

**PART 4: STORMWATER DRAINAGE****4.1 Scope – No change****4.2 General – No change****4.2.1 Objectives**

Add the following new sentence after the 2<sup>nd</sup> paragraph:

Note that the Wanganui District Council promotes the use of 'On-site Stormwater Management Guideline' document for sustainable stormwater design solutions. This document was published by the Ministry for the Environment and NZWERF in October 2004. This document is available for free download from the Water NZ website.

**4.2.2 Legislation – No change****4.2.3 Local authorities' requirements – No change****4.2.3.1 Authorization from the regional council – No change****4.2.3.2 Exercising permits – No change****4.2.4 Catchment management planning – No change****4.2.5 Effects of land use on receiving waters – No change****4.2.6 System components – No change****4.2.7 Alternative stormwater systems – No change****4.2.8 Catchments and off-site effects – No change****4.2.9 Stormwater pipelines and waterways – No change****4.2.9.1 Stormwater pumping – No change****4.2.9.2 Materials – No change****4.2.9.3 Rural areas – No change****4.3 Design – No change****4.3.1 Approval of proposed works – No change****4.3.1.1 Approval process for stormwater drainage works – No change****4.3.1.2 Information to be provided – No change****4.3.2 System Design – No change****4.3.2.1(e) The designer**

Alteration – Incorrect reference:

Drawing WS-003 should read drawing WW-002

**4.3.2.2 Separate system – No change****4.3.2.3 Primary and secondary systems – No change****4.3.2.4 Secondary flow paths – No change****4.3.2.5 Minimum protection standards – No change****4.3.2.5.1 Design storms – No change****Table 4.1 Minimum AEP for design storms – No change****4.3.2.5.2 Freeboard – No change****4.3.2.5.3 Tidal areas – No change****4.3.2.5.4 Bridges and culverts – No change****4.3.3 Pipelines and culverts – No change****4.3.3.1 Location and alignment of stormwater mains – No change****4.3.3.2 Pipe Materials**

Add the following paragraphs:

Roller Compacted concrete pipes (RCP) shall only be used if it can be shown and verified that each individual pipe has passed the factory hydrostatic test.

PVC pipes and fittings shall be rubber-ring jointed complying with AS/NZS 1260 for foul sewers and AS 1254 for stormwater sewers. Class SN4 is generally acceptable.

PVC-U pipes and fittings shall be used in all areas where sewer connections are required to be made to the constructed pipeline.

Stormboss pipe will be accepted by the WDC.

#### **4.3.3.3 Building over pipelines – No change**

#### **Table 4.2 Acceptable pipe materials**

See Table 4.2 in Appendix G.

#### **4.3.3.4 Pipeline connections**

Paragraph 1 – remove the words:

“and the distance from the connection to the closest inspection point is not greater than 11 m.”

(Note: The second paragraph in NZS 4404 should still apply).

#### **4.3.3.5 Minimum pipe sizes – No change**

##### **Minimum cover**

WDC accepts the minimum cover requirements of AS/NZS 2566 for flexible pipelines.

#### **4.3.3.7 Gradients and acceptable flow velocities – No change**

#### **4.3.3.8 Backflow effects – No change**

#### **4.3.3.9 Culverts**

Add the following new paragraph after the 4<sup>th</sup> paragraph:

The Council accepts headwalls constructed of concrete filled bags for culverts less than DN375. All culverts DN375 and over will require precast headwalls. See drawing RD-WDC-011 in Appendix A.

#### **4.3.3.10 Inlets and outlets – No change**

#### **4.3.3.11 Subsoil drains**

Add the following paragraph:

The developer needs to check with WDC's approved Product List or apply for a new product to be added at the developers expense.

See drawing CM-WDC-019 in Appendix A for subsoil details

**Note:** Wanganui is prone to iron ochre effecting subsoil drains. Where the water table is high and subsoil drains are necessary Council advice should be sought. WDC have specific requirements for subsoil drains to minimise difficulties associated with the presence of the iron ochre. These requirements include the use of special vitrified clay subsoil pipes. WDC has a supply of these pipes and will sell them to developers for use in the iron ochre prone areas.

