DESIGN OF SEDIMENT BASIN

Soil type = B

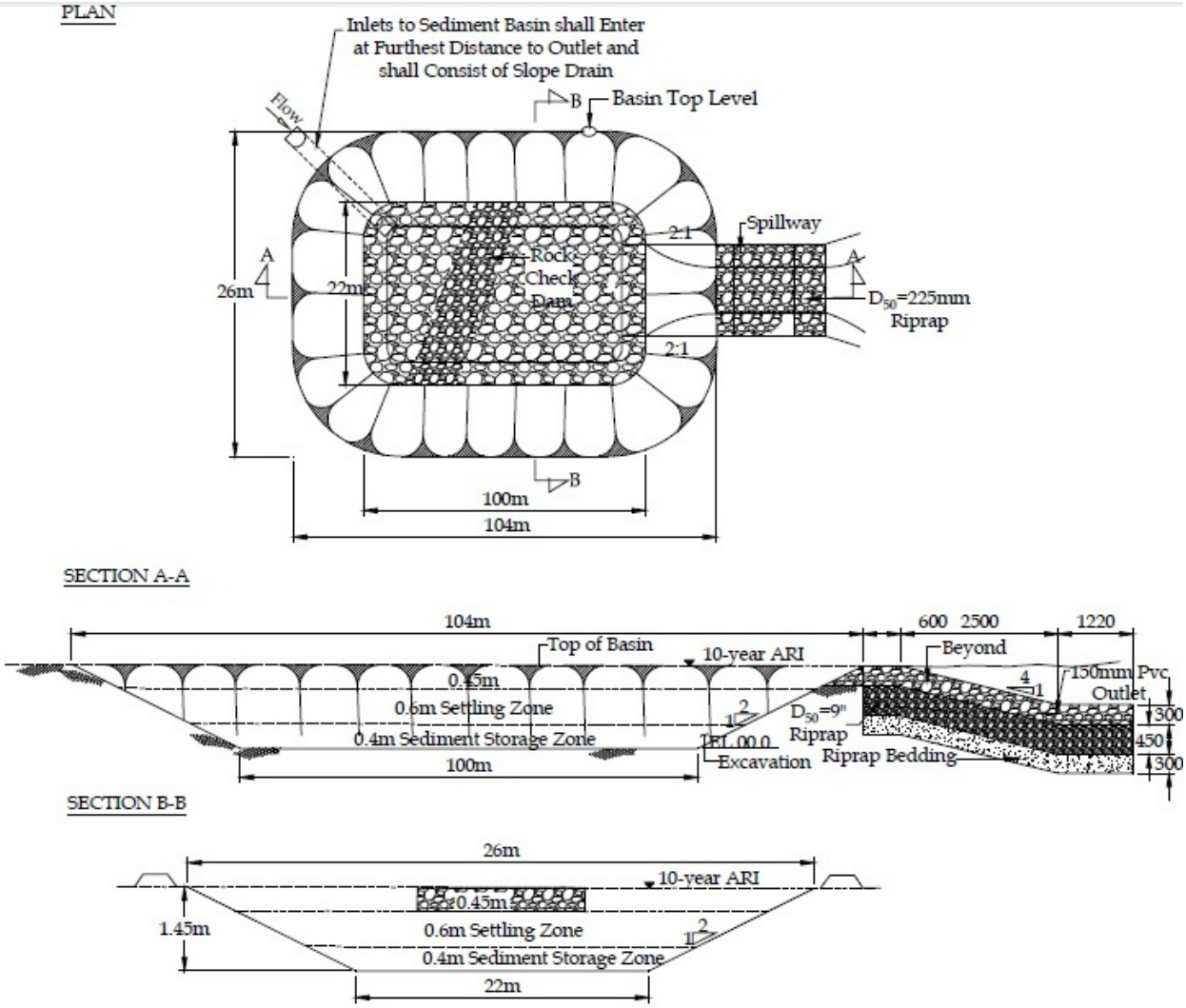
Basin type = Wet

ZONE	SB 1A				SB 1B				SB 1C				SB 1D			
Required surface area (m^2/ha) =	340				340				340				340			
Required total volume (m^3/ha) =	510				510				510				510			
Surface area required (m^2) =	6290.0				5610.0				4080.0				3910.0			
∑ basin volume required (m^3) =	9435				8415				6120				5865			
SETTLING ZONE																
Required settling zone, V_1 (m^3) =	4717.5				4207.5				3060				2932.5			
Settling zone depth, y_1 (m) =	1				1				1				1			
Try settling zone;																
Average width, W_1 (m) =	60				50				50				50			
Average length, L_1 (m) =	120				110				110				120			
Average surface area (m^2) =	120	x	60		120	x	50		120	x	50		120	x	50	
=	7200	>	6290	OK	6000	>	5610	OK	6000	>	4080	OK	6000	>	3910	OK
Checking settling zone;																
L_1/y_1 ratio =	120.00	<	200	OK	120.00	<	200	OK	120.00	<	200	OK	120.00	<	200	OK
L_1/W_1 ratio =	2.00	>	2	OK	2.40	>	2	OK	2.40	>	2	OK	2.40	>	2	OK
SEDIMENT STORAGE ZONE																
Required settling zone, V_2 (m^3) =	4717.5				4207.5				3060				2932.5			
Side slope, Z =	2	:	1		2	:	1		2	:	1		2	:	1	
Average width, W_2 (m) =	58				48				48				48			
Average length, L_2 (m) =	118				118				118				118			

Required depth, V_2 (m^3) =	5251.97	>	4717.5	OK	4320.77	>	4207.5	OK	4320.77	>	3060	OK	4320.77	>	2932.5	OK
Sediment storage depth, y_2 (m) =	0.8	>	0.3	OK	0.8	>	0.3	OK	0.8	>	0.3	OK	0.8	>	0.3	OK
OVERALL BASIN DIAMETER																
At top water level :																
$W_{TWL} = W_1+2 \times Z \times y_1/2$ (m) =	62				52				52				52			
$L_{WTL} = L_1-2 \times Z \times y_1/2$ (m) =	118				118				118				118			
Base :																
$W_B = W_1-2 \times Z \times (y_1/2 + y_2)$ (m) =	55				45				45				45			
