AIRPORT OPERATIONAL AND SAFETY REQUIREMENTS

FOR CHANGI & SELETAR AIRPORTS

Compiled by

Safety and Health Unit
Engineering & Development Cluster

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CONTENTS

Note: The Contractor is required to confirm that they have read, understood and will comply with the AOS requirements including all attachments, annexes and appendix A by signing on the acknowledgement sheet found in Attachment A19.

FOREWORD

This set of Airport Operational and Safety (AOS) requirements is compiled and published by the Safety and Health Unit of Changi Airport Group (Singapore) Pte Ltd (CAG) Engineering & Development Cluster, with inputs from CAG Airport Emergency Service Division, Airport Operations Planning & Airside Division (Airside Management, Airside Operations Team & Changi East Development), Aerodrome Safety Unit and Aviation Security Unit. It also contains the requirements forwarded by the Air Traffic Services Division of the Civil Aviation Authority of Singapore (CAAS), Changi Airbase and Airport Police Division.

The requirements and specifications stipulated in this set of AOS requirements are intended for reference and compliance by Developers, Consultants, Project and Maintenance Contractors/Sub-Contractors and all parties working in the airport, who shall be referred to as "Work Party" or "Work Parties" in this document. These Work Parties are required to obtain an updated copy of the AOS requirements from the CAG Superintending Officer (S.O.), Project Officer or Coordinating Officer overseeing their works. A set of the AOS requirements is also normally found in the contract documents for project works within the airport. All Work Parties are to ensure that their management team and all their site workers read and understand the latest AOS requirements thoroughly and comply with them strictly when carrying out works within the airport premises. Compliance with all the AOS requirements shall constitute part of the Work Party's lease agreement and/or contractual obligations.

This set of AOS requirements is owned by CAG and will be updated/revised and re-published by CAG from time to time. Any suggestions for improvement, proposed correction of errors, or request for an updated copy can be directed to:

The Safety Manager
Engineering & Development Cluster
Changi Airport Group (Singapore) Pte Ltd
PO Box 168, Singapore Changi Airport
Singapore 918146

SECTION A - AIRPORT SECURITY REQUIREMENTS

1 WORKERS IN THE AIRPORT

All workers working in the airport shall be subject to security clearance and approval of Changi Airport Group (Singapore) Pte Ltd (herein referred to as the "CAG") and the Airport Police Division of the Singapore Police Force (SPF) whose decision on this shall be final and binding. Workers found objectionable to CAG or the Airport Police shall not be permitted to work in the airport.

2 SECURITY CLEARANCE FOR WORKERS

2.1 Prior to the commencement of the work, the Work Party shall submit the particulars of all the personnel he intends to deploy for the work in the Airport for the Seasonal Airport Pass application. The applications must be submitted via the online Airport Pass Application System at https://www.changiairport.com/corporate/e-services/airport-pass-application.html. Work Party shall be given access to the System by the respective CAG Project Officer. For Seletar Airport, the applications must be submitted via email. Work Party can obtain the application form and submission procedures from Seletar Airport's website at https://www.seletarairport.com/permits-passes.html.The Work Party shall allow at least 14 working days for the background screening and security clearance. The particulars of the workers required for the application shall include, but not be limited to the following:

a) Full Name
b) NRIC No. /Passport and Work Permit No.
c) Nationality
d) Date of Birth
e) Residential Address
f) Appointment
g) Nature of Duties

2.2 The Work Party shall ensure that all his workers involved in executing the works hold valid Work Permits. The Work Party shall also submit the particulars of all his workers for record and declare to the S.O., Project Officer and/or Coordinating Officer that all his workers hold valid Work Permits to carry out the works. All the cost for application and making of the Airport Passes (including photograph taking) shall be borne by the Work Party concerned.

2.3 Workers shall be required to surrender their Changi Airport passes to the Airport Pass Office (located at Terminal 2 Basement) and Seletar Airport Passes to the Seletar Airport Pass Office (located at Seletar Airport) upon the expiry of the Airport Pass, or when they have no more association with the work in the airport.

2.4 Any person found using the Airport Pass for unauthorised purposes will be arrested and prosecuted by the Airport Police. The Work Party management shall ensure that all his workers and sub-contractor workers comply with this requirement strictly at all times.

3 PHOTOGRAPH TAKING AND VIDEO FILMING

No photograph taking or video filming shall be allowed in the airport without the prior approval of CAG. Personnel who are caught with unauthorised photographing or video filming activities

in the airport will be arrested and prosecuted accordingly. All parties who wish to carry out filming or photography at Changi Airport will need to apply for a filming/photography permit from Changi Airport Group (CAG) at https://www.changiairport.com/corporate/e-services/filming-and-photography.html

4 SITE ENTRY AND SECURITY PASSES

4.1 The Airport Passes issued are not transferable.

4.2 The Airport Passes are to be worn conspicuously on the upper part of the body at all times whilst within the restricted area.

4.3 All Airport Pass holders shall obey the directions given by the Auxiliary Police Officer or any authorised officer of CAG.

4.4 For any loss of the Airport Pass, a Police report shall be made immediately at Airport Police Division or any Neighbourhood Police Posts. A levy fee will be charged for a replacement other than normal fair, wear, and tear.

4.5 The Airport Passes issued shall remain the property of the issuing authority (i.e. CAG) and may be withdrawn at any time by the issuing authority without assigning any reason.

4.6 Only approved list of persons cleared by CAG and/or the Airport Police and vehicles issued with valid Temporary Airfield Vehicle Entry Permit issued under the CAAS (Changi Airport) By-Laws 2009/CAAS (Seletar Airport) By-Laws 2009 by CAG Airside Management's Airside Driving Centre are allowed entry into the airport via the designated entry gates. All persons/vehicles holding such pass/permit shall ensure that the validity date for the pass/permit has not expired.

5 WORKS INVOLVING SECURITY GATE, FENCE OR RELATED FACILITIES

5.1 For any works on the inner perimeter fencing of the Changi Airport, the Work Party shall fill up Form (Attachment A16) and submit it to CAG for approval before the work can commence. The Work Party shall liaise directly with the Perimeter Intrusion Detection System (PIDS) contractor for the removal and reinstatement of the PIDS sensor cables at the affected sections of the fencing, and in some cases, the work may also involve removal of the lead-in cable. The Work Party shall work out payment arrangements with the PIDS contractor based on the Schedule of Rate of the PIDS contract with CAG. The details of the PIDS contractor are as follows:

Company: ST Engineering Electronics Ltd
Address: 24 Ang Mo Kio Street 65,
Singapore 569061

Attention: Mr Teo Seow Khye
Office: 6521 7833
Email: teo.seowkhye@stengg.com

5.2 For works involving the design and construction of new facilities or alteration (either permanent or temporary) of the existing airport security fence or facilities, or affecting the boundary of the airfield or restricted premises in the passenger terminal buildings, proper security and fencing

measures shall be taken to ensure that there is no entry by unauthorised persons or vehicles or intrusions by wildlife (e.g. dogs and cats) into the airport restricted areas and/or aircraft movement areas at any time due to such changes. When erection of security fence, door, gate or barrier is required, the new security fence, door, gate or barrier shall be completed and accepted by CAG and the Airport Police before the works affecting the existing security fence, door, gate or barrier of the airport is allowed to commence.

6 SECURITY

The Work Party shall ensure that no work is carried out or structures built adjacent to the security fencing or gates, which may jeopardize the security of the airport, without prior permission of CAG and the Airport Police.

SECTION B – AIRPORT FIRE SAFETY REQUIREMENTS

1 GENERAL

The Work Party shall comply with all fire safety requirements, safety instructions, permit to work system and hot work procedures stipulated in the CAG Fire Safety Manual and also the regulations and fire safety practices of the Singapore Civil Defence Force (SCDF). CAG Airport Emergency Service (AES) provides fire safety consultation on airport fire safety requirements on Mondays to Fridays from 1030 hrs to 1130 hrs and 1530 hrs to 1630 hrs at Changi Airport Terminal 2.

2 FIRE SAFETY MANUAL

For details on airport fire safety requirements, reference may be made to the latest Fire Safety Manual available online from the CAG website at https://www.changiairport.com/corporate/e-services/documents.html.

3 FIRE PROTECTION SYSTEM

All addition and alteration work, renovations, construction, or installation works shall comply with SCDF regulations and CAG renovation guidelines and shall in no way affect the functioning or efficiency of existing fire protection systems and means of fire escape on CAG's property at all times.

4 ACCESS FOR CAG AES FIRE VEHICLES

4.1 Unimpeded access for CAG Airport Emergency Service (AES) vehicles responding to aircraft emergencies shall be maintained at all times and all existing gates and access roads shall not be obstructed. There shall be at least two separate accesses for CAG AES vehicles into the site.

4.2 In particular, all service roads leading directly from the Fire Station to aircraft movement areas shall be out of bound to all vehicles and personnel, except the CAG AES teams or airport authorised personnel during an airport emergency.

5 STORAGE OF FLAMMABLE MATERIALS

No storage of flammable liquids, i.e. diesel/petrol for vehicle/machinery/plant or other hazardous substances shall be allowed at the site. Fuel shall only be brought to site as and when refuelling is necessary. Prior written approval of CAG must be obtained and subject to strict compliance with all conditions set by the relevant authorities.

6 EXISTING FIRE HYDRANT SYSTEM

Works affecting the airport fire hydrant system shall be reported to CAG and no fire hydrant shall be rendered inoperative without the concurrence of CAG AES Division.

7 USE OF COMMUNICATION EQUIPMENT ON THE AIRSIDE

Communication equipment used during aircraft refuelling operations within 3 metres (10 feet) of the fuelling equipment or the fill or vent points of aircraft fuel systems shall be intrinsically safe

in accordance with UL913, Standard for Intrinsically Safe Apparatus and Associated for Use in Class I, II and III Division 1, Hazardous (classified) Locations.

8 OTHER ACTIVITIES INVOLVING BURNING AND OPEN FLAME

There shall be NO burning of candles, joss sticks, joss papers, oil lamps, etc. within the airport premises, particularly in the airside and within buildings. Any burning of these items outside the airport premises shall require approval of CAG AES Division.

9 HOT WORKS, ISOLATION OF FIRE ALARM SYSTEM AND DRAINING OF SPRINKLER SYSTEM

9.1 The prior approval of CAG AES Division shall be obtained for all hot works that generate heat or sparks through submitting a request for approval of hot works. The approval will be granted subject to the condition that all fire safety requirements are met. Prior approval shall also be required when works are being carried out to isolate the fire alarm system and draining of the sprinkler system.

9.2 The "Hot Work Permit" shall be applied online via https://onecalendar.changiairport.com. This shall be done at least 3 working days before the work is expected to commence. When the work needs to be carried out urgently, CAG AES Division HQ [Tel No.: 6541 2535 (Changi)/6481 3377 (Seletar) during office hours] or Fire Station 1 [Tel: 6541 2526 (Changi)/6481 3377 (Seletar) during non-office hours] shall be notified and approval sought.

9.3 All hot works on site shall be supervised by a person who has attended the "Fire Patroller Course" conducted by recognised local training institution i.e. SAA or SCDF. Other local training institutions may be considered only if the contractor shows evidence that the training syllabus are consistent with CAG's fire safety requirements. The course fee will be at the prevailing rate set by the institute. A qualified fire patroller equipped with appropriate fire extinguisher must be present at site whenever welding/hot works is in progress. One fire extinguisher of the appropriate type shall be placed on site to cover a protection zone within a radius of 15 metres from each hot work area. The Work Party shall ensure that each and every area where hot works are carried out is supervised by a qualified fire patroller. Each qualified fire patroller is only allowed to provide fire coverage for a work radius of up to 15 metres. The Work Party shall take into account of this requirement in his tender submission.

9.4 The "Isolation of Fire Alarm System/Draining of Sprinkler System" shall be applied via https://onecalendar.changiairport.com. This shall be done at least 3 working days before the work is expected to commence. When the work needs to be carried out urgently, CAG AES Division HQ [Tel No.: 6541 2535 (Changi)/6481 3377 (Seletar) during office hours] or Fire Station 1 [Tel: 6541 2526 (Changi)/6481 3377 (Seletar) during non-office hours] shall be notified and approval sought. The requested works shall be carried out during normal office hours and where applicable be approved by the Work Party's Qualified Person. Any isolation, draining or recharging to the affected sprinkler system must be carried out by CAG Term Maintenance Contractor (TMC). The Work Party shall engage the CAG TMC for such requests and any fees chargeable by the TMC are to be borne by the Work Party. The sprinkler system must be promptly charged up and normalised by 1800 hrs for Mondays to Fridays to reinstate its full function. Isolation of the system on Weekends and Public Holidays is not allowed unless with CAG AES Division's approval. A joint physical site check must be carried out with CAG TMC to ensure that the requested fire alarm zone to be isolated is correct before recording the

zone label in "PART 2" of the application. Approval will not be given if the joint verification inspection is not carried out. The Work Party supervisor-in-charge is required to be present during the draining and charging of the requested zone. The sprinkler works contractor is required to label the Alarm Control Valve (ACV) number on all the new sprinkler pipes which they have installed. The applicant shall ensure that all affected parties are duly informed of the application status and the intention to carry out the works beforehand. All sprinkler installation works shall only be carried out by Qualified Persons. The Work Party supervisor-in-charge shall contact Changi Airport Fire Station 1 (Tel No.: 6541 2526) for notification prior to the start and after the completion of the above-mentioned works. The Work Party shall also make arrangements for the TMC to be on site on standby to react promptly to any situation where there is water discharge due to incorrect isolation of the sprinkler system so as to minimise disruption to operations.

9.5 Where hot works that could produce fumes are carried out in the vicinity of air-conditioning return air diffusers/ducts, the Work Party shall take appropriate measures to prevent the burning smell from being propagated into the air-conditioning return air system (e.g. installing temporary ioniser deodorants near the return air system).

10 SAFETY REQUIREMENTS FOR HOT WORKS ON THE APRON

10.1 There shall be NO aircraft or any part of it allowed within 75 metres of any hot works in the apron areas. However, if the hot works is supervised by qualified Safety Officer (registered with Ministry of Manpower), the safety distance can be reduced to 50 metres.

10.2 The Work Party Safety Officer must be competent in supervising hot works and monitoring ambient fuel vapours using a flammable gas detector with alarm. He must attend a briefing conducted by CAG on airside fire safety requirements.

10.3 All hot works must stop immediately when there are refuelling or defueling activities carried out for aircraft at the adjacent bays.

10.4 Other AES requirements for specific work activities, such as application for hot works permit, engagement of fire patroller and fire vehicle standby (required for all hot works in the airside and chargeable for non-CAG projects), shall also be complied with.

10.5 Smoking is strictly prohibited on the airside of the airport. “No Smoking” signs shall be adequately and prominently displayed at the Work Party’s work site.

11 AES SERVICE CHARGE

11.1 To prevent abuse of AES resources, CAG AES Division may levy a service charge on the Work Party for any of the following services:

a) Removal of fuel hazards;
b) Refuelling/defueling standby;
c) First Aid Fire Appliances (FAFA) training;
d) False fire alarm activation turnout;
e) Domestic / Special Incident Turnout;
f) Others (Specify below)

11.2 The schedule of rates is as follows:

Service	Charge
a) Fire vehicle	$600 per vehicle per hour or part thereof*
b) Sea rescue craft	$1010 per vessel per hour or part thereof*
c) Fire officer (SAEO)	$100 per officer per hour or part thereof*
d) Firefighter (AEO)	$60 per firefighter per hour or part thereof*
e) Engineer and Technician	$400/$500 per team per incident*
f) Auxiliary Police	$400 per team per incident*

* Excludes prevailing government taxes.

SECTION C - AIRPORT SAFETY REQUIREMENTS

1 GENERAL

1.1 In general, no activity shall be allowed to take place within the aircraft movement areas unless the areas are closed to aircraft operation and permission is obtained from CAG for works to be carried out. Approval will have to be sought from CAG should there be an absolute need for closure of any aircraft movement areas to carry out the works. All works carried out in the airside shall comply with the latest requirements as stipulated in Attachment A15 (for Changi Airport) and Attachment A17 (for Seletar Airport).

1.2 For the purpose of this section of the Airport Operational and Safety requirements, the following areas are defined as aircraft movement areas in the airport.

At Changi Airport

a) Runway

All areas within 140 metres from the centre line of Runway 1 (02L/20R) and Runway 2 (02C/20C) and Runway 3 (02R/20L) as well as the areas defined at the ends of runway (see Attachment A1-1 and Attachment A1-2 for reference).

b) Taxiways (TWY)

Except for taxiways as listed below, all taxiways at Changi Airport are ICAO Code F taxiways. No activity shall be allowed to take place in all areas bound within 51 metres from the centre line of all Code F taxiways.

i. Code E Taxiways:

- TWY Q (between TWY V and TWY P7)
- TWY S2
- TWY S3
- TWY SA

No activity shall be allowed to take place in all areas bound within 43.5 metres from the centre line of all Code E taxiways.

ii. Code C Taxiways:

- TWY S7
- TWY U7 (between TXL U2 and TWY U)
- TWY U8 (between TXL U2 and TWY U)
- TWY U9 (between TXL U2 and TWY U)

No activity shall be allowed to take place in all areas bound within 26 metres from the centre line of all Code C taxiways.

iii. Military taxiways for use by RSAF aircraft only:

- TWY M, M4, M5, M6, M7
- TWY MY, MY1 MY2, MY3, MY4, MY5, MY6, MY7, MY8, MY9, MY10

To seek approval from CAG and Republic of Singapore Air Force (RSAF) for all works within 43.5 metres from the centre line of all military taxiways.

c) Aircraft Stand Taxilanes (TXL)

Except for taxilanes as listed below, all taxilanes at Changi Airport are ICAO Code F taxilanes. No activity shall be allowed to take place in all areas bound within 47.5 metres from the centre line of all Code F taxilanes.

i. Code E Taxilanes:

- TXL Q1 (behind aircraft stands C16 to C19 and between TWY P and TWY Q)
- TXL Q2
- TXL Q3 (behind aircraft stands D35 to D38 and between TWY P and TWY Q)
- TXL P7 (behind aircraft stands E20 to E22)
- TXL R7 (behind aircraft stands F50 to F54)
- TXL V11 (behind aircraft stands A18 to A21)
- TXL S4

No activity shall be allowed to take place in all areas bound within 40 metres from the centre line of all Code E taxilanes.

ii. Code C Taxilanes:

- TXL U2
- TXL S6
- TXL S8
- TXL S9

No activity shall be allowed to take place in all areas bound within 22.5 metres from the centre line of all Code C taxilanes.

d) Aircraft Parking Apron

All operational aircraft parking apron, (See Attachment A2 for reference).

At Seletar Airport

a) Runway

All areas within 75 metres from the centre line of the runway as well as the areas defined at the ends of runway (see Attachment A3 for reference).

b) Taxiway

All areas bound within 35 metres from the centre line of all the operational taxiways.

c) Aircraft Parking Apron

All operational aircraft parking apron (see Attachment A4 for reference).

Note: The above information for Changi or Seletar Airport may change due to work in progress. The Work Party shall check with the S.O., Project Officer and/or Coordinating Officer for the latest information.

1.3 The work party shall develop a work plan based on the template obtainable from the Project / Maintenance Officer sponsoring the works which is available on Nexus and continually provide updates as and when they become available at significant junctures of the project in ensuring continued compliance with the ANR-139 and the relevant Aviation Specifications and submit associated risk assessments to CAG as early as practicable.

1.4 Works will only be allowed to commence after the Project Officer / Maintenance Officer, from the respective agencies / organisation who had engaged the Work Parties, is satisfied that the work plan comply with CAG's requirements and procedures as well as the standards and recommended practices stipulated in the Civil Aviation Authority of Singapore (CAAS) Air Navigation-139 Regulations, respective aviation specification and advisory circulars.

1.5 The requirement for a work plan shall applies to, but not limited to works involving the:

a) Introduction of new runway, taxiway/taxilane, or aircraft parking stand;
b) Extension of runway, taxiway/taxilane;
c) Reconfiguration of aircraft parking stand to multiple aircraft receiving stand (MARS);
d) Extension or expansion of runway, taxiway/taxilane, or aircraft parking stand to accommodate a more exacting aircraft type;
e) Construction of new final approach and take-off area, helicopter taxiway / taxi-route, or helicopter stand;
f) Expansion of final approach and take-off area, helicopter taxiways / taxi-route, or helicopter stand;
g) Reconfiguration or relocation of final approach and take-off area, helicopter taxiways / taxi-route, or helicopter stand;
h) Planned works with duration more than one calendar month that are within or adjacent to a "live" aircraft manoeuvring area, excluding that which involves routine maintenance activities.

CAG reserves the right to decide on other works in the airside that will require the development of a work plan.

1.6 The content of the work plan shall be prepared to demonstrate that all reasonable measures are taken to ensure that aerodrome works are well-organised and that all work personnel carry out aerodrome works in a manner that will ensure the safety of aircraft operations.

1.7 The CAG Project Officer / Maintenance Officer in charge of the project shall be responsible for ensuring that the appointed work parties execute each item of aerodrome work in a safe and

proper manner. The work plan shall be adequately prepared and sufficient safety measures are put in place on the work site at all times during the execution of the aerodrome works.

1.8 The Work Party shall conduct daily toolbox meeting in accordance with the following items:

a) Conduct in languages that can be understood by the foreign workers.
b) Translation of contents briefed during the toolbox meeting is not required when all workers have been tested at least once to verify that they have understood the topics briefed. Such verification shall be recorded in the contractor toolbox meeting records and be endorsed by person conducting the briefing.
c) Illustrations with pictures on the "Dos and Don'ts".
d) Pose questions to the workers to reinforce their understanding of the briefings.
e) Briefing on the work area layouts and Out of Bound areas.
f) Risk mitigation stated in RA.
g) Changes to work activity / process.
h) All work party shall be reminded on the importance of regular checks on toolbox meeting records, checklists and site reports. Information included in these records shall be accurate and only works and checks conducted shall be recorded.

1.9 CAG's appointed site representative is to conduct checks on contractor's toolbox briefing at least once a week, signing off on the attendance record only when they are physically present for the briefing session and had verified the accuracy of contents briefed against what is recorded.

1.10 All work parties shall ensure that drivers, both permanent or ad-hoc, have attended a toolbox meeting before entering the airside. The toolbox briefing shall cover information designated access route, recent vehicular infringements in the airside and also key activities which may affect the safety of anyone entering the work area. The briefing shall be recorded in a separate toolbox meeting attendance form as the contents shared may differ from that of the general workforce.

2 BARRICADES, SIGNS, AND HAZARD LIGHTINGS

2.1 The project title of works shall be displayed on the hoardings of worksites. In the absence of hoarding, a pegged down signboard shall be used and placed at a strategic location. The name of the Work Party's company and associated work title shall also be displayed on all site offices and at designated access points.

2.2 The Work Party shall provide, erect, and maintain all necessary barricades, signs, signals and lights for the protection of his work and for the safety of the public activities in the vicinity of his work areas.

2.3 Works on Active Roadway or Works Affecting the Active Roadway

2.3.1 For open trenches or pit works or any other works (e.g. superstructure works, foundation works, pavement re-surfacing, underground services work) to be carried out on the active roadway pavement, subject to the approval of CAG, these works shall be planned in such a manner that only one lane of the affected roadway shall be closed at any one time. Approved impact-resistant barricades e.g. water-filled plastic barrier shall be used to fence up the work area to prevent vehicle from running into it and to segregate the work area from traffic. Traffic marshalling service (either manual or via approved traffic signalling equipment etc.) shall also

be provided for the affected section of roadway to regulate the traffic during the roadway closure period. Alternatives may be proposed to overcome site or operational constraints, subjected to the approval of CAG.

2.3.2 A comprehensive, round-the-clock traffic marshalling service (either manual or via approved traffic signalling equipment etc.) shall be provided at the affected section of the roadway throughout the roadway closure period when work affects active roadway or requires the section of the roadway spanning along more than 15 metres stretch to be closed.

2.3.3 For trench or pit works to be carried out on the roadway in front of the aircraft parking stand, it shall be planned in such a way that at any one time, a minimum continuous 30 metres length of unobstructed, full-width roadway pavement is maintained to allow the ground servicing vehicles to access to the parking stand to service the aircraft. When the nature of work requires a number of trial holes or trenches to be made and to remain on the active roadway pavement over a period of time, proper fencing or barricades shall be provided at these trenches and holes to prevent the traffic from running into it during the works. During no-work or off-work hours, such trench and hole shall be properly barricaded all round and be illuminated with amber flashing lights spaced at 1.5 metres along its boundary and at its corners. These work areas shall also be temporarily covered up with properly designed and secured steel plates if the affected roadway is to be re-opened temporarily for traffic use.

2.3.4 Prior to the commencement of the works, the Work Party shall submit a detailed traffic management plan on how he plans to carry out the works, including all the necessary safety and traffic marshalling measures, to the S.O., Project Officer and/or Coordinating Officer for evaluation and approval.

2.4 Works and Equipment on Non-pavement Area

Open trenches, pits and large excavations on non-pavement area shall generally be fenced up with appropriate barricades approved by CAG and shall be illuminated with amber flashing lights spaced at 1.5 metres along its boundary and at its corners at all times.

2.4.1 Obstacle lighting comprising illuminated red stationary lamp shall comply with paragraph 7.4 of Section D. It shall be placed at the extremities and the highest point of all stationary plant and equipment and their designated parking zones. Approved red and white obstruction barricades shall be used to demarcate areas of equipment and plant storage with amber flicker lamps placed at a maximum spacing of 1.5 metres along its boundary and at its corners at all times.

2.4.2 The Work Party's vehicles/plant/machineries/equipment travelling in the airfield shall have appropriate markings approved by CAG or shall display approved markings/signs/flags/flashing lights at all times.

3 INSPECTIONS AT THE END OF EACH DAY'S WORK

3.1 Prior to the end of each day's work and before dusk on days when there are work activities on site, the Work Party's representative shall inspect his worksite in the vicinity of the aircraft movement areas or in areas that could affect the operation of the aircraft movement areas nearby to ensure that checks are conducted using Checklist for carrying out daily inspection in CHANGI / SELETAR AIRPORT (Attachment A24). The work parties shall ensure that no Foreign Objects or potential Foreign Object Debris (FOD) would be encountered by aircraft

operation and all other safety and operational requirements of the aircraft movement areas (e.g., covering up of open trench, proper operation of obstacle lighting, etc.) are met. The "Daily FOD Checklist" (Attachment A5) and "Checklist for carrying out daily inspection in CHANGI / SELETAR AIRPORT" (Attachment A24) shall be submitted to the S.O., Project Officer and/or Coordinating Officer for reference and records of checks carried out shall be kept.

Project officer or CAG's appointed site representative (i.e., RTO) shall use the same checklist to carry out daily inspection in CHANGI / SELETAR AIRPORT (Attachment A24) at his work site daily on days when there are work activities. The checklist shall be checked by CAG Project Officer after the inspection has been completed.

3.2 The Work Party shall also carry out daily inspection and maintenance for all the signs and markers, markings and lights displayed at his work site, within the closed aircraft movement areas and his storage areas and make arrangements to ensure that all these lights, signs and markings are constantly maintained in good operating condition.

4 LIGHTING AND MARKINGS FOR CLOSED AIRCRAFT MOVEMENT AREAS

4.1 In general, approved airfield warning signs, markers and lights shall be displayed at the closed aircraft movement areas and aircraft parking stands or part thereof to warn pilots, ground handlers and other users operating near the area. Prior to the commencement of work and after having been instructed by the S.O., Project Officer and/or Coordinating Officer to proceed, the Work Party shall ensure that sufficient quantity of approved closure warning signs, markers and illuminated unserviceability lights are placed at the strategic locations along the boundary of the closed aircraft movement areas and also at the locations directed by the S.O., Project Officer and/or Coordinating Officer so as to warn the aircraft operating in the vicinity of the closure of the aircraft movement areas or parts thereof. The Work Party shall ensure that all these warning signs, markers and illuminated unserviceability lights are properly secured so that they are not dislodged by strong winds, jet blast or other environmental conditions.

4.2 At the end of each closure period all warning signs, markers and illuminated unserviceability lights shall be removed from the aircraft movement areas and stored within the Work Party's designated storage area.

4.3 The unserviceability lights shall consist of a 50-50 mix of types that can be operated on two different sources (e.g., Battery powered, solar powered, generator powered, conventional electrical supply, etc.). Electrical supply source for the unserviceability lights may be tapped from existing street lighting OG Box in the vicinity of the lights. The Work Party shall provide all necessary cables and connections to the power source. The Work Party shall engage a qualified electrician to carry out checks to ensure that the existing street lighting supply is able to support the unserviceability lights' power demand. The Work Party may also propose to use appropriate generators sets to power the lights reliably. The cables shall be adequately protected, pegged down and marked such that the cables would not be damaged. The unserviceability lights shall have photocell sensors so that they can be turned on automatically during hours of darkness or bad weather.

4.4 All warning signs, markers and lights for closed aircraft movement areas shall be inspected daily and their status shall be recorded for submission to CAG. If any of the light or marker board is found faulty or is damaged, the Work Party shall take immediate action to restore or replace it.

Battery operated unserviceability lights shall be checked daily to ensure that the effective intensity does not drop below the minimum acceptable intensity.

4.5 The Work Party shall refer to Section D, paragraphs 7 to 9 for more specific requirements on obstacle markings and lighting in the airfield.

5 OBSTACLE MARKING AND LIGHTING OF WORKING AREAS UNSERVICEABLE AREAS AND AREAS CLOSED TO AIRCRAFT MOVEMENTS

5.1 General

5.1.1 All obstacle marking and lighting of working areas, unserviceable or closed aircraft movement areas shall comply with all the requirements as specified hereunder and in accordance with the operational practices CAG deems adequate and appropriate.

5.1.2 The Work Party shall consult CAG S.O., Project Officer and/or Coordinating Officer for the relevant requirements with regards to obstacle marking and lighting of working areas, unserviceable areas and areas closed to aircraft movements.

