Environmental Impact Assessment

Project Number: 43253-026
June 2019

India: Karnataka Integrated and Sustainable Water Resources Management Investment Program – Project 2

Vijayanagara Channels

Annexure 2 part 1

Prepared by Project Management Unit, Karnataka Integrated and Sustainable Water Resources Management Investment Program Karnataka Neeravari Nigam Ltd. for the Asian Development Bank. This is an updated version of the draft originally posted in June 2018 available on https://www.adb.org/India:Karnataka Integrated and Sustainable Water

Annexure 2

Typical Drawing

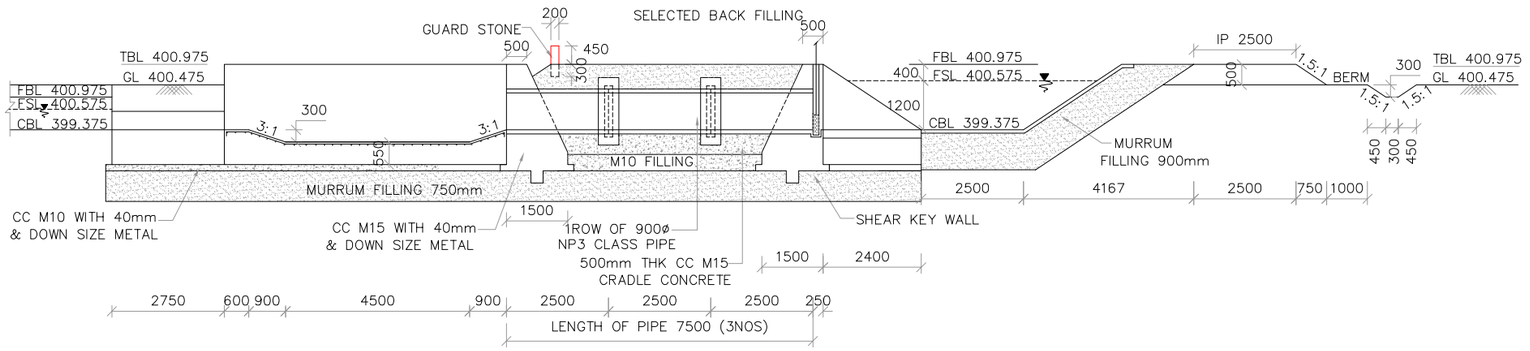
GLOSSSARY OF TERMS IN IRRIGATION SYSTEM DESIGN AND MANAGEMENT

Any Irrigation System Design and Management Reports refer to various terms that are typically used to denote the function and the structures utilised to provide the necessary services required from an irrigation system. The glossary of terms used in a Typical Irrigation System and Design Management Report is provided in the table below. All the structures mentioned herein may not find a place in the VNC System. Following the glossary of terms are provided Typical Drawings of the structures utilised in the Modernization of the VNC Project. For details of the design and location of these structures, kindly refer to the DPR 2017.

No.	Term	Description
1	Anicut	A barrier built across the river to impound water to feed the canals connected to the anicut.
2	Aquaduct	A structure of masonry, concrete or pipe constructed across natural drainage valley, or road or canal or railway or river etc. , to carry canal water without having to drop the bed level of the lower water way.
3	Balancing Tank / Reservoir	A subsidiary tank / reservoir for storing excess water from the canal which is utilised during the periods of short-supply.
4	Base Period	The number of days a crop requires for maturing from first watering till last watering before harvest.
5	Berm	(a) A horizontal strip built into an embankment / cutting to break the continuity of an otherwise long slope. (b) The space left between the upper edge of the cut and the toe of the embankment.
6	Branch Canal	A canal receiving its supply from main canal and acting as a feeder canal for distribution.
7	Bridges	A structure carrying a road, rail or pathway across a canal or river
8	Canal	Canal is a water-way constructed and maintained for conveyance of water.
9	Canal Losses	Losses of water by percolation, absorption and evaporation from canals.
10	Capacity	The discharge carried at full-supply depth of canal.
11	Cattle Ramp	Cattle ramp provided along the length of the canal to provide the animals of the area access to canal water.
12	Chute	An inclined conduit or open channel for conveying water to negotiate a drop.
13	Continuous Flow Irrigation	A system by which each irrigator receives his allotted quantity of water continuously without resort to rotational water supply.
14	Contour Canal	Canal conforming generally to the contours of the country traversed being given however such a bed fall along its length as is necessary to produce the required velocity of flow.

No.	Term	Description
15	Cross Drainage Works	Cross drainage works is a structure constructed when there is a crossing of canal and natural drain, to prevent the drain water from mixing into canal water.
16	Culturable Command Area	The gross command area less the un-culturable areas like village site, cart tracks, natural drainages, grazing grounds, cremation and burial grounds, thrashing floors, highlands and other uncultivable lands.
17	Delta	The total depth of water required for a crop to mature over its base period.
18	Demand	The irrigation water requirement at the point under consideration.
19	Distributary	A water way receiving its supply from main / branch canal. It supplies water to laterals.
20	Distribution System	Network of canals and appurtenances conveying irrigation water from the head of the distributary down to the fields.
21	Drainage	A natural or artificial process of removing excess water from the surface or sub-surface of an area.
22	Drainage Channel	A channel through which surface or sub-surface water escapes into the valley.
23	Duty Of Water	The relation between the area irrigated and the quantity of water used or required to irrigate upto maturity. Duty is stated with reference to a base period and the point of its reckoning or measurement.
24	Escape	An escape is a structure to remove surplus water from the canal.
25	Fall Or Canal Drop	A work designed to secure lowering of the water surface in a canal and safe dissipation of energy.
26	Feeder	A canal constructed primarily to convey water from one source of supply or system to another.
27	Field Channel	A channel which supplies water from an outlet of a distributary system to the fields. The capacity of the field channel is generally about 1 cusec.
28	Flume	A constricted water-way.
29	Free Board	The minimum vertical distance provided above the full-supply level in the waterway of the canal.
30	Gross Command Area	The total area included within the farthest limits upto which canal water is proposed to be supplied.
31	Inlet	A cross-drainage work consisting of an opening in a canal bank, to admit upland drainage water into the canal.
32	Intensity Of Irrigation	The percentage of culturable command area proposed to be annually irrigated.
33	Inundation Canal	A canal taking off from a river during floods without permanent diversion works constructed.

