VALIDATION REPORT
OF
WATER TREATMENT PLANT

CAPACITY - 40 MLD

TABLE OF CONTENTS

45%

VALIDATION REPORT - CASCADE AERATOR

NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED
1	*No. of Units*	Nos.	-	**1**	-
2	*Overloading*	%	20	**20**	-
3	*Losses*	%	5	**5**	-
4	*Designed Flow*	MLD	-	**40**	*Calculated*

INLET SHAFT

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED
1	*Velocity*	m/sec	-	**0.65**	✓	0.6 to 1.25 m/sec
2	*Internal Diameter*	m	-	**1.1**	✓	1.065
3	*Thickness*	m	-	**0.1**	✓	Minimum 0.100 mm
4	*Outer Diameter*	m	-	**1.3**		*Calculated*
5	*Velocity Achieved*	m/sec	-	**0.609**		*Calculated*

STEPS AND PLANNERS

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED
1	*Area Criteria*	m^2/m^3.hr	-	**0.015**	✓	0.015 to 0.045 m^2/m^3.hr
2	*Area of Aerator*	m^2	-	**32**	✓	31.250 m^2
3	*Number of Steps*	Nos.	-	**5**	✓	4-6 Nos.
4	*Rise of step*	m	-	**0.3**	✓	0.2m to 0.4m
5	*Tread of step*	m	-	**0.6**	✓	0.522 m
6	*Diameter of Aerator*	m	-	**7.3**		*Calculated*
7	*Actual Area Criteria*	m^2/m^3.hr	-	**0.020**		*Calculated*

COLLECTION LAUNDER

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED
1	*Velocity in Aerator*	m/sec	-	**0.65**	✓	0.6 to 1.25 m/sec
2	*Width of Launder*	m	-	**0.6**	✓	0.6 - 1.8 m
3	*SWD*	m	-	**0.742**		*Calculated*
4	*Free Board*	m	-	**0.3**	✓	Minimum 0.3 m
5	*Depth of Launder*	m	-	**1.042**		*Calculated*

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VALIDATION REPORT - PARSHALL FLUME

NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Units*	Nos.	-	**1**	
2	*Overloading*	%	20	**20**	-
3	*Losses*	%	5	**5**	-
4	*Designed Flow*	MLD	-	**40**	*Calculated*

PARSHALL FLUME

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Flow for Flume*	MLD	-	**50**	✓	50 MLD

STANDARD PARSHALL FLUME DIMENSIONS (Unit = mm)

W	A	B	C	D	F	G	K	Z
300	**1350**	**1322**	**600**	**831**	**600**	**900**	**75**	**225**

* Above values for designed flow are, as per CPHEEO Sewerage and Sewerage treatment Manual (Table No. 5.5)

UPSTREAM CHANNEL

>

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Velocity of flow*	m/sec	-	**0.65**	✓	0.6 to 0.9 m/sec
2	*Ht of water u/s of Hydraulic jump (hu)*	m	-	**0.916**		*Calculated*
3	*Depth of water u/s of Flume (h)*	m	-	**1.141**		*Calculated*
4	*Width of Channel*	m	-	**0.9**	✓	0.831 m
5	*Free Board*	m	-	**0.3**	✓	Minimum 0.3 m
6	*Total Depth*	m	-	**1.441**		*Calculated*
7	*Length of Channel*	m	-	**2.5**	✓	Minimum 1.5 m

DOWNSTREAM CHANNEL

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Velocity of flow*	m/sec	-	**0.65**		Same as U/S
2	*Hydraulic jump Coefficient*		-	**0.6**	✓	0.4 to 0.7 h_u
3	*Ht of water u/s of Hydraulic jump (hu)*	m	-	**0.916**		*Calculated*
4	*Depth of water u/s of Flume (h)*	m	-	**0.55**		*Calculated*
5	*Width of Channel*	m	-	**1.65**	✓	1.620
6	*Free Board*	m	-	**0.9**	✓	0.891 m
7	*Total Depth*	m	-	**1.45**		*Calculated*
8	*Length of Channel*	m	-	**2.5**	✓	Minimum 1.5 m

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VALIDATION REPORT - CLARIFLOCCULATOR

➤ NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Units*	Nos.	-	**1**	-
2	*Overloading*	%	20	**20**	-
3	*Losses*	%	5	**5**	-
4	*Designed Flow*	MLD	-	**40**	*Calculated*