5.2 Marking of the Portion of Runway or Taxiway Closed to Aircraft

5.2.1 At least 3 closed markers shall be displayed on the runway or portion of the runway which is closed to aircraft for more than 2 hours.

5.2.2 Where runway closure period is more than 3 days, or where a section of the runway is closed for more than 3 days, a runway closed marker shall be placed at each end of the closed area and additional markers shall be placed along the runway centre line so that the maximum interval between markers does not exceed 300 metres.

5.2.3 Where runway closure period is 2 hours or less, a set of lighted red/white obstacle marker board shall be placed at the holding position located at each of the two entry taxiways located at each end of the closed runway.

5.2.4 Unless otherwise shown on the drawings, the runway and taxiway closed marker shall be of the form of a cross with the minimum dimensions shown in Attachment A14 and shall be of a single contrasting colour yellow (for taxiway) and white (for runway). (A marking utilising material other than paint on the surface may be suitable for temporary closure.)

5.2.5 In addition, the marker shall also be heavy enough so that it would not be displaced or lifted by the direct aircraft jet engine blast or by strong winds.

5.2.6 Airfield lights on or certain section/length of airfield light leading to the closed portion of runway, taxiway and aircraft parking stands shall be effectively covered up by the Work Party concerned in a manner acceptable to CAG, including demarcating and switching off / blocking the affected Airfield Lighting (AFL) circuits leading into and within the closed area on the Advance Surface Movement Ground and Control System (ASMGCS) and Airfield Lighting Control System (ALCS) graphic interface at the control tower (please refer to Section C (Clause 13.9)).

5.2.7 Where taxiway closure period is more than 3 days, or where a section of the taxiway is closed for more than 3 days, a taxiway closed marking shall be painted at each end of the closed area. At the end of the taxiway closure period, the closed marking shall be totally removed.

5.3 Lighting of the Portion of Runway or Taxiway Closed to Aircraft

5.3.1 Unserviceability lights shall be placed across the entire entrance and exit to the closed area at intervals not exceeding 3 metres. The unserviceability lights shall consist of a 50 - 50 mix of types that can be operated on two different sources (e.g. battery powered, solar powered, generator powered, conventional electrical supply, etc.).

5.3.2 An unserviceability light shall consist of a red fixed light and shall not cause glare and confusion to the pilots or traffic controllers.

5.3.3 The following light characteristics shall be complied with:

a) Light shall be seen in all directions;

b) Red colour;

c) Minimum of 10 candelas effective intensity;

d) Weather-proof; and

e) The unserviceability lights shall be lit between the hours half an hour before official sunset time until half an hour after official sunrise, and during periods of poor visibility e.g. heavy rain.

5.4 Marking and Lighting of Work Sites and Unserviceable Areas

5.4.1 Unserviceability markers and lights shall be displayed whenever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. Unserviceability markers and lights are used for such purposes as warning pilots of a hole in a taxiway or apron pavement or outlining a portion of pavement, such as on an apron, that is under repair. (Note: Such measures are not suitable for use when a portion of a runway becomes unserviceable, or on a taxiway when a major portion of the width becomes unserviceable. In such instances, the runway or taxiway is normally closed.)

5.4.2 For taxiway closures more than 2 hours, at least 3 unserviceability markers with 2 obstacle lights at each end of the marker, shall be placed at not more than 3 metres intervals so as to delineate the unserviceable area. For closures more than 3 days, unserviceable markers shall be provided across the entire breath of the taxiways.

5.4.3 Unserviceability lights shall comply with the requirements specified in paragraph 5.3.3 above.

5.4.4 Unserviceability markers shall consist of conspicuous upstanding marker board. An unserviceability marker board shall be at least 0.5 metre in height, 3.0 metres in length with alternate red and white vertical stripes (see Attachment A13).

5.4.5 Markers shall be light-weight and frangible mounted. Those located near a runway or taxiway shall be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft. (Note: Anchors or chains, to prevent markers which have broken from their mounting from blowing away are to be used where necessary.)

5.4.6 All the markers and lights shall be adequately designed such that they shall be able to withstand a direct aircraft jet engine blast at velocity of 216 km/h without toppling or displacement. All the marker boards shall be properly weighed down to ensure that they will not be displaced by jet blast or strong wind. Non-frangible materials, such as concrete slabs, shall not be used to weigh down the marker boards. The Work Party shall ensure that materials used to weigh down the marker boards, such as sandbags, will not contribute to FOD.

5.4.7 Each marker board shall have at least two serviceable lights mounted at the highest point. The intervals between obstacle/warning lights shall not exceed 3 metres.

5.4.8 The exact location of the unserviceability markers and lights shall be subject to the approval of CAG.

5.4.9 All lamps used to light up the construction site shall be shielded to shine downward onto the ground. In no circumstances shall any light be allowed to point in the direction of north or south or towards the Changi/Changi East/Seletar Tower.

6 INTRUSIONS INTO AIRCRAFT MOVEMENT AREAS

6.1 The Work Party's attention is drawn to the fact that the aircraft movement areas are in operation all the time and no workmen or machinery shall be allowed into the active aircraft movement areas. Trespassers to such areas will be prosecuted. In this connection, the Work Party working in the airfield shall be required to clearly mark out (e.g. use of physical demarcation) the boundary of his work site and confine all his workers and activities strictly within these designated work areas. All his workers and machineries movements beyond these designated areas shall be directed and escorted by CAG's authorised personnel or supervisors.

6.2 Under no circumstances shall the Work Party use the runway to gain access to his work areas. The crossing of taxiway (either active or closed) to gain access to work areas shall strictly be done at designated and approved locations only.

6.3 Access and egress for works on the runway shall only be through designated runway entry point (REP). Work parties shall strictly adhere to prevailing runway maintenance closure rules found in Section C, paragraph 26.

6.4 All work parties shall observe the "never cross illuminated red" rule (i.e. red stop bar lights at runway holding positions, flashing-red lights at road holding positions or red traffic lights at applicable road holding positions) regardless of the status of the runway.

6.5 All work parties shall ensure that all personnel, equipment, vehicles and/or machineries are accounted for when entering and vacating the runway.

6.6 All CAT 1 vehicles entering the aircraft manoeuvring areas shall be fitted with Vehicle Tracking at Airside (VETA).

7 INTERFERENCES TO AIRCRAFT, VEHICULAR TRAFFIC, ETC.

7.1 At all times, the movement and deployment of the Work Party's plant and equipment in the airport shall comply with the Airport Operational and Safety requirements stipulated herein and shall also be subject to the conditions imposed from time to time, by CAG who have jurisdiction over the matter.

7.2 The Work Party shall be responsible for ensuring that the movement of plant, equipment and materials, and his employees, do not at any time interfere with airport operations regardless of whether the plant are in operation or unused/parked. In the event that the Work Party's plant obstructs the movement of aircraft or other vehicular traffic, etc., CAG reserves the right to instruct the Work Party to shift the plant, equipment, etc. and the Work Party shall immediately comply with such instruction, failing which CAG reserves the right to engage a third party to do the same at the Work Party's expense.

8 INSPECTIONS PRIOR TO OPENING FOR AIRCRAFT OPERATIONS

8.1 At the end of each closure period of aircraft movement areas for works, the Work Party shall carry out thorough inspection and preparation on the affected aircraft movement areas to see that all the Airport Operational and Safety requirements are met and fully complied with before handling over the area for aircraft operation.

8.2 The opening of aircraft movement areas for aircraft operations shall be subject to the approval of the S.O. Project Officer and/or Coordinating Officer representing CAG.

9 OPENING OF SECTION OF AIRPORT TO AIRCRAFT TRAFFIC

9.1 When in the opinion of CAG any runway, taxiway, aircraft parking apron, roadway or any structure is in satisfactory condition, it may be opened to traffic with the permission of CAG. The opening of any runway, taxiway, aircraft parking apron, roadway shall not be considered as a waiver of any of the provisions of these specifications or the Work Party’s obligations. Pending final completion and acceptance of the work, all necessary repairs and renewals on any section of the taxiway, runway, roadway so opened, due to defective material of work, or natural causes other than ordinary wear and tear, or other works of the Work Party, shall be performed by and at the expense of the Work Party.

10 MOTORISED VEHICLES

10.1 Any vehicle intending to enter the operational aircraft manoeuvring areas must obtain clearance from the Changi/Seletar Tower. All drivers are to adhere to the standard phraseology for driving into manoeuvring area. If the vehicle is not radio-equipped, it shall be escorted by an authorised radio-equipped vehicle driven by an authorised person.

10.2 With reference to the Airside Driving Theory Handbook for Changi and Seletar Airport Airfield Driving Theory Handbook, ADP escort drivers shall be allowed to escort a maximum of two (2) vehicles at any one time.

11 RESPONSES TO AIRPORT EMERGENCY

11.1 The Work Party shall be required to respond to any airport emergency call activated by CAG related to his work at all times.

11.2 Upon receipt of such instruction, he shall immediately mobilise his resources to the site to carry out the works required by CAG to reinstate the operational status of the airport.

11.3 In connection to this, he is required to submit a list of related contact persons to CAG.

11.4 In the event of an aircraft emergency requiring the re-opening of the runway, all the work activities (including construction and maintenance works) within the runway strips and operational surface shall be ceased and the Work Party shall be required to remove all plant, equipment, materials and evacuate all workers from these areas and tidy up the site to meet the requirements as stipulated in Section D in order to open the runway for operations within 30 minutes of notification by CAG. The Work Party shall liaise closely with and respond to the S.O., Project Officer and/or Coordinating Officer's needs for such emergencies.

12 AIRPORT OPERATION UNDER LOW VISIBILITY CONDITION

12.1 In the event that low visibility aircraft operating conditions are initiated by CAG due to poor weather conditions, all the works within all aircraft movement areas and other out-of-bound areas in the airfield (see Attachment A6, A9-1 and A9-2) shall cease immediately and the Work Party shall be required to remove all his plants, equipment, materials and personnel out of these areas until such time this restriction is lifted.

12.2 During this period, all the vehicles at the site shall display appropriate obstacle lights when moving from place to place and shall also exercise extreme care when entering the runway, crossing any active taxiway/taxilane and when travelling within the active aircraft parking apron areas.

12.3 The Work Party shall request from CAG a copy of the Category II Low Visibility Operational Procedure Manual and disseminate to all his workers the requirements and restrictions for works under such weather conditions.

13 MODIFICATION AND ALTERATION TO EXISTING RUNWAYS, TAXIWAYS, TAXILANES, AND AIRCRAFT PARKING STANDS

13.1 When alteration or modification works (e.g. airfield lights diversion, airfield signs relocation, pavement marking alteration, pavement re-surfacing, etc.) to the existing operational facilities (i.e. runways, taxiways, taxilanes, aircraft parking stands) are called for in the Work Party's scope of work, these works shall only be carried out in close coordination with the aerodrome operational requirements, which could require the works to be carried out during the restricted night working hours if so requested by CAG. The Work Party shall request from the S.O., Project Officer and/or Coordinating Officer the restricted night working hours during which works can be carried out.

13.2 All the alteration/modification works affecting the operation of the runway, taxiway, taxilane or aircraft parking stand shall be completed within the stipulated working hours granted by CAG and have the work-area reinstated and handed back to CAG for aircraft operation punctually by

the end of the restricted working hours. Any damages to existing services caused by the alteration/modification works shall also be rectified by the Work Party.

13.3 When a runway is shortened for construction, the Work Party shall provide the following measures:

a) repaint runway designation markings, runway centre line markings, threshold markings and touchdown markings and remove existing markings not appropriate for the shortened runway;

b) blacken existing taxiway markings, including taxiway centre line and side stripe markings, leading into the closed section of the runway;

c) change runway light configuration for the shortened runway;

d) isolate all necessary runway lights in the closed area;

e) install temporary runway end and threshold lights provided with a permanent power supply at the shortened runway end;

f) install runway guidance sign on shortened runway showing revised runway distance available, e.g. TORA distance;

g) mask out all necessary runway guidance signs at closed runway area;

h) mask out and isolate the circuits of all taxiway lights and taxiway guidance signs leading into the closed section of the runway including demarcating and switching off / blocking the affected Airfield Lighting (AFL) circuits of the closed area on the Advance Surface Movement Guidance and Control System (ASMGCS) and Airfield Lighting Control System (ALCS) graphic interface at the control tower (please refer to Section C (Clause 13.9)).

i) any other measures requested by CAAS Air Traffic Control, or the CAG S.O., Project Officer and/or Coordinating Officer.

13.4 When a taxiway or taxilane is closed continuously (more than 3 days, and less than 3 months) for construction, the Work Party shall provide the following measures:

a) paint taxiway side stripe markings (double yellow lines 15 cm wide and 15 cm apart) across all entrances leading into the closed taxiway or taxilane;

b) blacken existing taxiway markings, including taxiway centre line and side stripe markings, leading into the closed taxiway or taxilane;

c) install blue reflective taxiway edge markers across all entrances leading into the closed taxiway or taxilane and alongside all straight taxiway or taxilane segments where the side of the taxiway or taxilane abuts a large span of paved area that is not used**,** at a maximum separation of 60 metres or lesser as directed by CAG; and

d) mask out and isolate the circuits of all taxiway lights and taxiway guidance signs leading into the closed taxiway or taxilane including demarcating and switching off / blocking the affected

Airfield Lighting (AFL) circuits leading into and within the closed area on the Advance Surface Movement Guidance and Control System (ASMGCS) and Airfield Lighting Control System (ALCS) graphic interface at the control tower (please refer to Section C (Clause 13.9)).

13.5 When an aircraft parking stand is closed continuously (more than 3 days, and less than 3 months) for construction, the Work Party shall blacken existing lead-in line that leading into the closed aircraft parking stand, including demarcating and switching off / blocking the affected Airfield Lighting (AFL) circuits leading into and within the closed area on the Advance Surface Movement Guidance and Control System (ASMGCS) and Airfield Lighting Control System (ALCS) graphic interface at the control tower (please refer to Section C (Clause 13.9)).

13.6 When a taxiway or taxilane, or an aircraft parking stand is closed continuously (more than 3 months) for construction, the work party shall grind off the existing taxiway / taxilane markings and/or existing lead-in line that leading into the closed aircraft parking stand, including demarcating and switching off / blocking the affected Airfield Lighting (AFL) circuits leading into and within the closed area on the Advance Surface Movement Guidance and Control System (ASMGCS) and Airfield Lighting Control System (ALCS) graphic interface at the control tower (please refer to Section C (Clause 13.9)).

13.7 The above works are in addition to any closure markers, markings or obstacle lights that are required to be placed to demarcate the closed taxiway / taxilane / aircraft parking stand areas.

13.8 Work Parties shall note and take reference from Section G (Clause 2.2) for more information on the procedures required to modify the Advance Surface Movement Guidance and Control System (ASMGCS) graphic interface and Airfield Lighting Control System (ALCS) for any addition/decommission of runway, taxiway, aircraft parking stands and any other areas where lighting services are provided.

13.9 Work Parties shall note that for any closure of runway, taxiway, aircraft parking stands and any other areas which have airfield lighting services, there is a need to work with CAAS ATC/ FMC to demarcate and switch off/ block the affected airfield lighting (AFL) circuits leading into and within the closed area on the Advance Surface Movement Guidance and Control System (ASMGCS) graphic interface and Airfield Lighting Control System (ALCS) graphic interface. Work Parties are to refer to the Changi Airside Works Procedure Manual (AWPM) for further information on any closure of runway, taxiway, aircraft parking stands and any other areas which have airfield lighting services.

13.9.1 Based on the duration of closure, work parties (CAG project officer/ appointed contractors or Approved personnel by Airside Ops and CAAS ATC) shall take note of the following procedure:

a) Duration three (3) days or less.

i. On the day of closure:
Work parties to request for approval from Changi Tower to close the proposed closure area and to demarcate the closure area on the ASMGCS Graphic Interface. After which, Work Parties will inform FMC to switch / block off the affected Airfield Lighting (AFL) circuits leading into and within the closed area (demarcated on the ALCS Graphic Interface)

ii. On the day of opening:
Work parties shall carry out inspection of the affected Airfield Lighting (AFL) circuits and inform Changi Tower that the closed area has been re-opened.

b) Duration more than three (3) days.

i. Before the closure:
Work parties to inform FMC, CAAS ASMGCS and CAG ALCS team via email of the closure area and duration, including the affected AFL circuit names leading into and within the closed area to be temporarily blocked from the ASMGCS/ALCS control ("off and block")

The email attachment to FMC should include the approved closure programme by Airside Ops and CAAS ATC, as well as the AFL circuit names / Constant Current Regulators (CCRs) to be blocked.

ii. On the day of closure:
Work parties to request for approval from Changi Tower to close the proposed closure area and to demarcate the closure area on the ASMGCS Graphic Interface. After which, Work Parties will inform FMC to switch / block off the affected AFL circuits leading into and within the closed area (demarcated on the ALCS Graphic Interface).

iii. On the day of opening:
Work parties shall carry out inspection of the affected Airfield Lighting (AFL) circuits and inform Changi Tower that the closed area has been reopened.

13.9.2 For any queries on the above procedures, please contact the following personnel:

Team: FMC
Email: fmccag.support@changiairport.com
Phone Number: 64961302 or 64961303

System: Airfield Lighting Control Monitoring System (ALCMS)
Location: Seletar Airport
Attention: Richard Chia
Email: Richard.chia@changiairport.com

System: Airfield Lighting Control System (ALCS)
Location: Changi Airport
Attention: Teo Wei Yi/ Bobby Chua
Email: teoweiyi@changiairport.com/ bobby.chua@changiairport.com

System: Advanced Surface Movement Guidance and Control System (ASMGCS)
Location: Changi Airport
Attention: Toh Seow Teng/ Kevin Kong
Email: Toh_Seow_Teng@caas.gov.sg/ Kevin_Kong@caas.gov.sg

13.10 The work party shall allow for all necessary provision in their scope of work to comply with the above requirements.

14 JET BLAST HAZARDS DURING AIRCRAFT MANOEUVRING

14.1 Jet blast hazards due to aircraft manoeuvring can be expected at the following locations in the airfield:

a) on or next to the runway, particularly near to the take-off end;

b) in the vicinity of apron taxiways and taxilanes, adjacent to and behind the aircraft parking stands; and

c) in the vicinity of taxiway junctions.

14.2 All lightweight or wind attracting objects shall be kept away from the above areas whenever possible. All plant/equipment when deployed at these areas shall be checked against stability under jet blast and measures shall be taken to ensure the stability of the plant/equipment when necessary and their suitability for deployment. All the airfield closure signs and markers placed in the above areas shall be properly strengthened and secured against jet blasts from the manoeuvring aircraft. The Work Party shall propose his method of strengthening or securing the signs/markers for CAG's approval.

14.3 All personnel working within the jet blast hazard area shall temporarily evacuate the site during the times when aircraft is manoeuvring at these areas. Personnel working on or next to the runway, particularly near to the take-off end, shall keep clear at least 750 metres away behind an aircraft taking off. Personnel working behind the aircraft parking stands shall temporarily move away a distance at least 80 metres behind the aircraft during aircraft power-in operation and shall keep clear 250 metres away behind the aircraft during its breakaway operation.

15 LIGHTNING WARNING SYSTEM

15.1 Where works are involved in the open or aircraft movement areas, the Work Party shall be required to check weather forecast for thunderstorms/lightning from any of the following channel:

- NEA Website at www.nea.gov.sg
- NEA's Application such as "myENV" & "Lightning@SG"
- Weather Forecast Hotline at 65427788

The Work Party shall allow for such costs under this work scope.

15.2 Upon receiving the information on weather forecast, it is the sole responsibility of the Work Party to decide whether to proceed with the works with proper mitigating measures or stop works to protect the personnel and equipment from lightning hazard.

15.3 No extension of time due to stoppages of works and loss and expense in compliance with the above Clause will be entertained.

16 DETECTION AND PROTECTION OF CABLES

16.1 Overlaid Cables

a) Overlaid cables shall be protected, firmly secured to the ground and make visible by securing them at about 300 mm above ground or placed under marker boards (i.e. at taxiways, apron access areas, etc.).

b) These cables shall be transferred to permanent installation whenever possible.

c) All unused cables shall be removed from the airfield immediately.

d) Work Parties shall remove unwanted or unused cables promptly.

16.2 Work parties performing earthworks at the airport shall adopt proper and disciplined managed of underground installations, where reasonably practicable, including:

a) The use of service corridors or service ducts for the laying of underground installations, as designated by CAG;

b) The removal of decommissioned underground installations as a result of the works, or abandoned underground installations discovered within the excavated zone, as designated by CAG.

16.3 Work parties shall establish procedures to avoid damage to underground installations during works, including but not limited to:

a) Obtaining all necessary information on underground installations prior to commencing earthworks from CAG and other relevant agencies and the owner of the underground installations, and procuring the relevant services drawings;

b) Carry out services detection on site through engaging the services of a Licensed Cable Detection Worker (LCDW);

c) Submit to CAG prior to commencing works:

i. An LCDW report showing the exact location of services found;

ii. Method statements and risk assessment of the earthwork; and

iii. Services protection or diversion schemes, if applicable;

d) Provide full time standing supervision of excavation works by a Registered Earthwork Supervisors

16.4 In the event of an incident involving damage to any underground installation at the airport, the work party shall immediately inform CAG and take immediate measures to minimise disruption to operations, including but not limited to:

a) Informing CAAS and CAG's fault reporting and control centre of the damage;

b) Informing the owner of the underground installation, supplier of the affected underground service and any person responsible for the maintenance of the underground installation, if service is known, so as to enable them to manage and rectify the damage and any disruption to the affected underground service;

c) Engage the help of incumbent airfield maintenance contractors to trace and identify the service if damaged service is unknown; and

d) Carrying out rectification works for its underground installation.

16.5 Work parties shall submit their investigation report on any underground services damage or disruption to CAG within 2 weeks from date of occurrence.

16.6 Underground Cables

The Work Party shall locate and trace all underground services, both charted ones shown in as-built services layout drawings and uncharted ones, before commencement of any ground works such as excavation, underground services diversion work and piling in the airport premises. The Work Party shall comply with all the requirements stipulated in the checklist for carrying out trial holes, excavation, underground services diversion work and piling works in Seletar Airport (Attachment A7-1, A7-2, A20, A21 and A22). The checklist and application forms are available from the CAG website at https://www.changiairport.com/corporate/e-services/documents.html under Engineering and Development tab.

(a) For Earthworks in Changi Airport, the "Earth Works Permit" shall be applied online via https://oc.changiairport.com/. This shall be done before the work is expected to commence.

Work party can refer to the user guide under the "EarthWorks" section at https://cag-one-calendar.s3.amazonaws.com/user-guide/contractor.html#submit.

For urgent works, the Work Party shall seek approval from:

- CAG E&D Division Safety Manager
  Email: yeo.keemeng@changiairport.com
  Contact Number: 96912566

- and their respective CAG Project Officer/ CAG liaison.

(b) For Earthworks in Seletar Airport, the application of the "Earth Works Permit" shall be done via hardcopy/ email.

(c) For trial holes, subject officer should, to the best of his ability, obtain information on the depth of the underground services so as not to damage them during the course of work. When digging a trial hole, there must be 100% standing supervision for each excavation, with the presence of LCDW and Registered Earthwork Supervisor (RES) accredited under the Registered Earthwork Supervisor Scheme administered by EMA and SPPG.

(d) Prior to commencement of any earthwork, Licensed cable detection worker (LCDW) shall be engaged to perform underground services detection so that the risk of damage to

underground services can be reduced. LCDW and competent earthwork supervisor shall provide 100% standing supervisor when conducting trial hole works. This is to ensure that trial holes are carried out till all possible underground service cables are found.

There may be instances where different entities may engage the same term contractors to help service their systems, as such, it is the duty of the work party to ensure that the correct stakeholders are consulted during the request for information stage to confirm the presence of underground services.

Due to the uniqueness of some systems that exist only in the airport environment, below guidance material is provided for reference. CAG shall not be responsible if the LCDW had misjudge the detection mode. LCDW shall exercise their professional knowledge and judgement to ensure that the right cable detection method is employed. LCDW shall inform and/or advise the earth works contractor, who engaged him, of the location of the cables detected / not detected within the worksite. This shall be clearly marked out in the cable detection report and included in the legend.

Type of underground services	**Recommended Detection Mode**
CAFHI e-stop Cable (110V DC signal)	Power Mode with direct cramping detection. Active and Passive detection Work party to exercise caution as cable runs on DC signal and may not be clearly identified. When in doubt, CAFHI shall be consulted, and a site meeting should be arranged to locate such cables.
Fuel Hydrant / Fire Hydrant / Drainage Sub-soil, Potable and NEWater Pipes	Radio Mode (Metal detection)
Airfield Lighting (AFL) Cable	Power Mode or Power and Radio Mode. Active and Passive detection (*required to Master ON – energize the AFL circuit)
Structured Cabling / IT services, E&D & ATE Fibre Optics	Ground Probing Radar (GPR) *Note: Only able to detect up to depth of 2 - 3m. Work party to exercise caution as fibre optic cables may not be clearly indicated during the scan.
High Tension (HT) Cable	Power Mode. Passive and/or active detection (when necessary, such as cable on soak cannot be passively detected and cable known to be passing through the area cannot be detected in passive mode)
Low Tension (LT) Cable	Power Mode. Active and Passive detection

LCDW shall indicate the detection method used in the cable detection report. He/she shall locate and confirmed the location of the underground services prior any earthworks.

Work party shall stop all works and information CAG officer should they come across any unknown underground services. In the absence of any information, underground services discovered shall be deemed to be live and shall not be removed without prior approval of the service owner.

16.6.1 When performing cable detection, the LCDW shall request to "**Master on**" circuits within the vicinity of the area where earthworks is to be conducted. Where "**Master On**" is not possible, the LCDW will have to perform cable detection once in the **day** and once **after sunset**. This is to ensure that services which are not turned on during the daytime are included in the detection.

It is the responsibility of the work party conducting the earthwork to ensure that all relevant stakeholders are consulted, and information gathered are as comprehensive as possible.

Where necessary, additional trial holes shall be conducted along the route of cables to confirm the absence of services.

Important Notes:

- No cutting of any unknown cables without LCDW confirmation that they are "dead" or "abandon" cables.
- "**Master On**" all related AFL circuits including those blocked circuits leading into the closure areas, taxiway edge light circuits and taxiway stop bar light circuits when carrying out underground services detection, verification and confirmation of the AFL primary cables.
- Underground services diversion shall be carried out if the services are causing obstruction to the project works.
- To "**Master On**" ALL the AFL circuits again after any works involved with the AFL primary cables which might be affected during the work to ensure and confirm that there are no circuit faults (i.e., opened circuits, earth fault, etc) received by FMC via Honeywell ALCS system or operational airfield lighting circuits failure on site before night falls.

16.7 Detection and Diversion of Underground M&E Services

16.7.1 Underground M&E Services Diversion

The Work Party shall engage a qualified registered and competent contractor(s) of the relevant trade(s) and work head(s) to execute a thorough & complete service(s) protection and/or diversion work(s) at the subject site.

The following checklists shall serve as a guide for the proper and complete execution of the underground M&E services diversion works to be carried out by the appointed contractor(s)

(a) Sewerage & Sanitary Service Diversion Works

Checklist for Underground Sewerage & Sanitary Service Diversion Works (Attachment A20)

(b) Water Supply Service Diversion Works

Checklist for Underground Water Service Diversion Works (Attachment A21)

(c) Gas Supply Service Diversion Works

Checklist for Underground Gas Supply Service Diversion Works (Attachment A22)

17 SAFETY EQUIPMENT

17.1 All personnel performing work in the airside shall be equipped with appropriate personal protective/safety equipment such as safety vests, safety helmet and safety boots. Every person entering or performing work within the runway, taxiway, apron, including the aircraft stands and compass swing area, shall wear a high visibility safety vest at all times.

17.2 All Personnel shall also be equipped with proper tools/PPE in handling carcasses.

18 AIRSIDE SAFETY INDUCTION BRIEFING (CHANGI AIRPORT & SELETAR AIRPORT) / AIRPORT OPERATIONAL AND SAFETY BRIEFING (CHANGI AIRPORT & SELETAR AIRPORT)

18.1 All contractors (applicable for seasonal pass holder) shall attend an Airside Safety Induction Briefing (Changi Airport & Seletar Airport) before they are being deployed for duties.

18.2 Airside Safety Induction Briefing (for Changi Airport) will be conducted based on available sessions found on the ASIB portal at https://www.changiairport.com/corporate/our-expertise/airport-operations/airside-safety-induction-briefing.html#A1
A step-by-step user registration guide is available on the portal. An auto-generated confirmation email will be sent to the participant upon successful registration. The venue will be advised in the confirmation email.

18.3 Airside Safety Induction Briefing (for Seletar Airport) will be conducted on every Wednesday (except on public holidays) from 0930 hrs to 1030 hrs at the Meeting Room at Seletar Airport Passenger Terminal Building, 21 Seletar Aerospace Road 1. Registration and viewing of available slots for the ASIB sessions can be made via https://outlook.office365.com/owa/calendar/AirsideSafetyInductionBriefing@changiairport.com/bookings/ by providing the staff's full name and organization name

18.4 All contractor supervisors and above shall attend the Airport Operational and Safety (AOS) briefing, and test conducted by respective CAG Cluster's Safety Unit.

18.5 All contractor supervisors shall conduct the Airport Operational and Safety (AOS) briefing once before project commencement and a refresher training once every year subsequently to all staff.

19 GEOGRAPHICAL SURVEY

19.1 The geographical coordinates of each threshold, appropriate taxiway centre line & each aircraft stand shall be measured in degrees, minutes, seconds and hundredths of seconds (reference to CAAS Aviation Specifications 5 – Aerodrome, Chapter 5, 5.2.2 to 5.5.5).

19.2 The geographical survey and submission of survey reports shall comply with the quality requirements specified in the ICAO WGS-84 Manual (Doc 9674) format complying to the requirements in ICAO Annex 14 Vol.1 Appendix 5, Table A5-1.

