

**ABSTRACT OF VOLUME FOR CONSTRUCTION OF HUME PIPE CULVERT**

Side slope (%)	Hume pipe dia.	No. of culvert	Foundation excavation (m <sup>3</sup> )		DRM vol. (m <sup>3</sup> )	Fill volume		H/pipe Length (m)	Remarks
			Soil	Rock		Soil	Stone		
30	60	5	44.08	29.39	31.15	9.24	6.92	31.25	100% soil
40	60	4	41.77	13.92	26.22	7.39	5.45	25.00	100% soil
30	90	1	2.68	8.03	7.40	9.24	6.92	6.25	100% soil
<b>Total</b>		<b>10</b>	<b>88.52</b>	<b>51.34</b>	<b>64.76</b>	<b>25.86</b>	<b>19.29</b>	<b>62.50</b>	

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**VOLUME CALCULATION FOR 60CM DIA. HUMEPIPE CULVERT AT 30% SIDE SLOPE**

Soil 60%	44.078	m <sup>3</sup>
Rock 40%	29.39	m <sup>3</sup>

**1) Foundation excavation**

	L(m)	W(m)	H(m)	F	Nos.	Vol (m <sup>3</sup> )	No. of culverts	Tota vol. (m <sup>3</sup> )
a) DRM wall	3.00	2.22	1.23	0.50	1	4.10		
b) Apron	1.25	1.25	0.17	0.50	1	0.13		
	1.25	0.40	0.30		1	0.15		
c) Catchpit	1.50	1.31	0.29	0.50	1	0.28		
	1.50	1.00	1.38		1	2.07		
	1.50	1.50	1.50		1	3.38		
d) Hume pipe trenches								
	5.15	0.69	(1.38 + 1.20)	0.50	1	4.58		
				<b>Total</b>		<b>14.69</b>	<b>5.00</b>	<b>73.46</b>

**2) Dry Rubble Masonry**

a) Retaining wall

	3.00	(0.95+ 0.50)	1.80	0.50	1	3.92		
	3.00	0.95	0.24	0.50	1	0.34		
b) Apron	1.25	0.68	0.25		1	0.21		
	0.68	0.25	0.25		2	0.09		
c) Catchpit	1.50	1.50	0.25		1	0.56		
	1.50	1.25	0.25		2	0.94		
	1.25	1.00	0.25		2	0.63		
				<b>Sub-total (i)</b>		<b>6.68</b>		

d) (-) Vol. occupied by H/pipe

	L(m)	R(m)	H(m)	F	Nos.	Vol (m <sup>3</sup> )	No. of culverts	Tota vol. (m <sup>3</sup> )
	(0.85 + 0.68)/2	(0.35 x 0.35)		3.14	1	0.29		
	0.25	(0.35 x 0.35)		3.14	1	0.10		
	0.40	0.25	0.30		2	0.06		
				<b>Sub-total (ii)</b>		<b>0.45</b>		
				<b>Total = Sub-total {(i) - (ii)}</b>		<b>6.23</b>	<b>5.00</b>	<b>31.15</b>

**3) Filling**

a) Soil/boulder

	L(m)	W(m)	H(m)	F	Nos.	Vol (m <sup>3</sup> )	No. of culverts	Tota vol. (m <sup>3</sup> )
	4.50	0.69	(0.68 + 0.51)	0.50	1	1.85	5.00	9.24
b) Stone filling								
	3.00	0.65	0.68		1	1.33		
	1.25	0.62	0.15	0.50	1	0.06		
				<b>Total</b>		<b>1.38</b>	<b>5.00</b>	<b>6.92</b>

