PRELIMINARY IMPACT ANALYSIS

PROPOSAL: This proposal seeks to amend Australian Standard/New Zealand (AS/NZS) 3500.1, 2, 3 and 4 *Plumbing and drainage* to include marking for of pipes.

Responsible Technical committee: Australian Standard Committee WS-014, *Plumbing and drainage*

NCC REFERENCE:

For revisions or amendments to existing National Construction Code (NCC) referenced documents, provide additional information

BCA Volume One:	
AS/NZS 3500.3	F1.1
BCA Volume Two:	
AS/NZS 3500.3	3.2.3.0, 3.1.3.4, 3.5.3.0, 3.5.3.3, 3.5.3.5
PCA Volume Three:	
AS/NZS 3500.1	B1.4, B3.3, B4.2, B5.2, BS5.1.2, B6.4, B6.5
AS/NZS 3500.2	C1.3, CV2.2, C2.3, C2.4
AS/NZS 3500.4	B2.2, B2.6, B2.7, B2.8, B2.9

PROPONENT:

Nominating organisation: Plastics Industry Pipe Association

Nominating individual: Alan Whittle

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DATE OF PIA:

To differentiate between versions include the document date and/or version number

Date: 28 February 2020

Version: 2

Status: DRAFT

NATURE AND EXTENT OF THE PROBLEM:

Nature of the problem

As an outcome of public consultation on the drafts of the AS/NZS 3500 series, it was identified that there would be merit in reviewing the marking requirements for commercial pipework. The primary benefit being clear identification of pipework in commercial buildings, reducing the risk of plumbing practitioners as well as other construction and maintenance staff misidentifying pipework.

The consequences of misidentifying pipework varies between the difference pipework, however evidence suggest that there is a high likelihood of this occurring. Although not in the area of plumbing, misidentification of pipework has happened in the past causing the death of a baby in Bankstown-Lidcombe Hospital in 2016.

The risks associated with misidentifying existing plumbing systems are cross-connection between a drinking and non-drinking water source risking the health and safety of the building occupant's. There is also risk associated with the interconnection of sanitary and stormwater drainage systems risking both environmental issues caused from untreated waste from the sanitary drainage system discharging to the stormwater system resulting in discharge the environment such as creeks and lakes and economic impacts on effluent treatment with stormwater discharging to the sanitary drainage system.

Misidentification can arise as a result of the requirements in AS/NZS 3500 parts 1, 2, 3 and 4 for marking pipes in accordance with AS 1345. This introduces conflicts between the Plumbing and Drainage Standard and product Standards as well as established practice. For example, according to AS 1345, the colour green is specified for water pipes, whether drinking, cooling, recycled or waste water. Lilac/ purple is specified for recycled water in both pipe product Standards and AS/NZS 3500, but according to AS1345 violet / lilac is used to identify acids and alkalis. Green is, in practice, used for rainwater. Blue is nominated in the PE product Standards for water pipes, but blue is assigned to 'air' in AS 1345. Also, AS 1345 nominates different print sizes from those required by the product Standards.

Consequently, it is impossible to comply completely with all aspects of AS/NZS 3500 when there are colour conflicts between it, product Standards and AS 1345. However, it is recognised that AS1345 provides useful information regarding print details under some installation conditions.

Additionally, some pipe products are marked comprehensively during manufacture in accordance the relevant product Standards. Marking of pipe products in accordance with product Standards has been found by experience to be satisfactory but this marking is currently not recognised in AS/NZS 3500. The combination of colour and normative product marking provides adequate identification of the pipeline contents. Additional marking in accordance with AS 1345 is not necessary.

For plumbing applications, the ≤ 8 m spacing of markings, as required by AS/NZS 3500, is too large. In order to ensure a plumbing pipe can be conveniently identified marking intervals need to be shorter. It is considered a repeat interval of 3 m is more appropriate.

OBJECTIVES:

The primary objective of this amendment is to ensure that the AS/NZS 3500 series provides clear

and consistent requirements for commercial pipework labelling to ensure that the risk of pipework misidentification is minimised.

