires:	An Interim Prohibition Order can remain in force for up to 12 weeks. This Interim Prohibition Order will remain in force until 11 March 2021 while an investigation is conducted unless it is revoked before that date.
Effect of this Interim Prohibition Order:	1. The general health service provider named above must not: • advertise or cause to be advertised, or • offer or cause to be offered, or • provide or cause to be provided any general health service (paid or otherwise, in a clinical or non-clinical capacity). 2. The general health service provider named above must not establish, direct or otherwise operate any business that provides any general health service (paid or otherwise, in a clinical or non-clinical capacity). 3. The general health service provider named above must display a copy of this Interim Prohibition Order at their business premises and ensure that it is easily visible to the public. 4. The general health service provider named above must publish a copy of this Interim Prohibition Order on any website she uses to offer or promote any general health services.

In this Interim Prohibition Order 'general health service' and 'general health service provider' have the same meaning as in section 3 of the **Health Complaints Act 2016**.

This Interim Prohibition Order takes effect on the service of the order on the general health service provider to whom it applies.

This Order will be published in the Victoria Government Gazette and on the internet site of the Health Complaints Commissioner, www.hcc.vic.gov.au

KAREN CUSACK
Health Complaints Commissioner

Health Complaints Act 2016
Section 90

INTERIM PROHIBITION ORDER

This Interim Prohibition Order is made pursuant to section 90 of the **Health Complaints Act 2016**.

The Health Complaints Commissioner (Commissioner) has made this Interim Prohibition Order because the Commissioner reasonably believes that the general health service provider named below has contravened a code of conduct applying to the general health service being provided and is satisfied that it is necessary to make this order to avoid a serious risk to the health, safety or welfare of the public.

Name of the general health service provider on whom the Interim Prohibition Order is imposed:	Victor Bennett of Melton South in the State of Victoria, Director of Engaging Care Pty Ltd. ACN: 626 415 692, also trading as Men's First MHS.
Date this Interim Prohibition Order is made:	7 January 2021
Date on which this Interim Prohibition Order expires:	An Interim Prohibition Order can remain in force for up to 12 weeks. This Interim Prohibition Order will remain in force until 31 March 2021 while an investigation is conducted, unless it is revoked before that date.
Effect of this Interim Prohibition Order:	1. The general health service provider named above must not, directly or indirectly: a. advertise or cause to be advertised, or b. offer or cause to be offered, or c. provide or cause to be provided, or d. establish, direct or otherwise operate any business that either advertises, offers or provides (or causes to be advertised, offered or provided) any general health service, paid or otherwise, in a clinical or non-clinical capacity. 2. The general health service provider named above must display a copy of this Interim Prohibition Order at any premises where he provides any general health service and must ensure that it is easily visible to the public. 3. The general health service provider named above must publish a copy of this Interim Prohibition Order on the homepage of any website or social media platform he uses to offer or promote any general health service including (but not limited to), the following websites: ● <https://www.galaxy.com/profile/mr-victor-bennett/counsellor/488541> ● <https://www.halaxy.com/profile/victor-bennett/location/455381>

In this Interim Prohibition Order 'general health service' and 'general health service provider' have the same meaning as in section 3 of the **Health Complaints Act 2016**.

This Interim Prohibition Order takes effect on the service of the order on the general health service provider to whom it applies.

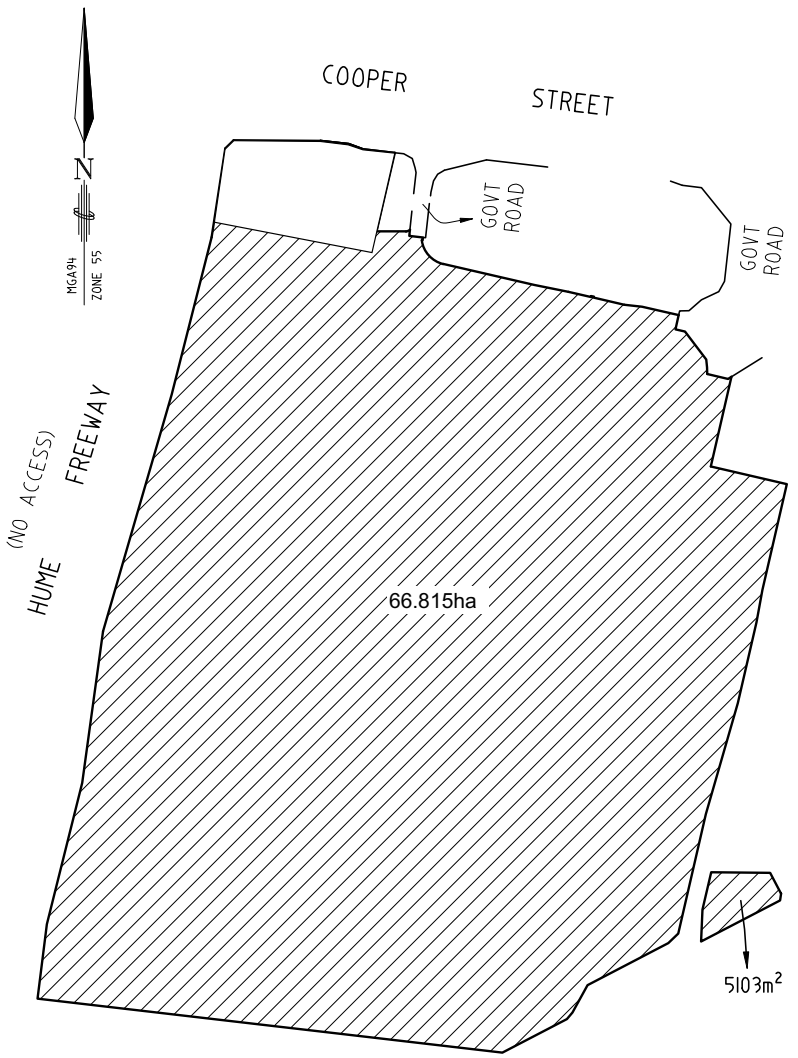
This Order will be published in the Victoria Government Gazette and on the Internet site of the Health Complaints Commissioner, www.hcc.vic.gov.au.

KAREN CUSACK
Health Complaints Commissioner

Melbourne Market Authority Act 1977

NOTICE OF VARIATION OF ENLARGEMENT OF MARKET LAND

In accordance with section 34 of the **Melbourne Market Authority Act 1977** (the Act), the Melbourne Market Authority revokes the declaration made pursuant to section 34 of the Act on 14 January 2017 (Victorian Government Gazette No. S 386) and declares that the land shown as hatched on the following plan, being land near the corner of the Hume Freeway and Cooper Street in Epping and being part of the land in Certificate of Title Volume 11575 Folio 183 and part of the land in Certificate of Title Volume 11575 Folio 184, to be part of the market land of the Melbourne wholesale fruit and vegetable market in accordance with the Act, with effect on and from the date of this notice



Dated 21 January 2021

MARK MASKIELL
Chief Executive Officer
Melbourne Market Authority
Enquiries: (03) 9258 6100

Major Transport Projects Facilitation Act 2009

(Section 15)

APPOINTMENT OF PROJECT PROPONENT

I, Jacinta Allan MP, Minister for Transport Infrastructure, as Project Minister for the Yan Yean Road Upgrade – Stage 2, being a project to which the **Major Transport Projects Facilitation Act 2009** (other than Parts 3 and 8) applies ('the Act'), give notice pursuant to section 15 of the Act that I have appointed the Secretary to the Department of Transport to be the project proponent for the Yan Yean Road Upgrade – Stage 2.

Dated 21 December 2020

Responsible Minister
HON. JACINTA ALLAN MP
Minister for Transport Infrastructure

Major Transport Projects Facilitation Act 2009

(Section 10)

DECLARATION OF A MAJOR TRANSPORT PROJECT

I, Daniel Andrews, Premier of the State of Victoria, in accordance with section 10(1)(b) of the **Major Transport Projects Facilitation Act 2009** (the Act) declare the transport project known as the Union Road and Mont Albert Road Level Crossing Removal Project to be a declared project to which the Act (other than Parts 3 and 8) applies.

This declaration comes into effect on the date it is published in the Government Gazette.

Dated 21 December 2020

HON. DANIEL ANDREWS MP
Premier of Victoria

Major Transport Projects Facilitation Act 2009

(Section 14)

APPOINTMENT OF MINISTER TO BE THE PROJECT MINISTER
FOR A DECLARED PROJECT

I, Daniel Andrews, Premier of the State of Victoria, in accordance with section 14 of the **Major Transport Projects Facilitation Act 2009**, appoint Jacinta Allan, the Minister for Transport Infrastructure, to be the Project Minister for the Union Road and Mont Albert Road Level Crossing Removal Project.

This declaration comes into effect on the date it is published in the Government Gazette.

Dated 21 December 2020

HON. DANIEL ANDREWS MP
Premier of Victoria

Marine Safety Act 2010

Section 208(2)

NOTICE OF BOATING ACTIVITY EXCLUSION ZONE

Corangamite Catchment Management Authority as the declared waterway manager for the Barwon River between the Lower Breakwater and Orana Road, hereby gives notice under section 208(2) of the **Marine Safety Act 2010** that all persons and vessels not registered to take part in Rowing Victoria 2021 Season Regattas on the Barwon River as detailed in Table 2 are prohibited from entering and remaining in the following waters.

Waters of the Barwon River between an imaginary line joining two signs stating 'Rowing Zone – Power Boat Zone' situated on opposite banks of the river at the downstream edge of the Princes Bridge (Shannon Avenue), and an imaginary line joining two signs stating 'Rowing Zone – Power Boat Zone' situated on opposite banks of the river approximately 115 metres west of the southern Swanston Street carpark, within the established rowing course area, provided the stated safety controls and undertakings detailed in the application form and associated documentation are adhered to.

The exclusion zone will be in effect for the times and dates detailed in Table 2 below.

Table 2

Name of Event	**Start date**	**End date**	**Start time** (include set up and specify am or pm)	**End time** (include breakdown and specify am or pm)
2021 Barwon Regatta	23/1/2021	24/1/2021	6 am	5 pm
2021 RV Schools – Morongo Regatta	30/1/2021	30/1/2021	6 am	5 pm
2021 RV Schools – The Geelong College Regatta	6/2/2021	6/2/2021	6 am	5 pm
2021 RV Schools – Firbank Regatta	13/2/2021	13/2/2021	6 am	5 pm
2021 RV Junior Girls State Championship	20/2/2021	20/2/2021	6 am	5 pm
2021 SSV Regatta	11/3/2021	11/3/2021	6 am	3 pm
2021 Head of the Schoolgirls Regatta	12/3/2021	14/3/2021	6 am	5 pm
2021 Geelong Masters Regatta	17/4/2021	17/4/2021	6 am	5 pm

Dated 18 December 2020

CORANGAMITE CATCHMENT MANAGEMENT AUTHORITY

Marine Safety Act 2010

Section 208(2)

NOTICE OF BOATING ACTIVITY EXCLUSION ZONE

Parks Victoria as the declared waterway manager for Lake Moodemere hereby gives notice under section 208(2) of the **Marine Safety Act 2010** that all persons and vessels not registered to take part in the Moodemere Slalom Classic are prohibited from entering and remaining in the following waters.

Waters of Lake Moodemere – 180 metres north of the boat ramp to an area delineated by yellow buoys at Picnic Point. Between the two GPS coordinates 36°02′46.57″S, 146°22′53.63″E and -36.052871, 146.386629

The exclusion zone will be in effect from 8.00 am to 7.00 pm on Saturday 13 and Sunday 14 February 2021.

Dated 21 January 2021

BY ORDER OF PARKS VICTORIA

Hindmarsh
Shire Council

Marine Safety Act 2010

Section 208(2)

NOTICE OF BOATING ACTIVITY EXCLUSION ZONE

Hindmarsh Shire Council as the declared waterway manager for Wimmera River (within the Shire of Hindmarsh) hereby gives notice under section 208(2) of the **Marine Safety Act 2010** that all persons and vessels not registered to take part in the Dimboola Boating & Ski Club, VIC/SA Barefoot Waterski Challenge 2021 are prohibited from entering and remaining in the following waters.

Waters of Wimmera River at Dimboola – between the Lloyd Street boat ramp to a point 50 metres downstream of the Dimboola Rowing Club ramp as marked by buoys.

The exclusion zone will be in effect from 7.00 am to 12.00 pm on Friday 22 and Monday 25 January 2021, and 7.00 am to 7.00 pm on Saturday 23 and Sunday 24 January 2021.

Dated 14 January 2021

HINDMARSH SHIRE COUNCIL

Plant Biosecurity Act 2010

ORDER PROHIBITING OR RESTRICTING THE ENTRY OR IMPORTATION INTO VICTORIA OF MATERIALS WHICH ARE HOSTS OF EUROPEAN HOUSE BORER

I, Rosa Crnov, as delegate of the Minister for Agriculture, being of the reasonable suspicion that the exotic pest European house borer exists within Australia but outside Victoria, make the following Order:

1 Objective

The objective of this Order is to prohibit, restrict or impose conditions upon the entry or importation into Victoria of materials which are hosts of European house borer.

2 Authorising Provision

This Order is made under section 36(1) of the **Plant Biosecurity Act 2010** (the Act).

3 Commencement

This Order comes into operation on the date of making.

4 Revocation

The Order entitled *Order prohibiting the entry of importation into Victoria of materials which are hosts of European house borer* made under section 36(1) of the **Plant Biosecurity Act 2010**, prohibiting or restricting the entry or importation of European house borer host materials into Victoria, and published in Victorian Government Gazette G2 on 16 January 2020 at pages 66–67, is **revoked**.

5 Definitions

In this Order –

'European house borer' means the exotic pest *Hylotrupes bajulus* (Linnaeus);

'host material' means any pinewood, including pallets, packing materials and structural pinewood, but excluding items made only from reconstituted pinewood, any pinewood product made only of heartwood, any pinewood product less than 4 millimetres thick, or pinewood household articles and furniture imported by or on behalf of a person for the personal use of the person or a member of the person's household (e.g. moving household furniture);

'pinewood' means any wood from trees of the genera *Abies* (Mill), *Picea* (Mill), *Pinus (*L.), *Araucaria* (Juss) or *Pseudotsuga* (Carriere);

'structural pinewood' means any pinewood which is part of an existing building or is to be used in the construction of a building.

6 Prohibitions, restrictions and conditions

The following prohibitions, restrictions and conditions are specified in relation to the entry or importation of host material.

(a) The entry or importation into Victoria of any host material is prohibited.

(b) Sub-clause (a) does not apply if the host material:

(i) originates from an area for which there is currently in force an area freedom certificate issued by an officer responsible for agriculture in the State or Territory from which the material originated, certifying that the area from which the material originated is known to be free of European house borer; or

(ii) is accompanied by a plant health certificate, assurance certificate or plant health declaration, certifying or declaring that the material has been treated in a manner described in the Schedule to this Order; or

(iii) enters Victoria under and in accordance with a permit issued by an inspector and there is compliance with any conditions or requirements set out in the permit.

7 Verification of consignments

Where requested by an authorised inspector, host material imported into Victoria, which is required by clause 6(b)(ii) to be accompanied by a certificate or declaration, must be presented to an authorised inspector for inspection.

8 Expiry

This Order remains in force for a period of 12 months after the date of making.

Schedule

Host material must –

(1) be treated –

(a) with a preservative specific for European house borer, and to a hazard class of H2 or greater as provided in the AS/NZS 1604 series *'Specification for preservative treatment'*; or

(b) by heating so that the core temperature at the product's greatest thickness, remains at or above 56°C for not less than 30 minutes, where treatment has occurred not more than 21 days prior to the host material's arrival in Victoria; or

(c) in the case where the cross section measures less than 20 centimetres, with methyl bromide in accordance with the following table and where treatment has occurred within 21 days prior to the arrival in Victoria; and

Temperature	**Minimum concentration dosage (g/m^3) at:**				
	Start	**2 hours**	**4 hours**	**12 hours**	**24 hours**
21°C or above	48	36	31	28	24
16°C or above	56	42	36	32	28
10°C or above	64	48	42	36	32

(2) in the case of structural pinewood, stored so as to prevent infestation:

(a) in a secure building, which has been inspected and approved by an authorised officer as being suitable for the purpose of excluding European house borer; or

(b) by fully wrapping in plastic film which is not ripped, torn or otherwise damaged; or

(3) in the case of pallets, be sourced from a supplier approved under a scheme administered by Quarantine Western Australia.

Dated 11 January 2021

ROSA CRNOV
Chief Plant Health Officer

Plant Biosecurity Act 2010

ORDER PROHIBITING OR RESTRICTING THE ENTRY OR IMPORTATION INTO VICTORIA OF MATERIALS WHICH ARE HOSTS OF CUCUMBER GREEN MOTTLE MOSAIC VIRUS

I, Rosa Crnov, as delegate of the Minister for Agriculture, being of the reasonable suspicion that the exotic disease cucumber green mottle mosaic virus exists within Australia but outside Victoria, make the following Order.

1 Objective

The objective of this Order is to prohibit, restrict or impose conditions upon the entry or importation into Victoria of materials which are hosts of cucumber green mottle mosaic virus (CGMMV).

2 Authorising provision

This Order is made under section 36(1) of the **Plant Biosecurity Act 2010** (the Act).

3 Commencement

This Order comes into operation on the date of making.

4 Revocation

The Order entitled *Order prohibiting or restricting the entry or importation into Victoria of materials which are hosts of cucumber green mottle mosaic virus* made under section 36(1) of the **Plant Biosecurity Act 2010** and published in Victoria Government Gazette G3 on 23 January 2020 at pages 158–159 is revoked.

5 Definitions

In this Order –

'host material' means any host plant, agricultural machinery and packages used in association with the growing, harvesting and packaging of any host plant, or earth material from properties on which host plants have been grown.

'host plant' means any plant or plant product, excluding fruit, from the family *Cucurbitaceae*.

6 Prohibitions, restrictions and conditions

The following prohibitions, restrictions and conditions are specified in relation to the entry or importation of host material.

(a) The entry or importation into Victoria of any host material is prohibited.

(b) Subclause (a) does not apply if the host material –

(i) originates from a State or Territory that is known to be free of CGMMV; or

(ii) originates from an area for which there is currently in force an area freedom certificate issued by an officer responsible for agriculture in the State or Territory from which the material originated, certifying that the area from which the material originated is known to be free of CGMMV; or

(iii) is accompanied by a plant health certificate, assurance certificate or plant health declaration, certifying or declaring that the host material has been treated in a manner described in the Schedule to this Order; or

(iv) enters Victoria under and in accordance with a permit issued by an inspector and there is compliance with any conditions or requirements set out in the permit.