No.	Term	Description
34	Lateral	A channel which takes off from a distributary and its discharge is more than 1 cusecs. It is also called a minor or water course.
35	Main Canal	The principal canal taking off from a river, tank or reservoir.
36	Measuring Devices	A device for measuring discharge directly by measuring the depth of water flowing through it. Open channel methods generally rely on a structure such as a weir, flume, or orifice installed in the channel.
37	Outlet	A regulation structure through which water is supplied to a field channel.
38	Peak Consumptive Use Or Peak Crop Water Requirement	Maximum rate at which water is consumed in the life of a crop
39	Proportional Distributor	A distributor which divides the flow proportionately as required.
40	Regulator	A structure to regulate the flow, passing through the structure or to control the upstream water surface elevation or both. These include the Cross Regulator and Head Regulator.
41	Ridge Canal	Canal aligned along a ridge. There will be no cross-drainage works on a ridge canal.
42	Sopanams	Access provided to the local community along the length of canal for utilising the canal water for washing clothes. In certain cases, the sopanams are also used by the local community to use the canal water for washing clothes.
43	Super Passage	A cross-drainage structure where the natural drainage water is passed over the irrigation canal
44	Syphon	A pressure duct constructed to carry water at a level lower than that at which the open channel normally flows.
45	TMC	Tmcft, (Tmc ft), (TMC), (tmc), is the abbreviation of one **thousand million cubic** feet (1,000,000,000 = 10^9 = 1 billion), commonly used in India in reference to volume of water in a reservoir or river flow.
46	Water Allowance	The authorized discharging capacity of outlets for thousand hectares of culturable command, expressed as number of cumecs
47	Water Logged Area	Land is classified as water logged when the water table is permanently retained within the crop root zone due to which, the crop yield gets reduced



SECTION A-A
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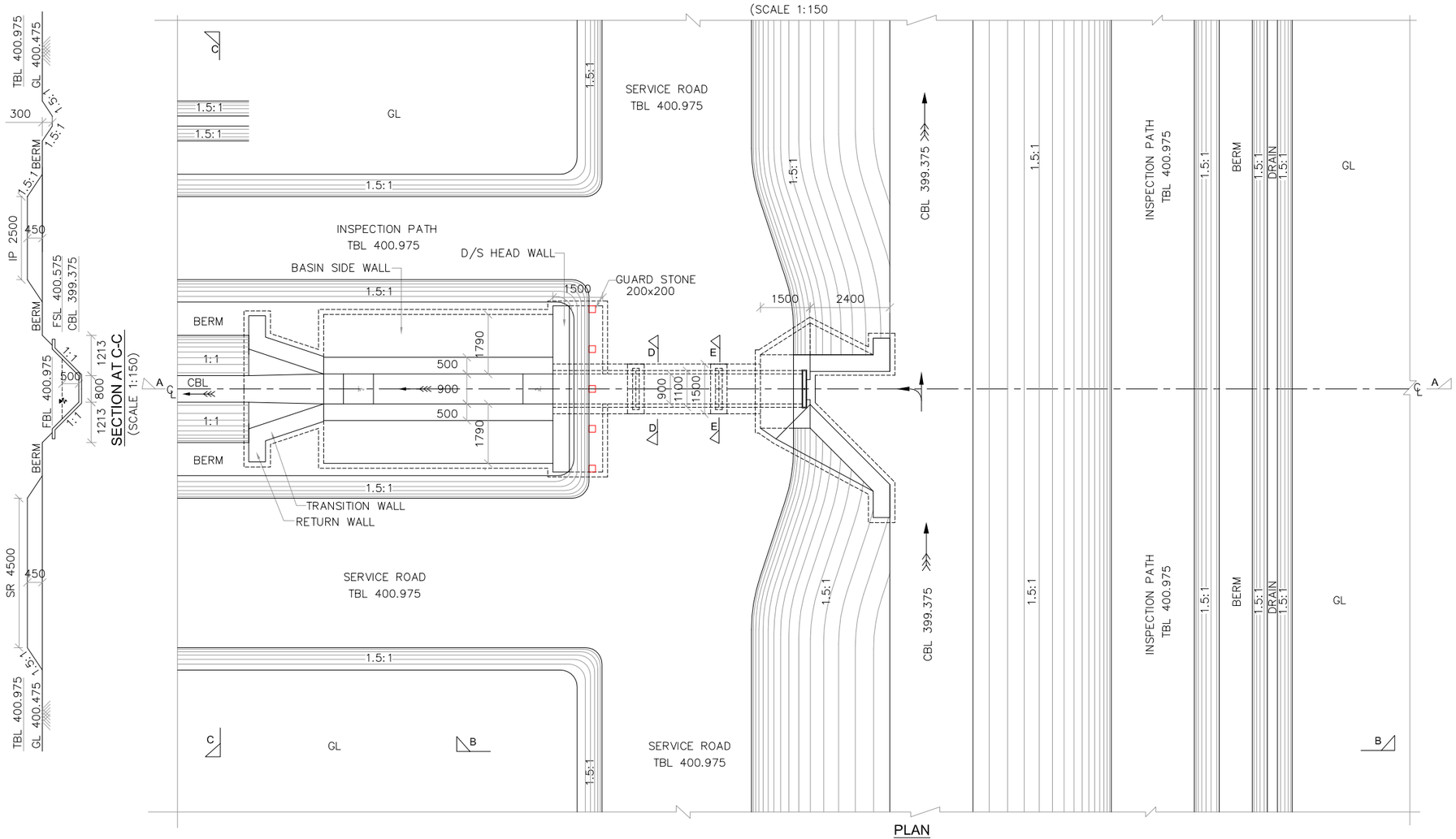

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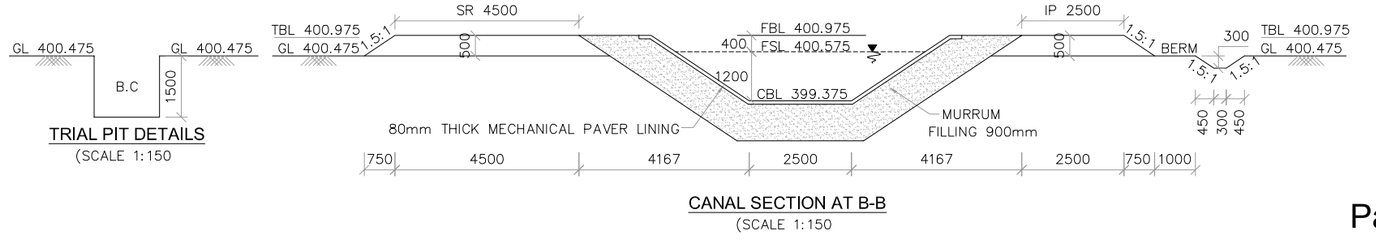
(SCALE 1:150)



CANAL SECTION AT B-B
(SCALE 1:150)

