5. SUPER PASSAGES

S.No.	ITEM/COMPONENT	REFERENCE
I	**GENERAL:**	
	1.The proposals,be scrutinised and verified by the unit officers before communicating to the C.D.O for vetting.	
	2.catchment Area(C.A)of drain/river and the assessed MFD/OMFL be scrutinised,verified and confirmed by the Unit officers.	
II	**SITE SURVEY:**	
1	Site survey should be furnished as per check slip for CM & CD works with the following details.	check slip enclosed.
a	i) Report accompanying the Site survey ii) H.Ps of canal & drain / river.	
b	Site plan with flow direction of canal & drain along with net levels @ 10m interval & contours.	IS ; 7784 (Part I) : 1993
c	LS of drain / river i) covering 500 metres on U/S & D/S with levels @ 10m interval. ii)The L.S with levels @10m to 20m interval with cross sections of drain on U/S, D/S @ centre line,10m,25m,50m,100m,& @100m interval beyond for a length of 500m. iii)The cross section levels shall be @ 3m to 5m interval in the gorge portion and 10m intervals in the flanks extended up to MFL touching the ground.	
d	The catchment area shall be marked on the Topo sheet for all the C.A's more than 2.5sq. Km. If the C.A. is less than 2.5sq.Km.,the C.A. is to be traversed on ground and to be furnished. The MFD may be computed as per the following formula. 1.IN UPLAND AREAS: Dicken's Formula, $Q = CM^{3/4}$ where Q = Discharge in Cusecs. M = Catchment area in sq.miles C = Coefficient depending on Catchment area. CA upto 1 Sq.mile. C=1400 CA from 1 Sq.mile to 30 Sq.miles C=1200 CA more than 30 Sq.miles C=1060 (2) IN DELTAIC AREAS : Ryve's Formula $Q = CM^{2/3}$ C = 1000 for Q more than 500 cusecs C = 750 for Q less than 500 cusecs For deltaic catchment of Krishna & Godavari the formula shall be Ryve's formula adopting 'c' value as per the Mitra Committee Report for Upland & Deltaic Catchments.	CE/CDO Lr No:CDO/EEC1/1084/83-3 Dt.28/3/83. Mitra Committee Report
f	Observed MFD may be computed from the observed MFL and shown on the LS & CSs.	
g	Details of Tank such as FTL, distance from the structure etc., if there is any tank on D/S on Vagu course.	
h	Bore hole data /TPs upto Hard strata or for min. depth of 2m for shallow foundations & upto 1/3rd embedment depth below maximum scour depth along the Centre line @ suitable intervals depending upon the importance of structure with minimum 5 Nos covering both the Drain & Canal @ centre, U/S & D/S sides.	Table I & II of APERL for test results of foundation soils enclosed. IRC 78 : 2000

S.No.	ITEM/COMPONENT	REFERENCE
III	**DESIGN:**	
a	Note on Principles of Design, the assumptions made & the general features of the structure.	
b	HYDRAULIC DESIGN	
	1.MFL computations adopting Step by Step method.	Design of Small Dams by USBR.
	2.(a)Design of ventway(or size of pipe) for the Drain/river limiting allowable velocity.	IS:7784(part ii / section 2):
	(b). For small discharge of Drain, pipes can be proposed limiting the velocity .	IS 458 -1988 IS :783 - 1985
	(c)The Drain bed level can be raised upto 600mm above the natural bed level to achieve vertical clearance in the canal.	
	3. Design of Tail channel & approach channel keeping in view the Lacey's formula for Wetted perimeter & velocity limits depending on stratification.	IS : 7784 (part - I) - 1993
	4. Transition lengths on U/S & D/S of drain	IS ; 7784 (part 2/sec2)
	5. TEL calculations for the Drain considering eddy loss coefficients as per IS code along with flow diagram with dimensions and levels.	IS : 7784 (part - I) - 1993
	6.Scour depth calculations of Drain:	IS : 7784 (part - I) - 1993
	$R= 1.34 (q^2/f)^{1/3}$ with relevant factor of safety.	
	7. Checking of Thickness of Apron	IS : 7784 (part - 2 / sec 2) - 2000
	8.Exit gradient calculations:	IS : 7784 (part - I) - 1993
	$G_E = (H/d)x [1/(\pi\sqrt{\lambda})]$; Where $\lambda = [1+ \sqrt{(1+\alpha^2)}]/2$; $\alpha = b/d$	
	9. Proposal sketch	
c	**STRUCTURAL DESIGN**	
	i)SUPER STRUCTURE	
	a. Design of trough	As per IS:456-2000 and IS: 3370-1965
	b. Design of head wall on U/S & D/S by adopting TVA procedure / Coulomb's Theory/ Rankine's theory with a top width of 500mm.	TVA Hand book
	ii)SUB STRUCTURE	
	1. Design of pier	
	2.Design of Abutment	
	3. Abutment and Pier foundations shall be isolated footing/ RCC raft as the case may be.	IRC- 78-2000; SP-16; SP-34
	4. FOR PIPE TYPE :-	
	Pipe details	IS 458 : 1988 , IS 783 - 1985
	a) Design of wing walls & return wall both on U/S & D/S of drain - The walls are to be designed adopting TVA procedure /Coulomb's Theory / Rankine's Theory with a top width of 500mm.	TVA Hand book ; IS 1904 - 1966
	b) Tabulation of stress table :- A consolidated stress table has to be furnished indicating the stress on concrete & stress on soil for the Abutment, Piers, Wings &Returns.	
	c) Minimum grade of PCC shall be M10 Grade, unless otherwise specified.	IS-456:2000

S.No.	ITEM/COMPONENT	REFERENCE
	d) Minimum grade of concrete for RCC shall be M20 Grade,unless otherwise specified.	IS-456:2000
d	**MISCELLANEOUS ITEMS :-**	
	a) Water stops	IS : 7784 :1993
	b) Weep holes in the Retaining walls	IS : 7784 :1993
	c) Bearings	IS : 7784 :1993
	d) Expansion , Contraction & Construction Joints	IS : 3370 - 1965
	e) Cut & Ease waters	IS:7784
III	**DRAWINGS** a)General Layout on net level plan duly showing contours. b) General plan,Sectional elevation & End View - Plan indicating Half plan @Top &Half plan @ bottom & Sectional Elevation along the LS of the drain & End View along the cross section of the drain.	Scale : 1:50, 1:100, (or) 1:200
	c)Wall Sections, RCC Details & Details of miscellaneous items.	i)Scale : 1:50,(or) 1:100 for sections ii)Scale : 1:25 (or) 1:20 for Rcc details.
	The Drawings shall contain assumptions made, TPs, Specifications,HPs of canal,Hydrology of the Drain, Bar bending schedule,Stress table etc.	