20 DRIVING TO AIRPORT/HEIGHT LIMIT FOR HEAVY VEHICLES

20.1 The Work Party shall ensure that all drivers (from the Work Party or its sub-contractors) coming to the airport are properly briefed of the approved designated driving routes to the work

site at the airport and physically taken through this route at least twice (once in the day and once after sunset) before driving any construction equipment or making actual delivery to site.

20.2 Contractors shall consult Project/Maintenance Officer for the height limit of route and obtain a set "HEIGHT LIMIT FOR ROADS IN CHANGI AIRPORT "document for references (see Appendix A) and conduct a safety assessment before bringing in vehicle/ equipment to the airport premises.

20.3 Contractors shall issue travel route map to their drivers covering the access from outside Airport to airside on the access route map with the following marked:

(i) Landmarks where the drivers are to take note to guide him/her to the worksite;

(ii) If driver realised, they are lost within the airside:
   a) Driver shall come to a stop in a safe location;
   b) Driver to check for landmarks;
   c) Driver to check aerodrome chart for orientation and designated access route;
   d) If driver is still lost, driver shall contact Airside Management Centre (AMC) at 6541 2275 and wait for assistance;

(iii) Accident hot spots where the project officer would like the drivers to take note; and,

(iv) Translated to the language understood by the driver.

20.4 The work party shall have a plan in place to address the possibility of drivers losing their way when driving to or within the airport roadways. General rule to stop at a safe location to seek assistance in wayfinding shall be observed.

21 IN HOUSE RULES AND REGULATION

21.1 All Contractors shall ensure compliance with the Workplace Safety & Health (WSH) Requirements (see Attachment A18) and In-House Safety Rules (see Attachment A19).

22 HAZARD REPORTING

22.1 There are several channels available to facilitate hazard reporting for airport community:

(a) Hazard reporting mobile application, iFeedback, residing on the SWEET, ONE Changi mobile applications;

(b) An on-line hazard reporting form established on the Changi Airport website. https://hazardreporting.changiairport.com/Hazard/Safety_Hazard.aspX;

(c) Via email: safety@changiairport.com;

(d) For hazard requiring immediate attention, the airport community can call the following 24-hour hotline numbers:

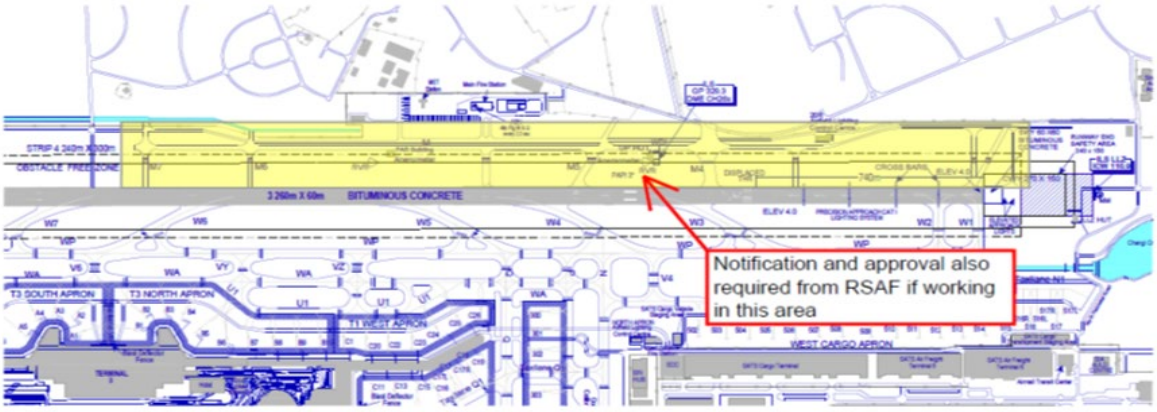
Changi Airport
- Fault Management Centre – 6541 2424

Seletar Airport

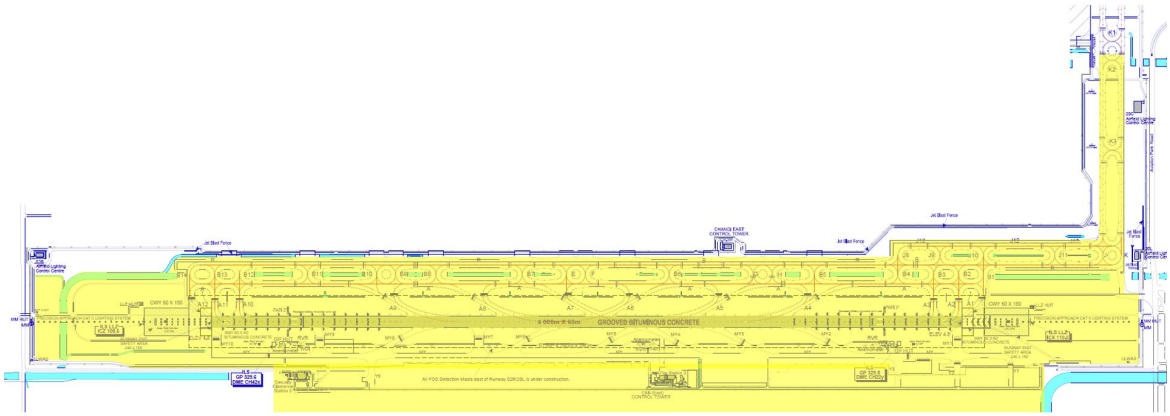
- Seletar Airside Operations Unit – 6481 5077

23 CARRYING OUT ACTIVITIES OR WORKS IN/NEAR RSAF AREA

Runway 1 Area



Runway 3 Area



23.1 If there are any works to be carried out and is within the highlighted area shown above (West of Runway 02L/20R or East of Runway 02R/20L or Taxiway A/B/J/K/ Runway 02R/20L), the Project/ Maintenance Team shall take additional steps to inform Changi Air Base (CAB) of the upcoming works and ensure approval is sought prior to work commencement.

The personnel from RSAF to be notified are as follows:

No.	Name	Role	Email Contact
1	CAB Duty Officer	24hrs Duty Officer	Cab_duty@defence.gov.sg
2	CAF Airfield Lighting Team	In charge of AFL for RSAF	Woon_Yik_Seng@defence.gov.sg

The cab duty phone (24 hr hotline) is 65864033 / 34.

23.2 All movements within the yellow highlighted military area above are subjected to CAB's approval. The maintenance/project contractor shall communicate with CAB ATC Tower via RSAF approved walkie talkie and ensure the supervisor has CAB airfield driving permit before entering/exiting the area. For procedure to enter/exit Taxiway A/B/J/K/ Runway 02R/20L after 1

Dec LT 0400Hrs, the maintenance/ project contractor shall refer to Attachment A29 for more details.

23.3 For the CAB airfield driving permit, CAB will be conducting lessons and certification on a monthly basis. To enrol for the lessons, please ensure you have gotten CAG approval before contacting Ms Celine (Goe_De_Qi_Celine@defence.gov.sg).

23.4 For the walkie talkie, project/maintenance contractor can:

a) Purchase the walkie talkie from CAB's appointed contractor and get the walkie talkies programmed.

For more info, please contact Ms Celine (Goe_De_Qi_Celine@defence.gov.sg).

23.5 All work parties are reminded that there shall be strictly no photo-taking of military facilities allowed from the airfield.

24 WORK ACTIVITIES INVOLVING ROADWAY LANE CLOSURE IN LANDSIDE / AIRSIDE

24.1 When lane closure at landside is necessary, the Work Party shall comply with the "Terms and condition of works in landside" (see attached Attachment A23) and complete the "Road Work Permit and submit to the divisions stated in the distribution list five (5) working days before the commencement of work. The Work Party shall only commence the planned work after receiving the approval from all divisions on the distribution list.

24.2 When lane closure at Airside is necessary, the Work Party shall seek approval from CAG Airside Operations." (See attached Attachment A15)

25 ELECTRICAL SAFETY

25.1 The Work Party shall ensure that sufficient safety measures are put in place when working with energized equipment or when installing and/or modifying equipment that was connected, is connected, or shall be connected to a live power source. The Work Party shall ensure that all staff and workers involved in the work activity shall be briefed on associated risk assessments and safe work procedures related to the scope of work.

25.2 All circuits, DBs, PDPs and any electrical distribution system must be isolated and checked by an authorized competent person to be safe to work on before works can commence.

25.3 The Work Party shall ensure all electrical works must be undertaken or carried out by a licensed electrical worker of the appropriate class as per the guidance set out by the Energy Market Authority.

25.4 It shall be the responsibilities of the Work Party to ensure that its workers are sufficiently protected throughout the entire duration of work. In doing so, Work Party must put in place a lock-out, tag-out system to minimise the possibility of accidental turn-on of the incoming power supply. On top of that, workers working on the electrical system shall be provided with necessary and appropriate form of personal protective equipment to mitigate the severity of any incident / accident that may occur during electrical works. This may include, but not limited to

the use of grounding bracelets, goggles, face masks, rubber mats, etc. All metallic tools (i.e. aluminium ladder, screw drivers, pliers) should be avoided within the vicinity of the work area. The use of such tools are only permitted when sufficient form of insulation is provided for exposed metallic surfaces to reduce the likelihood of such tools causing electrical shorts or arcing.

25.5 The Work Party shall also ensure that circuit diagrams and schematics are available and incorporated into the emergency response plan to facilitate prompt and immediate response to any electrical incidents that may arise during the course of work.

25.6 For electrical installations taking electricity supply from the CAG's substations, advice on circuit protection requirements must be sought from CAG LEW responsible for the respective licenced electrical installation.

25.7 The Work Party shall:

(i) Update the respective existing electrical drawings for any new installation/modification to the existing system with an endorsement of the Licence Electrical Worker (LEW).

(ii) Submit Certification of Compliance (COC) of the new equipment/system installed to CAG LEW prior to the power turn-on to the new equipment/system.

(iii) Submit the approved Method of Statement and Risk Assessment prior to the commencement of the work.

(iv) Inform Fault Management Centre (FMC) before work commencing and after work completion.

25.8 The work party shall be responsible for provision of barricades and warning signs for other live switchboards within the same switch room, that are not intended for works.

25.9 Lockout and Tagout (LOTO) procedure shall be strictly enforced when a HT panel is de-energised and isolated (compliance with SS571 standards) for the control of energy sources which could cause injury to persons. It applies, but is not limited to, activities such as erecting, installing, constructing, repairing, adjusting, inspecting, modifying, unjamming, setting up, troubleshooting, testing, cleaning, dismantling, servicing, and maintaining machines, equipment, or processes. This procedure is to ensure proper isolation from LIVE electrical supply with safety padlocking and caution notices to warn personnel at work.

25.10 All airport stakeholders are required to provide the as-built drawings indicating the provisions of secondary power supply and inform CAG of any new installation or replacement of the following equipment:

a) The signalling lamp and the minimum lighting necessary to enable air traffic service personnel to carry out their duties;

b) All obstacle lights which, in the opinion of the Aerodrome and ANS Regulation Division, are essential to ensure the safe operation of aircraft;

c) Approach, Runway and Taxiway lighting;

d) Meteorological equipment;

e) Essential security lighting;

f) Essential Equipment and facilities for the aerodrome responding emergency agencies;

g) Floodlighting on a designated isolated aircraft parking position;

h) Illumination of apron areas over which passengers may walk.

25.11 For works within the terminal, after any shifting of temporary lightings. The Contractor's supervisor shall carry out checks to ensure the connections of such temporary lightings are properly connected.

26 WORKS DURING RUNWAY CLOSURE

26.1 Anyone with works to be carried out during scheduled runway closure are to ensure that the "Runway Closure Works Control Matrix" set out by CAG Airside Operations, is applied.

Runway Closure Works Control Matrix

Managed by:	**REP Officer**			**AMC**
Work Type	**1**	**2**	**3**	**4**
Work Area	**Works on Runway**	**Works within Runway Strip & Runway End Safety Area (RESA)**	**Works outside Runway Strip but within GP critical sensitive area (CSA)**	**Works outside Runway Strip with risk when runway needs to open** e.g. impact to critical systems, OLS penetration, drone ops & exposure to jet blast
Registration Type	**Report physically to REP Hut** - Complete Form A & C - Collect tags and geofence trackers - Attend safety briefing			**Report to AMC** (6541-2275) **over phone call**
Travel Route	**Via REP access road**		**Via Perimeter Roadway/Taxiway** *(Except grasscutters or turfing works to enter via REP access road)*	**Via Taxiway/Perimeter Roadway**

***Form A & C as Attachment A27 & Attachment A28**

26.1.2 For Work Type 1/2/3

a) Work areas spelled out under work type 1, 2 or 3 of the matrix, shall follow the Runway Entry/Exit Point (REP) procedures. Supervisors shall be the overall in-charge of the work parties and to always remain contactable to the REP Officer. They are to ensure the following:

i) Before Runway Closure:

1. All work parties shall report to REP Hut 1 hour before runway closure for registration.
2. Supervisor to ensure that Form A and Form C are filled in and submitted.

3. Supervisor to fill work details and mark out work area on the whiteboard outside REP hut.
4. Geo-fence trackers, vehicle, and machinery tags to be collected by each work party and/or driver.
5. All work parties shall attend the safety briefing conducted by the REP Officer.
6. Works requiring more than 30 minutes to vacate in the event of emergency opening, are to be reported to REP Officer.

ii) During Runway Closure:

1. All work parties to remain within their work site as marked out on whiteboard outside REP hut.
2. No one shall unhook, unchain, remove physical barriers (i.e., chains, markerboards, cones) without authorization from REP Officer.
3. No one shall cross or attempt to cross any physical barriers at all times.

iii) Before Runway Opening:

1. Supervisors shall ensure that work parties pack and clean up the work area 1 hour prior to runway opening to facilitate timely evacuation from the closed runway 30 minutes before runway opening.
2. All personnel, vehicles and machinery are to be accounted for when exiting the runway.
3. Supervisor shall ensure Form A and Form C are signed out.
4. All geo-fence trackers, vehicle and machinery tags shall be returned to the REP hut.

26.1.3 For Work Type 4

a) Work areas spelled out under work type 4 of the matrix, shall adhere to the following All relevant permits must be obtained (e.g., height permit) before commencement of works.

i) **[1 hour before scheduled runway closure]** Supervisor to contact AMC (6541-2275) to report for works during runway closure. Works requiring more than 30 minutes to de-mobilise in the event of emergency opening, are to be reported to AMC.

ii) **[Runway Closed]** Works may commence upon receiving confirmation over phone call from AMC that runway is closed.

iii) **[1 hour before Runway Opening]** Supervisors shall ensure that work parties pack and clean up the work area (e.g., boom down crane, lower drone, restore critical system) upon receiving phone call from AMC to notify him/her on runway re-opening.

iv) Supervisor shall report to AMC, informing that works have completed (e.g. critical system restored/no unsafe equipment deployed).

26.2 Refer to **Form A (Attachment 27)**: Contractor Checklist for Works reporting to REP Hut (to be completed by Contractor's Supervisor).

26.3 Refer to **Form C (Attachment 28)**: Safety Meeting Log (To be completed by Contractor's Supervisor and submitted to REP Officer before entering the closed Runway).

27 WORKS AROUND CHANGI AIRPORT FUEL HYDRANT INSTALLATION (CAFHI)

a) Driving over the fuel pits are prohibited. Photos of fuel pits as show:

b) The work party shall engage CAFHI if their works affect any E-Stop or fuel hydrant system prior to commencement of works.

c) No foreign materials shall be dumped into the fuel pits.

SECTION D - OBSTACLE CONTROL REQUIREMENTS

I) WORK ACTIVITIES NEAR RUNWAY & TAXIWAY

1 GENERAL

All the Standards and Recommended Practices stipulated in the Civil Aviation Authority of Singapore (CAAS) Air Navigation (139 – Aerodrome) Regulations, respective aviation specification and advisory circulars (where applicable) and in the International Civil Aviation Organisation (ICAO) Annex 14 Volume I and Volume II (where applicable) are to be complied with.

2 MAXIMUM HEIGHT OF OBJECTS

2.1 All above ground objects (such as mobile machineries, tall construction machineries/plant, temporary structures, stockpile, etc.) present on the airfield are subject to height control. The maximum height of all these objects shall not infringe into the obstacle limitation surfaces, Tower and radar line of sight and any other navigational instrument paths as CAG and/or CAAS may declare from time to time.

2.2 If there are special circumstances where it is absolutely necessary to carry out activity or to place objects in the airfield infringing the runway operational surfaces or affect line of sight or navigation equipment performance, ample advance notice and good justification must be given, subject to CAG' and CAAS' approval.

2.3 To ensure the active runway operational surfaces are not infringed, no above ground object or work activity at the site shall be allowed to take place higher than the Height Limit (expressed in above ground level), as stipulated in the following table, at all times when the runway concerned is in operation.

At Changi Airport

CHANGI AIRPORT RUNWAY 1, 2 & 3	
Perpendicular distance of object or activity from centre line of runway, D (m)	Permissible maximum height (expressed in above ground level)
$D < 140$ m	No object allowed above ground level
$140 \text{ m} \leq D < 455$ m	$\frac{(D-140)}{7}$ m
$D \geq 455$ m	45 m

If temporary mobile construction at distances less than specified in the table, approval from CAAS Airspace Policy (ASP) Division shall be sought.

At Seletar Airport (Current till further notice)

SELETAR AIRPORT RUNWAY	
Perpendicular distance of object or activity from centre line of runway, D (m)	Permissible maximum height (expressed in above ground level)
D < 75 m	No object allowed above ground level
75 m ≤ D < 390 m	$\frac{(D-75)}{7}$ m
D ≥ 390 m	45 m

Note: The above table for Seletar Airport will change to the following after the runway is equipped with Instrument Landing System. The Work Party shall check with the S.O., Project Officer and/or Coordinating Officer for the effective date.

At Seletar Airport (after runway is equipped with Instrument Landing System)

SELETAR AIRPORT RUNWAY	
Perpendicular distance of object or activity from centre line of runway, D (m)	Permissible maximum height (expressed in above ground level)
D < 140 m	No object allowed above ground level
140 m ≤ D < 455 m	$\frac{(D-140)}{7}$ m
D ≥ 455 m	45 m

2.4 The Work Party shall submit to CAAS Airspace Policy (ASP) Division for height clearance, a list of mobile machineries, tall construction machineries/plant, temporary structures, stockpile, etc to be brought onto the airfield, at least 7 days prior to their deployment. In the submission, the following information shall be provided:

a) type and height (in metres above mean sea level, AMSL) of equipment, plant, structures, stockpiles, etc. with extensible arms both in extended and retracted positions;

b) proposed location of deployment (with site plan);

c) expected duration and daily working hours; and

d) contact number of Work Party.

2.5 The CAG S.O., Project Officer and/or Coordinating Officer shall ensure that prior approval be obtained from CAAS Airspace Policy (ASP) Division before allowing such mobile machineries, tall construction machineries/plant, temporary structures or stockpile, etc to be deployed on site.

3 HEIGHT CONTROL

3.1 Work sites near the airport are subject to height restriction imposed by CAG and/or CAAS Airspace Policy (ASP) Division. The Work Party shall seek the approval of CAAS Airspace Policy (ASP) Division before deploying tall equipment and ensure that the height restrictions stipulated are strictly complied with.

3.2 The height restrictions imposed by CAG and/or CAAS Airspace Policy (ASP) Division also apply to temporary structures and construction machineries such as cranes, piling rigs, etc. with extensible arms both in extended and retracted positions. The Work Party shall apply to CAAS Airspace Policy (ASP) Division for height clearance of construction machineries at least 7 days prior to the deployment of the equipment. The Work Party shall apply via the gobusiness link provided on CAAS website at https://www.caas.gov.sg/e-services-forms/e-services/application-for-obstacle-clearance. The following information shall be provided:

a) Type and height (in metres above mean sea level, AMSL) of equipment and plant to be used with extensible arms both in extended and retracted positions;

b) Proposed work sites (please provide a site plan);

c) Expected duration and daily hours of working;

d) Name and contact numbers (office number, mobile number, and pager number) of the Work Party; and

e) Name of client.

3.3 Work parties shall ensure that contact number of the supervisory staff for works be made available as per the requirements of the CAAS height limit approval letter.

4 MINIMUM CLEARANCE FROM RUNWAY

4.1 No object shall penetrate the Approach, Take-off Climb and Transitional Surfaces of the operational runway, or be within the various safety areas i.e., runway strip, clearway, stopway, runway end safety area as declared for the operation of the airport by CAG and/or CAAS (see Attachments A1-1, A1-2 and A3 for Changi Airport and Seletar Airport respectively).

Note: The obstacle control requirement at runway end area in Seletar Airport will change after the runway is equipped with Instrument Landing System. The Work Party shall check with the S.O., Project Officer and/or Coordinating Officer for the latest permissible maximum height (shown in Attachment A3).

4.2 No above ground object or work activity shall be allowed within the runway strips (i.e., 140 metres and 75 metres from the centre line of the runway for Changi Airport and Seletar Airport respectively) when the runway is in operation, unless otherwise approved by CAAS/CAG.

Note: The width of the runway strip in Seletar Airport will change after the runway is equipped with Instrument Landing System. The Work Party shall check with the S.O., Project Officer and/or Coordinating Officer for the latest requirement.

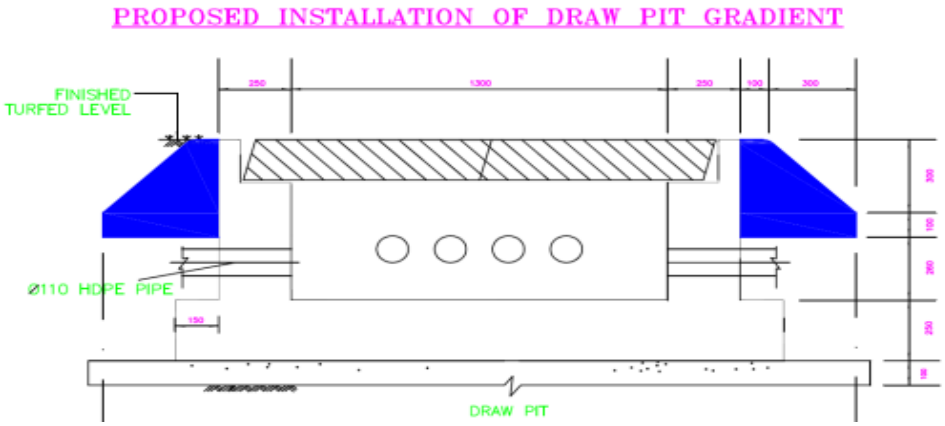
4.3 All machineries/plants or tall objects, shall be parked or placed as far away as possible from the runway. The height control requirements specified in paragraph 3 above shall be fully complied with.

4.4 Vehicles, construction equipment and workers shall keep out of the Instrument Landing System (ILS) critical and sensitive areas at both ends of the runways at Changi Airport (see Attachments

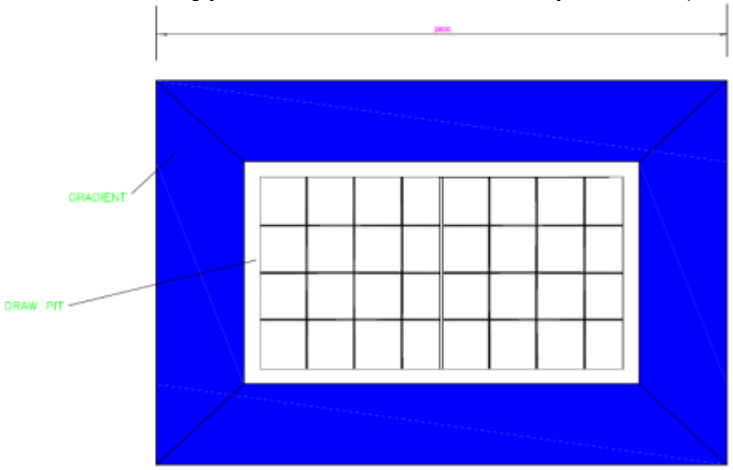
A8-1 and A8-2) and at Seletar Airport at all times, unless otherwise approved by CAAS/CAG (see Attachments A9-1 and A9-2).

Note: Seletar Airport's runway would be equipped with Instrument Landing System from upon further notice. Work party shall check with the respective S.O., Project Officer and/or Coordinating Officer for the effective date.

4.5 Within the graded runway strip and runway end safety area (See Attachment A10 and A11), measures should be taken to prevent an aeroplane wheel, when sinking into the ground, from striking a hard-vertical face. In the case of concrete foundations for runway light fittings or any other objects which the object surface must also be flush with the surface, the vertical face can be eliminated by chamfering from the top of the foundations/objects to not less than 30 cm below the strip surface level and with a slope of 30 – 45 degrees.



Picture 1 - Typical Installation with a slope of 45° (Side View)



Picture 2 - Typical Installation with a slope of 45° (Top View)

Other objects, the functions of which do not require them to be at surface level, should be buried to a depth of not less than 30 cm.

4.6 All taxiways leading into the runway at Changi Airport and Seletar Airport including Runway Entry Points (REPs), other than REP 3 are equipped with Microwave Barrier Detectors (MBDs). MBDs are installed at the runway-holding positions / road holding positions to detect unauthorised entry of aircraft or vehicles into the runway.

No machineries/plants or objects are allowed to be parked or placed in front of the MBDs. The area to be kept clear at all times shown in the diagrams below.

Diagram 1: Photo of a typical MBD installed at the runway-holding positions/ road holding positions

Diagram 2: For single-sided MBD

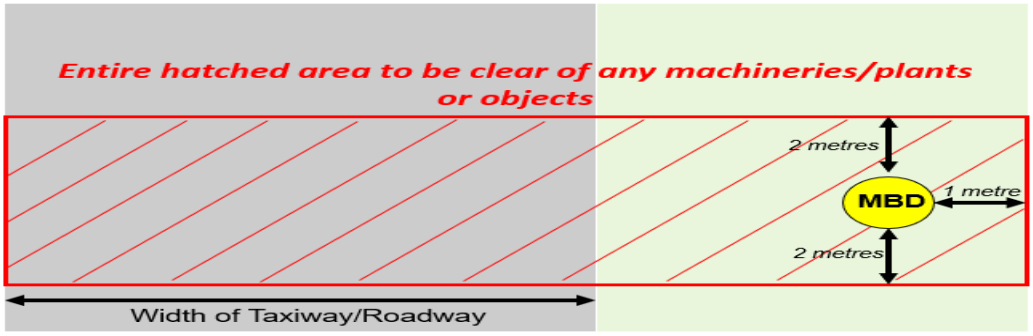
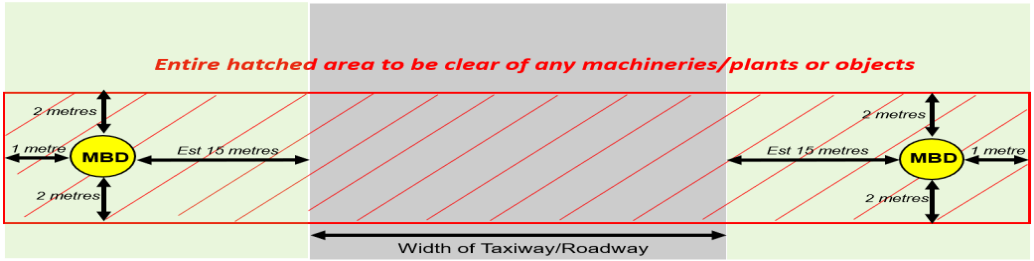


Diagram 3: For double-sided MBD



4.7 Excavation, Open Trench and Pits

Excavations, trenches, pits or holes are not permitted to be left uncovered and back-fill of these areas are not to be left uncompacted within graded runway/taxiway strips and runway end safety areas when the runway is in operation (see Attachments A10 and A11 for Changi Airport and Seletar Airport respectively).

5 MINIMUM CLEARANCE FROM TAXIWAY

5.1 All work activities such as construction equipment, personnel, FOD, etc. must be kept at least 51 metres (Changi)/35 metres (Seletar) from the centre line of the taxiway when the taxiway is in operation. The minimum clearance from taxiway for Changi Airport may be less than 51 metres based on the separation distances stated in paragraph 1.2 of Section C or as published by CAG from time to time. The minimum clearance from taxiway for Changi or Seletar Airport may change due to work in progress. The Work Party shall check with the S.O., Project Officer and/or Coordinating Officer for the latest information.

5.2 All machineries/plants or tall objects (objects having a height to smaller base width ratio of more than 1) shall be parked or placed as far away as possible from the taxiway when not in deployment or unattended.

5.3 Under no circumstances shall any non-operating or unattended machinery/plant or tall objects be placed nearer than the distance, T, from the centre line of the operational taxiway:

T = total height of the object/machinery/plant + 51 metres (Changi)
T = total height of the object/machinery/plant + 35 metres (Seletar)

Note: The above information for Changi or Seletar Airport may change due to work in progress. The Work Party shall check with the S.O., Project Officer and/or Coordinating Officer for the latest information.

5.4 Excavation, Open Trench and Pits

Excavations, trenches, pits and holes are not permitted to be left uncovered and back-fill be left uncompacted within 30 metres (Changi)/13 metres (Seletar) from the operational taxiway centre line. If they are carried out within these areas when the taxiway is closed, they must then be backfilled and compacted before the taxiway is re-opened for operations. Outside these areas, uncovered or uncompacted excavations shall be minimised. The above information for Changi or Seletar Airport may change due to work in progress. The Work Party shall check with the S.O., Project Officer and/or Coordinating Officer for the latest information.

6 OTHER AREAS

6.1 Vehicles, construction equipment and workers shall not be near the runway and taxiways unless necessary for working purposes.

6.2 When not in use, vehicles, machineries, plant, equipment and materials shall be placed within the designated areas assigned by CAG and they shall be as far away from the aircraft movement areas as possible.

6.3 Working areas, parking areas, storage areas and access routes to and from these areas shall be clearly designated and approved by CAG.