NOTES

1) ALL DIMENSIONS ARE IN MILLIMETRES AND REDUCED LEVELS ARE IN METRES.
2) DO NOT SCALE THE DRAWING.WRITTEN DIMENSIONS ONLY SHALL BE FOLLOWED.
3) GRADE OF CONCRETE :
   (I). CC M10 WITH 40mm DOWNSIZE METAL – FOUNDATION BED CONCRETE.
   (II). CC M15 WITH 40mm DOWN SIZE METAL – GUIDE WALLS, U/S & D/S HEAD WALLS,SHEAR KEY WALL, BASIN SIDE WALLS,TRANSITION WALLS,RETURN WALLS & CRADLE. CONCRETE BELOW PIPE.
   (III). CC M15 WITH 20mm DOWN SIZE METAL – U/S BASIN, STILLING BASIN, SLAB, STEPS,AND CANAL LINING.
4) 80mm THICK CC LINING IS PROVIDED FOR MAIN CANAL,
5) SKIN REINFORCEMENT OF 10₹ AT 200mm C/C BOTH WAYS IS PROVIDED.
6) MINIMUM CLEAR COVER TO THE REINFORCEMENT SHALL BE 50mm UNLESS OTHER WISE MENTIONED.
7) NP3 CLASS HUME PIPES ARE PROPOSED.
8) CATCH WATER DRAIN SHOULD BE SUITABLY DIVERTED TO NATURAL STREAM OR NALA.
9) DRY STONE PITCHING IS PROVIDED WHEREVER NECESSARY.

Rev.	Description.	Date.	Drw.	Pre.	Chk.	App.
0	For Approval	.	.	.	.	.

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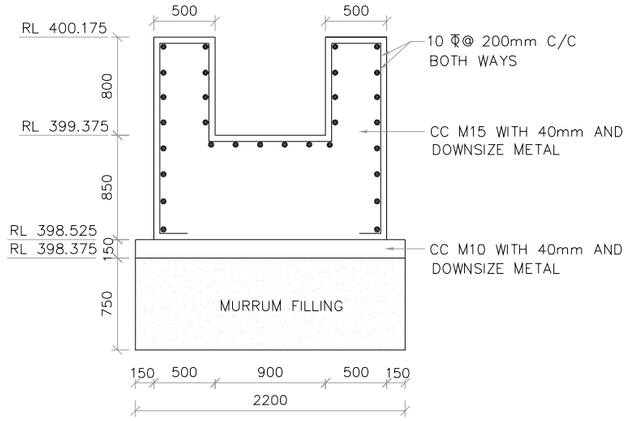
PROJECT TITLE
MODERNISATION OF VIJAYANAGARA CHANNELS IN TUNGABHADRA PROJECT

DRAWING TITLE
CONSTRUCTION OF HEAD REGULATOR FOR DIST-1 AT CH : 6+738 Km OF RAMSAGARA CHANNEL

Date	Drw.	Pre.	Chk.	App.	Scale.	Drawing Status.
.	.	.	.	.	AS SHOWN	FOR APPROVAL

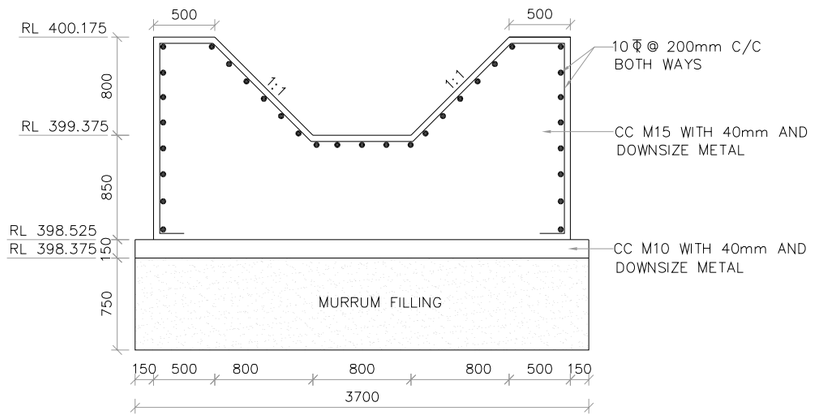
Project No.	Drawing No.	Sheet No.	Rev.
.	KNNL-VNC-RSC-STR-HR-007	01 of 04	0

Consultant E I Technologies Pvt. Ltd. Bangalore	Asst.Executive Engineer VNC Sub.Division Kamalapur	Executive Engineer TR Division No.1 Munirabad
Superintending Engineer Tungabhadra Project Circle Munirabad	Chief Engineer Irrigation Central Zone Munirabad	



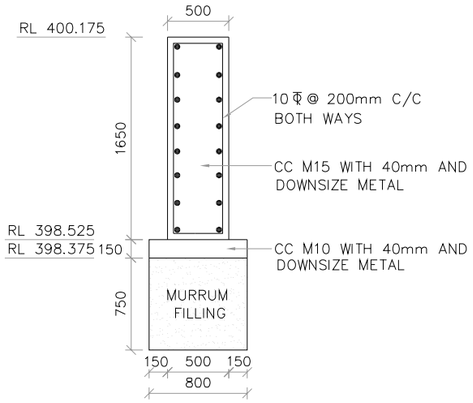
SECTIONAL ELEVATION FOR TRANSITION WALLS AT START

(SCALE 1:50)



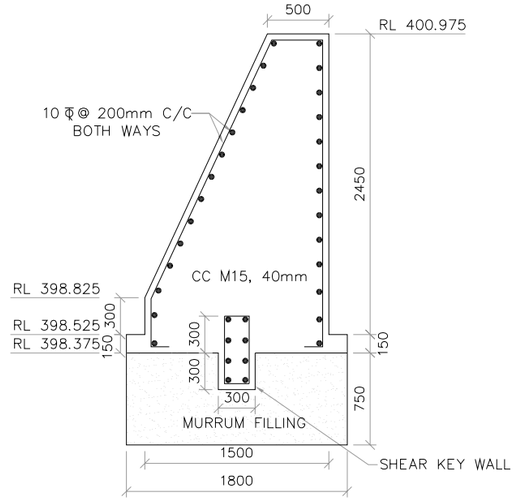
SECTIONAL ELEVATION FOR TRANSITION WALLS AT END

(SCALE 1:50)



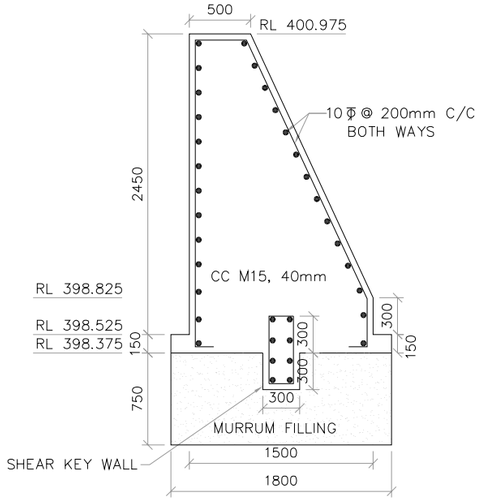
SECTION OF RETURN WALL

(SCALE 1:50)