The amendment addresses the following :

- Clear identification of the specific building classes building this amendment applies to.
- Reducing the labelling requirements from 8m intervals to 3m to avoid the incidence of pipe runs in a building space not being labelled.
- Removing the conflict between the requirements of AS 1345 and both WaterMark pipe product marking and the AS/NZS 3500 requirements.
- Clear identification where labelling is required in areas such as pipework penetrations and junctions.
- Ensuring that the requirements for pipework labelling are consistent across all four parts of the AS/NZS 3500 suite.

OPTIONS:

Option 1 Status quo.

No changes to the four parts of AS/NZS 3500.

Option 2 Informative Guidance

Provide informative notes under each clause affected by the conflict with AS 1345 explaining the problems with colour and print height conflicts between AS 1345 and both AS/NZS 3500 and the product standards. Provide recommendations on where labelling is to be applied where this differs from the current requirements. No changes to AS/NZS3500 text to remove inconsistencies.

Option 3 Non-regulatory content

Remove the requirements to comply with AS 1345 in AS/NZS 3500 and make them informative. Provide recommendations on where labelling is to be applied where this differs from the current requirements. No changes to AS/NZS3500 text to remove inconsistencies between parts. Retain the various colour requirements in AS/NZS 3500 and the product standards.

Option 4 Regulatory revision (1)

In AS/NZS 3500 qualify what parts of AS 1345 are to be applied each time the Standard is referenced and where there is a conflict between the relevant product Standard and AS 1345 (e.g. conflicts in colour and print height) or between AS 1345 and AS/NZS 3500. Or, as an alternative, insert relevant text from AS 1345 into each part of AS/NZS 3500 as a replacement for references to AS 1345. Provide requirements on where pipes are to be marked and change AS/NZS3500 text to remove inconsistencies between Parts.

Option 5 Regulatory revision (2)

Remove the requirements to comply with AS 1345 (except for Fire Services). Provide requirements on where pipes are to be marked, and guidance on how they are marked. Retain the various colour requirements in AS/NZS 3500 and leave the marking requirements in the relevant product standards. Make an informative reference to AS 1345. Changes to AS/NZS3500 text to remove inconsistencies between Parts.

IMPACT ANALYSIS (OF ALL OPTIONS):

Impact analysis of all options is outlined below:

Option 1. Status quo

If no action is taken the current inconsistencies in pipe marking will remain, with the consequent risk of misidentification by plumbing practitioners and other construction and maintenance staff, . The conflict between the requirements of AS 1345 and pipe markings and colours as stated in the product Standards and AS/NZS 3500 will remain. In certain installations, one or the other would have to be over-ridden. The issue of uncertainty about where labelling is to be applied will remain. This option is not satisfactory and will continue to have the potential for major cost should a case of misidentification result in major incident. It is worth noting that it is unlikely AS 1345 is being adhered to in the field due to the use of pre-marked pipes and the requirements of AS/NZS 3500.

Option 2 Informative Guidance

Providing informative notes under each clause affected by the conflict with AS 1345 is a minimal change and only addresses the conflict with AS 1345. As with option 1 the current inconsistencies in pipe marking will remain and there will still be the necessity to be in conflict with one or other standard. Recommendations on where labelling is to be applied also provides no certainty for practitioners since the recommendations can be ignored. Not an effective solution to reducing the risk of mismarking or misidentification. This option also does not address the inconsistencies within AS/NZS 3500. This will have no continuing cost implications since it is essentially status quo, but the potential for a major incident of misidentification is considered to continue to be a high risk.

Option 3 Non-regulatory content

Remove the normative references to AS 1345 in AS/NZS 3500 and make them informative. This will remove the conflict with pipe product specifications and AS/NZS 3500.

Leaving a reference to AS 1345 will mean there is still information on characteristics such as print size and marking details in those instances where adequate information is not printed on the pipe at the time of manufacture or is not listed in AS/NZS 3500. But providing recommendations on where labelling is to be applied provides no certainty for practitioners since they can be ignored and the limited existing requirements followed.

This option also does not address the inconsistencies within AS/NZS 3500, however may result in some may cost savings through the resolution of conflicting information regarding colours which will be removed.

