Environmental and Social Due Diligence Report

Project Number: 47083-004
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INDIA: Accelerating Infrastructure Investment Facility in India – Tranche 3

MEP Sanjose Kante Waked Road Private Limited (Part 3 of 3)

Prepared by India Infrastructure Finance Company Limited for the India Infrastructure Finance Company Limited and the Asian Development Bank.

c. The horizontal members of type I and II barricades may be of wooden planks, metal or other suitable material. These should be 300 mm wide and should be painted in alternate yellow and white stripes of 150 mm width. The stripes should slope away at an angle of 45° in the direction traffic is to pass. Where the barricades extend entirely across the carriageway, the stripes should slope downward towards the direction the traffic must turn in detour. Where both left and right turns are provided for, the chevron stripes should slope downward in both directions from the centre of the barricade. The entire area of chevrons should be reflectorised so as to be visible from safe distance. Type I or Type II barricades shall be used when traffic is redirected. These barricades can be used inter-changeably and are more useful in repair work that is generally initiated on emergency basis. The support should be of an "A" frame configuration or hinged or otherwise flattened at the top to permit convenient folding and stacking for transportation. Since these barricades are susceptible to overturning in wind, their stability can be improved through ballast.

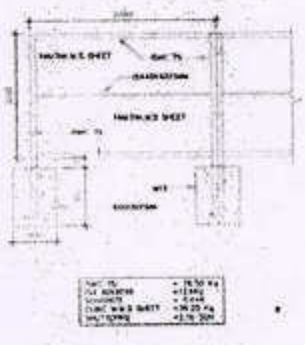
d. Type III barricades are the permanent type and can be made of wood, metal or other suitable material like masonry. These are erected at the point of closure when a road section is closed to traffic on construction projects. They may extend completely across a roadway and its shoulders or from Kerb to Kerb. Where provision must be made for the access of construction and supervision vehicles, type III barricades must be provided with a gate or moveable section that can be opened and/or closed as required. Signs such as "ROAD CLOSED" and "DETOUR ARROWS" should be erected on the fixed barricade.

e. Where the works are to be undertaken which will continue for some time or where the space is limited and there is a need for the protection of the work force, particularly where the speed of passing traffic may be high, purpose designed concrete or plastic barricades may be used. Their design is often similar to the cross section of a New Jersey Barrier or rectangular and they are some

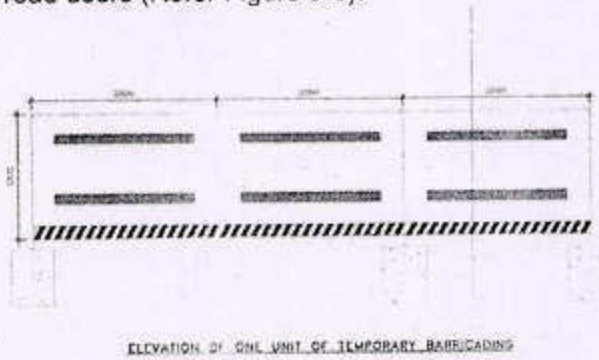
1.5 m to 2.0 m long with shaped ends that can be interlocked and connected. Plastic barricades available in trapezoidal shape of about 80 cm to 100 cm length can also be tried. Their use should be carefully controlled until more experience is gained with them but they offer advantages to the workforce in that the speed of impact will be much reduced should there be an accident and the workforce will feel more secure. They will enable narrower traffic lanes and buffer zones to be employed where space is a premium and vehicle speed likely to be

high.

f. Type IV Barricades are used where the work area has deep excavation which mustbe barricaded from moving traffic and other road users (Refer Figure 3-9).



DETAILS OF FIX BARRICADING BOARDS



ELEVATION OF ONE UNIT OF TEMPORARY BARRICADING

FIGURE 9: TYPE IV BARRICADE BOARDS

17.4 Roll Up Signs:

Roll up signs are used in construction work zones to guide the traffic and in road ways for emergency traffic control (Figure 3-27). Roll up signs shall be portable, changeable and shall have provisions for application on different objects depending on the need for temporary sign.

a. Mounting of the roll up sign on the portable stand

The roll.up sign shall have the back support ribs to fix on the portable stand and the roll up sign stand shall have knobs to receive the short rib of the sign fascia. The back support ribs shall be inserted in to the clamp provided on the stand and tightened using the knobs. The sign ribs shall be moved up and down to adjust the height of the sign.

b. Mounting of the roll up sign on construction or maintenance vehicles

The roll up signs shall have necessary attachments to mount it on the work zone maintenance vehicles. The back support ribs shall have dual lock high bonding tapes, mechanical fastening or snap fit clips or attached magnets. The receiving part of dual lock tape, clips or metallic attachment shall be pasted on the vehicle surface where the roll up sign needs to be mounted. The sign mounting mechanism shall with stand the weight and movement of the vehicle.

c. Mounting of the roll up sign on barricades

The roll up signs shall have necessary attachments to mount it on Barricades. The ribs at the back side of the signs shall have a dual lock high bonding tapes or a mechanical fastening system which can be removed and re applied multiple times. The receiving part of the tape of fastener shall be applied on the barricade. The locking portion of the tape or the fastener shall be permanently fixed on the ribs of the roll up signs.

The list of Road Safety Devices to be used during Construction is given below:

1. Traffic Cones and Chain
2. Drums
3. Barricades
4. Rumble Strips/Speed Retarders
5. Raised Pavement Marker (RPM)
6. Portable Variable Message Signs
7. Solar Delineators, Solar Studs & Solar Signs, etc.
8. Hand Flasher/Batons
9. Safety Vests/Jacket
10. Safety Helmets
11. Traffic Bollards
12. Spring Posts
13. Road Flashers
14. Barricading Tape/Plastic Mesh Fencing
15. Median Marker
16. Convex Mirror
17. Traffic Signs
18. Reflective Road/ Pavement Marking
19. Safety Shoes

18. Works on Footways - Alternative Way for Pedestrians

1. An alternative safe route for pedestrians must be provided if it is necessary to close a footway or part of a footway. Additional equipment may be required to do this. Pedestrian access to property must always be ensured. Temporary pedestrian ways should never be less than 1 m wide and, wherever possible, they should be 1.5 m or more in width.
2. It must be ensured that pedestrians are not diverted onto an unguarded carriageway. If the temporary footway is in the carriageway, the approach should be properly guarded and provided with signs. The lateral buffer safety clearance (S) of the safety zone must be on the traffic side of the pedestrian barriers. The signages and barricades should be in place before the footway is blocked.
3. Exceptionally, the use of the other footway may be acceptable in some quiet roads, but if this option is selected the alternative route must be safe to use, and the needs of children and of people with disabilities must be taken into account.

18.1 Pedestrian Safety

1. It should be ensured that there is no danger to pedestrians from falling objects or sharp edges and they will not fall over or bump into anything. Scaffolding be marked with white bands at eye level and allow at least 2.1 m head room.
2. Kerb ramps or raised footways should be provided to help blind, poorly sighted, elderly and disabled people and for those with prams or wheelchairs. Traffic calming devices like rumble strips and speed humps must be used near pedestrian crossing areas to ensure pedestrian safety.

18.2 Pedestrian Barriers

a. Pedestrian barriers should be used to mark out any temporary footway. A rigid barrier must always be used to protect pedestrians from traffic, excavations, plant or materials. Place road danger lamps at the end of the barriers at night. Portable pedestrian barriers, which may include mesh, should be reasonably rigid and have: - a hand rail fixed at between 1.0 m and 1.2 m above ground level, which should be reasonably smooth and rigid for pedestrians to hold to obtain guidance and some measure of support; - a visibility panel at least 150 mm deep which may be integral with the hand rail or if separate must be fixed so that its upper edge is a minimum of 0.9 m above ground level. Visibility panels of yellow, white or orange colors are best for detection by partially sighted people, while the red and white rail gives a good contrast and provides interchangeability with traffic barriers ; and - a tapping rail (for blind people with a white stick) of min depth 150 mm with a lower edge at ground level or up to a maximum height of 200 mm above the ground. b. Alternatively, when covers are to be removed from underground chambers or manholes and someone will always be there, a barrier with a handrail fixed no lower than 0.8m above ground level will be satisfactory. In this case the barrier must be large enough to enclose the opening and its cover.

18.3 Deep Excavations

If excavations are deeper than 1.2 m, stronger barricades will be required (Type IV).

18.4 Safety Zones

A safety zone is provided in the carriageway if the works are closer to the Kerb than the width of the Lateral Buffer Safety Clearance (S) as given in Table 4-2. Use the basic layout in Figure 3-29 to help with the approach signing and guarding of the safety zone.

