 ITSO Division	Division/Section: ITSO Division /ITSO OCC Traffic Operations	Rev No. 2
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	<h2>Handling& Managing of Major Incidents</h2>	

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DOCUMENT CONTROL

REV	DOCUMENT TITLE & COPY NUMBER	Date	Prepared by	Reviewed by	Approved by
0	Handling & Managing of Major Incidents Copy____of ____	15 th December 2009	Muhamad Ridha (OE)	Alfred Loh (SOE)	Soh Ling Tim (MOPN)
1	Handling & Managing of Major Incidents Copy____of ____	XX October 2013	Chiam Zhi Wei (DysOE) Chua Teck Leong (AOM, ITSO OCC)	Ng Soon Han, Frankie (DOM, ITSO OCC)	Yeo Se Lay (SM,Ops)
2	Handling & Managing of Major Incidents Copy____of ____	XX December 2020	Daniel Wu (AOM) Lye Keng Fatt (DM, ITSO OCC)	Ng Soon Han, Frankie (Mgr, ITSO OCC)	Yeo Se Lay (DDIT)

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AMENDMENT HISTORY RECORD

Rev No.	Effective Date of Change	Section & Sub- Section Amended	Amendments/ References	Party Requesting for Change
1	XX Oct 2013	Whole Document	Due to organization change of division name from ITSO to ITSO.	DOM, ITSO OCC
2	XX Dec 2020	Whole Document	Due to change of Staff Designations in ITSO OCC. Delete SOE, insert DM Delete DySOE, insert DyAM	Mgr, ITSO OCC

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Section 1. Introduction

- 1.1.1 This document describes the general principle for ITSO OCC in terms of operational handling and managing major complex road incidents that may or may not result in a severity level 3, 2 or 1 incident classification (Refer to Attachment 1 for definition).
- 1.1.2 **Major Incidents** that are road related can be define as having a greater impact on road usage safety, the traffic flow condition and prolong delay to all road users as compared to a minor incident. It may also involve multiple human injuries and emergency services or it may result in a major degradation of traffic services provided by ITSO OCC.
- 1.1.3 The role of ITSO OCC in any road related incident is mainly an operational function. Any major incidents that cannot be handled with operational decision will result in escalation and management decision to upgrade the classification incident to level 1 or 2 ITSO OCC shall handover the incident management to CMG as soon as it is practicable. Before the CMG convenes, ITSO OCC will handle the initial actions in consultation with the KCO and/or Manager (Operations).
- 1.1.4 For any emergency situations, with effect from 08 June 2004, vehicles owned or authorized by LTA are allowed to use the road shoulder for emergency purpose, without the need to seek Traffic Police's permission. However, the empowerment to use the road shoulder shall come from the Deputy Manager (ITSO OCC). The guidelines for using the road shoulder are detailed in Attachment 2.

Section 2. Personnel Involved

- a) ITSO OCC staff
- b) LTM & VRS staff
- c) Other LTA department staff
- d) External Agencies

Section 3. Actions & Process

Sub-Section 3.1 Handling & Managing Major Incidents on the Expressway

- 3.1.1 Upon occurrence or detection of an incident. Both DM and OE will try to ascertain the incident by all means at their disposal.
- 3.1.2 Once confirmed DM & OE will execute initial actions to secure the site, activate the necessary resources and co-ordinate with other agencies to handle the situation. This will include creating an incident report (IR), implement messages, dispatch EMAS recovery crew, LTM, inform traffic police and traffic watch. If the incident requires other external or internal agencies assistance, e.g. PUB, NEA, Nparks, SCDF, LTA RAMs, ITSO maintenance team etc.... they will be informed accordingly.
- 3.1.3 DM will analyze the impact of the incident based on the nature of the road network and average traffic volume of that road, severity of the incident before deciding on escalation to management via sms (Refer to Attachment 7 for criteria for escalation).
- 3.1.4 DM may need to make additional operational decision and direct OEs as the incident progress in order to mitigate the impact. Example, DM to configure ad-hoc messages

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for OE to display on site to mitigate the traffic jam caused by the incident or if more VMS are required to display messages for the incident.