Pipes are manufactured to the requirements of product standards (outlined on the WaterMark Schedule of Products), not AS/NZS 3500, with marking requirements being specified through both the product specification and the requirements for WaterMark, as outlined in the Manual for the WaterMark Certification Scheme. As such, it is considered that there will be no cost change for the manufacturing of pipework.

There is still with the potential to have long runs (8m) of unidentified pipe in buildings, or unmarked pipes on one or other side of a penetration or valve. This lack of certainty in identification has the potential to cause problems with cross connections or opening a pipe.

Option 4 Regulatory revision (1)

In AS/NZS 3500 qualify what parts of AS 1345 are to be applied or, as an alternative, insert relevant text from AS 1345 into each part of AS/NZS 3500. Either alternative will remove any conflict or inconsistencies and have a positive financial benefit by greatly reducing the risk of misidentification. However, it would make the plumbing and drainage Standards far more complex, difficult to keep in step, and significantly increase the size of AS/NZS 3500 without providing any significant benefit to practitioners or asset owners. And it would not remove conflict with the Watermarked product standards. For most installations the product marking and colour coding is sufficient. Providing new requirements on where pipes are to be marked may result in minor installation costs since pipes will now have to marked every 3 m and at some additional points. However, since nearly all pipes are marked during manufacturing these increases would be minimal.

Option 5 Regulatory revision (2)

Removing the requirements to comply with AS 1345 (except for fire service pipes) and leaving the marking to product standards and the colour requirements of AS/NZS 3500 will remove any conflict or inconsistencies and have a positive financial benefit by greatly reducing the risk of misidentification. For most installations the product marking and colour coding is sufficient. Since pipes are now currently marked during manufacturing to comply with product standards there should be no cost increase. Providing new requirements on where pipes are to be marked may result in minor installation costs since pipes will now have to marked every 3 m and at some additional points. However, manufacturing organisations have confirmed that a marking interval not exceeding 3 m would not impose any additional cost on manufacturing. Some product Standards already require an even greater frequency. Removing inconsistencies within AS/NZS 3500 will result in some benefits by removing any potential sources of confusion. This is the simplest option since it broadly reflects current practice, has the greatest benefit in terms of reducing the chance of misidentification, and has little or no cost increases.

TRANSITIONAL MEASURES

No transitional measures are recommended under Option 5 as it would merely formalise what is currently happening.

Option 4 would require advice being provided to practitioners as to what changes have been made to AS/NZS 3500 and how these are to be implemented. It is expected this would be done via plumbing organisations and regulators.

Options 2 and 3 would require no transitional measures since they are both essentially the status quo.

CONSULTATION:

Both Standards Australia's WS-014 committee and the ABCB's Plumbing Code Committee have been consulted on this project. WS-014 consists of representatives from, amongst others, the plastics industry, plumbing organisations and representatives of AIG.

Consultation has also occurred with the Plastics Industry Pipes Association (PIPA) through its technical committees for polyolefin and PVC pipes and fittings. The responses have been that the current situation with requirements specified in the various product Standards that are not consistent with the requirements of AS 1345 where nominated in AS/NZS 3500.1, .2, .3 and .4. The conflict between the requirements is unsatisfactory and needs to be resolved.

As AS/NZS 3500 is a joint Australian and New Zealand standard, WS-014 representatives from New Zealand have be consulted throughout this project to ensure that the changes to these provisions will not cause any unintended consequences. If any issues are identified they will be resolved between the Australian Building Codes Board and the New Zealand Ministry of Business, Innovation and Employment (in consultation with other key stakeholders).

Drafts of AS/NZS 3500 Parts 1, 2, 3 and 4 will be released for public consultation where members of the Plumbing Code Committee and the general public will be invited to provide comment on the drafts.

CONCLUSION AND RECOMMENDED OPTION:

Option 5 is recommended as it will remove the conflicting requirements that currently exist and not impose any additional costs on the community. Options 1, 2 and 3 do not resolve the situation. Option 4 will make the plumbing and drainage Standards far more complex, will impact on current manufacturing and will not entirely resolve the problem.

IMPLEMENTATION AND REVIEW:

This option is proposed to be implemented into the National Construction Code thorough reference in Volume Three in May 2022.

