8. INFALL AND OUT FALL REGULATORS

S.No	ITEM / COMPONENT	REFERENCE
I	**GENERAL**	
	1) The proposals, be scrutinised and verified by the unit officers before communicating to CDO for vetting.	
II	**SITE SURVEY**	
	1) The site survey to be furnished as per check slip with the following details.	Check slip enclosed
	a) Report accompanying the site survey	
	b) HPs of canal.	
	c) LS of canal for a distance of 1KM	
	d) If the regulator is clubbed with a road bridge, mention the road level and type of bridge i.e. Single lane or Double lane bridge.	
	e) Salient features of Reservoir / Tank.	
	f) Bore Hole data / TPs upto Hard strata or for min. depth of 2m for shallow foundations with min. 3 Nos covering canal @ centre.	Table I & II of APERL for test results of foundation soils enclosed. IRC 78: 2000
III	**DESIGN**	
a	Note on principles of Design, the assumptions made and the general features of the structure	
b	The design shall be checked for the following two conditions: 1) canal full and reservoir/tank empty 2) canal empty and reservoir / tank full	
c	**HYDRAULIC DESIGN**	
1	i) Fixation of crest level, vent way calculations and crest width, Glacis profile with U/S & D/S slopes with radius of curve.	IS 6531-1994; IS 7114-1993.
	ii) The minimum thickness of pier shall be 1M to 1.5M	
2	Scour depth calculations: $R= 1.34 (q^2/f)^{1/3}$ with relevant factor of safety.	IS 7784 (part I) - 1993,
	If road bridge is combined also refer IRC code	IRC : 78-2000
3	Energy Dissipation Calculation	IS 4997 - 1996 & CBIP No 179
4	Hydraulic jump Calculation	IS 4997 - 1963 / 1996 & CBIP No 179
5	Exit gradient calculations & cut - off $G_E = (H/d)x [1/(\pi\sqrt{\lambda})]$; Where $\lambda = [1+ \sqrt{(1+\alpha^2)}]/2$; $\alpha = b/d$	CBIP - 12 & IS : 7114 - 1973.

S.No	ITEM / COMPONENT	REFERENCE
6	Uplift pressure Computations.	IS 6966 part I - 1989,1996 CBIP 12
7	Design of impervious floor thickness as per Khosla's Theory	CBIP - 12 & IS : 7114 - 1973.
8	Protection works	IS : 7784 (part - I) - 1993
IV	**DESIGN OF SUPER STRUCTURE**	
	1. DL Bridge (or) 2. SL Bridge (or) 3. Hoist Bridge Slab	MOST Drawings IRC: 5-1998, IRC : 6-2000, IRC : 21-2000
	The Top of Hoist bridge level shall be tentatively finalised considering crest level + 2 x Ht of Gate + free board (0.6 to 0.9m) + thickness of Hoist slab subject to confirmation of Mechanical Drawings.	
	4. Design of Bearings as given in MOST drawings	IRC : 83 (part II) - 1997
	5. Breast wall where ever necessary.	IS : 456 - 2000
V	**DESIGN OF SUB STRUCTURE**	
	1. Pier, Abutment, Wings & Returns : Minimum thickness of pier shall be 1.0 M to 1.5 M	IRC: 5-1998, IRC : 6-2000, IRC : 21-2000 & IRC : 78 - 2000.
	2. Hoist platform	IS : 456 - 2000
	3. Wings & Returns be designed adopting TVA procedure/Coulomb's Theory / Rankine's Theory adopting top width of 500mm.	
	4. Adequate gate grooves in pier and Abutment & provision of sill beam , embedded metal parts shall be made.	Hydro Mechanical Guide lines by CDO.
	5. Unless otherwise mentioned ,the grade of concrete shall be M10 for PCC & M20 for RCC.	
	6. A note shall be included duly mentioning that the groove sizes are indicative & a separate Hydro Mechanical drawing shall be referred for details of EM parts & secondary concrete.	
	7.Infall Refulator shall be provided with double seals.	

S.No	ITEM / COMPONENT	REFERENCE
VI	**DESIGN OF FOUNDATIONS:**	
	Foundations for Pier, Abutments, Wings & Returns.	
	i) For shallow & open foundations.	IS : 1904 - 1986
	ii) For Raft foundations.	IS : 2950 - 1981 Part - I
	iii) For pile foundations	IS : 2911 - 1979 (Part - I, section 1,2,3,4)IS : 2911-1980 (part-II) , IS : 2911-1980 (part-III) , IS : 2911 - 1985 (part - IV)
VII	**MISCELLANEOUS DETAILS:-**	
	a) Weep holes in the Retaining walls	
	b) Bearings	IS : 7784 (part I) :1993
	c) Expansion , Contraction & Construction Joints	IS : 3370 (PART I) -1965, IS : 7784 (part II/ SECTIONIII):1996
	d) Size of grooves, hoist details, EM Parts, gates , slabs etc., gate shall be checked for the conditions as mentioned in III (b)	Hydro mechanical guidelines by cdo
VIII	**DRAWINGS**	
	a) General Plan & Sectional Elevation - Plan indicating Half plan @Top & Half plan @ foundation level, LS along the canal & C/S across the canal	Scale : 1:50, 1:100, (or) 1:200
	b) Details of sections of Pier,Abutment, Wings	Scale 1:25 (or) 1: 50 (or) any suitable scale.
	c) RCC details of deck slab, Hoist slab.	Scale 1:25 (or) 1: 20 (or) any suitable scale.
	d) The drawings shall contain assumptions made,TPs,Specifications, HPs of canal, salient features of river/ tank , bar bending schedule (if applicable) , stress table etc.,	
	A special note shall be inscribed duly mentioning that the groove sizes are indicative and a separtate hydro mechanical drawing shall be referred for the details of EM parts and secondary concrete.	