JOB No: 20-026 Civil

Sheet: C1 **of** C22

TMC | Building Design Group
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PROJECT

Project Description: Proposed Car Wash

FOR: Carwash World Pty Ltd

AT: Lot 3, 1-21 Cranebrook Rd
Cranebrook, NSW, 2749

CODES AND REFERENCES

National Construction Code 2019 Vol 1 Part F1.1.
Australian Rainfall & Runoff – 2016
2016 Rainfall IFD Data System- Australian Government Bureau of Meteorology
Local Council Drainage Construction Standard Drawings (If relevant)
Australian Standard AS/NZS 3500.3 - 2018

[redacted]

Project Design Engineer: **Tracey Michaels**
B.Eng (Hon), M.Eng (Hon)

Checking/Certifying Engineer: Zlatko Sgrovic - EC 23514

of ZS. Consulting Pty Ltd

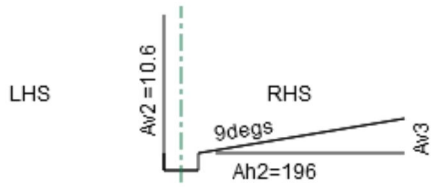
TMC BUILDING DESIGN GROUP
PO BOX. 3494, MORNINGTON, VIC, 3931
DESIGNED BY: T. Michaels
PROPOSED CAR WASH

JOB NO: 20-026 Civil
DATE: 26th Nov 2020

BOX GUTTER AND RAIN WATER HEAD DESIGN TO AS/NZS 3500.3:2018

BOX GUTTER #1- Self-Serve Wash Bays
1-21 Cranebrook Road, Cranebrook, NSW, 2749

Diagramaic shape of Given Data (Not to scale)



Ah	=	Area Horiz	sq.m.
Av	=	Area Vert'l	sq.m.
Ac	=	Area Cment	sq.m.
LHS	=	Left hand	side
RHS	=	Right hand	side

Design Storm Intensity (ARI 100)		I	=	239 mm/hr
Catchment Areas as shown in the diagram.				
Calculate roof rise areas.				
Roof Slope RHS = 9 deg	Therefore	Av3	=	Ah2*tan(Slope) sqm
		Av3	=	196*tan(9)
			=	31 sqm
Calculate catchment area for each wind direction				
Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)				
wind from LHS		Ac(LHS)	=	0+196+0.5*(31+0-0-10.6)
			=	206.2 sq.m
wind from RHS		Ac(RHS)	=	0+196+0.5*(0+10.6-31-0)
			=	185.8 sq.m
Worst wind direction is from the left		Ac	=	**206.2** sqm.
Design Flow		Q	=	I*Ac/3600 Litres/sec
			=	239*206.2/3600 Litres/sec
			=	**13.7** Litres/sec

Box Gutter Depth

From AS/NZS 3500.3 Fig I1 (Interpolating where necessary)				
Using :- Gutter Slope	1	in	200	
and Gutter Width	W	=	600	mm
from AS/NZS 3500.3 fig I1 Minimum Gutter Depth	d	=	122	mm
from fig I1 gutter depth at 1:200	d	=	121	mm

Rain Water Head Calculations

Selected down pipe size	=	150	mm
From AS/NZS 3500.3 fig I3, Rain water head Depth (Interpolating where necessary)	=	140	mm
Rain water Head Depth increased to comply with Note 1 Fig I2 (RWH depth to be >= 1.25*DP dia.)	=	1.25*150	mm
	=	188	mm
From AS/NZS 3500.3 fig I3, Rain water head Length at slope 1:200	=	129	mm
Rain water Head Length increased to fit the DP 150 +20	=	170	mm
Rain water Head Width	=	600	mm

Summary

Down Pipe Size	=	**150**	mm
Box Gutter Width	=	**600**	mm
Box gutter minimum Depth	=	**122**	mm
Rain Water Head Depth	=	**188**	mm
Rain Water Head Length	=	**170**	mm
Rain Water Head Width	=	**600**	mm

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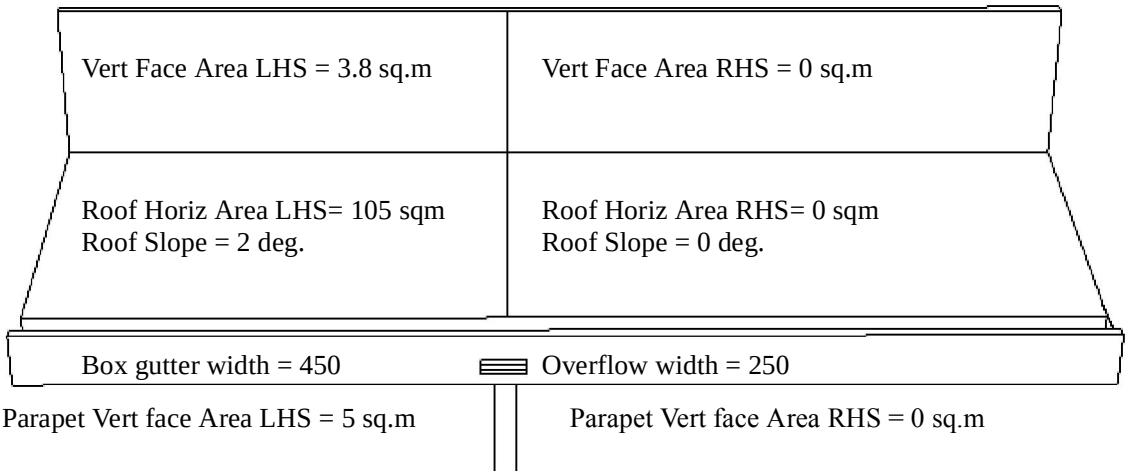
BOX GUTTER AND SIDE OVERFLOW DESIGN TO AS/NZS 3500.3:2018

BOX GUTTER #2- Auto Bay 1 + 2

1-21 Cranebrook Road, Cranebrook, NSW, 2749



Catchment areas and sizes as per diagram above

Design Storm Intensity (ARI 100)	I	=	239	mm/hr
Calculate Vertical areas.				
Roof Slope LHS = 2 deg Therefore Area Vertical rise		=	roof Area*tan(Slope)	
		=	105*tan(2)	
		=	4	sqm
Total vert area LHS = roof rise + vert face = 4+3.8		=	7.8	sq.m
Calculate LHS catchment area for each wind direction				
Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)				
wind from front	Acf	=	(105+ 0.5*(7.8-5)	
		=	106.4	sq.m
wind from back	AcB	=	(105+ 0.5*(5-7.8)	
		=	103.6	sq.m