LIST OF ATTACHMENTS:

- Attachment A – Major changes
- Attachment B – WSAA Codes

AS/NZS 3500.1 Cold Water Services

5.18 Identification of piping

In commercial and industrial buildings, accessible pipework shall be permanently marked so as to be readily identifiable as the type of the water service.

Identification markings shall be placed —

(a) at spacings not exceeding 6 m; and

(b) adjacent to branches, junctions, valves, service appliances, bulkheads, and wall and floor penetrations.

(c) at every floor level within vertical ducts and riser cupboards

NOTE 1: Pipes which are marked as part of the manufacturing process are acceptable.

NOTE 2: Refer to AS 1345 for information on identification tags and labels in Australia.

NOTE 3: Refer to NZS 5807 for information on identification marking in New Zealand.

NOTE 4: In Australia, commercial and industrial buildings include all Class 2 to Class 9 buildings.

5.19 Temperature control devices

Temperature control devices shall be installed …

9.6 Identification of non-drinking water services

9.6.1 Colour of non-drinking water pipework

…

9.6.2 Marking of non-drinking water pipework

In commercial buildings (Class 2 to Class 9 buildings) accessible pipework shall be permanently marked as a non-drinking water service.

Identification markings shall be placed —

(a) at spacings not exceeding 3 m;

(b) adjacent to branches, junctions, service appliances, bulkheads and wall and floor penetrations.

NOTE 1: Pipes which are marked as part of the manufacturing process are acceptable.

NOTE 2: AS 1345 contains information on identification marking in Australia.

NOTE 3: NZS 5807 contains information on identification marking in New Zealand

9.6.3 Identification of buried non-drinking water services

…

AS/NZS 3500.2 Sanitary Plumbing and Drainage

10.10 Identification of pipes

In commercial and industrial buildings, accessible pipework shall be permanently marked so as to be readily identifiable as the type of the water service.

Identification markings shall be placed —

(a) at spacings not exceeding 6 m; and

(b) adjacent to branches, junctions, valves, service appliances, bulkheads, and wall and floor penetrations.

(c) at every floor level within vertical ducts and riser cupboards

NOTE 1: Pipes which are marked as part of the manufacturing process are acceptable.

NOTE 2: Refer to AS 1345 for information on identification tags and labels in Australia.

NOTE 3: Refer to NZS 5807 for information on identification marking in New Zealand.

NOTE 4: In Australia, commercial and industrial buildings include all Class 2 to Class 9 buildings.

AS/NZS 3500.3 Stormwater Drainage Systems

1.7 Identification of piping

In commercial and industrial buildings, accessible pipework shall be permanently marked so as to be readily identifiable as the type of the water service.

Identification markings shall be placed —

(a) at spacings not exceeding 6 m; and

(b) adjacent to branches, junctions, valves, service appliances, bulkheads, and wall and floor penetrations.

(c) at every floor level within vertical ducts and riser cupboards

NOTE 1: Pipes which are marked as part of the manufacturing process are acceptable.

NOTE 2: Refer to AS 1345 for information on identification tags and labels in Australia.

NOTE 3: Refer to NZS 5807 for information on identification marking in New Zealand.

NOTE 4: In Australia, commercial and industrial buildings include all Class 2 to Class 9 buildings.

AS/NZS 3500.4 Heated Water Services

4.12 Installation of heated water services

4.12.1 Design and installation

…

4.12.2 Identification of pipes

In commercial and industrial buildings, accessible pipework shall be permanently marked so as to be readily identifiable as the type of the water service.

Identification markings shall be placed —

(a) at spacings not exceeding 6 m; and

(b) adjacent to branches, junctions, valves, service appliances, bulkheads, and wall and floor penetrations.

(c) at every floor level within vertical ducts and riser cupboards

NOTE 1: Pipes which are marked as part of the manufacturing process are acceptable.

NOTE 2: Refer to AS 1345 for information on identification tags and labels in Australia.

NOTE 3: Refer to NZS 5807 for information on identification marking in New Zealand.

NOTE 4: In Australia, commercial and industrial buildings include all Class 2 to Class 9 buildings.

