"Environmental Protection and Safety during Construction"

International Road Federation-India Chapter

W E L C O M E

14th July 2018

WE *CARE* ABOUT

"SAVING LIVES ON ROADS TOGETHER"

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Intercontinental Consultants and Technocrats Pvt. Ltd.

Managing Construction Zone Traffic Road Safety and Environmental Challenges

—A Case Study from Qatar (Middle East)

ROAD SAFETY CHALLENGES...

…ARE CHALLENGES POSED TO THE

‘FIVE PILLARS’ OF ROAD SAFETY

…that support the

‘SAFE SYSTEM’ ON ROADS

PILLAR 1

Road Safety Management

PILLAR 2

Safer Roads and Mobility

PILLAR 3

Safer Vehicles

PILLAR 4

Safer Road Users

PILLAR 5

Post-Crash Response


PILLAR 1
Road Safety Management

The Conundrum !

- **In the Middle East generally there is a Health, Safety and Environment (HSE) Department, headed by the HSE Manager. He is almost always from the Construction Operations groups, NOT from Traffic Road Safety side.**

- **Construction packages consume most of the project budget, leaving a miniscule package for Traffic Management.**

- **As a result, HSE manpower which work closely in-step with the massive Construction armies, not only FAR OUTNUMBER Traffic Management Team, but also try to OUTWEIGH the latter. Result? ROAD SAFETY SUFFERS!!!**

So, how does the Traffic Management platoon gain an equal footing with the huge HSE brigade?

The Gravity of Situation ...

Road Accidents impact the *Top Management* of a Construction Company in different ways:

- **All casualties, injuries and vehicle damages must be reported to the Police, which affects Contractor's Grade.**
- **Huge compensation amounts have to be paid in case of a casualty, especially of road user outside to the company.**
- **Huge downtime costs are incurred for HGV, HCV or moving plant upon serious damages.**
- **Lost production due to out-of- action manpower/vehicles/ plant and lost productivity due to delays caused.**
- **Vehicles Insurance Premium goes up due to accidents.**
- **Depressed morale of workers, often seen as resignations causing human resource turnover costs.**
- **Adverse public image due to media reports of accidents involving general public**

... *and more*

How a Road Safety And Traffic Management Specialist *Pushes the Road Safety Cause* *to bring it at par with* Construction and HSE

- Earnestly solicits the **Top Executive (CEO)** for Management Approval for introducing a *pilot* ***Road Traffic Safety Management System (RTSMS)***, supported upon the ***Five Pillars*** of Road Safety.
- ***A recognised Certification from U.K. as Lead Auditor of ISO-39001 Road Traffic Safety Management System helps him convince the CEO!***
- ***The payoff for the Management:***

  The Company can join the league of ISO 39001 RTSMS Certified companies of the world.

Corollary-With a world fast moving towards ***ROAD SAFE SYSTEMS***, it means those **coveted few extra points** for Management to get precious winning edge in ***future pre-qualification bids*** for coveted tenders.

So where does all this kick-off?

A *Road Safety Policy* is needed…

A Sample Road Safety Policy

Company acknowledges the hazards and risks associated with driving at work and shall implement arrangements to ensure all of the vehicles are effectively managed to reduce the risk of road related incidents and accidents to as low as is reasonably practicable.

This level of Road Safety is achieved by ensuring the following :

- **To maintain all company vehicles in safe, clean and road worthy condition to ensure maximum safety of occupants and other road users.**
- **All drivers of Company vehicles are competent and fit to drive the class of vehicle needed by the organization, comply with traffic legislation and demonstrate efficient driving skills and good road safety habits at all times.**
- **Induction training is conducted for staff to the company's road safety policies, procedures and defensive driving before being allowed to operate company vehicles.**
- **Conduct Road Safety Audit of roads, both internal and external upto their tie-in with surrounding road networks, required for mobility and accessibility.**
- **Monitoring and managing work schedules to ensure they do not encourage unsafe driving.**
- **Collecting and collating statistics on crashes and their causes.**
- **All Company employees, as well as sub-contractors, partners or affiliates have responsibilities for policy implementation where applicable. Line management must allocate adequate resources and provide necessary training and support.**
- **The policy statement is available to interested parties and communicated to all company stakeholders.**

Practical roll-out of THE PILOT RTSMS involves:

- **AUDITS of existing**

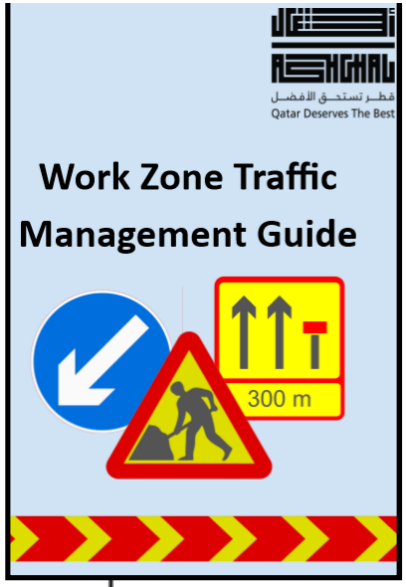
  - temporary roads in and permanent roads inter-facing with the Construction Zone, provision of segregated pedestrian ways

  - fitness of construction related vehicles – heavy, medium and light - and moving plant and machinery

  - road user practices, e.g. pedestrians walking on carriage-way, drivers using mobile-phones while driving, drivers not wearing seat-belts while driving, drivers speeding high, unauthorised parking by drivers

