INTERNSHIP REPORT
ON

"WIDENING OF BRIDGE UNDER PWD"

Submitted to-

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE GWALIOR
(A govt. Aided Autonomous Institute under RGPV, Bhopal (M.P) Established in 1957)

IN PARTIAL FULFILLMENT FOR REQUIREMENT FOR THE AWARD OF THE DEGREE OF

BACHELOR of TECHNOLOGY
In
CIVIL ENGINEERING

2017-2022

Submitted By–

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CERTIFICATE

OFFICE OF THE EXECUTIVE ENGINEER
BRIDGE DIVISION, M.P.P.W.D.
GWALIOR (M.P.)

Ref. No. 1340 Date : 20/05/2022

CERTIFICATE

This is to certify that **MR. SHAILENDRA SINGH ARYA, B.Tech. (CIVIL BRANCH) S/O SHRI JAGRAM SINGH ARYA** Student of **"MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.)** has Summer internship training in the Bridge division in our Department from **14th JAN. 2022 to 15th MAY 2022.**

During the above period he has learnt on **"ANALYSIS OF BRIDGE"** and completed his assigned project.

We found him sincere and hard working. We wish his all success in his future endeavors.

Sub Division Officer
M.P.P.W.D. Bridge Construction
Sub Division, Gwalior (M.P.)

Executive Engineer
PWD (Bridge Constn.)
Gwalior

(G.V. MISHRA)
Executive Engineer
P.W.D. Bridge Division
Gwalior (M.P.)

DECLARATION

I, the undersigned declare that this internship report is bonafide work carried out by me during 14 Jan 2022- 15 May 2022 in partial fulfillment of the requirements for the award of Graduation Degree of Bachelor of technology in Civil Engineering of MITS, Gwalior and is based on the internship carried out in PWD, under the guardians of Dr. Abhilash Shukla, Er G.V Mishra.

I also declare that this internship report has not been submitted to any other University or Institute for the award of any degree.

Shailendra Singh Arya

0901CE171096

B.TECH(Civil Engineering)

MITS,GWALIOR

RECOMMENDATION

It is here by recommended that the internship report entitled "Widening of bridge under pwd " tank which is being submitted by shailendra singh arya completed under the guidance of Dr. Abhilash shukla may be accepted in the partial fulfillment of the award of the degree of Bachelor of Engineering in Civil Engineering.

GUIDED BY

Prof. Dr. Abhilash Shukla
Civil Engineering Department
MITS, Gwalior

HEAD OF DEPARTMENT

Civil Engineering Department
MITS, Gwalior

ACKNOWLEDGMENT

I express my gratitude to my renowned guide, Dr Abhilash shukla, Assistant Professor, Department Of Civil Engineering, MITS Gwalior.

I express my sincere thanks to Dr M.K Trivedi, Head Of Department of Civil Engineering, MITS, Gwalior and all other academics and staff members of MITS Gwalior's Civil Engineering Department for their unwavering support throughout the project.

I express my sincere thanks to Dr. R. K. Pandit, Director of MITS Gwalior, for establishing an outstanding institutional environment and for giving me all facilities and assistance in the preparation of my dissertation. I also express my gratitude to Mr. VIKRAM for providing the facilities needed for the accomplishment of this project.

I am grateful to Er G.V Mishra, Of PWD Bridge division, Gwalior for providing an opportunity to work as an intern in this deemed organisation and their guidance throughout the period of internship.

Shailendra singh arya

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B.TECH(Civil Engineering)

MITS,GWALI

ABSTRACT

The main objective of this report is to imprint the knowledge and experiences gained while pursuing the internship at GOVERNMENT PWD DEPARTMENT OF MADHYA PRADESH in the form of the report to the university and industry.

This project of BOX CULVERT in which we will understand about the Design of bridge to take When subjected to loads or displacements, all true physical structures behave dynamically. Newton's second law states that additional inertia forces are equal to mass times acceleration. If the weights or When displacements are applied slowly, inertia forces can be ignored and a static model can be created. It is possible to justify load analysis. As a result, dynamic analysis is a straightforward extension of static analysis

List of Abbreviations

OGL……. Original Ground Level

NGL……..Natural ground Level

SBM……..Solid Block Masonry

CJ…… Construction Joint

RCC……reinforced cement concrete

RMC……Ready mix concreting

CONTENTS

LIST OF FIGURE

LIST OF TABLES

INTRODUCTION

In terms of public quarter works, the critical Public Works Department of India, also known as the CPWD, is the most dependable major authorities authority. The relevant Public Works department, which is now part of the Ministry of Housing and Urban Affairs, is responsible for homes, roads, bridges, flyovers, and complex systems like as stadiums, auditoriums, labs, bunkers, border fences, border roads (hill roads), and so on (MoHUA). Lord Dalhousie launched a crucial endeavour in July 1854 to complete public works and establish the Ajmer Provincial Division. It has since grown into a full-service production management division, offering services spanning from design to completion, as well as ongoing maintenance.

It is overseen by the Director Standard (DG), who is also the senior Technical Marketing Consultant for the Indian government. In all kingdom capitals, special DGs and additional DGs are in command of the regions and sub-regions, while chief Engineers are in charge of the zones (save a few). To monitor CPWD's most essential projects, a new job of chief assignment supervisor (CPM) has just been created. CPMs are the equivalent of chief engineers in the CPWD. The CPWD's strength is its ability to build complicated projects even in difficult terrains and to preserve them during the construction stage, thanks to its nationwide presence.

It is the government of India's high engineering branch, and local public works departments and other departments' engineering wing follow its requirements and instructions.

CPWD consists of three wings in execution area:

1) B&R (homes and Roads)

2) E&M (electrical and Mechanical)

3) Horticulture

Following are the middle capabilities of CPWD

Other than those for Railways, Communications, Atomic Energy, Protection Services, All India Radio, Doordarshan, and Airports, design, manufacturing, and protection of primary government non-residential dwellings (IAAI & NAA).

Construction and maintenance of residential housing for relevant government officials.

Production work for essential Armed Police Forces (formerly paramilitary) such as the CRPF, CISF, BSF, and ITBP, as well as maintenance of CRPF and CISF infrastructure entrusted to CPWD.

SSB, SIB, and other cabinet Secretariat establishments require creation work.

Construction work for public zone projects that do not have their own engineering firm, other government businesses, self-sufficient our bodies and organisations as a deposit work. â€oeDepositWorksâ€ are projects that are conducted at the discretion of a well-known CPWD Director and for which the expenditure is provided entirely or partially from the CPWD.

A)The Union of India's monetary estimates and accounts no longer cover a price range of a public character.

B) Contributions from the public.

Providing civil engineering planning, design, and construction consultancy services as needed by public projects and other self-supporting entities.

