

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)



Final Year Internship Report

on

REDEVELOPMENT OF KATORA TAL ROAD

UNDER

GWALIOR SMART CITY DEVELOPMENT CORPORATION LIMITED

Submitted By:

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DEPARTMENT OF CIVIL ENGINEERING

**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE
GWALIOR - 474005 (MP) est. 1957**

MAY-JUNE 2022

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)



REDEVELOPMENT OF KATORA TAL ROAD

A final year internship report submitted in partial fulfilment of the requirement for the degree of
BACHELOR OF TECHNOLOGY

in

CIVIL ENGINEERING

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Submitted to:

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CERTIFICATE

Date: 24.05.2022

This is in reference to the ongoing Internship of **Ms. Amisha Mujalda** at IPE Global Limited under Gwalior Smart City Project from 18th January, 2022 to 23th May, 2022.

We found her sincere, hardworking, and technically sound and result oriented. She worked well as a part of the team during her tenure. We take this opportunity to thank and wish her all the best for her future.

As a part of her institute grading we would like to grade her as **Excellent** during these course of months.

For IPE Global Limited



Authorized Signatory



Address: ICCCL, 1st floor, Moti Mahal, Gwalior

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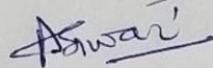
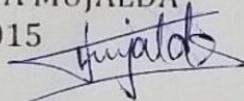
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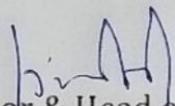
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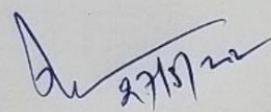


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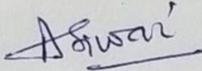
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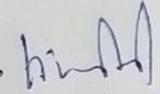
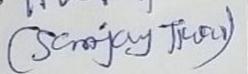
CERTIFICATE

This is certified that **AMISHA MUJALDA** (0901ce181015) has submitted the Internship report titled **Internship Redevelopment of Katora Tal Road** of the work he has done under the mentorship of **Prof. ARCHANA TIWARI**, in partial fulfilment of the requirement for the award of degree of Bachelor of Technology in Civil Engineering from Madhav Institute of Technology and Science, Gwalior.



Prof. Archana Tiwari
Faculty Mentor
Civil Engineering

Dr. Manoj Kumar Trivedi
Professor and Head,
for Civil Engineering

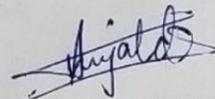



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DECLARATION

I hereby declare that the work being presented in this Internship report, for the partial fulfilment of requirement for the award of the degree of Bachelor of Technology in CIVIL at Madhav Institute of Technology & Science, Gwalior is an authenticated and original record of my work under the mentorship of **PROF. Archana Tiwari**, Department of CIVIL.

I declare that I have not submitted the matter embodied in this report for the award of any degree or diploma anywhere else.



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ACKNOWLEDGEMENT

The full semester internship has proved to be pivotal to my career. I am thankful to my institute, **Madhav Institute of Technology and Science** to allow me to continue my disciplinary/interdisciplinary internship as a curriculum requirement, under the provisions of the Flexible Curriculum Scheme (based on the AICTE Model Curriculum 2018), approved by the Academic Council of the institute. I extend my gratitude to the Director of the institute, **Dr. R. K. Pandit** and Dean Academics, **Dr. Manjaree Pandit** for this.

I would sincerely like to thank my department, **Department of Civil Engineering**, for allowing me to explore this internship. I humbly thank **Dr. Manoj Kumar Trivedi**, Professor and Head, Department of Computer Science and Engineering, for his continued support during the course of this engagement, which eased the process and formalities involved.

I am sincerely thankful to my faculty mentors. I am grateful to the guidance of **Prof. Archana Tiwari**, Department of Civil Engineering, for his continued support and close mentoring throughout the internship. I am also very thankful to the faculty and staff of the department.

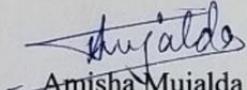

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ABSTRACT

Roads make a crucial contribution to economic development and growth and brings important social benefits. They are of vital importance in order to make a nation grow and develop. In addition, providing access to employment, health, social and education services make a road network crucial in fighting against poverty. Roads open up more areas and stimulate economic and social development. For those reason, ROAD INFRASTRUCTURE is the most important of all the public assets. Idea of smart city is to provide data driven solution to social problem specific to urban area in the GWALIOR. India's population keeps expanding; increase in urbanism brings population explosion in urban areas. Going forward solution based on data ith the help of technology is the best solution for the ease Governance. The project reveals about Indian Governance initiatives on smart cities, secureness in smart city and a secured smart city with a UUID tracking system.

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LIST OF ABBREVIATIONS

S.NO.	ABBREVIATION	DESCRIPTION
1	GSB	Granular Sub Base
2	WMM	Wet Mix Macadam
3	DBM	Dense Base Macadam
4	BC	Bituminous Concrete
5	SC	Seal Coat
6	PC	Prime Coat
7	TC	Tack Coat
8	HMA	Hot Mix Asphalt

Chapter 1: INTRODUCTION

ORGANISATION INFORMATION: Gwalior is the northernmost city of the second-largest state i.e. Madhya Pradesh, as it is known for its rich heritage and tourism. Gwalior Smart City Development Corporation Limited (GSCDCL) aims to “develop heritage & culture sustainability with tourism, and promote city as tourist destination”. As per the report of GSCDCL's outreach program for implementation of Gwalior smart city projects (Dec 2017), its vision is to promote heritage and culture and transform Gwalior by inculcating various new economic opportunities and reinstate its strength in Education, Health & Trade. Many cities in smart cities in India are being planned as ‘counter magnets’ to Delhi like Kanpur, Jaipur, Kota, and Gwalior. The Gwalior Smart City Development Corporation (GSCDCL) major goal is to develop Gwalior city as “counter magnet” to Delhi along with environment-friendly infrastructure. GWALIOR SMART CITY DEVELOPMENT CORPORATION LIMITED is a mca provider company based on the National Industrial Classification (NIC) code of 75100 and it is involved in the business activities related to this industry code such as #Administration of the State and the economic and social policy of the community The other Indian private limited and limited liability companies involved in similar business activities and industry activities as of GWALIOR SMART CITY DEVELOPMENT CORPORATION LIMITED are mentioned below in the similar companies section.

The city of Gwalior wants to comprehensively transform Gwalior through promotion of heritage and cultural assets to create new Economic opportunities and reinforce its strengths in education, health and trade. The focus area on enhancing city identity and culture aims to strengthen Gwalior's identity as the cultural Capital of Madhya Pradesh. The city wants to stay connected and accessible through initiatives like promotion of Non-Motorised Transport (NMT) and by pursuing Transit Oriented Development (TOD). Another focus area is promotion of resilient urban Ecosystem, which is to be achieved by adhering to urban design guidelines, increasing open spaces, use of green technologies etc. Then promotion of citizen centric services through promotion of ICT also receives focus.