  - post-crash response, e.g. ambulances, paramedics, clinic


PILLAR 2
Safer Roads and Mobility

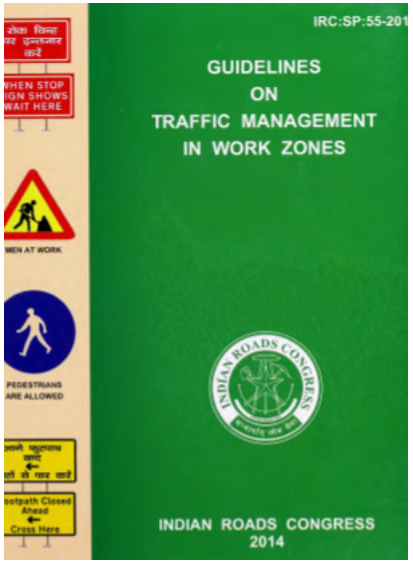


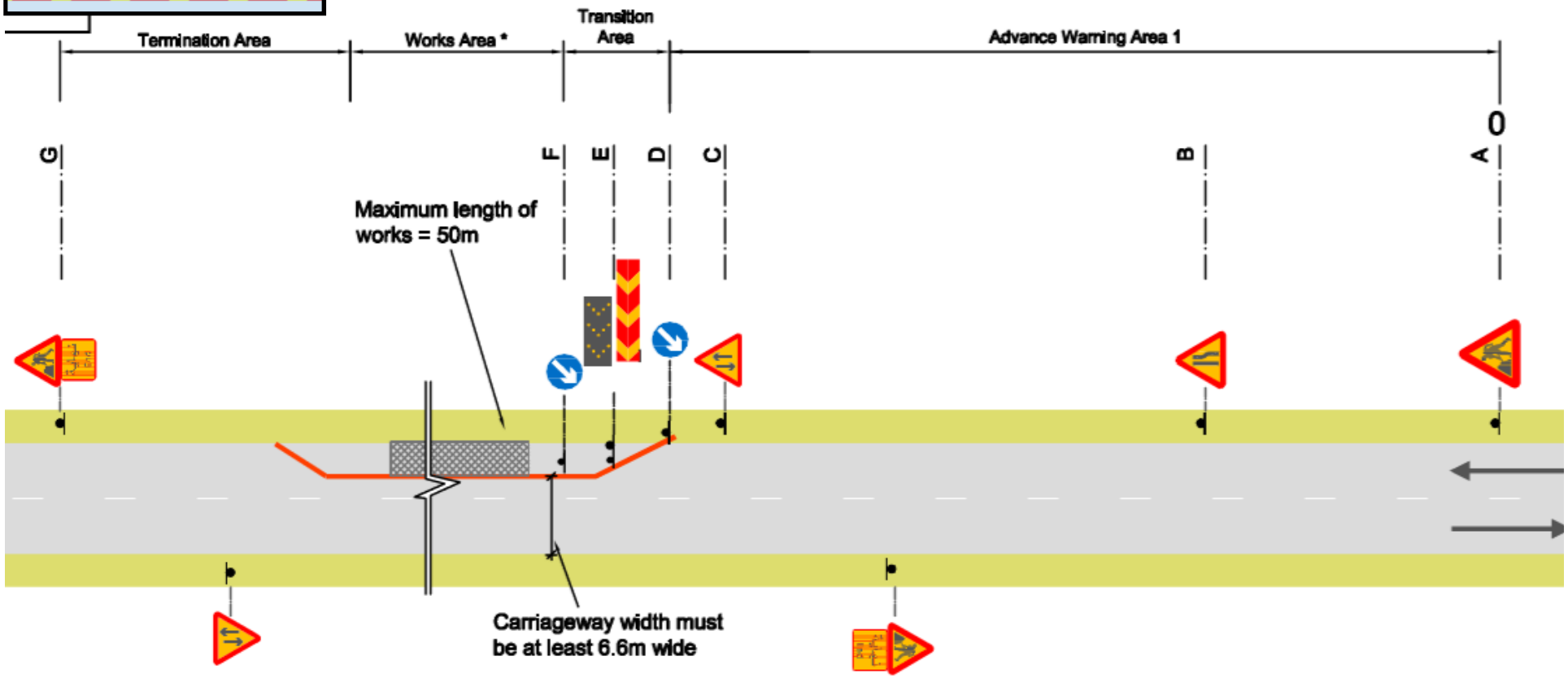
←Qatar follows this

Equivalent in India is this →

IRC Code IRC:SP:55-2014

Guidelines in Traffic Management on Work Zones