Calculate RHS catchment area for each wind direction

Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)

wind from front	Acf	=	(0+ 0.5*(0-0)	
		=	0	sq.m
wind from back	AcB	=	(0+ 0.5*(0-0)	
		=	0	sq.m

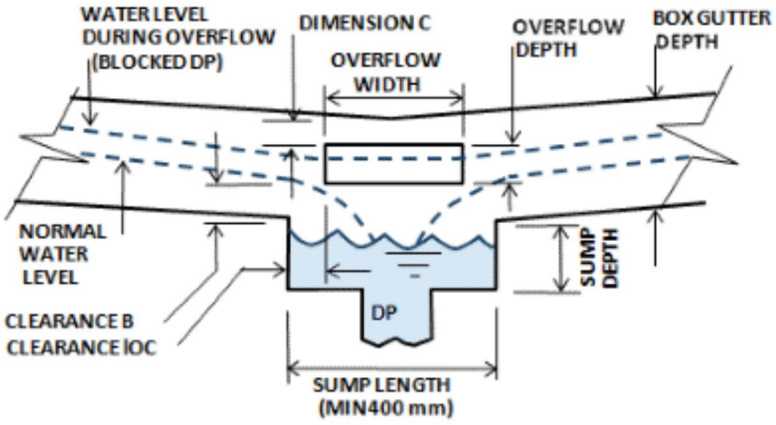
Find worst case and design Box gutter for that condition

Largest catchment area = LHS with wind from front	ca	=	106.4	sq.m
Design Flow = 239 x 106.4/3600 therefore	Q	=	7.06	L/s
from Fig I6(a)	l_{oc}	=	30	mm
From Fig I6(b) Overflow (spitter) depth	d_{oc}	=	88	mm
Box gutter depth from Fig I5 = l_{oc} + (d_{oc} + 30)	BGd	=	148	mm

Sump Design

Total catchment area	Ca	=	106.4 + 0	sq.m
Therefore Flow in sump = Ca x 239 / 3600	Qs	=	7.1	L/s
Downpipe Dia	Dia	=	150	mm
from Fig I4 Sump Depth	SD	=	42	mm
From Code sump length = overflow width + 2*l_{oc}	SL	=	250+ 2*30	mm
		=	310	mm
Sump length is less than Code min of 400 therefore sump length		=	400	mm

Clearances

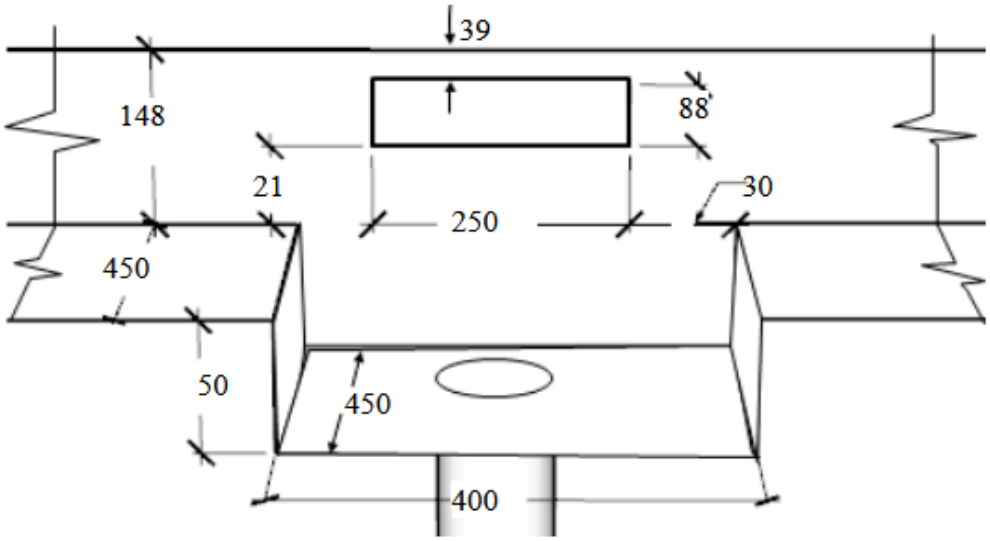


From Code clearance B, (Height of spitter above base of box gutter) = 0.7 * l_{oc}

= 21 mm

Dimension C (freeboard above spitter)=BG depth-B-O'flow depth = 39 mm

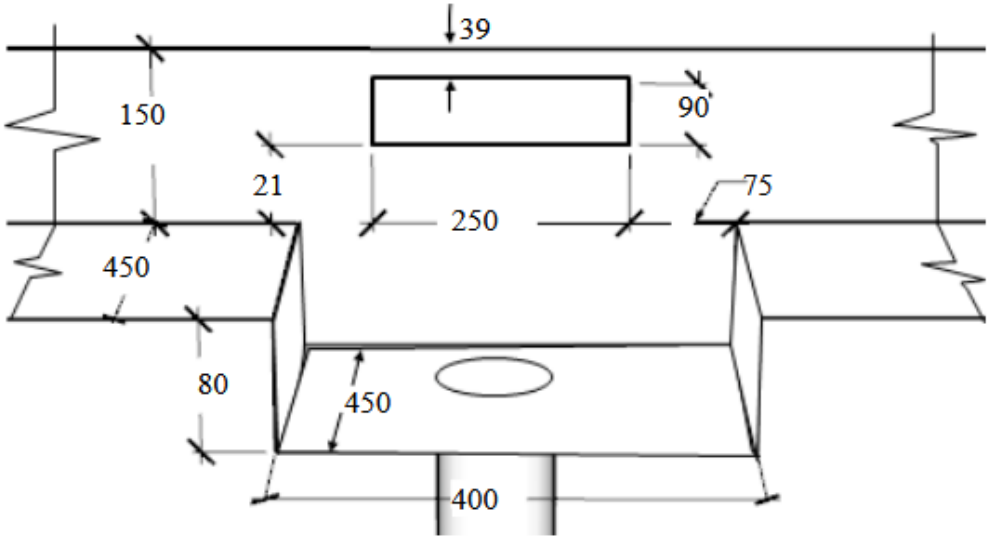
Diagrammatic, Code required minimum sizes. (Not to scale)