➤ CLARIFIER

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Detention Time*	Hours	-	**2.5**	✓	Minimum 2.5 Hours
2	*Bottom slope of Flocculator*	1	in	**11**	✓	1 in 10 to 1 in 12
3	*Thickness of partition wall*	m	-	**0.2**	✓	0.1 to 0.25
4	*SWD*	m	-	**3**	✓	< 4.5
5	*Diameter of Clarifier*	m	-	**50**	✓	49.21
6	*Actual Slope maintained*	1	in	**11.667**		*Calculated*
7	*Weir Loading*	$m^3/d/m$	-	**300**	✓	300 $m^3/m.d$
8	*Surface Overflow Rate*	$m^3/m^2.d$	-	**30**	✓	25 - 75 $m^3/m^2.d$
9	*Actual Detention Time*	Hours	-	**2.826**	✓	2.5
10	*Actual Surface Overflow Rate*	$m^3/m^2.d$	-	**28.00**		Ok
11	*Actual Weir Loading*	$m^3/m.d$	-	**318.471**		*Provide Additional Weir Length*
12	*Provide Additional Weir Length*	m	-	**9.67**		*Calculated*

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VALIDATION REPORT - CLARIFLOCCULATOR

➤ NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Units*	Nos.	-	**1**	-
2	*Overloading*	%	20	**20**	-
3	*Losses*	%	5	**5**	-
4	*Designed Flow*	MLD	-	**40**	*Calculated*

➤ WEIR

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Width of Weir*	m	-	**0.9**	✔	
2	*Length of Weir*	m	-	**2**	✔	
3	*Number of Weir*	Nos.	-	**3**		
4	*Total Length of Weir provided*	m	-	**12.00**	✔	> 9.67

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VALIDATION REPORT - CLARIFLOCCULATOR

➤ NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Units*	Nos.	-	**1**	-
2	*Overloading*	%	20	**20**	-
3	*Losses*	%	5	**5**	-
4	*Designed Flow*	MLD	-	**40**	*Calculated*

➤ NOTCH

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Discharge Coefficient*	m	-	**0.6**	✓	0.6 to 0.7
2	*Angle of Notch*	Degrees	-	**90**	✓	
3	*Water Head*	m	-	**0.07**	✓	0.06 to 0.3 m
4	*Total Depth of V Notch*	m	-	**0.1**	✓	
5	*Spacing Between Notches*	m	-	**0.4**	✓	0.300 m
6	*Number of Notches*	Nos.	-	**423***		314.928 Nos

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VALIDATION REPORT - RAPID SAND GRAVITY FILTER

➤ NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Units*	Nos.	-	**1**	-
2	*Overloading*	%	20	**20**	-
3	*Losses*	%	5	**5**	-
4	*Designed Flow*	MLD	-	**40**	*Calculated*

➤ BACKWASHING

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Rate of Backwash*	$l/m^2.min$	-	**600**	✔	600 $l/m^2.min$
2	*Rate of Airwash*	$l/m^2.min$	-	**750**	✔	600 - 900 $l/m^2.min$
3	*Pressure of Airwash*	kg/cm^2	-	**0.35**	✔	0.35 kg/cm^2

➤ WASH WATER TROUGHS

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*No. of troughs on either side of gullet*	Nos.	-	**5**	✔	4 to 6 Nos.
2	*Total No. of troughs*	Nos.	-	**10.000**		*Calculated*
3	*Width of trough*	m	-	**0.3**	✔	0.2 to 0.45 m
4	*SWD of Wash water*	m	-	**0.264**		*Calculated*
5	*Free Board*	m	-	**0.1**	✔	Minimum 0.100 m
6	*Clear spacing of troughs**	m	-	**1.400**		< 2.0 m
7	*Total Depth of troughs*	m	-	**0.364**		*Calculated*
*Correct Validation for Spacing of trough for the value entered by designer being less than or equal to calculated recommended value.						
Assumption : Flat bottom through with zero slope and free fall and Provide bottom of Troughs minimum 0.3m above sand.						