Gwalior Smart City Proposal (SCP) has been selected to implement the Area Based Development (ABD) and pan-city proposals by Government of India (GoI) under Smart City Mission (SCM). Gwalior SCP proposes smart solutions in ABD area and across pan city with various smart features and infrastructure. To implement smart city projects in Gwalior, Gwalior Municipal Corporation

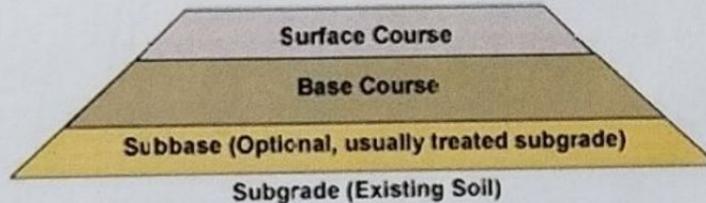
(GMC) and Madhya Pradesh Urban Development Corporation has formed a special purpose vehicle called Gwalior Smart City Development Corporation Limited (GSCDCL). GSCDCL has prepared this Tender Document (TD) for the “Re-Development of Katora Tal, Gwalior”. This TD is a detailed document with specific terms and conditions on which the Bidder is expected to work. GSCDCL has taken due care in preparation of information contained herein and believes it to be accurate. However, neither GSCDCL or any of its authorities or agencies nor any of their respective officers, employees, agents, or advisors give any warranty or make any representations, express or implied as to the completeness or accuracy of the information contained in this document or any information which may be provided in connection or arising out of it.

This PROJECT is for “Redevelopment of Katora Tal, Gwalior”, the detailed scope of work has been provided in this section. The initial period of 5 (five) years after physical completion of work shall be treated as Defect Liability Period (DLP). The operation and maintenance of the Pond for 5 (five) years after completion of work is included in the scope of work. Background Gwalior has been selected under Smart City Challenge proposal. Various projects have been identified in this proposal to improve the city and somewhere meet international standards. One of those projects is Heritage and Culture Module. Many heritage sites have been identified in this module for conservation and restoration. One of the site among them is Katora Tal. Katora Tal can is a key heritage site of Gwalior. This pond functions as important community space, and provides opportunity for physical and recreational activity. There is, therefore an urgent need for upgrading this Pond in the town. Project GSCDCL is desirous of executing Pond re-development project for the Katora Tal. The project report prepared by GSCDCL proposes following works in the project area,

- i) Roads and footpath
- ii) Horticulture works,
- iii) Paving works,
- iv) Cladding and painting of boundary wall,
- v) Play Area
- vi) Lighting and electrical works,
- vii) Control Room,
- viii) Water Fountain and Light and Music Show, etc.

CHAPTER-2 LAYERS OF THE ROAD

i) **ROADS – Mahal road, Gwalior is an urban type road.** Redevelopment of **1km** has done from **MAHAL ROAD TO MATA KA MANDIR**, which has varied width of 7.4 metres to 9 metres. This road is a flexible pavement road. A typical flexible pavement consists of a bituminous surface course over base course and sub-base course. The surface course may consist of one or more bituminous or Hot Mix Asphalt (HMA) layers. These pavements have negligible flexure strength and hence undergo deformation under the action



of loads. The structural capacity of flexible pavements is attained by the combined action of the different layers of the pavement. The load from trucks is directly applied on the wearing course, and it gets dispersed (in the form of a truncated cone) with depth in the base, sub base, and subgrade courses, and then ultimately to the ground. Since the stress induced by traffic loading is highest at the top, the surface layer has maximum stiffness (measured by resilient modulus) and contributes the most to pavement strength. The layers below have lesser stiffness but are equally important in the pavement composition. The subgrade layer is responsible for transferring the load from the above layers to the ground. Flexible pavements are designed in such a way that the load that reaches the subgrade does not exceed the bearing capacity of the subgrade soil. Consequently, the thicknesses of the layers above the subgrade vary depending upon strength of soil affecting the cost of a pavement to be constructed.

Urban roads are classified into the following three categories:

Expressways:- The function of expressways is the same for both urban areas o& non-urban areas.

Collector Streets:- It's function is to collect traffic from local streets and feed it to the arterial and sub-arterial streets or vice versa. Generally, full access is allowed on these streets. There are few parking restrictions except during the peak hours.

Local Streets:- Local streets may be residential, commercial or industrial, depending on the use of the adjoining land. They allow unrestricted parking and pedestrian movements.

EXCAVATION- All excavations shall be carried out in conformity with the directions laid here-in-under and in a manner approved by the Engineer. Where, however, unstable shales or other unsuitable materials are encountered at the formation level, these shall be excavated to the extent of 605 mm below the formation level or as otherwise specified.



LEVELLING- (AUTO LEVEL) A dumpy level, builder's auto level, leveling instrument, or automatic level is an optical instrument used to establish or verify points in the same horizontal plane. It is used in surveying and building with a vertical staff to measure height differences and to transfer, measure and set heights.



SUBBASE COURSE

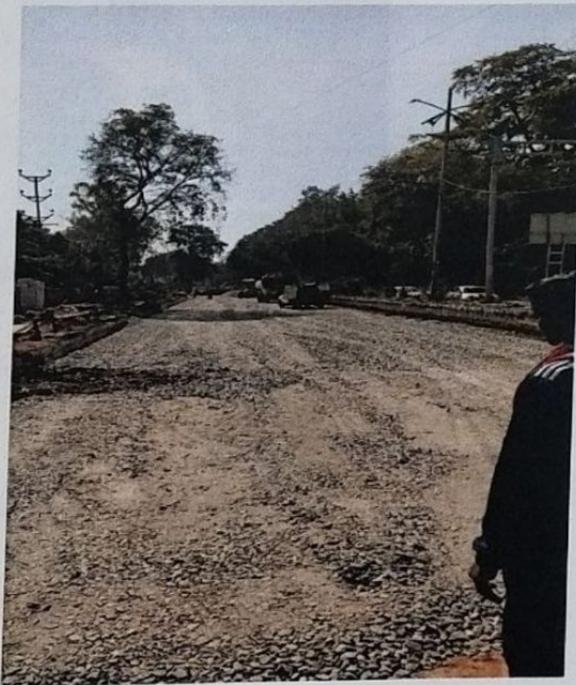
GRANULAR SUB BASE- This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of these Specifications. The material to be used for the work shall be natural sand, crushed gravel, crushed stone, crushed slag, or combination thereof depending upon the grading required. Use of materials like brick metal, Kankar and crushed concrete shall be permitted in the lower sub-base. The material shall be free from organic or other deleterious constituents and shall conform to the gradings given in Table

SPREADING AND COMPACTING The sub-base material of the grading specified in the Contract and water shall be spread uniformly by a suitable mixer equipped with spreading and controlled addition of water and mechanical mixing. Moisture content of the material shall be controlled in accordance with IS:2720 (Part 2) and uniformly compacted as specified in the Contract, a minimum 1 to 2 percent below the optimum moisture content. The speed of compacting shall be such that

Table 400-1 : Grading for Granular Sub-base Materials

IS Sieve Designation	Percent by Weight Passing the IS Sieve					
	Grading I	Grading II	Grading III	Grading IV	Grading V	Grading VI
75.0 mm	100	-	-	-	100	-
53.0 mm	80-100	100	100	100	80-100	100
26.5 mm	55 -90	70-100	55-75	50-80	55-90	75-100
9.50 mm	35-65	50-80	-	-	35-65	55-75
4.75 mm	25 - 55	40-65	10-30	15-35	25-50	30-55
2.36 mm	20- 40	30-50	-	-	10-20	10-25
0.85 mm	-	-	-	-	2-10	-
0.425 mm	10-15	10- 15	-	-	0-5	0-8
0.075 mm	<5	< 5	< 5	< 5	-	0-3

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SPREADING AND COMACTING- The sub-base material of the grading specified in the Contract and water shall be mixed mechanically by a suitable mixer equipped with provision for controlled addition of water and mechanical mixing. Moisture content of the mix shall be checked in accordance with IS:2720 (Part 2) and suitably adjusted so that, at the time of compaction, it is from 1 to 2 percent below the optimum moisture content. The speed of the roller shall not exceed 5 km

per hour.