The Ministry of External Affairs and other ministries have requested the construction of embassies and other structures/initiatives in other nations.

CHAPTER 1

LITERATURE REVIEW

LITERATURE REVIEW

A bridge is a structure that allows road visitors or other transferring masses to cross a boundary or impediment, such as a river, stream, canal, road, or railway. The talk might take place on a railway track, a tramway, a street, a footpath, bicycle music, or a combination of these.

Element of a bridge

Extensively a bridge can be divided into main pans:

(i) Superstructure

(ii) Substructure

The superstructure of a bridge is analogous to the roof of a single-story house, while the substructure is similar to the walls, columns, and foundations that support it.

Structural components in the superstructure wear a conversation route. The superstructure is made up of railings, protecting stones, and floors that are supported by any structural device above the bearings, such as beams, girders, arches, and cables.

Substructure is a helping machine for superstructure.

It includes the subsequent:

(a) Abutments

(b) Piers and Abutment piers

© Wing walls, and

(c) Foundations for the piers and abutments.

The opposing main aspects of bridge shape are techniques, bearings, and river schooling works, such as aprons, revetment for slopes at abutments, and many more.

Perfect Bridge website characteristics:

1. For the bridge's abutments and piers, a suitable, unyielding, and non-erodable material must be accessible at a shallow depth. The bearing strata must be devoid of the tendency to slip, slide, or sink under stress, and they must be positioned far away from the fault zone. In a different way, to be sure. It has to be geologically correct.

2. The stream at the bridge must be defined precisely and maintained as small as feasible. Three, the circulate must be available on the bridge website promptly.

The water flow within the move at the bridge website online must be in a constant regime state. It must be free of whirlpools and crosscurrents.

There should be no large tributaries converging in the vicinity of the bridge site. Direct method roads and rectangular alignment, i.e. right-angled crossing, must be feasible.

There should be no shortage of courtly river education projects in the bridge web site area.

To have minimal afflux, there must be minimal obstruction of natural waterways.

There should be clean availability of labour, construction materials, and transportation within the region of the bridge website online in order to obtain financial system.

High-stage bridges, also known as non-submersible bridges, are those that do not allow excessive floodwaters to pass beneath them. The floodwater is permitted to flow freely via the vents. In other words, it consists of the roadway above the channel's highest flood level.

A submersible bridge is a structure that allows floodwater to bypass a bridge while keeping the communication cable above water. Floods should not delay traffic for more than three days at a time or six times a year, according to the formation degree.

The causeway is an underwater pucca bridge that allows floodwaters to pass beneath it. It is offered on less essential routes to save money on the creation of a pass drainage system. Vents could be used to tolerate low water flow.

A footbridge is a bridge designed specifically for walkers, bicycles, and animals.

Culvert: A culvert is a movable drainage shape that is given when a small circulation crosses a street with a linear canal of less than 6 metres.

Deck Bridges have flooring that is supported at the pinnacle of the superstructure. Bridges having flooring that is supported or suspended at the bottom of the superstructures are known as through bridges.

Bridges with semi-thru floorings have an intermediate level of support for their superstructures.

Easy bridges are all beam, girder, or truss bridges that are supported on both ends. It's suited for up to 8-metre spans.

Cantilever bridges are bridges that are more or less fixed at one end and unfastened at the other. It can cross distances ranging from eight to twenty metres.

Continuous bridges are those that have two or more spans. They're used for large spans and foundations that need to be robust.

Bridges that produce slanted stresses on supports under vertical loads are known as arch bridges. These bridges can be used for up to 20 metre spans at a low cost. Inside the barrel or within the ribs, the arches may be found.

a stiff structure Bridges: In these bridges, the horizontal deck slab is built monolithically with the vertical abutment walls. The spans of these bridges can reach up to 20 metres. This sort of bridge isn't always considered as cost-effective for spans less than 10 metres.

A square bridge is one that is perpendicular to the river's axis. Skew Bridges are those that aren't at right angles to the river's axis.

Bridges hanging from the ends of cables are known as suspension bridges.

Below-Bridges: This mile-long bridge was built to allow a road to pass beneath any structure or impediment. Over-Bridges: A bridge built to allow two different types of land to communicate. Magnificence AA Bridges are bridges designed for I.R.C. magnificence AA loading and verified for class A loading. They're available inside certain municipal limits, in specific existing or projected business districts, in specific geographic areas, and along specific routes.

Designing permanent bridges for I.R.C. elegance Bridges with a Class A loading are referred to as Class A bridges.

Elegance B Bridges are bridges constructed for I.R.C. magnificence B loads.

A viaduct is a non-stop mile-long construction that supports a road or trains like a bridge over a dry valley and is made up of a series of spans over trestle bents rather than solid piers.

The apron is a layer of concrete, masonry stone, and other materials. Place it like flooring at the culvert's doorway or outlet to save scour.

A curtain wall is a thin barrier that protects against a moving vehicle's scouring effect.

Piers are the superstructure of a bridge's intermediate supports, and they can be either solid or open.

The superstructure's stop supports are known as abutments.

The distance between any two adjoining supports measured from centre to centre is the effective span of a bridge.

The term "clean span" refers to the space between any two adjacent bridge supports. Financial Span: This is the span with the smallest total value of the bridge structure.

Afflux: The canal may compress due to the bridge construction. Even as it passes beneath the bridge, the water level rises above its typical level. This upward thrust is referred to as aflux. Loose Board: Loose board is defined as the difference between the best flood stage after afflux, if any, and the formation level of avenue embankment at the processes or pinnacle degree of guide bunds at that point.

Headroom is the vertical space between a vehicle's best factor and the bottom point of any projecting out part of a bridge.

The general length measured along the bridge's centre line from the start to the end of the bridge deck can be defined as the period of a bridge structure.

The linear waterway of a bridge is the length available within the bridge between the extreme limits of a river floor at the best flood level, measured at right angles to the abutment faces.

The effective linear waterway is the whole width of the bridge's waterway less the powerful breadth of blockage. The powerful linear waterways will be calculated using the width of the indicative obstacle created by each pier. Abutments and pitched slopes should be avoided as end obstacles.

Low Water Stage (L.W.L): During the dry season, the low water stage refers to the normal extent of the water surface.

The average stage of a high flood that is predicted to occur every year is known as the normal flood level (O.F.L.).

The Maximum Flood Degree is the determined level for the maximum potential flood or the extent of the best flood each documented (H.F.L.).

Bridge alignment can take numerous forms depending on the angle the bridge makes with the river's axis:

1.The bridge is aligned squarely with the river's axis.

2. Skewed alignment: this bridge is angled away from the river's axis, which isn't the best position.

The waterway of a bridge is the space beneath the superstructure of the bridge where water flows.

The length of this land along the bridge is referred to as the linear canal. This linear waterway is made up of the clean spans combined.