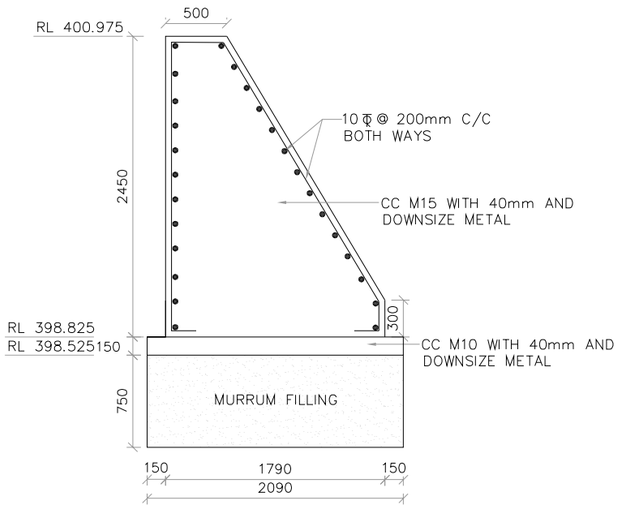
SECTION OF U/S HEAD WALL

(SCALE 1:50)



SECTION OF D/S HEAD WALL

(SCALE 1:50)



SECTION OF BASIN SIDE WALL

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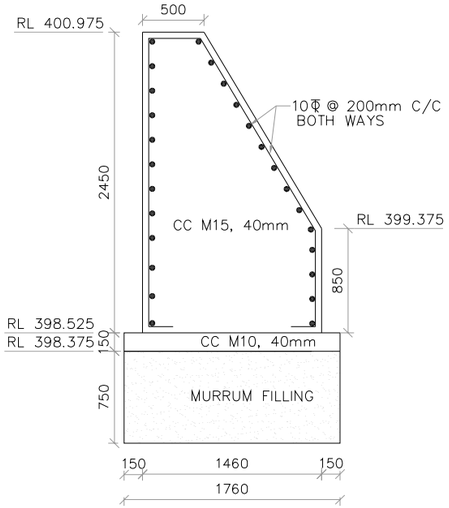
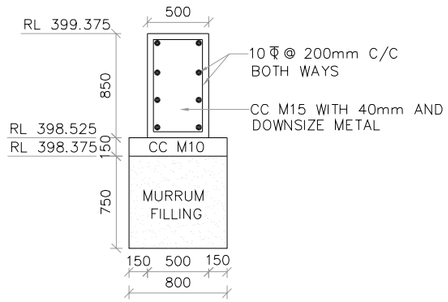


SECTION OF GUIDE WALL AT MAXIMUM HEIGHT

(SCALE 1:50)



SECTION OF GUIDE WALL AT MINIMUM HEIGHT

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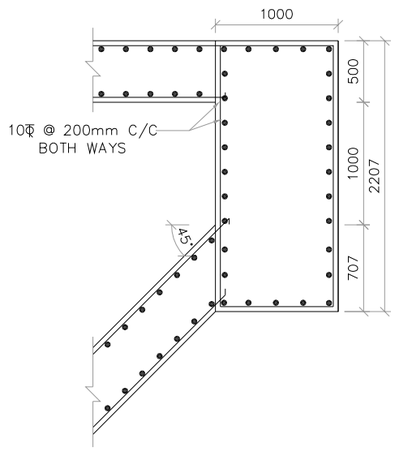

SKIN REINFORCEMENT DETAILS OF U/S HEAD WALL AND GUIDE WALLS

(SCALE 1:50)

NOTES

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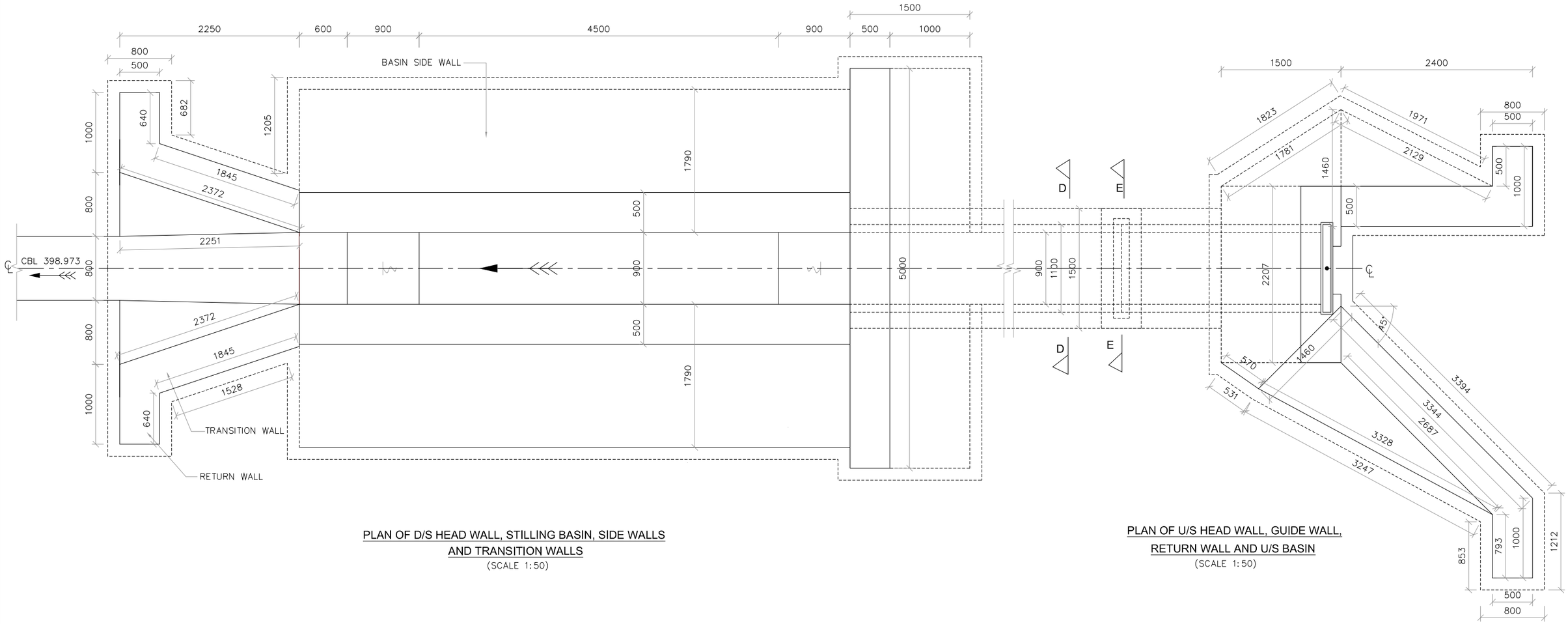
Superintending Engineer Tungabhadra Project Circle Munirabad	Chief Engineer Irrigation Central Zone Munirabad	