Table 4-1: Size and Sitting Distance: Detail of Signs and Cones

Type of Road	Minimum and normal Maximum siting distance "D" of first sign in advance of transition zone (m)	Minimum clear visibility to first sign (m)	Minimum size of signs (mm)	Minimum height of cones (or equivalent delineator (mm)	Details of lead-in cone tapers (note 2)	Width of hazard (m) 1 2 3 4 5 6 7
All purpose single carriageway road, urban, restricted to 50 km/h or less	25 to 50	60	600	500	Length of Transition zone "T" (m) Minimum number of cones Minimum number of lamps at night	13 26 39 52 65 78 91 4 4 6 7 9 10 12 3 3 5 6 8 9 11
All purpose single carriageway road, restricted to 60 km/h or less	50 to 110	60	750	500	Length of transition zone "T" (m) Minimum number of cones Minimum number of lamps at night	20 40 60 80 100 120 140 4 6 8 10 13 15 17 3 5 7 9 12 14 16
All purpose divided carriageway road, restricted to 60 km/h or less	110 to 275	60	750	500	Length of transition zone "T" (m) Minimum number of cones Minimum number of lamps at night	25 50 75 100 125 150 175 4 7 10 13 15 18 21 3 6 9 12 14 17 20
All purpose single carriageway road, with speed limit 80 km/h or less	275 to 450	75	50	500	Length of transition zone "T" (m) Minimum number of cones Minimum number of lamps at night	25 50 75 100 125 150 175 4 7 10 13 15 18 21 3 6 9 12 14 17 20
All purpose divided carriageway road, with speed limit km/h 80 or more	725 to 1600	105	1200	750	Length of transition zone "T" (m) Minimum number of cones Minimum number of lamps at night	32 64 96 128 160 192 224 5 9 12 16 19 23 26 4 8 11 15 18 22 25

Table 4-2: Buffer Zone Safety Clearances

Speed restriction (km/h)	Minimum longitudinal buffer zone (L) (m)	Minimum lateral buffer zone (S) (m)
50 or less	5.0	0.5
60	15	0.5
80	30	1.2
100	60	1.2
120	120	1.2

18.5 Pedestrian Crossings

If the works are on or near formally marked pedestrian crossings, care must be taken to avoid confusing pedestrians. Clear guidance must be given as to where they are expected to cross while the works are ongoing.

18.6 Works at Junctions

The two-way traffic should be kept flowing past the works if possible. If this is not possible, a diversion route may be required and should be identified by the Road Authority. Men at Work signs with arrow plates will be required on the main route if the works are located on a side road. (Refer Figure 3-35) Figure 3-36 shows on or near the far side of a junction. At works like these the taper of cones should be taken up to the approach side of the junction but that any cones near the junction mouth help drivers turn left smoothly. Table 4-1 gives the dimensions D and T and Table 4-2 dimensions of the safety zone.

18.7 Works on Construction of Additional Carriageway

The improvement of existing 2-lane carriageway to 4/6 lane divided carriageway facility on National Highway is a major project activity. The planning of traffic and safety management should be carefully planned in advance before taking up the execution of the project, preferably with the advice of a .traffic expert. There could be two situations requiring different plan for traffic control.

18.7.1 The Central line of the road shifted (eccentric widening)

While constructing the additional carriageway, the centre line of new road/highway gets shifted to a new location. It would have two stages of construction:-

a) The new carriageway shall be constructed in the first stage, adjacent to the existing one and the shoulder in between would become part of the central median of the improved divided carriageway facility. The traffic would continue to ply in both directions on the existing carriageway and an approached diversion would be taken out of the works zone for the movement of construction and supervision vehicles. Figure 3-37 shows a typical layout of the signage system. The location of signs for 'works traffic' shall be governed by the location of base camp. The construction zone of new carriageway shall be properly barricaded either by reflectorised delineators or type III barricades or plastic barricades.

b) In the second stage of improvement, the strengthening of the existing carriageway shall be taken up and the traffic would be allowed on the newly constructed carriageway. This would involve crossing of the traffic from existing to the new carriageway. This would involve crossing of the traffic from existing to the new carriageway and then again from the new carriageway to old carriageway. Figure 3-38 shows the layout of signs and traffic control devices for this stage.

18.7.2 No shift in central line of the road (con-centricwidening)

This activity would be mostly required to be taken up in the stretches of the road/highway passing through built up portions where there may be constraints of land availability. At such locations service roads would also be necessarily constructed for the segregation of the local traffic.

Typically it would have three stages

1. Stage I shall be construction of service roads or diversion road and the traffic moving on the existing carriageway in both directions.
2. Stage II of the construction activity shall be strengthening of the existing carriageway and the construction of the median. The traffic shall move in one direction only on the service /diversion road constructed on both sides in stage I.
3. In stage III, the work zone shall be shifted to take up the co-centric widening to the adjacent stretch of the road/highway.

Table 4-5 : Signage Requirements

Speed Limit	Signage Requirements
50 Km/h	As shown in Figure 3-42 and Figure 3-43 except that distance plates may be omitted
60 Km/h	As shown in Figure 3-42 and Figure 3-43 80 Km/
80 Km/h or More	As shown in Figure 3-42 and Figure 3-43 but with an extra Lane closed to traffic sign added on each side of the carriageway to give the sequence of signs on the right of this page.

19. Expressway and High Speed Divided Carriageway Roads

An Expressway is a road intended for motorized traffic only where pedestrians, pedal cycles, 2/3 wheelers, small engine motor cycles (mopeds) and rickshaws are not allowed. If these categories are allowed, the road is described as a high speed divided carriageway. These carriageway facilities can have two, three or four lanes in each direction. Because of the high speed of the vehicles using these roads, extreme care has to be taken when road works are carried out. Stopping distances increase considerably with each 10 km/h increase in speed. Drivers therefore have to have very early warning of restrictions on the road, if accidents are to be avoided. Adequate traffic management measures are, therefore, of great importance to safety. If an accident happens on this type of highway, the consequences can be very serious indeed.

Many traffic management techniques are available for longer duration operation:

(i) Partial closure for work on the carriageway;
(ii) Partial closure for work on shoulders;
(iii) Detour on secondary network;
(iv) Detour on a temporary diversion; and
(v) Speed control

19.1 Four -lane divided carriageways-right lane closure

The basic layout for a four lane divided high speed road is similar to those shown in Figure 3-42 and Figure 3-48. Great care has to be taken in this situation. The traffic should be led into the left lane in good time to allow drivers time to merge into a single lane

19.2 Four -lane divided carriageways-left lane closure

If the left lane is closed, normally traffic should be merged to the left by using a guide before transferring into the right - hand lane(s). If two or more lanes have to be transferred to the right, the carriageway markings must be changed to make sure that the traffic lanes are continuous. The length of the guide island should be: - 50 m long for roads with 80 km / h or less speed limit; and 100 m long for roads with a 100 km/h or more speed limit. If merging traffic to the right at a left -hand lane closure is required this can be done when : - lane 1 of a six lane divided carriageway is being closed; or - there will be no more than about 60 vehicles per 3 minutes on each traffic lane which is left open (1200 vehicles/hour for each traffic lane open).

19.3 Four-lane divided carriageways - carriageway closure with diversion to opposite carriageway

On occasions it may be necessary to close-one carriageway completely over a distance for major carriageway repairs or resurfacing. This can only be done by using (or specially constructing) emergency crossing points through the median and diverting all the traffic in both directions onto a single lane in opposite directions on one carriageway. This does reduce capacity, and is likely to cause some delays for motorists. Table 4-1 gives the dimensions for D and T and the dimensions of the safety zone are given in Table 4-2.

20. Detours via Secondary Network

a. In the rural situations it may be possible to reduce traffic flows past the construction zone by diverting traffic to an existing alterhative route, thereby improving safety at the site. However, it is likely that this will be a road of lower category and it is also likely that the increase in traffic flows will bring about an increase of accidents on the alternative route. Residential roads in cities should, if possible, be avoided. It is, therefore, acceptable only with low traffic volumes. In such cases, it causes a lot of inconvenience to the users. Before diverting the traffic to any alternative route it must be ensured that traffic detours:

(i) Are compatible with additional traffic in terms of geometric and structural length. These should be improved to the extent possible to have safe and smooth flow of traffic;
(ii) Have efficient driver information and
(iii) Are clearly identifiable throughout.

b. The public in the area affected, and intending road users should be well informed through press and other mass media about the closure/partial closure of the road and the alternatives for through traffic.

c. Guidance regarding the diversion of traffic to the alternative route must be provided at the appropriate road intersections on either side of the section with the construction zone so that it is possible for the through traffic to divert. This must be done with suitable warning, regulatory and guide signs at appropriate locations to suit the site requirements. The warning sign of 'Men at Work' must be placed before the intersection, for approaching traffic, together with a supplementary plate stating 'ROAD AHEAD CLOSED' and with the distance to the hazard. There should also be a diversion sign, indicating the turn to be taken. Again it must be emphasized that once traffic is diverted onto the alternative route, all junctions along the route must be provided with signages until the original route is rejoined. If space to site new signs is limited, the use of a symbol is encouraged. The signs at the start of the diversion would state "for diversion follow symbol", which should then be

continued until the original route is rejoined. It is, of course, possible to use different signed routes for the different directions of flow to reduce problems along the alternative routes.

d. At the intersection where the diversion starts, and if the road is fully closed, the use of the permanent type barricade (Type III) is recommended. Suitable 'Chevron' signs and 'Diversion' sign should also be provided at this location for the guidance of the approaching traffic. A watchman should invariably be present at these barricades. A small opening should be provided, if need be, at the extreme edge of the carriageway, at this location. This should normally be kept closed with a double row of painted tar drums. These drums should be removed only for permitting the vehicle for construction and supervision, to pass each time and be put back in position immediately thereafter.

At night, lanterns with red light should be placed, at the drums for delineation. Suitable direction and destination signs should also be provided at appropriate locations for the guidance and smooth flow of traffic through the alternative route. The detour 'arrow' signs should also be used at sharp turns on the diversion. Alternative routes are more likely in urban areas and at confined sites it may be necessary to utilize the technique to permit the work to be undertaken at all. However, there are similar safety implications of diverting large volumes of traffic in choosing the alternative routes and in providing signages.