The construction of a bridge creates a natural channel, which increases the velocity of the float beneath it. The outcome of this increased speed is aflux, or the rising of water upstream of the river or flow.

Only the monetary span reduces the bridge fee to the bare minimum.

The following elements influence the overall cost of the bridge:

1. value of cloth and its nature.

2. Availability of skilled labour.

3. Span period.

Four. Nature of circulate to be bridged.

5. Climatic and different conditions. Monetary span, l

where P is the price of one peir with its foundation a1 = steady

i.e. the cost of a single span helping device is the same as the cost of a single pier.

In other words, the cost of the substructure is the same as the cost of the superstructure. The number of spans should probably be maintained to a minimum, as piers restrict water flow. If piers are required, an unusual range of spans or even a wide range of piers is preferable. Well-known formula

L = kâP, where l is the monetary span's duration, and k is the constant.

With a slight tweak, the IRC has endorsed the following principle:

Price of variable component inside the substructure = price of variable element of outstanding shape

Scour intensity: scours occur when the rate of flow surpasses the limitation velocity that the erodible particle of mattress cloth can withstand. The usual scour intensity is the depth inside the move's centre while it's experiencing the highest flood discharge.

CHAPTER-2

BRIDGE SUPERSTRUCTURE

A bridge connecting the island to the mainland is a structure that carries a route or roadway over a depression or obstacle (such as a river). b: a period of time, place, or manner of connecting or transitioning between two civilizations, such as the transition from war to peace.

TYPES OF BRIDGE

SLAB BRIDGE

GIRDER BRIDGE

1) **SLAB BRIDGE :-** It's far appropriate for spans as much as 8m.
2) **GIRDER BRIDGE :-** This sort of bridge is reasonable for spans among 10m to 20m.

The types of girder bridges vary depending on the width of the roadway.

a) Parapet girder bridge
b) Tee Beam bridge
c) Balanced bridge

1. Ground beams: they are commonly plate girders or rolled metal. Joists supported through the primary girder of Trusses. They run perpendicular to the longitudinal center line of the bridge.

2. Stringers: they're commonly rolled steel joists or wooden beams supported at the floor beams at right perspective to them.

3. Predominant floors: floors is supported or suspended at the bottom of the superstructure and the top chord is braced laterally.

4. Carrying floor: this is the element of floors system with which wheels for cars are in actual contact.

CHAPTER-3

CONSTRUCTION SITE BRIDGE

Name of work

Detail estimate for widening of submersible bridge across morar river on nadi paar tal on morar thana to shamshan ghat road.

NECCESSITY

The existing box bridge on connecting main road i.e. morar thana, nadi paar tal and shamsan ghat road is very dense populated area. A carriage way width of existing bridge across morar river is quite inadequate to fulfil the need of traffic. Due to traffic jam, the district administration is facing law & order proble, daily during peek hours. Looking to demand of public as well as concering hon'ble MLA a joint spot visit was conducted on dated 04-06-2019 accordingly widening of existing box is essential. Hence a detailed estimate has been framed to overcome the problem of day by day traffic jam.

PROVISIONS

Submersible bridge construction for avg. 6m width bridge is provided as per site condition salient features of the bridges are as follow

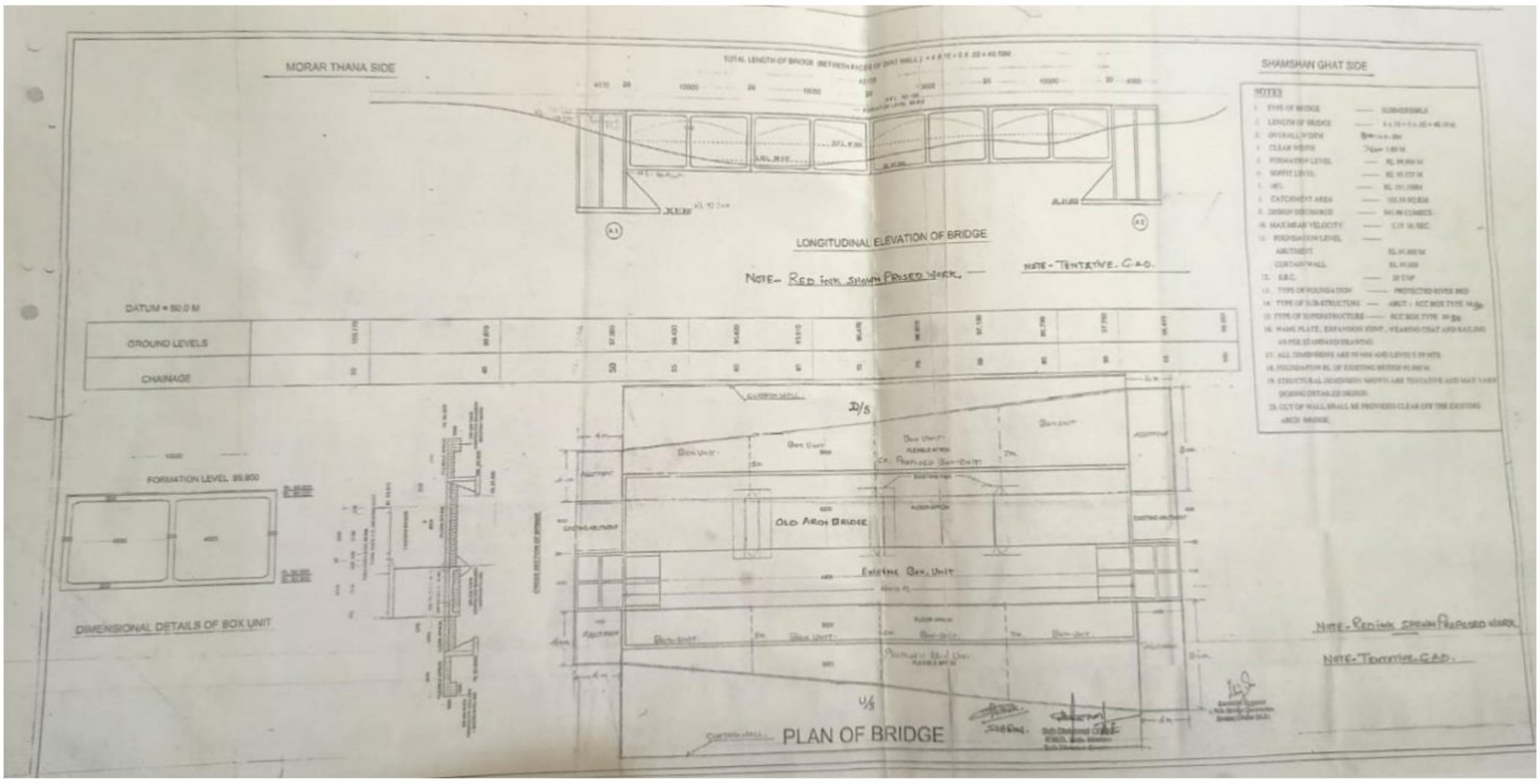
1) Types of Bridge :- submersible bridge
2) Length of bridge :- 40.1m
3) Span arrangement :- 1 box unit of 10m. RCC complete in RCC M30
4) Overall width :- Avg 200m.
5) Type of foundation :-open Foundation.
6) Carriage way:- Avg. 19.80m
7) Type of superstructure :- box unit
8) Design loading :- IRC class AA Loading