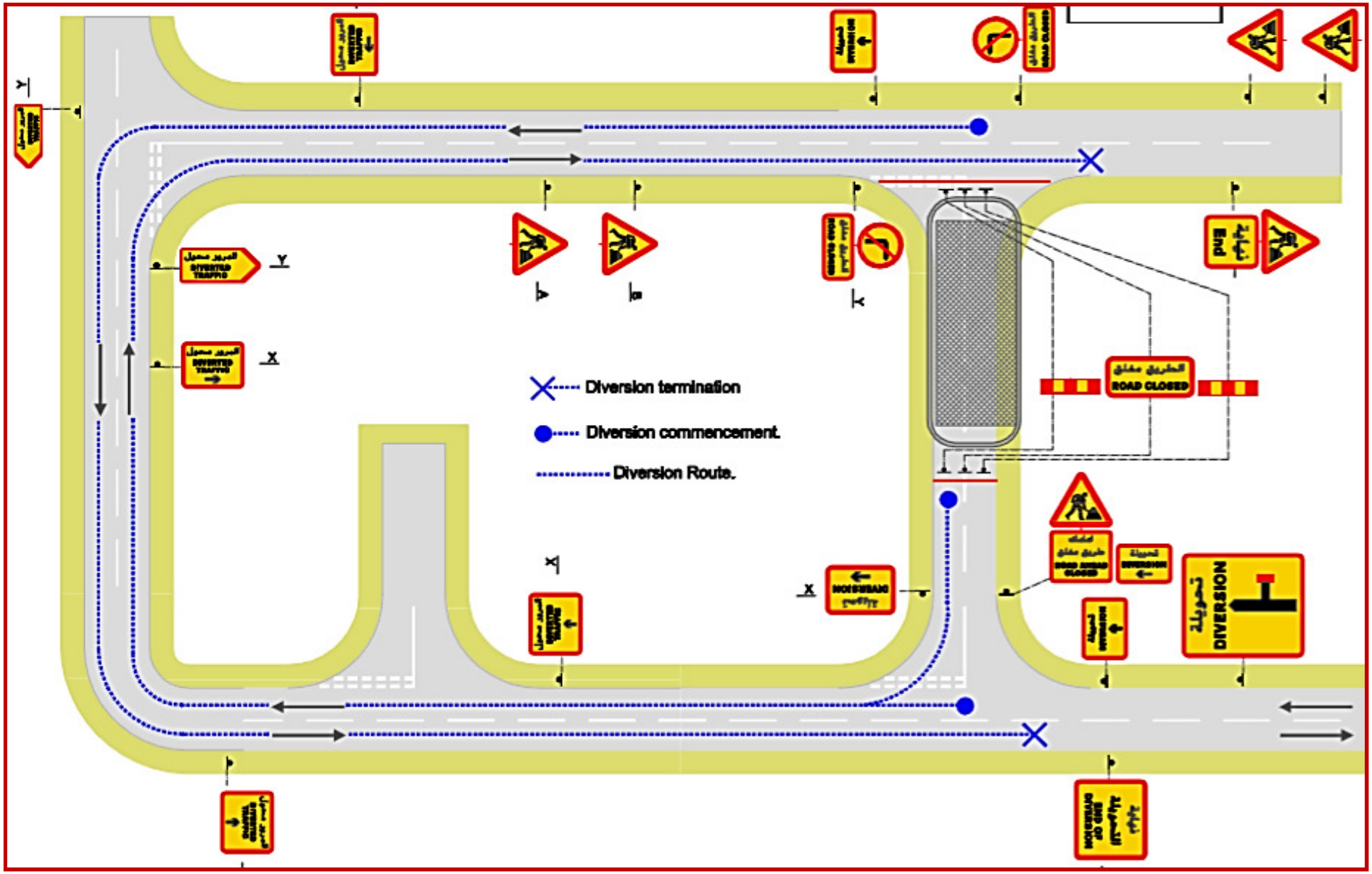


STANDARD LAYOUTS

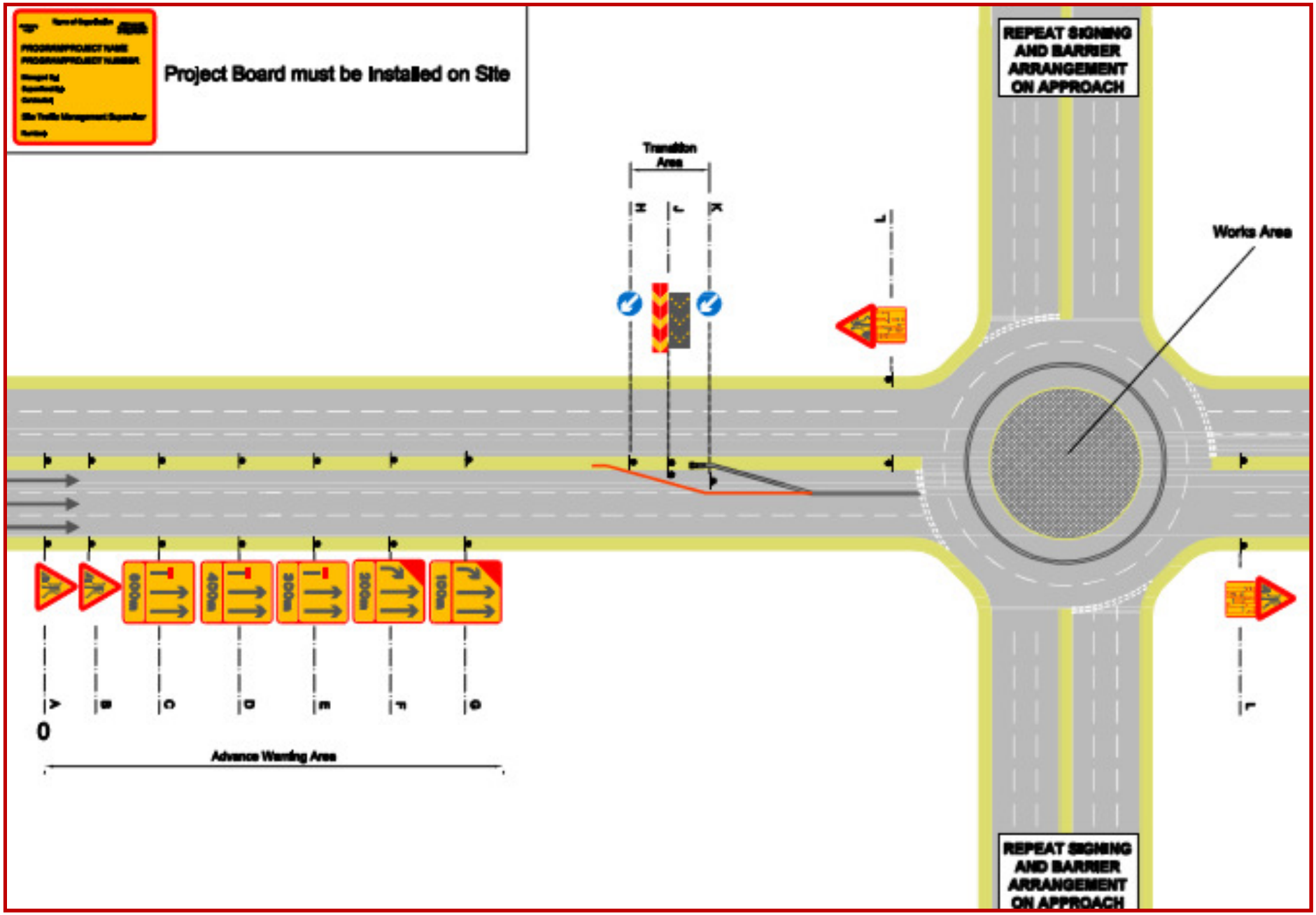
FOR

TRAFFIC DIVERSIONS

A Typical Layout (T.L.) of Traffic Diversion from the Qatar Work Zone Guide



- **Another T.L. for Work Site inside existing Roundabout**



HOW DID IT LOOK...