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VALIDATION REPORT - RAPID SAND GRAVITY FILTER

➤ NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Units*	Nos.	-	**1**	-
2	*Overloading*	%	20	**20**	-
3	*Losses*	%	5	**5**	-
4	*Designed Flow*	MLD	-	**40**	*Calculated*

➤ GULLET/GUTTER

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Rate of Backwash*	l/m^2.min	-	**600**		*600 lpm/m^2*
2	*Width of Gullet*	m	-	**0.5**	✓	0.4 to 0.8 mm
3	*SWD of Wash Water*	m	-	**0.873**		*Calculated*
4	*Free Board*	m	-	**0.3**	✓	Minimmum 0.3 m
5	*Total depth of gullet*	m	-	**1.173**		*Calculated*

➤ WASH WATER TANK

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Rate of Backwash*	l/m^2.min	-	**600**		*600 lpm/m^2*
2	*Backwash Duration*	min	-	**10**	✓	10 min
3	*Extra quantity of Water*	%	-	**5**	✓	5 - 15 %
4	*Depth of Water*	m	-	**2**	✓	2.0 to 5.0 m
5	*Length of Tank*	m	-	**15**	✓	
6	*Width of Tank*	m	-	**13**	✓	11.781 m

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VALIDATION REPORT - MECHANICAL DESIGN (RAPID SAND GRAVITY FILTER)

➤ NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Filter Beds*	Nos.	-	**2**	*Designer Input*

➤ FILTER INLET

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Rate of flow from each filter*	m^3/hour	-	**1,101.399**		*From Filter Bed*
2	*Velocity at Inlet*	m/sec	-	**0.6**	✔	0.6 to 1.2 m/sec
3	*Area of opening required*	m^2	-	**0.510**		*Calculated*
4	*Pipe Diameter*	m	-	**0.85**	✔	0.806
5	*Area of opening provided*	m^2	-	**0.567**		*Calculated*

➤ FILTER OUTLET

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Rate of flow from each filter*	m^3/hour	-	**1,101.399**		*From Filter Bed*
2	*Permissible Velocity*	m/sec	-	**0.6**	✔	0.6-1.2 m/sec
3	*Area of pipe required*	m^2	-	**0.510**		*Calculated*
4	*Diameter of Valve*	m	-	**0.85**	✔	0.806 m

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VALIDATION REPORT - MECHANICAL DESIGN (RAPID SAND GRAVITY FILTER)

➤ NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*No. of Filter Beds*	Nos.	-	**2**	*Designer Input*

➤ WASH WATER INLET

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Rate of flow from each filter*	m^3/sec	-	**0.56**		*From Filter Bed*
2	*Permissible Velocity*	m/sec	-	**1.5**	✔	1.5 to 3.0 m/sec
3	*Area of pipe required*	m^2	-	**0.373**		*Calculated*
4	*Wash water inlet pipe*	m	-	**0.85**	✔	0.85

➤ WASH WATER OUTLET

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Rate of flow from each filter*	m^3/sec	-	**0.56**		*From Filter Bed*
2	*Permissible Velocity*	m/sec	-	**1.5**	✔	1.5 to 3.0 m/sec
3	*Area of pipe required*	m^2	-	**0.373**		*Calculated*
4	*Diameter of Valve*	m	-	**0.7**	✔	0.69

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VALIDATION REPORT - ALUM

NUMBER OF UNITS, OVERLOADING AND LOSSES

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER	RECOMMENDED*
1	*Designed Flow*	MLD	-	**40**	-

ALUM SOLUTION TANKS

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Monsoon Season*	mg/l	-	**70**	✓	70 mg/l
2	*Winter Season*	mg/l	-	**30**	✓	30 mg/l
3	*Summer Season*	mg/l	-	**10**	✓	10 mg/l
4	*Purity for Alum Cakes*	%	-	**75**	✓	75 %
5	*Number of Alum Tanks*	Nos.	-	**3**	✓	Minimum 3 Nos (2 Working + 1 Standby)
6	*Duration of tank to serve*	hrs	-	**8**	✓	Minimum 8 hours

PREPERATIONS OF SOLUTIONS

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Strength of Solution*	%	-	**12**		
2	*SWD*	m	-	**1**	✓	Minimum 1 m
3	*Length of Tank*	Nos.	-	**4**	✓	
4	*Width of Tank*	hours	-	**4**	✓	-
5	*Free Board*	%	-	**0.3**	✓	Minimum 0.3 m

ALUM AND TCL SPACE

SR NO	PARAMETER	UNIT	TENDERED	DESIGNER		RECOMMENDED*
1	*Weight of 1m^3 Alum*	kg/d	-	**1700**	✓	Minimum 1700 kgs
2	*Extra Volume Added*	Nos.	-	**5**	✓	
3	*Storage/Stack Height*	Nos.	-	**4**	✓	
4	*Total Volume of Chemicals*	m^3	-	**223.67**		*Calculated*
4	*Storage Space Required*	m^3	-	**56**	✓	*55.918 m^2*

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