- 3.1.5 DM and OE to continue monitoring the incident, and DM will update the progress of the incident to higher management until it is over.
- 3.1.6 If the situation deteriorate, management may decide to upgrade severity to level 2 or 1 and ITSO OCC will assume the following functions:
 - a. Execute the initial response plans to contain the incident site and evacuate trapped motorists upstream of incident site;
 - b. Manage the incident until Management takes over the decision making process.
 - c. Report and escalate incident occurrence to Management for a decision to activate the LTA CMG;
 - d. Co-ordinate with the external agencies (e.g. SCDF, TP, SPF) and internal divisions (e.g RAM,CMG, LTOC) and cells (Operations, Planning and Admin) in managing the incident;
 - e. Provide regular situational updates to the LTA CMG on rescue and recovery actions taken and act on directions given by the CMG;
 - f. Assist in the recovery and reinstatement works, as well as the incident investigation works
 - g. Information presentation to higher management

Sub-Section 3.2 Handling & Managing a Major Incident on Arterial Roads

- 3.2.1 As of the current procedure any incident occurring on arterial roads outside the VRS contract boundary RC will not be sent to site.
- 3.2.2 For incident on arterial roads, traffic police or division police will handle the incident and manage the traffic on site. They will also do the road diversion or closure if need be.
- 3.2.3 However, DM holds the rights to activate RC or LTM to any incident on arterial roads if he or she feels that the occurred major incident is serious and additional resources may be needed or the incident will cause massive congestion affecting the expressways or critical roads or VIP routes.
- 3.2.4 DM may instruct the OE to adjust traffic light timings to mitigate the traffic jam. Messages will also be displayed on VMS to inform motorists of such incident so that the latter will not travel along that road and join the jam. Traffic watch will be informed, followed by the required agencies if necessary.
- 3.2.5 DM shall escalate such major incident occurrence to the management if they deem the incident warrants management notification (Refer to Attachment 7 for criteria for escalation).

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- 3.2.6 If the situation deteriorate, management may decide to upgrade severity to level 2 or 1 and ITSO OCC will assume the following functions same as those reflected in section 3.1, sub-section 3.1.6 of this document.

Section 4. Abbreviations

CMG Crisis Management Group
 EMAS Expressway Monitoring Advisory Service
 ITSO Intelligent Transport Systems Operations
 LTA Land Transport Authority
 LTM Land Transport Authority Traffic Marshals
 NEA National Environment Agency
 Nparks National Parks
 OE Operations Executive
 OCC Operations Control Center
 PTZ Pan Tilt Zoom Camera
 PUB Public Utilities Board
 RC Recovery Crew
 RAM Road Asset Maintenance
 DM Deputy Manager
 DyAM Deputy Assistance Manager
 SPF Singapore Police Force
 SCDF Singapore Civil Defense Force
 TM Traffic Management
 TP Traffic Police
 VRS Vehicle Recovery Service
 VMS Variable Message Signs

Section 5. References & Attachments

1. Intelligent Transport Systems Operations (Operations), Integrated Standard Operating Procedures
2. ITSO Crisis Management Procedure

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ATTACHMENT 1-Classification of Incident Severity Levels

The severity levels of incident can be classified as:

A1) Level 1- The most serious classification of a peacetime incident. This level would denote that the incident is a civil emergency at National level with the Executive Group (EC) convening to manage the incident. LTA will assume a supporting and advisory role with other government agency taking the lead. Example, collapse of MRT/LRT structure, road tunnel or viaduct, severe flooding, fire or explosion in tunnel/underpass, Island wide power failure, Terrorism/sabotage on road network systems, Toxic or inflammable substance spill, objects (Large & Heavy) crashing onto moving trains.

A2) Level 2- Denotes a peacetime major incident that involves the Land Transport System with the management deciding to activate LTA CMG/MOT CMG to manage the incident. LTA CMG/MOT CMG will decide if the incident level needs to be upgraded. Example, major damage of bridge structure / vehicular viaduct / tunnel, flooding, gas leaks affecting personnel on site, landslide resulting in actual or potential collapse of road infrastructure, Fire/sabotage at ITSO, Major and prolonged service disruption due to power or systems failure, Flooding or explosion/fire in vehicular tunnels

A3) Level 3- Denotes a peacetime major incident that do not require the activation of the LTA Crisis Management Group (CMG) to handle the situation. They are localised in nature, where loss of life and injury are confined to individual or small numbers, and where service disruption is minimal, and manageable by applying the departmental Standard Operating Procedures. Example, collapse of crane or lifting machinery with/without fatalities, Minor landslide/cave-in affecting part of carriageway, overhead gantry structure damaged, building/surface subsidence affecting the public, major accident involving multiple lane closure in tunnels, minor collapse of temporary or permanent works, accident involving major injury to one or more personnel on site, bomb scare/alert tunnel, flooding in CTE tunnel, power failure in tunnels, split Paint causing skidding of vehicles, major accident involving multiple lanes closure in Tunnels.