4.12.3 Provision for expansion

Heated water supply pipes shall …

Attachment B: Water services Association of Australia (WSAA) Codes

The colour requirements are included in the individual WSAA Product Specifications (you can download a free copy: https://www.wsaa.asn.au/shop/category/11

See below WSA Codes:

- WSA 02-2004 – 3.1; and
- WSA 03-2011-3.1.

WSA 02-2004-3.1

4 PRODUCTS AND MATERIALS

4.1 GENERAL

Design Drawings and specifications shall state requirements for pipeline component products and other construction items and materials such as embedment, trench fill, marking tapes etc. and the corresponding product specifications.

Water Agencies may require products and materials to be "approved" and/or product and material suppliers to be "accredited" and may have limitations on use of some products.

Unless otherwise permitted by the Water Agency, only Water Agency "approved" products and materials shall be used. Details of Agencies' approved products and materials may be obtained from their respective websites.

Where Agencies do not provide details of "approved" products and materials, Designers should include Product Specifications in project specifications to ensure that constructors purchase and install the correct products. Product Specifications should nominate any known Agency-specific requirements.

Product Specifications are listed on the WSAA website. Additional specifications may at times be added and existing specifications may at times be changed. Water Agencies may have additional, fewer or modified specifications listed on their websites that take precedence.

Product and material information, specifications and guidance including pipeline system selection and quality assurance options are available from WSAA. Where product specifications are not available, arrangements should be made to develop and publish such documents to address essential product attributes.

4.2 IDENTIFICATION OF SEWER SYSTEMS

The principal means of identification of sewers include one or more of the following:

(a) Pipes of specific colours.

(b) Identification printed on pipes and/or sleeving.

(c) Use of marking tapes (Refer to 4.14 MARKING TAPES).

(d) Marking of surface fittings (Refer to 4.15 ACCESS COVERS AND FRAMES).

(e) Identification markers and marker posts.

A summary of colour identification measures for reticulation sewers and property connection sewers is given in Table 4.1. Colour identification for branch and trunk/main sewers (generally >DN 300) should be specified on project-specific basis, subject to limitations on available product options, augmented by marking and process controls.

Table 4.1 COLOUR IDENTIFICATION OF COMPONENTS IN RETICULATION SEWER SYSTEMS

COMPONENT		GRAVITY SEWERS	PRESSURISED SEWERS[5]
RETICULATION SEWERS 5DN300			
Pipe	Ductile Iron	Grey PE sleeving OR grey coating	Cream PE sleeving OR cream coating 2
	PE	Plain grey OR black	Plain cream
	PP	Plain grey OR black	Plain cream
	PVC	Plain grey	Plain cream
	VC	Natural brown	N/A
	GRP	Beige 3	Beige 3
Fitting e.g. bend, junction		Colour not required 4	Colour not required 4
Valve (spindle cap, handle)		N/A	Plain cream or cream coating
Valve (body)		N/A	Colour not required 4
Scours (outlets)		N/A	Cream coating
Marking tapes		Plain grey	Plain cream
Surface fittings and surrounds		Note 5	Note 5

COMPONENT		GRAVITY SEWERS	PRESSURISED SEWERS*
RETICULATION SEWERS 5DN 300			
Signage (marker posts, plates etc.)		Note 5	Note 5
PROPERTY CONNECTION SEWERS[6]			
Pipe	PE	Plain grey OR black	Plain cream
	PP	Plain grey OR black	Plain cream
	PVC	Plain grey	Plain cream
Fitting e.g. connectors, elbows		Colour not required 4,5	Colour not required 4,5
Valve (spindle cap, handle)		N/A	Plain cream or cream coating
Valve (body)		N/A	Colour not required 4,5
Surface boxes		N/A	Colour not required
Surface boxes (lids)		N/A	Note 5

Notes:

1 Includes pressure and vacuum sewers and pressure (rising) mains.

2 Factory applied coating where permitted by the Product Specification.

3 Depending on the resin used for specific applications, may be slightly greener.

4 Some Water Agencies may require colour differentiation to be provided.

5 To be coloured in accordance with Water Agency requirements.

6 Includes pressure laterals and property discharge lines.

4.3 SERVICABILITY OF SEWER SYSTEMS

Products and materials used to construct sewer systems should be selected and configured so as to provide:

(a) sufficient access and working space (personnel and equipment) for operations and maintenance with an emphasis on facilitating non-man entry operations and maintenance as far as practicable; and

(b) ease of internal inspection and condition assessment using remote controlled equipment e.g. CCTV including the

use of suitably coloured materials so as not to inhibit inspection processes e.g. internal surfaces thermoplastic pipes should not be black and preferably coloured white or other light shaded colours, i.e. yellow, white, grey.