... AT NIGHT


30
أمامك
AHEAD


30
امامك
AHEAD


30


خفض
SLOW


WORK ACCESS
ENTRY

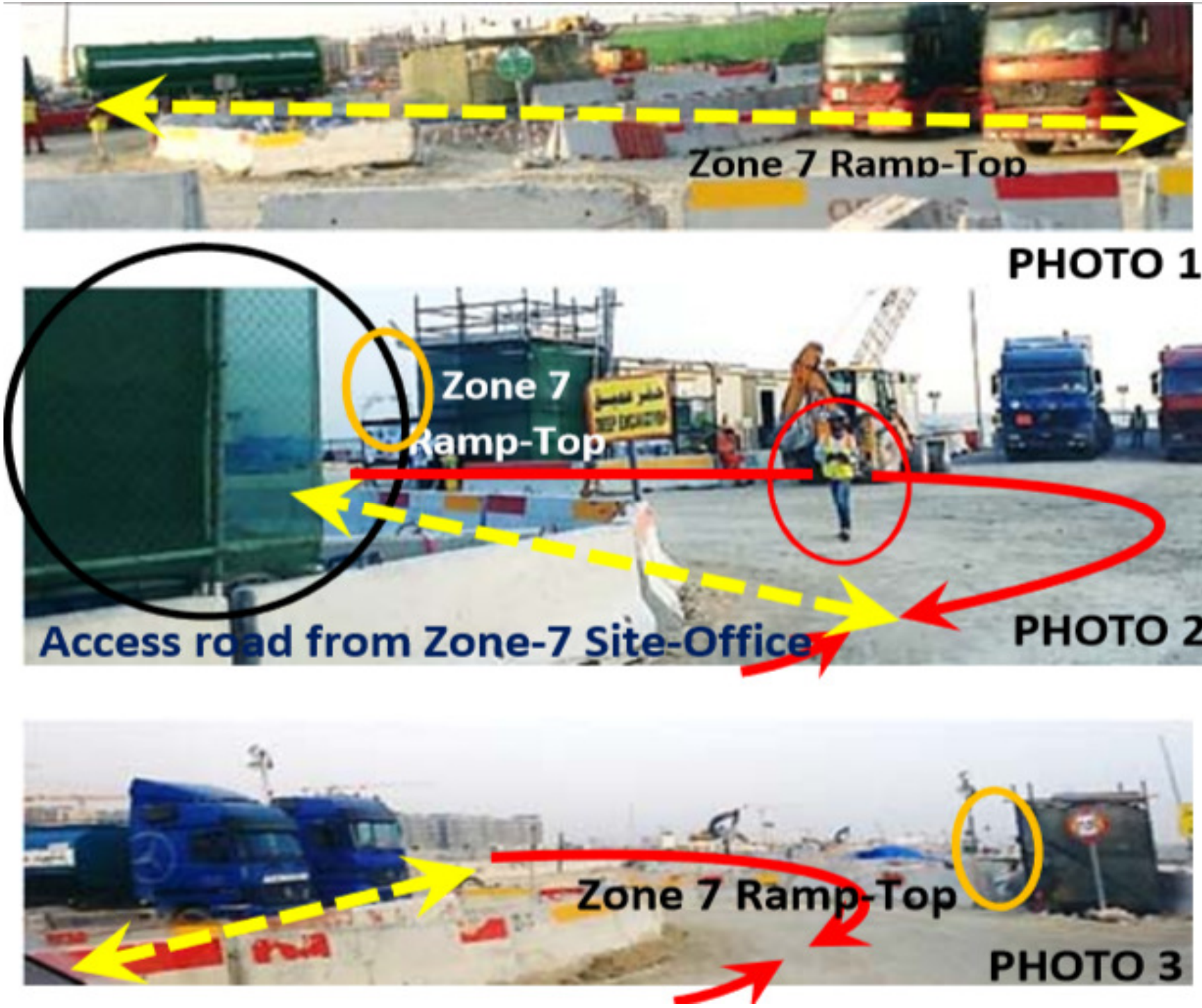

EXIT


مخرج أعمال
WORK
EXIT
قف
STOP
مخرج أعمال
WORK
EXIT
GN273


EXIT


Pedestrian
Route

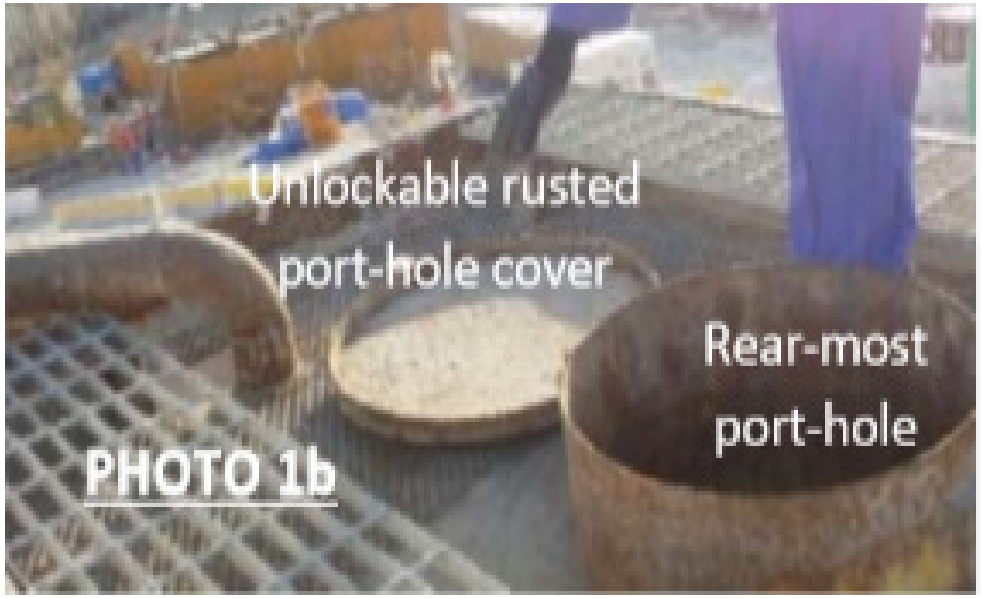
ROAD SAFETY AUDITS !