- 4.3.3.12 Seismic design – No change**  
**4.3.3.13 Geotechnical investigations – No change**  
**4.3.3.14 Bulkheads – No change**  
**4.3.4 Manholes – No change**

**4.3.4.1 Standard manholes**

Replace the last paragraph with the following new paragraph:

Refer to drawing CM-WDC-001 and CM-WDC-007 for manhole details.  
 (Appendix A)

**4.3.4.2 Manhole materials**

Replace paragraph one with the following new paragraph:

MH may be manufactured in reinforced concrete, or from suitable materials as approved by the Wanganui District Council.

- 4.3.4.3 Size of manholes – No change**  
**4.3.4.4 Shallow manholes – No change**  
**4.3.4.5 Manhole connections – No change**  
**4.3.4.6 Access – No change**
- 4.3.5 Waterways – No change**  
**4.3.5.1 Constructed waterways – No change**  
**4.3.5.2 Natural waterways – No change**  
**4.3.6 Water quantity and quality control – No change**  
**4.3.7 Connection to the public system – No change**

**4.3.7.1(e) Individual lots and developments**

Replace clause with the following:

- (i) 90mm for internal lots

**4.3.7.1(h) Individual lots and developments**

Replace clause with the following:

Connection to an alternative stormwater disposal system such as vegetated swales, soakpits, or soakage basins is acceptable provided the system is authorised by the WDC and adverse effects and potential nuisances are addressed;

**4.3.7.1(k) Individual lots and developments**

Add the following new clause:

The principle of the ownership and responsibility for stormwater drains apply similarly to the sanitary sewer drawings prepared in Appendix A.

See drawings CM-WDC-014, CM-WDC-015, CM-WDC-016, CM-WDC-017 and CM-WDC-018 in Appendix A.

**Note:** For stormwater application ignore the rodding eye notes on the sanitary sewer drawings.

- 4.3.7.2 Connection of lateral pipelines to mains – No change**  
**4.3.8 Stormwater disposal – No change**  
**4.3.8.1 Approved outfall**

**4.3.8.2 Soak pits**

Add the following new paragraph:

Guidance on soak pits is also contained within WDC's Stormwater Separation Guide.

**4.3.9 Easements****4.3.10 Fencing and safety****4.3.10.1 Fencing – No change****4.3.10.2 Health and Safety - No change****4.3.11 Developer contributions – No change****4.3.12 Means of compliance – No change****4.3.12.1 Surface water – No change****4.3.12.2 Estimation of surface water run-off – No change****4.3.12.2.1 Large catchments**

Replace clause with the following:

For catchment areas greater than 100 ha or smaller catchments with significant storage elements (eg ponds, wetlands, and basins) surface water run-off shall be determined by unsteady flow modelling or an alternative method agreed to by WDC for each specific case.

**4.3.12.2.2 Rainfall intensity and time of concentration**

Replace clause with the following:

Rainfall intensity shall be drawn from the depth-duration-frequency table for Cooks Gardens, Wanganui (1951-1995) shown below:

Rainfall depths (mm)										
ARI (y)	Duration									
	10m	20m	30m	1 h	2 h	6 h	12 h	24 h	48 h	72 h
2	7.4	10.8	12.9	17.0	21.6	32.7	41.7	52.5	62.7	68.5
5	10.4	15.1	18.1	23.3	28.1	41.6	52.7	68.1	80.0	85.8
10	12.3	17.9	21.6	27.5	32.4	47.4	59.9	78.4	91.5	97.2
20	14.2	20.6	24.9	31.6	36.5	53.1	66.9	88.3	102.5	108.2
30	15.3	22.2	26.7	33.9	38.9	56.3	70.9	94.0	108.8	114.5
50	16.7	24.1	29.1	36.8	41.9	60.3	75.9	101.1	116.7	122.4
60	17.2	24.8	30.0	37.9	42.9	61.8	77.7	103.7	119.6	125.2
70	17.6	25.4	30.7	38.7	43.8	63.0	79.2	105.8	121.9	127.6
80	17.9	25.9	31.3	39.5	44.6	64.0	80.5	107.6	124.0	129.6
90	18.2	26.3	31.8	40.2	45.3	65.0	81.7	109.3	125.8	131.4
100	18.5	26.7	32.3	40.8	45.9	65.8	82.7	110.7	127.4	133.1
EV1 distribution parameters										
Mode (U)	6.4	9.5	11.3	14.9	19.5	29.9	38.2	47.5	57.1	62.9
Scale (a)	2.6	3.8	4.6	5.6	5.7	7.8	9.7	13.8	15.3	15.3
Standard error of rainfall depths (mm)										
ARI (y)	Duration									
	10m	20m	30m	1 h	2 h	6 h	12 h	24 h	48 h	72 h
2	0.4	0.6	0.7	0.9	0.9	1.2	1.5	2.1	2.4	2.3
5	0.6	0.8	1.0	1.3	1.3	1.8	2.2	3.1	3.5	3.4
10	0.8	1.2	1.4	1.7	1.8	2.4	3.0	4.2	4.7	4.7
20	1.0	1.5	1.8	2.2	2.3	3.1	3.8	5.4	6.0	6.0
30	1.2	1.7	2.0	2.5	2.6	3.5	4.3	6.2	6.8	6.8
50	1.3	1.9	2.4	2.9	2.9	4.0	5.0	7.1	7.9	7.8
60	1.4	2.0	2.5	3.0	3.1	4.2	5.2	7.4	8.2	8.2
70	1.5	2.1	2.6	3.1	3.2	4.4	5.4	7.7	8.5	8.5
80	1.5	2.2	2.6	3.2	3.3	4.5	5.6	7.9	8.8	8.8
90	1.5	2.2	2.7	3.3	3.4	4.6	5.7	8.1	9.0	9.0
100	1.6	2.3	2.8	3.4	3.5	4.7	5.8	8.3	9.2	9.2