II) OBSTACLE MARKING AND LIGHTING OF MOBILE OBJECTS (PLANT, MACHINERIES, EQUIPMENT, VEHICLES, ETC.)

7 GENERAL

7.1 The marking and/or lighting of obstacles is intended to reduce hazards to aircraft by indicating the presence of the obstacles.

7.2 Vehicles, construction equipment, etc. on or near the movement area (i.e. runways, taxiways, taxilanes and aprons) of an airport are obstacles and shall be marked and, if they are used at night or in conditions of low visibility, lighted, in accordance with the specification given herein and in the manner CAG deems acceptable.

7.3 The markings and lighting of obstacles in accordance with the CAAS Aviation Specifications 5 – Aerodrome, Chapter 9. Marking and lighting standards for vehicles (e.g. pickups, trucks and trailers) are as follows:

a) The low-intensity obstacle lights displayed on vehicles shall be flashing yellow.

b) The flash frequency shall be between 60 and 90 per minute.

c) The effective-intensity of the flash shall not be less than 40 candelas of yellow light. Maximum not more than 400 candelas.

d) Flags used to mark mobile vehicles shall not be less than 0.9 metre square.

e) Flags used to mark mobile vehicles shall consist of a chequered pattern, each square having sides of not less than 0.3 metre. The colours of the pattern shall contrast each with the other and with the background against which they will be seen. Orange and white or alternatively red and white shall be used.

f) Examples of the obstacle lights and chequered flags are attached for your easy reference (see Attachment A12).

g) The Work Party shall ensure the quality of the chequered flag are in good and clean condition.

7.4 The markings and lighting of obstacles in accordance with the CAAS Aviation Specification 5, Para 9.2 for cranes, piling, rigs, excavators, silos, etc. are as follows:

a) Omni and fixed red light

i) Cranes/piling rigs/excavators (< 45 m above the surrounding ground) (Low intensity, type A (Minimum 10 candelas) or B (Minimum 32 candelas), fixed red).

ii) Cranes/piling rigs (> 45 m, < 150 m above the surrounding ground) (Medium intensity, type B, flashing, 20-60 fpm, 2000 ± 25% candelas)

b) Flags of size not less than 0.9 metre square shall consist of a chequered pattern, each square having sides of not less than 0.3 metre. The colours of the pattern shall contrast each with the

other and with the background against which they will be seen. Orange and white alternatively red and white shall be used.

8 MARKING OF MOBILE OBJECTS

8.1 All mobile objects issued with Airfield Vehicle Permit shall be painted in a single conspicuous colour except for tall construction equipment. Vehicles that require to enter the aircraft manoeuvring areas shall be painted yellow, while other vehicles moving outside the aircraft manoeuvring areas shall be painted white. For concrete trucks, lorry cranes, tipper lorries & trailers which are not feasible to be painted with a single conspicuous colour, shall display a chequered flag at its highest point.

8.2 All mobile objects with Temporary Entry Permit shall display flags not less than 0.9 metre square of chequered pattern of orange and white colours, each square having sides of not less than 0.3 metre at its highest point while travelling in the airfield (see Attachment A12).

9 LIGHTING OF MOBILE OBJECTS

9.1 All CAT 1 vehicles & mobile equipment operating in taxiways and runway shall be equipped with dual low-intensity flashing yellow obstacle light type C and shall be installed longitudinally on top of the vehicles & mobile equipment.

9.2 All other vehicles and mobile equipment operating in the aircraft parking stands and airside roadway are required to have one low-intensity flashing yellow obstacle light type C, installed at its highest point and shall switch on the lights at all times when vehicles and equipment are operating in the airside, except for Airport Emergency Services (AES) and Airport Police Division (APD) vehicles.

9.3 A copy of the documentation proof certifying that the flashing yellow obstacle light installed on each vehicle complies with the required specifications will be required to support the application or renewal of the Airside Vehicle Permit (AVP), as well as Temporary Entry Permit (TEP).

9.4 Tall objects (e.g., cranes and piling rigs) shall be lighted up with conspicuous steady red omni-directional obstacle lights at the top and extremities. Any equipment parked on closed aircraft movement areas (when there are no work activities in the closed areas) shall also be marked with chequered flags and lighted (i.e., red fixed obstacle light at the highest point at night or during poor visibility condition) when not in use.

9.5 The obstacle light on vehicles & mobile equipment shall comply with CAAS Aviation Specifications 5 – Aerodrome, Chapter 9, Table 9-1. Characteristics of obstacle lights.

9.6 The driver of the vehicle shall switch on hazard lights, head lights, spotlights & directional arrows when the vehicle is stationary on runway while carrying out work at night. Where long vehicle is concerned, additional flashing yellow obstacle light shall also be installed at the rear of the vehicle so that the entire vehicle is conspicuously lighted.

SECTION E – WILDLIFE CONTROL REQUIREMENTS

1 MEASURES TO MINIMISE WILDLIFE HAZARD

1.1 Work Parties shall consult Airside Operations Planning before erecting any new buildings and structures in the aerodrome.

1.2 Work Parties shall take appropriate measures to avoid attracting birds, dogs, cats and other wildlife to the airport. In addition, Work Parties shall conduct daily checks to ensure that their workers adhere to these measures.

1.3 Work Parties shall avoid damaging turf in the course of their activities as ponding could lead to the growth of insects and other invertebrates which in turn attract birds. All excavated areas shall be covered up with approved materials and methods.

1.4 Work Parties shall minimise the presence of stockpiles or poles or wires and other such items which could act as perches for birds at worksites. Appropriate mitigation measures must be taken if birds are found to be attracted to these areas.

1.5 Work Parties shall ensure that there is no overgrown grass and minimize water ponding within the work sites.

1.6 Work parties shall ensure that there are no gaps or holes in the hoardings and any damage to the hoardings must be repaired immediately with stopgap measures to block up the holes. This is to prevent dogs, cats and other stray animals from entering the airfield. Checks on the base of the hoardings, gates and fences shall also be carried out daily to ensure no disturbance to the ground that could lead to wildlife trespassing.

1.7 No person shall consume any food or beverage in the movement area except in the offices located on the apron or on board an aircraft. There shall be proper management of food waste to reduce attractants for wildlife. No person shall feed any bird or animal within the airside.

1.8 Work Parties shall be required to catch any dogs, cats or other animals found within their worksites. If the dogs, cats or other animals escape into the airfield, Work Parties shall report such incidents to CAG Airside Operations immediately at Tel: 6541 2275/3 (Changi Airside Management Centre)/6481 5077 (Seletar Airport Operations Unit) or contact the Changi/Changi East/Seletar Tower directly.

SECTION F - OTHER HAZARDS CONTROL REQUIREMENTS

1 FOREIGN OBJECTS/DEBRIS/DUST (FOD)

1.1 There must not be any foreign objects debris (such as stones, earth lumps, nails, construction waste, cut grass, mud stain, etc.) left behind on the aircraft pavements (such as runways, taxiways, taxilanes and aircraft parking aprons, etc.) as well as in their vicinity as these objects could be ingested by the aircraft engines and may subsequently endanger the safety of the aircraft during operation. The Work Party shall ensure that all the foreign objects on the aircraft pavements and their vicinity are cleaned up and cleared away before the pavements are opened for operation. The Work Party shall be required to ensure that all his vehicles, machineries or equipment are in proper serviceable condition and are cleaned and free from foreign objects or debris before they travel on the aircraft pavement.

1.2 There must also be strict supervision to ensure that workers do not litter the work site, as the litter could be blown onto the runways, taxiways, taxilanes or aircraft parking apron.

1.3 Measures must be taken to ensure that objects such as markers and dust from construction areas, piles of material/debris, etc. are not blown onto the runways, taxiways, taxilanes or aircraft parking apron.

1.4 Every person on the premises of the airside shall obey the lawful directions given by an authorised person to remove any material, handling or transporting equipment, refuse or litter. No person shall leave or deposit any foreign matter or thing in the movement area that is likely to be hazardous to the operation of any aircraft.

2 GLARES FROM LIGHTS AND REFLECTIVE PANELS

2.1 In general, all lights for illumination of work sites shall be shielded and directed to shine towards the ground. Should pilots or air traffic controllers complain of glare after the installation of the lights, these lights shall be modified or removed accordingly.

2.2 Lighting installed at developments similarly shall not cause glare and confusion to aircraft pilots or to air traffic controllers. Should pilots or air traffic controllers subsequently complain of glare or confusion, the lights shall be modified or removed accordingly.

3 INTERFERENCE TO NAVIGATION AIDS/AIRPORT EQUIPMENT

3.1 There shall not be large metallic cladding/metallic structures which can cause radio signal reflection or blockage against line-of-sight operations to systems such as Instrument Landing System (ILS) and radars installed in the airport. Installation of such metallic cladding/metallic structures is strictly subject to written approval from CAAS Aeronautical Telecommunications & Engineering (ATE) Division.

3.2 Vehicles, construction equipment and workers shall keep out of the ILS critical and sensitive areas along the runways.

3.3 Metal cladding and materials of high reflectivity to radar signal of frequencies 1 GHz to 3 GHz shall not be used for wall and roof facing our radars. However, if such metal cladding or materials are to be used, a suitable consultant would have to be engaged to advise on how radar

signal reflections from the buildings could be minimised to a level similar to that of the same building with its walls and roof using conventional building materials, e.g. concrete.

3.4 Arc welding shall be avoided as it could interfere with the navigation aids. CAAS ATE Division shall be kept informed of any arc welding carried out during the work.

3.5 Radio equipment to be used must be of the type which will not cause interference to airport telecommunications and navigational aid equipment. The procedures for application of mobile radio sets are as follows:

a) The Work Party is to write to the officer-in-charge from the Communications Section of CAAS ATE Division, LIM_Wee_Siang@caas.gov.sg / Augustine_LAU@caas.gov.sg furnishing the following details:

i) Reason for the need of mobile radio set, supporting letter or document from the airport employer, project title and reference number and duration;

ii) Vehicle(s) licence plate number; and

iii) Areas where sets would be used.

b) If acceptable, CAAS ATE Division will approve the use of mobile radio sets.

c) With CAAS' approval letter, the Work Party is to approach the officer-in- charge from NCS Communications Engineering Pte Ltd, saleem@ncs.com.sg / mdshafee@ncs.com.sg for rental of mobile radio set. The contact details of NCS Communications Engineering Pte Ltd:

NCS Communications Engineering Pte Ltd
Aeradio Service Division
Changi Airport
P.O. Box 2838
Singapore 918199
Tel: 6541 1677

3.6 Prior arrangements must be made between CAG and CAAS ATE Division for any maintenance work e.g. grass cutting and excavation work, carried out in the vicinity of navigational aids and other ATE facilities within the airside. Such arrangements may include for works to be carried out during planned shutdown of the aids/facilities, e.g. HF Transmitting Antennae.

3.7 All vehicles which need to enter the aircraft manoeuvring areas at Changi Airport (i.e. runways, taxiways and taxilanes) are required to be equipped with Automatic Dependent Surveillance – Broadcast (ADS-B) transponders utilising 1090 MHz Extended Squitter. Such transponders shall comply with the prevailing standards of aircraft avionics for ADS-B OUT (air-to-ground). The purpose of having the ADS-B transponders is to enhance aerodrome safety by facilitating Air Traffic Control (ATC) in tracking vehicular movements in the aircraft manoeuvring areas. For more information and technical details, please contact the officer-in-charge from the Surveillance Section of CAAS ATE Division, chan_seng_seck@caas.gov.sg.

3.8 All the cost associated with equipping the Work Party's vehicles with radio equipment or ADS-B transponders are to be borne by the Work Party.

4 PROTECTION OF TELECOMMUNICATIONS SERVICES
(Applicable where works cut across Telecom's Underground Services)

4.1 The Work Party shall arrange with NCS Communications Engineering Pte Ltd to make available sufficient special comms cable and ACR (Approach Control Radar) cables where applicable for emergency repairs as their severance will disrupt the aircraft operations. Such spare cables must be stored at suitable locations, with the aim of reaching the proposed work sites in the shortest possible time in the event of cable cut.

4.2 Where the works would be carried out over ACR cables, NCS Communications Engineering Pte Ltd (CAAS' contractor) shall be engaged for on-site standby to repair the cables in the event of their severance. Please liaise with NCS Communications Engineering Pte Ltd for further details. For the Navaids, ATC radio and comms cables, prior arrangement shall be made for engagement of SingTel's repair team when its services are needed. Please liaise with SingTel Network Services Outside Plant Planning, (Tel: 6848 5854/Fax: 6848 4110) for further details.

4.3 The depth of existing ducts shall be ascertained by manual trial hole excavation prior to overcrossing the ducts. Only manual excavation is to be carried out within 4 meters of such crossing.

4.4 If the proposed works were to overcross the comms cable ducts, slabs shall be provided to protect the comms cable ducts before heavy machinery could go over them during the works as such ducts are not supported by piles.

4.5 If the proposed works were to overcross the comms cable ducts, the method of support and protection shall be submitted to NCS Communications Engineering Pte Ltd, Line Plant Operations Division for approval. NCS Communications Engineering Pte Ltd, Line Plant Operations Division must be informed of the dismantling of supports and the backfilling procedure of the comms cable ducts.

4.6 A comprehensive work schedule shall be submitted to CAAS and SingTel through CAG. In addition, CAG, CAAS and SingTel shall be kept informed in advance of all works approaching existing CAG's or CAAS' comm plants/ducts.

4.7 Any severance of existing CAG's or CAAS' comm plants/ducts shall be attended to immediately with the aim of restoring normal services in the shortest possible time. The Work Parties responsible for the works shall inform CAG, CAAS and SingTel immediately of such severance.

4.8 All construction works within the existing services shall be carried out under the standing supervision and direction of the services detection worker and the Work Party supervisor, in a manner similar to that of making the trial hole or inspection pit.

4.9 The Work Party shall submit service detection report and surveyed services drawings endorsed by the services detection worker to CAG and CAAS. The surveyed services drawings shall include but not limited to the following:

a) the location and depth of the services observed, to be expressed in Airport Coordinates and in elevation with respect to mean sea level (MSL) respectively; and

b) the cross section and description of the services.

4.10 The Work Party shall note the consequences of damaging SingTel's cables. Under Section 29 of the Telecommunications Act 1999, any person who fails to give 7 days notification to SingTel prior to commencement of earthworks is liable on conviction to a fine not exceeding $100,000 or to imprisonment for a term not exceeding 3 years or both. Under Section 49 of the same Act, any person who in the course of carrying out earthworks, damages any SingTel's cable is liable on conviction to a fine not exceeding $1 million or to imprisonment for a term not exceeding 5 years or to both.

5 PROTECTION OF AIRCRAFT PAVEMENTS

5.1 The Work Party shall take all necessary measures to prevent his vehicles, machineries or plant from damaging the aircraft pavements during the work and shall be responsible to make good all the damaged pavements at his own expense to the satisfaction of CAG.

5.2 No tracked vehicles, plant or machineries shall be allowed to travel on the aircraft pavements. Prior approval is needed for such crossing and any damages arising from such movement of tracked vehicles, plants or machineries shall be made good by the Work Party to the satisfaction of CAG. In event where the damages are assessed to require urgent attention and the Work Party is not able to respond immediately, CAG reserve the rights to carry out such repair works and back charge the related rectification cost to the Work Party.

5.3 In no circumstances shall any diesel or fuel leaking vehicle be allowed to work in the airfield. Diesel or fuel leaking plant and machineries shall also, as far as possible, be discouraged for work in the airfield and shall not be brought to site without CAG's approval.

5.4 Unless otherwise decided by CAG, all the plant and machineries found leaking with fuel or diesel during the work shall be immediately stopped and removed from site and replaced at Work Party's own expense.

6 PASTING OF ADHESIVE MATERIALS ON HIGH MAST POLE

The Work Party shall not attach any posters, stickers or notices on the High Mast Poles since they may cause structural damages to the poles. If identified, the Work Party will be held accountable for the damages, which may necessitate the replacement of the entire pole if the damage is substantial. CAG reserves the right to carry out urgent safety rectifications works and bill the Work Party for the associated rectification costs.

7 WATER AND LAND POLLUTION CONTROL

7.1 No trade effluent other than that of a nature or type approved by NEA Director-General shall be discharged into any watercourse or land.

7.2 No trade effluent other than that of a nature or type approved by the Public Utilities Board shall be discharged into any public sewer.

7.3 All repair, servicing, engine overhaul, and related activities must take place within a properly contained area, such as one with a concrete floor and steel plates. All generated waste must be directed to undergo suitable treatment or disposal in accordance with regulations. Additionally, oil removers/interceptors should be installed to manage oil waste from workshop areas.

7.4 Diesel drums and chemicals must be stored in sheltered areas enclosed by concrete bund walls or within well-ventilated storage containers. Spill trays shall be provided for all drums, machinery, and equipment used on-site, especially for potentially pollutive substances used on site. Contractors shall regularly maintain these spill trays to prevent rainwater from washing away polluting substances.

7.5 All hazardous chemicals shall be labelled in accordance with the Globally Harmonised System of Classification and Labelling of Chemicals.

7.6 The Contractor is required to establish a response plan to cater for accidental spillages into any watercourse. This plan shall be effectively communicated to all project personnel.

7.7 Emergency spill kits must be made available on site or in the workshop for expeditious response to any case of chemical spill incidents. Additionally, the emergency response team shall be well-trained and proficient in using these spill kits.

7.8 All accidental spillages and trade effluent discharges shall be investigated and reported to the Authority.

SECTION G - AIR TRAFFIC CONTROL OPERATIONS REQUIREMENTS

1 AIR TRAFFIC CONTROL OPERATIONS

1.1 The Work Party shall be required to implement the following co-ordination procedures with Air Traffic Control (ATC) during his works within the aircraft manoeuvring areas:

a) The Work Party shall ensure the provision of a Co-ordinator (e.g. site engineer or approved certified safety officer) stationed full-time at site during the works who must be contactable and be able to respond immediately and communicate at all times with the Changi/Seletar Tower Duty Watch Manager in case of emergency or irregularities. The Work Party's Co-ordinator's mobile phone number shall be provided to the Changi/Seletar Tower.

b) Unless otherwise decided by CAG, the Work Party shall provide at least 2 radio-equipped vehicles at site at all times (including night works) during his works within the aircraft manoeuvring areas (either operational or closed) or when there is a need to manoeuvre in the aircraft manoeuvring areas. Both radio-equipped vehicles shall have good conditioned and reliable radio sets turned-on at all times to enable effective and instant communication with the Changi/Seletar Tower.

c) In case of obstructions or hazards to aircraft operations, or any incidence during the works that may endanger the operation of aircraft within the aircraft manoeuvring areas, the Co-ordinator shall immediately alert the Changi/Seletar Tower Duty Watch Manager through the radio set on 121.9 MHz (Changi)/122.9 MHz (Seletar Ground)/118.45 MHz (Seletar Tower) or Tel No 6541 2416 (Changi) or 6481 2893 (Seletar) [to be used only when a radio set is not available] for Changi and Seletar Airport respectively.

d) In the event of an aircraft emergency requiring opening of runways or taxiways, the Changi/Seletar Tower Duty Watch Manager will alert the Co-ordinator through radio-set and he shall evacuate all construction personnel and equipment from the work areas within the runway/taxiway strip and operational surfaces to pre-designated holding areas. Runway must be ready for operation (i.e. cleared of all obstructions) within 30 minutes upon notification by the Changi/Seletar Tower Duty Watch Manager.

e) Notification procedure for works or movement of equipment/vehicles that require Changi/Seletar Tower Duty Watch Manager's clearances.

1.2 The Work Party shall provide proper supervision of his workers movement and clearly mark out the work areas to ensure that vehicles, personnel, equipment, works, etc. are confined to the designated work areas and that there is no unauthorised entry into aircraft movement areas, such as runways, taxiways, taxilanes, aprons, runway safety areas, navigational aids sensitive areas, etc.

1.3 Vehicles, construction equipment and workers shall only use the approved designated routes to gain access to work areas.

1.4 Access routes to the work areas shall as far as possible be routed clear of taxiways (either operational or closed). Where crossing of operational taxiway/taxilane is necessary during his works and approved by CAG, the Work Party shall obtain clearance from the Changi/Seletar Tower before each crossing is made and be responsible to engage approved safety supervisor

stationed at the designated crossing point to manage and regulate his vehicular crossing activities. Priority shall be given to the taxiing aircraft on the taxiway during his vehicular crossing activities. No crossing of the taxiway shall be permitted whenever the Changi/Seletar Tower so directs. Crossing is also not permitted in front of the path of a taxiing aircraft. He shall also be required to station two workers full-time at his designated taxiway/taxilane crossings to maintain the cleanliness of the taxiway/taxilane pavement and ensure it is free from FOD at all times during his vehicular usage.

1.5 All vehicles which are required to enter and manoeuvre in the aircraft movement areas (i.e. runways, taxiways, taxilanes and aprons) shall be equipped with radio sets on 121.9 MHz (Changi West)/122.9 MHz (Seletar Ground)/118.45 Mhz (Seletar Tower) frequency which must be manned at all times such that there will be a constant communications link between the Changi/Seletar Tower and the vehicle/equipment in the aircraft movement areas.

1.6 Where entry into a particular manoeuvring area is approved by CAG, ATC clearance shall be obtained before mobilising any vehicle, personnel or construction equipment into that particular area. In this case, radio communications between the Changi/Seletar Tower and the Work Party's work supervisor shall be continuously maintained at an approved radio frequency. The Work Party shall also confirm with the CAG S.O., Project Officer or Coordinating Officer on a daily basis regarding the closure of the airfield facility before entering the area concerned to start work each day.

1.7 At the end of each work period or period of runway closure, the Co-ordinator shall conduct runway/taxiway inspection to see that it is free from FOD and debris hazards. FOD and hazards found shall be immediately removed before the runway/taxiway is handed back to CAG for aircraft operation.

2 CONTROL OF AIRFIELD LIGHTS FROM THE CHANGI/SELETAR TOWER

2.1 Work parties shall note and take reference to Section C (Clause 13.9) for more information on the procedures required to demarcate and switch off / block the affected airfield lighting (AFL) circuits leading into and within the closed area on the CAAS Advanced Surface Movement Guidance and Control System (ASMGCS) and CAG Airfield Lighting Control System (ALCS) graphic interface, for any closure of runway, taxiway, aircraft parking stands and any other areas where airfield lighting services are provided.

2.2 Modification of ASMGCS and ALCS at Changi Airport or ALCMS at Seletar Airport shall be required for the following airside works involving AFL services:

a) addition / decommissioning / replacement of infrastructure with AFL services on the runway, taxiway and aircraft parking stands;

b) addition / deletion/ modification of AFL services and circuits in the airfield;

c) changes in taxiway naming; or

d) any other works which involves AFL services.

Work parties shall bear the cost of the required modification works to ASMGCS, ALCS and ALCMS. Work parties shall check with CAAS ASMGCS team for any modification cost to ASMGCS.

2.2.1 The modification works carried out by the Work Parties to ASMGCS/ ALCS/ ALCMS shall include but not limited to the following activities:

a) Inform and get approval from ASMGCS/ ALCS/ ALCMS system owners.

b) Liaise directly with ASMGCS/ ALCS/ ALCMS specialised contractors to carry out the following works:

i. Any new software and/ or hardware installation/ modification works;

ii. All necessary surveys, pre-testing, deployment, testing and commissioning works in accordance with Aviation Specification 5;

iii. Updating of ASMGCS/ ALCS/ ALCMS operational and maintenance manuals and training materials.

c) Coordinate and perform thorough software testing together with CAAS ATS, system owners and operation parties on the various systems' offline Testing and Validation System (TVS).

d) Deployment of the necessary software and/ or hardware including testing and commissioning activities.

e) Ensure all necessary documents (e.g., signed reports and updated OMM documents) to be submitted to system owners.

The general requirements above are for reference and is subject to change according to the type of works. Work parties shall clarify with ASMGCS/ ALCS/ ALCMS system owners when in doubt.

2.2.2 For any queries on CAAS ASMGCS and CAG ALCS at Changi Airport and CAG ALCMS at Seletar Airport, please contact the following personnel:

System: Airfield Lighting Control Monitoring System (ALCMS)
Location: Seletar Airport
Attention: Richard Chia
Email: Richard.chia@changiairport.com

System: Airfield Lighting Control System (ALCS)
Location: Changi Airport
Attention: Teo Wei Yi / Bobby Chua
Email: teo.weiyi@changiairport.com / bobby.chua@changiairport.com

System: Advanced Surface Movement Guidance and Control System (ASMGCS)
Location: Changi Airport
Attention: Toh Seow Teng / Kevin Kong
Email: Toh_Seow_Teng@caas.gov.sg / Kevin_Kong@caas.gov.sg

2.3 The Changi/Seletar Tower shall at all times continue to have effective remove control to all the active runways and taxiway and apron airfield lights which are not affected by the construction works.

2.4 There shall not be any disruption to the ATC operations due to airfield lighting control modification works. In particular, operations on the runways shall not be disrupted.

SECTION H - AIRSIDE REGULATIONS

The contents of this section are subjected to changes. CAG reserves the right to update and/or revise these requirements as and when necessary. The Work Party shall comply with the latest requirements accordingly as instructed and the latest terms and conditions for works in the airside. All drivers are bound by the terms and conditions for operation as specified in the Airside Driving Theory Handbook for Changi Airport and Seletar Airport Airfield Driving Theory Handbook and CAT1 Airfield Driving Handbook (CAT1 ADTH for Changi and Seletar Airport).

1 PART 1: PERMITS ISSUED UNDER THE CAAS (CHANGI AIPRORT) BY-LAWS 2009/CAAS (SELETAR AIRPORT) BY-LAWS 2009

1.1 Under the provisions of the CAAS (Changi Airport) By-Laws 2009/CAAS (Seletar Airport) By-Laws 2009, the CAG Airside Management's Airside Driving Centre issues the following permits:

a) Airfield Vehicle Permit (AVP)

b) Temporary Entry Permit (TEP) for Vehicles

a) Airfield Driving Permit (ADP)

1.2 All applications are to be submitted via CAG online system, APIES. Applicants shall refer to the Conditions of Application in this URL:
https://apies3.changiairport.com/APIES

2 PART 2: RULES AND REGULATIONS

2.1 All drivers shall refer to the Airfield Driving Theory Handbook for Rules and Regulation. This can be downloaded from the URL: https://www.changiairport.com/corporate/e-services/documents.html under the Airside Driving Centre tab.

SECTION I – COMPLIANCE WITH OTHER STATUTORY REQUIREMENTS

1 GENERAL

1.1 The Work Party shall comply with CAAS (Changi Airport) By-Laws 2009/CAAS (Seletar Airport) By-Laws 2009 and all other applicable local legislation and statutory requirements related to the carrying out of the works.

1.2 The Work Party shall ensure that his workers complete or have completed the necessary training courses (including the refresher courses) required by local legislation and/or CAG before allowing them to perform any work for which the training is required.

1.3 The contents of this section highlight some of the requirements stipulated under these statutory requirements. The Work Party shall note that these highlighted items are only a brief representation and not exhaustively mentioned in this section. The Work Party concerned shall be required to find out all other requirements and comply with them fully.

2 WORKPLACE SAFETY AND HEALTH (WSH) ACT

2.1 The Work Party shall, as far as reasonably practical, protect the health and safety of his workers and all other users who may be affected by the works.

2.2 The Work Party shall comply with the statutory requirements stipulated under the Workplace Safety and Health (WSH) Act. The Work Party shall have in place a proper risk management system for stakeholders to proactively identify potential hazards and take reasonable measures to eliminate or reduce risk at source and instil greater ownership to prevent workplace accidents and injuries through sound safety management processes.

2.3 In this respect, the responsibilities of the Work Party shall include but not limited to the following proactive safety measures:

a) Conduct risk assessments of his work activities, take reasonably practicable steps to eliminate/reduce foreseeable risk and implement safe work procedures;

b) Review and revise risk assessments and safety measures regularly to improve safety performance;

c) Maintain safe work facilities and arrangements for workers;

d) Ensure machinery and equipment in use are kept in safe and proper condition at all times;

e) Develop and implement control measures to deal with emergencies in a smooth and effective manner to minimise damage to property or injury to persons; and

f) Provide workers with proper personnel safety apparels, clear safety instruction, with adequate training and supervision.

2.4 The Work Party shall notify and report accidents leading to death/injury of worker, airport staff and/or members of public to CAG, using the format of the Workplace Occurrence

Notification Report that can be found on https://app.cagsweet.com/ and if necessary, the Ministry of Manpower (MOM) and other relevant agencies promptly.

2.5 Upon award of the Contract, the Contractor shall register their works with the Building and Construction Authority (BCA) to obtain BCA's permit to carry out structural works as defined under the Building Control Act and its Regulations. A copy of the BCA's permit shall be submitted to CAG Project Officer.

2.6 For worksites that do not need BCA's permit to carry out structural works, the Contractor shall submit a copy of the non-notifiable Workplace Number from MOM to CAG Project Officer.

2.7 The Work Party shall employ one or more full time qualified Workplace Safety and Health Officer and/or Workplace Safety and Health Coordinator as stipulated under relevant subsidiary legislations of the Workplace Safety and Health Act.

2.8 All level 1 sub-contractors engaged by the main contractor shall be minimally bizSAFE level 3 accredited.

3 BUILDING CONTROL ACT (CHAPTER 29) – BUILDING CONTROL (LICENSING OF BUILDERS) REGULATIONS 2008

3.1 The Work Party shall comply with the statutory requirements stipulated under the Building Control Act (Chapter 29) – Building Control (Licensing of Builders) Regulation 2008.

3.2 The Work Party shall keep and maintain at the premises of the work site the following documents, books and records for inspection purposes:

a) An updated register of all the licensed builders (general and specialist) indicating the valid licence numbers, Approved Persons, Technical Controller and expiry of the said licences for the respective builders;

b) A copy of the approved manpower programme (if applicable) and approved changes;

c) An official site attendance record for all registered construction personnel deployed, in the form and manner as the Commissioner of Building Control may determine;

d) A quarterly update of the actual deployment of registered construction personnel on site; and

e) A record of all documents accounting for the absence of each registered construction personnel during the scheduled period of his deployment.