DP Dia 150

Summary (minimum required sizes)			**Adopt the below sizing:**	
Box Gutter width	=	450		mm
Box Gutter depth	=	148	150	mm
Overflow (spitter) width	=	250		mm
Overflow (spitter) depth	=	88	90	mm
Sump depth	=	50	80	mm
Sump width	=	450	450	mm
Sump length	=	400	400	mm
clearance l_{oc}	=	30	75	mm
clearance B	=	21	21	mm
Dimension C	=	39	39	mm
Downpipe Dia.	=	150		mm

Diagrammatic, Adopt the below sizing: (Not to scale)



DP Dia 150

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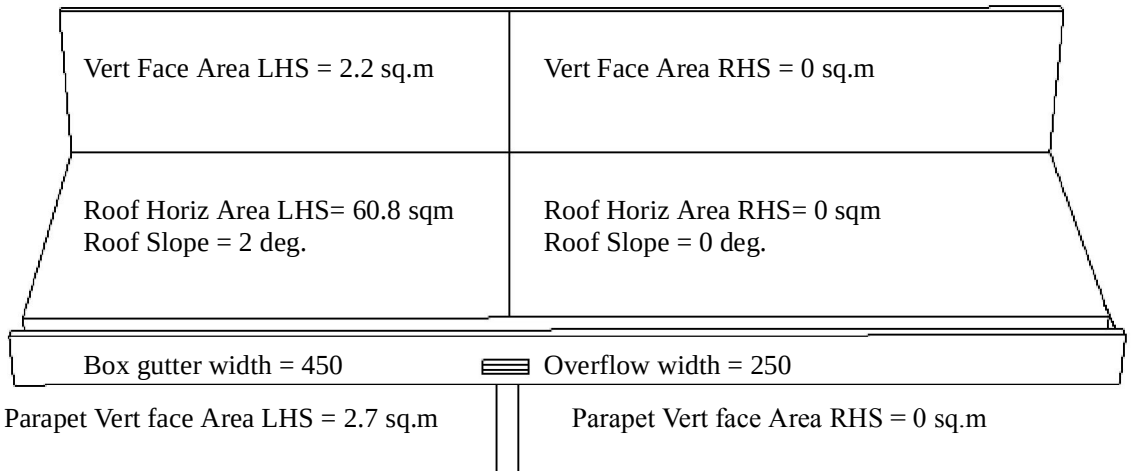
BOX GUTTER AND SIDE OVERFLOW DESIGN TO AS/NZS 3500.3:2018

BOX GUTTER #3- Plant Room

1-21 Cranebrook Road, Cranebrook, NSW, 2749



Catchment areas and sizes as per diagram above

Design Storm Intensity (ARI 100)	I	=	239	mm/hr
Calculate Vertical areas.				
Roof Slope LHS = 2 deg Therefore Area Vertical rise		=	roof Area*tan(Slope)	
		=	60.8*tan(2)	
		=	3	sqm
Total vert area LHS = roof rise + vert face = 3+2.2		=	5.2	sq.m
Calculate LHS catchment area for each wind direction				
Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)				
wind from front	Acf	=	(60.8+ 0.5*(5.2-2.7)	
		=	62.05	sq.m
wind from back	AcB	=	(60.8+ 0.5*(2.7-5.2)	
		=	59.55	sq.m

Calculate RHS catchment area for each wind direction

Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)

wind from front	Acf	=	(0+ 0.5*(0-0)	
		=	0	sq.m
wind from back	AcB	=	(0+ 0.5*(0-0)	
		=	0	sq.m

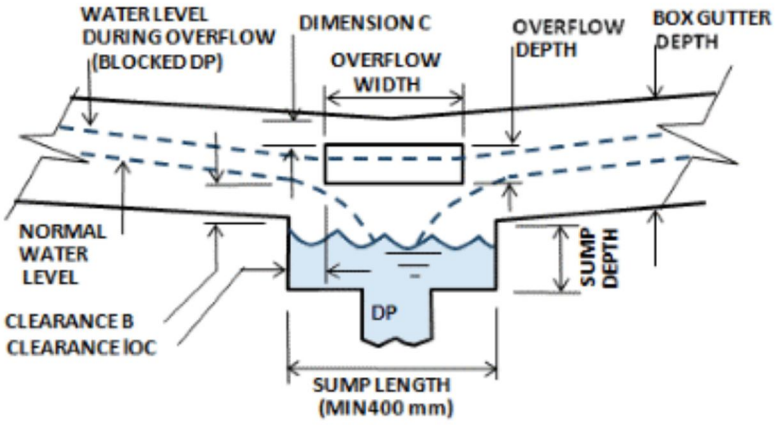
Find worst case and design Box gutter for that condition

Largest catchment area = LHS with wind from front	ca	=	62.05	sq.m
Design Flow = 239 x 62.05/3600 therefore	Q	=	4.12	L/s
from Fig I6(a)	l_{oc}	=	21	mm
From Fig I6(b) Overflow (spitter) depth	d_{oc}	=	66	mm
Box gutter depth from Fig I5 = l_{oc} + (d_{oc} + 30)	BGd	=	117	mm

Sump Design

Total catchment area	Ca	=	62.05 + 0	sq.m
Therefore Flow in sump = Ca x 239 / 3600	Qs	=	4.1	L/s
Downpipe Dia	Dia	=	150	mm
from Fig I4 Sump Depth	SD	=	15	mm
From Code sump length = overflow width + 2*l_{oc}	SL	=	250+ 2*21	mm
		=	292	mm
Sump length is less than Code min of 400 therefore sump length		=	400	mm