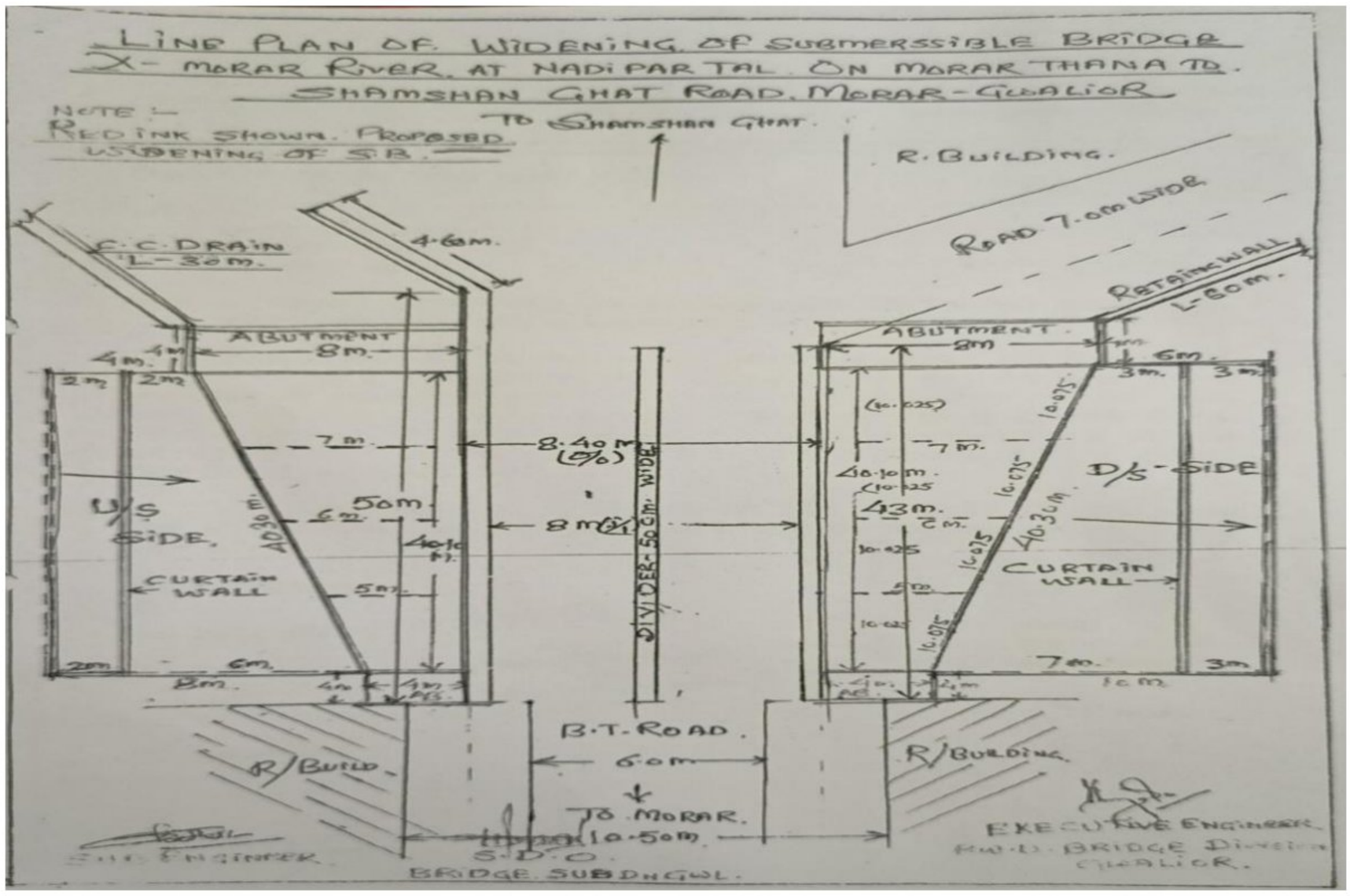
SPECIFICATION :-

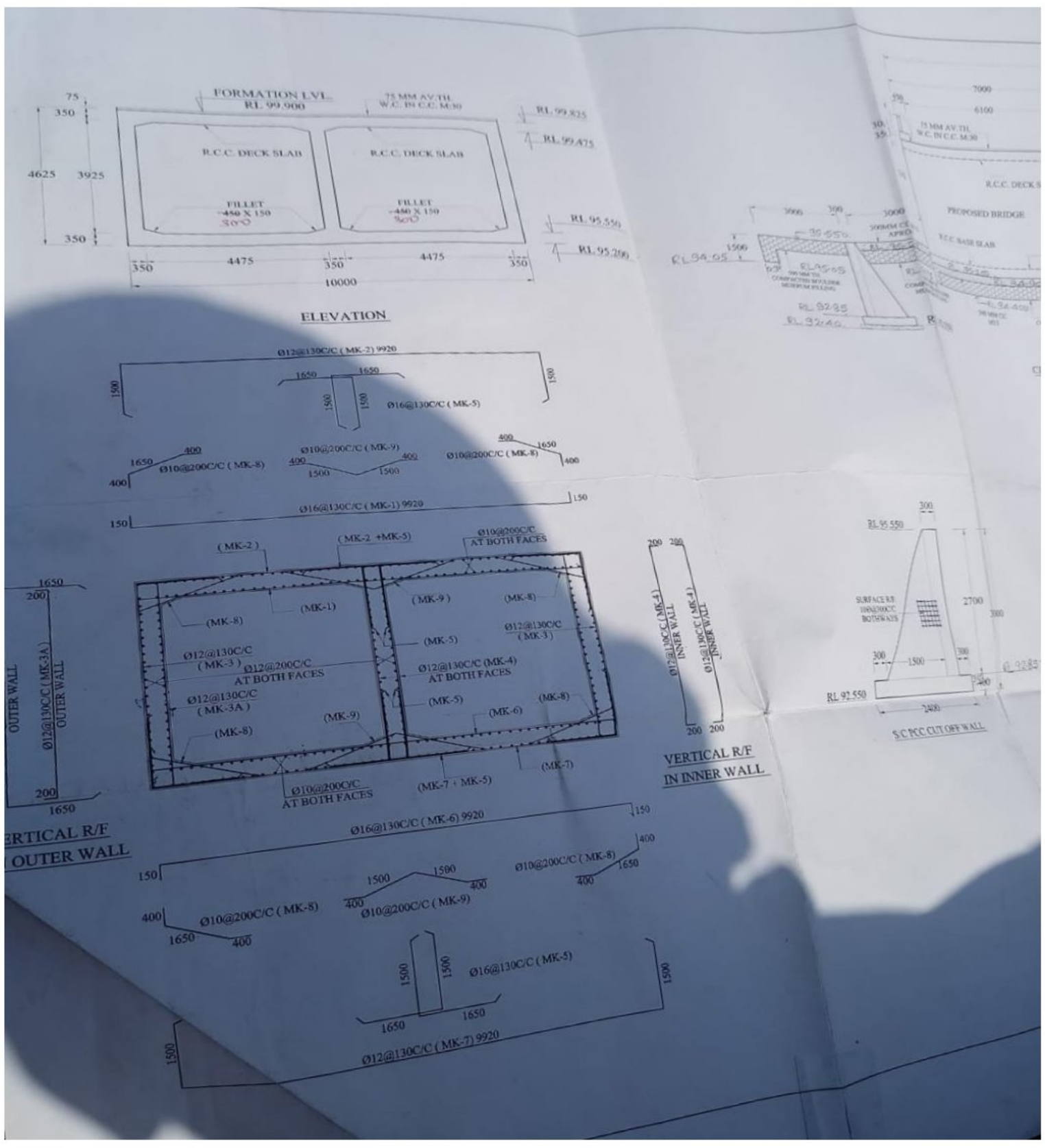
As per IRC and M.O.R.T. & H specification