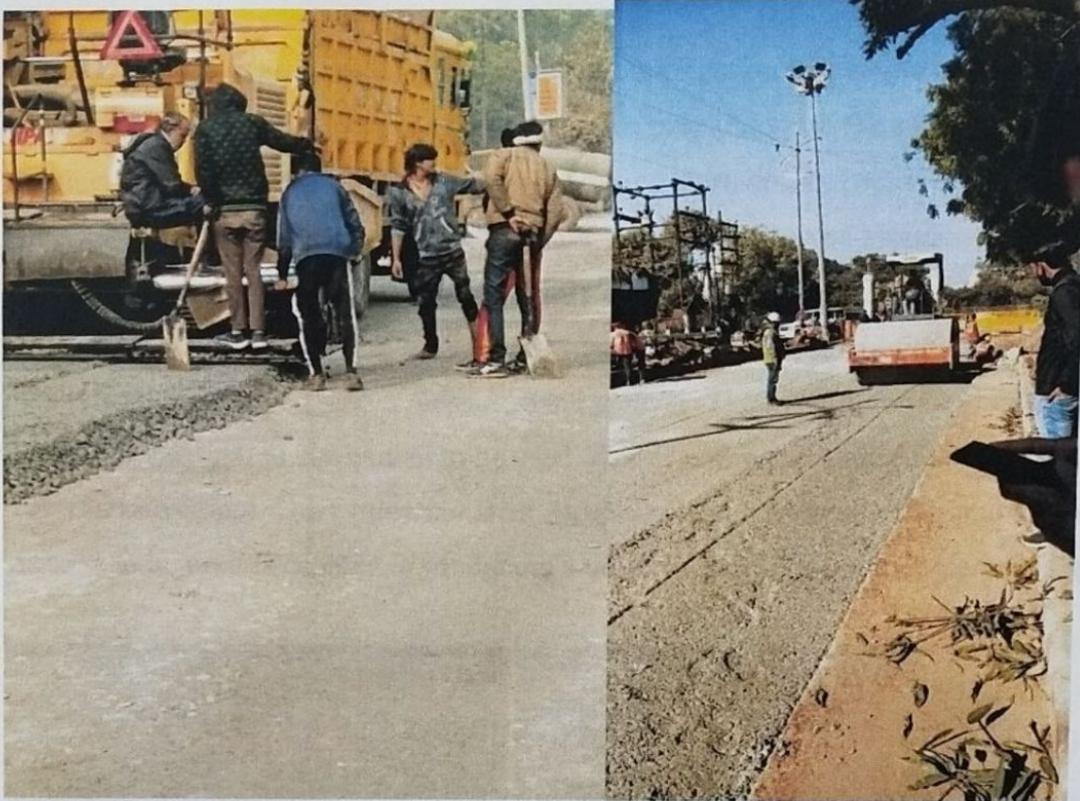
Rolling shall be continued till the density achieved is at least 98 percent of the maximum dry density for the material determined as per IS:2720 (Part 8). Immediately after spreading the mix, rolling shall be done by an approved roller. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 100 kN weight may be used. For a compacted single layer upto 202 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 kN static weight capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional crossfall or on super elevation. For carriageway having crossfall on both sides, rolling shall commence at the edges and progress towards the crown.



WET MIX MACADAM- This work shall consist of laying and compacting clean, crushed, graded aggregate and

granular material, premixed with water, to a dense mass on a prepared sub-grade/sub-base/ base or existing pavement. The thickness of a single compacted Wet Mix Macadam layer shall not be less than 75 mm. When vibrating or other approved types of compacting equipment are used, the

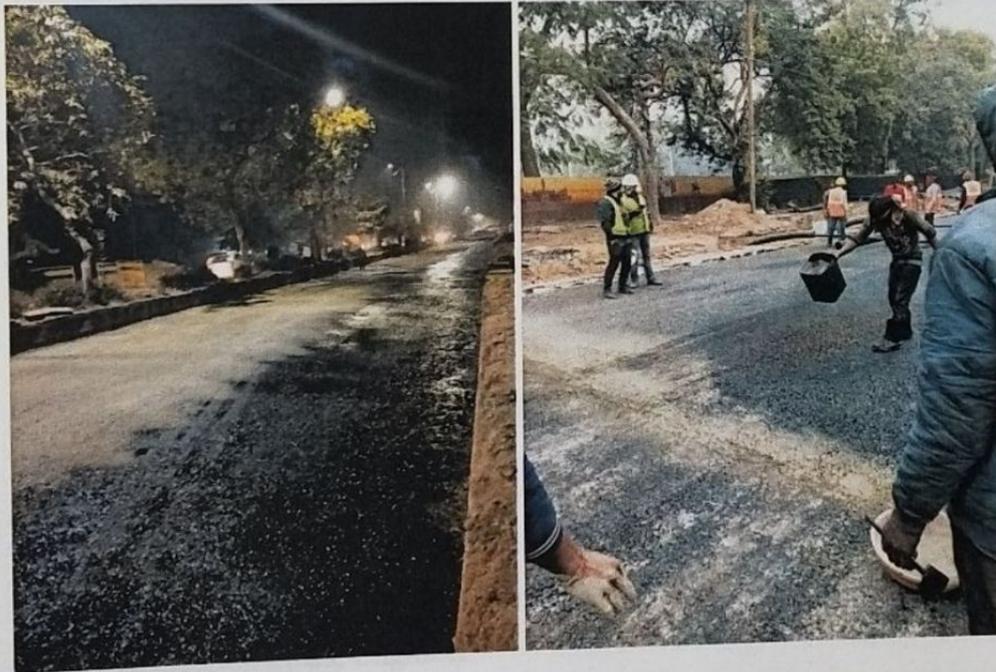
compacted depth of a single layer of the sub-base course may be upto 250 mm with the approval of the Engineer.



After the mix has been laid to the required thickness, grade and crossfall/camber the same shall be uniformly compacted to the full depth with suitable roller. If the thickness of single compacted layer does not exceed 100 mm, a smooth wheel roller of 80 to 100kN weight may be used. For a compacted single layer upto 250 mm, the compaction shall be done with the help of vibratory roller

of minimum static weight of 80 to 100 KN with an arrangement for adjusting the frequency and amplitude. An appropriate frequency and amplitude may be selected. The speed of the roller shall not exceed 5 km/h.

PRIME COAT- This work shall consist of the application of a single coat of low viscosity liquid bituminous material to a porous granular surface preparatory to the superimposition of bituminous treatment or mix. The work shall be carried out on a previously prepared granular/ stabilized surface. The primer shall be applied by a self-propelled or towed bitumen pressure sprayer equipped for spraying the material uniformly at specified rates and temperatures. Hand spraying shall not be allowed except in small areas, inaccessible to the distributor, or in narrow strips where primer shall be sprayed with a pressure hand sprayer. The method for application of the primer will depend on the type of equipment to be used, size of nozzles, pressure at the spray bar and speed of forward movement. The Contractor shall demonstrate at a spraying trial, that the equipment and method to be used is capable of producing a uniform spray, within the tolerances specified.