Clearances

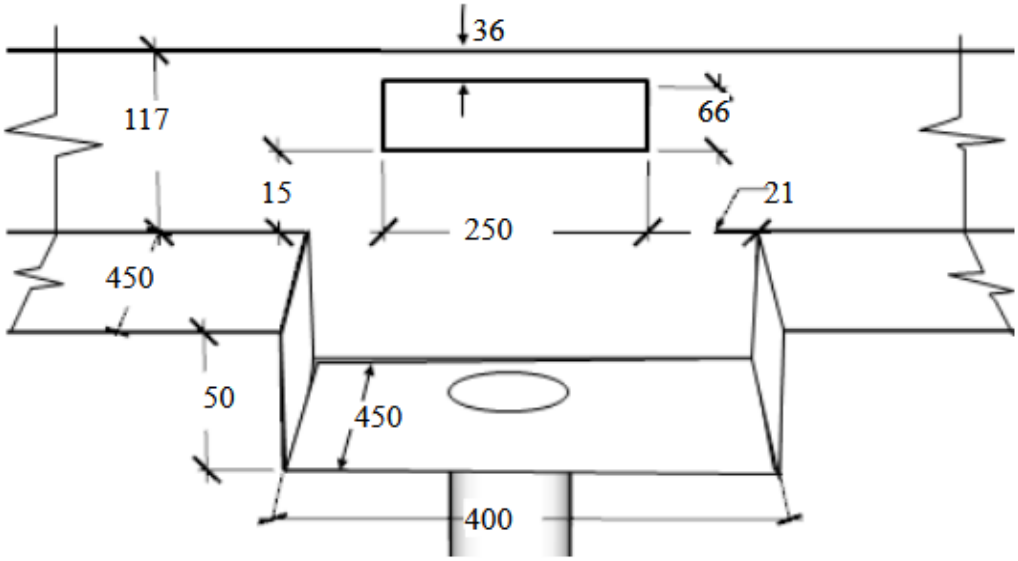


From Code clearance B, (Height of spitter above base of box gutter) = 0.7 * l_{oc}

= 15 mm

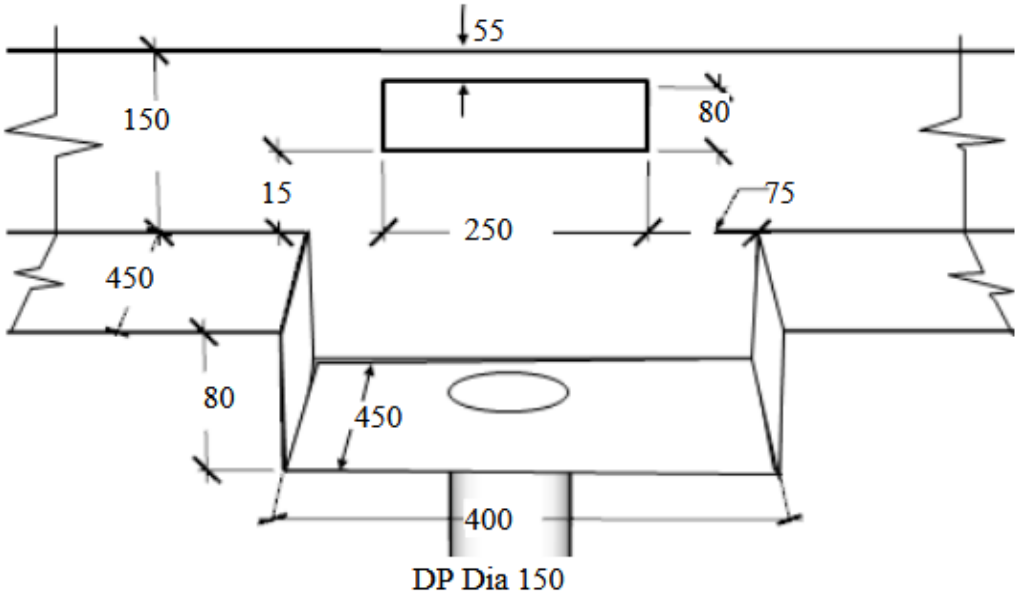
Dimension C (freeboard above spitter)=BG depth-B-O'flow depth = 36 mm

Diagrammatic, Code required minimum sizes. (Not to scale)



Summary (minimum required sizes)			**Adopt the below sizing:**	
Box Gutter width	=	450		mm
Box Gutter depth	=	117	150	mm
Overflow (spitter) width	=	250		mm
Overflow (spitter) depth	=	66	80	mm
Sump depth	=	50	80	mm
Sump width	=	450	450	mm
Sump length	=	400	400	mm
clearance l_{oc}	=	21	75	mm
clearance B	=	15	15	mm
Dimension C	=	36	55	mm
Downpipe Dia.	=	150		mm

Diagrammatic, Adopt the below sizing: (Not to scale)



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PROPOSED CAR WASH

JOB NO: 20-026 Civil
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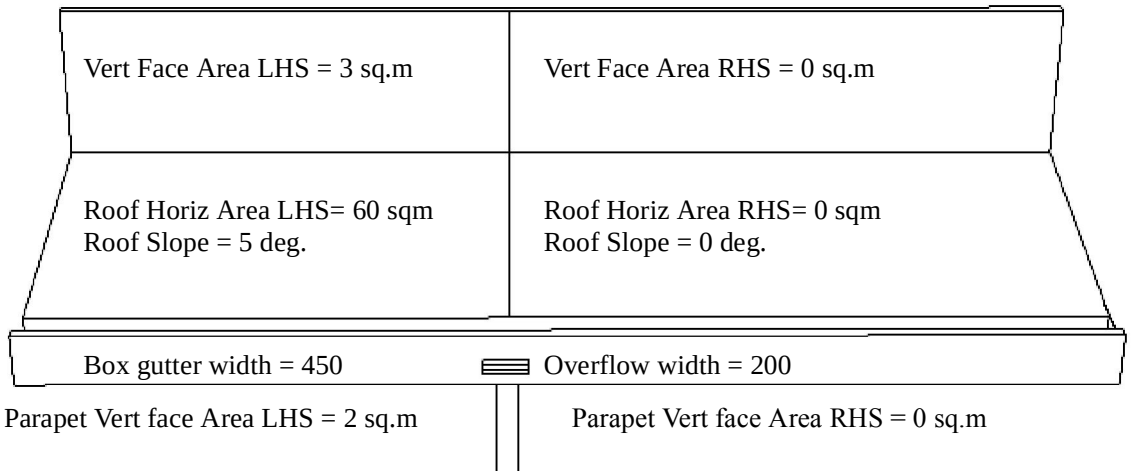
BOX GUTTER AND SIDE OVERFLOW DESIGN TO AS/NZS 3500.3:2018