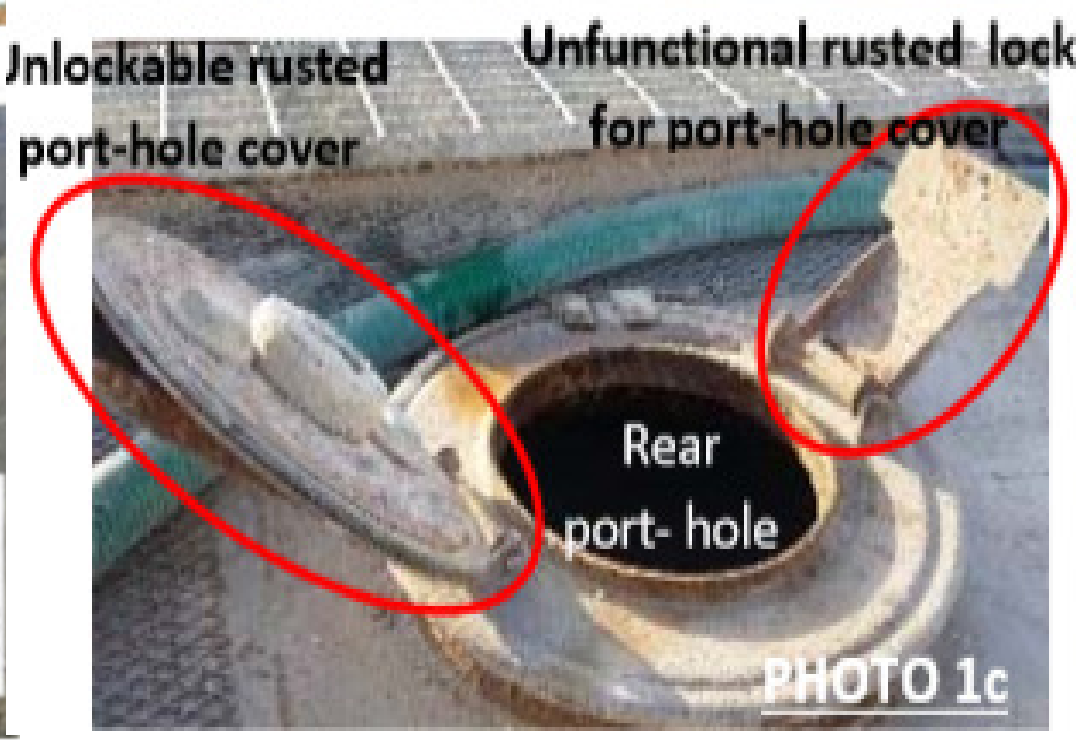

Zone 7 Ramp-Top
PHOTO 1
Zone 7
Ramp-Top
Access road from Zone-7 Site-Office
PHOTO 2
Zone 7 Ramp-Top
PHOTO 3

OBSERVATION	PICTURE (LOCATION)	CORRECTIVE ACTIONS	RISK RATE
ROAD SAFETY HAZARD Obscured sight-line (indicated by dashed yellow-line arrow) for drivers on the two approaches to a sharp U-bend, between Zone-7 ramp top level and the access road from Zone-7 Site-Office, caused by dust-screens (circled in black) that have been installed at Zone-7 laydown yard perimeter, as also sometimes by water-tankers that park on Zone-7 ramp top about 2-3 m nearer the bend than necessary. See Photos 1 to 3. **ROAD SAFETY RISKS:** 1. Head-on type of vehicular crashes between vehicles reaching the bend from opposite directions, as indicated by red arrows. 2. Vehicle-to-pedestrian type crashes between vehicle and pedestrians walking on the bend, (circled in red). Note: The above risks are compounded during foggy/wet weather and at night.	 PHOTO 1  PHOTO 2  PHOTO 3	1. Install convex mirror at the corner of bend at location shown as circled in amber colour. 2. Dismantle dust-screens on those bays of Zone-7 laydown yard perimeter that are located at or near the bend. 3. Install signage for water-tanker parking area at parking bay limits. 4. Deploy traffic marshal at the bend. 5. Install "10 Kmph" speed-limit signs on both approaches to the subject bend.  6. Install curve warning signs on both approaches to the bend.  7. Install "No Overtaking" sign on both approaches to the bend.  8. Install tower light at/near the bend.	Medium to High

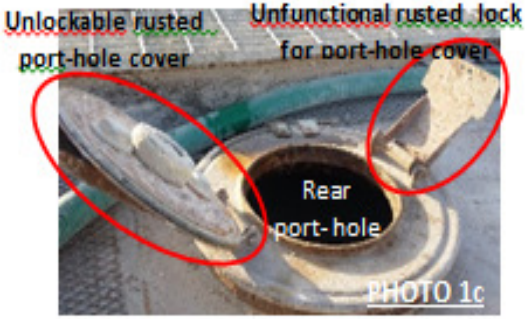
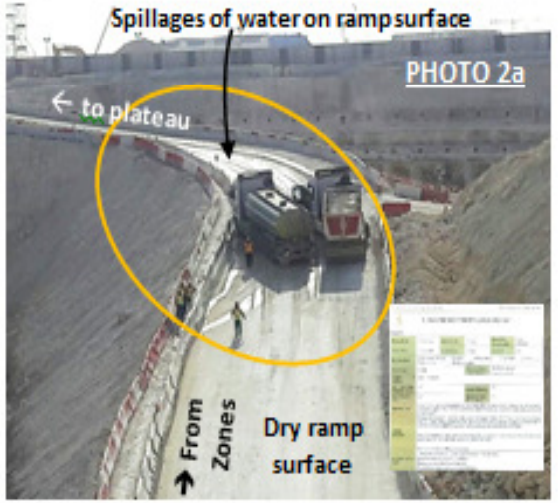

PILLAR 3
Safer
Vehicles

Exit Ramp





Tanker filling bays Zone-7

OBSERVATION	PICTURE (LOCATION)	CORRECTIVE ACTIONS	RISK RATE
ROAD SAFETY HAZARDS 1. Water spillage in general from unsecured rear hatch/port-hole (Photo 1a) of loaded water-tankers, on the ascending grade of the Exit Ramp making the earthen carriageway surface muddy. See for example tanker (plate No. 41611) driving up on the Exit Ramp spilling water near left-handed bend, making the spilled-over patches muddy on 7th December, 2016 at 11: 30 AM.(start of break time)   	Exit Ramp   Tanker filling bays Zone-7	1. For water-tankers carrying water with defective port-hole cover locks and covers: (Photos. 1b to 1d) a) Do not allow entry to site b) Issue monetary fines Note: While ascending Exit Ramp, the water inside tanker flows backward creating a dynamic surge force that pushes open the unsecured rear port-hole cover, causing spillage of water. The surge force intensity increases with the intensity of jerks given to the vehicle by driver while driving. 2. Regulate rate of water-sprinkling from bowser tanker by adjusting sprinkler valve and controlling the speed of bowser-tanker during sprinkling.	Low to mediun

2. Excess rate of water-sprinkling by water-tanker-bowser on earthen ramp/road surface as dust control measure, making the surface muddy. See completely wet carriageway surface on Exit Ramp portion upward of the left-handed bend in Photo 2a, on same day, 7th December, 2016 at 1:40 PM (break-time end) and resultant slippage of water-tanker and dumper-trailer.