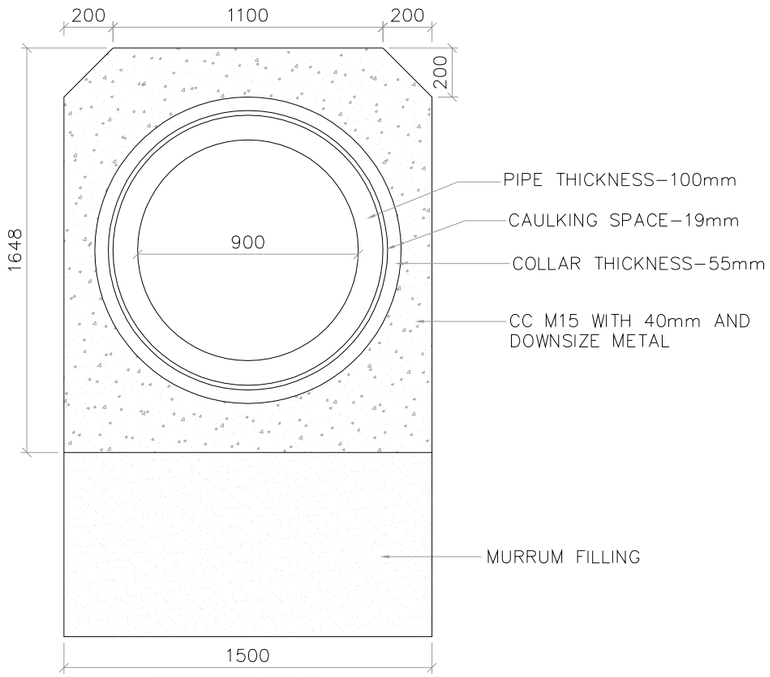


PLAN OF D/S HEAD WALL, STILLING BASIN, SIDE WALLS AND TRANSITION WALLS

(SCALE 1:50)

PLAN OF U/S HEAD WALL, GUIDE WALL, RETURN WALL AND U/S BASIN

(SCALE 1:50)



SECTION D-D

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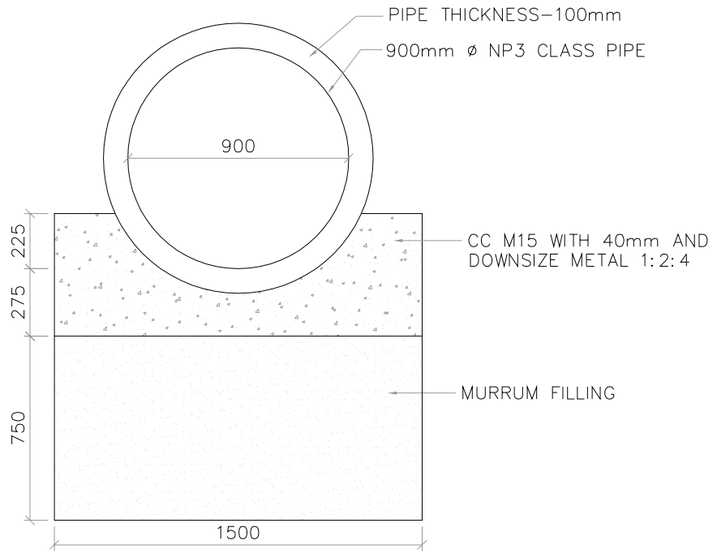

SECTION E-E

(SCALE 1:25)

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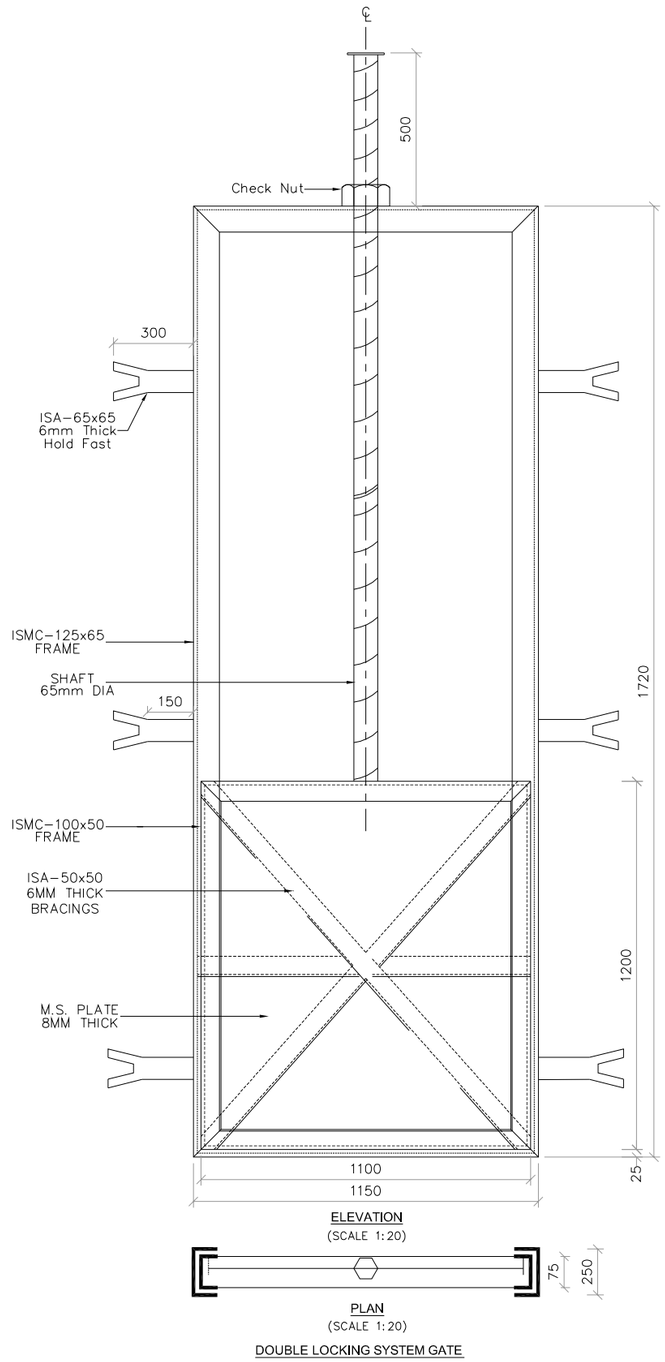
.	KNNL-VNC-RSC-STR-HR-007	03 of 04	0