A primed surface shall be allowed to cure for at least 24 hours or such other higher period as is found to be necessary to allow all the moisture/volatiles to evaporate before any subsequent surface treatment or mix is laid.

Table 500-3 : Quantity of Bitumen Emulsion for Various Types of Granular Surfaces

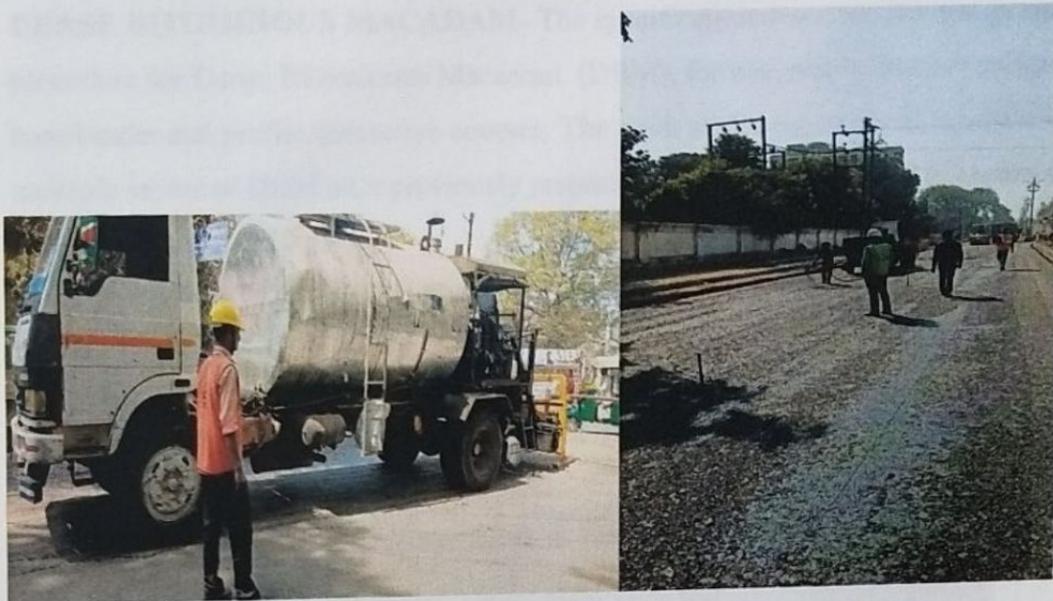
Type of Surface	Rate of Spray (kg/sq.m)
WMM/WBM	0.7-1.0
Stabilized soil bases/Crusher Run Macadam	0.9-1.2

Where the material on which the dense bituminous macadam is to be laid is other than a bitumen bound layer, a prime coat shall be applied, as specified, in accordance with the provisions of Clause 502, or as directed by the Engineer.

TACK COAT- The work shall consist of the application of a single coat of low viscosity liquid bituminous material to existing bituminous, cement concrete or primed granular surface preparatory to the superimposition of a bituminous mix, when specified in the Contract or as instructed by the Engineer. The work shall be carried out on a previously prepared surface

The tack coat shall be applied by a self-propelled or towed bitumen pressure sprayer, equipped. for

spraying the material uniformly at a specified rate. The surface on which the tack coat is to be applied shall be clean and free from dust, dirt, and any extraneous material, and be otherwise prepared in accordance with the requirements of Clauses 501.8. The normal range of spraying temperature for a bituminous emulsion shall be 20°C to 70°C and for cutback, 50°C to 80°C.



Where the material on which the dense bituminous macadam is to be laid is either bitumen bound layer or primed granular layer, tack coat shall be applied, as specified, in accordance with the provisions of Clause 503, or as directed by the Engineer.

Table 500-5 : Rate of Application of Tack Coat

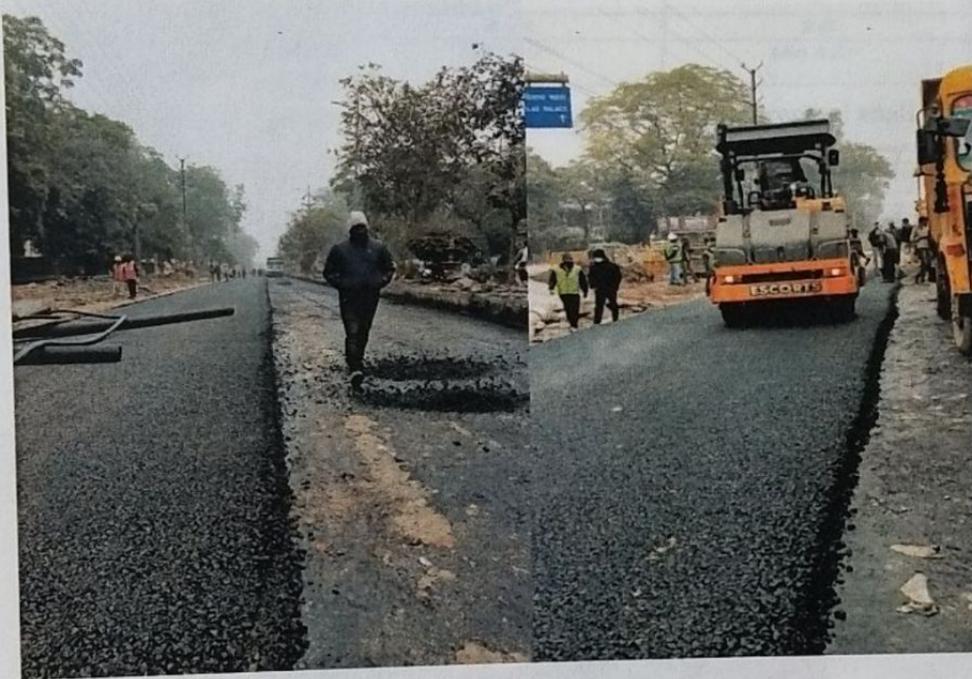
Type of Surface	Rate of Spray of Binder in Kg per sq. m
Bituminous surfaces	0.20 – 0.30
Granular surfaces treated with primer	0.25 – 0.30
Cement concrete pavement	0.30 – 0.35

A Tack coat over the base shall be applied in accordance with clause 503, or otherwise as directed by the engineer. Generally the initial or breakdown rolling shall be done with 8-10 tonne static weight smooth-wheeled rollers. The intermediate rolling shall be done with 8-10 tonne static weight or vibratory rollers or with a pneumatic tyred roller of 12-15 tonne weight having a tyre pressure of

at least 0.56 MPa. The finish rolling shall be done with 8-10 tonne deadweight smooth wheeled tandem rollers. The exact pattern of rolling shall be established at the laying trials.

2.5 Base Course

DENSE BITUMINOUS MACADAM- The specification describes the design and construction procedure for Dense Bituminous Macadam, (DBM), for use mainly, but not exclusively, in base/binder and profile corrective courses. The work shall consist of construction in a single or multiple layers of DBM on a previously prepared base or sub-base. The thickness of a single layer shall be 50 mm to 100 mm.