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ATTACHMENT 2- Guidelines on the Use of Expressway Shoulder for EMAS Recovery Vehicles

The Control Room Deputy Manager shall give the permission for the EMAS tow trucks to travel on the road shoulder (if available) to attend to incidents based on the following criteria:

1. Length of congestion greater than 2km as a result of the occurrence of serious incidents. Serious incidents are defined as follows:
 - Incidents that result in only one or no passable lane on the expressway
 - The 2km traffic queue has lasted for more than 15 minutes

All EMAS tow crews upon instructed to travel on road shoulder to reach the incident scene will have to adhere to followings:

- Switching on revolving lights
- Switching on head lights and hazards light at all times
- Depending on the width of the shoulder, tow crew is to regulate the traveling speed accordingly to ensure safe travel.
- Traveling speed shall not exceed 60 km/h at all times
- Paying special attention to the vehicles ahead of them that may suddenly filter onto the road shoulder.

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ATTACHMENT 3- Approved Abbreviation for Usage by ITSO OCC Operators

Approved Abbreviation for Usage by ITSO OCC Operators		
DC - Detection camera PTZ - Surveillance camera TP - Traffic Police IO - Investigation officer RCS - Traffic watch RC - Recovery crew AB - Ambulance HGV - Heavy good vehicles M'sian - Malaysia OTC - Own towing crew OTM - Own towing mechanic FB-Fire Brigade US – understudy TCMT-Traffic Congestion Management Team	B/d – Breakdown Acc - Accident CC – Chain collision Misc - Miscellaneous Veh - vehicle L/p - lampost VIG - vehicle impact guardrail Ln - lane SH - Shoulder F/O - Flyover aft - after bef - before LTM – Land Transport Authority Traffic Marshal	m/f - mechanical fault f/t - flat tyre abd - abandoned n/p - no petrol OA – Optical Assembly BO - blackout FY - flashing yellow LCB – Lamp Control Board MCB – main Circuit Breaker RCCB –Residue Current Circuit Breaker OSM – On Scene Management OSI – On Scene Investigation

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ATTACHMENT 4- Major Accident In Tunnel Checklist

Time	Tunnel OE	Other Zone OE	DM
H + 0 min	<div><div><input type="checkbox"/> Detects & confirm accident by CCTV camera or by other sources</div><div><input type="checkbox"/> Inform DM & Create Accident Situation.</div><div><input type="checkbox"/> Activate VRS & LTM.<div><div>➤ To perform traffic control and assess incident situation on-site.</div><div>➤ Close affected sections of expressway and activate more LTM & VRS to assist if total closure is required.</div></div></div><div><input type="checkbox"/> (For motorist injury) Call Traffic Police to inform:<div><div>➤ Location</div><div>➤ Accident situation</div><div>➤ Casualties</div><div>➤ Camera to view</div><div>➤ Access route</div></div></div></div>	<div><div><input type="checkbox"/> To perform normal own zone duties.</div><div>OR</div><div><input type="checkbox"/> IF total closure is required, assist to call Traffic Police to inform:<div><div>➤ Location of accident & total closure</div><div>➤ Accident situation</div><div>➤ Casualties</div><div>➤ Camera to view</div><div>➤ Access route</div></div></div><div><input type="checkbox"/> Play RBBI.</div></div>	<div><div><input type="checkbox"/> Call KPE if incident is predicted to affect KPE.<div><div>➤ CCTV to view</div><div>➤ Location & incident bound.</div></div></div><div>OR</div><div><input type="checkbox"/> IF total closure is required SMS incident to Key Officers</div><div><input type="checkbox"/> Strategize with VRS & LTM DO on how best to secure the affected site</div><div><input type="checkbox"/> Assist to call external agencies if requ</div></div>