BOX GUTTER #4- Auto Bay Entry Canopy
1-21 Cranebrook Road, Cranebrook, NSW, 2749



Catchment areas and sizes as per diagram above

Design Storm Intensity (ARI 100)	I	=	239	mm/hr
Calculate Vertical areas.				
Roof Slope LHS = 5 deg Therefore Area Vertical rise		=	roof Area*tan(Slope)	
		=	60*tan(5)	
		=	6	sqm
Total vert area LHS = roof rise + vert face = 6+3		=	9	sq.m
Calculate LHS catchment area for each wind direction				
Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)				
wind from front	Acf	=	(60+ 0.5*(9-2)	
		=	63.5	sq.m
wind from back	AcB	=	(60+ 0.5*(2-9)	
		=	56.5	sq.m

Calculate RHS catchment area for each wind direction

Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)

wind from front	Acf	=	(0+ 0.5*(0-0)	
		=	0	sq.m
wind from back	AcB	=	(0+ 0.5*(0-0)	
		=	0	sq.m

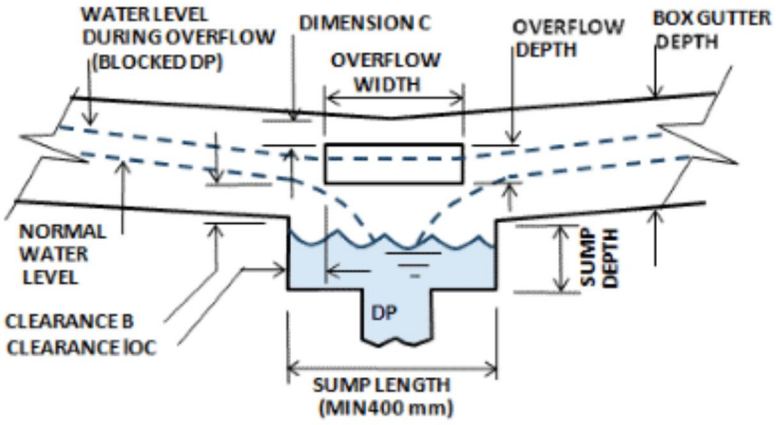
Find worst case and design Box gutter for that condition

Largest catchment area = LHS with wind from front	ca	=	63.5	sq.m
Design Flow = 239 x 63.5/3600 therefore	Q	=	4.22	L/s
from Fig I6(a)	l_{oc}	=	21	mm
From Fig I6(b) Overflow (spitter) depth	d_{oc}	=	75	mm
Box gutter depth from Fig I5 = l_{oc} + (d_{oc} + 30)	BGd	=	126	mm

Sump Design

Total catchment area	Ca	=	63.5 + 0	sq.m
Therefore Flow in sump = Ca x 239 / 3600	Qs	=	4.2	L/s
Downpipe Dia	Dia	=	150	mm
from Fig I4 Sump Depth	SD	=	15	mm
From Code sump length = overflow width + 2*l_{oc}	SL	=	200+ 2*21	mm
		=	242	mm
Sump length is less than Code min of 400 therefore sump length		=	400	mm

Clearances

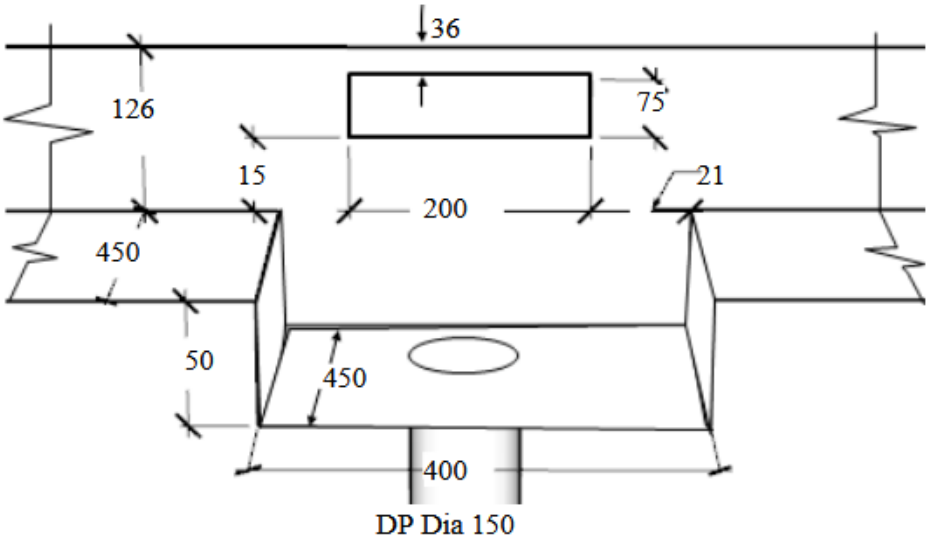


From Code clearance B, (Height of spitter above base of box gutter) = 0.7 * l_{oc}

= 15 mm

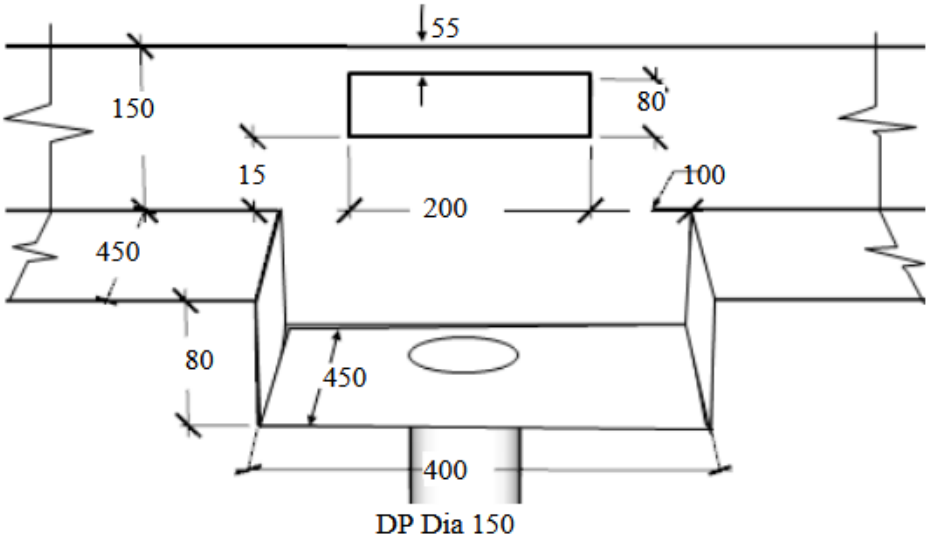
Dimension C (freeboard above spitter)=BG depth-B-O'flow depth = 36 mm