3.3 The Work Party shall ensure that all his Specialist Builders (whether Nominated, Designated or Domestic and the like) possess the necessary valid builder's licences in compliance with the Building Control Act on Licensing of Builders and shall ensure the necessary deployment of coretrade manpower and resources to the project.

3.4 The Work Party shall not employ any unlicensed builders for the purpose of the Works in contravention of Part VA of the Building Control Act, Chapter 29 on Licensing of Builders.

In an event of a suspension of works due to a contravention of Part VA of the Building Control Act, Chapter 29 on Licensing of Builders by the Commissioner of Building Control, the Work Party shall take all necessary measures to maintain the site and ensure it is safe in accordance with statutory requirements. If the Work Party fails to ensure the proper renewal of his licences (whether Nominated, Designated or Domestic and the like) under Part VA of the Building Control Act, Chapter 29, 30 calendar days before the date of expiry of the said licences, CAG will have the right to suspend the Work Party's Works or portion of the Works without giving any extension of time to the Contract Completion Date. If the Work Party's licences cannot be renewed after revocation or expiry, he shall be obliged to assist in arranging the novation of his Contract and/or the relevant Sub-Contracts to the replacement Work Party to mitigate the loss to CAG. In addition, at CAG's option, CAG may elect to issue a Notice of Termination as though a Termination Certificate had been issued by the Architect immediately upon the expiry of 30 calendar days after the revocation or expiry of the Work Party's licence.

3.5 The Work Party shall be liable and shall indemnify CAG against any damage, expense, liability, loss, claims, proceedings and/or penal sanctions whatsoever arising out of or by reason of the commission of any offence under Part VA of the Building Control Act on Licensing of Builders and of any breach or default of the terms and conditions stipulated in paragraph 3.4 of Section I of the AOS requirements.

3.6 The Work Party shall submit the manpower programme to the Commissioner of Building Control for approval within 30 days from the date of grant of the permit to carry out structural works for the project and extend a copy to the Architect for record. The manpower programme shall be in such form and manner as determined by the Commissioner of Building Control. The manpower programme shall be reported in every site meeting and the Work Party shall conform and ensure that the manpower programme is strictly adhered to. Where there are any changes to the manpower programme, the Work Party shall submit the updated manpower programme to the Commissioner of Building Control for approval within the stipulated number of days in the Building Control Regulations of the change.

SECTION J – HAZARD IDENTIFICATION AND RISK ASSESSMENT

1 INTRODUCTION AND PURPOSE

1.1 This section illustrates the process for hazard identification, risk assessment and safety submission as required of the Work Party carrying out airside and/or development projects at Changi Airport and Seletar Airport.

1.2 These procedures apply to all projects that involve physical changes to the airport infrastructure and new systems installed in the airport (e.g. new building developments, airside works, and major landside works) which have impact on public safety and changes with significant safety implications. Aviation Safety must be considered for any works performed in the airside in addition to WSH risks. Risk assessment shall be carried out at the beginning of the project.

1.3 The objective of this set of procedures is to ensure that the Work Party has adequate knowledge, commitment and resources to manage safety effectively, and that projects are designed and constructed to meet a high level of safety standards.

1.4 Safety submissions are required at beginning and throughout the planning and execution phases of a project so that CAG can monitor and track closely the safety measures put in place during the project life cycle.

1.5 CAG reserves the right to update and/or revise this set of procedures as and when necessary. The Work Party shall comply with the latest procedures accordingly as instructed.

1.6 CAG Project officers shall refer to the CAG SMS Manual, Section 2.2 for guidance on the Risk Assessment process.

2 RISK ASSESSMENT FORM

2.1 A risk assessment form shall be created at the commencement of the project when the Work Party is officially appointed.

2.2 The risk assessment form shall be used to identify potential safety hazards that could arise during any phase of the project works and to allow risk analysis to be performed so that all the safety concerns are satisfactorily managed and mitigated.

2.3 The risk assessment form is a live document that is passed through each and every phase of a project, from the planning to the implementation and post construction/maintenance stages. The risk assessment form shall be minimally reviewed and updated once every 3 years or earlier, when:

(a) There has been an accident, serious incident or incident arising from that activity, or

(b) Changes to the work activity/process, including when new technology or infrastructure or new aircraft code is introduced or to a particular infrastructure within the aircraft movement area (i.e., runways, taxiways, aircraft stands); or

(c) Changes to the airside infrastructure, facilities and/or operating methods that may affect the safety of operations; or

(d) Internal changes such as:

i. Construction activities in the airside;

ii. New infrastructures or changes to existing operations that can potentially reduce the existing risk tolerability level, e.g., changes in runway inspection timings, reduction in preventive maintenance frequencies;

iii. Trial in "live" aircraft movement areas (including trials to evaluate the effectiveness of alternate safety risk controls differing from established safety risk controls).

(e) External changes such as:

i. Environmental changes like low visibility;

ii. Air traffic control procedures directly affecting users in the aircraft movement areas like use of stop bar lights to regulate airside vehicle movement, use of single frequency for communication on runway.

iii. A new contractor working at or ground handling agent performing services in the airside.

3 HAZARD IDENTIFICATION

3.1 The Work Party shall develop a complete description of the project and the environment in which the project is to be operationalized.

3.2 The objective of the hazard identification process is for the Work Party to identify potential safety hazards for airport users and other affected parties so that safety issues are carefully and fully considered prior to actual works being carried out on site. The Work Party shall consider all interfaces between the project and the existing airport system and works proposed or under construction or on adjoining or nearby sites.

3.3 The Work Party's project manager, safety manager, design engineer, site foremen or any competent staff shall endorse on the risk assessment form.

3.4 Under the 'Identified Hazards' column, the Work Party shall be responsible for identifying as comprehensively as possible, all possible risks associated with his system or equipment design, project scheduling or planning, supply, delivery, storage, installation, testing, commissioning, operation relevant to each phase/portion of the project works, including the post-completion maintenance stages. Such hazards could arise due to design or planning constraints, equipment limitations, unsafe practices, or other external factors.

3.5 The location(s) of such hazards, and a full description of the potential safety concerns shall be clearly explained and documented. Where necessary, the Work Party shall illustrate the potential safety concerns using photographs or an appropriately scaled sketches or drawings.

4 RISK ASSESSMENT

4.1 For each potential hazard identified, the Work Party shall perform a risk assessment by reviewing the severity of the impact of the hazard in the light of all possible environmental, human, equipment (hardware and software) and their interfacing factors, and by assessing the likelihood of these scenarios. Such risks should include all possible damage to equipment and property, harm to project personnel and general public, as well as plausible impact on airport operations due to first and third-party equipment malfunction or human error. Each hazard or safety deficiency identified shall be documented together with a detailed description of the unsafe scenario concerned in the risk assessment form.

4.2 Each identified hazard or safety deficiency shall be allocated a risk category estimated according to the contractors' risk management procedures.

5 DEFENCES PROPOSED

5.1 Proposals and recommendations for the elimination or reduction of each of the identified hazards or safety deficiencies shall be made in the risk assessment form. These proposals and recommendations shall be explained as detailed as possible to allow an initial and objective assessment of practicability. Annotated photographs or appropriately scaled sketch drawings shall be used to illustrate recommendations wherever possible.

5.2 The Work Party shall ensure that these proposals and recommendations are sound and can effectively mitigate, reduce or eliminate the risks identified.

5.3 The Work Party shall also consider each hazard or safety deficiency identified in the risk assessment form and recommended suitable means of eliminating it or reducing its associated risks as far as practicable. The Work Party shall record all identified hazards or safety deficiencies and assess whether their associated risk tolerability is acceptable. The Work Party shall also document the risk probability, severity and risk category associated with each hazard or safety deficiency after the implementation of the proposed mitigation measures in the risk assessment form. The Work Party shall prepare detailed proposals to eliminate or mitigate that particular hazard and its consequences. These proposals must then be circulated to the other related stakeholders for their inputs on the effectiveness and practicality. The Work Party shall then follow through to ensure that the level of safety becomes acceptable or, if not possible, tolerable. If the outcome of the assessment for the same consequences is assessed to be unacceptable, then the Work Party shall source for new mitigating solutions or consider abandoning the hazardous work.

6 SAFETY SUBMISSION AND VERIFICATION CHECK

6.1 The Work Party shall submit the work method statement and risk assessment to CAG S.O., Project Officer and/or Coordinating Officer for review and acceptance each time the form is updated, or when requested for by CAG.

6.2 S.O. may require the Work Party to present the Aerodrome RA and WMS to their respective Safety Working Committee and/or at any other forum where necessary prior to commencement of work or E&D.

6.3 The Work Party shall ensure the control measures listed in the submitted Aerodrome RA are completed to the satisfaction of the S.O. team before the commencement of work. S.O. may instruct that additional safety measures be provided by the Work Party if the proposed control measures are found to be insufficient. The Work Party shall comply with such instructions accordingly at no cost to CAG.

6.4 Notwithstanding paragraphs 6.2, 6.3 and 6.4 above, the Work Party shall be entirely responsible for its site, system and/or equipment safety, by taking all necessary precautions and appropriate safety measures and by complying with all standing safety requirements stipulated by CAG, CAAS and any other regulatory authorities.

7 NON-COMPLIANCE WITH SAFTEY REQUIREMENTS

CAG reserves the right to take action against the Work Party for non-compliance with any safety requirements. Such actions could include:

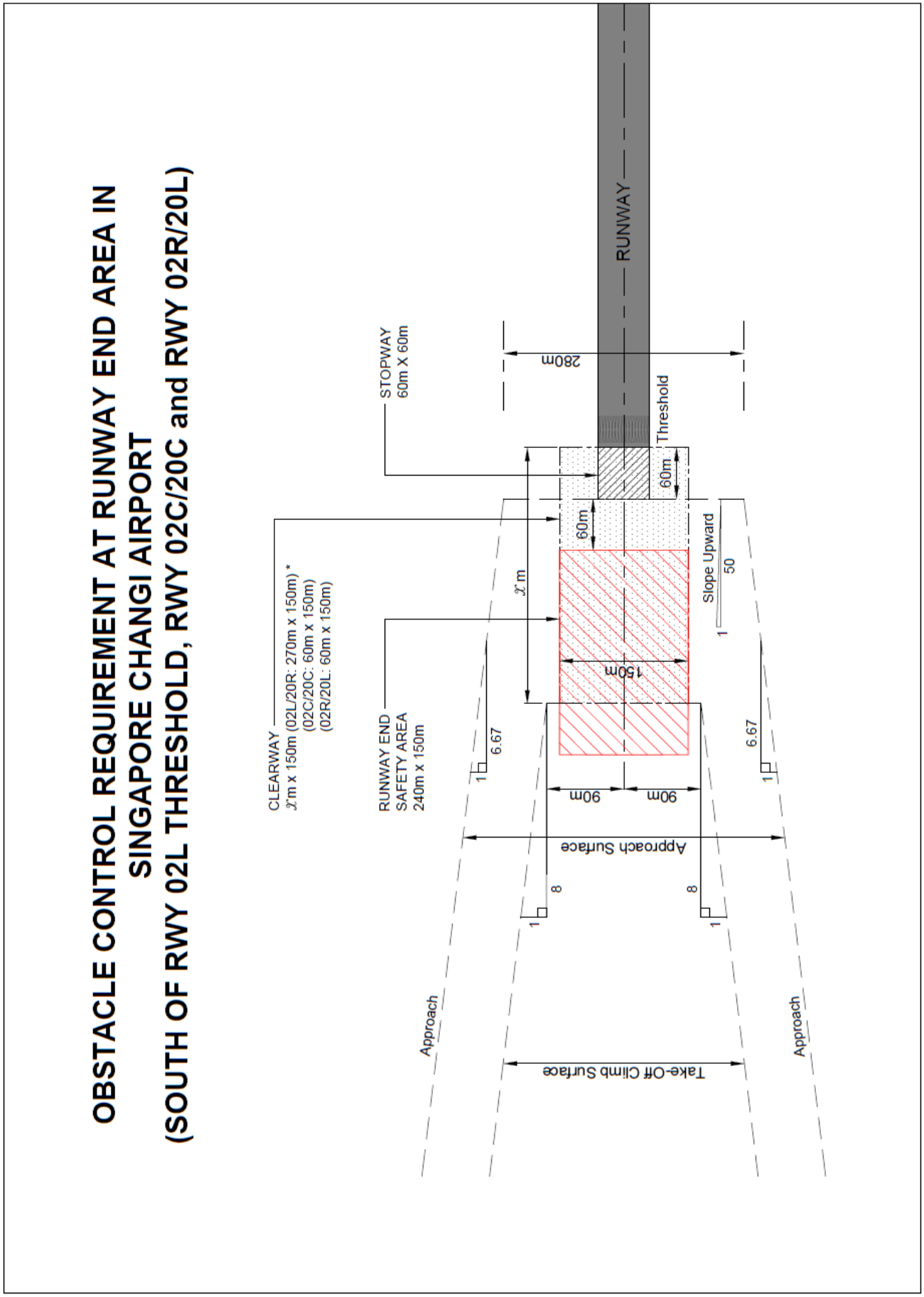
a) Withholding of passes of negligent workers and supervisors temporarily and suspending them from work

b) Removal of passes of negligent workers and supervisors permanently leading to their expulsion from the work site;

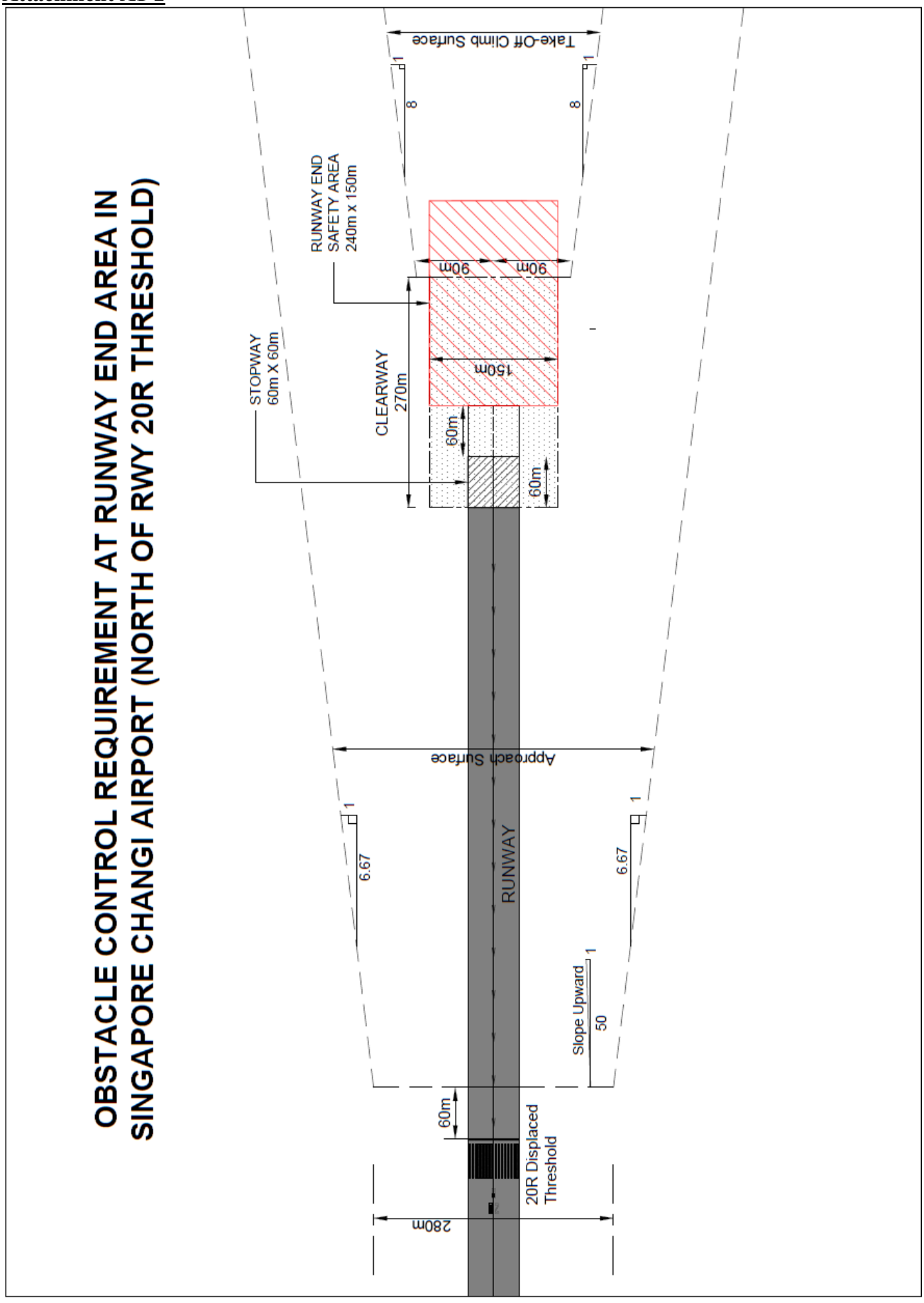
c) Removal of the Work Party's Project Manager or Safety Officer if they are deemed not competent for the job or not effective in ensuring that adequate safety measures are taken; and/or

d) Issuance of partial stop work orders to specific areas for serious non-compliance with the Airport Operational and Safety (AOS) requirements.

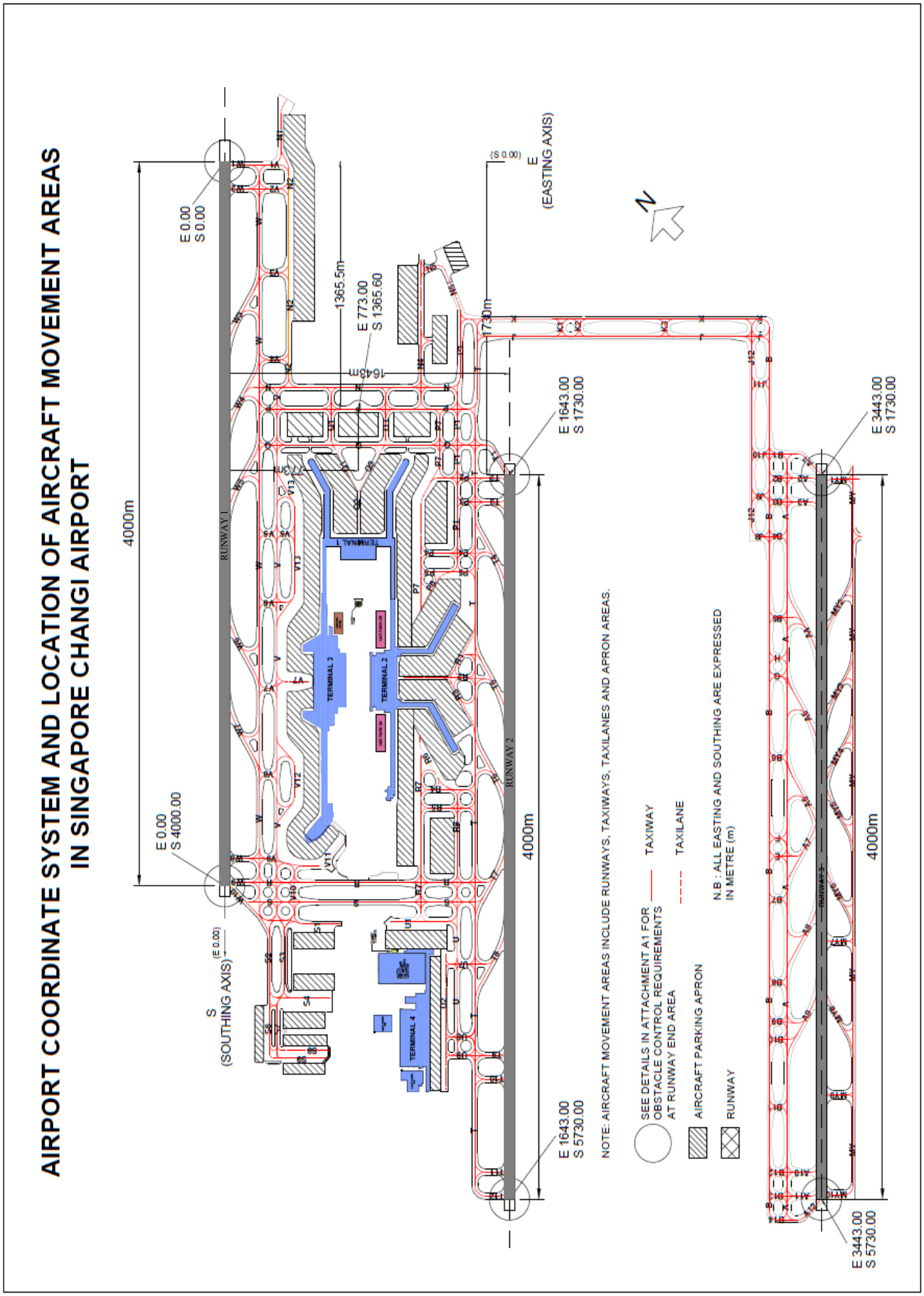
Attachment A1-1



Attachment A1-2



Attachment A2



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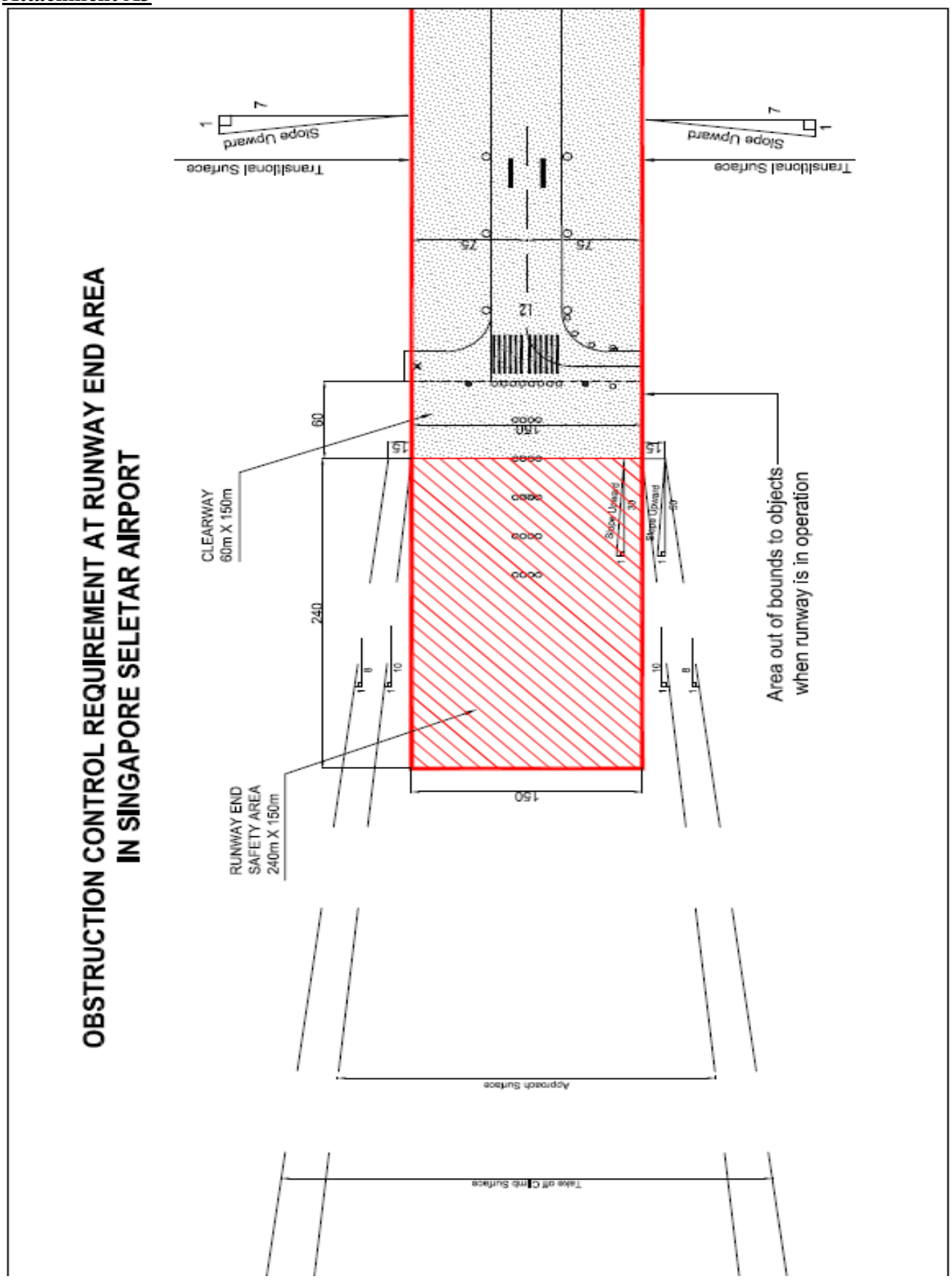

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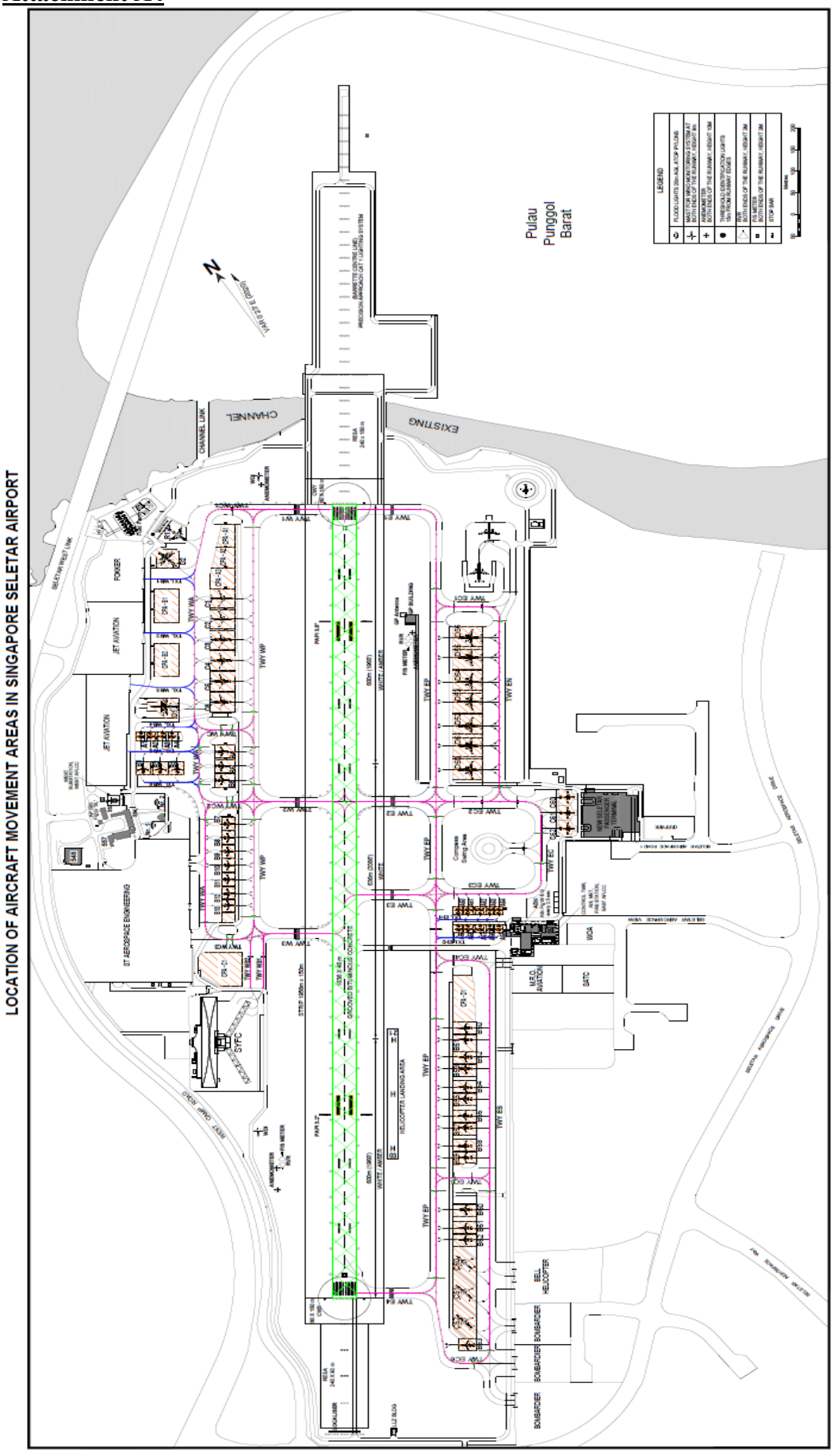


Attachment A5

DAILY FOD CHECKLIST

Date: _____

Time: _____

Location of work area: _____

1) TAXIWAYS

i) Do you have works on the taxiway?

Yes / No (Please circle accordingly)

ii) If yes,

I have inspected the work areas within my project/scope of works (including access route) and its surrounding premises and confirmed that it is free of FOD and other visible equipment/defects/unfinished work, including the items below:

a) I have removed the closure markers.

b) I have checked all equipment have been cleared at least 51 metres^ (Changi)/35 metres* (Seletar) from taxiway centre line.

c) I have checked that all excavations within 30 metres (Changi)/13 metres* (Seletar) from taxiway centre line have been backfilled.

d) The taxiways have been swept clean.

2) RUNWAY

a) Are you the last work party to leave runway?

Yes / No (Please circle accordingly)

b) If yes,

- I have inspected the entire runway and ensure that there is no FOD and other visible equipment/defects/unfinished work.

- I have removed the cross markers and marker boards.

- I have checked that all equipment have been cleared at least 150 metres (Changi)/75 metres (Seletar) from the runway centre line.

- I have checked that all excavations within 105 metres (Changi)/75 metres (Seletar) from runway centre line have been backfilled.

