



# भारतीय राष्ट्रीय राजमार्ग प्राधिकरण

(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)

## NATIONAL HIGHWAYS AUTHORITY OF INDIA

(Ministry of Road Transport and Highways, Govt. of India)

### क्षेत्रीय कार्यालय \ REGIONAL OFFICE

ई-2/167, अरेरा कॉलोनी, हबीबगंज रेल्वे स्टेशन के पास, भोपाल (म.प्र.) 462 016

E-2/167, Arera Colony, Near Habibganj Railway Station, Bhopal (M.P.)-462 016

दूरभाष/Phone : 0755-2426638, फैक्स/Fax : 0755-2426698, ई-मेल/E-mail : robhopal@nhai.org



सत्यमेव जयते



भारतमाला  
प्रगति के पथ पर अग्रसर  
BHARATMALA  
ROAD TO PROSPERITY

NHAI/RO-MP/JBP/MP-Jal Nigam/2022/46313

Date: 04.04.2022

### Invitation of Public Comments

**Sub.:-** Permission for laying pipeline along the NH-34 (Tilwara to Lakhnadon) and crossing at various places –Payli MVRWSS.- – Regarding permission for Pipe lying along National Highway from Tilwara to Lakhnadon.

- Ref. :-**
1. PD, PIU-Jabalpur letter no. 18928 dated 08.03.2022
  2. RO letter no. 45481 dated 10.01.2022
  3. PD, PIU-Jabalpur letter no. NHAI/PIU-JBP/MP-Jal Nigam/2021/18429 dated 23.12.2021


The Project Director, PIU-Jabalpur NHAI vide their letter dated 08.03.2022 & 23.12.2021 has submitted the Proposal for Permission for laying pipeline along the NH-34 (Tilwara to Lakhnadon) and crossing at various places.

2. As per Ministry vide OM No. RW/NH-33044/29/2015/S&R (R) dated 22.11.2016, the Highways Administrator will make available the proposal seeking permission for utility laying for public comments for **30 days** on ground of public interest.

3. In view of the above the comments of public are invited on captioned proposal (copy of application is enclosed) and the same should reach to below mentioned address till **03.05.2022** beyond which no comments will be considered.

The Highway Administrator  
O/o Regional Officer,  
National Highways Authority of India  
E-2/167, Arera Colony,  
Near Rani Kamlapati Railway Station,  
Bhopal (MP)-462016  
E-mail ID:robhopal@nhai.org

4. This issues with the approval of Highways Administrator Cum Regional Officer, NHAI, Bhopal (MP).

  
(Anand Prasad)  
Manager (T)

### Copy to:

- (i) Web-Admin, [nhai.org@gmail.com](mailto:nhai.org@gmail.com), NHAI-HQ for uploading on NHAI website.
- (ii) The Senior Technical Director, NIC, Transport Bhawan, New Delhi-110001 for uploading on Ministry's Website.
- (iii) The Project Director, PIU-Jabalpur (MP) for information please.



## Methodology for laying of pipes along the NH road

It is proposed to adopt the following methodology for laying of pipe line work for your necessary approval.

a) **Alignment**-The alignment of pipe line trench is drawn on the field, prior to laying of pipe as per approved drawing in such a way that it should cause minimum damage to the existing structures & services etc. and minimum trouble to the public.

b) **Depth**- Depth will be sufficient to provide a minimum cover of 1 m above the pipe. Where ever it is not possible to maintain such depth due to any unavoidable reasons, NHA will be duly informed and permission for any change will be taken prior to execution of work.

c) **Width**-The standard & recommended width of pipe trench used for pipe laying is equal to pipe dia plus 200 mm on either side.

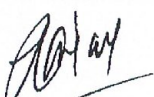
1) **Bedding**-If rock is found in excavation then bedding with selected fine earth/soft soil/sand /morrum/stone dust of minimum 150 mm thickness will required below & above the pipe.

2) **Pipe Jointing**-DI pipes are jointed by push on method. The qualities of joints are checked, while performing hydraulic tests on laid pipes.

3) **Refilling-Compaction and Road restoration for water lines-**

Excavated pipe trench shall be refilled by the same excavated stuff in manually compacted layers. Top surface is compacted by manual compaction ramming /rolling to attain firm top surface is again restored to make it good after within 3 to 4 months after one rainy season as per the requirement.