Consultant	Asst.Executive Engineer	Executive Engineer
E I Technologies Pvt. Ltd. Bangalore	VNC SubDivision Kamalapur	TR Division No.1 Munirabad

Superintending Engineer	Chief Engineer
Tungabhadra Project Circle Munirabad	Irrigation Central Zone Munirabad



ELEVATION
(SCALE 1:20)

PLAN
(SCALE 1:20)

DOUBLE LOCKING SYSTEM GATE

SL. NO.	ITEMS	UNIT	DIMENSION	WT/.M (kg/sqm)	TOTAL WT. (kg)
1	ISMC-125 X 65 FRAME	RMT	5.84	12.70	73.02
2	ISMC-100 X 50 FRAME	RMT	4.20	9.20	42.32
3	ISA-5050; 6MM THICK. FOR BRACINGS.	RMT	4.36	4.50	19.62
4	ISA-6565; 6MM THICK. FOR HOLD-FASTS	RMT	1.80	5.80	10.44
5	M.S. PLATE 8MM THICK	SQM	1.32	62.80	82.90
6	SHAFT 65MM Ø M.S.	RMT	1.00	26.05	26.05
7	CHECK NUT M.S.	NO.	1.00	4.00	4.00
8	WHEEL M.S.	NO.	1.00	30.00	30.00

TOTAL Wt. = 288.350 Kgs
SAY = 299.000 Kgs
= 0.299 MT

NOTES

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2) DRAWING SHALL NOT BE SCALED OR MEASURED.

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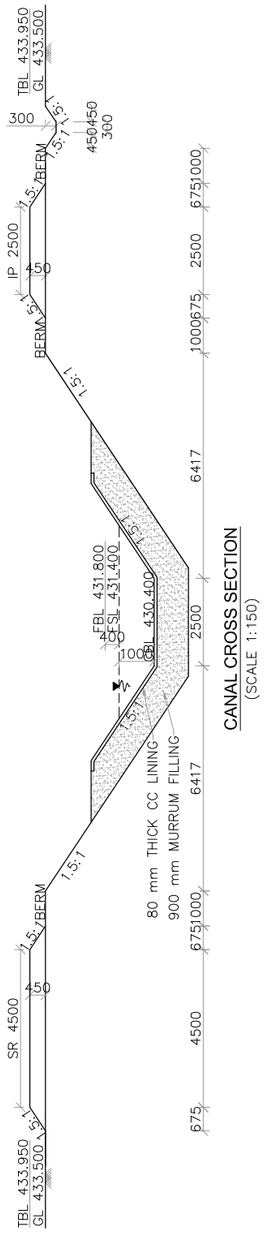
Project No.	Drawing No.	Sheet No.	Rev.
.	KNNL-VNC-RSC-STR-HR-007	04 of 04	0

Consultant E I Technologies Pvt. Ltd. Bangalore	Asst.Executive Engineer VNC Sub-Division Kamalapur	Executive Engineer TR Division No.1 Munirabad
Superintending Engineer Tungabhadra Project Circle Munirabad	Chief Engineer Irrigation Central Zone Munirabad	



CANAL CROSS SECTION
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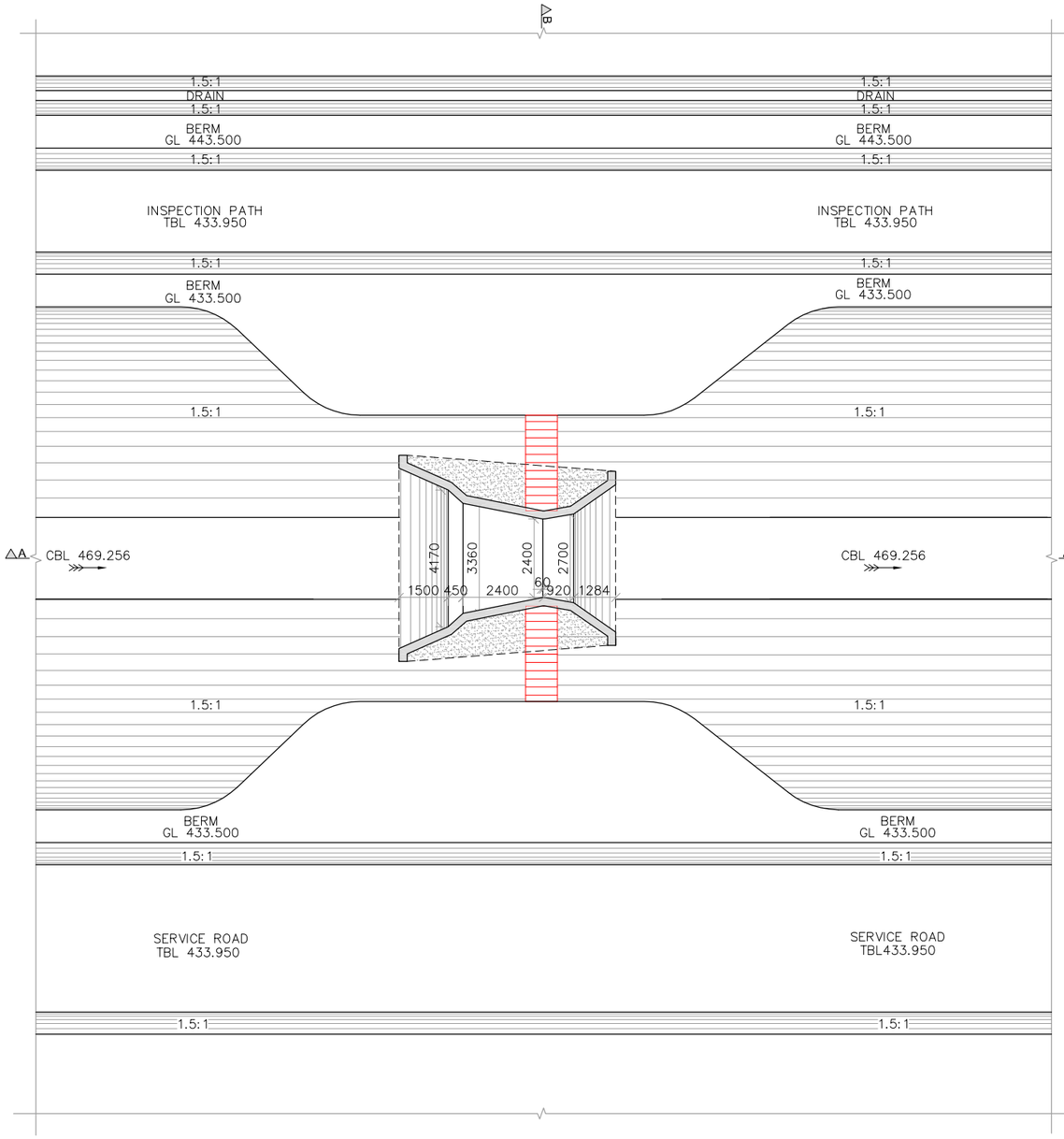
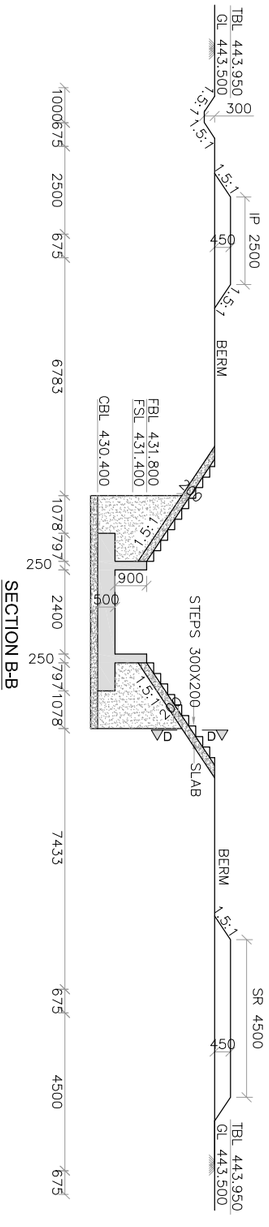