7 Verification

Where requested by an inspector, host material imported into Victoria which is required by clause 6(b)(iii) to be accompanied by a certificate or declaration, must be:

(a) presented to an inspector for inspection; or

(b) verified by a person accredited to do so by the Department of Jobs, Precincts and Regions.

8 Expiry

This Order remains in force for a period of 12 months after the date of making.

Schedule

Host material must –

1. In the case of host plants, be grown on the property, and have been sampled, tested and found free of CGMMV within the previous 12 months.
2. In the case of agricultural equipment and packages, be cleaned free of earth material and organic matter by –
   (a) steam cleaning; or
   (b) washing with high pressure hot water; or
   (c) disinfection with a solution containing not less than 100 ppm available chlorine used as a spray rinse or drench treatment.

Dated 12 January 2021

ROSA CRNOV
Chief Plant Health Officer

Water Act 1989

DECLARATION OF NEW AREAS FOR WATER SUPPLY AND SEWERAGE

Declaration of Serviced Properties

City West Water has made provision to supply water and sewerage services to each property in the serviced areas known as:

SERVICED AREA	LOCATION	PS NUMBER
LND/17/00812	River Valley Estate – Stage 7B	740161W
LND/18/00718	11 Palm Springs Road, Ravenhall	823511K
LND/19/00031	91–167 Palm Springs Road, Ravenhall, Stage 1	827494K
LND/19/00981	Aspire Estate – Stage 24	818614D
LND/20/00738	90 Somerville Road, Yarraville	841665D

Pursuant to section 144 of the **Water Act 1989**, City West Water now declares each such property to be a serviced property for the purposes of:

(a) water supply;

(b) sewerage,

on and from 1 November 2020.

Please direct any enquiries about this declaration to City West Water on 9313 8379.

Water Act 1989

DECLARATION OF NEW AREAS FOR POTABLE WATER, RECYCLED WATER AND SEWERAGE

Declaration of Serviced Properties

City West Water has made provision to supply potable (drinking) water, recycled water and sewerage services to each property in the serviced area(s) to be known as:

SERVICED AREA	LOCATION	PS NUMBER
LND/17/01345	Riverdale Estate – Stage 19	811235A
LND/17/01630	The Glen Estate – Stage 7	817464B
LND/18/00372	Windermere Estate – Stage 7	817493T

Pursuant to section 144 of the **Water Act 1989**, City West Water now declares each such property to be a serviced property for the purposes of:

(a) potable water supply;

(b) recycled water supply; and

(c) sewerage,

on and from 1 November 2020.

Please direct any enquiries about this declaration to City West Water on 9313 8379.

Water Act 1989

DECLARATION OF NEW AREAS FOR WATER SUPPLY AND SEWERAGE

Declaration of Serviced Properties

City West Water has made provision to supply water and sewerage services to each property in the serviced areas known as:

SERVICED AREA	LOCATION	PS NUMBER
LND/16/01490	1–3 Essex Street, Footscray	803760A
LND/19/00590	40–44 Buckley Street, Footscray	838797D

Pursuant to section 144 of the **Water Act 1989**, City West Water now declares each such property to be a serviced property for the purposes of:

(a) water supply;

(b) sewerage,

on and from 1 December 2020

Please direct any enquiries about this declaration to City West Water on 9313 8379.

Water Act 1989

DECLARATION OF NEW AREAS FOR POTABLE WATER, RECYCLED WATER AND SEWERAGE

Declaration of Serviced Properties

City West Water has made provision to supply potable (drinking) water, recycled water and sewerage services to each property in the serviced area(s) to be known as:

SERVICED AREA	LOCATION	PS NUMBER
LND/18/00643	Windermere Estate – Stage 8	817494R
LND/18/01002	Ellarook Estate – Stage 6	822296R
LND/19/00477	Savana Estate – Stage 10	809300E
LND/19/00522	Marigold Estate – Stage 4	830849E
LND/19/00574	Pearland Estate – Stage 1	826722E
LND/19/00598	Elpis Estate – Stage 15	809757F
LND/19/00669	Elpis Estate – Stage 19	809738K
LND/19/01370	Emerald Estate – Stage 12	749002U

Pursuant to section 144 of the **Water Act 1989**, City West Water now declares each such property to be a serviced property for the purposes of:

(a) potable water supply;

(b) recycled water supply; and

(c) sewerage,

on and from 1 December 2020

Please direct any enquiries about this declaration to City West Water on 9313 8379.

Water Act 1989

DECLARATION OF NEW AREAS FOR WATER SUPPLY AND SEWERAGE

Declaration of Serviced Properties

City West Water has made provision to supply water and sewerage services to each property in the serviced areas known as:

SERVICED AREA	LOCATION	PS NUMBER
LND/18/01464	Kerani Heights Estate – Stage 2	825324X
LND/19/00964	3 Grendon Street, Truganina	803801N

Pursuant to section 144 of the **Water Act 1989**, City West Water now declares each such property to be a serviced property for the purposes of:

(a) water supply;

(b) sewerage,

on and from 1 January 2021.

Please direct any enquiries about this declaration to City West Water on 9313 8379.

Water Act 1989

CENTRAL GIPPSLAND REGION WATER CORPORATION –
DECLARATION OF SERVICED PROPERTIES

Pursuant to section 144 of the **Water Act 1989**, Central Gippsland Region Water Corporation declares the following land to be serviced property for the services listed below on or from the Declaration Date/s listed below.

Address	Service	Subdivision No.	Declaration Date
34 McFarlane Street, Stratford	Water and Sewerage	PS835791 H	1/12/2020
Heartwell Drive, Warragul	Water and Sewerage	PS818218 M	3/12/2020
Tassell Drive and Lillypilly Street, Warragul	Water and Sewerage	PS834307 W	3/12/2020
Applebox Crescent, Rodier Road and Silvertop Drive, Yarragon	Water and Sewerage	PS830597 F	10/12/2020
Emberwood Road, Heartwell Street, Lonsdale Court and Ormond Avenue, Warragul	Water and Sewerage	PS818216 R	11/12/2020
Albert Street, Rosedale	Water and Sewerage	PS837414 E	16/12/2020
Madsen Avenue, Dooyork Crescent and Kavanagh Street, Traralgon	Water and Sewerage	PS823971 X	23/12/2020
Peck Place, Sale	Water and Sewerage	PS642253 N – S2	24/12/2020

Water Act 1989

WESTERN WATER – DECLARATION OF SERVICED PROPERTIES

Pursuant to section 144 of the **Water Act 1989**, Western Water declares the following land to be serviced property for the listed services on or from the Declaration Date/s listed below.

Lot/s	PS Number	Address	Commence Date	Services
1–2	PS821694J	11 Kororoit Court, Kurunjang	05/12/2020	**Water**
1–6	PS822393T	43 College Square, Bacchus Marsh	27/09/2018	**Water/Sewer**
1–2	PS832073G	6 Old Farm Way, Romsey	11/12/2019	**Water/Sewer**
1–5	PS836640A	13 and 15 Dazln Drive, Melton	27/05/2020	**Water/Sewer**
301–366	PS817667L	Orchard Green Estate Stage 3	01/12/2020	**Water/Sewer**
412–413, 436–440	PS825845S	Orchard Green Estate Stage 4	01/12/2020	**Water/Sewer**
901–927	PS831641A	Monument Estate Stage 9, Jantar Way, Fraser Rise	02/12/2020	**Water/Sewer**
13001–13079	PS826739L	Mt Atkinson Estate Stage 13, Truganina	04/12/2020	**Water/Sewer**
14005–14007, 14013–14024, 14041–14055	PS826744T	Mt Atkinson Estate Stage 14A, Truganina	06/12/2020	**Water/Sewer**
14001–14004, 14008–14012, 14025–14040, 14056–14072	PS836015A	Mt Atkinson Estate Stage 14B, Truganina	07/12/2020	**Water/Sewer**
1101–1132	PS831697V	Monument Estate Stage 11, 1275 Plumpton Road, Fraser Rise	08/12/2020	**Water/Sewer**
2909–2933, 2940–2978	PS822264F	Thornhill Park Estate Stage 29, 951–971 Mt Cottrell Road, Thornhill Park	09/12/2020	**Water/Sewer**
501–537	PS825854R	Attwell Estate Stage 5B, Deanside	09/12/2020	**Water/Sewer**
3001–3052, 3060–3077	PS822276X	Thornhill Park Estate Stage 30, 951–971 Mt Cottrell Road, Thornhill Park	10/12/2020	**Water/Sewer**
1–3	PS838375G	23 Sulivans Road, Woodend	15/12/2020	**Water/Sewer**
11055–11085	PS543210K	Eynesbury Estate S112, St Arnaud Road, Eynesbury	05/10/2020	**Water/Recycled Water/Sewer**
11086–11097	PS543210K	Eynesbury Estate Stage S113, Goulburn Way, Eynesbury	07/10/2020	**Water/Recycled Water/Sewer**
11098–11123, 11146–11153	PS543210K	Eynesbury Estate Stage S114, St Arnaud Road, Eynesbury	07/10/2020	**Water/Recycled Water/Sewer**

11124–11145	PS543210k	Eynesbury Estate Stage S115, Goulburn Way, Eynesbury	07/10/2020	**Water/Recycled Water/Sewer**
4075–4107	PS543210K	Eynesbury Estate Stage 43, 808 Eynesbury Road, Eynesbury	09/10/2020	**Water/Recycled Water/Sewer**
11154–11183	PS543210K	Eynesbury Estate S116, St Arnaud Road, Eynesbury	19/10/2020	**Water/Recycled Water/Sewer**
4061–4074	PS543210K	Eynesbury Estate Stage S42, 18 Logan Street, Eynesbury	19/10/2020	**Water/Recycled Water/Sewer**

Water Act 1989

DECLARATION OF NEW AREAS FOR POTABLE WATER, RECYCLED WATER AND SEWERAGE

Declaration of Serviced Properties

City West Water has made provision to supply potable (drinking) water, recycled water and sewerage services to each property in the serviced area(s) to be known as:

SERVICED AREA	LOCATION	PS NUMBER
LND/18/00782	Westbrook Estate – Stage 57	825291L
LND/19/00004	Harpley Views – Stage 82	825784L
LND/19/00478	Elements Estate – Stage 15A	825802M

Pursuant to section 144 of the **Water Act 1989**, City West Water now declares each such property to be a serviced property for the purposes of:

(a) potable water supply;

(b) recycled water supply; and

(c) sewerage,

on and from 1 January 2021.

Please direct any enquiries about this declaration to City West Water on 9313 8379.

Interpretation of Legislation Act 1984

NOTICE OF AMENDED INCORPORATED MATTER IN THE PUBLIC HEALTH AND WELLBEING REGULATIONS 2019

1. The Public Health and Wellbeing Regulations 2019 were made on 10 December 2019 and commenced on 14 December 2019. These regulations incorporate by reference the *'Water quality guidelines for public aquatic facilities: Managing public health risks'* that were made in July 2019 and published on 20 August 2019.

2. The Department has amended the '*Water quality guidelines for public aquatic facilities: Managing public health risks'*, dated 9 December 2020 (the amended Guidelines). The amended Guidelines were published on 22 December 2020.

3. In accordance with the requirements of section 32(4)(a) of the **Interpretation of Legislation Act 1984**, a copy of amended Guidelines has been lodged with the Clerk of the Parliaments and will be laid before each House of Parliament.

4. In accordance with the requirements of section 32(4)(c) of the **Interpretation of Legislation Act 1984**, a copy of the amended Guidelines is available for inspection during normal office hours by members of the public, without charge, at 50 Lonsdale Street, Melbourne. Requests to inspect the amended guidelines can be directed to the Department of Health and Human Services' Water Unit at water@dhhs.vic.gov.au. The amended Guidelines are available for download from the Department of Health and Human Services' website, https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/quality-guidelines

WATER QUALITY GUIDELINES FOR PUBLIC AQUATIC FACILITIES
Managing public health risks
December 2020

CONTENTS

CHAPTER 1: INTRODUCTION

1.1 Purpose

While public aquatic facilities are vital for maintaining and promoting active lifestyles for improved health and wellbeing, these facilities have been associated with outbreaks of illness. Aquatic facility users, especially children, can be affected by disease-causing microorganisms that are passed through contaminated pool water, contaminated surfaces or through person-to-person contact.

These guidelines assist organisations and people who operate public aquatic facilities to reduce risks to public health. The focus of these guidelines is on water quality-associated risks. Outside the scope are risks related to pool design (such as hydraulics), physical safety (for example, slips and falls), drowning and sun protection. These guidelines also provide advice to local and state government environmental health officers to help fulfil their regulatory and advisory roles with respect to water quality.

1.2 Scope

The information and advice in these guidelines apply to all public aquatic facilities. Public aquatic facilities are those that are commonly used by the public. They include but are not limited to:

- public swimming pools and spa pools
- learn-to-swim pools
- school swimming pools
- aquatic facilities in gyms or fitness centres
- aquatic facilities associated with apartment blocks, retirement complexes and other strata title and body corporate developments
- aquatic facilities associated with holiday accommodation including holiday parks, caravan parks, hotels, holiday apartment complexes and motels
- water theme parks with installations such as water slides, wave simulators and 'lazy river' pools
- hydrotherapy pools
- domestic pools when used for commercial purposes (such as private learn-to-swim classes).

Specific information about interactive water features, also known as splash pads, spray parks and water play areas, is included in Appendix 1.

Although these guidelines may be useful to domestic swimming and spa pool owners, questions about water quality or maintaining these pools are best directed to a pool shop or pool contractor.

Organisations that manage natural bodies of water for recreational use should refer to the latest edition of the National Health and Medical Research Council's *Guidelines for managing risks in recreational water* (refer to 'Reference material').

For operational matters not covered by these guidelines, public aquatic facility operators should refer to the Royal Life Saving Society Australia *Guidelines for safe pool operations* (refer to 'Reference material'). This is the recognised guidance document for pool managers to safely operate aquatic facilities and includes guidance for facility design, risk management, safety equipment, first aid, asset management and supervision.

1.3 Water quality risk management plans

All public aquatic facilities must have a water quality risk management plan in place to help minimise potential public health risks.

A water quality risk management plan must include:

- staff roles and responsibilities, competencies and training requirements
- a description of the facility, its source water and its treatment systems
- water quality targets and treatment objectives

- hazard identification, risk assessment and control measures
- operational and verification monitoring
- incident management and response procedures
- data recording and reporting.

To assist aquatic facility operators to develop their water quality risk management plan, a template, supporting guide and completed example templates are available on the Department of Health and Human Services website <https://www2.health.vic.gov.au/public-health/water/aquatic-facilities/developing-water-quality-risk-mgmt-plan>. Aquatic facility operators can also use their own water quality risk management plan template if they prefer, provided that the required items are included.

When completing the water quality risk management plan, potential users of the aquatic facility, including any vulnerable groups such as children, immunocompromised, pregnant or elderly bathers, should be considered in the risk assessment. For example, an aged care or hospital aquatic facility may implement additional controls such as increased frequency of verification sampling to verify that water quality is within specification.

CHAPTER 2: PUBLIC HEALTH HAZARDS ASSOCIATED WITH PUBLIC AQUATIC FACILITIES

Key points

- Poorly managed public aquatic facilities can create ideal conditions for spreading disease.
- In public aquatic facilities, microbiological hazards pose the greatest risk to health because they can cause outbreaks of disease.
- Chemicals can pose a risk to the health of bathers and staff.

Public aquatic facilities are important for maintaining and promoting active lifestyles. Although using public aquatic facilities provides many health benefits, if aquatic facilities are not properly managed, the health of bathers may be put at risk. This is particularly relevant for vulnerable groups in our community such as young children, the elderly and people with low immunity.

Bathers can be affected by disease-causing microorganisms (pathogens) that are passed on through contaminated pool water, contaminated surfaces, contact with respiratory secretions or person-to-person contact. Similarly, certain chemicals can put the health of bathers at risk. This chapter provides general guidance on the types of public health hazards that bathers can be exposed to in public aquatic facilities.

2.1 Microbiological hazards

Microbiological hazards that can cause illness in humans include viruses, bacteria and protozoa. In public aquatic facilities, microbiological hazards pose the greatest risk to public health because they can cause outbreaks of illness.

Microbiological hazards are typically introduced into aquatic facilities through the following sources:

- faecal matter – for example, from a contaminated water source, through faecal accidents or through shedding of faecal matter from bathers
- other contaminants – for example, shedding from human skin, mucus, vomit or other secretions, from animals, windblown matter, stormwater runoff or natural inhabitants of warm water environments that flourish if introduced into poorly disinfected aquatic facilities.

Table 1 lists examples of illnesses related to microbiological hazards in public aquatic facilities. Gastroenteritis and skin, wound and ear infections are the most common. Other conditions such as respiratory illnesses caused by *Legionella* are less common and are typically associated with poorly maintained spa pools.

Illness caused by *Acanthamoeba,* atypical *Mycobacterium*, *Leptospira and Naegleria* from aquatic facilities are uncommon, with infrequent reports of illness in Australia or internationally.