ROAD SAFETY RISKS:

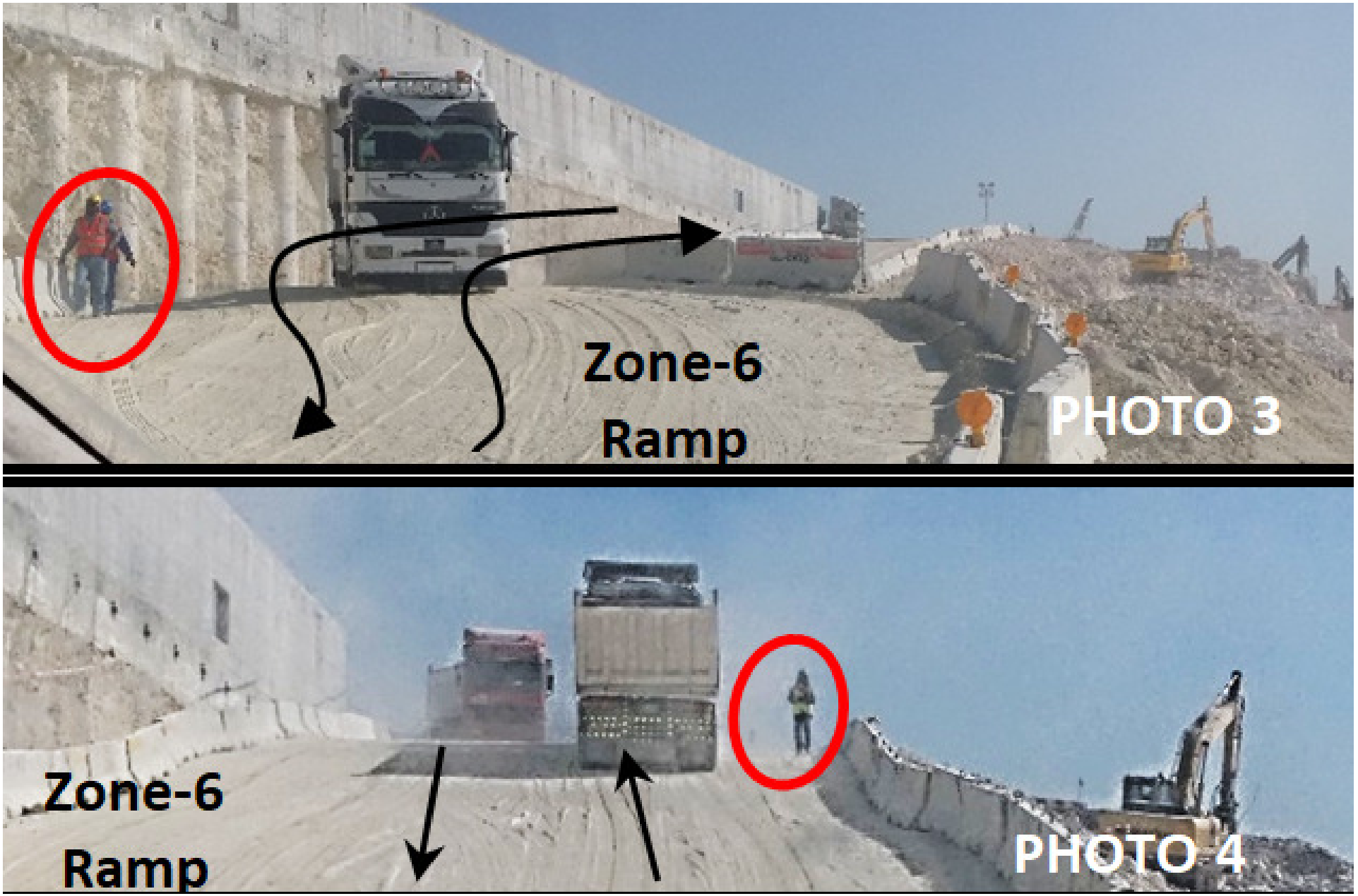
1. Low to medium risk of loss-of-control type vehicle-to-stationary object collisions between vehicle and concrete barriers positioned on both shoulders of the Exit Ramp carriageway.

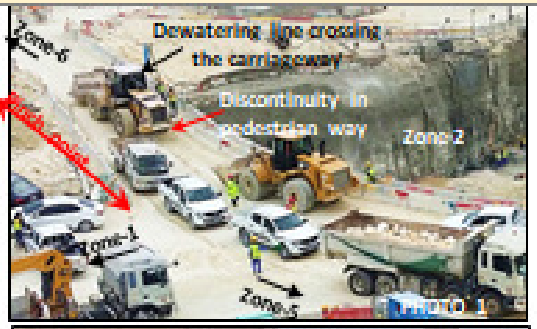
2. Low to medium risk of loss-of-control type vehicular collisions between adjacent/trailing vehicles skidding on muddy ramp surface, while trying to ascend on the Exit Ramp.


PILLAR 4
Safer
Road Users


Zone-6
Dewatering line crossing the carriageway
Discontinuity in pedestrian way
Pinch point
Zone-2
Zone-1
Zone-5
PHOTO 1