  
General Manager  
M.P. Jal Nigam Maryadit  
Project Implementation Unit  
Jabalpur (M.P.)





## **Road restoration on top surface-**

### **i) In concrete Road Carriageway-**

- a) **Motorable Roads-** After compaction refilling by non-compressible soil the top riding surface is restored by providing & laying in position PCC M30 grade of suitable thickness as per the site condition.
- b) **Narrow streets / Pathways** — Permanent restoration of top surface shall be done after passing of minimum four months' period or one rainy season whichever is earlier, by scarping out minimum 100 mm thick top refilled material and then laying a fresh layer of M30 grade concrete of minimum 100mm thick over it to restore it permanently.

**Note** – Road/surface restoration will be done as per NHAi guidelines.

### **ii) In the Bitumen Road carriageway-**

- a) **Motorable Roads-** After compaction refilling by non-compressible soil the top layer is restored by providing & laying in position PCC M30 grade of suitable thickness as per the site requirement. Bitumen seal coat/ tack coat as per SOR of UADD may also be provided over the top concrete surface if so required for smooth riding surface of important roads.
- b) **Narrow streets / Pathways** — Permanent restoration of top surface shall be done after passing of minimum four months' period or one rainy season whichever is earlier, by scarping out minimum 100mm thick (or as decided by Engineer in Charge) top refilled material and then laying a fresh layer of M30 grade concrete of minimum 100mm thick over it to restore it permanently.

**Note** – Road/surface restoration will be done as per NHAi guidelines.

### **iii) In the WBM Road Carriages-**

- a) **Motorable Roads-** After compaction refilling by non-compressible soil the top riding surface is restored by constructing new WBM on damaged portion of existing WBM by using road compactors/vibratory roller's.
- b) After satisfactory settlement of backfilling excavated stuff, the top riding surface is restored only after passing 3 to 4 months or after one rainy season whichever is earlier by scraping suitable thickness refilled material and then constructing new WBM on damaged portion of existing WBM by road compactors/vibratory rollers.

**Note** – Road/surface restoration will be done as per NHAi guidelines.



*S. Hishar Singh*

*M.P. Jal Nigam Maryadit*  
General Manager  
M.P. Jal Nigam Maryadit  
Project Implementation Unit  
Jal Nigam, MP



### General Note for Refilling of Pipe trenches-

All the pipe trenches are refilled as early as possible. No pipe trench should have kept open more than maximum 24 Hour. After refilling immediately extra stuff available around the trench shall be cleaned & disposed at suitable place.

In conformity to the relevant contract condition; in general, to all cases, the compaction after refilling is done in such a way that there should be no settlement of top surface of pipe trenches so as avoid any inconvenience to the public. However, after passing out some time if signs of settlement is observed on the top surface soil/restored surfaces of pipe trench, the same shall be rectified immediately within 7 days.

**General Note for Road Restoration:** -Restoration of road way shall be done as early as possible to avoid inconvenience to the public. The testing for compressive strength/density shall be done exclusively for newly constructed road items only along with other mandatory tests. Major road which are maintained by PWD, MPWD & NHAI shall be restored as per the requirements / norms if they direct to do so or otherwise above methodology may be adopted for all roads.

- 1) **Hydraulic Testing** — Sectional hydraulic testing of laid pipes for the specified pressure given in the contract or shall be carried out without any leakage & seepage in any of part.
- 2) **Laboratory**—Lab shall be set up to carry out the tests required for the work. For pipe work; following tests in conformity to the condition of contract shall be carried out:
  - 1) Only hydraulic testing on desired pressure with pressure Gauges of Dial type.

### **For Road restoration work**

- 1) Compressive strength/density Test
- 2) All other desired test as per the requirement of work (relevant test as per restoration item)
- 3) **Air Valves**—Kinetic air valves shall be provided in all pumping mains to release the air at ever distance of maximum 750-meter C/C.
- 4) **Scour Valves**—Scour Valves of suitable size will be provided in Clear Water Feeder minimum at required places near Nalla Cross Section.
- 5) **Thrusts Blocks**—Thrust blocks are made up of M15 grade concrete. RCC Pedestals required to support the pipe are constructed of M25 grade of concrete.
- 6) **Valve Chambers**—Brick Masonry Valve Chambers shall be constructed in cement mortar 1:4.
- 7) **Safe Guards**—Adequate barricades, construction signs, torches red lanterns and guards, caution tape etc. as required, shall be placed and maintained around pipe trench alignment during laying of pipe works in such a way that it should not cause any injury to any third person or damage to the existing property.