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H + 1 To 3 min	<div><input type="checkbox"/> Call Traffic Watch.</div> <div><input type="checkbox"/> Call LTOC. (6396 2952)</div> <div><input type="checkbox"/> Call One-Call-Center. (6538 8330)</div> <div><input type="checkbox"/> Modify and implement response plan if necessary.</div> <div><input type="checkbox"/> Check CO2 levels if exceeds 150ppm to activate jet fans</div>	<div><input type="checkbox"/> To perform normal own zone duties.</div>	<div><input type="checkbox"/> Inform OE to check congestion area CO level. (AMS sensors)</div> <div><input type="checkbox"/> Inform RAMs for any damage to property.</div> <div><input type="checkbox"/> SMS incident to Key Officers if congestion is 3km or more.</div>
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Time	Tunnel OE	Other Zone OE	DM
Arrival of VRS & LTM	<input type="checkbox"/> Modify and implement response plan if necessary base on LTM & VRS on site report	To perform normal own zone duties.	<input type="checkbox"/> Infd update to KPE on expected. Congestion if it affects KPE: ➤ Junctions ➤ Adjoining expressway
Arrival of Police.	<input type="checkbox"/> Info update	To perform normal own zone duties.	<input type="checkbox"/> Info update SMS
End of Incident	<input type="checkbox"/> Update situation record. <input type="checkbox"/> Remove response plan and close IR <input type="checkbox"/> Inform LTM and VRS to commence Tunnel re-opening once DM has given the clearance. <input type="checkbox"/> Update Traffic Watch	To perform normal own zone duties	<input type="checkbox"/> Confirm clearance from TP to open Tunnel. <input type="checkbox"/> Check Congestion has cleared. <input type="checkbox"/> Update KPE <input type="checkbox"/> Update SMS. .

ATTACHMENT 5- Major Flooding In Tunnel Checklist

1. Time	2. Tunnel OE	Other Zone OE	DM
H + 0 min	<div><input type="checkbox"/> Verify & confirm Flooding by CCTV camera.</div> <div><input type="checkbox"/> Inform DM & Create Flooding Situation</div> <div><input type="checkbox"/> TP to inform<ul style="list-style-type: none">➤ Location➤ Camera to view➤ Access route</div>	To perform normal own zone duties	<div><input type="checkbox"/> Call DDIT & seek clearance to close affected section of tunnel (9668 3651)</div> <div><input type="checkbox"/> Strategize with VRS & LTM DO on how best to secure the affected site</div> <div><input type="checkbox"/> Assist to call external agencies if required</div> <div><i>Call SCDF again if unable to determine the access route to incident site.</i></div>