Estimated depth-duration-frequency table for Wanganui at 2050

ARI (yr)	Rainfall Depths (mm)									
	Duration									
	10m	20m	30m	1 hr	2 hr	6 hr	12 hr	24 hr	48 hr	72 hr
2	8.0	11.6	13.8	18.2	23.0	34.6	44.0	55.0	64.5	70.5
5	11.2	16.2	19.4	24.9	29.9	44.0	55.6	71.8	82.0	88.4
10	13.3	19.3	23.2	29.4	34.5	50.2	63.1	82.8	93.8	100.3
20	15.3	22.2	26.7	33.8	38.9	56.2	70.5	93.5	104.9	111.7
30	16.5	23.9	28.7	36.2	41.4	59.6	74.7	99.6	111.4	118.3
50	18.0	25.9	31.2	39.3	44.6	63.8	80.0	107.2	119.4	126.5
60	18.6	26.7	32.2	40.5	45.7	65.4	81.9	110.0	122.4	129.4
70	19.0	27.3	33.0	41.4	46.6	66.7	83.5	112.3	124.8	131.9
80	19.3	27.9	33.6	42.2	47.5	67.7	84.9	114.2	126.9	134.0
90	19.7	28.3	34.1	43.0	48.2	68.8	86.1	116.0	128.7	135.9
100	20.0	28.7	34.7	43.6	48.9	69.6	87.2	117.6	130.4	137.6

**4.3.12.3 Sizing of the stormwater drainage system – No change****4.3.12.3.1 Pipe flow – No change****4.3.12.3.2 Energy loss through structures – No change****4.3.12.3.3 Determination of water surface profiles – No change****Figure 4.1 Part full pipe flow data – No change****Table 4.3 Loss coefficients for bends – No change****Figure 4.2 Typical stormwater catchment – No change****Figure 4.3 Sump to manhole connection – No change****Table 4.4 Backwater calculation for surcharged stormwater systems – No change****4.3.12.3.4 Outfall water levels – No change****4.3.12.4 Manholes – No change****4.3.12.4.1 Hydraulic flow in manholes – No change****4.3.12.4.2 Angle of connection – No change****4.3.12.5 Waterways – No change****4.3.12.5.1 Manning's 'n' – No change****4.3.12.6 Outlets – No change****4.3.12.7 Stormwater quality control – No change****4.3.12.8 Subsoil drains – No change****4.4 Construction – No change****4.4.1 Construction standard specifications**

Replace the clause with the following:

Construction shall be carried out in accordance with the WDC standard construction specifications.

**4.4.2 Pipeline construction**

The construction of pipelines shall be carried out in accordance with the requirements of AS/NZS 2566 Part 1 and Part 2, AS/NZS 2032 (PVC pipes), AS/NZS3725 (concrete pipes) and AS/NZS 2033 (PE Pipes).

**4.4.3 Trenching – No change****4.4.4 Reinstatement – No change****4.4.5 Earthworks, erosion and sediment control – No change****4.4.6 Testing – No change**