*Babbar*

*10/1/24*  
General Manager  
M.P. Jal Nigam Maryadit  
Project Implementation Unit  
Jabalpur (M.P.)

*Sgt. H. K. Dhe*





Page: 1 of 7

© L&T Construction. All rights reserved

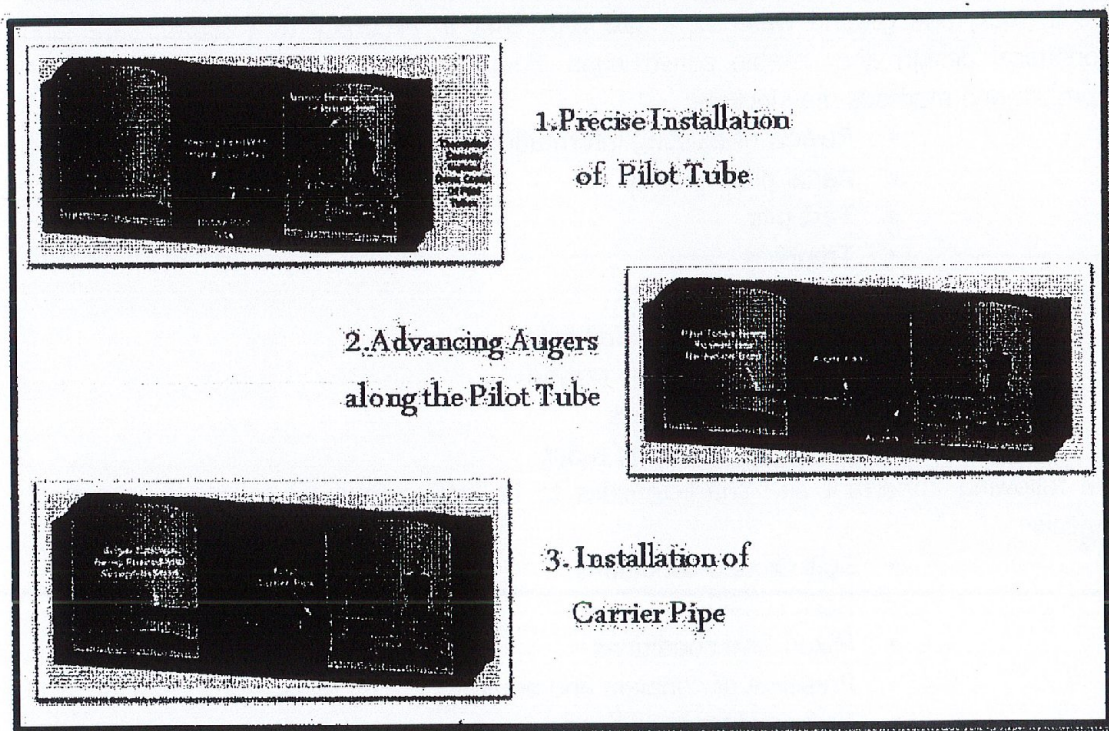




### 3. Types of Micro tunneling

#### 3.1 Pilot Tube Micro tunneling (PTMT) / (Auger Type Micro tunneling)

Pilot Tube Micro tunneling shall be defined as an alternate micro tunneling system for sizes 150mm through 600mm and larger nominal internal diameter pipe. This system is a two or three stage system, which allows both trenchless guided installations of house connection sewers as well as accurate direct jacking of mainline collection sewer pipes without use of casing a permanently installed casing. The Pilot Tube Micro tunneling boring machine uses a remote controlled, laser or theodolite guidance system to maintain specified line and grade, a jacking system is used for thrust and mechanical drive which creates torque to both the pilot tube and the augers used for spoil removal.