Diagrammatic, Code required minimum sizes. (Not to scale)



Summary (minimum required sizes)			**Adopt the below sizing:**	
Box Gutter width	=	450		mm
Box Gutter depth	=	126	150	mm
Overflow (spitter) width	=	200		mm
Overflow (spitter) depth	=	75	80	mm
Sump depth	=	50	80	mm
Sump width	=	450	450	mm
Sump length	=	400	400	mm
clearance l_{oc}	=	21	100	mm
clearance B	=	15	15	mm
Dimension C	=	36	55	mm
Downpipe Dia.	=	150		mm

Diagrammatic, Adopt the below sizing: (Not to scale)



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PO BOX. 3494, MORNINGTON, VIC, 3931
DESIGNED BY: T. Michaels
PROPOSED CAR WASH

JOB NO: 20-026 Civil
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EAVES GUTTER AND DOWN PIPE DESIGN TO AS/NZS 3500.3: 2018

EAVES GUTTER #1- Vacuum Bay Area

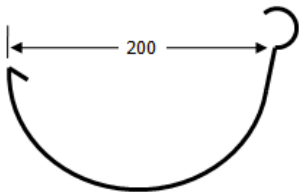
1-21 Cranebrook Road, Cranebrook, NSW, 2749

Horizontal catchment area	Ah	= 135	sq.m
Roof Average slope	S	= 25	degrees
Intensity	I	= 178	mm/hr
Is Gutter slope steeper than 1:500 ?		Yes	
Down pipe size selected	dia	= 125	mm
Cross referencing From Table 3.5.2 and Fig 3.5.2			
Theoretical number of DPs required	Tnum	= 1.98	
Selected Number of Down pipes	n	= 2	
from AS3500 Table 3.4.5.2, C'ment Area Multiplier	f	= 1.23	
Roof Area allowing for slope	Ac	= Ah*f	
		= 166.1	sq.m
Catchment Area per DP	A	= Ac/n	sq.m
		= 83	sq.m
Flow/DP	q	= I*A/3600	litres/sec
		= 4.11	litres/sec
from AS/NZS 3500 fig 3.5.2(B), Gutter Area		= 12699	sq.mm
Gutter Area rounded to nearest 100sq.mm		= 12700	sq.mm
From AS/NZS 3500 Table 3.5.2,, Down Pipe size		= 125	mm
(Interpolating between the sizes in the table. Info Only)		= *125*	*mm*
Down Pipe size selected		= 125	mm

Summary

This catchment requires :- number of DPs	= **2**	
Downpipe size	= **125**	mm
minimum eaves gutter cross sectional Area	= **12699**	sq.mm

GUTTER SELECTED: Lysaght Half Round 200 NSW Unslotted;
Area = 14500 sq.mm



Notes: Catchment area of each DP to be roughly similar size.
Length of any gutter draining to a downpipe to be not longer than 12m. (NCC vol2).

EAVES GUTTER #1- Vacuum Bay Area
1-21 Cranebrook Road, Cranebrook, NSW, 2749

POSSIBLE OPTIONS

	Number Req'd	Number Used	Gutter Area	Gutter Width	Gutter Depth
90 Dia:	4.52	5	6084	105	60
100 Dia:	3.42	4	7275	115	65
150 Dia:	1.27	2	12699	160	80
225 Dia:	0.46	1	22341	205	110
300 Dia:	0.22	1	22341	205	110

DOWNPIPE CAPACITY In terms of Plan area of roof.

	90 Dia	100 Dia	150 Dia	225 Dia	300 Dia
Max Catchment Area (sq.m)	30	39	106	362	741
Gutter Area (sq.mm)	6600	8200	18400	42310	76563

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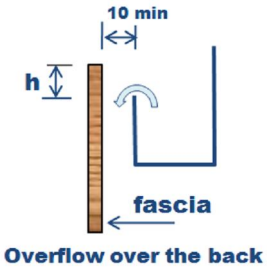
OVERFLOW DESIGN FOR EAVES GUTTERS to AS/NZS 3500.3:2018
EAVES GUTTER #1- Vacuum Bay Area
1-21 Cranebrook Road, Cranebrook, NSW, 2749

Catchment area	A	=	70	sq.m
Intensity ARI 100	I	=	178	mm/hr
Coefficient of Runoff	I	=	1	
Roof Slope	S	=	25	deg.
Roof Slope Factor	Sf	=	1 + 0.5*tan(Roof Slope)	
		=	1.23	
Design Catchment Area		=	Sf * A	
		=	86.1	
Roof runoff = Overflow required	Q	=	C*I*A/3600	L/s
		=	1 * 178 * 86.1/3600	
Therefore total Overflow required		=	4.26	L/s
Length of eaves gutter		=	9.8	m
Therefore required Oflow/metre of gutter		=	**0.43**	L/s/m

Overflow Methods:

Remaining Oveflow to be taken over the gutter top.		=	0.43	L/s/m



Determine the setdown "h" from AS/NZS 3500.3 Table G1 (Interpolating as required.)

Is the gutter sloping or level?		=	Sloping	
Therefore from table G1	h	=	14	mm
Is the roof sheeting turned down into the gutter?		=	no	
Therefore no change in set down	**h**	**=**	**14**	mm

Summary

Setdown adopted	=	**14**	mm
Total required Overflow/m for Q100 storm	=	**0.43**	L/s/m
Overflow through Slots (from Manufacturer)	=	0	L/s/m
Overflow over the edge of the gutter	=	0.43	L/s/m
Total designed overflow	=	**0.43**	L/s/m

Therefore this system has equal or greater capacity than the Q100 overflow requirement.
(Note: The setdown "h" is at the upstream end of the gutter.)