**4) Nos. of Hume pipe per culvert (Length of 1 pipe = 2.50m)**

L (m)	No. of pipe	No. of culverts	Tota L (m)
2.50	2.50	5.00	31.25

**VOLUME CALCULATION FOR 60CM DIA. HUMEPIPE CULVERT AT 40% SIDE SLOPE**

Soil 75%	41.769	m <sup>3</sup>
Rock 25%	13.92	m <sup>3</sup>

**1) Foundation excavation**

	L(m)	W(m)	H(m)	F	Nos.	Vol (m <sup>3</sup> )	No. of culverts	Tota vol. (m <sup>3</sup> )
a) DRM wall	3.00	1.51	0.98	0.50	1	2.22		
b) Apron	1.25	0.55	0.09	0.50	1	0.03		
	1.25	0.27	0.11	0.50	1	0.02		
	1.25	0.55	0.11		1	0.08		
	1.25	0.82	0.25		1	0.26		
c) Catchpit	1.50	1.47	0.37	0.50	1	0.41		

	1.50	1.00	1.97		1	2.96		
	1.50	1.50	1.50		1	3.38		
d) Hume pipe trenches	5.15	0.69	(1.38 + 1.20)	0.50	1	4.58		
				<b>Total</b>		<b>13.92</b>	<b>4.00</b>	<b>55.69</b>

## 2) Dry Rubble Masonry

a) Retaining wall

	3.00	(0.95+ 0.50)	1.80	0.50	1	3.92		
	3.00	0.95	0.24	0.50	1	0.34		
b) Apron	1.25	0.82	0.25		1	0.26		
	1.25	0.57	0.25		1	0.18		
	1.25	0.25	0.15		1	0.05		
c) Catchpit	0.57	0.25	0.25		4	0.14		
	1.50	1.50	0.25		1	0.56		
	1.50	1.25	0.25		2	0.94		
	1.25	1.00	0.25		2	0.63		
					<b>Sub-total (i)</b>	<b>7.01</b>		

d) (-) Vol. occupied by H/pipe

L(m)	R(m)	H(m)	F	Nos.			
(0.85 + 0.68)/2	(0.35 x 0.35)		3.14	1	0.29		
0.25	(0.35 x 0.35)		3.14	1	0.10		
0.40	0.25	0.30		2	0.06		
				<b>Sub-total (ii)</b>	<b>0.45</b>		
				<b>Total = Sub-total {(i) - (ii)}</b>	<b>6.56</b>	<b>4.00</b>	<b>26.22</b>

## 3) Filling

a) Soil/boulder

L(m)	W(m)	H(m)	F	Nos.			
4.50	0.69	(0.68 + 0.51)	0.50	1	1.85	4.00	7.39

b) Stone

3.00	0.68	0.65		1	1.33		
1.25	0.24	0.12		1	0.04		
				<b>Total</b>	<b>1.36</b>	<b>4.00</b>	<b>5.45</b>

4) Nos. of Hume pipe per culvert (Length of 1 pipe = 2.50m)

L(m)	No. of pipe	No. of culverts	Total L (m)
2.50	2.50	4.00	25.00

## VOLUME CALCULATION FOR 90CM DIA. HUMEPIPE CULVERT AT 30% SIDE SLOPE

Soil 25%	2.67691	m <sup>3</sup>
Rock 75%	8.03	m <sup>3</sup>

1) Foundation excavation

L(m)	W(m)	H(m)	F	Nos.	Vol (m <sup>3</sup> )	No. of culverts	Total vol. (m <sup>3</sup> )
a) DRM wall	5.00	1.00	2.04	0.50	1	5.10	
d) Hume pipe trenches	6.30	0.69	(1.38 + 1.20)	0.50	1	5.61	
				<b>Total</b>	<b>10.71</b>	<b>1.00</b>	<b>10.71</b>

2) Dry Rubble Masonry

a) Retaining wall

5.00	(0.95+ 0.50)	2.04	0.50	1	7.40		
				<b>Sub-total (i)</b>	<b>7.40</b>		

3) Filling

a) Soil/boulder

L(m)	W(m)	H(m)	F	Nos.			
4.50	0.69	(0.68 + 0.51)	0.50	1	1.85	5.00	9.24

b) Stone filling

3.00	0.65	0.68		1	1.33		
1.25	0.62	0.15	0.50	1	0.06		
			Total		1.38	5.00	6.92

4) Nos. of Hume pipe per culvert (Length of 1 pipe = 2.50m)

L (m)	No. of pipe	No. of culverts	Tota L (m)
2.50	2.50	1.00	6.25