21. Temporary Diversions

Where the construction zone would close the road completely, the remaining carriageway space would be insufficient for the traffic and create large delays, and there is no suitable alternative route, it will be necessary to construct a temporary carriageway for all or part of the traffic. This is most common situation in the cases of any major or reconstruction of cross drainage works and of pavement failure due to, for example, floods.

The temporary carriageway must satisfy the following requirements:

i. It should have smooth horizontal and vertical profile with smooth vertical and horizontal and vertical profile with smooth vertical and horizontal curves.
ii. It should not get overtopped by flood or drainage discharges under any conditions
iii. It should have adequate capacity to cater to the expected traffic
iv. It should be dust free and shoulders ensure clear visibility at all times of day and night;
v. Barricading should be provided to prevent construction material falling on the diversion.

This requires that some of the existing work practices and procedures are changed or abolished. For example, any separate area for stockpiling of construction material on or very near carriageway will have to be discontinued. The present practice of exposing the workman to traffic while carrying out works in the centre of the carriageway must be discontinued.

22. Speed Control

In most cases, work on the existing road encroaches on the running lanes and shoulders and, therefore, causes a hindrance to the normal flow of traffic. In such situations the closing of lanes is a normal practice. Its consequences on the level of service, resulting delays and/or congestion should be first evaluated. Any alternative strategy (e.g. detour, etc.) should also be evaluated. However, in any traffic management at road works situation, traffic using lanes which are to be closed should have time and space for merging with traffic in the next parallel lane as well as to transfer to provisional or altered lanes or both. Normally this requires some reduction in speed, enough advance information to enable afe

merging, but it should be kept to a minimum if successful merging is to be achieved. The critical information for approaching drivers is as to which lane is blocked so that they can begin moving into the open lane(s) at an early stage. It is preferable to close first the fastest lane and not the slowest, even if the work zone occupies the latter. The reason for this is that slow moving commercial vehicles are more reluctant to give way than the more maneuverable cars which use the fast lane. In this method a reduction in speed is also more easily achieved. If the work zone occupies a centre lane of a multi -lane road, it is recommended to close the adjacent lane to avoid an 'island' situation. Speed Control should often extend through the work site and will depend on the volume of traffic and the width of the traffic lanes that it is feasible to permit. Traffic lanes can be reduced to 3.0 m where space is restricted and, if used by cars and light vehicles only may be reduced to 2.75 m with caution. The maximum length of a lane closure would depend upon the traffic volume and number of remaining lanes and normally it should not exceed 5 km where speed control is in operation. The co-operation of the local police should be sought to the introduction of a temporary but mandatory speed limit, lower than the existing speed limit on the approaches and through the working zone. This may be as low as 50 km/h even for high speed roads, where only one lane is available for traffic.

23. Alternatives for Different work zone Situations for Traffic Management

1. If Construction is going at intersection then its alternatives are
   a) Narrow lane and decrease the number of lanes
   b) Use of temporary by-pass
   c) Shoulder use for traffic diversion
   d) If work for short period then do the work

I. At night time
II. In weekend
III. Restriction for entry of heavy vehicles
IV. Provide rumble strips at the entry of construction zone
V. In work zone area, always communicate by speaker to reduce speed you are in construction area.

2. Work in the centre of two lane single carriageways
   (a) Narrow lane
   (b) If work for short period then do the work

(i) At night time
(ii) In weekend
(iii) Restriction for entry of heavy vehicles
   (c) Shoulder use for traffic diversion
   (d) Provide rumble strips at the entry of construction zone
   (e) In work zone area, always communicate by speaker to reduce speed you are in construction area.

3. Work on shoulder
   (a) Narrow lane and decrease the number of lanes
   (b) Paved median used for traffic movement
   (c) Both side of traffic movement on one side with road marking.
   (d) Stopping & starting at irregular interval, i.e., closure of road for short period
   (e) If work for short period then do the work

(i) At nighttime
(ii) In weekend
(iii) Restriction for entry of heavy vehicles
(f) Provide rumble strips at the entry of construction zone
(g) In work zone area, always communicate by speaker to reduce speed you are in construction area.
(h) Complete closure of shoulder use till construction period

4. Work at the side of single lane carriageway
(a) Narrow lane and decrease the no of lanes
(b) Use of temporary by-pass
(c) Shoulder use for traffic diversion
(d) Completely close the lane and divert the traffic to other side of road
(e) To make temporary structure for movement of traffic on right of ways.
(f) Provide rumble strips at the entry of construction zone
(g) In work zone area, always communicate by speaker to reduce speed you are in construction area.

5. When road is completely closed for long duration of construction
(a) To make temporary (for short duration) and paved shoulder (for long duration) for the traffic movement.
(b) With the help of traffic police, tell the drivers to use alternative route.

6. For flyover construction
(a) Narrow lane and decrease the no of lanes
(b) Use of precast materials
(c) Use of rapid curing materials
(d) Shoulder use for traffic diversion
(e) Provide rumble strips at the entry of construction zone