RATES:-

The estimate has been framed on the basis of bridge and road SOR issued by E in C PWD Bhopal w.e.f 29/08/2017 and their amendment up to date.


MORAR THANA SIDE
SHAMSHAN GHAT SIDE
LONGITUDINAL ELEVATION OF BRIDGE
NOTE- RED INK SHOWN PROPOSED WORK.
NOTE- TENTATIVE. C.A.D.
DATUM = 80.0 M
GROUND LEVELS
CHAINAGE
FORMATION LEVEL 99.800
DIMENSIONAL DETAILS OF BOX UNIT
D/S
OLD ARCH BRIDGE
EXISTING BOX UNIT
U/S
PLAN OF BRIDGE
NOTES
NOTE- RED INK SHOWN PROPOSED WORK.
NOTE- TENTATIVE. C.A.D.


LINE PLAN OF WIDENING OF SUBMERSSIBLE BRIDGE
X- MORAR RIVER AT NADIPARTAL ON MORAR THANA TO.
SHAMSHAN GHAT ROAD, MORAR-GWALIOR
NOTE :-
RED INK SHOWN PROPOSED WIDENING OF S.B.
To Shamshan Ghat.
R. BUILDING.
ROAD 7.0m WIDE
RETAINING WALL L-60m.
C.C. DRAIN L-30m.
4.60m.
ABUTMENT
8m.
4m.
2m
7m.
8.40 m (Avg.)
DIVIDER-50cm. WIDE
U/S SIDE.
CURTAIN WALL
5.0m.
8m.
6m.
3m.
D/S SIDE
43m.
40.30 m.
B.T. ROAD
6.0m
To MORAR.
10.50m
S.D.O.
R/BUILD.
EXECUTIVE ENGINEER.
BRIDGE SUB DN GWL.


FORMATION LVL RL 99.900
75 MM AV.TH. W.C. IN C.C. M-30
R.C.C. DECK SLAB
FILLET 450 X 150
RL 99.825
RL 99.475
RL 95.550
RL 95.200
10000
ELEVATION
Ø12@130C/C (MK-2) 9920
Ø16@130C/C (MK-5)
Ø10@200C/C (MK-8)
Ø10@200C/C (MK-9)
Ø16@130C/C (MK-1) 9920
(MK-2) (MK-2 +MK-5)
Ø10@200C/C AT BOTH FACES
(MK-1)
(MK-3)
(MK-3A)
(MK-4)
(MK-5)
(MK-6)
(MK-7)
(MK-7 + MK-5)
OUTER WALL
INNER WALL
VERTICAL R/F IN INNER WALL
Ø16@130C/C (MK-6) 9920
Ø12@130C/C (MK-7) 9920
PROPOSED BRIDGE
RL 95.550
RL 92.550
S.C.P.C.C CUT OFF WALL

BBS (Bar bending schedule):-

The Bar Bending Schedule (BBS) aids in determining the amount of steel required for your home's construction. This aids in obtaining an accurate steel estimation. Cutting and bending calculations reduce steel waste and make the process more cost effective.

RCC BOX SIZE 10370X 5500X4500(Single box Steel Quantity As Per Drawing)

S.N.	Location	Marks	Description	Shape & Size	Dia of Bar's	No. of Member	No. of Renforcement	Cut Length			Dia. Of Bar & (weigth)					Total	Remark
								Drawing	Over Lap(50D)	Final	10mm	12mm	16mm	20mm	25mm		
1	LC-34	a1	vertical outer bar both outer wall		25	2	51	10.14		10.14	0.00	0.00	0.00	0.00	3981.98	**3981.98**	2320+5600+2320-100
2		a2	Top bar for top slab		12	1	51	10.5		10.5	0.00	476.60	0.00	0.00	0.00	**476.60**	2000+6600+2000-100
3		b	Top slab bottom bar		20	1	103	6.5		6.5	0.00	0.00	0.00	1646.97	0.00	**1646.97**	6600-100
4		c	Bottom slab bottom bar		16	1	51	10.5		10.5	0.00	0.00	846.09	0.00	0.00	**846.09**	2000+6600+2000-100
5		d	Bottom slab in top		25	1	103	6.5		6.5	0.00	0.00	0.00	0.00	2577.58	**2577.58**	6600-100
6		e	vertical inner bar		12	2	51	5.5		5.5	0.00	499.29	0.00	0.00	0.00	**499.29**	5600-100
7		h	distribustion bar bottom & Top,Bottom slab/Top slab		10	4	66	10.265		10.265	1680.18	0.00	0.00	0.00	0.00	**1680.18**	10365-100
8		f1	Haunch bar at top outer corners		25	2	51	3.17		3.17	0.00	0.00	0.00	0.00	1244.86	**1244.86**	543+2090+543
9		f2	Haunch bar at bottom outer corners		25	2	51	3.17		3.17	0.00	0.00	0.00	0.00	1244.86	**1244.86**	543+2090+543
10		g1	shear link of Top slab		10	1	1683	0.64		0.64	667.81	0.00	0.00	0.00	0.00	**667.81**	33x51
11		g2	shear link of bottom slab		10	1	1683	0.64		0.64	667.81	0.00	0.00	0.00	0.00	**667.81**	33x51
12		g3	Shear link of both outer wall		10	2	1122	0.64		0.64	890.42	0.00	0.00	0.00	0.00	**890.42**	22x51
13		h1	distribustion bar vertical wall outer		10	4	28	10.265		10.265	712.80	0.00	0.00	0.00	0.00	**712.80**	10365-100
									TOTAL		3906.22	499.29	846.09	0.00	0.00	17137.24	