$L_B = L_1-2 \times Z \times (y_1/2 + y_2)$ (m) =	115				115				115				115			
Depth :																
Settling zone, y_1 (m) =	1				1				1				1			
Sediment storage zone, y_2 (m) =	0.8				0.8				0.8				0.8			
Side slope, Z = (H) : (V) =	2	:	1		2	:	1		2	:	1		2	:	1	
BASIN OUTLET																
ARI spillway for sediment basin (yr) =	10				10				10				10			
Spillway dimension (m) =	1.5 wide	x	0.3 high		1.5 wide	x	0.3 high		1.5 wide	x	0.3 high		1.5 wide	x	0.3 high	
Riser pipe head, H_0 (mm) =	300				300				300				300			
Try orifice ;	1				1				1				1			
Diameter orifice (m) =	0.45				0.45				0.45				0.45			
C_0 =	0.5				0.5				0.5				0.5			
$Q_{riser} = C_0 A_0 \sqrt{2gH_0}$ (m^3/s) =	0.19				0.19				0.19				0.19			
Q_{10} (m^3/s) =	2.57				2.29				1.67				1.60			
$Q_{required} = Q_{10} - Q_{riser}$ (m^3/s) =	2.38				2.10				1.47				1.40			
Try dimension spillway ;																
Spillway base width, B (m) =	1.50				1.50				1.50				1.50			
Eff head on spillway crest, H_p (m) =	0.30				0.30				0.30				0.30			

Spillway discharge coeff, C_{sp} =	1.48				1.48				1.48				1.48			
$Q_{spillway} = C_{sp}\ B\ H_p^{1.5}$ (m^3/s) =	0.36	>	0.35	OK	0.36	>	0.35	OK	0.36	>	0.35	OK	0.36	>	0.35	OK
∑ Basin depth including spillway (m) =	2.4				2.4				2.4				2.4			
Sediment yield, Y (tonne) =	2706.22				2267.52				334.59				319.02			
Efficiency 90% (tonne) =	2435.60				2040.77				301.13				287.12			
or in (m^3) =	1522.25				1275.48				188.21				179.45			
Provide sediment basin can contain sediment from sediment yield =	PASSED				PASSED				PASSED				PASSED			
Events to fill sediment storage zone =	3				3				16				16			
Design storm (month ARI) =	3				3				3				3			
Storage zone fill up (years) =	1				1				4				4			

APPENDIX 'B'



Engineering Drawing for Wet Sediment Basin for Development Site