24. Traffic Management Plan (Drawing):-

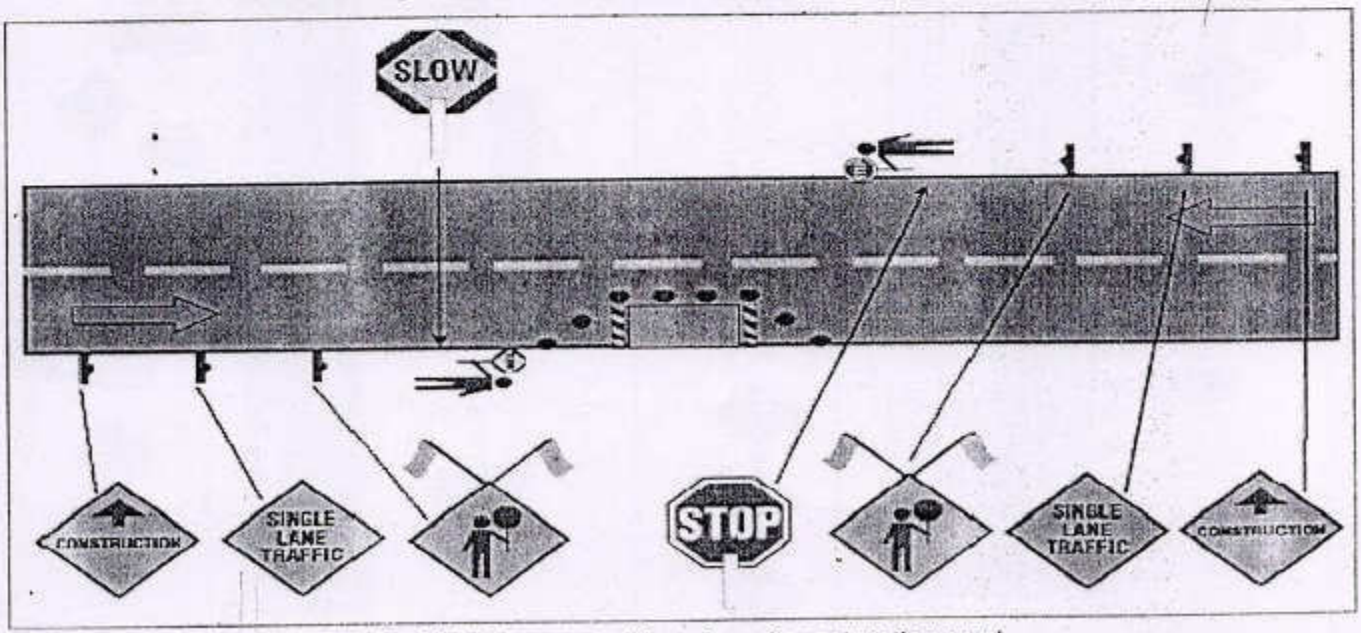


Fig 24.1- Temporary Diversion of construction road

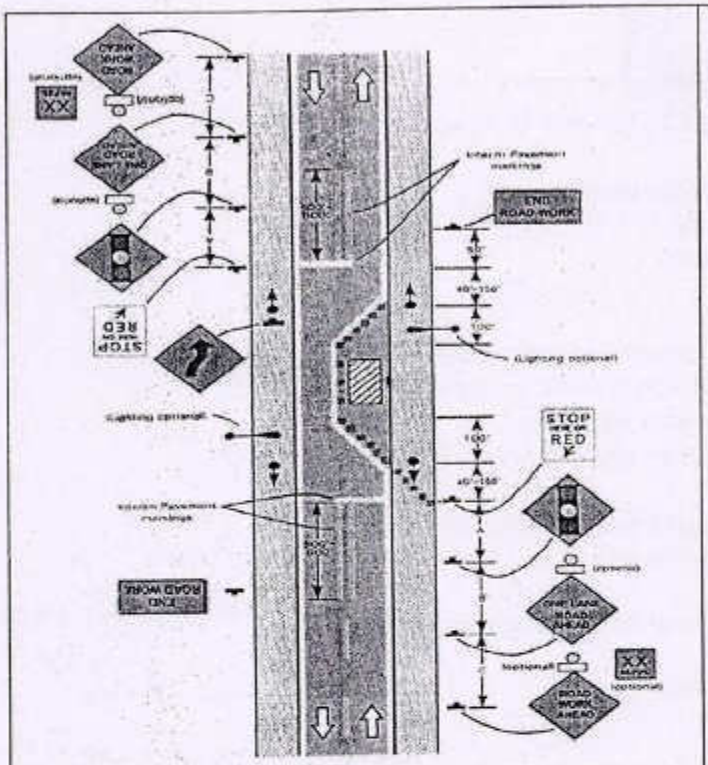


Fig 24.2- Temporary Diversion of construction of CD work

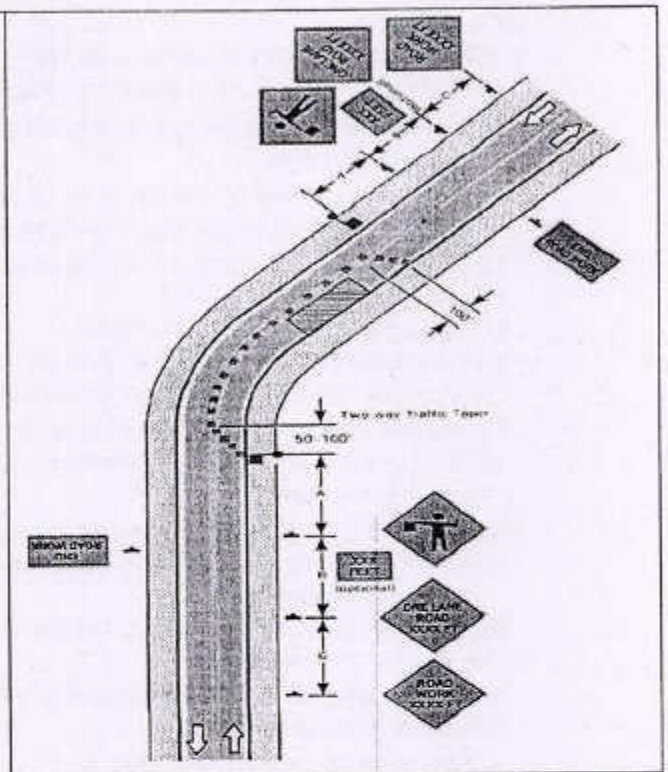


Fig 24.3- Temporary Diversion at Sharp terning

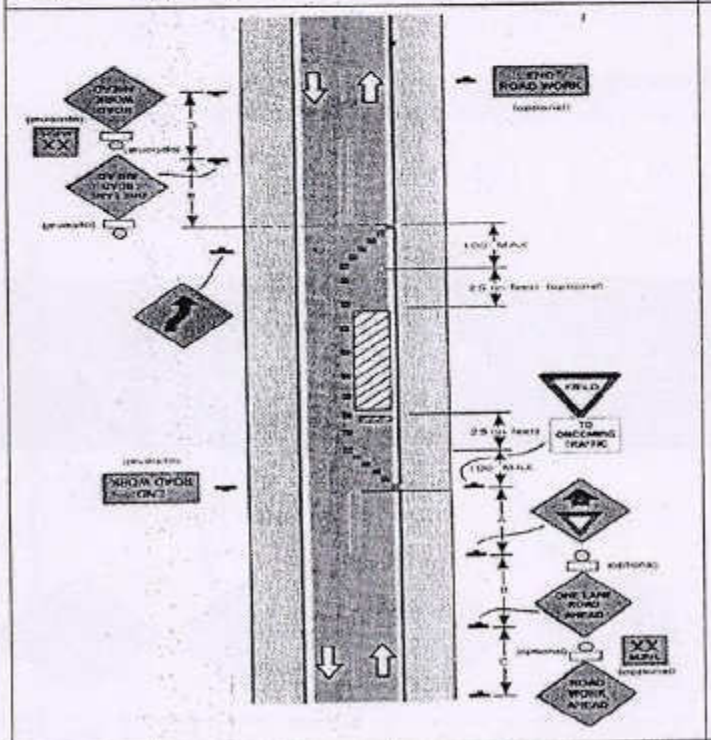


Fig 24.4-Upgrading of Single Lane Road to Two Lane with shoulder

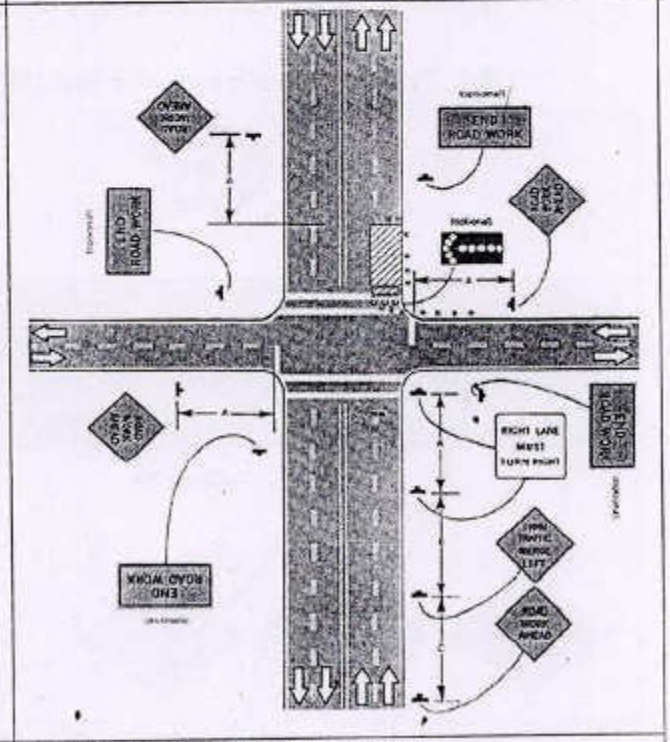


Fig 24.5- Road Work at the Junction

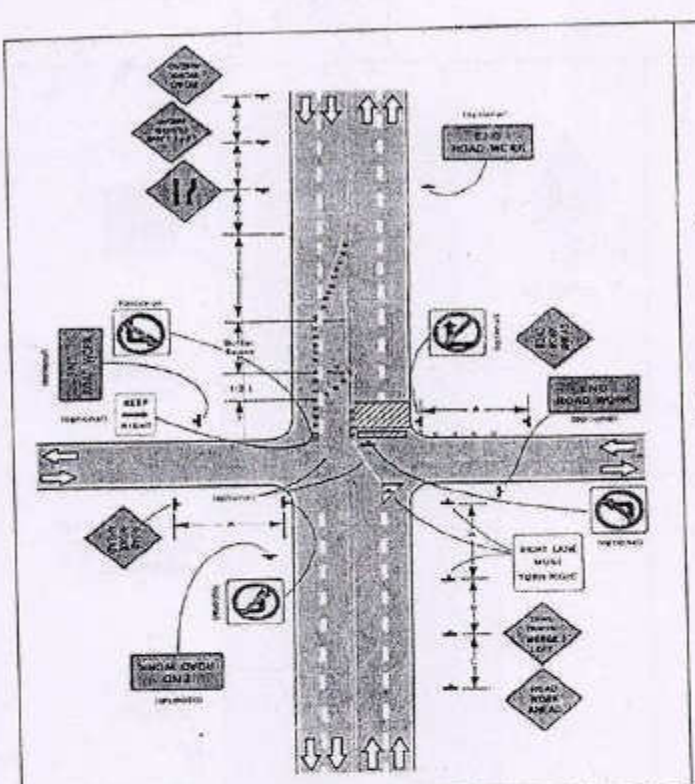


Fig 24.6- Road Work at the corner of Junction

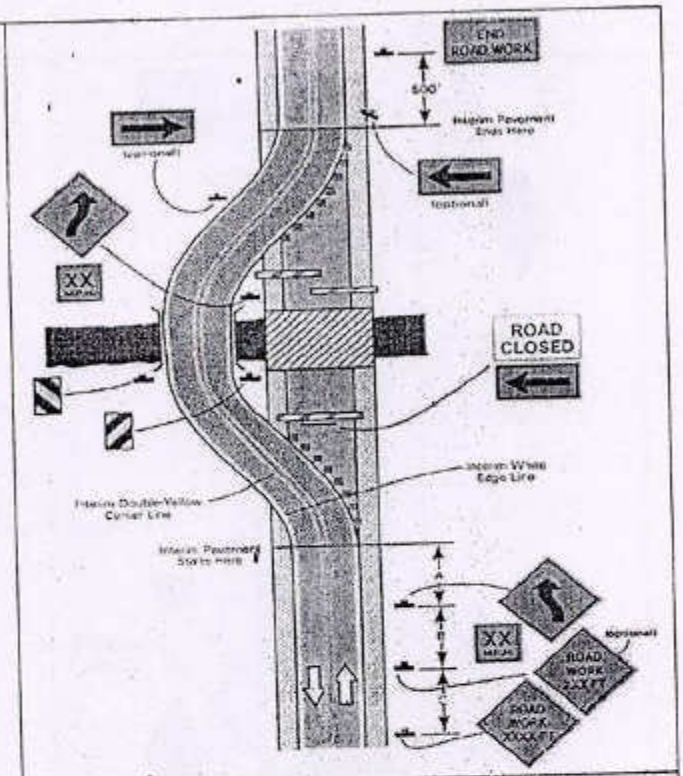


Fig 24.7- Temporary Diversion of reconstruction of CD work

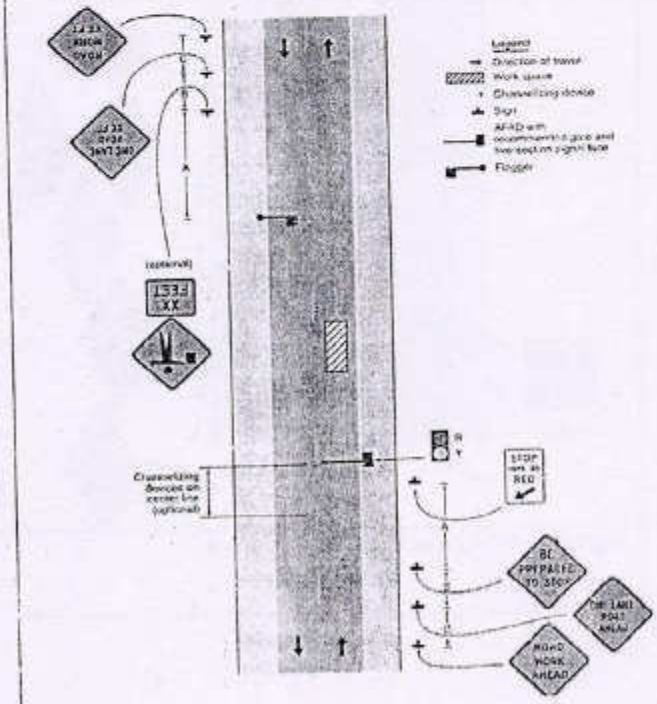


Fig 24.8- Temporary Diversion of Road Work

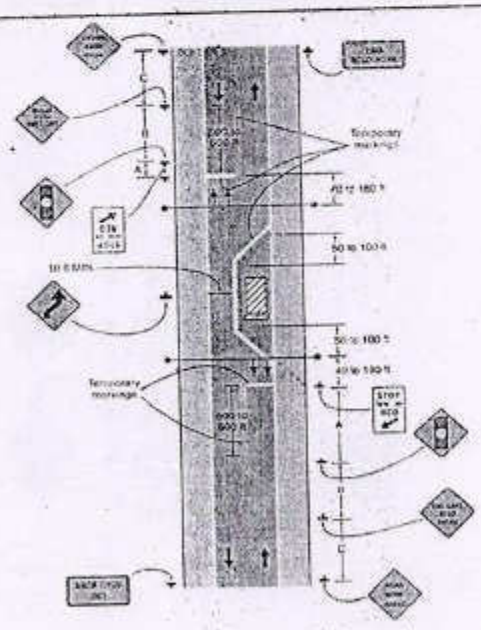


Fig 24.9- Temporary Diversion of construction of CD work

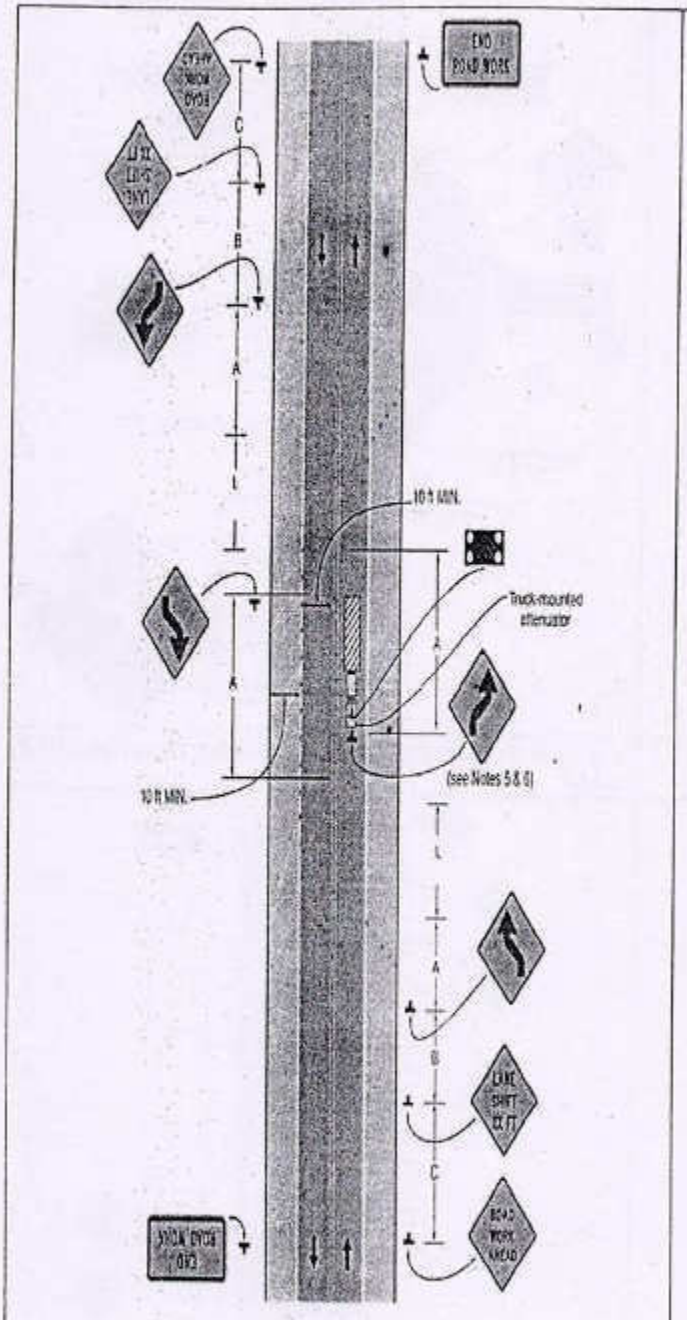