Construction of different structure at site:-

1) CUTOFF WALL
2) BOX CULVERT
3) CAST-IN-SITU
4) WING WALLS

1) CUTOFF WALL:- A cut-off wall is a device that is used to reduce or prevent water seepage through pervious surfaces. It is always provided beneath the foundation's top story. The reduce-off wall is known as a whole reduce-off wall if it continues through the inspiration to impermeable material beneath

2) **BOX CULVERT** :-

A culvert is a tunnel built beneath roadways or railroads to allow for cross-drainage or the transportation of electrical or other cables from one side to the other. It is fully surrounded by the earth or ground. Pipe, box, and arch culverts are the most common types found beneath highways and railways.

3) **CAST-IN-SITU:-**

The forged-in-situ method of bridge construction is a versatile method that can easily accommodate the needs of more odd geometrical designs. Due of the difficulty of transporting the created pars, cast-in-situ techniques are used.

4) **WINGS WALLS:-**

The wing walls maintain grade elevations, keep the embankment adjacent to the culvert in place, and direct water flow. The scour apron is intended to prevent scour and erosion at the inlet or exit's base.

Different types of loading

IRC magnificence AA Loading

The IRC elegance AA Loading corresponding to the magnificence 70 loading.

Two kind of vehicle loading are designated:

1. Tracked automobile
2. Wheeled automobile

The choice is made, relying upon the expected styles of cars to travel on the bridge.

Bridge designed for sophistication AA loading should be checked for class A loading also, as under sure

Situations heavier stress may be acquired under class A loading.

Effect impact of sophistication AA Loading for street Bridges

1. For spans much less than nine metres.

(i) For tracked motors 20% for spans as much as 5 m, linearly reducing to ten% for spans of nine m.

(ii) For wheeled cars 25%

1. For Spans of 9 m or greater

Bolstered Concrete Bridges

(i) Tracked automobiles 10% up to a span of 40 m.
(ii) Wheeled vehicles 25% for span as much as 12 m.

Detailed Estimate for Widening of submersible bridge across Morar river on Nadi Paar Tal on Morar Thana to Shamshan Ghat Road

S. No.	Item of work	No.	L	W	H/D	QTY	Rate	Unit	Amount
	FOUNDATION								
1	**S.O.R Item No. 2.3/P-15** Dismantling of Structures Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and lead of 1000 metres.								
	(i) Lime /Cement Concrete								
	B Cement Concrete Grade M-15 & M-20								
	For Existing Curbe U/S 55.00 m D/S 43.00 m	1	98.00	0.40	0.40	15.68	342.00	Cum	5363.00
2	**S.O.R Item No. 12.1/P-58** Excavation for Structures Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material. as per relevant clauses of section 300 & 2100 in								
	I Ordinary soil								
	B Mechanical Means								
	(i) Depth upto 3 m								
	(A) Abutment								
	(i) Morar Side RL 97.45 to 94.45	2	4.30	7.30	3.00	188.34			
	(ii)Shamshan Ghat Side RL 97.65 to 94.65	2	8.30	7.30	3.00	363.54			
	(B) R.C.C. Box RL 96.45 to 93.45	2	28.20	(8.0+4.0)/2	2.05	693.72			
	(C) Cut of Wall RL 96.45 to 93.45	2	40.30	1.60	3.00	386.88			

	(D) Appron U\S Side RL 96.45 to 94.70	1	40.30	(8.0+4.0)/2	1.75	423.15			
	(E) Appron D\S Sie RL 96.45 to 94.70	1	40.30	(6.0+10.0)/2	1.75	564.20			
	(F) Return wall RL 98.90 to 95.90	1	60.00	3.10	3.00	558.00			
	(G) C.C. Drain RL 99.00 to 97.15	1	30.00	1.70	1.85	94.35			
						3272.18	52.00	Cum	170153.00
	(ii) Depth 3 m to 6 m								
	(A) Abutment								
	(i) Morar Side RL 94.45 to 91.65	2	4.30	7.30	2.80	175.78			
	(ii) shamshan Ghat Side RL 94.65 to 91.65	2	8.3	7.30	3.00	363.54			
	(B) Cut of Wall RL 93.45 to 92.85	2	40.30	1.60	0.60	77.37			
	(C) Return wall RL 95.90 to 95.05	1	60.00	3.10	0.85	158.10			
						774.79	59.00	Cum	45713.00
3	**S.O.R Item No. 12.2 P-58** Add extra as follows in the rates of the above items if dewatering is resorted to								
	I Ordinary soil								
	B Mechanical Means								
	(i) Depth upto 3 m								
	RCC Box RL 96.11 to 93.45	2	28.20	6.00	2.66	900.14			
	Cut of wall RL 96.11 to 93.11	2	40.30	1.60	3.00	386.88			
	Appron U\S Side RL 96.11 to 94.70	1	40.30	6.00	1.41	340.94			
	Appron D\S Side RL 96.11 to 94.70	1	40.30	8.00	1.41	454.58			
						2082.55	26.00	Cum	54146.00
	b) beyond 3 m to 6 m depth								
	Cut of wall RL 93.11 to 92.85	2	40.30	1.60	0.26	33.53	44.25	Cum	1484.00
4	**S.O.R Item No. 15.1 P-73** Providing and laying boulders apron on river bed for protection against scour with stone boulders weighing not less than 40 kg each complete as per drawing and Technical specification.								
	A Boulder laid dry without wire crates.								
	Below RCC Box RL 94.70 to 94.90	2	40.10	(7.4+3.4)/2	0.50	216.54			
	Below Appron U\S Side	1	40.10	6.00	0.50	120.30			
	Below Appron D\S Side	1	40.10	8.00	0.50	160.40			
	Extrain Tow wall U\S & D\S	2	40.10	1.00	0.50	40.10			
						537.34	2033.00	Cum	1092412.00