3) OBSERVATIONS (IF ANY)

_____

_____

4) COMMENTS (IF ANY)

_____

_____

_____

Inspected by:

_____
(Name & Signature)

Designation: _____

Date: _____

CAG Counter-Signing Officer:

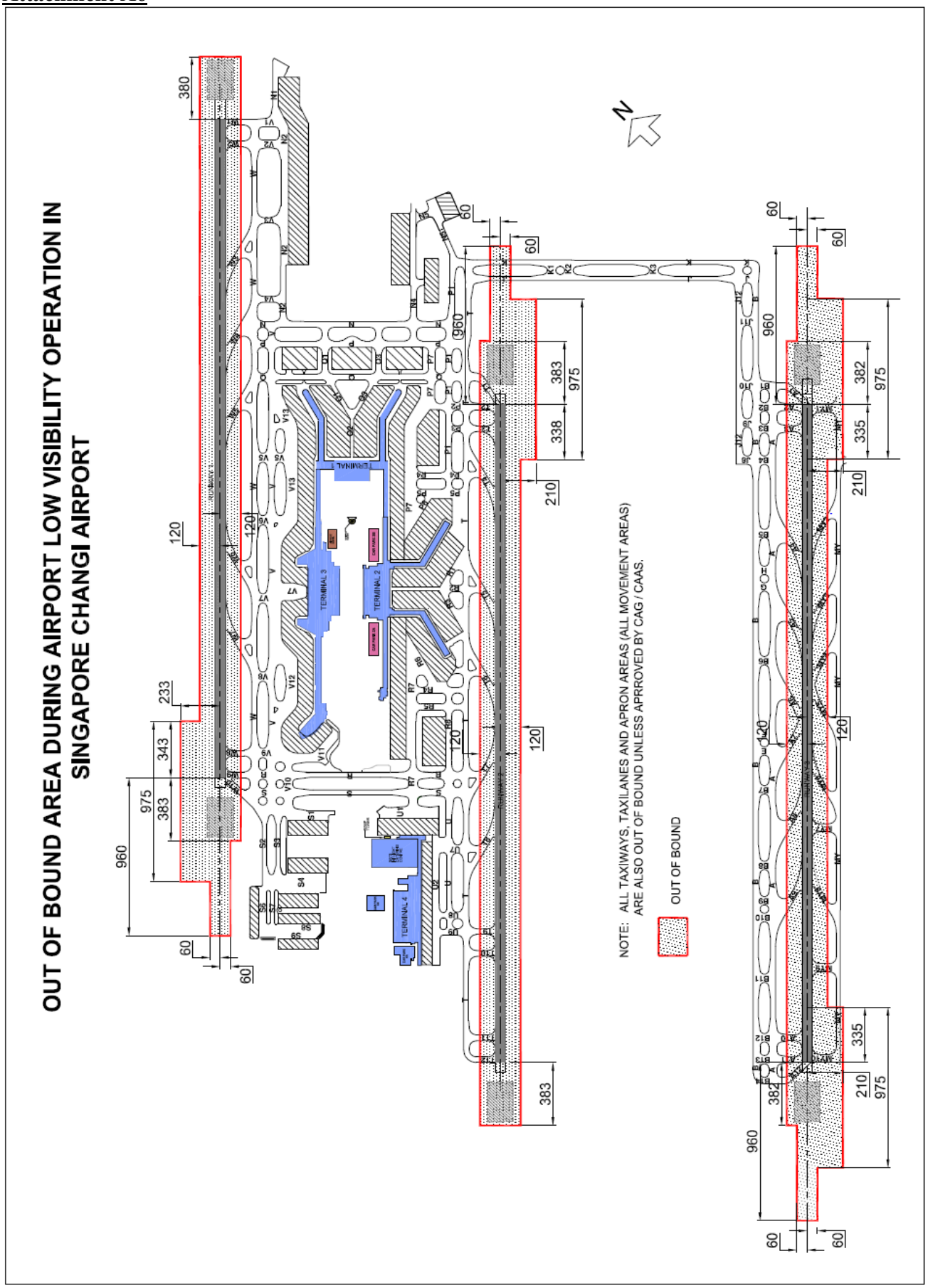
_____
(Name & Signature)

Designation: _____

Date: _____

^ The minimum clearance from taxiway for Changi Airport may be less than 51 metres based on the separation distances stated in paragraph 1.2 of Section C.
* The above information for Seletar Airport may change due to work in progress. The Work Party shall check with the Superintending Officer (S.O.), Project Officer and/or Coordinating Officer for the latest information.

Attachment A6



Attachment A7- 1

CHECKLIST FOR CARRYING OUT TRIAL HOLES

IN CHANGI / SELETAR AIRPORT

Objective:

To locate and trace all underground services, both charted and uncharted, before commencement of ground works to ensure that all activities can proceed safely without damage or downtime to operating services. Proper and disciplined underground services management will help to ensure safety and reliability in airport operations and the provision of airport services and facilities, and support master planning by preventing encumbrances on future airport development plans.

1. Before commencement of any trial holes on site, the Work Party shall request for and obtain existing as-built services drawing using the "**REQUEST FOR INFORMATION ON UNDERGROUND SERVICES FOR EARTHWORKS**" (Form A) and purchase services drawings from relevant agencies.

Check box when completed.

CAG Engineering & Development Cluster, covering: ☐
- High Tension cables
- External Airside and Landside Low Tension cables
- Airfield lighting cables
- Control cables
- Water pipelines
- Drainage subsoil pipes
- Turf maintenance
- CCTV Cables

Other CAG Division, covering ☐
- Horticulture (Irrigation pipes, Landscape Area and / or less than 2m from the tree collar)
- Airside Operations (Airside Work Permit & Lane closure at airside)
- Roadway Unit (Lane closure at landside)
- Corporate IT and Technology (Structured cabling)
- Airport Operations Management (LT cable for Airport Operations Systems at landside)

Other relevant agencies, including ☐
- CAAS Aeronautical Telecommunication & Engineering, covering:
  - Communications
  - Navigation
  - Surveillance Services
- SingTel
- StarHub
- CAFHI
- CityGas / PowerGas
- PUB - Sewage pipes
- Tenants concerned, where necessary

2. The Work Party shall submit the method statement for trial holes works to CAG project officer and consultants one week in advance for approval. ☐

3. The Work Party shall carry out services detection on site through engaging the services of a licensed cable detection worker (LCDW). The particulars of the licensed cable detector shall be submitted to the CAG project officer and consultants in charge for endorsement. The CAG project officer and consultants shall make necessary arrangements to ensure that all related electrical services are turned on to facilitate cable detection work. All work party and LCDW in Changi Airport shall ensure that appropriate cable detection method is used for the detection of CAFHI's e-stop cable system. Such cables run on 110V DC signal and are normally buried direct, as such, conventional cable detection method may not be able to pick up the location of these cables. A joint site inspection with relevant CAFHI representative, together with the work party, LCDW and CAG project officer shall be conducted to ensure that presence of CAFHI underground services are accurately identified. ☐

4. After LCDW has completed the detection works, the LCDW will compile a comprehensive services layout report and his recommendation of the proposed trial holes location through the Work Party to CAG project officer and consultants for approval. The LCDW report will recommend suitable measures to be taken to protect all services on site based on sound industrial practice and recommendations by the services' owners. The LCDW report showing exact locations of services found shall be submitted to relevant services' owners for verification. ☐

5. Prior commencement of trial holes work, the Work Party shall submit this "**CHECKLIST FOR CARRYING OUT TRIAL HOLES IN CHANGI/SELETAR AIRPORT**" to consultants and CAG approving officer one week in advance for comments and approval respectively. ☐

6. Prior to commencement of trial holes works, LCDW shall marked out the detected services on the trial holes location using wooden pegs or different spray paints. ☐

7. Prior to commencement of each trial hole works, the Work Party shall notify CAG Project Officer on the commencement and location of the trial holes works. LCDW shall conduct a briefing to all competent supervisors and workers assigned to perform the trial holes works to highlight to them the services layout and possibility that indicators, e.g. cable slabs, markers and sand above existing indicated or non-indicated services or cables may be absent. He shall also determine the depth of services or cables with users and the service detection plan as far as possible. ☐

8. The Work Party shall provide trial holes that are manually dug under the full-time 100% standing supervision of the LCDW and Registered Earthwork Supervisor to expose, identify and confirm the services detected. Trial holes shall be required to positively identify all ☐

communications cables, fibre optic cables, gas and water pipe location, as well as all other services within or in the proximity of the intended excavation/piling area that cannot be accurately located or easily detected. Detailed information shall be obtained from the appropriate party as to the possibility of such services being located within the proposed construction area. It should be noted that CAFHI e-stop cables run on 110V DC signal and may not be detected by conventional cable detection method. As such, CAFHI shall be consulted for such cable detection and a site visit with relevant CAFHI personnel shall be arranged for to positively identify these cables. The Work Party shall take all necessary precautions to ensure that these “undetectable services” are located and protected during the earthworks. Examples of “undetectable services” are certain telecommunication / data cables, un-energized cables, CAFHI fuel pipes, fibre optic cables, co-axial cables and radar cables.

9. All trial holes work must be carried out with caution and dug by manual means until services are successfully located, or desired excavation depth is achieved with the standing supervision of both LCDW and Registered Earthwork Supervisor. Excavator or other machinery shall not be used for digging trial holes except for the top asphalt or concrete layer (Only Registered Excavator (REO) or Probational Registered Excavator Operators (PREO) will be allowed to operate the excavators). ☐

10. The contractor shall stop any trial holes & trenching works if they encounter any unknown structure or obstruction. LCDW shall be on site to verify any presence of live services. Contractor must consult CAG project/maintenance officers before proceeding further. ☐

11. The Work Party shall install safety barriers to protect workers from falling into trial holes when works are in progress or are left exposed. ☐

12. The LCDW report shall also highlight all discrepancies between the services layout indicated on plans versus their actual location found on site. CAG project officer shall coordinate a meeting to sort out such discrepancies with all relevant services owners concerned. ☐

13. Upon completing items 1 to 11, the Work Party shall submit an updated cable detection plan showing markings done on site and exact location of services found, proposed work methods, and risk assessment and services protection and/or diversion scheme (if applicable) to the CAG project officer, consultants and relevant service owners for approval at least 2 weeks before the planned commencement of actual excavation / piling work. ☐

Attachment A7- 2

CHECKLIST FOR CARRYING OUT EARTHWORKS IN SINGAPORE CHANGI / SELETAR AIRPORT

Objective:

To locate and trace all underground services, both charted and uncharted, before commencement of earthworks to ensure that all activities can proceed safely without damage or downtime to operating services. Proper and disciplined underground services management will help to ensure safety and reliability in airport operations and the provision of airport services and facilities, and support master planning by preventing encumbrances on future airport development plans.

For the purposes of this Checklist, "earthwork(s)" means –

a) Excavating earth, rock or other materials (by whatever means) in connection with –
   i. Any work for or relating to the construction, reconstruction, extension, renovation, alteration, demolition or repair of any building, road, railway, bridge, viaduct, flyover, sewer or sewage works;
   ii. Any work for or relating to the laying, inspecting, repairing or renewing of any main, pipe, cable, fitting or other apparatus;
   iii. Any soil investigation work; or
   iv. Such other work as are usually undertaken by a person carrying on business as a contractor in the construction industry or as a professional civil or structural engineer;
b) Boring, dredging, jacking, levelling, piling or tunnelling on or under any premises or street by any mechanical means; or
c) Driving or sinking any earth rod, casing or tube into the ground;

1. Before commencement of any works on site, the Work Party shall Request for and obtain existing as-built services drawing using the "**REQUEST FOR INFORMATION ON UNDERGROUND SERVICES FOR EARTHWORKS**" (Form A) and purchases services drawings from other relevant agencies.

Check box when completed.

- CAG Engineering & Development Cluster, covering: ☐
  - High Tension cables
  - External Airside and Landside Low Tension cables
  - Airfield lighting cables
  - Control cables
  - Water pipelines
  - Drainage subsoil pipes
  - Turf maintenance
  - CCTV cables

- Other CAG Divisions, covering ☐
  - Horticulture (Irrigation pipes, Landscape Area and / or less than 2m from the tree collar)
  - Airside Operations (Airside Work Permit & Lane closure at airside)
  - Roadway Unit (Lane closure at landside)
  - Corporate IT and Technology (Structured cabling)
  - Airport Operations Management (LT cable for Airport Operations
  - Systems at landside)

- Other relevant agencies, including ☐
  - CAAS Aeronautical Telecommunication & Engineering, covering:
    - Communications
    - Navigation
    - Surveillance Services
  - SingTel
  - StarHub

- CAFHI
- CityGas / PowerGas
- PUB - Sewage pipes
- Tenants concerned, where necessary

2. The Work Party shall carry out services detection on site through engaging the services of a Licensed Cable Detection Worker (LCDW). The particulars of the licensed cable detector shall be submitted to the CAG project officer and consultants in charge for endorsement. The CAG project officer and consultants shall make necessary arrangements to ensure that all related electrical services are turned on to facilitate cable detection work. All work party and LCDW in Changi Airport shall ensure that appropriate cable detection method is used for the detection of CAFHI's e-stop cable system. Such cables run on 110V DC signal and are normally buried direct, as such, conventional cable detection method may not be able to pick up the location of these cables. A joint site inspection with relevant CAFHI representative, together with the work party, LCDW and CAG project officer shall be conducted to ensure that presence of CAFHI underground services are accurately identified. ☐

3. After LCDW has completed the detection works, the LCDW will compile a comprehensive services layout report though the Work Party to CAG Project Officer and Consultants for approval. The LCDW report will recommend suitable measures to be taken to protect all services on site, based on sound industrial practice and recommendations by the services owners. The LCDW report showing exact locations of services found shall be submitted to relevant services owners for verification. ☐

4. The LCDW report shall also highlight all discrepancies between the services layout indicated on plans versus their actual location found on site. CAG project officer shall coordinate a meeting to sort out such discrepancies with all relevant services owners concerned. ☐

5. The Work Party shall submit an updated earthwork work plan showing marking done on site, an LCDW report showing the exact location of the services found, the method statement and risk assessment for the earthworks and services protection and / or diversion schemes (if applicable to CAG project officer / consultants one week in advance for approval. ☐

6. Prior commencement of earthworks, LCDW shall marked out the detected services on the piling / excavation works location using wooden pegs or different spray paints. It should be noted that CAFHI e-stop cables run on 110V DC signal and may not be detected by conventional cable detection method. As such, CAFHI shall be consulted for such cable detection and a site visit with relevant CAFHI personnel shall be arranged for to positively identify these cables. ☐

7. Prior commencement of earthworks, the Work Party shall submit the "Application for Permit to Carry Out Earthworks" (Form C) to CAG project officer / consultants two weeks in advance for approval. ☐

8. Standing earthwork supervisor, workers and piling / excavator operators on site shall be briefed by the LCDW on the services layout and the above markings and warned against carrying out any earthworks bounded within the marked-out area unless under the direct supervision of the LCDW and with the explicit approval of the Work Party's project manager, Consultant and CAG project officer. ☐

9. The Work Party shall implement appropriate measures as required by the LCDW, Consultant and Services' Owner to protect the services found and adopt proper and disciplined underground services management practices, including: ☐

   a) The use of services corridors, and service ducts where reasonably practicable, as designated by CAG for the laying of underground services;
   b) Where reasonably practicable and as designated by CAG, the removal of decommissioned underground services as a result of the works, or abandoned underground services discovered within the work site.

10. The Work Party shall install safety barriers to protect workers from falling into cable trenches when works are in progress or are left exposed. ☐

11. Only Registered Excavator Operators (REO), Probational Registered Excavator Operators (PREO) and certified piling operator will be allowed to operate excavator / piling machines within the work area ☐

12. A competent full-time Registered Earthwork Supervisor shall be deployed to monitor the site operations during the entire earthworks and to provide close guidance to the excavator operator. ☐

13. The Work Party shall provide protective steel plates or conduits over exposed services positions to prevent damage due to movements of heavy vehicles or human traffic over them. ☐

14. If there is High Tension cable(s) near or within the vicinity of the excavation area, the project contractor's LCDW shall positively identify the cable by injection of signal to the cable at CAG substation. CAG in-house contractor shall assist to make the cable dead. The project contractor's LCDW shall also mark out the detected High-Tension cable(s) route on the ground using spray paint. ☐

15. The contractors shall stop any excavation works if they encounter any unknown structure or obstruction. LCDW shall be on site to verify any presence of live services. Contractor must consult CAG project/maintenance officers before proceeding further. ☐

16. If the proposed works were to overcross comms cable ducts, the Work Party shall submit method of support and protection of these ducts to CAG, CAAS Aeronautical Telecommunication & Engineering (ATE) Division and NCS Communications Engineering Pte Ltd, Line Plant Operations Division for approval. They shall also be informed prior to the dismantling of supports and the backfilling of comms cable ducts. ☐

17. Where the works would be carried out over the Approach Control Radar (ACR) cables, NCS Communications Engineering Pte Ltd shall be engaged for on-site standby to respond quickly to any problem. ☐

18. Excavation / piling by machine shall stop once cable slabs are exposed. Only manual excavation is allowed after the cable slabs are removed. Protection slabs over HT cables shall not be tampered with and shall be remained intact unless authorised by CAG and the Work Party's PE to remove them. ☐

19. If unknown services are unaccounted in the process of excavation, Work Party shall stop all works immediately at the affected area and inform the CAG project officer to help to identify these services found. ☐

20. Where necessary, the Work Party shall plan for further cable detection checks to scan the work area for other undetected / undetectable services. Given the technical limitations of the equipment currently available, investigative detection must be carried out at each stage of the construction process. Stage by stage detection of the underground services must be considered and incorporated within the construction schedule for deep excavation works. This procedure must be implemented until services are successfully located or the effective depth of the excavation is reached. In simple terms, detection / trial holes have been carried out before the earthworks, at intervals in accordance with the limitations of the detection (typically every 2 to 3 metres), until services are precisely located or the desired construction depth is achieved. ☐

21. In the event of an incident involving damage to the underground services, the Work Party responsible for causing the damage at the airport must take immediate measures to minimise disruption to operations, including: ☐

    a) Informing CAG's [fault reporting and control centres] of the damage;
    b) Informing the underground services owners and maintenance parties to identify the damaged service;
    c) Arranging for rectification works to be carried out.

FORM A

File Reference : _____

Date : _____

To : See Distribution List

Dear Sir/Mdm,

REQUEST FOR INFORMATION ON UNDERGROUND SERVICES FOR EARTHWORKS

We are planning to carry out earthworks within the boundaries of Singapore Seletar Airport. Details of the project and scope of work is as follow:

Project Title	
Contractor	
Contact Person	
Contact Number	
Consultant	
CAG Officer-in-Charge	
Support by CAG Safety Team	
Location of Works *(Please attached site layout plan)*	
Proposed Date of Commencement	
Proposed Date of Completion	
Request Required	Planning / Earthworks*
Type of Earthwork	Trial Trenching / Excavation / Piling / Boring / Soil Investigation / Sinking of Earth Rod / Others (Please Specify) * _____ _____
Maximum Depth of Earthworks	
Remarks (if any)	

We hereby request for information of any underground services under your purview that could be affected by the above-mentioned works. We will carry out cable detection and trial holes and where necessary, contact your staff to verify the services identified on site.

We will seek your approval before commencing the proposed earthworks.

Your reply with the required information within 2 weeks from the date of this submission would be appreciated.

Name & Designation : _____ Signature : _____

Contact No : _____

Distribution List
For Seletar Airport only:

CAG (Master Planning)
Seletar Master Planning (grp-mpseletar@changiairport.com)
[Airport Development]

CAG (Seletar Airport)
Chiew Zhi Yong (chiew.zhiyong@changiairport.com)
[HT / LT Cables]

CAG (Seletar Airport)
Richard Chia (richard.chia@changiairport.com)
[Airfield Lighting including ALCMS]

CAG (Seletar Airport)
Jerome Choo (jerome.choo@changiairport.com) /
[Potable/Fire Hydrant Pipelines]

Note: The contractor(s) shall purchase the services plans for sewer, gas, communication cables for SingTel and Starhub as per these agencies requirements and seek separate approval from these agencies to commence excavation/piling works.

FORM B

File Reference :

Date :

To : See Distribution List

Dear Sir / Mdm,

APPLICATION FOR PERMIT TO CARRY OUT TRIAL HOLE WORKS

We are planning to carry out trial hole works within the boundaries of Singapore Seletar Airport*. Details of the project and scope of work is as follow:

Project Title	
Contractor	
Contact Person	
Contact Number	
Consultant	
CAG Officer-in-Charge	
CAG Safety Team Reviewed By	
Location of Works *(Please attached site layout plan)*	
Proposed Date of Commencement	
Proposed Date of Completion	
Maximum Depth of Earthworks	
Remarks (if any)	

We hereby apply for a permit to commence trial hole works as stipulated in the above location and undertake to comply with the requirements as specified in the checklist and guidelines attached.

In the event of any incident involving damage to the underground services, we shall take immediate measures to minimize disruption to operations, including:

a) Informing [CAG fault reporting and control centers] of the damage;
b) Informing the underground services owners and maintenance parties to identify the damaged services;
c) Arranging for rectification works to be carried out

Applicant

Name & Designation : _____ Signature : _____

Contact Number : _____

Consultant Support

Project Manager : _____

Signature : _____

Date : _____

CAG Support

Supporting Officer : _____

Signature : _____

Date: : _____

Status : Support ☐ Reject ☐

FORM C

File Reference : _____

Date : _____

To : See Distribution List

Dear Sir / Mdm,

APPLICATION FOR PERMIT TO CARRY OUT EARTHWORKS

We are planning to carry out earthworks within the boundaries of Singapore Seletar Airport*. Details of the project and scope of work is as follow:

Project Title	
Contractor	
Contact Person	
Contact Number	
Consultant	
CAG Officer-in-Charge	
CAG Safety Team Reviewed By	
Location of Works *(Please attached site layout plan)*	
Proposed Date of Commencement	
Proposed Date of Completion	
Maximum Depth of Earthworks	
Remarks (if any)	

We hereby apply for a permit to commence earthworks as stipulated in the above location and undertake to comply with the requirements as specified in the checklist and guidelines attached.
In the event of any incident involving damage to the underground services, we shall take immediate measures to minimize disruption to operations, including:

a) Informing [CAG's fault reporting and control centers] of the damage;
b) Informing the underground services owners and maintenances parties to identify the damaged services;
c) Arranging for rectification works to be carried out

Applicant:

Name & Designation : _____ Signature : _____

Contact No : _____

Consultant Support

Project Manager : _____

Signature : _____

Date : _____

CAG Support

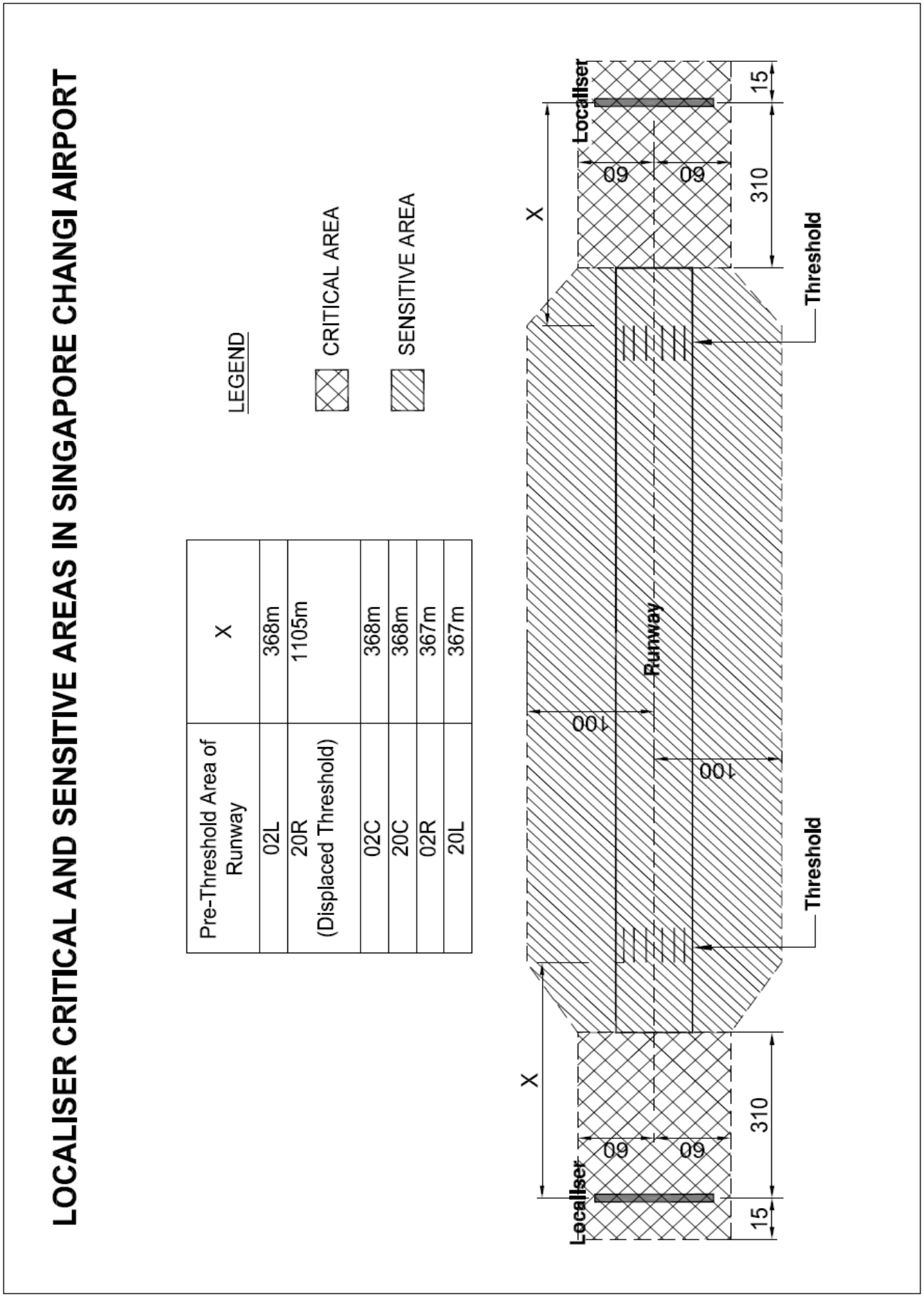
Supporting Officer : _____

Signature : _____

Date : _____

Status Approved ☐ Reject ☐

Attachment A8-1



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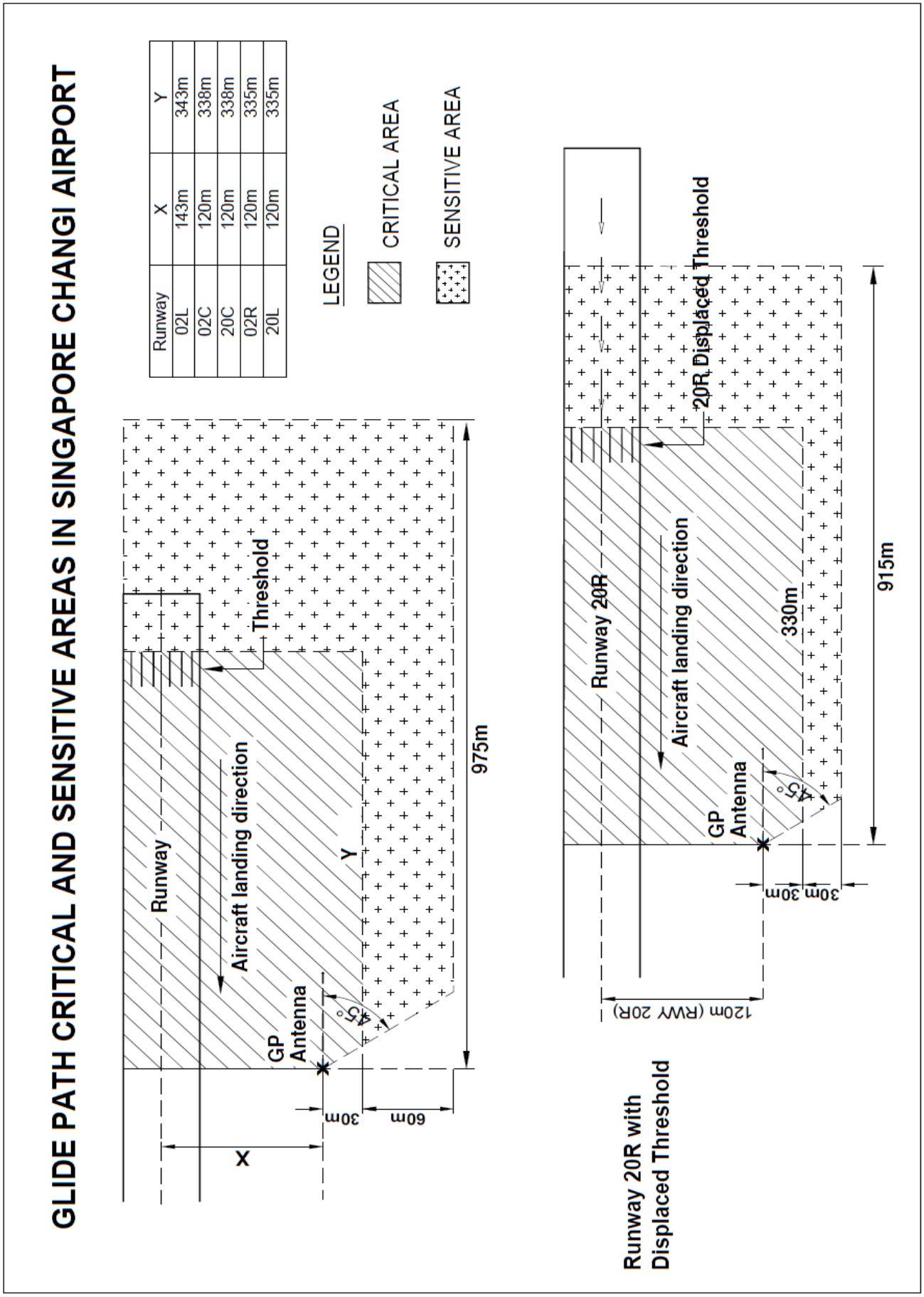