PLAN
(SCALE 1:150)



SECTION B-B
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TRIAL PIT DETAILS
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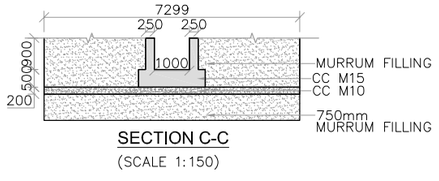

SECTION C-C
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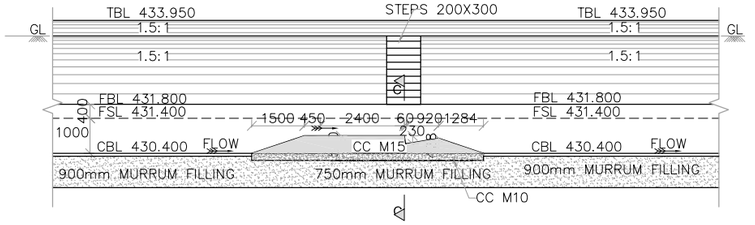

LONGITUDINAL SECTION AT A-A
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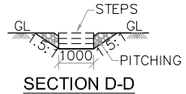

SECTION D-D
(SCALE 1:150)

NOTES AND SPECIFICATIONS

1) ALL DIMENSIONS ARE IN MILLIMETRES AND REDUCED LEVELS ARE IN METRES.
2) DO NOT SCALE THE DRAWING.WRITTEN DIMENSIONS ONLY SHALL BE FOLLOWED.
3) GRADE OF CONCRETE : CONFORMING TO IS 456–2000
   (I) LEVELLING COURSE IN FOUNDATION – CC M10 WITH 40mm AND DOWN SIZE COARSE AGGREGATE.
   (ii) HUMP,STEPS AND WAIST SLAB – CC M15 WITH 20mm AND DOWN SIZE COARSE AGGREGATE.
   (iii) PITCHING IS PROVIDED IN 1.5:1 SLOPE ACROSS THE STEPS

Rev.	Description.	Date.	Drw.	Pre.	Chk.	App.
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PROJECT TITLE
MODERNISATION OF VIJAYANAGARA CHANNELS IN TUNGABHADRA PROJECT

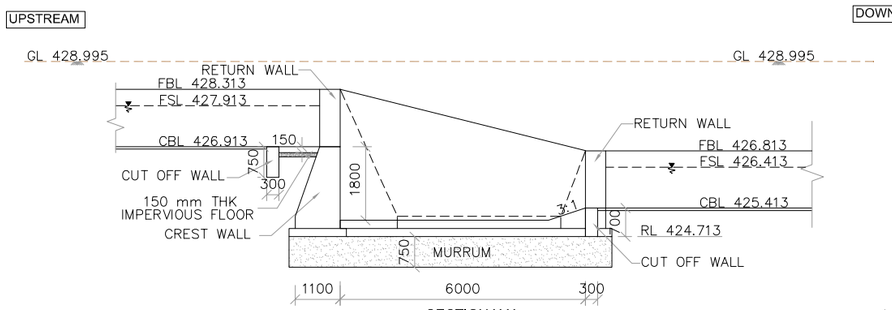
DRAWING TITLE
Construction of Measuring Device at CH:0+50 km of Ramsagar Channel

Date	Drw.	Pre.	Chk.	App.	Scale.	Drawing Status.
.	.	.	.	.	AS SHOWN	FOR APPROVAL

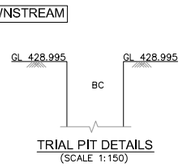
Project No.	Drawing No.	Sheet No.	Rev.
.	KNNL-VNC-RC-STR-MD-007	01 of 01	0

Consultant	Asst.Executive Engineer	Executive Engineer
E I Technologies Pvt. Ltd. Bangalore	VNC Sub-Division Kamalapur	TB Division No.1 Munirabad

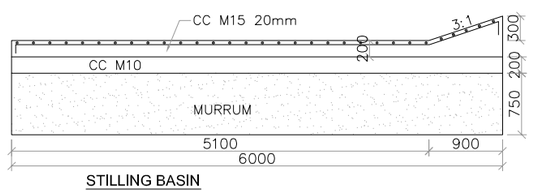
Superintending Engineer	Chief Engineer
Tungabhadra Project Circle Munirabad	Irrigation Central Zone Munirabad



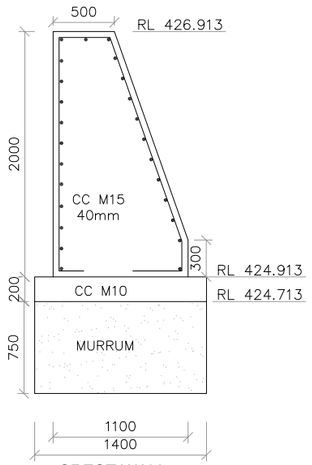
SECTION X-X
(SCALE 1:150)



TRIAL PIT DETAILS
(SCALE 1:150)

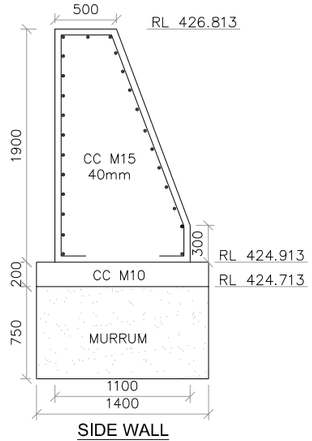


STILLING BASIN
(SCALE 1:75)