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EAVES GUTTER AND DOWN PIPE DESIGN TO AS/NZS 3500.3: 2018

EAVES GUTTER #2- Smaller Roof Areas

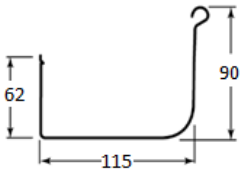
1-21 Cranebrook Road, Cranebrook, NSW, 2749

Horizontal catchment area	Ah	= 20	sq.m
Roof Average slope	S	= 5	degrees
Intensity	I	= 178	mm/hr
Is Gutter slope steeper than 1:500 ?		Yes	
Down pipe size selected	dia	= 90	mm
Cross referencing From Table 3.5.2 and Fig 3.5.2			
Theoretical number of DPs required	Tnum	= 0.57	
Selected Number of Down pipes	n	= 1	
from AS3500 Table 3.4.5.2, C'ment Area Multiplier	f	= 1.04	
Roof Area allowing for slope	Ac	= Ah*f	
		= 20.8	sq.m
Catchment Area per DP	A	= Ac/n	sq.m
		= 20.8	sq.m
Flow/DP	q	= I*A/3600	litres/sec
		= 1.03	litres/sec
from AS/NZS 3500 fig 3.5.2(B), Gutter Area		= 4286	sq.mm
Gutter Area rounded to nearest 100sq.mm		= 4300	sq.mm
From AS/NZS 3500 Table 3.5.2,, Down Pipe size		= 75	mm
(Interpolating between the sizes in the table. Info Only)		= *75*	*mm*
Down Pipe size selected		= 90	mm

Summary

This catchment requires :- number of DPs	= **1**	
Downpipe size	= **90**	mm
minimum eaves gutter cross sectional Area	= **4286**	sq.mm

GUTTER SELECTED: Lysaght QUAD 115 Hi-front Unslotted; Area = 5809 sq.mm



Notes: Catchment area of each DP to be roughly similar size.
Length of any gutter draining to a downpipe to be not longer than 12m. (NCC vol2).

EAVES GUTTER #2- Smaller Roof Areas
1-21 Cranebrook Road, Cranebrook, NSW, 2749

POSSIBLE OPTIONS

	Number Req'd	Number Used	Gutter Area	Gutter Width	Gutter Depth
90 Dia:	0.57	1	4286	90	50
100 Dia:	0.43	1	4286	90	50
150 Dia:	0.16	1	4286	90	50
225 Dia:	0.06	1	4286	90	50
300 Dia:	0.03	1	4286	90	50

DOWNPIPE CAPACITY In terms of Plan area of roof.

	90 Dia	100 Dia	150 Dia	225 Dia	300 Dia
Max Catchment Area (sq.m)	35	47	126	362	741
Gutter Area (sq.mm)	6600	8200	18400	42310	76563

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[redacted]

Sh: C19

Job No.:	20-026 Civil	**Date :**	26-Nov-20
Client :	CARWASH WORLD		
Job address :	1-24 CRANEBROOK ROAD, CRANEBROOK, NSW		

DRAINAGE DISCHARGE

ARI	5min Intensity Storm	10min Intensity Storm
10	153	
20	178	
50	212	
100	239	

DRAINAGE RUN #1- ARI 10 t (min)= 5

Overall Site with new Car Wash Site:

Pit #	SITE	A (m^2)	C	I (mm/hr)	Qi (l/s)	Q (l/s)	
URWT1	Roof Box	394.7	1	239.0	26.2	34.0	To be re-used in the Car Wash Operations
	Roof Eaves	157.9	1	178.0	7.8		
P1	Driveway	213	0.9	153.0	8.1	8.1	
	Roof Eaves				0.0		150 dia UPVC @ 1:100
P2	Driveway	340	0.9	153.0	13.0	13.0	
					0.0		150 dia UPVC @ 1:100
P3	Driveway	41	0.9	153.0	1.6	22.7	
					0.0		225 dia UPVC @ 1:100
Ex. P4	Driveway	47	0.9	153.0	1.8	24.5	
					0.0		Ex 375mm pipe @ 1:55
P5	Driveway	148	0.9	153.0	5.7	5.7	
							150 dia UPVC @ 1:100
P6	Driveway	219	0.9	153.0	8.4	14.0	
							150 dia UPVC @ 1:100
Ex. P7	Driveway		0.9	153.0	0.0	38.6	
							Ex 600mm pipe

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P. O. Box 3494, Mornington, Vic, 3931 Mob: [redacted]

Job No.:	20-026 Civil	**Date :**	26th Nov 2020
Client :	CARWASH WORLD		
Job address :	1-24 CRANEBROOK ROAD, CRANEBROOK, NSW		

D (min)	POST
5	239.0
6	230.0
7	221.0
8	212.0
9	204.0
10	196.0
11	189.0
12	182.0
13	176.0
14	170.0
15	164.0
20	140.0
25	123.0
30	109.0

DRAINAGE DISCHARGE- DRAINAGE RUN 1

PRE-DEVELOPEMENT		POST-DEVELOPEMENT				t_c (min)	I_{MAX}
ARI	100	ARI	100			25	123.0
t_c (min)=	10	t_c (min)=	15	20	25	30	30
SITE Width (m)		Roof Box Gutter Area (m2)	394.7	394.7	394.7	394.7	394.7
SITE Length (m)		Discharge Coefficient	1	1	1	1	1
SITE Area (m2)	1593.6	Roof Eaves Gutter Area (m2)	157.9	157.9	157.9	157.9	157.9
Discharge Coefficient	0.30	Discharge Coefficient	1	1	1	1	1
Rainfall Intensity (mm/hr)	140.0	Drive Area (m2)	1040.5	1040.5	1040.5	1040.5	1040.5
Allowable Discharge Qpsd(l/s/ha)	N/A	Discharge Coefficient	0.9	0.9	0.9	0.9	0.9
		Rainfall Intensity (mm/hr)	140.0	140	123	109	109
Allowable Discharge Qpsd(l/s)	18.6	Actual Discharge Qasd(l/s)	57.91	57.91	50.88	45.09	45.09
Volume total (m3)	11.16	Storage Vol req'd (m3)	35.38	47.18	48.43	47.69	47.69

Storage Location	Area	Length	Pit Depth	Storage Vol (M3)	Remaining Vol (M3)
22,500L Underground Water Tank				22.50	25.93
Existing Underground Detention System				26.00	-0.07

In this scenario; all roofed water will pass into an underground 22,500L water tank and be used in the Car Washing process. Therefore this water never contributes to the Stormwater Runoff volume.