Table 1: Illnesses associated with aquatic facilities

Type of illness	Group of causal microorganisms	Example causal microorganism	Example source of causal microorganism
Gastroenteritis	Virus	Norovirus	Faecal accidents Bather shedding Vomit accidents
Gastroenteritis	Virus	Hepatitis A	Faecal accidents Bather shedding Vomit accidents
Gastroenteritis	Virus	Adenovirus	Faecal accidents Bather shedding Vomit accidents

Type of illness	Group of causal microorganisms	Example causal microorganism	Example source of causal microorganism
Gastroenteritis	Bacteria	*Escherichia coli* (*E. coli*)	Faecal accidents Bather shedding Vomit accidents
Gastroenteritis	Bacteria	*Shigella*	Faecal accidents Bather shedding Vomit accidents
Gastroenteritis	Bacteria	*Campylobacter*	Faecal accidents Bather shedding Vomit accidents
Gastroenteritis	Protozoan parasite	*Cryptosporidium*	Faecal accidents Bather shedding Vomit accidents
Gastroenteritis	Protozoan parasite	*Giardia*	Faecal accidents Bather shedding Vomit accidents
Skin, wound and ear infections	Bacteria	*Pseudomonas aeruginosa*	Bather shedding in water or on wet surfaces
Skin, wound and ear infections	Bacteria	*Staphylococcus aureus*	Bather shedding in water or on wet surfaces
Skin, wound and ear infections	Virus	Molluscum contagiosum	Bather shedding in water, wet surfaces or swimming aids
Skin, wound and ear infections	Virus	Papillomavirus (plantar wart)	Bather shedding in water or wet surfaces, in particular on changing room floors and in showers
Skin, wound and ear infections	Virus	Varicella-zoster virus (chickenpox)	Direct contact with infectious fluid from an infectious person such as sharing a towel with an infectious person
Skin, wound and ear infections	Fungi	Tinea pedis (athlete's foot)	Bather shedding on floors in changing rooms, showers and facility decks
Eye and nose infections Respiratory infections	Virus	Adenovirus	Faecal accidents (and nasal and eye secretions)
Swimming pool granuloma Hypersensitivity Pneumonitis	Bacteria	Atypical mycobacterium	Bather shedding in water and on wet surfaces Aerosols from spas and water sprays
Legionellosis (Pontiac fever and Legionnaires' disease)	Bacteria	*Legionella*	Aerosols from spas and water sprays Inadequate disinfection Poorly maintained showers

Type of illness	Group of causal microorganisms	Example causal microorganism	Example source of causal microorganism
Granulomatous amoebic encephalitis (GAE) Keratitis	Protozoan amoeba	*Acanthamoeba*	Aerosols from spas Bather shedding in water or on wet surfaces
Wide ranging from flu-like symptoms to severe organ disease	Bacteria	*Leptospira*	Urine from infected animals
Primary amoebic meningoencephalitis (PAM)	Protozoan amoebae	*Naegleria fowleri*	Warm water environments that are inadequately disinfected Biofilm in pipes and other components in inadequately disinfected waters

Adapted from: NSW Department of Health 2013, Public swimming pool and spa pool advisory document

The risk of passing on illness increases if the pool water is not properly managed. Of all the microbiological hazards listed in Table 1, *Cryptosporidium,* the cause of the illness cryptosporidiosis, is responsible for most outbreaks of illness associated with public aquatic facilities. *Cryptosporidium* causes diarrhoea that, in some cases, can last up to 30 days. *Cryptosporidium* is a problematic microbiological hazard in public aquatic facilities because *Cryptosporidium* oocysts are much more resistant to chlorine disinfection than other microbiological hazards. Also, a person affected by cryptosporidiosis can continue to have *Cryptosporidium* oocysts in their faeces for several weeks after the symptoms have gone. Therefore, an exclusion period of at least 14 days after all symptoms have ceased is recommended to prevent potential contamination of a public aquatic facility.

2.2 Chemical hazards

Chemical hazards can pose a risk to the health of bathers and staff. It is important that chemicals are used and stored according to the manufacturer's instructions. Personnel who handle chemicals should be appropriately trained and wear the correct personal protective equipment. Safety Data Sheets should be available on site for all chemicals used by a public aquatic facility.

Disinfection by-products can also pose health risks. Disinfection by-products are chemical compounds that form when disinfection chemicals react with contaminants from the skin, hair, sweat, saliva, urine and other organic matter. The most common disinfection by-products associated with public aquatic facilities are chloramines and trihalomethanes.

Disinfection by-products pose a risk not only to water quality but also to air quality in indoor facilities. To help ensure the health and comfort of bathers and staff, ventilation rates detailed in the *Building Code of Australia* (Council of Australian Governments 2016) and Australian Standard 1668.2 should be followed for all indoor facilities.

2.3 Environmental hazards

Although bathers are mostly responsible for introducing contamination, it can also be introduced from the surrounding environment and can vary seasonally. Environmental contamination can be a problem for outdoor aquatic facilities where matter such as dust, soil, sand, leaves and grass can easily enter the pool. Birds, bats and other animals can also contaminate the pool with their droppings.

2.4 Water supply

The best available water supply, ideally mains drinking water, should always be used to fill a pool. Roof-harvested rainwater could be used for pools provided it is introduced into the pool through the balance tank to allow sufficient treatment. Recycled water, including treated stormwater or sewage, is not suitable to use in swimming pools due to risks to human health from microbiological and chemical contaminants.

CHAPTER 3: VICTORIAN REGULATORY FRAMEWORK

Key points

- The Public Health and Wellbeing Regulations outline the regulatory requirements that apply to all category 1 and category 2 public aquatic facilities in Victoria.
- Councils regulate aquatic facilities and conduct inspections to check compliance.
- Operators of all public aquatic facilities are legally required to have a water quality risk management plan and to keep water quality records for 12 months.
- Category 1 aquatic facilities must be registered with their local council from 14 December 2020.

3.1 Legislative requirements

In Victoria, aquatic facilities are regulated by councils under the **Public Health and Wellbeing Act 2008** and the Public Health and Wellbeing Regulations. The Public Health and Wellbeing Act provides council environmental health officers with powers to help them determine whether there is a public health risk at a public aquatic facility. The Act also provides enforcement tools to address public health risk.

3.1.1 Public Health and Wellbeing Regulations

The Public Health and Wellbeing Regulations define and apply to category 1 and category 2 aquatic facilities (Table 2).

Table 2: Aquatic facilities definitions

Category 1 aquatic facility	Category 2 aquatic facility
means a swimming pool, spa pool or interactive water feature that – (a) is used by members of the public,[1] whether free of charge or on payment of a fee; or (b) is used in association with a class or program that is offered free of charge or on payment of a fee; or (c) is located at the premises of an early childhood service, school or other educational institution; or (d) is located at premises at which residential aged care services are provided; or (e) is located at any of the following premises: (i) a public hospital; (ii) a multi-purpose service;[2] (iii) a denominational hospital; (iv) a private hospital; (v) a privately-operated hospital within the meaning of section 3(1) of the **Health Services Act 1988**	**means a swimming pool or spa pool that is used by members of the public[1] and located at the premises of the following –** (a) a residential apartment complex; (b) a hotel, motel or hostel;

[1] The term 'members of the public' means persons other than the owners and residents of the premises in which the aquatic facility is located.

[2] The functions of a multi-purpose service are the provision of any or a combination of the following – (a) public hospital services; (b) health services; (c) aged care services; (d) community care services; and further criteria as defined in the **Health Services Act 1998.**

These facilities are exempt from the regulations:

- a spa pool that is, or is intended to be, emptied of water after each use
- a floatation tank[3]
- a spring water pool that has a turnover rate of at least 25 per cent of the entire volume of the water in the pool to waste each hour
- a waterway within the meaning of section 3(1) of the **Water Act 1989**
- a private dam within the meaning of section 3(1) of the Water Act.

Division 3 of the Public Health and Wellbeing Regulations lists requirements for the 'aquatic facility operator' to ensure that any aquatic facility that this person owns, manages or controls is maintained and tested in the manner set out in the regulations. These regulations include requirements for registering category 1 aquatic facilities, water quality, record keeping, infection response, and a procedure for responding to noncompliance with microbiological parameters. The regulations are available online through the Victorian legislation and parliamentary documents website, which is listed in the 'Reference material' section.

3.1.2 Victorian Building Authority

The Victorian Building Authority oversees the **Building Act 1993** and the Building Regulations 2018, which prescribe requirements for designing, constructing and installing swimming pools and spas and their safety barriers. A building permit is required to ensure swimming pool construction complies with the Building Act, regulations, national construction code and relevant Australian Standards.

3.1.3 WorkSafe Victoria

WorkSafe Victoria governs occupational health and safety under the **Occupational Health and Safety Act 2004**. The occupational health and safety legislation has general provisions that apply to aquatic facilities to maintain a safe workplace and environment for bathers. WorkSafe's constructive compliance strategy uses a combination of incentives and deterrents to improve workplace health and safety. WorkSafe is also responsible for the **Dangerous Goods Act 1985**, which applies to aquatic facilities due to the handling and storage of dangerous chemicals such as chlorine.

3.1.4 The Safer Public Pools Code of Practice

The Safer Public Pools Code of Practice provides guidance about the operation and management of public aquatic facilities. It is intended to support duty holders to comply with their legal obligations under the Occupational Health and Safety Act and its accompanying regulations. The code was developed by Lifesaving Victoria in consultation with industry and government (Life Saving Victoria 2018).

3.2 Council

Councils are responsible for ensuring that aquatic facilities within their jurisdiction comply with the Public Health and Wellbeing Regulations. Councils inspect aquatic facilities and respond to complaints, incidents or outbreaks of illness linked to aquatic facilities.

Where required, councils may choose to use the powers in the Public Health and Wellbeing Act to investigate and ensure compliance with the regulatory requirements.

3.3 Department of Health and Human Services

The Department of Health and Human Services sets the regulatory framework and reviews the legislative requirements relating to public health risks from aquatic facilities. The department develops guidance to help councils administer the regulations and to educate stakeholders including members of the public on ways to prevent water quality issues at aquatic facilities. The department works closely with the aquatics industry to identify opportunities to address potential risks to public health.

3.4 Australian Pesticides and Veterinary Medicines Authority registered products

Swimming pool and spa chemicals sold in Australia are regulated under the Australian Government's **Agricultural and Veterinary Chemicals Code Act 1994**. The Australian Pesticides and Veterinary Medicines Authority (APVMA) operates the national system that evaluates, registers

[3] 'Floatation tank' means a heated, highly saline, fluid-filled enclosed tank designed for individual therapeutic use.

and regulates agricultural and veterinary chemicals. This means that swimming pool and spa chemical products must be registered with the APVMA before they can be sold to the aquatics industry or to the public.

This chemical registration process is described via the link to the APVMA website shown in the 'Reference material' section of these guidelines. Aquatic facilities must only use chemical disinfectants registered by the APVMA for their intended use in aquatic facilities.

3.5 Australian Standards

Several Australian Standards apply to public aquatic facilities. Where they are relevant for a particular facility, the most recently published Australian Standards should be complied with. A list of Australian Standards that apply to public aquatic facilities is provided in the 'Reference material' section of these guidelines.

CHAPTER 4: TREATMENT PROCESSES

Key points

- Aquatic facilities should adopt a multi-barrier approach to protect water quality that involves two or more types of treatment processes to reduce pathogen risk.
- At a minimum, treatment processes must include filtration combined with primary (chlorine- or bromine-based) disinfection.
- Secondary disinfection is recommended for all public aquatic facilities, particularly for high-risk facilities where there is a need for extra protection against *Cryptosporidium.*

Public aquatic facilities must maintain suitable water quality to prevent the spread of illness. Facilities are expected to have effective treatment barriers in place to reduce harmful microorganisms including viruses, bacteria and protozoan parasites. All public aquatic facilities should adopt a multi-barrier approach that involves two or more types of treatment processes to address pathogen risk. Each barrier (treatment process) on its own may not be able to completely remove or prevent contamination, but together, the barriers work to provide greater assurance that the water will be safe for use. Treatment processes need to be operated, monitored and maintained in accordance with manufacturer's instructions to minimise variability in performance.

At a minimum, treatment processes must include filtration combined with primary (chlorine- or bromine-based) disinfection. For facilities categorised as high risk, additional secondary disinfection such as ultraviolet (UV) disinfection or ozone is recommended to reduce *Cryptosporidium* risk.

4.1 Filtration

Key points

- Effective filtration improves the efficacy of disinfection and is an essential treatment step for protecting the health of public aquatic facility users.
- Filters capable of removing *Cryptosporidium* oocysts (4 microns in diameter) reduce the risk of cryptosporidiosis in bathers.
- New filtration systems should be designed to maximise the removal of *Cryptosporidium.*

In basic terms, filtration is a process of separating solids from liquids. In a public aquatic facility, filtration is a treatment process that physically removes suspended particles from the water. Effective filtration is essential pre-treatment to effective disinfection.

Filters are often categorised according to their allowable operating flow rates. The flow rate is a measure of how much water flows through each square metre of the filter medium's surface area per hour and is expressed as cubic metres per hour per square metre ($m^3/hr/m^2$), also described as the filtration flux (flowrate per unit area). Generally, the slower the flow of water through the filter, the more efficiently it filters to remove particulates. Filters installed at an aquatic facility will have a maximum operational flowrate based on the flux suitable for effective filtration.

It is recommended that new filtration systems be designed to maximise the removal of *Cryptosporidium.* Filters capable of removing particles 4 microns in diameter (NHMRC 2011) will provide additional protection against *Cryptosporidium,* noting that new aquatic facilities should also employ a secondary disinfection system (see section 4.2.3). Turbidity serves as a useful indicator of filter performance and can signal potential issues with filtration and flow rates, filter breakthrough or poor backwash routines. It is recommended that filtration systems are operated to continuously achieve filtrate turbidity less than 0.2 Nephelometric Turbidity Units (NTU).

'With chlorine-tolerant human pathogens like *Cryptosporidium* becoming increasingly common in aquatic venues, effective filtration is a crucial process in controlling waterborne disease transmission and protecting public health.'

– World Health Organization 2006

Where a public aquatic facility has several different pools or water attractions, each water body should ideally have its own filtration system. Independent filtration systems for each water body provides the potential to isolate water bodies at higher risk of contamination from lower risk pools,

thereby allowing for some parts of the facility to remain open if only one water body becomes contaminated. This is particularly important if pools are used by young children who have not been toilet-trained.

Each filtration system should ideally have multiple filter units to allow backwashing of one filter while maintaining filtration of the recirculating pool water. This flexibility also enables a planned inspection and maintenance program, which is essential for filter efficiency.

Filtration types differ markedly in terms of the media, coagulant, process configuration and the operational conditions applied. Each filter type should be operated in accordance with the manufacturer's specified operating parameters including filtration rates and run times, head loss and backwash rates. The filter capacity should be based on maximum bather numbers, operating 24 hours per day.

The following processes make filtration more effective:

- **Coagulation**. Where a facility uses media filtration, the use of coagulants and flocculants, when used in accordance with the manufacturer's instructions, can assist with removing fine, dissolved, colloidal or suspended material, and pathogens.
- **Backwashing** is the process of reversing the flow of water back through the filters to flush trapped material to waste. Backwashing should take place whenever the difference between the filter inlet pressure and the filter outlet pressure (differential pressure, or pressure drop) reaches a level identified by the manufacturer or based on a maximum filtration timeframe. Backwash water should always be sent to waste; the concentration of contaminants in backwash water makes it unsuitable for re-use (without advanced treatment).
- **Media filters** discard filtrate immediately following backwashing until the filtrate runs clear. This will help minimise the breakthrough of particulates following backwashing.
- **Air scouring** of media filters before backwashing can significantly improve filter cleaning because it breaks up sediment from the filtering media, allowing it to be backwashed out more easily.
- **Cartridge filters** must be removed and cleaned according to the manufacturer's instructions.

To monitor the efficacy of the filtration system, the operational monitoring program should include monitoring of the coagulation dosing process, flowrate, filtration cycle (including filter-to-waste times), triggers for backwashing and turbidity.

Turbidity should be monitored immediately post filtration. The recommended limits for turbidity are listed in Tables A2.1 and A2.2 in Appendix 2.

4.2 Disinfection

Key points

- Chlorine- and bromine-based disinfectants are the only chemical-based disinfectants acceptable for use in public aquatic facilities for primary disinfection.
- Recommended disinfectant residuals (concentrations) should be maintained at all times.
- Automatic dosing is recommended for all facilities for consistent and reliable dosing. Automatic dosing enables the operator to respond to variables such as bather numbers and weather conditions that can modify dosing requirements.
- Secondary disinfection should be designed to achieve a minimum of 3-$\log_{10}$ (99.9 per cent) inactivation of *Cryptosporidium* oocysts as water passes through the disinfection system.
- Pool circulation systems should have enough water turnover to ensure disinfected water is present in all parts of the aquatic facility.
- Operators of public aquatic facilities should implement proactive strategies to manage disinfection by-products.

Effectively disinfecting the water in a public aquatic facility is the best way to protect the health of bathers. Disinfection is the process of inactivating disease-causing microorganisms through either

physical destruction (for example, by UV light) or by adding specific disinfectant chemicals (for example, ozone). Filtration of pool water is required to remove particles and allow the chemicals to directly contact the microorganisms; therefore, disinfection systems should be located post filtration and treat 100 per cent of the filtration flow.

Not all disinfectants available on the market are fit to use in a public aquatic facility. Ideally a disinfectant should:

- be able to inactivate all disease-causing microorganisms
- be fast-acting
- maintain lasting residual effectiveness
- be dosed easily, accurately and safely
- be non-toxic at levels required for effective disinfection
- not cause damage to infrastructure
- be able to be measured accurately and simply on site.

In practice, no single disinfectant is able to meet all of these criteria completely.

The most suitable type of disinfectant will depend on a range of factors including:

- indoor or outdoor situation
- the type of aquatic facility – such as general pool or specialised hydrotherapy
- the chemical characteristics of the water supply
- the number of people who use the facility
- circulation capacity and pool design
- chemical handling and safety issues
- supervision and maintenance requirements
- pool water temperatures.

4.2.1 Types of disinfectants

In these guidelines, disinfectants are categorised as either 'primary' or 'secondary' disinfectants. Primary disinfectants must not only be capable of killing hazardous microorganisms, but they must also persist in the water to provide ongoing disinfection. They provide the greatest overall level of disinfection and should therefore be used at all public aquatic facilities. As mentioned in Chapter 3, in Australia the APVMA assesses primary disinfectants for their effectiveness and safety.

At the time of publication, the only primary disinfectants registered by the APVMA and acceptable to use in public aquatic facilities are specific compounds that are chlorine- or bromine-based. These disinfectants are generally effective at inactivating viruses and bacteria that can cause disease. However, neither chlorine nor bromine is effective against *Cryptosporidium* at levels that are acceptable for general use when the pool is operational.

Secondary disinfectants generally boost or support primary disinfection and are recommended for all facilities, particularly for high-risk facilities (see Table A2.4 in Appendix 2) where there is a need for extra protection against *Cryptosporidium*. Commonly accepted secondary disinfection systems include ozone and UV disinfection systems.

4.2.2 Primary disinfectants

4.2.2.1 Chlorine-based disinfectants

[Refer to Table A2.1 in Appendix 2 for the chemical criteria for facilities using chlorine-based disinfectants.]

Chlorine is the most common primary disinfectant and is generally effective at inactivating viruses and bacteria that can cause disease. Chlorine is not effective against certain protozoa such as *Cryptosporidium* at levels that are acceptable for regular use.

Approved chlorine-based chemicals include:

- elemental chlorine gas
- liquid chlorine (sodium hypochlorite)
- granular chlorine (calcium and lithium hypochlorite)
- electrolytic generation of chlorine from saline salt (salt chlorination)
- stabilised chlorine granules/tablets (dichloroisocyanurate and trichloroisocyanurate).

The concentration of stock chlorine solutions can degrade quickly with improper storage. As with all chemicals, chlorine should be stored in accordance with the label instructions.