#### 3.2 Slurry Micro tunneling

Slurry Micro tunneling shall be defined as an alternate micro tunneling system for sizes 760mm through 2400mm and larger nominal internal diameter pipe. Slurry systems employ a cutter head in a tunnel machine that is sealed against any penetration by liquid or solids. Typically, a crusher chamber will texturize the excavated ground so that it can be carried away from the head of the machine through a sealed pumped slurry network. This delivers the spoil outside of the tunnel.





#### 4. Sequence of Operations:

- 4.1 Site Investigations
- 4.2 Design and Construction of Jacking and Receiver Shafts
- 4.3 Installation of Jacking Equipment/Machineries in Jacking Shafts
- 4.4 Tunneling Operations
- 4.5 Dismantling/Moving out the Machineries from Shafts

##### 4.1 Site Investigations:

- A detailed site investigations shall be made using any or combined approach or methods to determine the factual information about the distribution and engineering characteristics of soil, rock, and ground water at a site with enough accuracy that sound, safe, and economical design and reliable construction planning for the work are possible. The approach and methods may include:
  - Review of existing information
  - Aerial photography
  - Test pits
  - Trenches
  - Borings
  - Large-diameter drilled holes
  - Cone penetrometer testing
  - Geophysical surveys
  - Ground penetrating radar
- The following important site characteristics to be determined for all micro-tunneling projects:
  - Soft Ground conditions
  - Rock conditions
  - Mixed face conditions
  - Presence of cobbles and boulders
  - Groundwater conditions
  - Potential obstructions
  - Contaminated Groundwater or soil
  - Man-made and Environmentally sensitive features
- The potential impact these characteristics exert on construction and impacts construction may have on site features are summarized. The relative importance of individual characteristics will vary from project to project.
- The required mitigation plan and resources with respect to the outcomes of the investigation shall be planned well ahead and initiated.





#### **4.2 Design and Construction of Jacking and receiver shafts:**

- Design of the Shafts must satisfy the minimum requirements like the Size and Shape (Circular, Rectangular, Elliptical etc.,) that varies according to the type of tunneling equipment planned for the particular job.
- Both Surface conditions including Soil type and Ground water Table decides the method of construction of the shafts. For example, Trench Boxes may be feasible for small conventional tunneling through stiff clay above the water table.
- The shafts must be designed for the extreme combinations of the jacking pressures, all the surcharge loads due to the outside traffic, machineries & man movements, and Hydraulic pressure due to ground water & Slurry Blow Backs.
- Inadvertent effects caused by the vibrations of jacking machineries as well as outside traffic/machines must be taken care in the designs.
- The platform of the shaft should be able to accommodate the weights and vibrations from the jacking equipment.

##### **4.2.1 Safe Operating procedure for the construction of Shafts:**

- Before the construction of the shafts, one shall make sure of the presence active of underground utilities like electrical, telephone line, sewers etc., within the range of the excavation.
- Work must be commenced with proper work permit and all clearances required from the local authorities.
- Proper Traffic Management Procedures shall be adopted as to suit the requirements particular to the site
- All workmen shall be provided with minimum PPE, Proper ventilation shall be maintained inside the shaft
- The Working area shall be hard barricaded (Reflectorized) in order to protect fall of men, machinery and vehicles.
- Sufficient Illumination shall be ensured during the night time works.
- Sloping, Shoring or any suitable technique shall be adopted to prevent collapse of soil
- The removed soil shall be placed at a distance equal to the depth of shaft from the edge of the shaft.
- Regardless of the Surface and Water Table conditions the shafts must always be provided with watertight excavation supports to prevent BLOW BACK of the Pressurized Slurry.
- The walls and platform of the shaft shall be pressure grouted to protect it from water seepage and slope collapse if required.
- Proper access and egress arrangements shall be provided with ladders/winch mechanism whichever is suitable.
- The following precautionary measures to be implemented for Electrical systems:
  - DB should confirm to IP 55.
  - Ensure double earthing.
  - Power should be routed through RCCB of 30 mA.
  - All power cables should be laid either underground or above ground (above hand reach height).
  - Ensure use of industrial plugs & plug tops.
  - Ensure all electrical driven equipment should be disconnected during idle.
  - Ensure certified electrician should deal with electrical activities.
  - Ensure LOTO while working with electrical power driven equipment.
  - Ensure availability of suitable fire extinguishers near DG & DBs.