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5	S.O.R Item No. 12.3 P-58 Providing Plain cement concrete M-15 nominal mix in foundation as per relevant clauses of sections 1500, 1700 and 2100								
	Abutment								
	Morar Thana Side RL 91.85 to 91.80	2	4.30	7.30	0.15	9.41			
	Shamshan Ghat Side RL 91.65 to 91.80	2	8.30	7.30	0.15	18.17			
	Below RCC Box RL 94.90 to 95.20	2	40.10	(8+4)/2	0.30	144.36			
	Key walls	2*2	40.10	0.30	0.50	24.06			
	Floor Appron U\S Side RL 95.20 to 95.50	1	40.10	(2+6)/2	0.30	48.12			
	Floor Appron D\S Side RL 95.20 to 95..50	1	40.10	(3+7)/2	0.30	60.15			
	Cut of wall RL 92.85 to 93.00	2	40.30	1.60	0.15	19.34			
	Return wall RL 95.05 to 95.20	1	60.00	3.10	0.15	27.90			
	C.C. Drain RL 97.15 to 97.30	1	30.00	1.70	0.15	7.65			
						359.16	4299.00	Cum	1544029.00
6	S.O.R Item 12.8 P-59 Provdiing and laying Plain/Reinforced cement concrete in open foundation including form work shuttering etc. complete as per drawing and technical specifications and as per relevant clauses of sections 1500, 1700 & 2100 with .								
	A PCC Grade M15								
	Cut of wall U\S & D\S RL 93.00 to 93.30	2	40.10	1.40	0.30	33.68			
	Wall RL 93.30 to 95.50	2	40.10	0.30	2.20	52.93			
		2	1/2*40.10	0.80	0.20	70.57			
						157.18	4572.00	Cum	718627.00
	G RCC Grade M30								
	Abutment Footings								
	Morar Thana Side RL 91.80 to 92.20	2	4.00	7.00	0.40	22.40			
	Shamshan Ghat Side RL 91.80 to 92.20	2	8.00	7.00	0.40	44.80			
	Inner Side wall RL 92.20 to 94.90								
	Morar Thans Side Abutment	3	1/2*3.00	0.40	2.70	4.86			
	Shamshan Ghat Side Abutment	6	1/2*3.00	0.40	2.70	9.72			

	SUBSTRUCTURE								
8	**S.O.R Item no. 13.6 P-65** Plain/Reinforced cement concrete in sub-structure complete as per drawing and technical specifications								
	G RCC Grade M30								
	Abutment Wall								
	Morar Thana Side								
	L/Wall RL 97.45 to 99.525	2*3	4.00	0.30	2.075	14.94			
	S/Wall RL 97.45 to 99.525	2*6	1.55	0.30	2.075	11.57			
	Shamshan Ghat Side								
	L/Wall RL 97.65 to 99.525	2*3	8.00	0.30	1.875	27.00			
	S/Wall RL 97.65 to 99.525	2*10	1.55	0.30	1.875	17.43			
	RCC Box								
	Bottom Slab RL 95.20 to 95.50	2	40.10	(8+4)/2	0.30	144.36			
	Vertical 1st wall	2	4.00	0.30	4.025	9.66			
	Vertical 2nd wall	2	5.00	0.30	4.025	12.07			
	Vertical 3rd wall	2	6.00	0.30	4.025	14.49			
	Vertical 4th wall	2	7.00	0.30	4.025	16.90			
	Vertical 5th wall	2	8.00	0.30	4.025	19.32			
	Top Slab								
	RL 99.525 to 99.825	2	40.10	(8+4)/2	0.30	144.36			
						432.10	5999.00	Cum	2592168.00
	E RCC Grade M20								
	Retaining wall RL 98.90 to 99.90	1	60.00	(0.50+0.40)/2	1.00	27.00	5396.00	Cum	145692.00
9	**S.O.R Item No. 13.7 P-65** Supplying, fitting and placing HYSD bar reinforcement in substructure complete as per drawing and technical specifications and as per relevant clause of section 1600.								
	(i) Steel in Abutment	120 Kg/cum= 70.94 x120/1000 = 8.5128				8.5128			
	(ii) Steel in RCC Box	150 Kg/cum= 361.16 x150/1000 = 54.174				54.174			
	Qty as per Item No. 6 (E) RCC Grade M-20	80 Kg/cum= 27.00 x80/1000 = 2.16				2.16			
						64.8468	66217.00	MT	4293961.00

10	S.O.R Item no.13.10 P-65 Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification and as per relevant clauses 305 of specifications and as per appendix 6 of IRC-78.								
	A) Granular Material								
	RL 92.20 to 99.375								
	Morar Thana Side Abutments	2*4	1.55	1.55	7.175	137.90			
	Shamshan Ghat Side Abutment	2*8	1.550	1.625	7.175	289.15			
						427.05	880.00	Cum	375804.00
							Total		740625.00
	SUPERSTRUCTURE								
11	S.O.R Item No. 14.10 P-69 PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification and as per relevant clauses of section 1700.								
	Abutment Box								
	RL 99.375 to 99.525								
	Morar Thana Side Abutment Box	2*4	1.55	1.55	0.15	2.88			
	Shamshan Ghat Abutment Box	2*8	1.55	1.625	0.15	6.04			
						8.92	4397.00	Cum	39221.00
12	S.O.R Item No. 14.11 P-69 Reinforced cement concrete approach slab (Grade of concrere M 30) including reinforcement and formwork complete as per drawing and Technical specification and as per relevant clauses of section 1500, 1600, 1700 and clause 2704 of specifications.								
	RL 99.525 to 98.825								
	Morar Thana Side	2.00	4.00	4.00	0.30	9.60			
	Shamshan Ghat Side	2.00	8.00	4.00	0.30	19.20			
						28.80	7970.00	Cum	229536.00

	Abutment walls								
	Morar Thana side								
	L/Wall RL 92.20 to 97.45	2*3	4.00	0.30	5.25	37.80			
	S/Wall RL 92.20 to 97.45	2*6	1.55	0.30	5.25	29.29			
	Shamshan Ghat Side								
	L/Wall RL 92.20 to 97.65	2*3	8.00	0.30	5.65	81.36			
	S/Wall RL 92.20 to 97.65	2*10	1.55	0.30	5.65	52.54			
						282.77	5337.00	Cum	1509143.00
	C RCC Grade M20								
	Return wall								
	Footing RL 95.20 to 95.50	1	60.00	2.80	0.30	50.40			
		1	60.00	2.80	0.30	14.40			
		1	60*1/2	0.80	0.30	7.20			
		1	60*1/2	0.80	0.30	10.80			
	Vertical Wall RL 95.80 to 98.90	1	60.00	(0.8+0.5)/2	3.10	120.90			
	C.C. Drain								
	RL 97.30 to 97.50	1	30.00	1.40	0.20	8.40			
	Vertical Wall RL 97.50 to 99.00	2	30.00	0.20	1.50	18.00			
	For Slab of Drain Cover	1	30.00	1.40	0.15	6.30			
						236.40	4919.00	Cum	1162852.00
7	**S.O.R Item 12.31 P-62** Supplying, fitting and placing un-coated HYSD bar reinforcement in foundation complete as per drawing and technical specifications and as per relevant clauses of section 1600.								
	Qty as per Item No. 4 (G) Rcc Grage M-30	282.77 Cum 120kg/1000 =33.9324 cum				33.9324			
	Qty as per Item No. 4 © Rcc Grage M-20	236.40 Cum 80kg/1000 =18.91 cum				18.912			
						52.8444	66069.00	MT	3491377.00
							Total		9795299.00