Fig 24.10 Two Lane to Four Lane

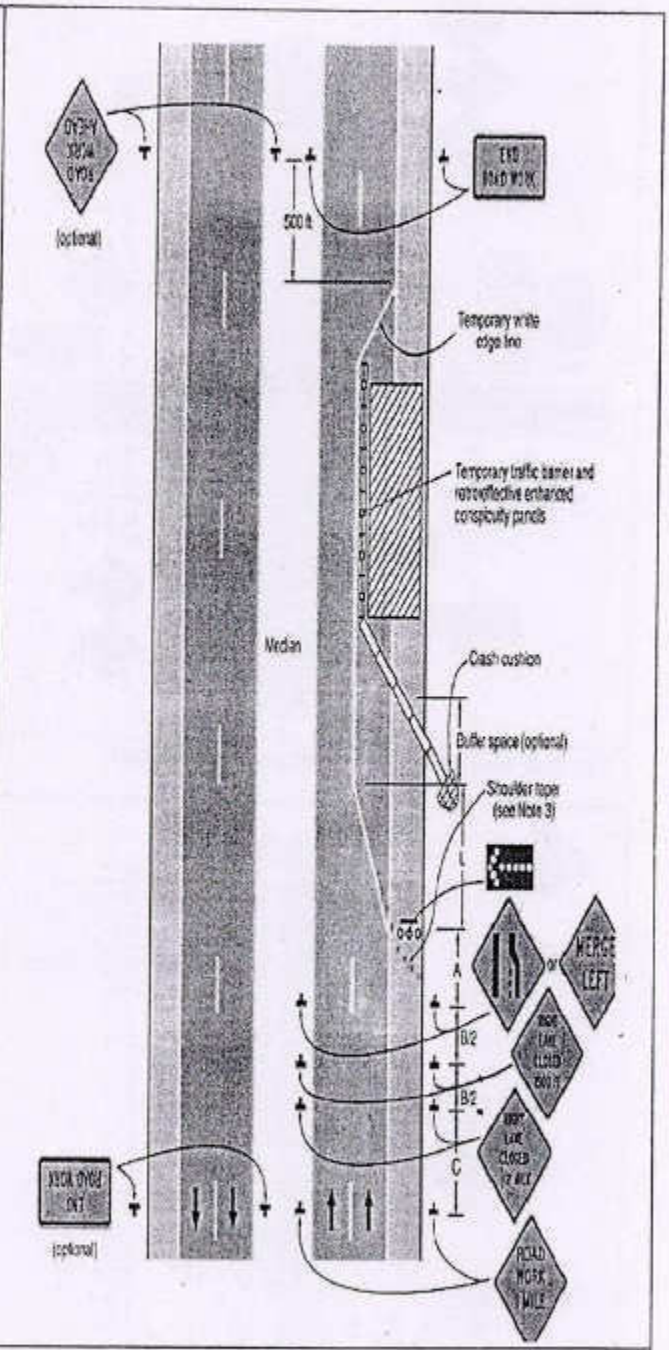


Fig 24.11 Fast Lane taken up for Work

SANJOSE KANTE WAKED ROAD PVT. LTD.

PROJECT SAFETY PLAN

Submitted to

PUBLIC WORKS DEPARTMENT.
(Ministry of Road Transport & Highway)
Govt. of India.

For

Rehabilitation and Up gradation of NH-66 (old NH-17) From Km 281/300 to km 332/200 (KANTE TO WAKED SECTION) to four lanes in the state of Maharashtra under NHDP-IV on Hybrid Annuity Mode

Client:

Ministry of Road Transport and Highway

Concession Agreement
28th June 2016

Concessionaire:-

MEP SANJOSE KANTE-WAKED ROAD PRIVATE LIMITED.

B1 406,

Boomrang,Chandivali Farm

Road, Near Chandivali

Studio Andheri East.

Mumbai, Maharashtra.-400072.

Website: www.mepinfra.com

POLICY STATEMENT ON HEALTH SAFETY AND ENVIRONMENT

"MEPIDL" Project Management shall continuously aspire to achieve higher standards in Health, Safety and Environment while engaged in construction activities.