FILLER- Filter shall consist of finely divided mineral matter such as rock dust, hydrated lime or cement approved by the Engineer. The filler shall be free from organic impurities and have a

Table 500-10 : Composition of Dense Graded Bituminous Macadam

Grading	1	2
Nominal aggregate size*	37.5 mm	26.5 mm
Layer thickness	75 – 100 mm	50 – 75 mm
IS Sieve ¹ (mm)	Cumulative % by weight of total aggregate passing	
45	100	100
37.5	95 – 100	100
26.5	63-93	90-100
19	–	71-95
13.2	55-75	56-80
9.5	–	–
4.75	38-54	38-54
2.36	28-42	28-42
1.18	–	–
0.6	–	–
0.3	7 – 21	7 – 21
0.15	–	–
0.075	2 – 8	2-8
Bitumen content % by mass of total mix	Min 4.0**	Min 4.5**

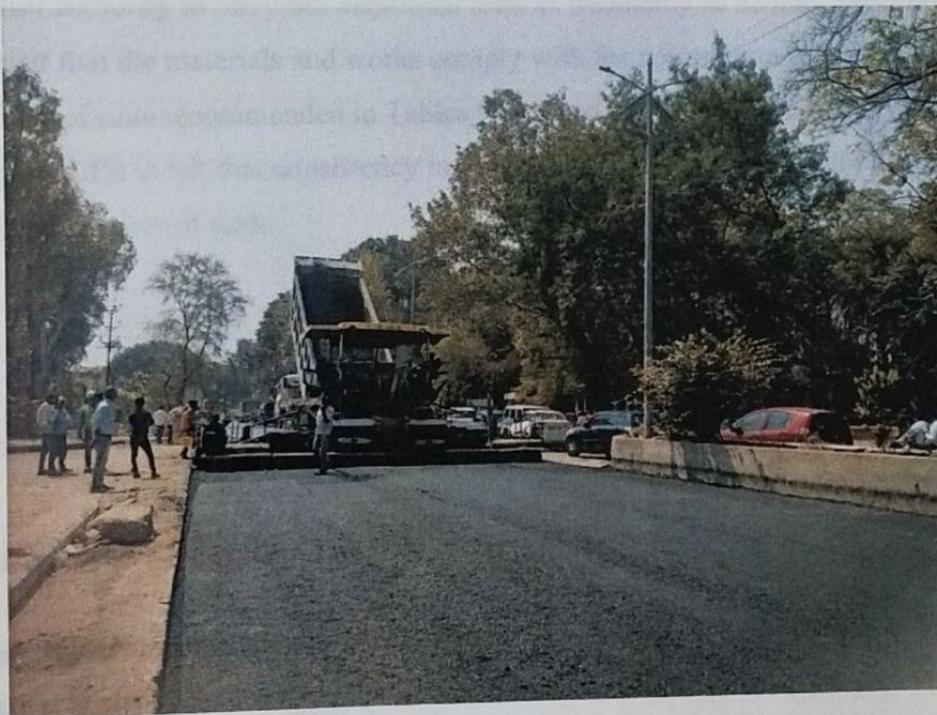
plasticity Index not greater than 4. The Plasticity Index requirement shall not apply if filler is cement or lime. Where the aggregates fail to meet the requirements of the water sensitivity test in Table 500-8, then 2 percent by total weight of aggregate, of hydrated lime shall be used and percentage of fine aggregate reduced accordingly.



Temperature of dbm in PLANT should be 140 celsius and on road it should be 90-120 celsius.



BITUMINUOS CONCRETE- This work shall consist of construction of Bituminous Concrete, for use in wearing and profile corrective courses. This work shall consist of construction in a single layer of bituminous concrete on a previously prepared bituminous bound surface. A single layer shall be 40 mm thick.



CHAPTER-3 TESTS

QUALITY CONTROL TEST DURING CONSTRUCTION- For ensuring the requisite quality of construction, the materials and works shall be subjected to quality control tests, as described

Table 500-16 : Physical Requirements for Coarse Aggregate for Bit. 205 / 903

Property	Test	Specification	Method of Test
Cleanliness (dust)	Grain size analysis	Max 5% passing 0.075 mm sieve	IS:2386 Part I
Particle shape	Combined Flakiness and Elongation Indices	Max 35%	IS:2386 Part I
Strength	Los Angeles Abrasion Value or Aggregate Impact Value	Max 30% Max 24%	IS:2386 Part IV
Durability	Soundness either: Sodium Sulphate or Magnesium Sulphate	Max 12% Max 18%	IS:2386 Part V
Polishing	Polished Stone Value	Min 55	BS:812-114
Water Absorption	Water Absorption	Max 2%	IS:2386 Part III
Stripping	Coating and Stripping of Bitumen Aggregate Mix	Minimum retained coating 95%	IS:6241
Water Sensitivity	Retained Tensile Strength*	Min 80%	AASHTO 283

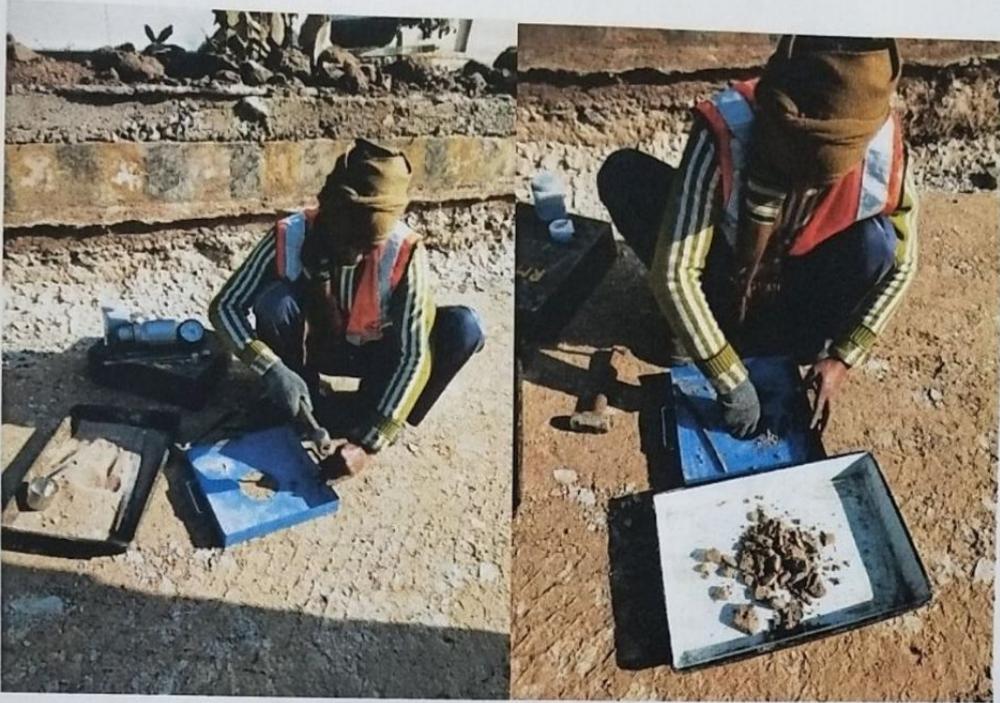
* If the minimum retained tensile test strength falls below 80 percent, use of anti stripping agent is recommended to meet the requirement.

hereinafter. The testing frequencies set forth are the desirable minimum and the Engineer shall have the full authority to carry out additional tests as frequently as he may deem necessary, to satisfy himself that the materials and works comply with the appropriate specifications. However, the number of tests recommended in Tables 900-3 and 900-4 may be reduced at the discretion of the Engineer if it is felt that consistency in the quality of materials can still be maintained with the reduced number of tests.