When chlorine is added to water it forms a mixture of hypochlorous acid (a strong disinfectant) and hypochlorite ions (a weaker disinfectant). Together, hypochlorous acid and hypochlorite ion make up what is known as 'free chlorine'.

The pH of the water will affect how much of the stronger disinfectant (hypochlorous acid) is formed. To ensure free chlorine remains effective, pH is recommended to be maintained within the range listed in Table A2.1 in Appendix 2. If the pH drops too low, it may affect bather comfort; if it becomes too high the free chlorine will lose most of its disinfection power.

Free chlorine can react with nitrogen-containing contaminants in the water, such as ammonia, to form 'combined chlorine' or 'chloramine'. Combined chlorine is unwanted because it is not only a poor disinfectant, but it can also cause skin irritation, eye irritation, corrosion and a strong and offensive chlorine smell.

When added together, free and combined chlorine is called 'total chlorine'. When evaluating total chlorine values, the combined chlorine value should not exceed the level stated in Table A2.1 in Appendix 2.

Chlorine demand

Chlorine demand reflects the amount of free chlorine that is lost or used up through reactions with microorganisms and other contaminants in the water; it is the difference between the amount of chlorine added to the water and the amount of free available chlorine or combined chlorine remaining at the end of a specified time period. Chlorine demand is often relative to the number of bathers but is ultimately related to the total amount of contaminants in the water (e.g. leaves, dirt, cosmetics, sunscreen). The greater the chlorine demand, the greater the amount of chlorine that will need to be added to the water to ensure the minimum recommended free chlorine level is maintained at all times. Chlorine demand can be reduced by encouraging bathers to shower before they enter the water and designing public aquatic facilities such that environmental contamination is minimised.

Stabilised chlorine

In outdoor facilities sunlight breaks down chlorine, which can lead to significant losses of free chlorine. Stabilised chlorine (chlorine with cyanuric acid added to it) can be used to address this issue because cyanuric acid bonds loosely to the free chlorine to minimise the impact of UV light. It can be purchased as granules/tablets or can be formed by adding cyanuric acid to water containing free chlorine.

The decision to use stabilised chlorine in an outdoor aquatic facility and the level at which it is added should be balanced against the need for immediate remediation in the event of a diarrhoeal incident or *Cryptosporidium* contamination incident (refer to Appendix 6). Using stabilised chlorine can affect the effectiveness of hyperchlorination procedures. For hyperchlorination to be undertaken, cyanuric acid concentration levels need to be dropped below 15 mg/L. This may involve partially draining the pool and adding fresh water.

The maximum level of cyanuric acid that is recommended to be added to an outdoor pool is detailed in Table A2.1 in Appendix 2. Cyanuric acid reduces the disinfection power of hypochlorous acid, therefore the minimum free chlorine level should be maintained at the level listed in Table A2.1 in Appendix 2. Cyanuric should not be used in indoor pools.

4.2.2.2 Bromine-based disinfectants

[Refer to Table A2.2 in Appendix 2 for the chemical criteria for facilities using bromine-based primary disinfectants.]

Bromine is another primary disinfectant that works in a similar way to chlorine. Bromine-based chemicals include:

- bromo-chloro-dimethylhydantoin (BCDMH) tablets
- sodium bromide with an activator (hypochlorite or ozone).

Bromine is more stable at higher temperatures than chlorine but slightly less effective as a disinfectant, therefore the minimum concentrations must be higher. Bromine is commonly used in spa pools but, because it will decay in sunlight and cannot be stabilised, is rarely used in larger outdoor aquatic facilities.

The effectiveness of bromine is also affected by pH but to a lesser extent than for chlorine. To ensure bromine remains effective, pH should be maintained within the range detailed in Table A2.2 in Appendix 2.

Bather contact with brominated pool water can lead to skin issues such as itching and rashes. However, skin irritation is less likely to occur in properly maintained facilities where the right water balance is maintained and where regularly exchanging water prevents a build-up of disinfection by-products and other chemicals.

4.2.3 Secondary disinfectants

Secondary disinfection is recommended for all new high-risk public aquatic facilities (refer to Table A2.4 in Appendix 2) on the basis of the need for extra protection against *Cryptosporidium.*

4.2.3.1 Ultraviolet disinfection

UV disinfection has a higher energy than visible light, but because it has a shorter wavelength, it is invisible to the human eye. UV light is a powerful secondary disinfectant, particularly against bacteria and protozoa such as *Cryptosporidium.* The germicidal wavelength of UV light kills or inactivates these microorganisms by destroying their nucleic acid. However, because no lasting residual can be provided, UV light is not considered a primary disinfectant.

UV disinfection systems should be designed for full flow (not side stream) to achieve a minimum of 3-$\log_{10}$, or 99.9 per cent, inactivation of *Cryptosporidium* for interactive water features (splash pads, spray parks and water play areas) and a minimum of 2-$\log_{10}$, or 99 per cent, reduction for all other types of facility (Centers for Disease Control and Prevention 2018).

UV disinfection systems typically have one or more UV lamps installed in the pipework where the pool water circulates. The ‘sleeves’ that protect the UV lamps must be cleaned regularly so the lamps continue to emit the correct dose. The clarity and flow rate of the water can also impact the effectiveness of UV lamps, therefore the operational limits set by the manufacturer should be complied with. Some UV disinfection systems have self-cleaning lamp sleeves and provide for real-time monitoring of the dose rate.

The maximum and minimum levels required for chlorine and bromine remain the same when using UV disinfection. UV disinfection systems should be positioned before any chlorine or bromine dosing points because the UV light can reduce the concentration of disinfectant residual in the water.

4.2.3.2 Ozone

Ozone is a highly reactive gas that can be dissolved in water. When dissolved in water, it acts as a powerful disinfectant that can inactivate a range of disease-causing microorganisms. Ozone is not considered a primary disinfectant because no lasting residual can be provided.

Ozone is typically used with chlorine as a secondary disinfectant. It provides greater disinfection power and can inactivate *Cryptosporidium* oocysts. Ozone systems should be designed to achieve a 3-$\log_{10}$, or 99.9 per cent, reduction of *Cryptosporidium* for interactive water features (splash pads, spray parks and water play areas) and a minimum 2-$\log_{10}$, or 99 per cent, reduction for all other types of facility (Centers for Disease Control and Prevention 2018).

When ozone returns to its gaseous form, it can cause respiratory irritation. Therefore, where ozone is used as part of the water treatment system it must be removed from the water ('quenched') before the water is returned to the part of the facility where bathers are exposed. The treatment systems should include an activated carbon bed or ozone destructor for quenching ozone before the treated water is returned to the area where people are using the water. Due to the safety hazard from ozone, a breakthrough oxidation reduction potential (ORP) sensor should be installed after the carbon filter to shut down and raise an alarm if ozone is detected after the filter.

The maximum and minimum levels required for chlorine should be maintained when using ozone. Ozone systems should be located before any chlorine dosing points because the activated carbon bed or ozone destructor will also remove any chlorine in the water.

Avoid the use of ozone with BCDMH because it may produce bromate, a harmful disinfection by-product.

4.2.3.3 Chlorine dioxide

Unlike chlorine-based disinfectants, chlorine dioxide is not a form of primary disinfection because it does not produce free chlorine. Chlorine dioxide is a powerful disinfectant; however, it is more complex to dose consistently compared with chlorine and bromine. Some public aquatic facilities may use chlorine dioxide as a supplementary 'shock treatment' to manage the health risks associated with *Cryptosporidium* and *Giardia* or the build-up of biofilm. If the chlorine dioxide manufacturer has validated the treatment efficacy, some facilities may choose to use chlorine dioxide for managing chloramine concentrations or in response to faecal contamination incidents.

4.3 Automatic chemical dosing

Automatic dosing of chemical disinfectants is recommended for all public aquatic facilities. Automatic dosing systems can be programmed with a set range of values that ensure optimal disinfection. Automatic dosing systems will range in complexity but, at a minimum, all dosing systems should be operated to ensure chemicals are dosed within the operational set point range to ensure the appropriate disinfectant residual is maintained at all times. More advanced automatic dosing systems allow for 'proportional dosing' whereby the dose rate varies according to the magnitude of the deviation from the set point.

4.4 Disinfection by-products

Disinfection by-products are unwanted chemical compounds that form when disinfection chemicals react with organic matter including contaminants from the skin, hair, sweat, saliva, urine and other organic matter. The most common disinfection by-products associated with public aquatic facilities are chloramines and trihalomethanes. Public health risks from disinfection by-products in aquatic facilities are likely to be low. By contrast, microbiological risks are significant if disinfection is inadequate. At no time should disinfection be compromised or reduced over concerns relating to disinfection by-products.

4.4.1 Chloramines

Chlorine reacts with certain nitrogen-containing compounds introduced by bathers (mostly urine and sweat) to form chloramines (also known as 'combined chlorine'). Chloramines can cause skin and eye irritation and have a strong smell that bathers often incorrectly associate with high levels of chlorine.

Chloramines can also affect air quality in indoor venues. As such, adequate ventilation is essential. Specific advice on controlling the air-quality impacts of chloramines in indoor facilities is contained in the NSW Department of Health's (2013) fact sheet *Controlling chloramines in indoor swimming pools* (refer to 'Reference material').

Reducing the amount of nitrogen-containing compounds introduced into the water will help to reduce the rate at which chloramines are produced. Requiring bathers to shower with soap and rinse well before swimming or entering the water, and strongly encouraging regular toilet breaks, can help achieve this.

Chloramines can be controlled with secondary disinfection systems such as medium-pressure UV disinfection and ozone. Alternatively, breakpoint chlorination or oxidisers – such as hydrogen peroxide, chlorine dioxide and potassium monopersulphate – can be used. Breakpoint chlorination is a process where enough chlorine is added to a pool to oxidise chloramines in the water to ensure effective free chlorine residual is produced.

Chloramines can also be controlled in public aquatic facilities by regular shock dosing of chlorine to a concentration of at least 10 times the combined chlorine concentration. To prevent harm, shock dosing must only occur when the facility is closed. The facility should not be reopened until the total chlorine level is less than 10 mg/L. In instances where shock dosing does not remove or reduce chloramines, replacing a proportion of the facility's water with fresh water can reduce the level of chloramines present.

4.4.2 Brominated disinfection by-products

Bromine can react with certain organic chemicals to form brominated disinfection by-products. Reducing the amount of organic chemicals introduced into the water will help to reduce the rate at which brominated disinfection by-products are produced. Requiring bathers to shower with soap and rinse well before swimming or entering the water, and strongly encouraging regular toilet breaks, can help achieve this.

4.4.3 Trihalomethanes

Trihalomethanes are produced when chlorine- and bromine-based disinfectants react with organic matter that is introduced by bathers or the surrounding environment, or is present in the source water. While long-term exposure to trihalomethanes may be hazardous to human health, in a well-managed aquatic facility they are unlikely to be a significant health risk.

'The risks from exposure to chlorination by-products in reasonably well managed swimming pools would be considered to be small and must be set against the benefits of aerobic exercise and the risks of infectious disease in the absence of disinfection.'

– World Health Organization 2006

Like chloramines and brominated disinfection by-products, the level of trihalomethanes can be minimised by getting bathers to shower using soap and rinsing thoroughly before they enter the water.

4.5 Treatment validation

Key points

- Investigate the applicability of pre-validated treatment systems when looking to install or upgrade treatment processes.
- Ask the manufacturer to provide evidence to demonstrate the efficacy of their treatment process.
- Manufacturers should ensure their treatment processes are validated to substantiate the ability for microorganisms to be reliably removed or reduced under the specific operating conditions applicable to the aquatic facility.

Treatment validation is an important consideration in designing new public aquatic facilities. Treatment manufacturers have a responsibility to demonstrate the efficacy of their treatment process to achieve specific water treatment objectives. The process should also be applied when upgrading facilities (expansions and retrofits) and when trialling new treatment systems.

Treatment validation – *(Can it work?)* – brings together the evidence of a treatment process' ability to remove the target disease-causing microorganisms with data from operational monitoring – *(Is it working?)*. Operational monitoring is used to prove that the system is performing reliably (for example, through disinfectant residual monitoring or membrane integrity testing) and that events or conditions that could lead to system failure are immediately detected. Prompt corrective action can then prevent substandard water reaching bathing areas. Treatment validation should also be confirmed by verification monitoring – *(Did it work?)*. The focus of routine, continuous and day-to-day monitoring activity should be on operational monitoring to control water quality rather than less frequent verification monitoring, the latter being used to confirm whether the treatment process has or has not worked well, often involving just monthly to quarterly monitoring (refer to Table A2.6 in Appendix 2).

4.6 Troubleshooting guide

Many variables can affect public aquatic facility treatment systems. Common issues are summarised in the troubleshooting guide in Appendix 3. The information provided should be used as a guide only. There may be other causes that are not listed. Misdiagnosis or inappropriate action can worsen some problems to a point where the safety of bathers and staff is at risk. Only qualified or experienced staff should diagnose or undertake corrective actions. If you are unsure, it is best to seek professional advice.

CHAPTER 5: BATHER NUMBERS, WATER CIRCULATION AND TURNOVER TIMES

Key points

- All facilities should strike a realistic balance between the number of bathers it allows and the capacity of the facility and treatment plant.
- Effective water circulation ensures treated water reaches all areas of the facility and that polluted water is removed efficiently.
- Short turnover times, in combination with filters that can remove *Cryptosporidium* and/or secondary disinfection systems that can inactivate *Cryptosporidium,* provide the highest level of protection.

5.1 Bather numbers

Working out the maximum number of bathers that a facility can accommodate should consider factors such as the surface area of water in the facility, the water depth, the type of activity and the capability of the water treatment plant.

The maximum bather numbers for a facility should be recorded, and pool managers should ensure systems are in place so the maximum bather number is not exceeded.

Where entrance to the facility cannot be controlled, the issue of bather numbers should be addressed in the risk management plan.

The maximum bather numbers should be reviewed regularly to determine whether the treatment system can maintain water quality. If the maximum bather number is approached or exceeded, then operators may need to:

- implement strategies to reduce bather numbers (for example, by sectioning off parts of the pool)
- increase the treatment plant capability
- further dilute the pool water with fresh water
- use additional treatment such as ozone or UV disinfection.

5.2 Water circulation

Efficient water circulation in a public aquatic facility is very important because it ensures contaminants are adequately removed as quickly as practicable and that treated water reaches all areas of the facility.

Ideally, most of the pool water should be taken from the surface of the pool because it contains the highest concentration of contaminants. The remainder should be drawn from the bottom to remove grit and other matter that accumulates on the floor. Undertaking a dye test is a reliable way of assessing water circulation and should be conducted during commissioning of a new facility and repeated routinely following any changes to the filtration or hydraulic system as well as to ensure water circulation remains effective. A procedure for undertaking dye tests is detailed in the Centers for Disease Control and Prevention's *Water circulation dye test procedure* (refer to 'Reference material').

5.3 Turnover times

Turnover time is the time taken for a quantity of water that is equal to the volume of water in the aquatic facility to pass through the filtration system.

Facilities with high bather numbers and low volumes of water (such as shallow wading pools and spas) require short turnover times, so that water is circulated through the treatment process more frequently. This is due to the potential for higher contaminant loads in the water. Facilities with low bather numbers and high volumes of water (such as diving pools) can use longer turnover times.

A shorter turnover time means there is less time between when contaminants are introduced into the water and when that water passes through the facility's water treatment plant. Using a secondary disinfection system or a filter that can remove *Cryptosporidium,* means the risk to bathers is reduced. This is the basis of the worldwide trend to decrease the turnover time for public aquatic facilities.

A public aquatic facility operator may have limited control over the turnover time for an existing water treatment system. However, when retrofitting or upgrading an existing pool, or constructing a new public aquatic facility, site-specific turnover times should be adopted, and the inlets and outlets should be positioned so they provide the best water circulation and contaminant removal. The NSW Department of Health's *Public swimming pool and spa pool advisory document* (Chapter 7) and the Pool Water Treatment Advisory Group's *Swimming pool water – treatment and quality standards for pools and spas* (Chapter 6) both contain acceptable approaches for calculating site-specific turnover times (refer to 'Reference material').

If site-specific calculations are not used to determine turnover times, some recommended times for different types of public aquatic facilities are shown in Table A4.1 in Appendix 4.

CHAPTER 6: MANAGING WATER BALANCE

Key points

- Appropriately balanced water is essential for effective disinfection, bather comfort and protecting the aquatic facility's infrastructure.
- The most common method for checking the water balance is to use the Langelier Saturation Index, which takes account of the water's pH, total alkalinity, calcium hardness, total dissolved solids and temperature.

Water balance is about pool water chemistry and how different physicochemical parameters interact. These parameters include pH, total alkalinity, calcium hardness, total dissolved solids and temperature. Water that is not well balanced can affect disinfection, can be uncomfortable for swimmers and can result in scale forming or fittings corroding.

6.1 Langelier Saturation Index

The most common method for checking the balance of water is the Langelier Saturation Index (LSI). The LSI is a mathematical equation that relates to each of the parameters described below. This equation is described in detail in Appendix 5. The LSI should always be within the acceptable range (refer to Table A5.1 in Appendix 5).

6.1.1 pH

The pH of water is a measure of how acidic or alkaline the water is. The pH of water in all aquatic facilities should be maintained within the recommended range (refer to Table A2.1 (chlorinated facilities) and Table A2.2 (brominated facilities) in Appendix 2) to ensure effective disinfection and bather comfort.

If the pH is too high, it can be reduced by adding strong acids such as hydrochloric (muriatic) acid or sodium bisulphate (dry acid). Acid should always be diluted into water before being added slowly to the balance tank. Lowering the pH also lowers total alkalinity, so take care when adding acid to ensure the water stays in balance. Carbon dioxide can also be used to lower pH but, because it is a weak acid, the pH change will be slower than when using strong acids.

If the pH is too low, sodium carbonate (soda ash) can be used to raise it quickly. Sodium bicarbonate (bicarb soda) can be used to raise pH more slowly. Increasing the pH in this way also increases total alkalinity.

Automatic pH control is recommended for all public aquatic facilities and strongly recommended for high-risk facilities (refer to Table A2.4 in Appendix 2 for more information on aquatic facility risk categories).

6.1.2 Total alkalinity

Total alkalinity is a measure of the ability of water to withstand changes to pH (also referred to as its buffering capacity). Total alkalinity should be maintained within the recommended range (refer to Table A2.1 (chlorinated facilities) and Table A2.2 (brominated facilities) in Appendix 2).

If the total alkalinity is too low, the pH can change rapidly. If the total alkalinity is too high, it will be difficult to adjust the pH. Total alkalinity can be reduced by adding strong acids or raised by adding chemicals such as bicarb soda, though adding these chemicals will also affect pH.