Pinch point
Zone-2
PHOTO 2


Zone-6
Ramp
PHOTO 3
Zone-6
Ramp
PHOTO 4

ROAD SAFETY ISSUE	PICTURE (LOCATION)	MITIGATIVE ACTIONS RECOMMENDED	RISK RATIN
ROAD SAFETY HAZARDS • Carriageway "pinch-point" (a narrow stretch of ramp carriageway) at the bottom of a descending reverse curve on Zone-6 ramp, having two-way traffic flow, especially of heavy vehicles and moving equipments, between Zones 1 and 2 west of the pinch-point and Zones 3 and 6 to the east. See Photos. 1 and 2. • Pedestrians walking unprotected on the carriageway of Zone-6 ramp and the above-mentioned pinch-point, in absence of segregated pedestrian-ways there. See Photos. 3 and 4. **ROAD SAFETY RISKS:** • Risk of vehicular collisions at the pinch-point, due to sudden narrowing of the very wide carriageway of Zone-6 ramp descending over the sharp reverse bend. See Photo. 3. • Risk of vehicle-to-pedestrian collision between vehicles descending from Zone-6 ramp and pedestrians walking on carriageway of the Zone-6 ramp and the pinch-point. See Photos. 3 and 4. Note: The above risks are compounded at night/ during foggy weather.	   	1. Widen the pinch-point access carriageway by cutting away side-slope of Zone-6 ramp to lower the dewatering line crossing (below the carriageway level. See Photo 1 2. Extend the installed alignment of pedestrian-way crash barriers from the point of discontinuity (see photo. 1) up on the Zone-6 ramp upto its top. 3. Install two traffic marshals on either side of the pinch-point, until it is widened. 4. Install "Reverse bend", "No- Parking No-Waiting", "Two-Way Traffic Flow", "No Overtaking", "15" Km speed-limit and "SLOW" traffic signs, facing both ways on the carriageway shoulders at the top and bottom of Zone-6 ramp.  5. Instal "Road Narrows on Both Side", "10" Kmph Speed-limit signs on either end of pinch-point.  6. Install "Deep Excavation" text signs on valley side shoulder of Zone-6 ramp and pinch-point carriageway. 7. Install "Pedestrian Way" signs on side shoulder of Zone-6 ramp and pinch-point carriageway. 8. Install tower-lights for adequate lighting of the access path at night located on benches cut at the side-slopes above the pinch-point and the sharp reverse bend location.	Hig


TC-17
Access through
Zone 4 (South) area
PHOTO 1c

PHOTO 1a

PHOTO 1b

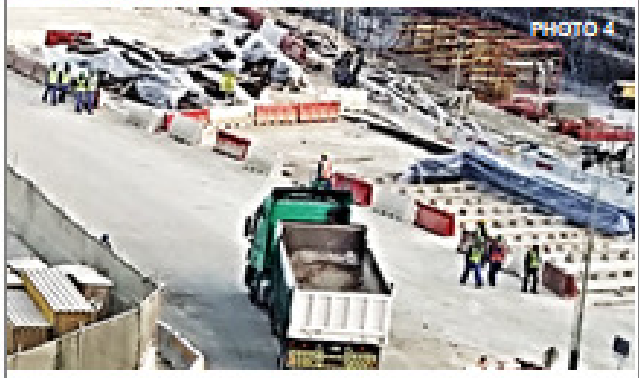
NO.	OBSERVATION	PICTURE (LOCATION)	CORRECTIVE ACTIONS	RISK RATE
1	**ROAD SAFETY HAZARD** • Jib of Tower crane TC17 working inside Zone 1 tunnel sweeps over the proposed new access in Zone 4 (South) area and loading trolley travels directly overhead above traffic on new access. **ROAD SAFETY RISK:** • Risk of fallen item of load from the trolley of TC-17 jib hitting vehicles/moving equipments and pedestrians travelling directly beneath the load in the event of a lifting failure. Note: The above risk would get compounded at night/ during foggy weather.	 PHOTO 1a  PHOTO 1b  PHOTO 1c	1. Include directives for tower crane operators of TC-17 in Lifting Method Statement to pull back loading trolley to near-end of jib as the jib sweeps over the new access road on eastern flank of Zone-1 tunnel. 2. Provide two traffic marshals on the new access road on either side of TC-17 to stop traffic over the new access road in the event of the loading trolley over the TC jib approaching overhead above traffic. 3. Install "!" (other danger) sign, "No Parking No Waiting" sign, "No Overtaking", "20" Km speed-limit and "SLOW" traffic signs, facing both ways on the carriageway shoulders.  4. Install tower-light for adequate lighting of the access path at night near TC-17 location.	High

PEDESTRIANS ARE VULNERABLE IF NOT SEGREGATED FROM MOVING PLANT AND VEHICLES!