4.4 PROTETION AGAINST DEGRADATION

The protection against internal and external corrosion and material degradation of sewer system components shall be addressed as part of the detail design (refer also to Products and Materials Information and Guidance downloaded from www.wsaa.asn.au).

Protection may include:

(a) protection against internal corrosion due to hydrogen sulphide attacks;

(b) protection against external aggressive environments such as acidic soils, high salinity soils, sulphate bearing groundwater and soils;

(c) protection against external contaminated ground with contaminants such as hydrocarbons; and

(d) protection against direct exposure to sunlight.

The Design Drawings and Specification shall nominate corrosion protection and degradation prevention requirements as appropriate.

APPENDIX D - PROTECTION AGAINST DEGRADATION lists a number of available methods for protection against internal and external corrosion.

4 PRODUCTS AND MATERIALS

4.1 GENERAL

Design Drawings and specifications shall state requirements for pipeline component products and other construction items and materials such as embedment, trench fill, marking tapes etc. and the corresponding product specifications.

Water Agencies may require products and materials to be "approved" and/or product and material suppliers to be "accredited" and may have limitations on use of some products.

Unless otherwise permitted by the Water Agency, only Water Agency "approved" products and materials shall be used. Details of Agencies' approved products and materials may be obtained from their respective websites.

Where Agencies do not provide details of "approved" products and materials, Designers should include Product Specifications in project specifications to ensure that constructors purchase and install the correct products. Product Specifications should nominate any known Agency-specific requirements.

Product Specifications are listed on the WSAA website. Additional specifications may at times be added and existing specifications may at times be changed. Water Agencies may have additional, fewer or modified specifications listed on their websites that take precedence.

All products and materials used in contact with drinking and non-drinking water shall comply with AS/NZS 4020.

Product and material information, specifications and guidance including pipeline system selection and quality assurance options are available from WSAA. Where product specifications are not available, arrangements should be made to develop and publish such documents to address essential product attributes.

4.2 DIFFERENTIATION OF DRINKING AND NON-DRINKING PIPE SYSTEMS

4.2.1 Principles

Regulators' guidelines for use of non-drinking water generally stipulate a range of measures to differentiate drinking and non-drinking water supply systems.

The principal means of differentiation between mains conveying drinking water and non-drinking water shall be selected from one or more of the following:

(a) Pipes of different colours (Refer to 4.2.2 Water supply mains - drinking water and 4.2.3 Water supply mains - non-drinking water).

(b) Warnings printed on non-drinking water mains and/or sleeving (Refer to 4.2.3 Water supply mains - non-drinking water).

(c) Use of marking tapes (Refer to 4.2.6 Marking tapes).

(d) Marking of surface fittings (Refer to 8.10.3 Marking of surface fittings).

(e) Identification markers and marker posts (Refer to 8.11.2 Marker posts and plates).

(f) Other additional differentiation measures may include:

- *(i)* Operating systems with a service pressure differential (Refer to 2.5.3.4.4 DUAL WATER SUPPLY SYSTEMS).
- *(ii)* Different pipe locations (Refer to 5.4.5 Dual water supply systems).
- *(iii)* Maintaining a minimum pipe separation.
- *(iv)* Use of different pipe materials for the drinking and non-drinking water mains.

Differentiation measures shall be based on risk assessment undertaken in accordance with the Australian Guidelines for Water Recycling published by the Environment Protection and Heritage Council, the Natural Resource Management Ministerial Council and the National Health and Medical Research Council. Copies of the guidelines may be downloaded from www.nepc.gov.au.

Identified risks can be treated by reducing the likelihood or reducing the consequence or both.