6.1.3 Calcium hardness

Calcium hardness is the amount of calcium dissolved in the water. Balanced water should contain enough calcium so the water does not damage concrete surfaces or tile grout but not so much that it causes scale to form.

If calcium hardness needs to be raised, it can be increased by adding calcium chloride. If it needs to be reduced, it can be reduced by draining some water from the aquatic facility and introducing make-up water containing lower levels of calcium hardness.

6.1.4 Total dissolved solids

Total dissolved solids (TDS) describes the amount of salts and the small amounts of organic matter dissolved in water.

The level of TDS in water increases over time as bathers introduce contaminants or when water treatment chemicals are added. In general, TDS is managed by exchanging facility water with fresh make-up water. In a well-designed and well-operated aquatic facility, with regular backwash and routine exchange of water, TDS should not be a significant problem.

6.1.5 Temperature

The temperature of the water will affect its balance, although it is the least important of the water balance factors. Higher water temperatures can increase bacterial growth in the water, increase scaling and also affect the comfort of bathers. The temperature of any swimming or spa pool should not exceed 40°C.

It is important to consider how temperature may vary throughout the day and within the swimming or spa pool. Consideration should be given to when and where temperature is measured to ensure representative results. Locally warmer or cooler parts of the pool (for example, near lamps or heaters or after cooler water has topped up the pool or heaters have been off for some time) should be considered when measuring water temperature. Samples should be taken, or temperature monitoring devices installed and monitored, to capture the warmest temperatures experienced in the pool during its use.

CHAPTER 7: MONITORING

Key points

- Operational monitoring should be the focus for monitoring activities.
- Automated operational monitoring is recommended for all public aquatic facilities and strongly recommended for high-risk facilities.

Monitoring public aquatic facilities helps ensure the water quality is maintained. There are two types of monitoring: operational and verification.

Operational monitoring involves monitoring the performance of treatment processes or physical variables like water temperature. This could involve manual and/or automated operational monitoring to ensure that they are operating within the operational limits. Operational monitoring provides pool operators with an opportunity to address water quality immediately. It should be the focus of monitoring activities.

Alternatively, verification monitoring usually involves sending a water sample to a laboratory to verify the water quality criteria have been met.

7.1 Operational monitoring

Operational monitoring includes any automated or manual monitoring of chemical and physicochemical parameters (for example, concentration of primary disinfectant, pH and temperature) and is essential for all public aquatic facilities.

Facility operators need to test the water regularly to check that the water treatment systems are operating as expected. Automated operational monitoring provides for more frequent or even 'real time' monitoring and is therefore the better option for operational monitoring. Manual operational monitoring provides the next best method for determining whether the treatment systems are operating as they should.

See Appendix 2: Water quality criteria and monitoring frequencies for more information on operational monitoring requirements.

7.1.1 Automated operational monitoring

Automated operational monitoring (sometimes called 'online monitoring') generally involves using monitoring probes or instruments to provide real-time information about water quality parameters. These probes require periodic calibration against standard solutions or 'calibration standards'. Automated operational monitoring is needed when automatic dosing systems are used (such as automatic chlorine dosing) but may also be used to monitor other water quality parameters or treatment steps. Treatment processes should have online instrumentation to monitor their performance and trigger alarms and corrective actions to ensure that they are operating within specification and in accordance with the manufacturer's recommendations.

Online instrumentation for filtration systems may include coagulant dosing control, online filtrate turbidity, pressure differential and flowrate; for UV disinfection systems, UV transmissivity, flowrate, UV lamp age, UV lamp sensor; and for chlorination systems chlorine setpoint dose, chlorine residual monitoring, pH and temperature. Where automated operational monitoring is used, the results should be recorded electronically. The automated monitoring system should be configured to alert facility operators whenever operational parameters are not with acceptable limits.

Where automated operational monitoring is used, regular manual operational monitoring should also be used to confirm that the results from the automated systems are accurate. These samples should be taken from a location just before the monitoring probes.

7.1.2 Manual operational monitoring

Manual operational monitoring provides spot checks of chemical and physicochemical parameters. Manual samples should be taken from a location furthest from the inlets where bathers have not been present in the previous 60 seconds. Taking samples for ozone is an exception; these samples should be taken close to an inlet to confirm ozone is being removed or 'quenched'.

7.1.3 Test kits

All aquatic facilities should use appropriately calibrated photometers for manual operational monitoring. Domestic pool kits and test strips are not recommended for public aquatic facilities because they are not accurate.

7.1.4 Frequency of operational monitoring

All aquatic facilities should ensure disinfectant residual, pH and water balance (alkalinity, calcium hardness and TDS) are monitored regularly. Higher risk facilities should be monitored more frequently than lower risk facilities. Table A2.4 in Appendix 2 provides guidance on risk categories for public aquatic facilities. Table A2.5 in Appendix 2 provides recommended operational monitoring frequencies for each risk category.

7.2 Verification monitoring

Verification monitoring checks that the required water quality criteria have been met. Verification monitoring typically involves taking a water sample and sending it to an external laboratory for analysis.

Verification monitoring usually focuses on microbiological parameters but can also include certain chemical criteria that cannot be easily analysed by pool operators.

7.2.1 Microbiological parameters

Microbiological parameters that should be included in a verification monitoring program for aquatic facilities include heterotrophic colony count (HCC), *E coli* and *Pseudomonas aeruginosa.* Guideline values for each of these parameters are provided in Table A2.3 in Appendix 2.

7.2.1.1 Heterotrophic colony count

HCC, sometimes referred to as 'heterotrophic plate count' or 'total plate count', provides a basic indication of the microbiological quality of a water sample. HCC does not differentiate between harmless and potentially harmful bacteria; it provides a simple indication of the number of bacteria present in the water. However, it can also provide important information that can help determine whether the filtration and disinfection processes are operating effectively.

Elevated HCC results suggest disinfection systems are not operating as required and so the performance of the treatment processes should be checked. If a treatment deficiency is found, actions should be taken to correct it (refer to Appendix 6). If no treatment deficiencies are found, a resample should be taken to verify there are no ongoing issues. If ongoing issues are found, the treatment process and/or management of the aquatic facility may need to be improved, such as through enhancing cleaning, water chemistry, water turnover, reducing bather numbers or treatment upgrades.

7.2.1.2 *Escherichia coli*

E. coli is a bacterium found in large numbers in the faeces of warm-blooded mammals. Most strains of *E. coli* are harmless, but some can cause serious illness in humans. *E. coli* is typically used as an indicator of faecal contamination and its presence in water suggests that filtration and disinfection may not have been effective and therefore disease-causing microorganisms may also be present.

Where a laboratory does not analyse for *E. coli,* samples may be submitted for thermotolerant coliforms analysis because these are the next best indicator of faecal contamination. A noncompliant *E. coli* or thermotolerant coliforms result indicates deficiencies in disinfection and this should trigger an investigation into the performance of the treatment process. If a treatment deficiency is found, appropriate remedial actions will need to be taken (refer to Appendix 6) and a resample taken to verify the effectiveness of the remedial action. If no treatment deficiencies are found, a resample should be taken to verify there are no ongoing issues.

7.2.1.3 *Pseudomonas aeruginosa*

Pseudomonas aeruginosa is a bacterium that can cause a range of infections in humans. It can be introduced to the water from bathers or from the surrounding environment. *Pseudomonas* in the

water can mean that disinfection systems are not operating as they should, and appropriate remedial actions will need to be taken (refer to Appendix 6).

7.2.2 Chemical parameters

Chemical parameters that should be included in a verification monitoring program for aquatic facilities include chloramines and ozone, if used. Guideline values for each of these parameters are provided in Table A2.1 in Appendix 2.

7.2.3 Frequency of verification monitoring

Verification monitoring should never be used as a substitute for operational monitoring. Higher risk facilities should undertake more frequent verification monitoring than lower risk facilities. Table A2.4 in Appendix 2 provides guidance on risk categories for public aquatic facilities. Table A2.6 provides recommended verification monitoring frequencies for microbiological parameters for each risk category and Table A2.7 provides verification monitoring frequencies for chemical parameters for each risk category.

The frequency of verification monitoring may be reduced via a risk assessment process. For example, where long-term monitoring (for example, monthly over a full calendar year of operation) shows a chemical parameter to be consistently compliant with the guideline level, frequency can be reduced to quarterly.

The frequency of verification monitoring may also have to be increased in some circumstances. For example, following any significant change in pool operations or treatment, during high use periods or following a change in chemical used, verification frequency for relevant parameters should be increased until evidence of a return to stable values is shown.

Frequent verification monitoring should also be undertaken at all public aquatic facilities when commissioning new water treatment equipment or when there is some uncertainty about the effectiveness of the water treatment processes in place.

7.2.4 Taking a verification sample

Verification samples should be taken from a location furthest from the water inlets where bathers have not been present in the last 60 seconds. When taking verification samples, always follow these steps:

1. Use an appropriate sample container and take care to remove the cap of the sample bottle with one hand.
2. Immerse the bottle, neck down in the water, to a depth of about 300 mm. At this point the container should be tilted to face horizontally away from the hand and then be moved horizontally until the container is full.
3. Remove the sample container, replace the bottle lid and label before storing in an appropriate container (such as an esky or cooler). Ensure samples are maintained in the conditions and sample submission timeframes specified by the laboratory. Freezer bricks can be used to ensure the samples stay cool during transport and kept within the correct temperature range and the required holding period.
4. Submit the verification samples to a laboratory that the National Association of Testing Authorities (NATA) has accredited to perform the requested analysis.
5. Ensure samples are analysed within 24 hours of collection.

Microbiological sampling

Microbiological samples should only be taken using a sample container provided by the analytical laboratory. It is important that the analytical laboratory is aware that the sample is to be taken from an aquatic facility with disinfected water and to provide the appropriate neutralising agent in the sample container. Neutralising agent in the sample bottles helps to ensure the results of microbiological sampling are representative of the water quality. Samples should be maintained in the conditions and sample submission timeframes specified by the laboratory. Samples must be analysed within 24 hours of collection.

7.3 Record keeping

All aquatic facilities must maintain a record of operational and verification monitoring results for 12 months from the date of creation. Monitoring logs should be filled out when samples are analysed and then retained on site. An example of a monitoring log template is provided in Appendix 7.

Aquatic facilities should have arrangements in place to ensure the laboratory undertaking the analysis immediately reports the results to the person(s) responsible for managing and maintaining water quality. Results should be reviewed on receipt for compliance with the appropriate water quality requirements (refer to Appendix 2). Appropriate corrective actions should be undertaken in instances where noncompliant results are observed.

CHAPTER 8: HEALTHY SWIMMING

Five key messages for all pool bathers

- Do not swim if you have diarrhoea and do not swim for 14 days after symptoms have stopped.
- Shower and wash with soap, especially your bottom, before swimming.
- Wash your hands with soap after going to the toilet or changing a nappy.
- Change nappies in nappy change areas only.
- Avoid swallowing pool water.

Bather hygiene and aquatic facility design are important factors in keeping swimming pools clean and to prevent disease-causing microorganisms and environmental contaminants being introduced.

The regulations include a requirement that 'an aquatic facility operator must ensure that an aquatic facility is kept in a clean, sanitary and hygienic condition' (regulation 50: 'Condition of aquatic facilities').

8.1 Exclusion periods following illness

Bathers can introduce large numbers of disease-causing microorganisms into the water. Disease-causing microorganisms come from the faeces of infected bathers. The period during which disease-causing microorganisms are excreted varies from person to person; however, once pool water is contaminated with these microorganisms, disease can spread to other people, even when only small amounts of water are swallowed.

In the case of an infection with *Cryptosporidium,* an infected person typically excretes *Cryptosporidium* during the illness and up to 14 days after symptoms have resolved (two weeks after the diarrhoea has stopped). This is particularly concerning because sufferers, even those who are no longer symptomatic and have showered, may introduce a small amount of faecal matter into the water, causing contamination. Furthermore, *Cryptosporidium* is resistant to the levels of chlorine or bromine typically used for pool disinfection. This means it can survive in the water for long periods and potentially make others sick.

Signage should be displayed at every public access point advising bathers who have recently had a diarrhoeal illness to not swim for 14 days after symptoms stop. The signage should also advise parents to exclude their children for 14 days if their children have had a diarrhoeal illness. Staff who use a public aquatic facility as part of their job should also adhere to these exclusion periods, although these staff may still undertake tasks that don't involve being in the water.

Public aquatic facilities can encourage parents to prevent ill children from attending swim lessons by promoting exclusion periods and providing 'catch-up' swim lessons for children who have recently had a diarrhoeal illness. All facilities should offer learn-to-swim class structure fees to allow refunds or 'catch-up' lessons if a child is sick with diarrhoea (and for 14 days after symptoms resolve) during the enrolment period.

8.2 Showering

Some people can become infected with disease-causing microorganisms without becoming ill; these are known as 'asymptomatic' infections. Although these people might not become ill, they will still have disease-causing microorganisms in their faeces. These people, like all other bathers, may have small amounts of faecal material on their bottom, which can transfer disease-causing microorganisms into the water. For this reason, it is important that all bathers shower and wash with soap before entering the water.

Pre-swim showering is a difficult requirement to enforce for many existing aquatic facilities. Bathers can be prompted to shower before using the facility via strategically placed signage at public access points, by providing soap dispensers in the shower facilities and by ensuring change rooms are kept hygienic. Verbal reminders to encourage bathers to shower before using a public aquatic facility can help to change behaviour, reduce chlorine demand and reduce the rate at which disinfection by-products are created.

In the design of new aquatic facilities, showers should be easily accessible and strategically located. Consider designs that require bathers to enter the change rooms before they can enter the aquatic facility itself because this will encourage bathers to shower before entering the water.

8.3 Toileting and handwashing

To help minimise public health risks, it is important to encourage proper toileting behaviour among bathers. Parents and the guardians of children should be encouraged to ensure their young children use the toilet before entering a public aquatic facility as well as regular toilet breaks while at the facility. Toilets should include signs to encourage bathers to wash their hands with soap before returning to the water. Always provide enough soap for handwashing. In the design of new aquatic facilities, toilets should be easily accessible and positioned close to the swimming area(s).

8.4 Changing nappies

Nappy change areas should be provided in an easily accessible location, kept clean, sanitised regularly, and always be supplied with soap for handwashing. Wash-down water from nappy change areas should not be allowed to flow to the pool or stormwater. Bins should be provided for dirty nappies, and these should be emptied regularly.

Infant 'aqua nappies' and swim pants are commonly used but may give a false sense of security regarding faecal contamination. There is no evidence to suggest that they can prevent faecal material from leaking into the pool.

Regular nappy changing and frequent trips to the toilet can reduce the chance of a faecal accident. Staff should let patrons know that nappies can only be changed in nappy change areas rather than near the water's edge.

8.5 Avoid swallowing pool water

Many illnesses associated with public aquatic facilities occur after swallowing contaminated water, so all bathers should be discouraged from drinking pool water. Children should also be supervised and discouraged from 'whale spitting' because this can often lead to accidently swallowing water. If possible, locate drinking fountains at convenient locations within the aquatic facility, particularly near areas used for exercise.

8.6 Assistance animals

Assistance animals (such as guide dogs) can be permitted to enter a public aquatic facility but should not be permitted to enter the water.

8.7 Signage

Appropriate signage can help ensure bathers practise good hygiene. It is best to display signage at each public access point that says:

- If you currently have, or have had, diarrhoea you should not enter the water. You should not swim for 14 days after symptoms have stopped.
- Parents/guardians of children who have had diarrhoea in the past 14 days should ensure their children do not enter the water.
- Please shower, with your bathers removed, using soap and rinsing thoroughly before entering the water.
- Avoid swallowing the pool water.
- Parents/guardians should ensure young children use the toilet before entering the water and regularly while at this facility.
- Do not change nappies beside the pool or rinse off your child in the pool. Use the change room provided.
- Wash your hands thoroughly after using the toilet or changing nappies. Please use the soap provided.
- Do not urinate in the pool. This contaminates the pool water.

- Faecal accidents can happen. If you or your child doesn't quite make it to the toilet, please tell our staff immediately. Confidentiality will be respected.

Resource material, including posters, videos, postcards, colouring sheets and stickers that promote healthy swimming behaviours are available online. Refer to the Department of Health and Human Services' *Healthy swimming resources* in the 'Reference material' section.

8.8 Minimising the likelihood of environmental contamination

Environmental contamination can affect water quality in many ways. Public aquatic facilities should be designed to reduce the likelihood of environmental contaminants being introduced into the water.

For outdoor facilities, the surfaces around the facility should be sloped to direct stormwater away from the water body. Nearby trees should have overhanging branches removed. Any play equipment should be designed to discourage birds from roosting on it, and barriers (fences) are recommended to exclude animals.

For indoor aquatic facilities, environmental contamination is also a concern and is predominantly caused by bathers carrying microorganisms and organic matter into poolside wet areas. For a proactive approach to minimise environmental contamination, consider the following:

- Dirt traps. Matting should be placed at the entry and exit points to aquatic facilities to capture dirt and additional environmental contaminants carried in on footwear.
- Shoe removal points. Appropriately signed areas for shoe removal on entry to pool change areas and poolside wet areas can reduce contamination from the external environment. Although there is a need for staff to introduce culture change within aquatic facilities, introducing storage lockers for shoes and patrons' bags can help facilitate this change.

CHAPTER 9: INCIDENT RESPONSE

Key points

- Incidents that adversely affect water quality can occur at any public aquatic facility.
- Operators should have documented procedures for responding to incidents.
- Staff should be trained to respond to incidents appropriately.

9.1 Response procedures

Despite the best efforts of public aquatic facility operators, the water in an aquatic facility may become contaminated or a water treatment failure may occur. These incidents often present a real risk to the health of bathers and it is therefore necessary for the operator(s) to respond appropriately.

Operators should have documented and readily accessible procedures for responding to incidents and be trained to carry out these procedures.

Appendix 6 provides guidance on responding to a water quality incidents or treatment failures that may affect public health. These incident response procedures are primarily for larger aquatic facilities with large volumes of water. For smaller aquatic facilities, it may be easier to empty the affected water body, remove any accumulated contaminants retained in the filter, refill and re-establish the necessary water balance and disinfectant residual.

9.2 CT value

In incident response, it is important that all public aquatic facility operators are familiar with the concept of disinfection CT; a measure of disinfection effectiveness. CT is the concentration of the disinfectant residual multiplied by the contact time (expressed in minutes) at the point of residual measurement. It is expressed as milligrams (mg) of chlorine per litre (L) times the number of minutes for which this concentration of chlorine is maintained (for example, 15 mg.min/L). CT values are used to determine what concentration of disinfectant residual and what length of time is required to inactivate a certain type of disease-causing microorganism. Variations in disinfection time for a range of pathogenic organisms are shown in Table 3.