13	**S.O.R Item No. 14.4 P-68** Providing and laying Cement concrete wearing coat M-30 grade including reinforcement complete as per drawing and Technical Specifications and as per relevant clauses of sections 1500, 1700 and Clause 2702 of specifications..								
	RL 99.825 to 99.90	2.00	40.10	(8+4)/2	0.075	36.09	10932.00	Cum	394536.00
14	**S.O.R Item No. 14.20 P-70** Strip Seal Expansion Joint Providing and laying of a strip seal expansion joint catering to maximum horizontal movement upto 70 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation.								
	Ist Wall	2.00	4.00	-	-	8.00			
	2nd Wall	2.00	5.00	-	-	10.00			
	3rd Wall	2.00	6.00	-	-	12.00			
	4th Wall	2.00	7.00	-	-	14.00			
	5th Wall	2.00	8.00	-	-	16.00			
	Traffic Direction	3.00	48.10	-	-	144.30			
						204.30	10431.00	RM	2131053.00
15	**S.O.R Item No. 14.25 P-71** Providing and fixing in position Marble Plates of size 0.9 m. x 1.2 m. with inscribed details as per detailed drawings.	2.00	-	-	-	2.00	1369.00	Each	2738.00
16	**S.O.R Item No. 14.23 P-71** Testing of span of bridge for deflection due to live load with platforms for loading arrangements apparatus for meaurement including unloading etc. complete as per approved drawing.	1*77	-	-	-	77.00	815.00	MT	62755.00

17	S.O.R Item No. 14.26 P-71 Providing and fixing and erecting 40mm dia steel pipe (medium weight) railing in 3 rows on steel channel ISMC-100mmx50mm and 0.95 in height and fixed at 1.8m. center to center and duly painted etc. complete as per standard drawing No.STD-33R, dtd.11.05.1987 of MP Rajya Setu Nirman Nigam Bhopal.	2*55	-	-	-	110.00	1192.00	RM	131120.00
18	S.O.R Item No. 8.12 P-45 Painting on Steel Surfaces Providing and applying two coats of ready mix paint of approved brand on steel surface after through cleaning of surface to give an even shade								
	(a)Channel ISMC-100mmx50mm @ 1.8 m C/C	2*31	-	-	-	62.00			
					62 @ 0.117Sqm/Each	7.254			
	(b) 40 mm dia Pipe	2*3	55.00	3.14	0.04	41.448			
						48.702	45.00	Sqm	2192.00
							Total		2993151.00
	APPROACH ROAD								
19	S.O.R Item 3.10 P-20 Embankment Construction with Material Obtained from Borrow Pits Construction of embankment with approved material having CBR>7 obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirement of table 300-1, 300-2 and as per relevent clauses of section-300.								
	Return wall	1	70.00	(3.0+5.5)/2	3.00	630.00	144.00	Cum	90720.00
20	S.O.R Item 4.12 P-25 Crusher Run Macadam Sub Base/Base Course Providing crushed stone aggregate, depositing on a prepared surface by hauling vehicles, spreading and mixing with a motor grader, watering and compacting with a vibratory roller to clause 410 to form a layer of sub-base/Base in accordance to Table No. 400-14, 400-15 and as per clause of section 407 of specifications								

	(ii) For 37.5 mm maximum size								
	Drain Side Road	1.00	35.00	25.00	0.20	175.00			
	Return wall Road	1.00	70.00	7.00	0.20	98.00			
						273.00	949.00	Cum	259077.00
21	**S.O.R Item No. 6.1/P-34** Dry Lean Cement Concrete Sub- base Construction of dry lean cement concrete Sub- base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per table 600-1, cement content not to be less than 150 kg/ cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8- 10 tonnes vibratory roller, finishing and curing as per clause 601 of specification complete in all respect.								
	Drain Side Road	1.00	35.00	25.00	0.10	87.50			
	Return wall Road	1.00	70.00	7.00	0.10	49.00			
						136.50	2199.00	Cum	300164.00
22	**S.O.R Item No. 6.4/P-34** Cement Concrete Pavement Construction of un-reinforced, dowel jointed, plain cement concrete pavement M-30 grade concrete over a prepared sub base with cement , coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, transported to site, laid with a fixed form or slip form paver, spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, admixtures as approved, curing compound, finishing to lines and grades as per drawing as per IRC 15 2011 and as per relevant clauses of section 602 of specifications complete but excluding cost of steel in dowel bar and tie rods etc.								
	Drain Side Road	1.00	35.00	25.00	0.25	218.75			
	Return wall Road	1.00	70.00	7.00	0.25	122.50			
						341.25	4841.00	Cum	1651991.00

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Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation			✓		
Performance/Quality of work			✓	✓	
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work			✓		
Comment on Safety of work done/Any Fight					

OVERALL GRADE (ANY ONE)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT
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Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation			✓		
Performance/Quality of work				✓	
Behaviour Discipline/Team work			✓		
Sincerity/Hard work			✓	✓	
Comment on nature of work done/Area/Topic					
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Punctuality/Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation			✓	✓	
Performance/Quality of work				✓	
Behaviour/Discipline/Team work			✓		
Sincerity/Hard work				✓	
Comment on nature of work done/Area/Topic					

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Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation				✓	
Performance/Quality of work				✓	
Behaviour/Discipline/Team work			✓		
Sincerity/Hard work			✓		
Comment on nature of work done/Area/Topic					
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT Good				
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Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation				✓	
Performance/Quality of work			✓		
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work			✓		
Comment on nature of work done/Area/Topic					

OVERALL GRADE (Any one)	**POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT** Good
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Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation			✓		
Performance/Quality of work				✓	
Behaviour/Discipline/Team work			✓		
Sincerity/Hard work				✓	
Comments on nature of work done/Any Topic					
OVERALL GRADING (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT Good				
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Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation				✓	
Performance/Quality of work			✓		
Behaviour Discipline Team work				✓	
Sincerity Hard work			✓		
Comment on nature of work done/ Area Topic					
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT Good				
Name of Industry Mentor	Chalah Sharma				
Signature of Industry Mentor					

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Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality Timely completion of assigned work			✓		
Learning capacity Knowledge up gradation				✓	
Performance Quality of work			✓	✓	
Behaviour Discipline Team work			✓		
Sincerity Hard work				✓	
Comment on name of work done/ Area Topic					
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT Good				
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