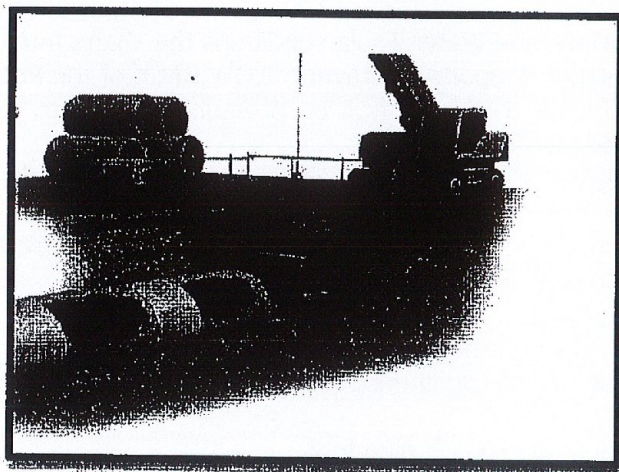




- All jacking shaft & receiving shaft after completion of construction to be well protected with suitable load bearing covers against falling of person, vehicle & materials.
- Ensure weekly inspection of shaft covers against any displacement, disorder, deformation or other defects.

#### **4.3 Installation of Jacking Equipment/Machineries and pipes in Jacking Shafts:**

- Before Jacking the Material Handling operations shall have the following precautionary measures:
  - Ensure Third party inspections for all lifting tools, tackles & lifting machines from competent person.
  - Ensure skilled riggers, licensed operators and signal man for materials handling into jacking and receiving shaft.
  - Ensure all workmen out of shaft during lowering or hoisting any materials from shaft.
  - Ensure PTW during lowering or hoisting any materials to both the shafts.
  - Daily inspection of lifting tools, tackles, wire ropes, gantry prior to start the job.
  - Avoid use of handmade lifting tools & tackles.
- Jacking equipment and other machineries can be installed by using cranes. The cranes shall be operated from at least equal to the depth of shaft away from the edge of the shaft if the depth is less than 6 m, and at a distance of minimum 6 m, if the depth is greater than 6 m.
- Trained person has to be deployed for signaling the crane operator and ensure that there is no movement of workmen within the swing area of the crane
- The exposed rotating parts of the crane shall be shielded and ensure that crane is equipped with back horn
- No workman is allowed to go inside shaft for guiding the crane operator for placing the machine/pipes, if it is necessary, the person shall be trained.
- The precautionary measures FRP Ladders, Cranes/hydra cranes/hydraulic lift trolley truck or tractors are to be dealt with banksman, Ensure de-energizing the power source while working underneath any live cable with PTW system.