OBJECTIVE

The objective of the policy is to create awareness among employees on the collective responsibilities and provide a safe and healthy working environment to prevent injury, occupational illness and ensure public safety when carrying out its construction activities so that a concerted effort is made to

- To preventaccident
- To prevent occupational healthhazards
- To prevent environmentalpollution

STRATEGY TO ACHIEVE OBJECTIVE

To achieve the above objectives, "MEPIDL" management staff, employees, subcontractors, Safety and Health committee members and all those involved in the project will jointly

- Comply with all applicable legislative and otherrequirements
- Provide information, training and facilities to employees and interestedparties
- Monitor performance and review the system regularly to achieve health, safety and environment standards
- Increase awareness and accountability at all levels of management and employees on their responsibilities for health, safety andenvironment.

INTRODUCTION

1.1 In line with the company's objective of Safety and Health awareness in the construction sector. "MEPIDL" has incorporated safety plan for all the constructionactivities.

1.2 Safety and Health of the employee is considered essential ingredient of goodmanagement

1.3 The company undertakes in so far as practicable, to provide safe and healthy environment for its area ofoperations

POLICY

2.1 Ensure a safe and healthy working environment for all its employees and workers who are involvedin its businessoperations.

2.2 Preventallformsofaccidentsthatgiverisetolossoflife,injurytopersonnel, lossordamageto property

2.3 Encouragetheraisingofhealth,safetyandenvironmentalstandardsthroughtraining,useof approved plant, tools andequipment's

2.4 Treat safety and progress equally, but safety will not becompromised.

OBJECTIVE

- To Provide safe workingenvironment
- To promote safetyawareness
- To observe and work with high safetystandards
- To ensure safety and health of staff and sub-contractors employees onsite
- To protect public from injury and damage toproperties
- To ensure minimum works disruption and to complete them within the acceptable targets in terms of safety andtime
- To provide training on safety at alllevels

TARGET

Zero accident and eliminating lost time due to accident by eliminating unsafe acts and unsafe conditions

SAFETY AND HEALTH COMMITTEE ORAGANISATION & RESPONSIBILITES

Team Leader

- TheTeamLeaderwhoistheheadofthesitewillberesponsibleforallactivitiesatsite.
- Delegate specific duties to line management and supervisor and ensure that such persons are competent to fulfill suchduties.
- Implement the Project Safety Plan (PSP) and ensure that adequate resources are available to provide a safe system of work and adequate welfare facilities.
- Ensures that Project Safety Plan (PSP) is communicated to all levels within the organization including sub-contractors
- He is to ensure all safety code and work procedures has been compiled with and carriedout.
- The Team Leader will chair all meetings of the site Safety and Health Committee and ensure all mattersrelatingtosafetybroughtoutinthemeetingarecarriedoutandenforced.

Safety Officer / Supervisor

- The role of Safety Officer/Supervisor at a construction site is to enforce and promote safety as set out in thePSP.
- The task is of equal importance as the progress of work, as he plays vital role in eliminating or minimizing the unsafe act or condition at the worksite
- The Safety Officer will sit as a secretary in all safety committee meetings and keep minutes of the meeting and distribute to all members as soon aspossible
- He is to liaise with the Safety Manager at Head Office. In educating and instilling safety awareness to the workers, he will give safety induction to all workers at site, as well as to assist the sub-contractors safety supervisor and hold regular Tool Boxmeetings
- To have knowledge of safetyregulation

Contractors Safety Supervisor

- The contractors upon appointing a site safety supervisor will liaise and work closely with MEPIDL Safety Officer in enforcing and promoting safety to all theirworkers.
- The Safety Supervisor will ensure their workers are provided with proper personal protective equipment, which shall be used and maintained at alltimes
- ArecordofallPPEprovidedmustbekeptandacopyofitextendedtoMEPIDLsafetyofficer
- Toholdtoolboxmeetingasrequiredanddocumentalltheminutesofmeeting
- To have knowledge of safetyregulation

ACCIDENT PREVENTION

- **Accident causes human suffering through loss of life, limbs, pain and damage to properties. Accident prevention can only be successful if allthose individuals havingthe authority have a strong and earnest desire to preventaccident.**
- **This means that all the supervisors accept the concept of accident prevention as part of their daily activities and the workmen must be convinced that Management is fully committed to safety and this is not only in compliance with the Employer's requirements but also in the interest of theworkmen.**
- **All accidents at work site are preventable and undoubtedly there is a cause for every accident. It is universally accepted that people actions are the main cause ofaccidents.**
- **The first step in reducing or minimizing accident is to eliminate unsafe acts by people and unsafe condition, situation, plant orequipment.**

- To achieve this goal, those concerned are to be made aware of their responsibilities and that safety is part of them.
- The installation of guards to the exposed parts of machinery, provision of safety devices, maintaining good first aid and firefighting equipment and providing training courses to staff will help to achieve thegoal

GENERAL SAFETY RULES

Every employee has an obligation under his / her term of employment to prevent accident by

- Utilizing the correct personal protective equipment(PPE)
- Employing safe workingpractices
- Utilizing correct workingtools
- Keeping the job site safe and tidy(Housekeeping)
- Ensuring other persons are not put at risks
- Following the company's established safety regulations andprocedures

IDENTIFICATION OF RISK RELATED ITEMS

Construction Industry are generally exposed to but not limited to the following risks related items.

Machineries and Plant Installed at Sites

- Certifiedmachineries
- Approved electricaltools
- Exposedwiring
- Machineryguarding
- Hand tools and powertools
- Machineries installation above groundlevel
- Slingingoperation
- Inspection and maintenanceschedule
- Liftingoperation

Excavation &Demolition works

- GroundStability
- PilingEquipment
- Pile driver protection
- Desiignatedperson
- Ladders
- Working atheight
- Excavation and Demolitionworks
- CatchPlatform

Earth Works & Bituminous works

- **Traffic managementcontrol**

Concrete Works

- Cat work for formstructures
- Formworks
- Stripping
- Shoring
- Re-shoring of slabs andbeams

Superstructure works (Scaffolds, Ladders, Ramps and Safety Netting)

- Scaffolding and netting (Materials &Design)
- Scaffolds - Erection and dismantling (Safe work procedure)
- Catch platform (Design &Construction)
- Working at height (Above3m)
- Ladders (Design &Construction)
- Runways and Ramps (Design &Construction)

Working at Heights (Above 3m)

- Safety beltsusage
- Roof laying andrepairing
- Painting
- Exterior finishing

P.P.E (Personal ProtectiveEquipment)

- PPE Usage (Hard hats, safety shoesetc.,)
- Fallingobjects
- Underground pits or areas (Gas &fumes)
- Weld andcutting
- Chipping anddrilling

Access, Egress and Vehicular Traffic

- Access / Egress to worksite
- Access / Egress topublic
- Vehicular trafficmovement

House keeping

- Good Housekeeping
- Material arrangement / stacking
- Protrudingnails
- Passageways
- SlipperyCondition

General

- **Blastingwork**
- **Drowning**
- **Dust (Asbestos, Silicaetc.,)**
- **Gases(Toxic)**
- **Fire**
- **Disposable of debris / wastematerials**

ACTION PLAN

Meetings, Audits and Inspections

Description	Frequency
Safety meetings between MEPIDL Management and Site safety & Health committee	Monthly (1-2 Hours)
Tool Box meetings / pep meeting between EPC contractor's safety officer/ supervisor and sub-contractors workers	Weekly 20- 30 min
Safety briefing to new Joiners & screening	Ad – Hoc
Site safety inspection EPC contractors plant, machinery and scaffolding	Weekly

PUBLICITY

- Safety posters will be displayed at strategic locations in construction site, canteen andoffice
- Zero Accident target and Accident free days target displayed at mainentrance

REPORTING

- All accidents including near must be reported andinvestigated
- Safety statistics and number of man-hours worked should be reported monthly and a copy should be extended to Head Office SafetyDepartment

Machineries & Plant used and installed at site

- Certified machineries must have valid certificate (e.g., Tower crane, Mobile crane , Air receivers etc.,)
- Only approved electrical tools, which confirm to local standards can beused
- Temporary wirings must not beexposed.
- Handsaws or table saws must have properguarding
- Hand tools and Power tools must be handled with care. Each hand tool must have "On/Off"switches
- Machineries installed above ground floor (heavy machineries) need to get structural engineers approvalfirst
- All machineries, plant and equipment's used must have regular and periodic inspection and maintenanceschedule

Excavation and Demolition works

- When working at heights, provide proper platform and safetybelts
- To ensure public safety when doing excavation or demolition works, the area should be provided with propersignage
- Machineriesusedforexcavationordemolitionshouldbeingoodoperatingcondition
- Ensure areas to be excavated are stable andfirm
- Catch platform must be provided for demolition work on exterior walls of structure 12.2 m high and shall be designed and certified by a professionalengineer

Earth work and bituminous works

- Traffic Management AndControl
  - The objective of temporary traffic management is to provide users of the highway safe passage in unusual road conditions arising out of routine maintenance, periodic maintenance activities, structural repairs and construction activities, emergency situations like accidents, vehicle breakdown, natural calamities or extreme weatherconditions.
  - Definition of Traffic ControlZones

    The traffic control zone is the distance between the first advance warning sign and the point beyond the work area where the traffic is no longer affected. Traffic control zones can be divided into following specificparts:

    - Advance Warning Area
    - Transition Area
    - Buffer Space
    - WorkArea
    - TerminationArea

An advance warning area is necessary for all traffic zones to enable drivers to adjust to new driving manner required through closure zone. Before reaching the work area, drivers should have enough time to alter their driving patterns. Advance warning area shall start 600 m in advance of the work.