Field dry density test (fdd) has been performed at Mahal Road at chainage of 55

SAND REPLACEMENT METHOD

Sand Replacement Method is performed calculate field density or specific gravity of the soil and this test is also called as Sand Cone Method. In this test we dig out soil in this cylinder and measure the weight of the soil and then fill the sand in it and find the volume and as mass and volume is known to us we can calculate the density of the soil which is the ratio of mass to volume.



RAPID MOISTURE METER TEST:

This test is performed to find the water content of the soil. In this test we mix the calcium carbide in soil and heat the sample and moisture meter measures the water evaporated.



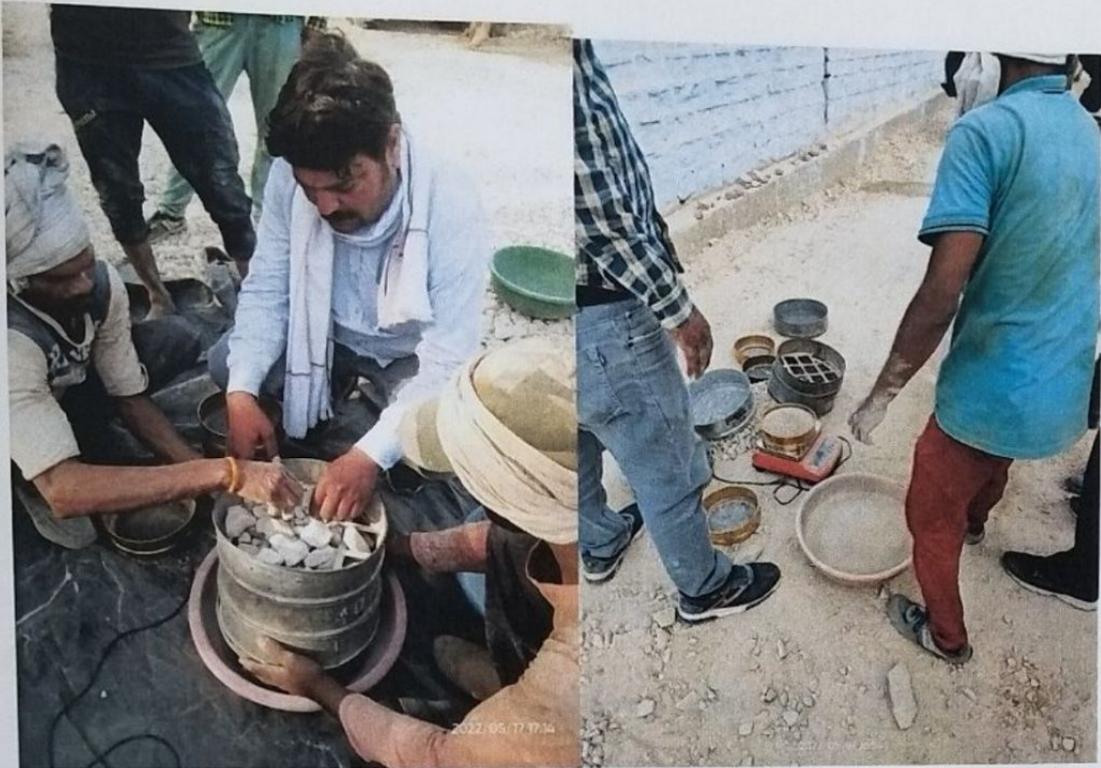
Table 900-3 : Control Tests and their Minimum Frequency for Sub-Bases and Bases
(Excluding Bitumen Bound Bases)

S. No.	Type of Construction	Test	Frequency (min.)
1)	Granular	i) Gradation ii) Atterberg limits iii) Moisture content prior to compaction iv) Density of compacted layer v) Deleterious constituents vi) CBR	One test per 400 cu.m One test per 400 cu.m One test per 400 cu.m One test per 1000 sq.m As required As required
2)	Lime/Cement Stabilised Soil Sub-base	i) Quality of lime/ cement ii) Lime/Cement content iii) Degree of pulverization iv) CBR or Unconfined Compressive Strength test on a set of 3 specimens v) Moisture content prior to compaction vi) Density of compacted layer vii) Deleterious constituents	One test for each consignment subject to a minimum of one test per 5 tonnes Regularly, through procedural checks Periodically as considered necessary As required One set of two tests per 500 sq.m One set of two tests per 500 sq.m As required
3)	Water Bound Macadam	i) Aggregate Impact Value ii) Grading of aggregate iii) Combined Flakiness and Elongation Indices iv) Atterberg limits of binding material v) Atterberg limits of screenings	One test per 1000 cu.m of aggregate One test per 250 cu.m One test per 500 cu.m of aggregate One test per 50 cu.m of binding material One test per 100 cu.m of aggregate
4)	Wet Mix Macadam	i) Aggregate Impact Value ii) Grading of aggregate iii) Combined Flakiness and Elongation Indices iv) Atterberg limits of portion of aggregate passing 425 micron sieve v) Density of compacted layer	One test per 1000 cu.m of aggregate One test per 200 cu.m of aggregate One test per 500 cu.m of aggregate One test per 200 cu.m of aggregate One set of three tests per 1000 sq.m

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SIEVE ANALYSIS TEST:

This test is performed to find the grading of aggregates and check the uniformity in aggregate and also find the weight of the different size and percentage of the aggregates. This information is used to classify the soil and to predict its behaviour.



SL NO: 000

SIEVE ANALYSIS REPORT FOR GRANULAR SUB BASE [As per MoSRT & H]

Laboratory Job No.	LE20M109	Date Of Sample	21.02.2022
Type of Material	GSB GRADE	Sampled By	L4T4 PDMC
Source	BILOVA	Date of Testing	21.02.2022
Location	Amkhoroad I.	Tested By	L4T4 PDMC
Proposed Use	RCC PIPE Crossing work usom	Testing Method	Dry sieve Analysis

11220 grams Total Weight of sample

Sieve size	Wt. Retained (gm)	% wt. Retained (gm)	Cum. % Retained	Cum. % Passing	% Passing as per Specification MoRT&H			Remarks
					Grading 1	Grading 2	Grading 3	
53.00 MM	0	0	0	100	80-100	100	100	GSB is As per MoRTH limits Grading
26.5 MM	1065	9.49	9.49	90.51	65-90	70-100	55-75	
9.5 MM	3215	28.65	38.15	61.85	35-65	50-80	-	
4.75 MM	1925	17.16	55.30	44.70	25-55	40-65	10-30	
2.36 MM	1162	10.36	65.66	34.34	20-40	30-50	-	
425 MIC	2225	19.83	85.49	14.51	10-15	10-15	-	
75 MIC	1325	11.81	97.30	2.70	0-5	0-5	0-5	
Pan wt.	303							
Total wt.	11220							