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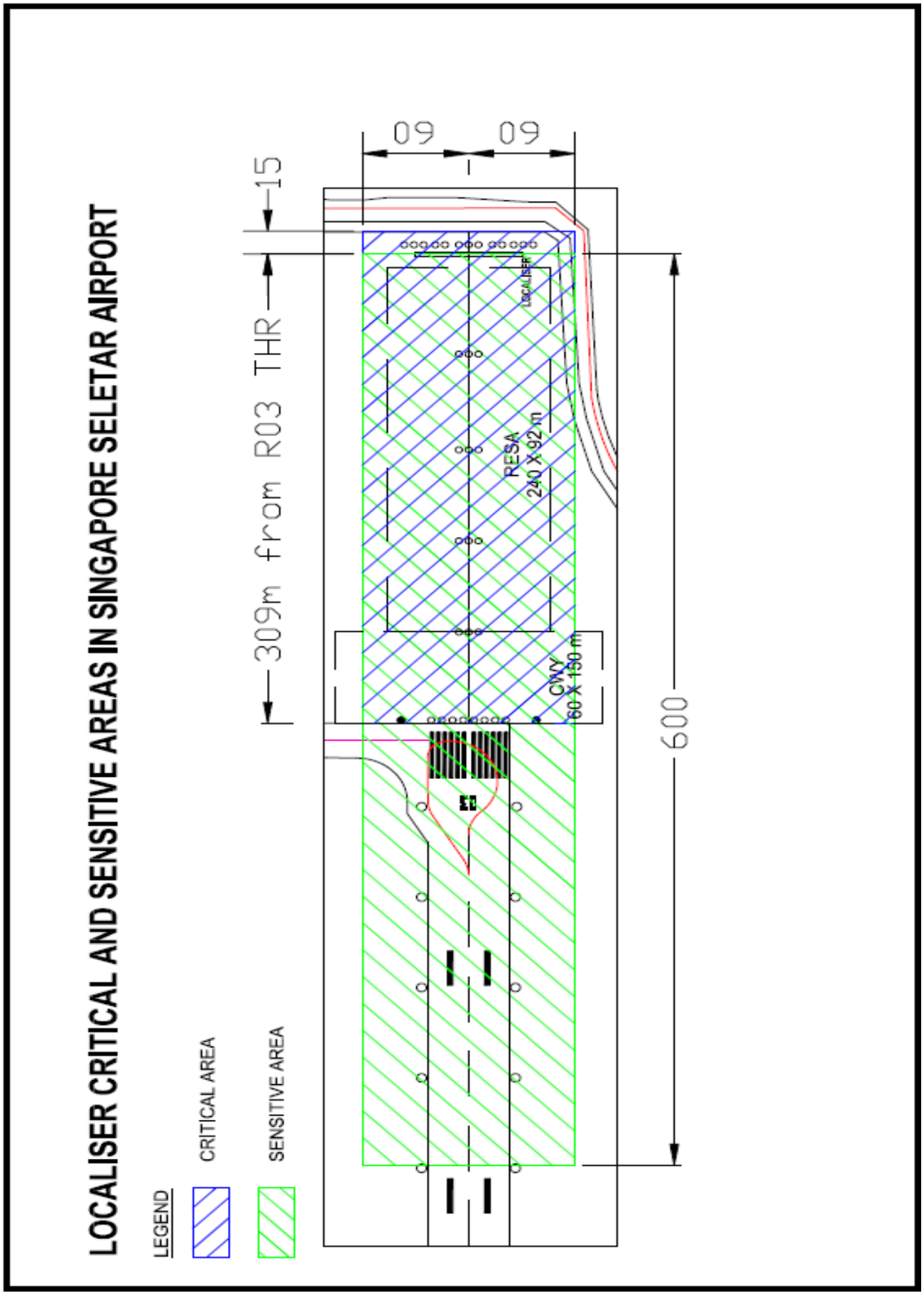

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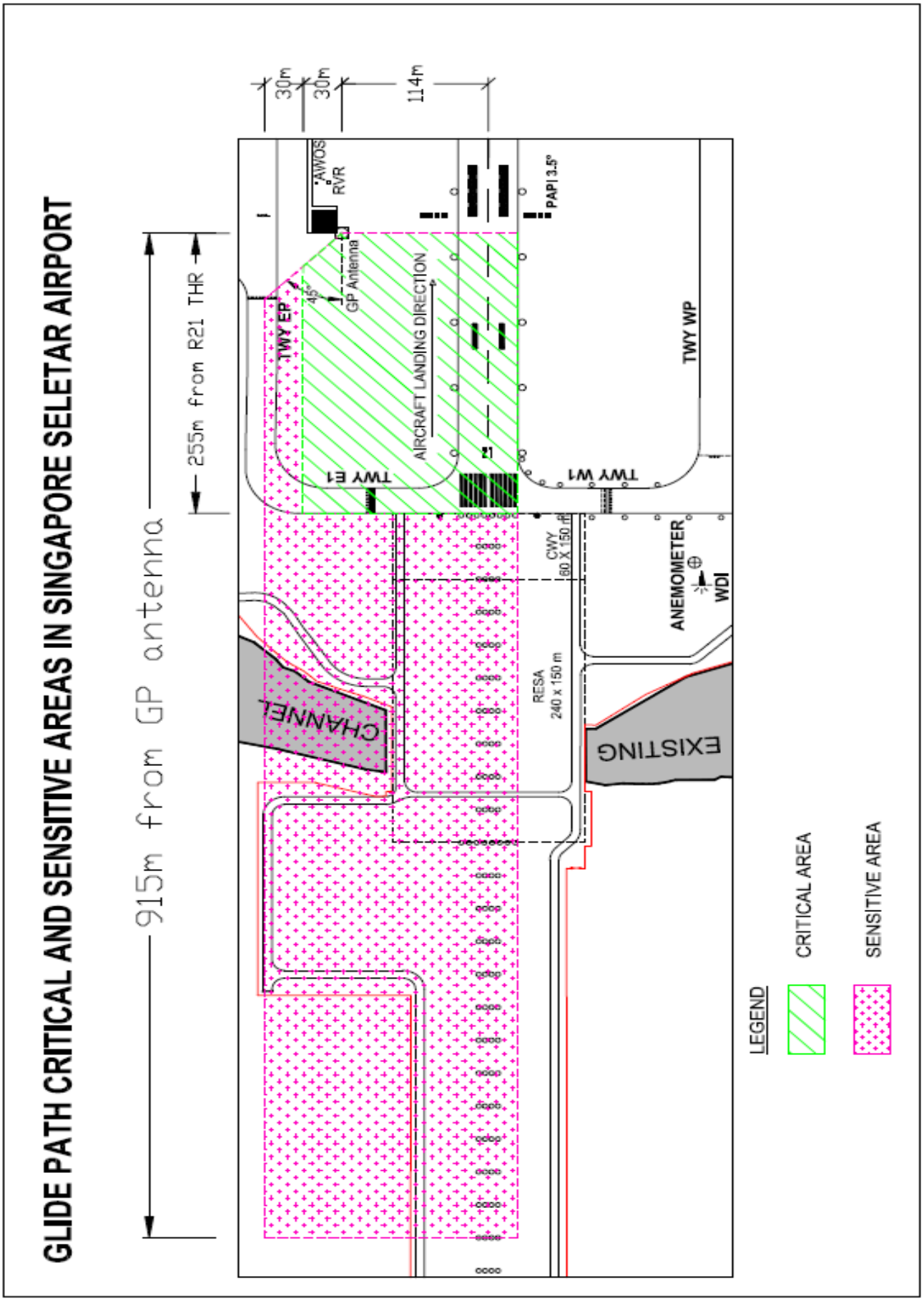

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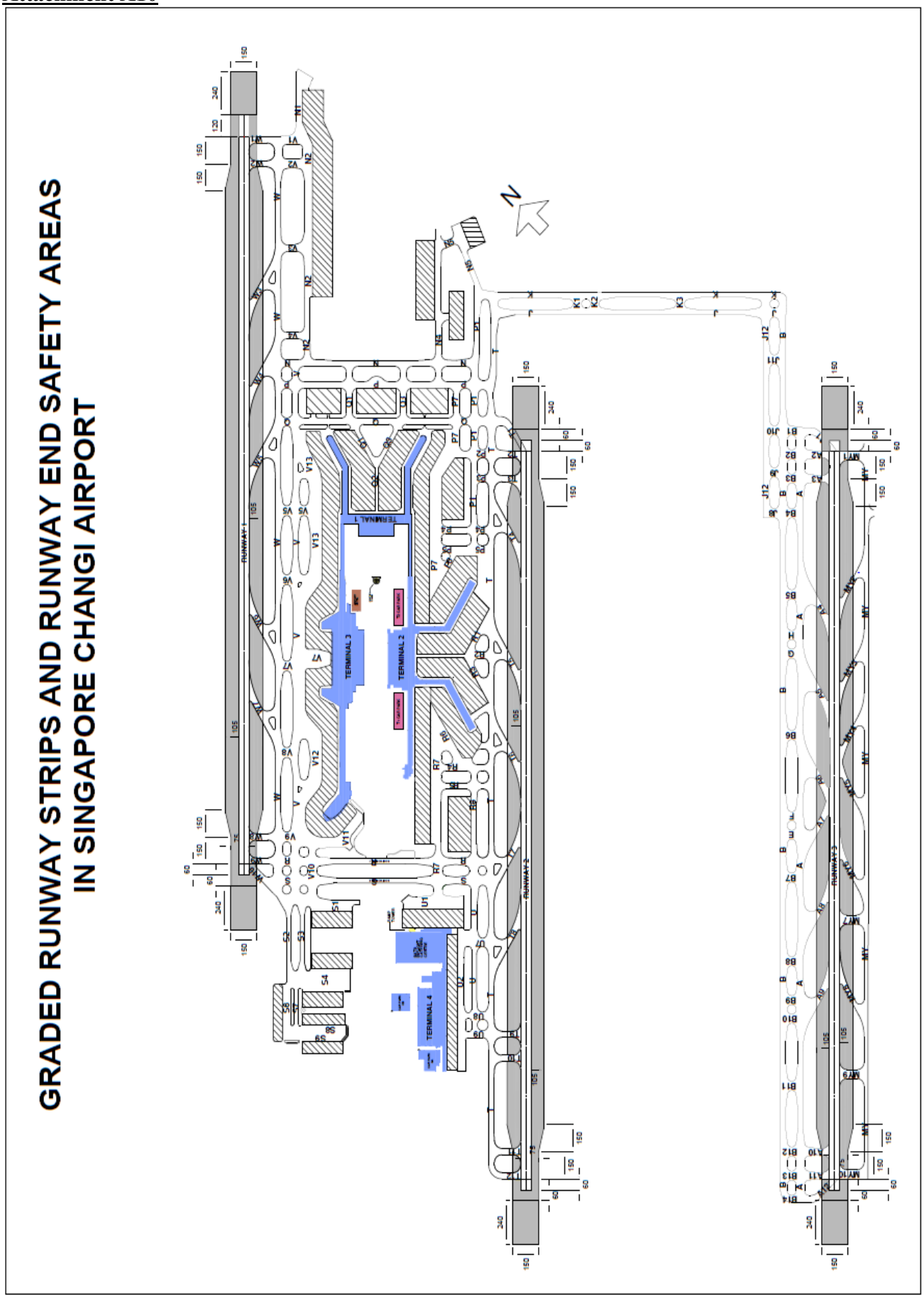

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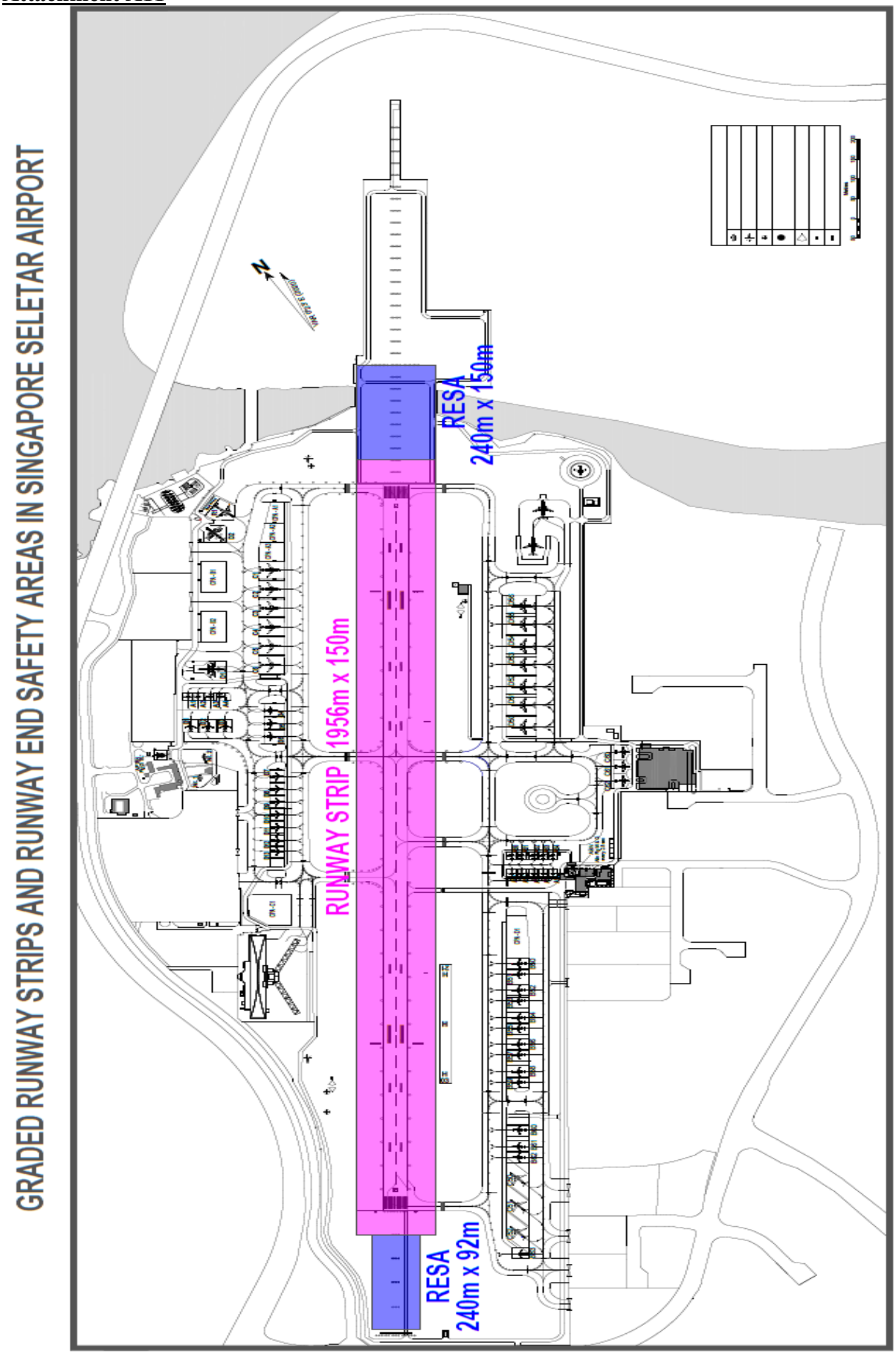

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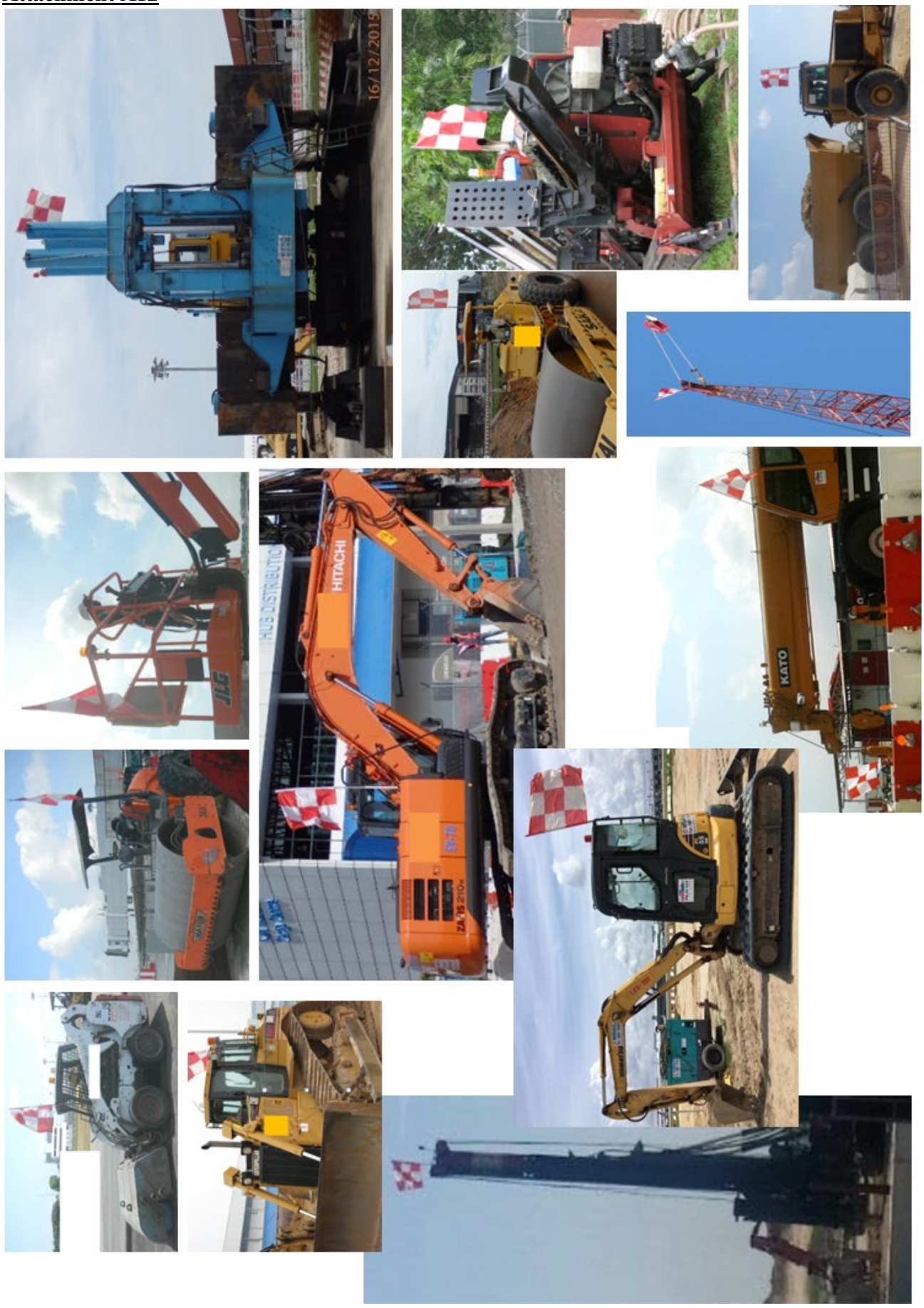

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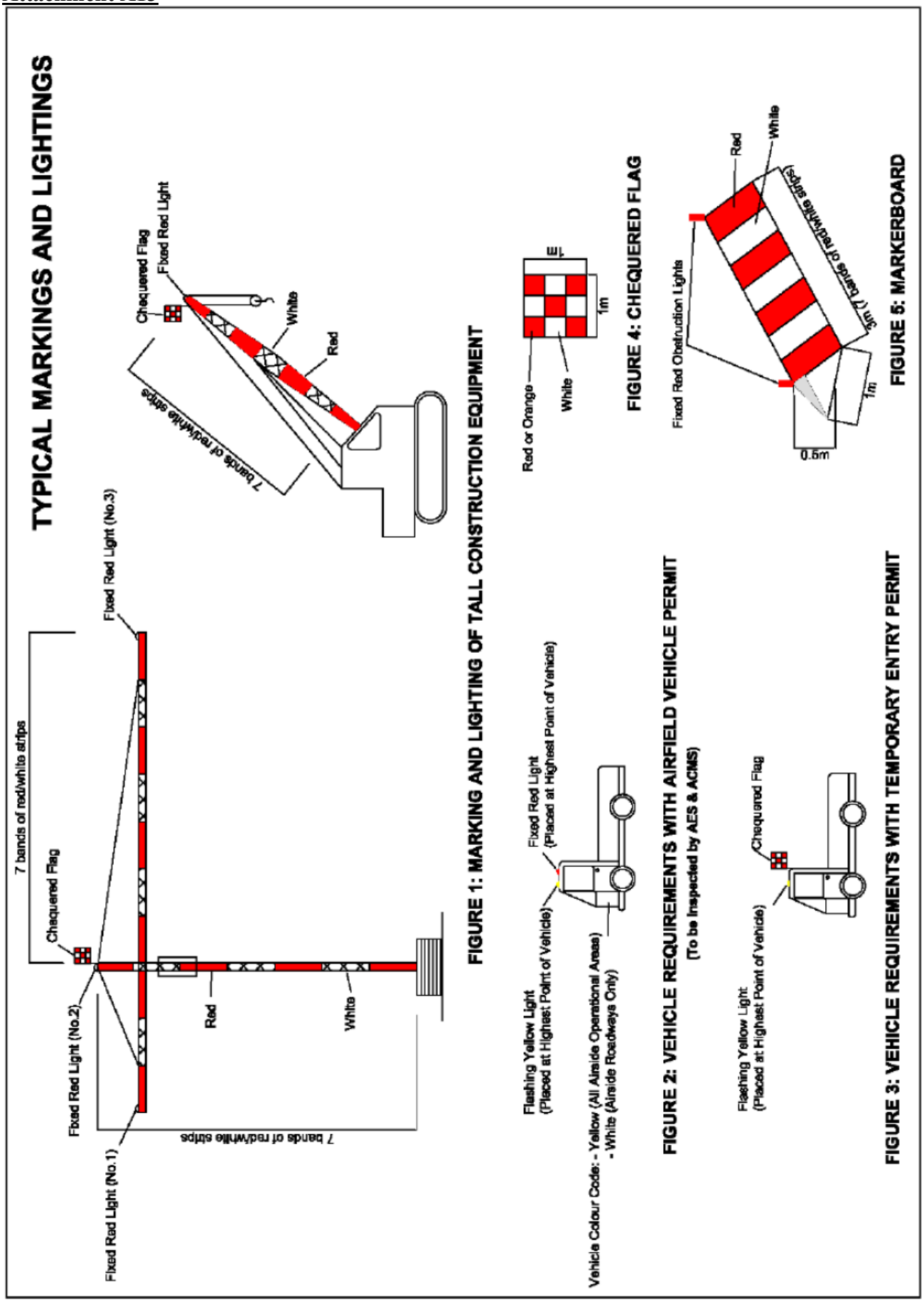
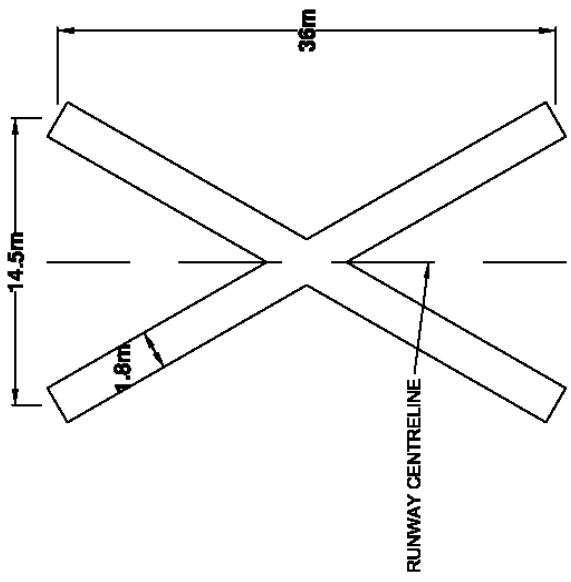


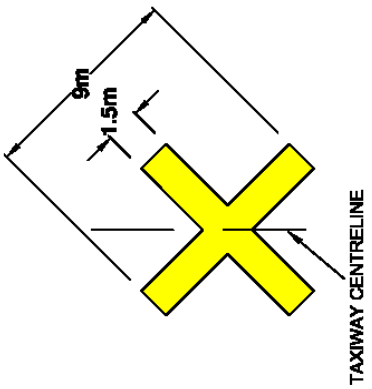
Attachment A14

CROSS MARKERS FOR A CLOSED RUNWAY, TAXIWAY OR PORTION THEREOF



CLOSED RUNWAY MARKER

- TO BE PLACED AT EVERY ENDS AND ALONG THE CLOSED RUNWAY.
- SPACING OF MARKERS AT 300m
- WHITE, NON REFLECTIVE PAINT



CLOSED TAXIWAY MARKER

- TO BE PLACED AT EVERY ENDS OF CLOSED TAXIWAY
- YELLOW, NON REFLECTIVE PAINT

Attachment A15

REQUIREMENTS FOR WORKS IN THE AIRSIDE (CHANGI AIRPORT)

1 Control of works in the Airside

1.1 Works within the operating aerodrome may impact or may be impacted by aircraft, ground handling and vehicular operations. The safety of work activities in the vicinity of aircraft maneuvering areas is therefore imperative and must be managed and controlled. The requirements stipulated in this document apply to **works in the airside**.

1.2 Works in the airside refer to physical activity carried out to maintain, develop or modify airside facilities. The following areas and systems are defined (but not limited to) as airside facilities:

a. Aircraft Manoeuvring Areas – runways, runway strips, taxiways, taxiway strips and taxilanes;

b. Operational systems - (e.g., airfield lighting, iFerret, navigation aids, etc.) and their respective critical and sensitive areas, if applicable;

c. Apron – aircraft stands (including equipment staging area), equipment parking area, Aircraft Docking Guidance System, Passenger Loading Bridge, fuel pits and emergency stop switch, flood lights, INS signs, CCTV cameras, etc.;

d. Airside Buildings – AFLCC, ILS Building, South Pump House, Fire Station, Control Tower, Passenger Terminal Building etc.;

e. Roadways – Perimeter Road, primary and secondary roadways in the aprons, perimeter fence and systems etc.

Note: For works in the Baggage Handling Area, refer to Annex B for Airside Work Permit (Baggage) requirements.

1.3 The Project Officer who has any form of work activities in the airside should engage Airside Development & Baggage (Airside Works team) on the Airside Work Permit (Airfield) requirements. If in doubt, please forward your enquiries via email to Airside Works team at grp.airsideworks@changiairport.com. Alternatively, enquiries can also be forwarded to lim.sengkee@changiairport.com

1.4 All works required to take place during runway closure are to adhere to the Runway Closure Works Control Matrix (refer to Section C, para 26).

1.5 No work activities shall take place in the airside unless approval has been granted by CAG Airside Development & Baggage (Airside Works team). Unauthorised works in the airside will be halted immediately.

1.6 Refer to Attachment A15 Annexes A – D for more details.

Annex A

1 Airside Work Permit (Airfield)

1.1 The Project Officer who is managing work activities in the airside shall ensure that the Work Party carrying out the works are properly briefed and informed of the requirements stipulated in the latest edition of the Airport Operational and Safety Requirements (AOS), Airside Works Procedure Manual (AWPM).

1.2 The Project Officer may consult Airside Development & Baggage (Airside Works team) on the scope of works to be carried out in the airside 3 months prior to the targeted commencement of works. The purpose for consultation is to assess the impact on operations and to confirm the need for closure of affected airside facilities, if any.

1.3 The Project Officer is required to consult the relevant stakeholders on the considerations related to safety, the method of works, impact on security and operations of critical systems prior to seeking approval from Airside Works team to commence works. Written approval/ permits are required for certain work activities. Refer to the list of stakeholders in the table below.

Area of Concern	**Approving Agency for Pre-requisite Requirements**
Works affecting airport security infrastructure	Aviation Security (CAG) and Airport Police Division
Works on the inner perimeter fencing and/or PIDS	Engineering & Development (CAG) and Aviation Security (CAG)
Hot works, works requiring isolation of fire alarm system	Airport Emergency Services (CAG)
Works within another project's work boundary	Relevant Project Officer
Works affecting tenanted and/or operational spaces	Rentable Properties (CAG), Airside Operations Control (CAG) and/or Engineering & Development (CAG)
Works affecting/on the external façade of terminal buildings	Facilities Management (CAG)
Closure or works affecting roadways	Airside Management (CAG) and Airside Operations Control (CAG)
Closure of aircraft stands	Airside Operations Control (CAG)
Closure of Aircraft Manoeuvring Area	Airside Operations Control (CAG) and Changi Tower (CAAS)
Aerodrome reporting requirements (e.g. AIP and NOTAM)	Airside Operations Control (CAG)
Trial hole works, Earthworks	Refer to stakeholders in e-PTW portal
Works involving tall machinery/equipment	Airspace Policy Division (CAAS)
Works near radio navigation and landing aids	Aeronautical Telecommunications & Engineering Division (CAAS)
Works on airfield lighting system, drainage, M&E systems, fire hydrant	Engineering & Development (CAG)
Works on CCTV, iFerret, ADGS	Engineering & Development (CAG) and Airside Operations Control (CAG)

Works affecting fire hydrant system	Airport Emergency Services (CAG)
Works affecting fuel system	Airport Operations Control - Operations Policy (CAG) and Changi Airport Fuel Hydrant Installation (CAFHI)
Works affecting Baggage Handling System or Baggage Handling Area	Engineering & Development (CAG) and Airside Development & Baggage (Baggage Ops) (CAG)

1.4 A copy of the Airside Work Permit (Airfield) forms can be downloaded at AWP forms (for non-CAG Project Officer, to contact Airside Works Team). The Project Officer shall refer to the "How-to-complete-AWP" Guide (see Appendix 1) to guide him/her in verifying that all the necessary requirements in the "Checklist for Project Officer (Airfield)" have been fulfilled.