- **ClosureTaper**

The length of taper used to close a lane varies from 50 m to 150 m. If restricted sight is a problem, the taper should begin well in advance of the view obstruction such as sharp vertical or horizontal curves. The length of taper shall depend on the sight distance and the visibility.

- **TransitionArea**

When work is performed within one or more travelled lanes, a lane closure(s) is required. In the transition area, traffic is analyzed from the normal roadway lanes to the path required to move the traffic around the work area. The transition area contains the tapers, which are used to close lanes. Through transition area, correct path should be clearly marked with cones and signboards so that drivers will not make a mistake in following the path. Transition area moves with the moving of work area.

- **Buffer Space**

The buffer space is the open or unoccupied space between the transition and work areas. The buffer space provides a margin of safety for both traffic and workers. If a driver does not see the advance warning or fails to negotiate the transition, a buffer space provides room to stop before the work area. It is important for the buffer space to be free of equipment, workers, materials, and work vehicles. Cones are placed along the edge of the buffer space.

- **WorkArea**

The work area is that portion of the roadway where work is being performed resulting in closure for traffic. Work areas may remain in fixed locations or may move as work progresses. An empty buffer space shall be included at the upstream end. Channeling devices or cars to exclude traffic and pedestrians delineates the work area. Conflict between traffic and the work activity or potential hazards increases as:

- The work area is closer to the travelled lanes Physical deterrents to normal operation exist, such as uneven pavements, material loading or unloading. Speed and volume of trafficincrease.
- The change in travel path gets more complex, shifting traffic a few meters in comparison with shifting traffic across the median and into lanes normally used by opposingtraffic.
- Work areas have a greater need for delineation at night than during daytimeoperations.

- **TerminationArea**

The termination area provides a short distance for the traffic to clear the work area and to return to the normal traffic lanes. It extends from the downstream end of the work area to the sign 'End of Work 7 'Speed Limit

- **Specification for Temporary TrafficManagement**

Temporary traffic management is required during repair or maintenance works on the carriageway, shoulders or median or when some incident on the carriageway requires immediate attention.

Following guidelines shall be followed for proper management.

a. Closure of lanes shall be done only after approval of schedule and plan submitted to the Engineer-in-Charge.

a. Closure of lanes without prior approval may be done only in emergency situation. A situation shall become an emergency when a vehicular accident has taken place on the carriageway, or a major obstruction like fallen tree or rock fall or caving in of carriageway hasoccurred.

b. All traffic control facilities, which have been agreed upon, shall be employed during lane closure. Road signs & barricades, flagmen, canalization in accordance with the previously approved procedure by Engineer forms parts of suchfacilities.

c. The signage, barricades, lighting, diversions, merging and other instruments for lane closure shall be incorporated in the form of clearsketches.

d. The sign stands shall be ballasted by sand bags, filled with sand or soil that has gradation, such that they prevent the signs from being blown over by wind caused by passing vehicles.

e. Safety standards shall be strictly complied with, in the event of any lane closure or traffic diversion.

- **Temporary Signs**

a. The objectives of temporary signsare:

i. Notify the users of specific hazards such as works/accident and to guide them through such affected road stretchsafely.

ii. Minimize inconvenience and conflict by reducing confusion and disruption to the normal traffic at the works/accidentsite

b. Criteria for choosing the type of temporarysigns:

iii. Which lane(s) isclosed

iv. Duration ofobstruction

v. Period of closure, normal or peakhours

vi. Geometry of thecarriageway

vii. The temporary signs shall be so placed that the users will have adequate time to respond.

Concreting Works

- To provide catwalk for form structure of 2 or moretiers
- All formworks to be inspected by designated persons, who shall inspect them regularly. The records of such inspection shall be kept at site for examination byinspector's
- Stripping work shall be accordance with the code of practice of such work and to remove or stockpile stripped form to a designated area, such that all protruding nails and wire ties are madesafe.
- Re-shoring shall be provided when necessary to safely support slabs and beam afterstripping

Superstructure Works

- Scaffold material shall be of sound and of adequate strength, and if wood is used, it is of well-seasoned wood or wood of equal or higherstrength
- Scaffolds and their supports must be designed to carry load and be at least with a safety factor of4
- Erection and Dismantling of scaffolds must be under direct supervision of designatedperson
- Standardoruprightofscaffoldshallbeverticalorslightlyinclinedtowardsthebuilding
- The erection of scaffolds and netting should always be one floor higher than the floor under construction to ensure there is no chance of objects fallingoff.
- Catch platform should be erected and designed by a Professional Engineer and certified for safety prior to erection. Catch platform should be 1.5 meters wide and able to sustain a live load of 735 Kg/Sqm
- Ladders and step ladders should be constructed of sound material and of adequatestrength
- Runways and ramps for use by site personnel and wheel burrows must be 1m in width with side railing and slope of 1 in4

Working at Height

- Safety belts must be worn when working at height and attached to a lifeline or any fixedstructure
- Lifeline should not be lower than the working position level and should be properly anchored to a fixedstructure.
- Proper instruction on usage of safety belts and the point of anchorage should be addressed to every employee. Safety belts and lifeline should be inspected before usage by the designated / authorised person

- When work is to be done on roof or slope greater than one in four, roofing bracket or crawling board must be provided if safety belts is notpossible

Use of P.P.E

- In all the work sites, each employee must use PPE provided by the employer
- Where there is a danger of falling object, Safety helmet must be provided andused
- In wet areas, suitable waterproof boots must be provided andused
- When there is corrosive or toxic substance, appropriate protective apparel and equipment must be provided andused
- When carrying out work in pits, underground chamber or enclosed areas where accumulation of toxic fumes or gases, suitable respirators or oxygen mask to be provided andused

Access, Egress and Vehicular Traffic Movement

- Work site should be fully enclosed by protective hoarding so that the general public would be protected from work in progress. It should be able to prevent the public from any dangers and also act a barrier or security to prevent persons from trespassing. Hoarding should be 2.44 metershigh
- There should be an adequate safety distance between the work site andthe hoarding
- The entrance to and exit from the work site should be located in such a manner so as to prevent danger and inconvenience to the public with propersecurity
- Works carried out in or near roads, the working area should be barricaded with sufficient warning signs or warning lights to direct traffic to slow down or away fromit

Housekeeping

- Bags, containers or bundles, materials must be stored in a manner they are stable, and have easy access to thematerials
- Timber should be stacked properly and at a properly designatedareas
- Aisles, passageways and access roads shall be kept clear to provide for the free and safe movement of material handling equipment ofworkers
- Materials stored inside buildings under construction should have a distance of 1.8 m away of any hoist way or inside floor opening or 3 m from an exteriorwall
- Materials should not be stored on scaffolds or runways in excess of supplies needed for immediate operation

Ensure all work area is free from slippery condition

General

- Blasting should be carried out by competent and designated personnelonly
- Warning signs must be placed at intervals for blasting work to be carriedout

- When demolition work is being carried out, warning sign shall be conspicuously placed around thesite
- Debris, bricks and other materials shall be removed and not stored on catch and scaffoldplatforms
- Where there is a possibility of drowning, adequate and proper equipment with trained personnel should be available for keeping persons afloat and promptrescue
- Necessary firefighting equipment should be provided atsite.

LIST OF LAWS & REGULATIONS RELATING TO Health, Safety and Environment (HSE)

1. NHGuidelines for RoadSafety.
2. Manuals and Guidelines ofMORTH.
3. IRC Specifications and Standards forSafety.
4. The factories Act, 1948- to consolidate and amendthe law regulating labour in factories.
   - State Factory Rules of respectivestates.
5. The Mines Act, 1952 —An Act to amend and consolidate the law relating to the regulation of labour and safety inmines.
   - The Mines Rules,1955
   - The Coal Mines Regulations,1957
   - The Metallic-ferrous Mines Regulation, 1961
   - The Mines Vocational Rules,1966
   - The Oil Mines Regulation,1984
   - The Mines Rescue Rules,1985
6. The Dock Workers (Safety, Health & Welfare) Act, 1986 — Ac Act to give effect to the Convention concerning the protection against accidents of workers employed in loading and unloadingships.
   - The Dock Workers (Safety, Health & Welfare) Regulations,1989
7. The Motor Transport Workers Act, 1961- An Act to provide for the welfare of motor transport workers and to regulate the conditions of theirwork
   - The Motor Transport Workers Rules,1964
8. The Plantation Labour Act, 1951 and Rulesthereunder

The Explosives Act, 1884 —An Act to regulate the manufacture, possession, use, sale, transport, import and export of Explosives.

- The Explosives Rules,1983
- The Static and Mobile Pressure Vessels (unfired) Rules,1981
- The Gas Cylinders Rules, 2004 (replaces theGas Cylinders Rules, 1981)

9. The Electricity Act, 2003 (replaces The Indian Electricity Act, 1910) — An Act to consolidate the lawsrelatingtogeneration,transmission,distribution,tradinganduseofelectricityand

generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas, rationalization of electricity tariff, ensuring transparent policies regarding subsidies, promotion of efficient and environmentally benign policies, constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal and for matters connected therewith or incidentalthereto.