CHAPTER-4 FOOTPATH & FOUNTAIN

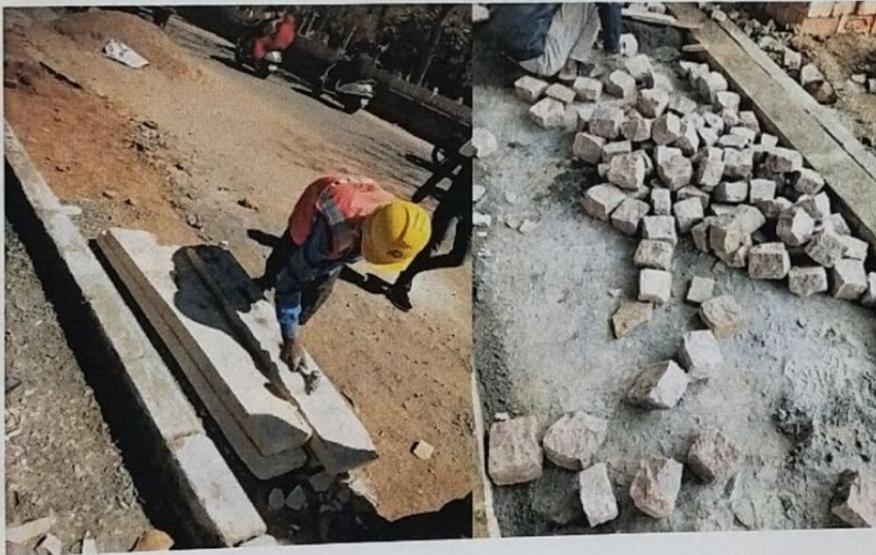
FOOTPATH WORK- The footpaths and separators shall be constructed with any of the following types:

- a) Cast-in-situ cement concrete of Grade M 20 as per Section 1700 of the Specifications. The minimum size of the panels shall be as specified in the drawings.
- b) Precast cement concrete blocks and interlocking blocks/tiles of grade not less than M 30 as per Section 1700 of the Specifications. The thickness and size of the cement concrete blocks or interlocking blocks/ tiles shall be as specified in the drawings.

Two coloured cobble stone used here. Cobble stone dimensions – 100*100*75

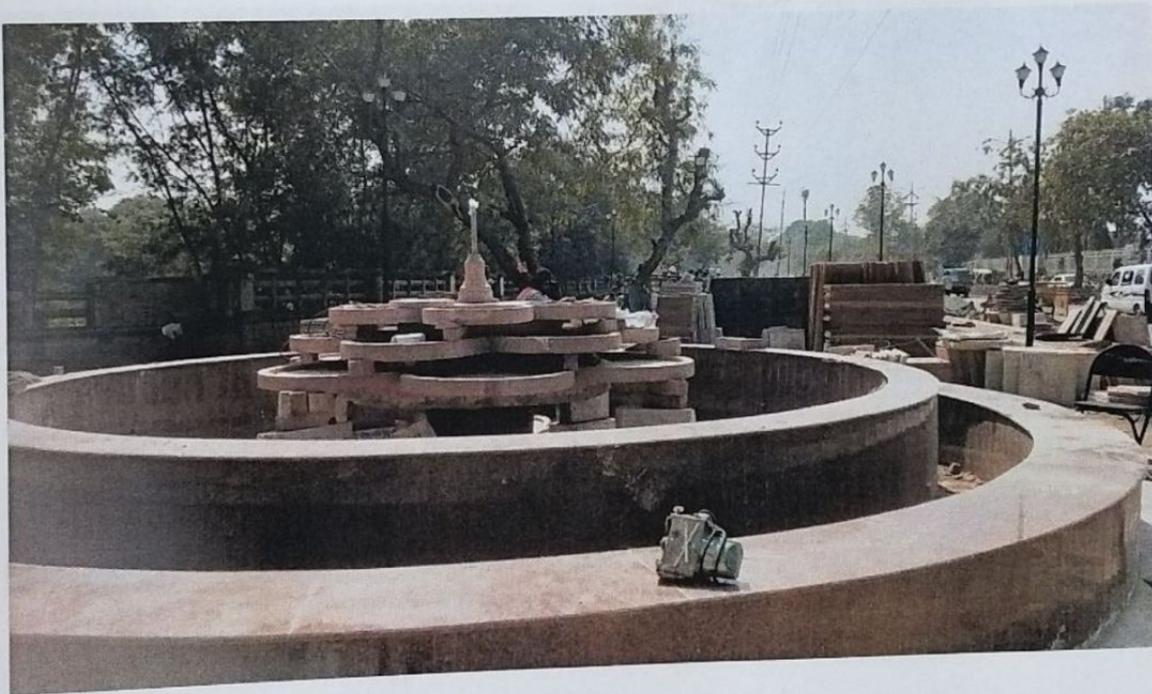
Precast slab-1.5m

Curved stone- 300*100





FOUNTAIN WORK-

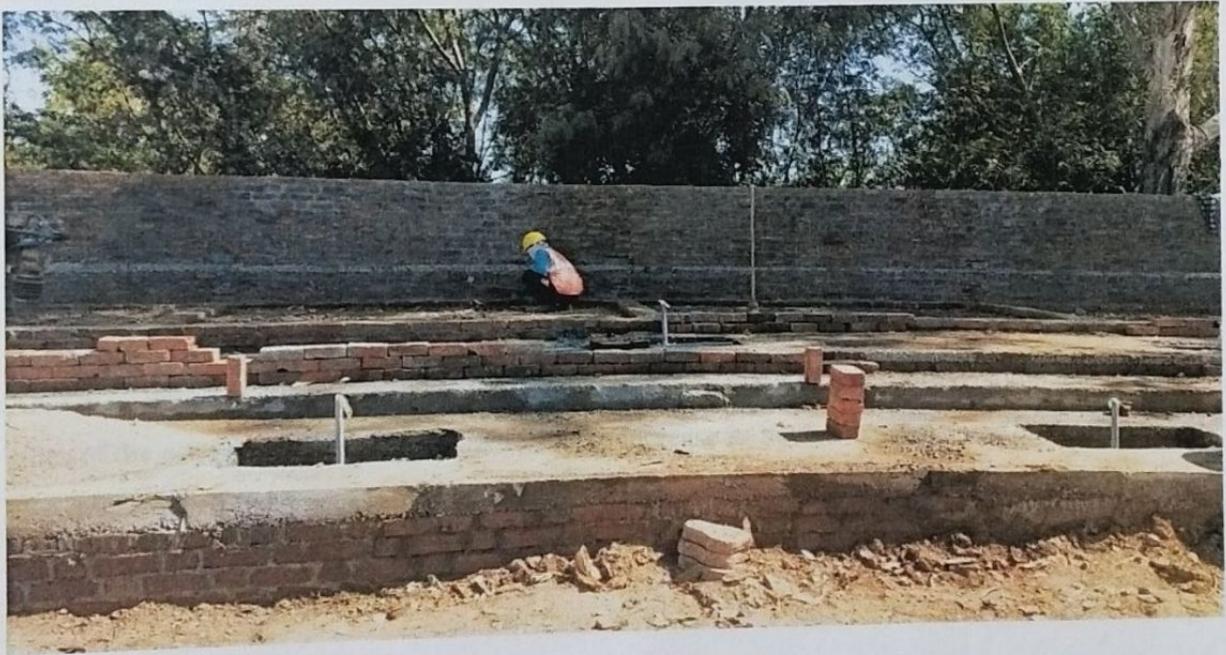


It is four lane divided road construction in which underground drainage system in one side and cable power duct system on another side is also provided along with footpath on both side of the road.

To improve its aesthetic value selfie point in front of katora taal is also constructed and fountain system is also provided to make the good appearance in night hours.