Table 3: Disinfection times for selected disease-caus ing microorganisms in pools

Contaminant[4]	**Disinfection time**[5] **(1 mg/L chlorine at pH 7.5 and 25°C, without cyanuric acid)**
E. coli bacteria	< 1 minute
Hepatitis A virus	16 minutes
Giardia parasite	45 minutes
Cryptosporidium parasite	15,300 minutes (10.6 days)[6]

Source: Centers for Disease Control and Prevention 2016, Disinfection and testing.

[4] In practice, only the *Cryptosporidium* value is relevant to most circumstances since that is the most resistant pathogen.

[5] These disinfection times relate to the given pH, temperature and disinfectant concentration ranges, and are influenced by other factors such as turbidity and cyanuric acid. For instance, required contact times will increase as pH rises and decrease as temperature rises, and vice versa.

[6] During an incident response, as summarised in Appendix 6, for water without cyanuric acid, a CT of 15,300 mg.min/L is required to inactivate the infectious *Cryptosporidium*. This can be achieved by maintaining a free chlorine concentration of 20 mg/L for 13 hours (15,300 ÷ 20 = 765 minutes or ~13 hours), or 10 mg/L for 26 hours (15,300 ÷ 10 = 1,530 minutes or ~26 hours), or via alternative combinations of chlorine concentration and time that achieve the required CT. A higher value applies to water with cyanuric acid, as noted in Appendix 6**.** Elevated levels of chlorine may damage the pool and its components. If required, consult a pool treatment specialist to determine a suitable combination of concentration and time for the affected pool(s). This requirement may not apply if a facility has a system that is validated to treat *Cryptosporidium* risk (for example, UV disinfection) and can be proven to have been operating within the validated parameters during and since the contamination event.

CHAPTER 10: OPERATOR TRAINING

Key points

- All staff involved in operating a public aquatic facility should undertake appropriate training for their role.
- Staff who operate high-risk facilities should undertake more extensive training.
- Managers of larger public aquatic facilities should consider obtaining industry accreditation.

Operators of public aquatic facilities should be committed to training and continuous professional development. Membership with a recognised industry body is encouraged.

The level of operator training should be proportionate to the risk of the facility. Operators of high-risk aquatic facilities should undertake more extensive training than those who operate lower risk facilities. It is strongly recommended that operators of high-risk facilities complete the relevant competency of either a Certificate III (course code CPP31218) or Certificate IV (course code CPP41312) in Swimming Pool and Spa Service, as offered by a registered training organisation.

The minimum standard for aquatic facilities would be for staff to undertake a short course offered by an industry body or registered training organisation. These typically cover the key water quality-oriented competencies of the Certificate III or IV.

Facility managers should ensure they have adequately trained staff who understand the treatment processes and know how to maintain water quality. Managers of public aquatic facilities, particularly managers of larger facilities such as aquatic centres and water parks, should also consider self-accrediting or obtaining formal accreditation under an industry-led accreditation framework for facility managers. This may involve completing qualifications specific to the role of managing a public aquatic facility and undertaking continuous professional development.

Operator training and competency in responding to water quality incidents should be incorporated into inspections of aquatic facilities.

APPENDIX 1: INTERACTIVE WATER FEATURES (SPLASH PADS, SPRAY PARKS AND WATER PLAY AREAS)

Interactive water features (IWF) such as splash pads, spray parks and water play areas have been associated with a number of disease outbreaks in Australia. The information provided below will help operators of IWFs to minimise the risk to public health.

Risk management

All IWFs should have site-specific risk management plans.

Location

IWFs are often located within public open spaces such as parks, so it is important to consider surrounding land uses and how other activities in the neighbouring area may affect the water quality of an IWF. For example, sand pits, garden beds and trees will increase the volume of physical contaminants (such as sand, dirt and leaf litter) entering the IWF. This will compromise the effectiveness of filtration and disinfection systems.

General site sanitation, including the availability of public infrastructure (such as toilet and shower facilities) will reduce physical and microbiological contamination of the IWF water system. Access to showers, toilets and baby change facilities encourage good hygiene practices among IWF users.

Ideally, fencing should be provided to keep out dogs and other animals during and outside operating hours. If this cannot be achieved, where IWFs are located in areas where animals may be present (for example, near dog parks), providing bag dispensers can prompt owners to collect and dispose of animal faeces.

System design

Full system design plans (as installed) and operating manuals should be maintained so they can be reviewed by an environmental health officer as required.

The following factors should be considered when designing an IWF:

- the quality and availability of the source water (only potable water should be used)
- containment structures and drainage including upstream interceptor drains to prevent stormwater runoff entering the IWF
- water circulation – recirculating water (subject to treatment and re-use) versus non-recirculating water (passes through the IWF only once)
- infrastructure – appropriately sized to achieve effective water circulation, turnover, filtration and disinfection targets
- materials and system components – fit for purpose (slip resistant, anti-entrapment) and able to withstand ongoing exposure to the surrounding environment including varying disinfection concentration levels (such as during periodic shock dosing)
- water flow – engineered to prevent both water stagnation and water pooling
- spray plume height and velocity – high spray plumes may expose more people due to the drift of water particles (aerosols), including people who may not be directly using the facility; low spray plumes may be more appealing to young children, resulting in accidental or intentional water consumption
- backflow prevention – this ensures water supply lines are protected from contamination. Any backflow device should be installed and commissioned to comply with the relevant plumbing and drainage legislation.

Recirculating systems

Water storage and circulation

Water should be stored and circulated to allow adequate water turnover and distribution of disinfectant throughout all parts of the system. Water tanks should be accessible for cleaning and inspection and be capable of complete draining. Storage capacity, including both the size

and number of tanks required, must be sufficient to ensure an adequate residual of disinfectant is maintained within the system.

Water temperature is an important consideration when sizing water storage tanks. Small volumes of water will heat rapidly when exposed to external surfaces during IWF operation, increasing the risk of microbiological growth. A water turnover rate of not more than 30 minutes is recommended due to the relatively small volumes of water and high contaminant load associated with IWFs. A flow gauge should be fitted to the system to demonstrate an adequate flow rate within the IWF.

Treatment

Filtration

Filtration systems should be fitted to remove particulate matter (soils, leaves, etc.) and potential disease-causing microorganisms. The filtration system should run constantly while the IWF is open to users.

For new aquatic facilities, the filtration system should be designed and operated to remove *Cryptosporidium* oocysts 4 microns in diameter or smaller and continuously achieve filtrate turbidity of not more than 0.2 NTU. Refer to Table A2.2 in Appendix 2.

Disinfection

Automatic dosing equipment and online monitoring equipment should be fitted to control the level of disinfectant in the water. Refer to Table A2.1 in Appendix 2 for water quality parameters and targets. Using cyanuric acid is unlikely to be beneficial where the majority of the water is contained in a balance tank. In addition, using cyanuric acid in such instances may reduce the effectiveness of chlorine disinfection.

Secondary disinfection

Secondary disinfection is recommended, usually in the form of UV disinfection, for all IWFs. UV disinfection can inactivate *Cryptosporidium* oocysts and medium pressure UV lamps can control combined chlorine while improving the water quality (including the odour from combined chlorine). A UV disinfection system should be installed in a location prior to the chlorine dosing point and run constantly while the IWF is open to effectively control the combined chlorine levels. Prioritise using validated equipment that is capable of delivering a UV dose required to achieve a minimum of 3-$\log_{10}$, or 99.9 per cent, inactivation of *Cryptosporidium* (Centers for Disease Control and Prevention 2018).

On-site monitoring

Daily on-site monitoring is essential for all IWFs and should include physically inspecting the site. This is important because IWFs are typically located in open public spaces and may be accessed after hours. On-site operational monitoring should be undertaken at all IWFs. This is important to gain an understanding of water quality and to verify the accuracy and reliability of any remote monitoring. The frequency of monitoring should be determined as part of the site-specific water quality risk management plan. Routine operational monitoring should include free chlorine, total chlorine, pH, alkalinity, cyanuric acid (if used) and water temperature. Refer to Table A2.1 in Appendix 2 for water quality parameter targets.

Records of physical inspection and on-site operational monitoring should be maintained and made available for compliance inspection.

Remote monitoring

To enable real-time, remote monitoring of free chlorine levels, pH and water temperature, IWF operators should install probes for free chlorine, pH and temperature.

The probes should be configured to allow automatic shutoff of the IWF when the free chlorine levels, pH levels or water temperature are out of specification.

If remote monitoring is used, the results should be reliable and accessible during operating hours and made available during compliance inspections.

Signage

Safety signage should be provided in a conspicuous location(s) and include:

- contact details for reporting issues/faults with the IWF
- advice to not swallow the water
- advice not to use the IWF if someone has diarrhoea, and for 14 days after symptoms have stopped
- advice for babies and toddlers to wear tight-fitting swim nappies
- the location of the nearest public toilets/change rooms
- advice that animals are prohibited from accessing the IWF.

Assistance animals

Assistance animals (such as guide dogs) can be permitted to enter an area with an IWF but should not be permitted to enter the IWF or drink the water.

Seasonal operation

For any IWF that are operated seasonally, to minimise water quality risks the IWF should be drained to remove any stagnant water prior to closing for the season. Prior to reopening, the system should be cleaned and disinfected.

Operator skills and knowledge

The owner or operator of an IWF should take reasonable care to ensure the person(s) responsible for managing the IWF has the appropriate skills, knowledge and experience. Further information on operator training is provided in Chapter 10.

Non-recirculating systems

The following systems present a lower public health risk and therefore may not require treatment:

- use mains drinking water supply
- do not recirculate water.

APPENDIX 2: WATER QUALITY CRITERIA AND MONITORING FREQUENCIES

Table A2.1: Chemical criteria for facilities using chlorine-based disinfectants

Parameter	Situation	Criteria(1)
Free chlorine(2)	Any pool without cyanuric acid, other than a spa pool	Min. 1.0 mg/L
Free chlorine(2)	Outdoor pool with cyanuric acid	Min. 2.0 mg/L
Free chlorine(2)	Spa pool	Min. 3.0 mg/L
Free chlorine(2)	Interactive water feature	Min. 1.0 mg/L
Combined chlorine (chloramines)	Any pool or interactive water feature	Max. 1.0 mg/L, ideally < 0.2 mg/L. Must be less than the free chlorine residual.
Total chlorine	Any pool or interactive water feature	Max. 10 mg/L
Turbidity (pool water)(3)	Any pool or interactive water feature	Max. 1 NTU(4), ideally < 0.5 NTU
pH	Any pool or interactive water feature	7.2–7.8
Total alkalinity	Any pool or interactive water feature	60–200 mg/L
Cyanuric acid	Outdoor pool only	Max.100 mg/L, ideally ≤ 30 mg/L
Ozone(5)	Any pool or interactive water feature	Not detectable

(1) mg/L is equivalent to parts per million or ppm.

*(2) **Free chlorine** concentration should be increased when high bather numbers are anticipated to ensure concentrations are never less than the minimum.*

*(3) If **turbidity** is measured immediately post filtration, it should not exceed 0.2 NTU (DIN 19643 (2012-11).*

*(4) **NTU** = Nephelometric Turbidity Unit. Ideally this would be measured with an appropriate device. If this option is not available, the following applies:*

'An aquatic facility operator must ensure that the water in the aquatic facility is maintained in a clear condition so that the floor of the aquatic facility or any lane marking or object placed on the floor of the aquatic facility is clearly visible when viewed from any side of the aquatic facility' (r. 51, Public Health and Wellbeing Regulations 2019).

(5) Residual excess ozone is to be quenched before circulated water is returned to the pool.

Table A2.2: Chemical criteria for facilities using bromine-based disinfectants

Parameter	**Situation**	**Criteria**(1)
Bromine(2)	Any pool, other than a spa pool	Min. 2.0 mg/L
Bromine(2)	Spa pool	Min. 6.0 mg/L
Bromine(2)	Any pool	Max. 8.0 mg/L
pH	Any pool	7.2–8.0
Sodium bromide	Bromine bank system	Max. 8.0 mg/L
Sodium bromide	Ozone(3)/bromide system	Max. 15 mg/L
Turbidity (pool water)(4)	Any pool	Max. 1 NTU(5), ideally < 0.5 NTU
Total alkalinity	Any pool	60–200 mg/L
Cyanuric acid	Any pool	None – no benefit

(1) mg/L is equivalent to parts per million or ppm.

(2) ***Bromine*** *concentration should be increased when high bather numbers are anticipated to ensure concentrations are never less than the minimum.*

(3) ***Ozone*** *quenching is not required in an ozone/bromide system.*

(4) If ***turbidity*** *is measured immediately post filtration, it should not exceed 0.2 NTU (DIN 19643 (2012-11).*

(5) ***NTU*** *= Nephelometric Turbidity Unit. Ideally this would be measured with an appropriate testing device, or via laboratory analysis. If this option is not available, the following applies:*

'An aquatic facility operator must ensure that the water in the aquatic facility is maintained in a clear condition so that the floor of the aquatic facility or any lane marking or object placed on the floor of the aquatic facility is clearly visible when viewed from any side of the aquatic facility' (r. 51, Public Health and Wellbeing Regulations 2019).

Table A2.3: Microbiological criteria for all facilities

Microbiological parameters

Parameter	**Guideline value**
Escherichia coli (or thermotolerant coliforms)	0 CFU(1)/100 mL or 0 MPN(2)/100 mL
Pseudomonas aeruginosa	0 CFU(1)/100 mL or 0 MPN(2)/100 mL
Heterotrophic colony count (HCC)	Less than 100 CFU/mL

(1) ***CFU*** *= Colony Forming Units*

(2) ***MPN*** *= Most Probable Number*

Table A2.4: Risk profiles to inform microbiological and chemical verification monitoring frequencies

Low-medium risk facilities	High-risk facilities
Residential apartment pools	Spas
Diving pools	Interactive water features
Lap pools (i.e. 25 m and 50 m pools)	Wading pools
Gym pools*	Learn-to-swim pools
Resort pools*	Program pools
Holiday park pools*	Hydrotherapy pools
Hotel/motel pools*	School pools
Theme park wave pools*	Water slides
	Shallow-depth interactive play pools
	Pools used by incontinent people
	Aged care facilities
	Retirement village pools
	Artificial lagoons with unrestricted access

Adapted from: NSW Department of Health 2013, Public swimming pool and spa pool advisory document (p. 34)

* *Note: The following are medium-risk facilities that may require increased monitoring consistent with high-risk facilities during peak seasonal use: lap pools, gym pools, resort pools, holiday park pools, hotel/motel pools, theme park wave pools.*

In instances where a facility manager is operating a type of facility that is not included in Table A2.4, the manager should identify the type of facility that is most similar and monitor accordingly.

If a facility falls into multiple risk categories, the facility should be monitored as if it were the type of facility in the highest risk category. For example, if a gym pool is used for learn-to-swim classes, the facility should be categorised as high risk.

Table A2.5: Minimum operational monitoring frequency(1)

Parameter	Category 1 and category 2 aquatic facilities
Disinfectant: Free chlorine, combined chlorine and total chlorine; or bromine	**For facilities with automated monitoring:** ● one check immediately before the pool opens for the day, and ● four hourly monitoring while the pool is open. At least one of these daily checks should be done by hand and analysed manually. It is strongly recommended that this occurs immediately before the aquatic facility opens for the day.
Disinfectant: Free chlorine, combined chlorine and total chlorine; or bromine	**For facilities without automated monitoring:** ● one daily check by hand and analysed manually immediately before the pool opens for the day, and ● four hourly monitoring by hand and analysed manually while the pool is open.

Parameter	Category 1 and category 2 aquatic facilities
pH	Tested at the same time as for disinfectant parameters (all facilities)
Water balance (includes calcium hardness, total alkalinity TDS and temperature)	Weekly (all facilities)
Turbidity	Daily (all facilities)
Cyanuric acid (if used)	Minimum monthly, ideally weekly (all facilities)
Condition of aquatic facilities: Facility must be kept in a clean, sanitary and hygienic condition	Aquatic facility operator to determine the inspection frequency necessary to ensure this regulatory requirement is met.

[1] The information provided in Table 2.5 is the minimum requirement under the Public Health and Wellbeing Regulations 2019. However, increased monitoring frequencies may be required based on the risk profile of the aquatic facility, as per Table A2.4. It is the responsibility of facility operators to determine if this applies. The frequency of monitoring should also be increased if the bather numbers increase significantly – for example, during school holidays.

Table A2.6: Recommended microbiological verification monitoring frequency

Parameter	Low-medium risk facilities	High-risk facilities
Escherichia coli (or thermotolerant coliforms)	Quarterly	Monthly
Pseudomonas aeruginosa	Quarterly	Monthly
Heterotrophic colony count (HCC)	Quarterly	Monthly

Table A2.7: Recommended chemical verification monitoring frequency

Parameter	Low-medium risk facilities	High-risk facilities
Chloramines (combined chlorine)	Quarterly	Monthly
Ozone (if used)	Quarterly	Monthly

Note: The frequency of monitoring should be increased if the bather numbers increase significantly. For example, during school holidays when bather numbers at public facilities increase significantly, medium-risk aquatic facilities should be monitored as if they were high-risk facilities.

APPENDIX 3: TROUBLESHOOTING GUIDE

The information in the following table should be used as a guide only. Where available, the troubleshooting guide provided by the manufacturer should be preferentially used. There may be other causes that are not listed. Misdiagnosis or inappropriate action can worsen some problems to a point where the safety of bathers and staff may be at risk. Only suitably qualified or experienced staff should diagnose or undertake corrective actions. If you are unsure, it is best to get professional advice.