A summary of colour differentiation measures for reticulation mains and property services is given in Table 4.1. Colour differentiation for transfer and distribution mains (generally >DN 300) should be specified on project-specific basis, subject to limitations on available product options, augmented by marking and process controls.

4.2.2 Water supply mains - drinking water

Water supply mains conveying drinking water as part of a dual water supply system shall be constructed from pipes, fittings, valves and other appurtenances that comply with relevant Product Specifications.

Blue sleeved purple pipes, fittings, valves and other appurtenances shall not be used for mains conveying drinking water.

Buried appurtenances such as fittings, valves, hydrants etc. that form part of the system may be required to be colour coded for maintenance purposes.

Where required, one of the following two options shall be adopted:

(a) Buried appurtenances shall be coated blue in accordance with Product Specifications; or

(b) Buried appurtenances shall be sleeved with blue sleeving.

In the case of option (b), purple components shall not be used.

Where colour differentiation of buried appurtenances such as hydrants, flushing points etc. is also required by the Water Agency for operational purposes, this may be achieved by means of a blue coating in accordance with AS/NZS 4158 to that part of the appurtenance visible from the surface when operating e.g. a spindle cap of a valve, a hydrant claw, a flushing point outlet etc. For some appurtenances, blue plastics handles may be available e.g. ball valves.

4.2.3 Water supply mains - non-drinking water

Water supply mains conveying non-drinking water as part of a dual water supply system shall be constructed from pipes, fittings, valves and other appurtenances that comply with relevant Product Specifications.

Purple sleeved blue pipes, including blue striped pipes, fittings, valves and other appurtenances shall not be used for mains conveying non-drinking water. Blue property service fittings e.g. tapping bands and saddles and pre-tapped connectors shall not be used for supply of non-drinking water to a property.

Other buried appurtenances such as fittings, valves and hydrants that form part of the system are not generally required to be colour coded, although, where available, they should be used.

Where colour differentiation of buried appurtenances is required by the Water Agency for operational purposes, this may be achieved by application of a purple coating in accordance with AS/NZS 4158 to that part of the appurtenance visible from the surface when operating e.g. a spindle cap of a valve, a hydrant claw, a flushing point outlet etc. For some appurtenances, purple plastics handles may be available e.g. ball valves.

4.2.4 Property services - drinking water

Property services conveying drinking water as part of a dual water supply system shall be installed using pipes that comply with relevant Product Specifications.

If buried appurtenances that form part of the property service are required to be colour coded for maintenance purposes, one of the following two options shall be adopted:

(a) coated blue in accordance with Product Specifications; or

(b) sleeved with blue sleeving, provided the appurtenance is not coloured purple.

4.2.5 Property services - non-drinking water

Property services conveying non-drinking water as part of a dual water supply system shall be installed using pipes that comply with relevant Product Specifications.

If buried appurtenances that form part of the property service are required to be colour coded for maintenance purposes, one of the following two options shall be adopted:

(a) coated purple in accordance with Product Specifications; or

(b) sleeved with purple sleeving, provided the appurtenance is not coloured blue.

Table 4.1 COLOUR DIFFERENTIATION OF DRINKING WATER AND NON-DRINKING WATER COMPONENTS IN

DUAL WATER RETICULATION SYSTEMS

COMPONENT		DRINKING WATER SYSTEM	NON-DRINKING WATER SYSTEM
RETICULATION MAINS			
Pipe	PVC	Plain blue	Plain purple
	PE	Plain blue OR black + blue stripes[1]	Plain purple OR black + purple
	Ductile Iron	Blue PE sleeving OR blue coating	Purple PE sleeving OR purple
Fitting e.g. bend coupling		Colour not required 3,4	Colour not required 3'4
Valve (spindle cap)		Blue coating	Purple coating
Valve (body)		Colour not required 3,4	Colour not required 3'4
Hydrant (claw)		Blue coating OR blue shroud	Purple coating OR purple shroud
Hydrant (body)		Colour not required 3,4	Colour not required 3'4
Standpipe hydrants		Blue coating	Purple coating
Scours (outlets)		Blue coating	Purple coating
Marking tapes		Blue	Purple
Surface fittings and surrounds		Note 5	Note 5
Signage (marker posts, plates etc.)		Note 5	Note 5
PROPERTY SERVICES			
PE Pipe		Plain blue OR black + blue stripes[1]	Plain purple OR black + purple
Pre-tapped connector (plug)		Blue coating	Purple coating
Pre-tapped connector (body)		Colour not required 3,4	Colour not required 3'4
Tapping band or saddle		Blue band or saddle	Plain purple plastics (plastics moulding) or purple coating (metallic)
Fittings e.g. ball valve		Blue handle	Plain purple handle (plastics moulding) or
Meters		Blue or blue coating	Plain purple plastics (plastics moulding) or
Meter boxes (lids)		Note 5	Note 5