Pipe Jacking





**L&T Construction, Water & Effluent Treatment IC**  
**SOP For Micro-Tunneling**



Document No: IM-09-A28

Revision No: 05

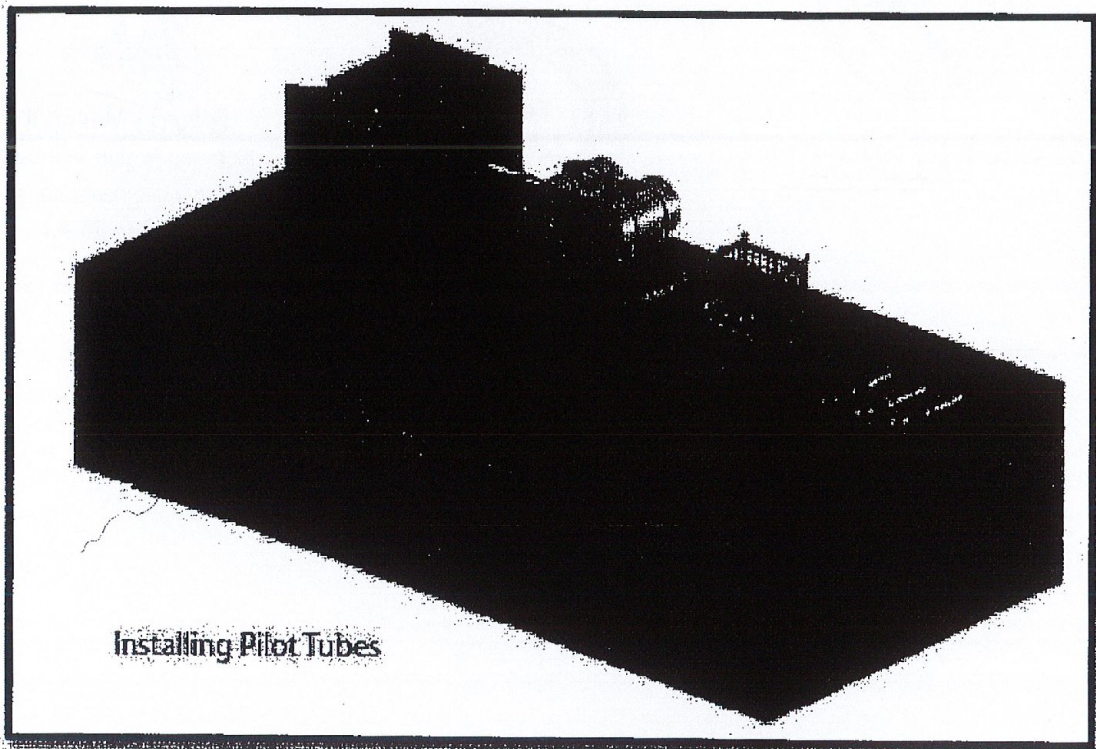
Date: 18/09/2018

Page: 6 of 7

- Noise protection equipment shall be provided to the workmen based on the noise levels during the jacking
- Air quality is to be maintained in the shaft during the operation, if required artificial breathing system shall be provided to the people working inside the shaft
- Suitable control measures shall be taken to protect the operators/workmen from the injuries caused by vibration and Heat effects as well (Deploying workmen in shift basis can one of the solutions)

#### **4.4 Tunneling Operations:**

- During the process of tunneling slurry is pumped out with a great pressure that shall be contained properly.
- The slurry pipe outlet shall be secured to a fixed support
- Safe procedure for handling and securing of the pipes shall be followed (ref.procedure-9)
- Grouting: It is done to fill the annular space between the outer surface of the pipe lines and the drilled hole. The following precautions must be taken to prevent hazardous effects due the grouting operation.
  - Only skilled and experienced personnel are deployed to this job, because of high risk level on mishandling.
  - PVC, Latex or rubber gloves shall be used for hand and wrist protection
  - Safety goggles shall be used for protection of eyes from high speed splatters from the nozzle
  - Breathing mask shall be used for protection against small sand particles/powder entering into our airways.



Installing Pilot Tubes

#### **4.5 Dismantling/Moving out the Machineries from Shafts:**





**L&T Construction, Water & Effluent Treatment IC**  
SOP For Micro-Tunneling



Document No: IM-09-A28

Revision No: 05

Date: 18/09/2018

Page: 7 of 7

All the machineries shall be taken out of the shaft with the help of cranes (Crane shall be operated from the previously specified distance) and shafts shall be closed and properly identified by using reflective stickers/tapes to avoid any fall of men/vehicles.

The previously mentioned precautionary measures such as PTW, Material Handling, electrical systems and others shall be applicable throughout the operations.

**Records**

Checklist for the Micro-Tunneling

IM-09-H31

Permit to Work at Height

IM-14-I

Vehicle & Earth moving Equipment  
Inspection Report

IM-09-H43

Checklist for Working on Roads

IM-09-H9

Equipment Fitness Report for vehicles &  
Earth Moving Equipment

IM-15-B

Confined Space Entry Permit  
Checklist for Bentonite Disposal

IM-14-A  
IM-09-H47

**Retention**

Till the end of the project

Till the end of the project

Till the end of project

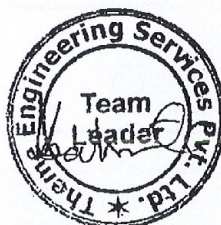
Till the end of project

Till the end of project

Till the end of project Till the  
end of project



*Satish B. She*



*[Signature]*  
**General Manager**  
M.P. Jal Nigam Maryedit  
Project Implementation Unit  
Jabalpur (M.P.)

"We are committed to achieve the "Zero Harm" across the sites of WET IC."