Problem	Possible reasons	Action
pH too high	Mains water is alkaline (and hard)	Add more acid
pH too high	Alkaline disinfectant used	Consider changing to less alkaline disinfectant
pH too high	Alkaline disinfectant used	Adjust regularly/frequently/ automatically by acid dosing
pH too high	Alkaline disinfectant used	Check pH probe and control settings
pH too low	Mains water is acidic	Add more alkali (e.g. sodium bicarbonate / soda ash)
pH too low	Acidic disinfectant used	Check pH probe and control settings
pH too low	Acidic disinfectant used	Adjust regularly/frequently/ automatically by alkali dosing
pH fluctuations	Water is not buffered – alkalinity is too low	Check and raise alkalinity
pH fluctuations	Dosing erratic	Check dosing accuracy and frequency
pH difficult to change	Water too buffered – alkalinity too high	Check and lower alkalinity
Cloudy, dirty water	Bathing load too high	Reduce bathing load
Cloudy, dirty water	Filtration inadequate	Check filter, coagulant dosing, filtration rate, backwash
Cloudy, clean water	Hardness salts coming out of solution	Check and where necessary correct pH, alkalinity, hardness
Cloudy, clean water	Air introduced when dosing coagulant	Check on coagulant dosing; check air release on filters and for air leaks on the suction side of the pump
Cloudy, coloured water (outdoor pools mainly)	Algae – sunlight, poor hydraulics	Increase residual level and backwash; consider using algicide as directed by the label when the pool is not in use
Slimy, coloured growth on pool walls, floor, black on grouting	Algae – sunlight, poor hydraulics	Without bathers, brush or vacuum off algae, increase disinfectant level, backwash, consider using algicide as directed by the label when the pool is not in use
Water has a bad taste or smell – irritates eyes and throat	High combined chlorine	Check combined chlorine levels and type; be prepared to dilute or correct free chlorine level

Problem	Possible reasons	Action
Water has a bad taste or smell – irritates eyes and throat	pH outside of correct range	Check and correct if necessary
Chlorine level difficult to maintain	Sunlight	Consider a stabiliser (cyanuric acid)
Chlorine level difficult to maintain	Chlorine product has deteriorated and lost strength	Check storage condition of chlorine, shelf life and test strength of chlorine
Chlorine level difficult to maintain	Bather pollution	Reduce bathing load
Chlorine level difficult to maintain	Filter blocked, turnover reduced, hydraulics poor	Check filter, strainer, flow rate and valves; consider air-scouring filters, where possible
Chlorine level difficult to maintain	Injectors blocked	Check chlorine injection point
Filter blocked (pressure across the filter is too high)	Backwashing/cleaning too infrequent or scale blocking the filter	Check and improve backwash effectiveness; consider replacing filter media
Filter blocked (pressure across the filter is too high)	Incorrect coagulant dosing	Check coagulant dosing; inspect filter
Water clarity generally poor	Wrong filter or incorrect use	Check filtration media (backwashing, etc.)
Water clarity generally poor	Insufficient chlorine	Check and correct free chlorine residual
Water clarity generally poor	Incorrect or no coagulant	Check coagulant use
Hard scale on surfaces, fittings, pipes, etc.; water may feel harsh	Hardness salts coming out of solution	Check and where necessary correct pH, alkalinity, hardness
Cannot get test kit readings for free chlorine residual	Chlorine levels too high	Test a 5:1 diluted water sample
Cannot get test kit readings for free chlorine residual	Chlorine levels too low	Check chlorine dosing
Poor air quality (indoor aquatic facilities)	Air circulation poor	Check air handling – introduce more fresh air
Poor air quality (indoor aquatic facilities)	Combined chlorine too high	Restore recommended chlorine levels by achieving breakpoint to oxidise chloramines
Poor air quality (indoor aquatic facilities)	Temperature too high	Reduce to recommended levels
Water has a salty taste	Dissolved solids too high	Dilute with mains water
Staining at water inlet	Irons salts coming out of solution	Check pH, water balance, coagulation

Adapted from: Pool Water Treatment Advisory Group 2017, Swimming pool water – treatment and quality standards for pools and spas.

APPENDIX 4: RECOMMENDED TURNOVER TIMES

Ideally, aquatic facility turnover times should be calculated on a site-specific basis because turnover interacts with other key aspects of pool operational management including bather numbers, pool volume, bather hygiene and pool circulation (including location and capacity of inlets and outlets). Acceptable approaches to calculating site-specific turnover times can be found in the NSW Department of Health's *Public swimming pool and spa pool advisory document* (Chapter 7) and the UK Pool Water Treatment Advisory Group's *Swimming pool water – Treatment and quality standards for pools and spas* (Chapter 6).

If a site-specific calculation is not used, the following table shows some recommended turnover times.

Table A4.1: Recommended turnover times for different types of public aquatic facilities

Maximum turnover time	Pool type
30 min	Interactive water features, spas and hydrotherapy pools
1 hour	Waterslide, wading, indoor learn to swim pools
2 hours	Outdoor learn-to-swim, lazy river, program, wave, artificial lagoons with unrestricted access, pools used by incontinent people
4 hours	School, 25 m and 50 m leisure pools (recommended to be 2 hours if used by the general public)
6 hours	Retirement village pools (not used for organised exercise activities), residential apartment, gym, resort, holiday park and motel pools
8 hours	Diving pool

Adapted from: Pool Water Treatment Advisory Group 2017, Swimming pool water – treatment and quality standards for pools and spas and the Centers for Disease Control and Prevention 2018, The model aquatic health code <https://www.cdc.gov/mahc/index.html>.

APPENDIX 5: LANGELIER SATURATION INDEX

The most common method for determining the balance of water in a public aquatic facility is the Langelier Saturation Index (LSI).

The LSI should be between –0.5 and 0.5, with an ideal value of 0.

The LSI is calculated using the following equation:

LSI = pH + AF + CF + TF – 12.1

Where:

- *pH* is the measured pH of the pool water
- *AF* is a factor related to the total alkalinity of the water
- *CF* is a factor related to the calcium hardness of the water
- *TF* is a factor related to the water temperature
- 12.1 is an average correction factor for total dissolved solids (TDS).
- The values for each of the factors above can be obtained from Table A5.1.

Table A5.1: Table of values for Langelier Saturation Index calculation

Measured value for total alkalinity (mg/L)	**Value to use for the AF**	**Measured value for calcium hardness (mg/L)**	**Value to use for the CF**	**Measured value for temperature (°C)**	**Value to use for the TF**
5	0.7	5	0.3	Plunge pools are typically > 10°C	
25	1.4	25	1		
50	1.7	50	1.3	8	0.2
75	**1.9**	75	1.5	12	0.3
100	**2.0**	100	1.6	16	0.4
150	**2.2**	150	1.8	19	0.5
200	**2.3**	200	1.9	24	0.6
300	2.5	300	2.1	29	0.7
400	2.6	400	2.2	34	0.8
800	2.9	800	2.5	40	0.9
1,000	3.0	1,000	2.6	40°C is the maximum allowable temperature	

***Bold** text (values for total alkalinity for 75, 100, 150 and 200 mg/L) indicates ideal operational ranges. Where the LSI is negative, the water is corrosive and may damage pool fixtures and fittings. Where the LSI is positive, scale can form and interfere with normal operation.*

Example calculation

Consider a pool with a pH of 7.4, total alkalinity of 100 mg/L, calcium hardness of 250 mg/L, at 29°C.

Reading from the table, the alkalinity factor is 2.0, the calcium hardness factor is 2.0, and the temperature factor is 0.7.

LSI = pH + AF + CF + TF – 12.1

LSI = 7.4 + 2.0 + 2.0 + 0.7 – 12.1

LSI = 0

This pool water is ideally balanced.

If the calcium hardness of the same pool was 1,000 mg/L, then the calcium hardness factor would increase to 2.6. In this case, the LSI would be +0.6 and scale is likely to form. If scale forms on heater elements and filter components, the pool will not operate efficiently.

Corrections to the Langelier Saturation Index

The LSI described above applies to most aquatic facilities. However, there are exceptions related to facilities with high TDS water and for operators of outdoor pools using cyanuric acid. These exceptions are discussed in detail in the *American national standard for water quality in public pools and spas* (American National Standards Institutes 2019). If the TDS of the water in an aquatic facility is greater than 1,500 mg/L, the factors in the American Standard should be used. Where outdoor aquatic facilities use cyanuric acid to stabilise chlorine, this will affect the alkalinity, and the correction factors stated in that document should be applied.

APPENDIX 6: INCIDENT RESPONSE

Diarrhoeal incident – public aquatic facilities that use chlorine *without cyanuric acid*

[Refer to Remedial steps for spas.]

Diarrhoeal incidents pose a particularly high risk to the health of bathers. Immediately closing the affected water body(ies) and undertaking appropriate remediation is the only way to prevent the spread of disease.

Recommended remedial steps

1. Immediately close the affected water body and any other connected water body(ies) within the aquatic facility and ensure staff involved in the response have appropriate personal protective equipment.
2. Remove as much of the faecal material as possible using a bucket, scoop or another container that can be discarded or easily cleaned and disinfected. Dispose of the faecal material to the sewer. Do not use aquatic vacuum cleaners for removing faecal material unless the vacuum waste can be directly discharged to the sewer and the vacuum equipment can be adequately cleaned and disinfected.
3. Adjust the pH to 7.5 or lower.
4. Hyper-chlorinate the affected water body(ies) by dosing the water to achieve a free chlorine contact time (CT) inactivation value of 15,300 mg.min/L (for example, free chlorine of 20 mg/L for 13 hours or 10 mg/L for 26 hours or via alternative combinations of chlorine concentration and time that achieve the required CT).
5. Ensure filtration and any secondary disinfection systems operate for the whole decontamination process.
6. If the filtration system incorporates a coagulation step, ensure coagulant concentration is correct to enhance the filtration process.
7. After the required CT has been achieved, reduce total chlorine to below 10 mg/L. Sodium thiosulphate can be added to neutralise excess chlorine.
8. Backwash filter media or replace the filter element as appropriate. Precoat filter media should be replaced.
9. Ensure the water is balanced.
10. Hygienically clean, disinfect or dispose of materials, tools, equipment or surfaces that have come into contact with contaminated water.
11. Record the incident and remedial action taken.
12. Reopen the water body(ies).

***Cryptosporidium* and/or general suspected illness or possible outbreak**

Where a state or council environmental health officer suspects or confirms a public aquatic facility has been linked to illness, or an outbreak of illness (including by cryptosporidiosis), all water bodies in the facility should be disinfected as per the recommended remedial steps above. This requirement may not apply if a facility has a system that is validated to treat *Cryptosporidium* risk and it can be demonstrated to have been operating within the validated parameters during and since the contamination event. Note that *Cryptosporidium* has been singled out since it is the most common reported source of illness or outbreak associated with aquatic facilities in Australia.

Diarrhoeal incident – public aquatic facilities that use chlorine *with cyanuric acid*

[Refer to Remedial steps for spas.]

Diarrhoeal incidents pose a particularly high risk to the health of pool users. Immediately closing the affected water body(ies) and undertaking appropriate remediation is the only way to prevent the spread of disease. Chlorine stabiliser (cyanuric acid) significantly slows the rate at which free chlorine inactivates or kills contaminants such as *Cryptosporidium*. It is therefore important to achieve a much higher free chlorine CT than is necessary in water bodies that do not use cyanuric acid.

Recommended remedial steps

1. Immediately close the affected water body and any other connected water body(ies) in the aquatic facility and ensure staff involved in the response have appropriate personal protective equipment.
2. Remove as much of the faecal material as possible using a bucket, scoop or another container that can be discarded or easily cleaned and disinfected. Dispose of the faecal material to the sewer. Do not use aquatic vacuum cleaners for removing faecal material unless the vacuum waste can be directly discharged to the sewer and the vacuum equipment can be adequately cleaned and disinfected.
3. Adjust the pH to 7.5 or lower.
4. Ensure cyanuric acid is 15 mg/L or less (this can be achieved by partially draining and adding fresh water without chlorine stabiliser to the affected water body).
5. Once the cyanuric acid concentration is 15 mg/L or less, use unstabilised chlorine to hyperchlorinate the affected water body(ies) by dosing the water to achieve a free chlorine CT inactivation value of 31,500 mg.min/L (for example, free chlorine of 20 mg/L for 28 hours or via alternative combinations of chlorine concentration and time that achieve the required CT).
6. Ensure filtration and any secondary additional disinfection systems operate for the whole decontamination process.
7. If the filtration system incorporates a coagulation step, ensure coagulant concentration is correct to enhance the filtration process.
8. After the required CT has been achieved, reduce total chlorine to below 10 mg/L. Sodium thiosulphate can be added to neutralise excess chlorine.
9. Backwash filter media or replace the filter element as appropriate. Precoat filter media should be replaced.
10. Ensure the water is balanced.
11. Hygienically clean, disinfect or dispose of materials, tools, equipment or surfaces that have come into contact with contaminated water.
12. Record the incident and remedial action taken.
13. Reopen the water body(ies).

***Cryptosporidium* and/or general suspected illness or possible outbreak**

Where a state or council environmental health officer suspects or confirms a public aquatic facility has been linked illness, or an outbreak of illness (including cryptosporidiosis), all water bodies in the facility should be disinfected as per the recommended remedial steps above. This requirement may not apply if a facility has a system that is validated to treat *Cryptosporidium* risk and it can be demonstrated to have been operating within the validated parameters during and since the contamination event. Note that *Cryptosporidium* has been singled out because it is the most common reported source of illness or outbreak associated with aquatic facilities in Australia.

Formed stool and vomit contamination – public aquatic facilities that use chlorine *with* or *without* cyanuric acid

[Refer to Remedial steps for spas.]

Formed stool (faeces) and vomit contamination incidents pose a risk to the health of users. The only way to prevent the spread of disease is to immediately close the affected body(ies) and undertake appropriate remediation.

Recommended remedial steps

1. Immediately close the water body and any other connected water body within the aquatic facility and ensure staff involved in the response have appropriate personal protective equipment.
2. Remove the stool or as much of the vomit as possible using a bucket, scoop or another container that can be discarded or easily cleaned and disinfected. Dispose of the waste to the

sewer. Do not use aquatic vacuum cleaners for removing the stool or vomit unless vacuum waste can be discharged to the sewer and the vacuum equipment can be adequately cleaned and disinfected. Ensure filtration and any secondary disinfection systems run until the end of the decontamination process.

3. For facilities that *do not use chlorine stabiliser* (cyanuric acid), raise the free chlorine concentration to a minimum of 2 mg/L and maintain that concentration for 25–30 minutes, making sure not to exceed a pH of 7.5.

   or

   For facilities that *use chlorine stabiliser* (cyanuric acid), raise the free chlorine concentration to a minimum of 2 mg/L and maintain that concentration for 50 minutes, making sure not to exceed a pH of 7.5.

4. If the filtration system incorporates a coagulation step, ensure coagulant concentration is correct to enhance the filtration process.
5. Backwash filter media or replace the filter element as appropriate. Precoat filter media should be replaced.
6. Ensure the water is balanced.
7. Hygienically clean, disinfect or dispose of materials, tools, equipment or surfaces that have come into contact with contaminated water.
8. Record the incident and remedial action taken.
9. Reopen the water body(ies).

Note that no remedial action is required for blood in the water provided an appropriate primary disinfectant residual is present.

Failure to meet microbiological parameters

If, during verification monitoring, there is a failure to meet microbiological parameters (for example, exceedances of the *Escherichia coli* or *Pseudomonas* guideline values) remediation of the affected water body(ies) should be undertaken.

The microbiological compliance requirement is stated in the Public Health and Wellbeing Regulations 2019, regulation 49.

Microbiological quality of aquatic facility water (regulation 49)

An aquatic facility operator must ensure that while the aquatic facility is in operation the microbiological standard of the water in the aquatic facility is maintained within the following parameters:

- the heterotrophic colony count is less than 100 colony forming units per millilitre
- *Escherichia coli* is not detected in 100 millilitres
- *Pseudomonas aeruginosa* is not detected in 100 millilitres.

The regulations require that, in the event of microbiological non-compliance, aquatic facility operators must follow a prescribed response procedure (stated in regulation 59). This procedure is listed below.

Procedure for responding to non-compliance with microbiological parameters (regulation 59)

1. This regulation applies if an aquatic facility operator is notified by an initial laboratory report that any sample of water taken from the aquatic facility does not comply with the microbiological parameters set out in regulation 49.
2. Within 24 hours of receiving a notification, the aquatic facility operator must ensure that the following procedure is implemented:
   a. corrective action is taken to bring the water quality within the microbiological parameters set out in regulation 49

(a) any water quality risk management plan required under the Water Quality Guidelines that is in place for the aquatic facility is reviewed

b. any faults are corrected

c. any changes necessary to prevent a re-occurrence of those faults is implemented.

3. Within 48 hours of receiving a notification, the aquatic facility operator must ensure that a further sample of water is taken from the aquatic facility and provided to a laboratory to assess compliance with the microbiological parameters set out in r. 49.

4. Within 24 hours of receiving a report from a laboratory with the results of the testing undertaken in accordance with subregulation (3), the aquatic facility operator must notify the Council of the test results.

5. If a laboratory has tested a further sample of water in accordance with subregulation (3) and reports that the sample of water does not meet microbiological parameters set out in r. 49, the aquatic facility operator must ensure that the steps set out in subregulations (2) to (4) are repeated within 24 hours of receiving the laboratory report.

6. If a laboratory has tested a further sample of water in accordance with subregulation (5) and reports that the sample of water does not meet the microbiological parameters set out in r. 49, the aquatic facility operator must ensure the aquatic facility is closed and not operated until the water in the aquatic facility complies with microbiological parameters set out in r. 49.

7. Within 24 hours of closing the aquatic facility, the aquatic facility operator must notify the Council in writing of the closure.

Aquatic facilities should incorporate this procedure into their water quality risk management plan. All staff must be aware of this procedure and be trained in its implementation.

Recommended corrective actions (other than for spas)

1. Immediately close the affected water body and any other connected water body within the aquatic facility.

2. For facilities *with or without stabilised chlorine*, raise the free chlorine concentration to a minimum of 2 mg/L and maintain that concentration for 25–30 minutes, making sure not to exceed a pH of 7.5.

3. If the filtration system incorporates a coagulation step, ensure coagulant concentration is correct to enhance the filtration process.

4. Backwash filter media or replace the filter element as appropriate. Precoat filter media should be replaced.

5. Ensure the water is balanced.

6. Hygienically clean, disinfect or dispose of materials, tools, equipment or surfaces that have come into contact with contaminated water.

7. Record the incident and remedial action taken.

8. Reopen the water body(ies).

Recommended corrective actions for spas

1. Empty all water from the spa (including balance tanks).

2. Scrub and rinse with tap water all surfaces known to have an acceptable water quality.

3. Spray all surfaces with a chlorine solution of one part bleach to 10 parts water. Note that the dilution factor is based on a bleach product containing 10–12.5 per cent sodium hypochlorite. Apply liberally and leave to soak for 10 minutes.