Fig. 1.12: View of the construction site showing the layout of the rebar and tiles on the prepared surface. The construction is for a road or pavement. Each of the road sections are for a width of 10m and 15m respectively.



CONCLUSION

It can be concluded that the most of the activities of a country will be stopped without transportation and road transportation is one of the main mode of transportation. Road condition of a nation describes the development of that nation because the road condition also affects the economy of the nations. If road conditions are well and good, the transportation cost of the goods will be less therefore it also reduces the inflation in the nation. But bad conditions of road or unplanned road can be a reason of inflation.

There are various types of roads according to their utility or purposes such as the expressways, national highways, state highways, MDR, ODR, village roads and urban roads. Each of the road construction are for different purposes hence construction of each road has some differences in their design criteria.

We worked on road which is a urban road hence it should be designed such that it fulfils multi task such as the electric power ducts are provided for the cables of electricity and fibres, underground sewer drainage system must be there because the drains nearby road prevails unsanitary conditions and also decreases the aesthetic value of road.

As it is an urban road so obviously pedestrian moment also will be very high so footpaths on both sides of the carriageway are also designed and to increase its aesthetic value some extra efforts are also done such as the fountain system, selfie point etc

REFERENCES- 1) MORTH BOOK

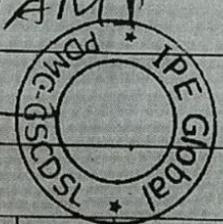
2) <https://fdocuments.in/document/re-development-of-katora-tal-2017-12-29-to-implement-smart-city-projects-in-gwalior.html?page=11>

3) https://www.google.com/search?q=smart+city+GWALIOR+project+KATORA+TAL&ei=VCeFYr6hMMigmAWMoafgDQ&ved=0ahUKEwi-m5abxOn3AhVIEKYKHYZQCdwQ4dUDCA4&uact=5&oq=smart+city+GWALIOR+project+KATORA+TAL&gs_lcp=Cgdnd3Mtd2l6EAMyBQghEKABMgUIIRCgATIFCCEQoAEyBQghEKABOgQIABBHOgYIABAWEB5KBAhBGABKBAhGGABQxAVYuDlGxDxoAHACeACAAZ4CiAGAB5IBBTauMi4ymAEAoAEBYAEIwAEB&sclient=gws-wiz

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FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

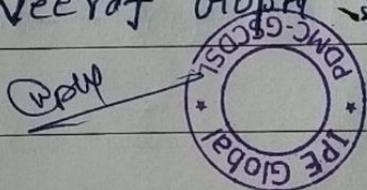
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Industry/Organization	bwalior smart city		Date/Duration	12/01/22 - 15/02/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work			✓		
Comment on nature of work done/Area/Topic	Interns with IPE Global, Gwalior in Gwalior smart city project worked in road work, under ground utilities work, footpath work - with contractor L&T Ltd.				
<u>OVERALL GRADE (An% one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	KANCHAN GOSWAMI				
<u>Signature of Industry Mentor</u>	Kanchan Goswami				



Receiving Date	27/05/22	Name of Faculty Mentor	Arachana Triwari	Sign	
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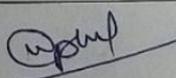
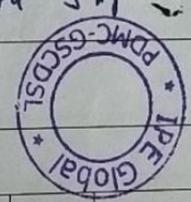
FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

Name of student	AMISHA MUJALDA		Department	Civil	
Industry/Organization	SMART CITY (Gwalior)		Date/Duration	DD/MM/YR -DD/MM/YR 17-2-22 - 28-2-22	
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	Internship with I.P.E Global, Gwalior in Smart City Project worked in Road work, underground utility work, footpath work. with Construction LAP. LTD				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	Er. Neeraj Gupta Sir				
<u>Signature of Industry Mentor</u>					

Receiving Date	xxxx	Name of Faculty Mentor	Prof. Archana Tiwari	Sign	
27/05/22					

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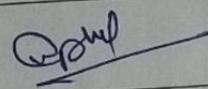
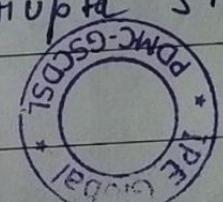
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Name of student	ANISHA MUTALDA		Department	Civil	
Industry/Organization	SMART CITY (GURGAON)		Date/Duration	DD/MM/YR - DD/MM/YR 01/03/22 - 16/03/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work					✓
Sincerity/Hard work			✓		
Comment on nature of work done/Area/Topic	<p style="font-size: 1.2em;">Construction of Storm Water Drainage Power Duct for underground Electric Cables, Const. of Road.</p>				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	Er. Neeraj Gupta Sir				
<u>Signature of Industry Mentor</u>	 				

Receiving Date	XXXX	Name of Faculty Mentor	Prof. Ashwani Tiwari	Sign	
27/05/22					

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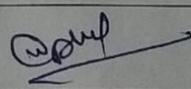
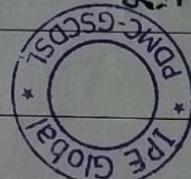
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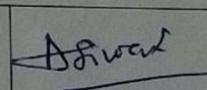
Name of student	AMISHA MUJALDA		Department	Civil	
Industry/Organization	SMART CITY GTWALIOR		Date/Duration	DD/MM/YR - DD/MM/YR 19/03/22 - 04/04/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge up gradation			✓		
Performance/Quality of work				✓	
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	Construction of Storm water Drainage, Power Duct for underground Elect Cables, Const. of Road.				
OVERALL GRADE (Any one)	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
Name of Industry Mentor	Er. Neeraj Gupta Sir.				
Signature of Industry Mentor	 				

Receiving Date	XXXX	Name of Faculty Mentor	Prof. Archana Tiwari	Sign	
27-05-22					

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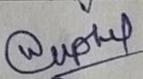
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Name of student	AMISHA MUJALDA		Department	Civil	
Industry/Organization	SMART CITY (BHWALDA)		Date/Duration	DD/MM/YR - DD/MM/YR 05/04/22 - 20/04/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work			✓		
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	Construction of Road, Power Duct and Storm Water Drainage. L&T.				
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT				
<u>Name of Industry Mentor</u>	Er. Neeraj Gupta Sir				
<u>Signature of Industry Mentor</u>	 				

Receiving Date	xxxx	Name of Faculty Mentor	Archara Tiwari	Sign	
27/05/2022					

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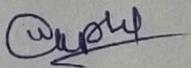
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Name of student	AMISHA MUJALDA		Department	Civil	
Industry/Organization	Smart City (revival)		Date/Duration	DD/MM/YR - DD/MM/YR 21/04/22 - 05/05/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	Construction of Road, Power duct and storm water drainage L&T.				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	Er. Neeraj Gupta				
<u>Signature of Industry Mentor</u>	 				

Receiving Date	xxxx	Name of Faculty Mentor		Sign	
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FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

Name of student	AMI SHAMUJALDA		Department	Civil	
Industry/Organization	Smart City (Bhubaneswar)		Date/Duration	DD/MM/YR - DD/MM/YR 06/05/22 - 23/05/22	
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	Construction of Road, Power duct and storm water Drainage etc.				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	Ex. Neeraj Gupta				
<u>Signature of Industry Mentor</u>					

Receiving Date	xxxx	Name of Faculty Mentor	Sign
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