- The Indian Electricity Rules,1956

10. The Environment Protection Act, 1986 —An Act to provide for the protection and improvement of environment and matters connectedtherewith.
    - The Environment Protection Rules,1986
    - The Manufacture Storage and Import of Hazardous Chemicals Rules, 1989.
    - The Rules for Manufacture, Use, Import, Export and Storage of Hazardous Micro Organisms, Genetically Engineered Organisms orCells,1989
    - The Hazardous Wastes (Management and Handling) Rules,1989
    - The Environmental Clearance of Project Notification,1994
    - The Chemical Accidents (Emergency Planning, Preparedness and Response)Rules, 1996
    - The Bio-medical Waste (Management and Handling) Rules,1998
    - The Environment (siting for Industrial Projects) Rules,1999
    - The Recycled Plastics Manufactures and Usage Rules,1999
    - The Noise Pollution (Regulation & Control) Rules,2000
    - The Ozone Depleting Substances (Regulation &Control) Rules,2000
    - The Municipal Solid Wastes (Management & Handling) Rules,2000
    - The Batteries (Management & Handling) Rules,2000.

11 The Water (Prevention &Control of Pollution) Act, 1974 — An Actto provide for the prevention andcontrol of water pollution and the maintaining or restoring of wholesomeness of water, forthe establishment, with a view to carrying out the purpose aforesaid, of Boards for the prevention and control of water pollution, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connectedtherewith.

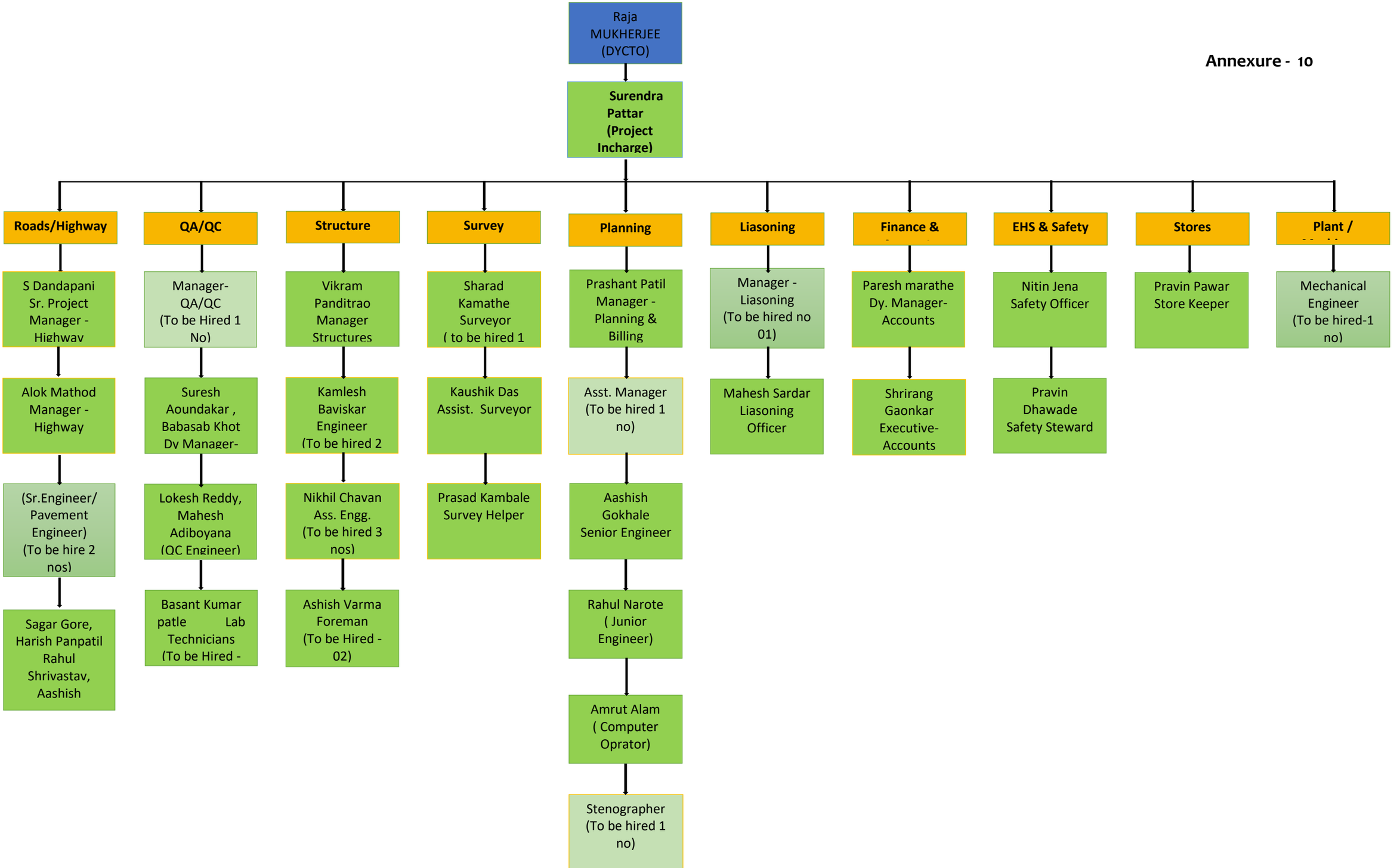
- The Water (Prevention & Control of Pollution) Rules, 1975

12. The Water (Prevention and Control of Pollution) Cess Act, 1975 —An Act to providefor the levy and collection of a cess on water consumed by persons carrying on certain industries and by local authorities, with a view to augment the resources of the Central Board and theState Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act,1974.
    - The Water (Prevention and Control of Pollution) Cess Rules,1978

13. The Air (Prevention &Control of Pollution of Pollution) Act, 1981- An Act to provide for the prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connectedtherewith.
    - The Air (Prevention &Control of Pollution) Rules,1982
14. The Public Liability Insurance Act, 1991- An Act to provide for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handlinganyhazardoussubstanceandformattersconnectedtherewithorincidentalthereto.
    - The Public Liability Insurance Rules,1991.
15. The Motor Vehicles Act, 1988- An Act to consolidate and amend the law relating to motorvehicles
    - TheCentralMotorVehiclesRules,1989andMotorVehiclesRulesofrespectiveStates.

16. The Energy Conservation Act, 2001- An Act to provide for efficient use of energy and its conservation and for matters connected therewith or incidentalthereto.

Annexure - 10


Raja MUKHERJEE (DYCTO)
Surendra Pattar (Project Incharge)
Roads/Highway
S Dandapani Sr. Project Manager - Highway
Alok Mathod Manager - Highway
(Sr.Engineer/ Pavement Engineer) (To be hire 2 nos)
Sagar Gore, Harish Panpatil Rahul Shrivastav, Aashish
QA/QC
Manager- QA/QC (To be Hired 1 No)
Suresh Aoundakar , Babasab Khot Dy Manager-
Lokesh Reddy, Mahesh Adiboyana (QC Engineer)
Basant Kumar patle Lab Technicians (To be Hired -
Structure
Vikram Panditrao Manager Structures
Kamlesh Baviskar Engineer (To be hired 2
Nikhil Chavan Ass. Engg. (To be hired 3 nos)
Ashish Varma Foreman (To be Hired - 02)
Survey
Sharad Kamathe Surveyor (to be hired 1
Kaushik Das Assist. Surveyor
Prasad Kambale Survey Helper
Planning
Prashant Patil Manager - Planning & Billing
Asst. Manager (To be hired 1 no)
Aashish Gokhale Senior Engineer
Rahul Narote (Junior Engineer)
Amrut Alam (Computer Oprator)
Stenographer (To be hired 1 no)
Liasoning
Manager - Liasoning (To be hired no 01)
Mahesh Sardar Liasoning Officer
Finance &
Paresh marathe Dy. Manager- Accounts
Shrirang Gaonkar Executive- Accounts
EHS & Safety
Nitin Jena Safety Officer
Pravin Dhawade Safety Steward
Stores
Pravin Pawar Store Keeper
Plant /
Mechanical Engineer (To be hired-1 no)

Compliance to ADB Observations on Environment & Social Due Diligence Report (ESDDR) of
MEP Sanjose Kante Waked Road Private Limited (MSKWRPL)

S.No.	ADB Comment	IIFCL response/clarifications
Environmental Safeguards		
1.	Please provide copies of consents to establish and operate, and authorization when obtained an addendum to ESDDR	Copies will be provided as and when obtained by the Developer.
2.	While in table 3 it is mentioned that the avenue plantation would be started after development of the highway, the Para. 47 has confirmed commencement of avenue plantation after September 2019. This need to be corrected as per the ground reality.	Table 3 of the ESDDR mentions under Status of EMP Implementation that "…..avenue plantation has just begun….". In the EMP (Column 2 of the Table) the word "after" in sentence "Avenue Plantation will be taken up **after** development of four laning of the highway" is replaced by with as "Avenue Plantation will be taken up **with the** development of four laning of the highway". This is consistent with Para 42 (point no. 4) that Avenue plantation has been initiated.
3.	The proposed sub-project fully complies with ADB's SPS, 2009;	Yes
4.	MSKWRPL shall procure all construction materials **only from** quarries, mines, borrow areas and construction equipment having requisite environmental clearances and permissions in accordance with the prevailing environmental regulations prior to commencement of relevant works	Developer has been informed of the same.
5.	Requisite permission has been obtained for temporary change in land use for the land being used for construction camp site if it was originally an agricultural land	Developer has been informed of this.
Social Safeguards		
6.	There seems to be about 5% land yet to be acquired for the project. From whom will the government acquire this from? How many persons will be affected by the land acquisition, if any. Please ensure that compensation is paid prior to start of any civil works.	Developer has been informed of this and a line has been added at Para 52 in this regard.