H + 1 To 3 min	<div><input type="checkbox"/> Call Traffic Watch</div> <div><input type="checkbox"/> Activate VRS & LTM.<div><div>➤ To close all affected entrance slips</div><div>➤ To perform traffic control at Flooding location.</div></div></div> <div><input type="checkbox"/> Activate pumps to clear floodwater.</div> <div><input type="checkbox"/> If unable to clear flood water to seek assistance from SCDF to pump out water</div>	<div><input type="checkbox"/> Call One-Call-Center (6538 8330)</div> <div><input type="checkbox"/> Call LTOC. (6396 2952)</div> <div><input type="checkbox"/> Call SCDF to inform them of the access route to incident site.</div>	<div><input type="checkbox"/> SMS incident to Key Officers.</div>
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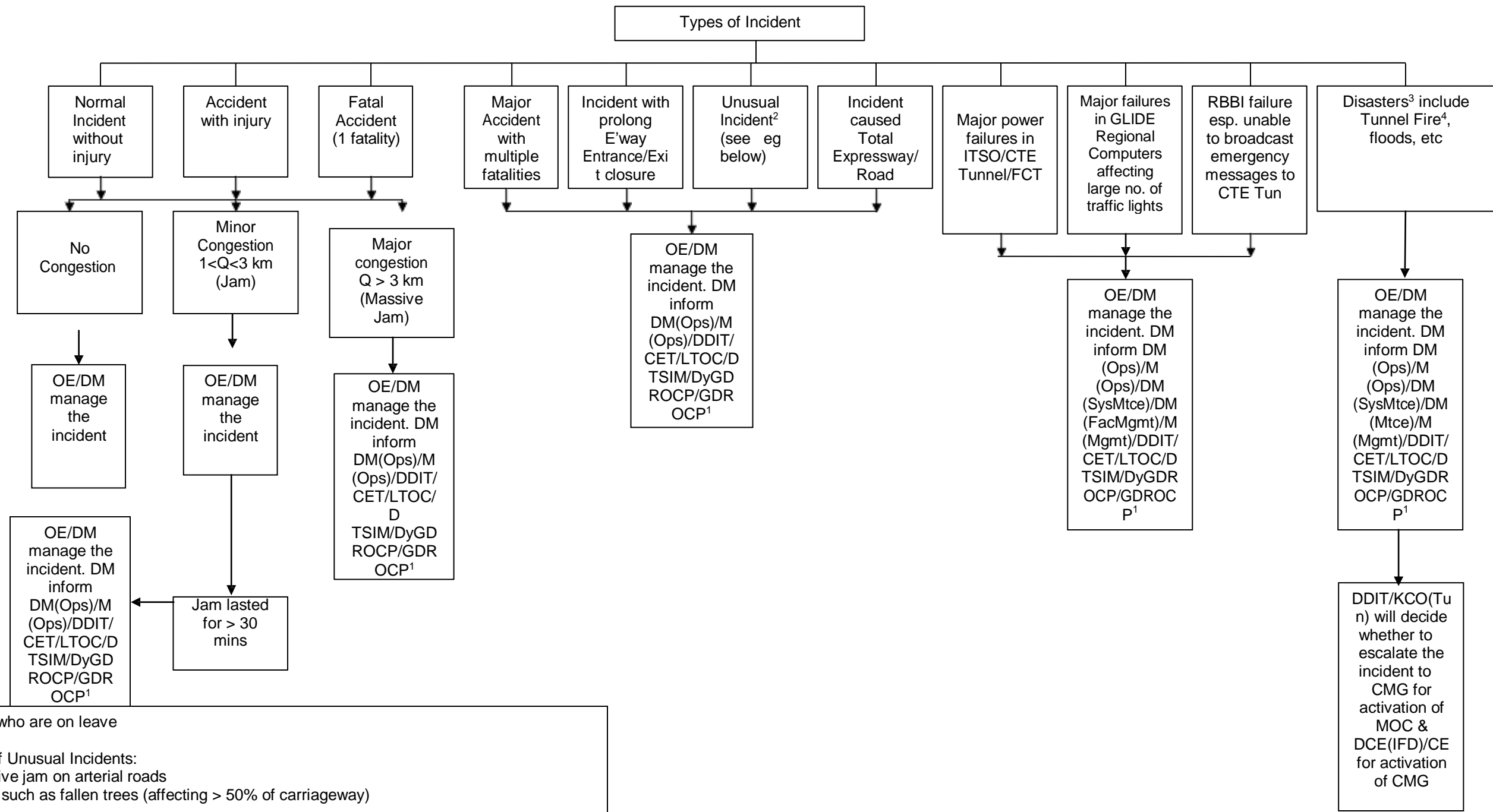
3. Time	4. Tunnel OE	Other Zone OE	DM
Arrival of VRS & LTM	<input type="checkbox"/> Modify and implement response plan if necessary base on LTM & VRS on site report. <input type="checkbox"/> Close affected sections of tunnel and activate more LTM & VRS to assist if total closure is required.	To perform normal own zone duties.	<input type="checkbox"/> Infd update to KPE on expected. Congestion if it affects KPE: <ul style="list-style-type: none"> ➤ Junctions ➤ Adjoining expressway
Arrival of SCDF and Police.	<input type="checkbox"/> Info update	To perform normal own zone duties.	<input type="checkbox"/> Info update SMS
Re-opening of Tunnel & end of incident	<input type="checkbox"/> Update situation record. <input type="checkbox"/> Remove response plan and close IR <input type="checkbox"/> Inform LTM and VRS to commence Tunnel re-opening once DM has given the clearance. <input type="checkbox"/> Update Traffic Watch	To perform normal own zone duties	<input type="checkbox"/> Confirm clearance from TP & SCDF to open Tunnel. <input type="checkbox"/> Check Congestion has cleared. <input type="checkbox"/> Update KPE <input type="checkbox"/> Update SMS. .