Australian Government
Bureau of Meteorology

Location

Label: Cranebrook, NSW

Latitude: 33° 41' 22"
[Nearest grid cell: 33.6875 (S)]

Longitude: 150° 43' 27"
[Nearest grid cell: 150.7125 (E)]

IFD Design Rainfall Intensity (mm/h)

Issued: 21 October 2020

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

	Annual Exceedance Probability (AEP)						
Duration	**63.2%**	**50% #**	**20% ***	**10%**	**5%**	**2%**	**1%**
1 min	119	136	191	229	267	319	360
2 min	97.1	110	150	178	206	245	276
3 min	89.9	102	140	167	193	230	259
4 min	84.8	96.4	134	160	185	221	249
5 min	80.4	91.7	128	153	178	212	239
6 min	76.5	87.4	122	147	171	204	230
7 min	72.9	83.4	117	141	164	196	221
8 min	69.6	79.8	112	135	158	188	212
9 min	66.6	76.5	108	130	152	181	204
10 min	63.9	73.4	104	125	146	174	196
11 min	61.4	70.5	99.7	120	140	168	189
12 min	59.1	67.9	96.1	116	135	162	182
13 min	57.0	65.5	92.6	112	131	156	176
14 min	55.0	63.2	89.5	108	126	151	170
15 min	53.2	61.1	86.5	104	122	146	164
20 min	45.7	52.5	74.1	89.2	104	125	140
25 min	40.2	46.1	65.0	78.1	91.3	109	123
30 min	36.0	41.2	57.9	69.6	81.2	96.9	109
45 min	27.8	31.6	44.1	52.8	61.5	73.4	82.7
1 hour	22.9	26.0	36.0	43.0	50.0	59.7	67.3
1.5 hour	17.4	19.6	26.9	32.0	37.2	44.4	50.2
2 hour	14.3	16.1	21.9	26.1	30.3	36.2	40.9
3 hour	10.9	12.2	16.5	19.7	22.9	27.4	31.0
4.5 hour	8.36	9.36	12.7	15.1	17.6	21.1	23.9
6 hour	6.98	7.82	10.6	12.7	14.8	17.8	20.2

Climate statistics for Australian locations

Monthly climate statistics

All years of record

About Climate statistics | Data file of statistics for this site (csv) | Site selection menu

Temperature | Rainfall | Other daily elements | 9am conditions | 3pm conditions

PENRITH LAKES AWS

An extended list of climate statistics recorded is provided below. There is also a summary table for printing with the commonly requested statistics and a map showing the location of this site. Monthly statistics are only included if there are more than 10 years of suitable data.

Note: Many statistics are updated quarterly and recent weather events may not be represented in the statistics below. For more current information on recent extreme values, please refer to the corresponding Daily rainfall, Maximum temperature and Minimum temperature data tables for this site, and our Australian Climate and Weather Extremes Monitoring System. Missing observations associated with the observer being unavailable (where observations are undertaken manually), a failure in the observing equipment, or when an event has produced suspect data may result in an extreme event not being recorded.

Site details

Site name: PENRITH LAKES AWS **Site number:** 067113 **Commenced:** 1995
Latitude: 33.72° S **Longitude:** 150.68° E **Elevation:** 25 m **Operational status:** Open

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years		Plot	Map
Rainfall																	
Mean rainfall (mm)	93.6	122.6	79.0	46.9	35.9	48.8	30.6	29.8	32.4	56.0	80.4	60.8	705.4	23	1995 2020		
Highest rainfall (mm)	307.8	356.8	230.2	258.8	150.2	226.0	101.0	161.2	93.6	256.2	206.2	164.2	1013.4	25	1995 2020		
Date	2016	2020	2017	2015	1996	2007	2020	1998	2006	2004	2007	2014	2007				
Lowest rainfall (mm)	19.2	1.8	16.8	1.8	3.2	3.0	1.4	0.0	0.2	4.6	13.0	0.0	450.0	25	1995 2020		
Date	2009	2016	2016	1997	2018	2001	2017	1997	2017	1998	2002	2019	2019				
Decile 1 rainfall (mm)	22.6	20.1	23.1	8.4	5.4	15.2	4.8	2.7	9.1	7.1	15.0	28.6	529.4	25	1995 2020		
Decile 5 (median) rainfall (mm)	82.0	87.4	67.4	34.2	24.8	33.6	19.2	18.8	26.5	45.8	65.6	58.8	693.6	25	1995 2020		
Decile 9 rainfall (mm)	154.2	257.0	148.6	90.2	86.8	92.2	65.8	71.4	71.8	86.0	150.5	95.2	898.2	25	1995 2020		
Highest daily rainfall (mm)	101.8	139.0	55.0	85.6	63.0	81.6	70.0	60.6	57.2	75.2	89.0	49.6	139.0	25	1995 2020		
Date	29 Jan 2013	12 Feb 1997	15 Mar 2017	21 Apr 2015	07 May 1996	05 Jun 2016	27 Jul 2020	20 Aug 2007	07 Sep 2006	18 Oct 2018	29 Nov 2018	07 Dec 2014	12 Feb 1997				
Mean number of days of rain	11.6	11.5	12.1	10.0	10.2	14.6	11.4	8.1	7.8	9.3	11.8	10.6	129.0	25	1995 2020		
Mean number of days of rain ≥ 1 mm	7.5	7.7	8.1	5.4	4.1	5.7	4.0	3.3	4.6	5.5	8.0	7.0	70.9	25	1995 2020		
Mean number of days of rain ≥ 10 mm	2.6	3.4	2.8	1.4	1.1	1.3	0.8	0.8	1.0	1.5	3.0	2.0	21.7	25	1995 2020		
Mean number of days of rain ≥ 25 mm	1.2	1.5	0.6	0.4	0.4	0.5	0.2	0.3	0.2	0.5	0.8	0.5	7.1	25	1995 2020		