Entry Ramp
PHOTO 1


PHOTO 2

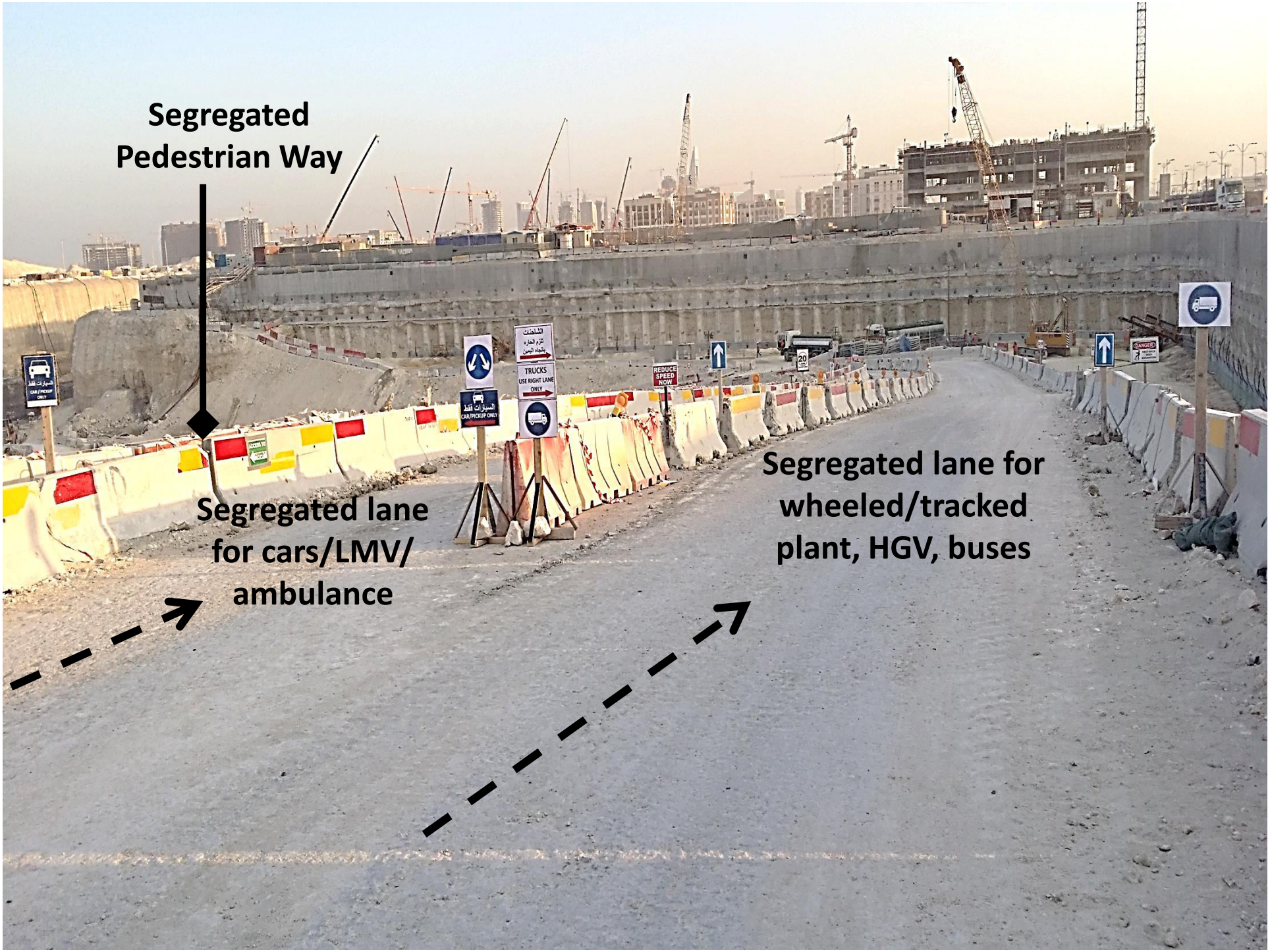

PHOTO 3

NO.	OBSERVATION	PICTURE (LOCATION)	CORRECTIVE ACTION	RISK RATE
	ROAD SAFETY HAZARDS 1. Massive traffic congestion on site-entry road near Gate No. 3 caused by usually very high volumes of earthmoving dumpers and trailers arriving to enter site, especially early in the morning, thus leaving cars, pick-ups and light vehicles trapped within the queue of heavy vehicles. 2. Extremely long traffic queues of dumpers and trailers formed on the entire length of Entry Ramp early every morning, often lining up on both lanes of the carriageway, thus leaving little room for cars, pick-ups and light vehicles to pass through. (see Photos 1, 2 and 3) **ROAD SAFETY RISKS** 1. Rear-shunt, side-on and side-swipe types of vehicular collisions on site-entry road outside and on the Entry Ramp inside the site due to impatient drivers making sudden manouevres to escape from long queues caused by congestion. 2. Vehicle-to-pedestrian type of collision risks at the bottom level of Entry-Ramp due to accelerating vehicles driving very close to pedestrians alighting from buses to walk upto their work-zones/areas. (see Photos 4 and 5) Note: The above risks are compounded during foggy/wet weather and at night.	   	Regulating the despatch of dumpers and trailers from originating vehicles yard early in the morning, at time intervals that is in proportion to the statistically observed time-cycles for their queueing, entry, loading and egress from site.	Low to Medium


Segregated lanes were carved out
of the 12 – 15 m wide ramp carriageway

Segregated driving lanes

Segregated pedestrian way


Segregated
Pedestrian Way
Segregated lane
for cars/LMV/
ambulance
Segregated lane for
wheeled/tracked
plant, HGV, buses
TRUCKS
USE RIGHT LANE
ONLY
REDUCE
SPEED
NOW
CAR/PICKUP ONLY
DANGER


السيارات فقط
CAR / PICKUP ONLY
السيارات فقط
CAR/PICKUP ONLY


الشاحنات
تلزم الحاره
باتجاه اليمين
TRUCKS
USE RIGHT LANE
ONLY
السيارات فقط
CAR/PICKUP ONLY
REDUCE
SPEED
NOW
20
DANGER


20


تمهل
SLOW
WEAR SEAT-BELT WHILE DRIVING
مدخل أعمال
WORKS ACCESS
أمن المواقع
SITE SECURITY


PILLAR 5
Post-Crash
Response

- A two-bedded adequately equipped **clinic** manned by a team of a **qualified doctor**, two **male nurses** each for the day and night shift and a **female nurse** in the day shift.

- Two **ambulances** each with a **driver** and a **paramedical staff**.

- Tie ups with two **hospitals** for referring serious cases.

ENVIRONMENTAL CHALLENGES ...

Its much cheaper…

to TRAP the dirt inside,

than to TRACK it outside!


Installation of mild steel grating on concrete bedding for trapping dirt from wheels at site egress point


JAC

DIRT/MUD CONTROL SECTION AT SITE EGRESS POINT

ROAD SAFETY HAZARD

Loose gravel/aggregate cushion on approach section to dirt-control point and the section between dirt-control point and permanent asphalt road, choked with dirt from surface water creating a muddy/slushy carriageway surface over the exit-lane of access point. (See photo)

ROAD SAFETY RISK

1. Loss-of-control type vehicular collisions due to skidding of tyres on muddy gravel surface on the approach to dirt-control point on exit lane.
2.
3. Low to medium risk of vehicle-to-stationary-object type collisions of vehicles due to speeding vehicles approaching exit point and hitting raised dirt-control point and/or concrete barriers.

Note: The above risks are compounded during foggy/wet weather and at night.

Dirt Control Point at Site Access
Near Gate No. 3

PHOTO 6

1. Maintenance of clog-free loose gravel/aggregates by periodic shoveling, replacing or additional filling, spreading and grading if needed.

2. "10 Kmph" speed-limit sign, "Speed-hump" signs to be placed behind barriers on shoulders and "Keep Right" sign at the terminal end of median barriers facing approaching traffic.

Low to Medium

DRIVING ADVISORY

FOR

GRAVEL ROADS

- **Drive slowly as there is less traction on gravel making it easier to lose control.**
- **If traffic signs warn of a gravel road ahead, slow down as the transition to gravel is often eroded and should be treaded with caution.**
- **Brake before entering corners to slow down enough, so as to negotiate the corner in controlled manner and be able to exit corner with mild acceleration.**
- **Follow tyre tracks wherever possible to keep to firmer ground, keeping away from loose gravel on the roa edge, to avoid run-off and rollover of vehicle.**
- **Slow down for corrugations (bumps) on the road, to avoid drifting sideways across the corrugations, even at low speeds.**
- **Drive at lower gears on gravel roads, using the engine as a brake without the need of much braking.**
- **Steer and brake as smoothly as possible avoiding jerks which may cause vehicle to skid.**
- **Drive slowly at approaches to blind corners and crests.**

T H A N K Y O U !

"IT IS NEVER AN END BUT…

ALWAYS A RE-START ! "

Ravi Choudhary