ATTACHMENT 6-Power Failure In Tunnel Checklist

Time	Tunnel OE	Other Zone OE	DM
H + 0 min	<div><input type="checkbox"/> Check Tunnel lighting level.</div> <div><input type="checkbox"/> Inform DM & Create IR.</div> <div><input type="checkbox"/> Activate VRS & LTM. To stand by close tunnel</div>	Perform own zone duties	<div><input type="checkbox"/> Check with Power Grid on the status.</div> <div><input type="checkbox"/> Tunnel contractor and tunnel maintenance team to start stand by generator.</div>
H + 1 To 3 min	<div><input type="checkbox"/> Stand by generator kicks in no further action is required.</div> <div>5. OR</div> <div><input type="checkbox"/> If stand by generator does not kick in instruct LTM and VRS to close Tunnel upon clearance by DM</div> <div><input type="checkbox"/> Call Traffic Watch.</div> <div><input type="checkbox"/> Modify (If necessary) response plan.</div>	<div><input type="checkbox"/> Stand by generator kicks in no further action is required.</div> <div>6. OR</div> <div><input type="checkbox"/> Call One-Call-Center (6538 8330)</div> <div><input type="checkbox"/> Call LTOC (6396 2952)</div>	<div><input type="checkbox"/> Stand by generator kicks in no further action is required.</div> <div>7. OR</div> <div><input type="checkbox"/> Call DDIT & seek clearance to close affected section of tunnel (9668 3651)</div> <div><input type="checkbox"/> Inform TP of closure</div> <div><input type="checkbox"/> SMS incident to Key Officers.</div>

Arrival of VRS & LTM	<div><input type="checkbox"/> Update Traffic Watch.</div> <div><input type="checkbox"/> Update IR</div> <div><input type="checkbox"/> Close Tunnel, activate more LTM & VRS to assist.</div>	<div><input type="checkbox"/> Perform own zone duties.</div>	<div><input type="checkbox"/> Information update via SMS</div>
Re-opening of Tunnel	<div><input type="checkbox"/> Inform LTM and VRS to commence Tunnel re-opening once DM gives the clearance</div> <div><input type="checkbox"/> Sweep both bound tunnel clearance before re-opening.</div> <div><input type="checkbox"/> Update situation record.</div> <div><input type="checkbox"/> Remove response plan and close situation.</div> <div><input type="checkbox"/> Update Traffic Watch</div>	<div><input type="checkbox"/> Perform own zone duties.</div>	<div><input type="checkbox"/> Confirm with Power Grid that power restored.</div> <div><input type="checkbox"/> Maintenance staff to check all systems are in working condition</div> <div><input type="checkbox"/> Update DDIT and permission to re-open Tunnel. (9668 3651)</div> <div><input type="checkbox"/> Information update via SMS</div>

ESCALATION OF INFORMATION ON INCIDENTS



¹To exclude those who are on leave

²Some examples of Unusual Incidents:

- (a) Abnormal massive jam on arterial roads
- (b) Huge obstacles such as fallen trees (affecting > 50% of carriageway)
- (c) Road cave-in
- (d) Serious upheaval of road surface
- (e) Flooding
- (f) Serious road settlement, subsidence or undulating carriageway over a considerable length of road
- (g) Unauthorised works on roads that adversely affect traffic flow / unusual events on roads
- (h) Severe damage to overhead gantry/cantilever sign causing massive jam or posing safety hazard (Also to inform DM (Fac Mgmt) & M (Mgmt) if it is an EMAS sign)

³Disaster – Please refer to the LTA CMG Minor Disaster List

⁴For Tunnel fire, SCDF takes command and control of the rescue and recovery operations

SMS Message

- (a) Est. Nos. of SMS per incident: (i) Start of an incident (ii) updates when there is a change in status (iii) End of an incident.
Min. = 3nos.
- (b) Format : <Time> : <New or U/D> : <Type of incident> : <Location> : <Actions taken> : <Impact of incident>
E.g. 0650hrs : New – Accident CTE(AYE) aft PIE(Changi) on Ln 1. TP & TW informed. Congestion 4km up to AMK Ave 1