4. Rinse with tap water known to have an acceptable water quality.

5. Refill the spa.

6. Raise the primary disinfectant level to that recommended in Appendix 2 (3 mg/L for chlorine or 6 mg/L bromine) and maintain that concentration for 25–30 minutes, making sure not to exceed a pH of 7.5.
7. Backwash filter media, or replace the filter element as appropriate. Precoat filter media should be replaced.
8. Ensure the water is balanced and the concentration of disinfectant is acceptable.
9. Hygienically clean, disinfect or dispose of materials, tools, equipment or surfaces that have come into contact with contaminated water.
10. Record the incident and remedial action taken.
11. Reopen the spa.

In major contamination events it may be necessary to submit a sample of the water to show it is free of microbiological contamination before reopening. Public aquatic facility operators should contact a council environmental health officer for advice.

Contamination of surfaces

Hard surfaces within a public aquatic facility may become contaminated with faeces, vomit or blood, or with water of poor quality that has been contaminated by such substances. In these instances, operators should follow the remediation measures below.

1. Restrict access to the affected area.
2. Remove all visible contamination with disposable cleaning products and dispose of appropriately.
3. Disinfect the affected area using a chlorine solution of one part household bleach to 10 parts water. Note that the mentioned dilution factor is based on a bleach product containing 10–12.5 per cent sodium hypochlorite. Apply liberally and leave to soak for 10 minutes.
4. Hose the affected area, directing the water to a stormwater drainage point.
5. Record the incident and remedial action taken.
6. Reopen the affected area.

APPENDIX 7: EXAMPLE AQUATIC FACILITY WATER QUALITY DAILY MONITORING LOG

Day and date		Aquatic facility	<Name of your pool>	Opening time:	Closing time:

		Free chlorine mg/L	Total chlorine mg/L	Combined chlorine mg/L	pH	Temp °C	Total alkalinity	Cyanuric acid	Calcium hardness	Water clarity	Condition of facility	Filters operating	Are results compliant?	Corrective actions required	Signed by
Check prior to opening	Time														
	Time														
	Time														
	Time														
	Time														
	Time														

Water balance
e.g. Langelier Saturation index (LSI)
SI = pH + TF + AF + CF – 12.1

	pH	Temperature factor	Alkalinity factor	Calcium factor	SI result	Performed by
Factor						

Close out

Name		Position	
Signed		Date	
Supervisor		Signed:	Date:

GLOSSARY

Term	Definition
Acid	A liquid or dry chemical used to lower the pH of pool water.
Acidic	Having a pH below 7.0.
Alkaline	Having a pH above 7.0.
Alkalinity	Refer to 'Total alkalinity'.
Alkalinity factor (AF)	Used to calculate the Langelier Saturation Index of water.
Ammonia	A nitrogen-containing compound that combines with free chlorine to form chloramines or combined chlorine.
Backwash	The process of removing debris accumulated in a filter by reversing the flow of water through the filter.
Bather number	A measure of the number of bathers in an aquatic facility over a set time. This should be linked to the capacity of the treatment system and pool safety.
BCDMH	Bromo-chloro-dimethylhydantoin. A common bromine-based disinfectant.
Biofilm	Slime-like community of microorganisms usually attached to wet surfaces.
Breakpoint chlorination	The addition of sufficient chlorine to oxidise combined chlorine to the point where free chlorine makes up the total chlorine and chloramines are oxidised to below detectable levels.
Buffering capacity	The number of moles of strong acid or base needed to change the pH of a litre of buffer solution by one unit.
Calcium hardness	A measure of calcium salts dissolved in pool water. Calcium hardness factor (CF) is used to calculate Langelier Saturation Index.
Carbon dioxide	A common gas found in air at trace levels. When injected into pool water it forms mild carbonic acid to lower pH.
Chloramines	A group of disinfection by-products formed when free chlorine reacts with ammonia in urine, sweat or other nitrogen-containing compounds in water.
Chlorination	The application of chlorine products for disinfection.
Chlorine demand	The amount of chlorine that will be consumed by readily oxidisable impurities in pool water.
Chlorine dioxide	A secondary disinfectant. Chlorine dioxide is generally generated on site and then added to the water or generated in the water itself by adding specially formulated tablets to the water.
Chlorine gas	Gaseous form of chlorine containing 100 per cent available chlorine.
Clarity	Degree of transparency with which an object can be seen through a given depth of pool water.
Coagulants	Chemicals, sometimes referred to as flocculants, that help clump suspended particles together into a filterable size.
Colloidal	Items of small size that are suspended in solid, liquid or gas.
Colony-forming units (CFU)	A measure of microorganisms per unit volume of water.

Term	Definition
Combined chlorine	A measure of the chloramines in water.
Cryptosporidium	A protozoan parasite that causes cryptosporidiosis. This is a diarrhoeal disease in healthy people that can last one to two weeks. For those with some underlying health conditions it can result in severe dehydration, and in some cases death.
CT	Disinfection residual concentration (C, in mg/L), multiplied by contact time (T, in minutes) at the point of residual measurement; a measure of disinfection effectiveness.
Cyanuric acid	A stabiliser that can be added to an outdoor aquatic facility to reduce chlorine loss due to ultraviolet light from the sun.
Disinfectant	An oxidising agent that is added to water and is intended to inactivate disease-causing microorganisms.
Disinfectant residual	The measurable disinfectant present in water.
Filter	A vessel or device that removes suspended particles.
Flocculant	A substance used in treating water that promotes clumping of particles.
Flow rate	Rate of movement of water typically stated as litres/second (L/s) or cubic metres per hour (m^3/hr). A cubic metre is 1,000 litres.
Free chlorine	A measure of the chlorine that is available as hypochlorous acid and chlorite ion.
Hyperchlorination	The practice of dosing high amounts of chlorine-containing product to achieve a specific CT to inactivate disease-causing microorganisms.
Hypochlorous acid	Formed when any chlorine-containing product is dissolved in water. The most active oxidising form of chlorine.
Inlets	Points at which water from the aquatic facility's water treatment is introduced to the water body.
Isocyanuric acid	Refer to 'Cyanuric acid'.
Langelier Saturation Index	Calculation based on various factors to determine the corrosive or scale-formation nature of water. Used to determine appropriate water balance.
Log reduction	A mathematical term referring in these guidelines to logarithms to the base 10, and a 10-fold (or 90 per cent) reduction in the quantitative value of a microbiological population. It is used in reference to physical-chemical treatment of water to remove and/or inactivate microorganisms such as bacteria, protozoa and viruses. For example, a 1-$\log_{10}$ reduction means the quantitative value of a microbiological population is reduced by 90 per cent or 10-fold reduction; 3-$\log_{10}$ = 99.9 per cent or 1,000-fold reduction; and so on.
Make-up water	Water used to replace water lost from an aquatic facility including backwash water, evaporation, splashing, water exchange and the water users carry out. Make-up water is typically introduced from municipal mains via an auto-level valve.
Micron	A micrometre – one millionth of a metre. Used to describe particle size.
Microorganism	Microscopic organism such as a virus, bacterium or protozoa.

Term	Definition
Multi-barrier approach	Water quality risks can be prevented or reduced at multiple points of the treatment process, not just relying on a single barrier in the treatment system.
National Association of Testing Authorities (NATA)	The national accreditation body for Australian testing laboratories.
Nitrogen	An element present in ammonia, sweat, urine, fertilisers and a variety of personal care products. When introduced to pools, it readily reacts with chlorine to form chloramines.
Oocyst	A hardy, thick-walled spore. The infective stage in the life cycle of *Cryptosporidium.*
Outbreak	Two or more human cases of a communicable (infectious) disease related to a common exposure.
Outlets	Points at which water exits a body of water for treatment by the facility's water treatment plant.
Oxidation	The process by which disinfectants destroy contaminants and inactivate disease-causing microorganisms.
Ozone	A relatively unstable molecule containing three oxygen atoms. Ozone is created on site by passing oxygen across a corona discharge (in the same manner as lightning creates ozone in a thunderstorm). It is one of the most powerful oxidants known. It has a very short life, wanting to revert to atmospheric oxygen, hence it cannot be stored for later use. It is a light blue gas and can also be created using ultraviolet light. It is very hazardous, especially in poorly ventilated spaces.
Pathogens	Disease-causing microorganisms.
pH	A scale used to express the acidity or alkalinity of a solution on a scale of 0–14, with 7.0 being neutral. Values less than 7.0 are acidic and values greater than 7.0 are alkaline.
Photometer	An analytical tool that uses light intensity measurements to determine the concentration of a particular chemical.
Physicochemical	Relating to both physical and chemical properties of a substance.
Residual	Refer to 'Disinfectant residual'.
Scale	The precipitate that forms on surfaces in contact with water when calcium hardness, pH or total alkalinity levels are too high.
Shock dosing	The practice of dosing high amounts of chlorine (sometimes in excess of 10 mg/L) into a public aquatic facility to reduce chloramines or to remove confirmed or suspected contamination.
Sodium bicarbonate	A white powder used to raise total alkalinity in pool water. Also known as bicarb soda.
Sodium bisulphate	A granular material used to lower pH and/or total alkalinity in water. Also known as dry acid.
Sodium carbonate	A white powder used to raise pH in water.

Term	Definition
Sodium hypochlorite	A clear liquid form of chlorine. Commercially available in bulk-delivered strengths of 10–12.5 per cent available chlorine. Also called liquid chlorine or bleach.
Source water	Water used to fill the aquatic facility and used as make-up water. Usually town water but could also include rainwater (provided it is introduced into the balance tank first).
Stabiliser	Refer to 'Cyanuric acid'.
Test kit	Equipment used to determine specific chemical residual and physical properties of water.
Total alkalinity	A measure of the pH buffering capacity of water.
Total chlorine	The sum of both free and combined chlorines.
Total dissolved solids (TDS)	A measure of the salts and small amounts of organic matter dissolved in water.
Trihalomethanes	Compounds formed by reaction between chlorine or bromine and certain organic compounds.
Turbidity	The cloudiness of water due to the presence of extremely fine particulate matter in suspension that interferes with light transmission. Generally measured using Nephelometric Turbidity Units (NTU).
Turnover time	The period of time required to circulate a volume of water, equal to the aquatic facility's capacity, through the treatment plant.
Ultraviolet (UV) light	Wavelengths of light shorter than visible light.
Water slide	A feature at an amusement park consisting of a large slippery slide, often with many curves and twists, leading to a pool, with water running along the slide into the pool.

REFERENCE MATERIAL

American National Standards Institute 2019, *American national standard for water quality in public pools and spas* <https://webstore.ansi.org/standards/apsp/ansiapsp112019>.

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Centers for Disease Control and Prevention, US Department of Health and Human Services 2018, *Annex to the model aquatic health code* <https://www.cdc.gov/mahc/index.html>.

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Pool Water Treatment Advisory Group 2017, *Swimming pool water – treatment and quality standards for pools and spas,* Micropress Printers, Southwold, UK.

Royal Life Saving Society Australia 2018, *Guidelines for safe pool operations* <https://www.royallifesaving.com.au/aquatic-centres/managers/guidelines-for-safe-aquatic-venues/guidelines-for-safe-pool-operations>.

Victorian legislation and parliamentary documents <http://www.legislation.vic.gov.au>.

World Health Organization 2006, *Guidelines for safe recreational environments Volume 2 Swimming pools and similar environments* <http://www.who.int/water_sanitation_health/publications/safe-recreational-water-guidelines-2/en/>.

Australian Standards

SAI Global has compiled a comprehensive list of Australian Standards that may be relevant to public aquatic facilities in its *Guide to Standards – pools and spas* <https://infostore.saiglobal.com/uploadedFiles/Content/Standards/Guide_to_Standards-Pools_and_Spas.pdf>.

Key Standards include:

HB 241-2002 *Water management for public swimming pools and spas*

AS 1668.2-2012 *The use of ventilation and airconditioning in buildings*

AS 1926.1-2012 *Swimming pool safety – safety barriers for swimming pools*

AS 1926.2-2007 (R2016) *Swimming pool safety – location of safety barriers for swimming pools*

AS 1926.3-2010 (R2016) *Swimming pool safety – water recirculation systems*

AS 2560.2.5-2007 *Sports lighting – specific applications – swimming pools*

AS 2610.1-2007 (R2016) *Public spas*

AS 2865-2009 *Confined spaces*

AS 3136-2001 *Approval and test specification – Electrical equipment for spa and swimming pools*

AS 3636-1989 (R2013) *Solar heating systems for swimming pools*

AS 3780-2008 *The storage and handling of corrosive substances*

AS 3979-2006 *Hydrotherapy pools*

AS/NZS 2416.1:2010 *Water safety signs and beach safety flags: Specifications for water safety signs used in workplaces and public areas* (ISO 20712-12008, MOD).

Planning and Environment Act 1987

BOROONDARA PLANNING SCHEME

Notice of Approval of Amendment

Amendment C305boro

The Minister for Planning has approved Amendment C305boro to the Boroondara Planning Scheme.

The Amendment comes into operation on the date this notice is published in the Victoria Government Gazette.

The Amendment applies the Heritage Overlay to the following places on a permanent basis:

- HO795 to a number of buildings and elements of heritage significance, within defined curtilages, at Methodist Ladies' College (MLC), 207 Barkers Rd, Kew;
- HO915 to Red House, 207 Barkers Rd, Kew (formerly 231 Barkers Road);
- HO916 to Wentworth, 207 Barkers Rd, Kew (formerly 876 Glenferrie Road).

The Amendment also deletes the existing Heritage Overlays affecting the subject land, including HO204, HO271, and part of HO150 that is within the MLC campus.

A copy of the Amendment can be inspected, free of charge, at the Department of Environment, Land, Water and Planning website at www.planning.vic.gov.au/public-inspection and, free of charge, at:

- the Boroondara City Council website at www.boroondara.vic.gov.au; or
- during office hours, at the offices of the Boroondara City Council, 8 Inglesby Road, Camberwell.

STUART MENZIES
Director
State Planning Services
Department of Environment, Land, Water and Planning

Planning and Environment Act 1987

BOROONDARA, KNOX PLANNING SCHEMES

Notice of Approval of Amendment

Amendment GC178

The Minister for Planning has approved Amendment GC178 to the Boroondara and Knox Planning Schemes.

The Amendment comes into operation on the date this notice is published in the Victoria Government Gazette.

The Amendment rezones residential land in the Boroondara and Knox Planning Schemes that were inadvertently omitted from Amendment GC172.

A copy of the Amendment can be inspected, free of charge, at the Department of Environment, Land, Water and Planning website at www.planning.vic.gov.au/public-inspection and free of charge at:

- the Boroondara City Council website at www.boroondara.vic.gov.au and the Knox City Council website at www.knox.vic.gov.au; or
- during office hours, at the offices of the Boroondara City Council, 8 Inglesby Road, Camberwell and the Knox City Council, 511 Burwood Highway, Wantirna South.

PHILLIP BURN
Director
Planning Systems
Department of Environment, Land, Water and Planning

Planning and Environment Act 1987

CARDINIA PLANNING SCHEME

Notice of Approval of Amendment

Amendment C234card

The Minister for Planning has approved Amendment C234card to the Cardinia Planning Scheme.

The Amendment comes into operation on the date this notice is published in the Victoria Government Gazette.

The Amendment gives effect to the *Pakenham East Precinct Structure Plan* (Victorian Planning Authority, July 2020) by rezoning the land Urban Growth Zone Schedule 5 and makes other associated changes to the Cardinia Planning Scheme.

A copy of the Amendment can be inspected, free of charge, at the Department of Environment, Land, Water and Planning website at www.planning.vic.gov.au/public-inspection and free of charge, at:

- the Cardinia Shire Council website www.cardinia.vic.gov.au or
- during office hours, at the offices of the Cardinia Shire Council, 20 Siding Avenue, Officer or
- during office hours, at the offices of the Victorian Planning Authority, Level 25, 35 Collins Street, Melbourne.

STUART MENZIES
Director
State Planning Services
Department of Environment, Land, Water and Planning

Planning and Environment Act 1987

CARDINIA PLANNING SCHEME

Notice of Approval of Amendment

Amendment C251card

The Minister for Planning has approved Amendment C251card to the Cardinia Planning Scheme.

The Amendment comes into operation on the date this notice is published in the Victoria Government Gazette.

The Amendment implements the *Pakenham East Infrastructure Contributions Plan* (Victorian Planning Authority, July 2020) by introducing Clause 45.11 Infrastructure Contributions Overlay into the Cardinia Planning Scheme and applying it to the Pakenham East Precinct Structure Plan area.

A copy of the Amendment can be inspected, free of charge, at the Department of Environment, Land, Water and Planning website at www.planning.vic.gov.au/public-inspection and free of charge, at:

- the Cardinia Shire Council website www.cardinia.vic.gov.au; or
- during office hours, at the offices of the Cardinia Shire Council, 20 Siding Avenue, Officer; or
- during office hours, at the offices of the Victorian Planning Authority, Level 25, 35 Collins Street, Melbourne.

STUART MENZIES
Director
State Planning Services
Department of Environment, Land, Water and Planning

Planning and Environment Act 1987

GREATER GEELONG PLANNING SCHEME

Notice of Approval of Amendment

Amendment C419ggee

The Minister for Planning has approved Amendment C419ggee to the Greater Geelong Planning Scheme.

The Amendment comes into operation on the date this notice is published in the Victoria Government Gazette.

The Amendment amends the schedule to Clause 72.01 of the Greater Geelong Planning Scheme to clarify the scope of the responsible authority roles of the Minister for Planning and Greater Geelong City Council for planning permit applications and approvals within the designated areas of Central Geelong and Moolap-Point Henry.

A copy of the Amendment can be inspected, free of charge, at the Department of Environment, Land, Water and Planning website at www.planning.vic.gov.au/public-inspection and, free of charge, at:

- the 'Amendments' section of the Greater Geelong City Council website at www.geelongaustralia.com.au/amendments/;or
- during office hours, at the offices of the Greater Geelong City Council, Customer Service Centre, Ground Floor, 100 Brougham Street, Geelong.

STUART MENZIES
Director
State Planning Services
Department of Environment, Land, Water and Planning

Planning and Environment Act 1987

INDIGO PLANNING SCHEME

Notice of Approval of Amendment

Amendment C74indi

The Minister for Planning has approved Amendment C74indi to the Indigo Planning Scheme.

The Amendment comes into operation on the date this notice is published in the Victoria Government Gazette.

The Amendment corrects mapping anomalies to ensure appropriate provisions are applied to land in the municipality.

A copy of the Amendment can be inspected, free of charge, at the Department of Environment, Land, Water and Planning website at www.planning.vic.gov.au/public-inspection and, free of charge, at:

- the Shire of Indigo website www.indigoshire.vic.gov.au or
- during office hours, at the offices of the Shire of Indigo, 101 Ford St, Beechworth.

STUART MENZIES
Director
State Planning Services
Department of Environment, Land, Water and Planning

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