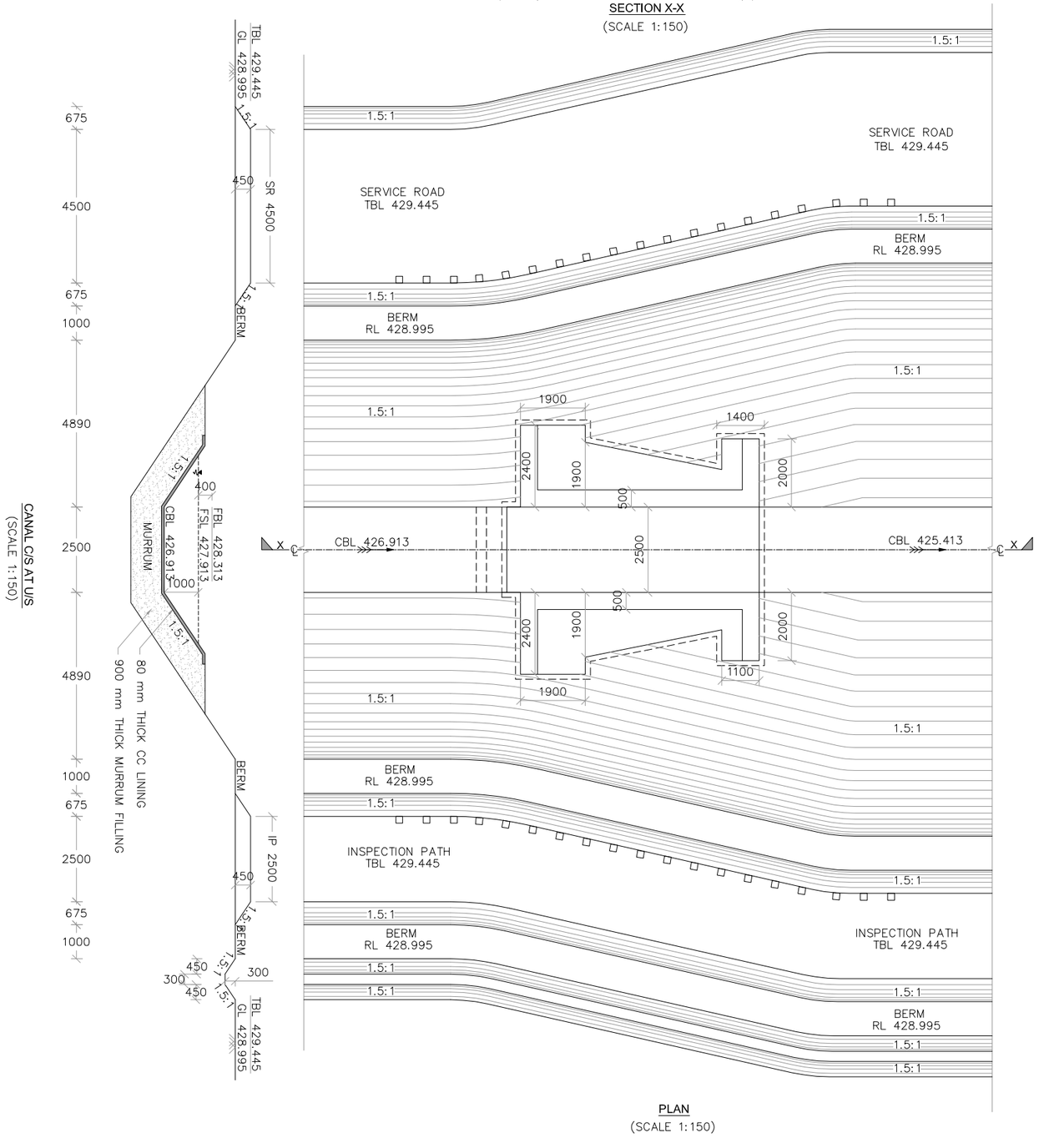


CREST WALL
(SCALE 1:50)

SIDE WALL
(SECTION AT MAX)
(SCALE 1:75)



SIDE WALL
(SECTION AT MIN)
(SCALE 1:50)



CANAL C/S AT U/S
(SCALE 1:150)

CANAL C/S AT D/S
(SCALE 1:150)

PLAN
(SCALE 1:150)

NOTES

1) ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN M UNLESS OTHERWISE SPECIFIED
2) DRAWING SHALL NOT BE SCALED OR MEASURED.
3) GRADE OF CONCRETE :
(I). CC M10 WITH 40mm DOWNSIZE METAL – FOUNDATION BED CONCRETE.
(II). CC M15 WITH 40mm DOWN SIZE METAL – SIDE WALLS, CREST WALL, & RETURN WALLS.
(III). CC M15 WITH 20mm DOWN SIZE METAL – STILLING BASIN,CUTOFF WALLS & CANAL LINING.
4) ALL REINFORCEMENT STEEL SHALL BE OF HIGH YIELD STRENGTH DEFORMED BARS GRADE DESIGNATION Fe 415 CONFORMING TO IS:1786
5) SKIN REINFORCEMENT OF 10ø AT 200mm IS PROVIDED FOR CREST WALL, SIDE WALLS, RETURN WALLS AND CUT OFF WALLS
6) MINIMUM CLEAR COVER TO THE REINFORCEMENT SHALL BE 50mm UNLESS OTHER WISE MENTIONED.
7) DRY STONE PITCHING IS PROVIDED WHEREVER NECESSARY.

Rev.	Description.	Date.	Drw.	Pre.	Chk.	App.
0	For Approval	.	.	.	.	.

CLIENT
KARNATAKA NEERAVARI NIGAM LIMITED
(A GOVT. OF KARNATAKA UNDERTAKING)
BANGALORE - 560 001

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PROJECT TITLE
MODERNISATION OF VIJAYANAGARA CHANNELS IN TUNGABHADRA PROJECT

DRAWING TITLE
Construction of canal drop 1.5M at CH:3+960 km of Ramsagar channel

Date	Drw.	Pre.	Chk.	App.	Scale.	Drawing Status.
.	.	.	.	.	AS SHOWN	FOR APPROVAL

Project No.	Drawing No.	Sheet No.	Rev.
.	KNNL-VNC-TC-STR-CD-008	01 of 01	0

Consultant
E I Technologies Pvt. Ltd.
Bangalore

Asst.Executive Engineer
VNC Sub-Division
Kamalapur

Executive Engineer
TB Division No.1
Munirabad

Superintending Engineer
Tungabhadra Project Circle
Munirabad

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