Notes:

1 It is recommended that a combination of plain and striped pipes be used in dual water reticulation systems rather than all plain or all striped pipes.
2 Factory applied coating where permitted by the Product Specification.
3 Some Water Agencies may require colour differentiation to be provided.
4 For any system, do not apply purple sleeve over a pipe, fitting, valve or other appurtenance that is coloured blue and vice versa.
5 To be coloured in accordance with Water Agency requirements.

4.2.6 Marking tapes

Relevant Product Specifications include:

- WSA PS-318 Marking Tape, Detectable
- WSA PS-319 Marking Tape, Non-Detectable.

NOTE:

Product Specifications are listed on the WSAA website. Additional specifications may at times be added and existing specifications may at times be changed. Water Agencies may have additional, fewer or modified specifications listed on their websites that take precedence.

Marking tapes (detectable and non-detectable) for drinking and non-drinking water mains and property services shall comply with relevant Product Specifications.

4.3 DUCTILE IRON PIPELINE SYSTEMS

4.3.1 Product Specifications

Relevant Product Specifications include:

- WSA PS-200 Ductile Iron Pipe (CIOD) for Pressure and Non-Pressure Applications - Water Supply and Sewerage
- WSA PS-201 Ductile Iron Fittings(CIOD) for Pressure and Non-Pressure Applications - Water Supply and Sewerage
- WSA PS-202 Ductile Iron Pipe and Fittings (ISO Sized) for Pressure Applications - Water Supply
- WSA PS-244 Ductile Iron Fittings, End Thrust Restraint for Pressure and Non-Pressure Applications - Water Supply and Sewerage
- WSA PS-310 Tapping Bands - Mechanical for Pressure Applications - Water Supply
- WSA PS-312 Flange Gaskets and 0-Rings
- WSA PS-320 Sleeving, Polyethylene (PE) for Ductile Iron Pipe and Fittings.

NOTE:

Product Specifications are listed on the WSAA website. Additional specifications may at times be added and existing specifications may at times be changed. Water Agencies may have additional, fewer or modified specifications listed on their websites that take precedence.

4.3.2 Sizes and configurations

The nominal diameter, pipe series (CIOD or ISO), pipe pressure classification (PN), joint type, length of pipes, types of fittings and the internal and external corrosion protection shall be detailed in the Design Drawings and/or Specification. The means of tapping the reticulation sized mains shall also be detailed in the Design Drawings and/or Specification noting that:

(a) Pre-tapped connectors are required for property services on all new DN 100 and DN 150 mains (Refer also to 5.11 PROPERTY SERVICES) except where the use of pre-tapped connectors is determined to be impracticable, in which case mechanical tapping bands may be used.

(b) Mechanical tapping bands are required for property services on all new mains >DN 150 and for connections to existing DICL mains and above-ground DICL mains.

(c) Direct tapping of all reticulation sized mains is not permitted.

4.3.3 Seal coating of lining

A seal coating, complying with AS/NZS 2280, shall be specified for all cement mortar lined pipes where the total alkalinity of the water being conveyed is less than 30 mg/L.

NOTE:

AS/NZS 2280 requires all cement mortar lined fittings to be seal coated.

4.3.4 Sleeving

PE sleeving shall be specified on all bituminous coated DI pipes applied in accordance with AS 3681. Constructors shall be required to repair any damaged sleeving in accordance with the pipe and/or fitting manufacturer's instructions.