1.5 The Project Officer is required to provide information about the proposed works, including but not limited to the following:

a. Purpose/nature of works;

b. Proposed work schedule indicating the dates and working hours;

c. Schematic superimposed on maps/architectural drawings/layout plans of current infrastructure indicating clearly the work areas and the boundary of each work site (including areas for staging machinery and equipment, assembly area, site office etc.);

d. Phasing plan for various stages of works (including pre-construction activities, e.g. ground surveys);

e. Approved risk assessment(s), documenting relevant risks and corresponding mitigating measures for safety hazards and potential disruptions to aircraft operations, and ground handling operations;

f. Contact details of key personnel from the project management team, and main contractor;

g. Designated driving routes to work site and vehicle utilization plan.

1.6 The Project Officer shall prepare the Airside Work Permit (Airfield) forms and the required supporting documents. The application shall be submitted **at least 3 working days** (not inclusive of the submission date) via email to the Airside Works team prior to the requested start date; otherwise, the application may be rejected due to insufficient processing time. The required 3 working days will be reset if the application is rejected.

1.7 Work activities shall **not** commence until approval has been granted by Airside Works team. Upon approval, the Project Officer must ensure that works are conducted within the approved duration and authorised daily working hours within the approved work boundary.

1.8 The Project Officer shall be responsible to ensure that approved work site is well maintained, and safety and hazards control measures (e.g. markerboards, water barriers, etc.) are diligently put in place by the work party. Housekeeping activities such as grass cutting within 1m outside the boundary of the work area, FOD management, waste disposal, ensuring the tidiness and cleanliness of temporary site office and/or access roads, etc., are performed regularly to maintain an acceptable level of upkeep of the work area and its surrounding.

1.9 For the extension of approved work duration, a new application will be required. If earlier supporting document(s) remain applicable and valid, references to these supporting document(s) can be stated in the application without having to attach a copy.

1.10 For early completion of works before the approved end date, the Project Officer shall notify the Airside Works team.

2 Specific Instructions

2.1 Any accident/incident in the airside must be reported immediately to Airside Operations Control - Airside Management Centre (AMC) at 6541-2275. The Project Officer or appointed representative shall respond immediately to the site to take control of the area and to prevent exacerbating safety hazard or further disruption to operations.

2.2 During the course of work, Airside Operations Control, Airside Works Team or Air Traffic Control may issue instructions to stop work arising from non-compliance, e.g. unauthorised works, failure to abide by aerodrome safety requirements or due to operational reasons etc. Upon receiving stop work instruction, the Project Officer shall take immediate actions to clear all equipment and personnel from the work area. The Project Officer shall provide an update to Airside Operations Control and Airside Works Team as soon as the work area is cleared.

Appendix 1
to Annex A

"How-to-complete-AWP" Guide

This guide was designed as **reference material** to assist the Project Officer in completing the AWP (Airfield) Checklist. This guide does not replace any of the manuals that document the requirements (e.g. AOS).

S/N	Description	Status (√ if completed, else N.A.)	Actions to be taken by Project Officer
	Airport Operational & Safety (AOS) Requirements		
1	The Work Party has obtained the latest copy of the AOS requirements; has read and is able to comply with the requirements.	☐	This is a **mandatory** requirement. It must be a 'tick'; 'NA' is not acceptable.
	Works on Security Gates, Fences or Related Facilities		
2	For works on the inner perimeter fencing of the airport, the application* has been approved by E&D/CAG and AVSEC/CAG. (Refer to AOS, Section A)	☐	'Tick' if: E&D and Avsec have approved works on inner perimeter fencing 'NA' if: otherwise
3	The erection of new security fence, door, gate or barrier has been completed and accepted by CAG and APD before works affecting the existing security fence, door, gate or barrier is allowed to commence. (Refer to AOS, Section A)	☐	'Tick' if: CAG and APD has accepted the completed erection of new security fence, door, gate or barrier, before works affecting existing security fence, door, gate or barrier commenced 'NA' if: otherwise
4	AVSEC/CAG and APD have been consulted on works near or affecting airport security infrastructure. (Refer to AOS, Section A)	☐	'Tick' if: Avsec and APD have been consulted for 1. works on or affecting ANY airport security infrastructure; or 2. works to be carried out within 3m of airport fences; or 3. works to be carried out between inner and outer fence 'NA' if: otherwise
	Airport Fire Safety Requirements		
5	The Work Party is able to comply with the airport fire safety requirements as stipulated in the CAG Fire Safety Manual and also the regulations and safety practices of the SCDF. (Refer to AOS, Section B)	☐	This is a **mandatory** requirement. It must be a 'tick'; 'NA' is not acceptable.
	Hot Works		
6	The Hot Work Permit* has been approved by AES/CAG. (Refer to AOS, Section B)	☐	'Tick' if: AES has approved hot works 'NA' if: otherwise

	Works requiring Isolation of Fire Alarm System		
7	Isolation of Fire Alarm System* has been approved by AES/CAG. (Refer to AOS, Section B)	☐	'Tick' if: AES has approved isolation of fire alarm system 'NA' if: otherwise
	Airport Safety Training		
8	The Work Party's personnel (supervisory level) have attended the Airport Operational and Safety (AOS) briefing and test. (Refer to AOS, Section C)	☐	This is a **mandatory** requirement. It must be a 'tick'; 'NA' is not acceptable.
	Work Programme		
9	The work proposal (e.g. Method Statement, design, demarcation layout, type of barricade used etc.) and detailed daily programme for the works have been approved by the Project Officer. (Refer to AOS, Section C)	☐	This is a **mandatory** requirement. It must be a 'tick'; 'NA' is not acceptable.
10	For works affecting/impacting any aircraft manoeuvring areas, the Project Officer is satisfied that the Work Party's Standard Operating Procedures (SOPs) comply with CAG's requirements and procedures, as well as the standards and recommended practices stipulated in the Civil Aviation Authority of Singapore (CAAS) Air Navigation (139-Aerodrome) Regulations, respective aviation specification and advisory circulars (Refer to AOS, Section C)	☐	'Tick' if: satisfied with Work Party's SOPs when works are carried out (regardless of the aircraft manoeuvring areas being operational or closed) on 1. runway or within the runway strip; or 2. taxiway or within the taxiway strip; or 3. military taxiway or within the military taxiway strip 'NA" if: no works on the runway/runway strip/taxiway/taxiway strip/military taxiway/ military taxiway strip
11	For works within another project's work boundary, the Project Officer has sought concurrence to co-exist and ensure that coordination between the two project teams has been established. **Please state the name of Project Officer whom you have liaised with.**	☐	'Tick' if: 1. co-existing has been agreed; and 2. coordination has been established for the proposed works to be carried out within another project team's work boundary (i.e. at the same location) 'NA' if: there is no on-going work at the same location
12	For works affecting tenanted (e.g. parking lots, EPA) and/or operational spaces (e.g. offsite ESA, Evacuation Assembly Area, access into critical installations), the Project Officer has coordinated with the respective stakeholders to co-exist and if	☐	'Tick' if: relevant stakeholders have been consulted for 1. works affecting any tenanted and/or operational spaces 2. alternative arrangements (as advised) have been made

	necessary, alternative arrangements have been made to address the stakeholder's concerns. Note: critical installations include, but are not limited to, AFLCC, GP building, LLZ building, MM hut, Fire Stations, VIP complex etc.		'NA' if: otherwise
13	Facilities Management/CAG has been consulted and concurred with the works affecting the terminal building.	☐	'Tick' if: FM has concurred the works to be carried out on the terminal building, including bus bays, parking lots, roadways (except underpass) 'NA' if: work area does not encroach into the abovementioned
14	For works within RSAF's operational areas, the RSAF has approved the work programme to be carried out. (Refer to AOS, Section C)	☐	'Tick' if: RSAF has approved works to be carried out within RSAF's operational areas 'NA' if: otherwise
	<u>Works Affecting Active Roadway or Pedestrian Foot Path</u>		
15	Prior to the commencement of works, the Work Party has submitted a detailed proposal on the plans to carry out the works, including all the necessary safety and traffic marshalling measures to the Project Officer for evaluation and approval. (Refer to AOS, Section C)	☐	'Tick' if: Project Officer has evaluated and approved on safety and traffic marshalling measures for works affecting active roadway and/or pedestrian foot path 'NA' if: works does not affect active roadway and/or pedestrian foot path
16	Airside Management/CAG has been consulted on any potential impact to safety and has concurred with the works on/affecting active roadway or pedestrian foot path.	☐	'Tick' if: Airside Management has concurred the works on/affecting active roadway and/or pedestrian foot path 'NA' if: works does not affect active roadway and/or pedestrian foot path
17	Airside Ops Control/CAG has been consulted on any potential impact to operations and has concurred with the works on/affecting active roadway or pedestrian foot path.	☐	'Tick' if: Airside Ops Control has concurred the works on/affecting active roadway 'NA' if: works does not affect active roadway
18	The Traffic Management Plan (TMP)* and request for closure of roadway* has been approved by Airside Management/CAG and Airside Ops Control/CAG respectively.	☐	'Tick' if: Airside Management has approved the traffic management plan and Airside Ops Control has approved closure of roadway

			'NA' if: works does not affect active roadway, or Airside Management/Airside Ops Control have agreed no roadway closure required
	Closure of Airside Facilities		
19	The request for closure of aircraft stand(s)* has been approved by Airside Ops Control/CAG. **Please state the reference number of AIP Supplement (if required).**	☐	'Tick' if: Airside Ops Control has approved 1. any request for closure of aircraft stand(s) for works to be carried out; or 2. layover at aircraft stand(s) has been assigned 'NA' if: closure of aircraft stand is not required by Airside Ops Control/CAG, or if works do not affect stands operations
20	The request for closure of aircraft manoeuvring area(s)* has been approved by Airside Ops Control/CAG and Changi Tower/ CAAS and the associated NOTAM(s)* issued. **Please state the reference number of NOTAM/AIP Supplement.**	☐	'Tick' if: works requiring closure of taxiway(s), taxilane(s) and/or runway has been approved 'NA' if: closure of taxiway, taxilane and/or runway is not required (after taking into consideration taxiway strip and jet blast influence area)
21	For work activities which coincide with runway closure period, arrangement has been made for the Work Party to report to Runway Entry/Exit Point (REP).	☐	'Tick' if: work party is reporting to Runway Entry/Exit Point (REP) 'NA' if: otherwise
	Aerodrome Reporting		
22	The Project Officer has read and understood the requirements listed in Changi Aerodrome Manual (CAM) Section 4.1 Aerodrome Reporting. Project Officer has consulted and obtained confirmation from Airside Ops Control on the requirement (current/impending/non-issuance) of AIP Supplement/AIP Amendment/AIC for the purpose of the works.	☐	This is a **mandatory** requirement. It must be a 'tick'; 'NA' is not acceptable.
	Trial Hole Works		
23	The application for permit to carry out trial hole works* has been approved. (Refer to AOS, Section C)	☐	'Tick' if: works requiring trial hole works has been approved 'NA' if: otherwise
	Earthworks		
24	The application for permit to carry out earthworks* has been approved. (Refer to AOS, Section C)	☐	'Tick' if: works requiring earthworks has been approved 'NA' if: otherwise

Use of Mobile Machinery, Tall Construction Machinery/Plant, Temporary Structures, Stockpile

25	The application for the deployment of mobile machineries, tall construction machineries/plant, temporary structures, stockpile* has been approved by CAAS Airspace Policy Division. (Refer to AOS, Section D)	☐	'Tick' if: CAAS ASP has approved for works requiring the deployment of mobile machineries, tall construction machineries/plant, temporary structures, stockpile 'NA' if: otherwise
26	If there is a requirement to demobilise machinery for operational reasons to another area within the airside (designated as staging area), that staging area* has been approved by CAAS Airspace Policy Division.	☐	'Tick' if: CAAS ASP has approved the staging area 'NA' if: otherwise

Works near Communications, Navigation, Landing and Surveillance Aids

27	CAAS ATE Division has been consulted and has concurred with the works to be carried out in the vicinity of ATE facilities (e.g. HF Stations & Antennae, Multilateration System Sensors (MLAT), Instrument Landing System) and its corresponding critical and/or sensitive areas. (Refer to AOS, Section F)	☐	'Tick' if: CAAS ATE has been consulted for 1. works to be carried out within the GP/LLZ critical and sensitive areas; or 2. works to be carried out within 15m radius of all ANS equipment 'NA' if: works are carried out outside the above stated areas

Hazard Identification and Risk Assessment

28	The approved Risk Assessment* has been submitted. (Refer to AOS, Section J)	☐	This is a **mandatory** requirement. It must be a 'tick'; 'NA' is not acceptable.

Works affecting Other Airport Systems

29	Relevant stakeholders have been consulted and have concurred with the works. (E.g. Airfield lighting, CCTV, iFerret, drainage, fire hydrant, ADGS, fuel system & M&E systems etc.) **Please state the type of system and name of officer whom you have liaised with.**	☐	'Tick' if: system owner and user of the affected system have concurred the works 'NA' if: no other airport system is affected

Annex B

1 Airside Work Permit (Baggage)

1.1 The Project Officer is required to engage Airside Development & Baggage on the scope of works to be carried out in the Baggage Handling Area (BHA) **at least 1 month** prior to the targeted commencement of works.

1.2 The purpose is to consult Airside Development & Baggage to assess the impact on operations and to confirm the need for closure of affected baggage facilities e.g. arrival belts, transfer input lines and/or race track, if any.

1.3 The Project Officer is required to provide information about the proposed works, including but not limited to the following:

a. Purpose/nature of work;

b. Proposed work schedule indicating the dates and working hours;

c. Schematic superimposed on maps/architectural drawings/layout plans of current infrastructure indicating clearly the areas of works and the boundary of each work site (including areas for staging machinery and equipment, assembly area, site office etc.);

d. Phasing plan for various stages of works;

e. Approved risk assessment(s) with the relevant signatures by CAG Project Officer highlighting relevant risks and corresponding mitigating measures for safety hazards and potential disruptions to baggage handling operations;

f. Impact on vehicular traffic flow, pedestrian walkway, CCTV coverage, FIDS etc.; and

g. Contact details of key personnel from the project management team, inclusive of consultant/main contractor.

1.4 **For closure of baggage handling facilities**, submit the closure request form (see Appendix 1) at least 10 working days before the targeted date of closure to the following personnel:

Name/ Designation	**Email Address**
Joseph Lim/ Manager, Airside Development & Baggage	joseph.lim@changiairport.com
Edmund Woo/ Manager, Airside Development & Baggage	edmund.woo@changiairport.com
Mokhtar Hussian/ Senior Support Officer, Airside & Development & Baggage	mokhtar.hussian@changiairport.com

1.5 If any baggage conveyor or facilities are affected by the proposed works, alternate loading line if available, shall be proposed by the Project Officer to support the request for closure.

1.6 Arising from limited storage spaces for baggage handling equipment low headroom and high volume of vehicular traffic within the BHA, a risk assessment for the proposed works must address the corresponding impact on safety and efficiency of baggage handling operations.

1.7 For temporary storage / staging of materials and equipment in the BHA (including transfer baggage handling facilities), approval of space must be granted by Airside Development & Baggage. The approved staging area must be properly cordoned. In addition, contact details of the Project Officer and contractor's key personnel shall be clearly printed and displayed on the cordon. The request for closure of baggage handling facilities/roadway must be submitted for approval.

1.8 Note that closure of any driveway in the BHA should be avoided. If temporary closure of any driveway is necessary, please seek approval from Airside Development & Baggage for closure and respective road diversion plan.

1.9 The Project Officer shall use the "Checklist for Project Officer (Baggage)" (see Appendix 2) to guide him/ her in verifying that all the necessary requirements have been fulfilled before submitting the application to Airside Development & Baggage for approval.

1.10 The Project Officer shall prepare the "Airside Work Permit (Baggage)" form (see Appendix 3) and submit together with the supporting documents to Airside Development & Baggage **at least 10 working days** prior to the targeted date of commencement of works. This request should be sent via email to the following personnel.

Name/ Designation	**Email Address**
Joseph Lim/ Manager, Airside Development & Baggage	joseph.lim@changiairport.com
Edmund Woo/ Manager, Airside Development & Baggage	edmund.woo@changiairport.com

1.11 Work activities shall not commence until approval has been granted by Airside Development & Baggage. Upon approval, the Project Officer must ensure that works are conducted within the approved duration and authorised daily working hours at the approved work site(s).

1.12 **A fresh application** for Airside Work Permit (Baggage) is required whenever there are any changes to the supporting document(s)/permit(s) and/or conditions based on which an earlier Airside Work Permit has been granted.

1.13 For extension of permit, a fresh application will be needed. However, if there are no changes to the earlier supporting document(s), references to these supporting document(s) can be stated in the application without having to attach a copy.

1.14 In the event of early completion of works before the approved end date, the Project Officer is encouraged to update Airside Development & Baggage accordingly.

2 General Instructions

2.1 Any incidents in the airside must be reported to Airside Operations - Airside Management Centre (AMC) at 6541-2275 immediately. The Project Officer or appointed representative shall respond immediately to the site to take immediate control of the area and to prevent exacerbating safety hazard or further disruption to operations.

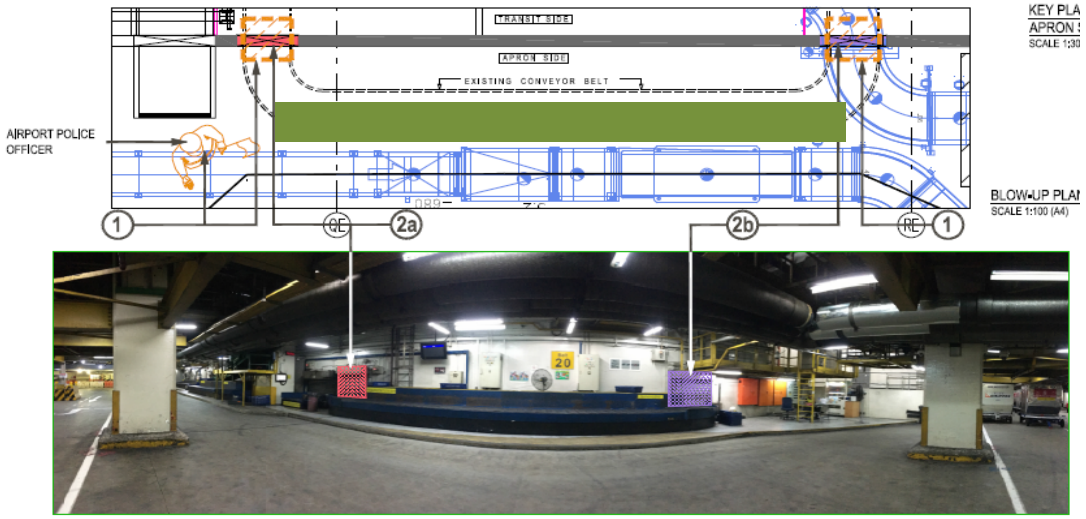
2.2 During the course of works, Airside Operations and/or Airside Development & Baggage may issue instructions to stop work arising from non-compliance, e.g. unauthorised works, failure to abide by aerodrome safety requirements, etc. Upon receiving stop work instruction, the Project Officer shall take immediate actions to clear all equipment and personnel from the work area. The Project Officer shall provide an update to Airside Operations and/or Airside Development & Baggage as soon as the work area is cleared.

Closure Request
(Baggage Handling Facilities)

Appendix 1
to Annex B

Project Title: _____

<Example only>



Site	Location of Work	Facility to be closed	Date (from/to)	Time (from/to)	Reasons for Closure	Remarks[1]
	T1 BHA	Belt 20	1/12/2015 to 10/12/2015	0000h to 0600h	Removal of baggage claim belt for upgrading works	Full closure

Requested by (Consultant/Contractor):
Name: _____
Designation: _____
Company/Section: _____
Contact No. (H/P): _____

Signature/Date: _____

Supported by (CAG Project Officer):
Name: _____
Designation: _____
Division/Section: _____
Contact No. (H/P): _____

Signature/Date: _____

Approved by (Airside Development &Baggage /CAG): **(For Official Use only)**

Name: _____
Designation: _____

Signature: _____
Date: _____

Remarks: _____

[1] Please indicate alternate facilities available for use and whether the request is for daily or full closure.

Appendix 1
to Annex B

CONDITIONS FOR APPROVAL OF CLOSURES

1. All requests for scheduled closures of **baggage handling facilities** must be submitted to Airside Development & Baggage at least **10 working days** before the intended day of work. Any urgent request must be submitted at least **24 hours** in advance and will be evaluated on a case by case basis.

2. All approved closures are subjected to changes and/or cancellation real time.

3. All works shall be completed withing the approved duration of the facility closure. Request for extension to the closure period must be submitted at least **2 hours** before the expiry of the approved closure timing.

4. The Work Part is to contact the Baggage Coordinator at 6541 2255 / 9723 2429; 30 minutes prior to the commencement of work and immediately after completion of work.

5. The Work Party to also contact the respective BHS Control Room at the affected terminals when work encroaches into BHS or BHS operational areas; 30 minutes prior to commencement of work and immediately after completion of work.

   T1: 6542 0053
   T2: 8860 3387
   T3: 6307 8522
   T4: 9178 6103

For BC Use Only The Closure approval has been updated as follows: 1 In RMS* 2 In Log Book* *Please tick where applicable
Shift: _____ Name: _____ Sign: _____ Date: _____
Remarks:

Checklist for Project Officer (Baggage)

Appendix 2
to Annex B

Project Title: _____

This checklist is designed to assist the appointed Project Officer in complying with all the necessary requirements **before** the application for Airside Work Permit. Supporting documents (marked with an "*") are to be appended with the application. Alternatively, references to approved document can also be made to support the application for subsequent applications. For this, the reference and approval date are to be stated in the remarks column.

S/N	Description	Status (√ if completed, else N.A.)	Remarks
	Airport Operational & Safety (AOS) Requirements		
1	The Work Party has obtained the latest copy of the AOS requirements; has read and is able to comply with the requirements.	☐	
	Airport Security Clearance		
2	The Work Party has applied for the seasonal airport pass for all personnel who are intended to be deployed for work in the Airport. (Refer to AOS, Section A)	☐	
	CAG Renovation Work Permit		
3	The Renovation Work Permit* for the scope and period of works has been approved.	☐	
	Airport Fire Safety Requirements		
4	The Work Party is able to comply with the airport fire safety requirements as stipulated in the CAG Fire Safety Manual and also the regulations and safety practices of the SCDF. (Refer to AOS, Section B)	☐	
	Hot Works		
5	The Hot Work Permit* has been approved by AES/CAG. (Refer to AOS, Section B)	☐	
	Works requiring Isolation of Fire Alarm System		
6	Isolation of Fire Alarm System* has been approved by AES/CAG. (Refer to AOS, Section B)	☐	

	Airport Safety Training	
7	The Work Party's personnel (at all levels) have attended the Airside Safety Induction Briefing. (Refer to AOS, Section C)	☐
8	The Work Party's personnel (supervisory level) have attended the Airport Operational and Safety (AOS) briefing and test. (Refer to AOS, Section C)	☐
	Work Programme	
9	The detailed proposal (e.g. Method of Statement, demarcation layout etc.) on the plans to carry out the works has been approved by the Project Officer. (Refer to AOS, Section C)	☐
10	Airside Development & Baggage/CAG and E&D/CAG have been consulted and have concurred with the works affecting Baggage Handling System, Hold Baggage Screening System, Inter-terminal Transfer Baggage System, equipment staging areas, etc.	☐
11	Alternative arrangements (if necessary) have been made to address tenanted and/or operational spaces affected by the works.	☐
12	For works within another project's work boundary, the Project Officer has sought concurrence to co-exist and ensure that coordination between the two project teams has been established.	☐
	Please state the name of Project Officer whom you liaise with.	
	Works Affecting Active Roadway or Pedestrian Foot Path	
13	Prior to the commencement of works, the Work Party has submitted a detailed proposal on the plans to carry out the works, including all the necessary safety and traffic marshalling measures to the Project Officer for evaluation and approval. (Refer to AOS, Section C)	☐
14	E&D/CAG has been consulted and has concurred with the works.	☐
15	Airside Management/CAG has been consulted on any potential impact to safety and has concurred with the works on/affecting active roadway or pedestrian foot path.	☐

16	Airside Operations/CAG has been consulted on any potential impact to operations and has concurred with the works on/affecting active roadway or pedestrian foot path.	☐	Appendix 2 to Annex B
17	The request for closure of roadway* (within Baggage Handling Area) has been approved by Airside Development & Baggage/CAG.	☐	
	Closure of Baggage Handling Facilities		
18	Request for closure* of relevant baggage facilities e.g. arrival baggage belt, departure race track, transfer input line, odd-size input/output lines, staging area, roadway etc. has been approved by Airside Development & Baggage/CAG.	☐	
	Trial Hole Works		
19	The application for permit to carry out trial hole works* has been approved. (Refer to AOS, Section C)	☐	
	Excavation/Piling Works		
20	The application for permit to carry out earthworks* has been approved. (Refer to AOS, Section C)	☐	
	Airside Driving Regulations		
21	All drivers are bound by the rules as specified in the Airside Driving Theory Handbook. All vehicles and drivers are to comply with the stipulated regulations before they are allowed to operate in the airside vicinity. (Refer to AOS, Section H)	☐	
	Hazard Identification and Risk Assessment		
22	The approved Risk Assessment* with the relevant signature has been submitted. (Refer to AOS, Section J)	☐	
	Note: RA is to be acknowledged by Project Officer		
	Works affecting Other Airport Systems		
23	For works affecting other systems such as FIDS (including BMIDS), CCTV, BIDS, M&E installations, etc. in the BHA, relevant stakeholders have been consulted and have concurred with the works.	☐	

Declaration

This is to certify that all the above checklist requirements are fulfilled. All approved documents are duly appended in this submission.

Submitted by (CAG Project Officer):

Name: _____

Designation: _____ Signature: _____

Organisation: _____ Date: _____

Airside Work Permit (Baggage)

Project Title: _____

Project Consultant (if any): _____

Description of Project: _____

Main Contractor: _____ Organisation/Division In-charge: _____

Layout of Work Area (to attach drawings if the space below is insufficient)

Please provide the site layout view and clearly mark out the work area. Please include dimensions of the work area and distances to nearby facilities/ roadway.

Scope of Works: _____

Period of Works: _____ (Date (DD/MM/YY)) to _____ (Date (DD/MM/YY))

Daily Working Hours: _____ (HH:MM) to _____ (HH:MM)

Remarks: _____

I/We hereby apply for a permit to commence works in the baggage handling area as stipulated in the above location and undertake to comply with the requirements as specified in the appended checklist.

In the event that works are completed before the authorised end date, I/We will update Baggage Coordinator at the earliest opportunity.

Requested by (Consultant/Contractor):		Supported by (CAG Project Officer):	
Name:		Name:	
Designation:		Designation:	
Organisation:		Division:	
Contact No. (H/P):		Contact No. (H/P):	
Signature/Date:		Signature/Date:	

Approved by (Airside Development & Baggage/CAG):

(For Official Use only)

Permit Number: AWP / _____ / _____

Name:		Signature:	
Designation:		Date:	

Remarks: _____

Annex C

1 CONDITIONS FOR CLOSURE OF AIRSIDE FACILITIES

1.1 To request for closure of aircraft manoeuvring areas (taxiway/taxilane), refer to the latest version of Airside Works Procedure Manual (AWPM) for Changi Airport. Submit the "Closure Programme" form in AWPM to Airside Operations (hereafter to be referred to as "Airside Ops") for approval **at least 14 working days** before the targeted date of closure.

1.2 For closure of aircraft stand, passenger loading bridge/ fixed gangway, gate hold room and airside roadway, submit the request via the "One Calendar" portal https://oc.changiairport.com, **at least 10 working days** before the targeted date of closure. Submission of less than the required lead time via the portal will be evaluated on case by case basis.

1.3 All application for closures must be supported by a CAG supporting officer.

1.4 For Airside Roadway closure request, to firstly submit Traffic Management Plan (TMP) to Airside Management, Ms Petrina Seow via email at petrina.seow@changiairport.com for comments and approval before submission via One Calendar for closure approval.

1.5 For queries regarding request for closure of airside facilities, please contact the following personnel:

Airside Facility	**Name/ Designation**	**Email Address**
Aircraft Stands or Taxiway / Taxilane / Airside Roadway	Norshidah Arshad/ Assistant Manager	norshidah.arshad@changiairport.com
	Teo Yu Ru/ Assistant Manager	teo.yuru@changiairport.com

1.6 The Project Officer shall inform Airside Ops in the event that the schedule for approved closure needs to be adjusted. Except for the unforeseen circumstances, cancellation of approved closure must be informed at least 24 hours in advance. No extension of working hours is allowed unless prior approval has been granted by Airside Ops.

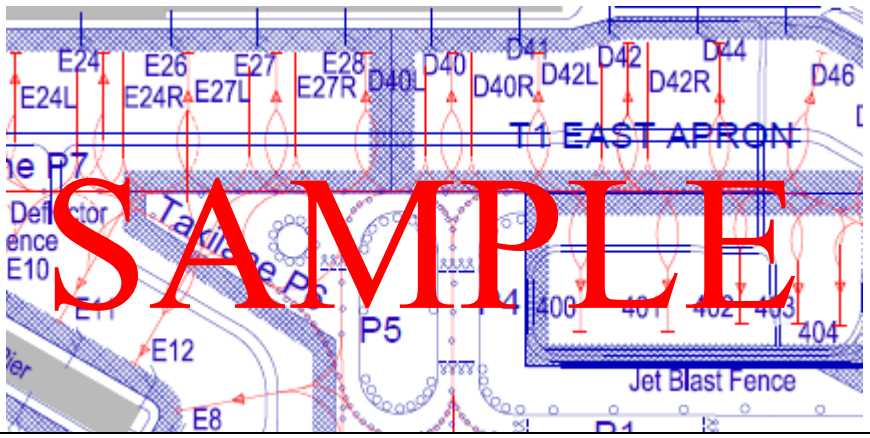
Closure Request Form
(Aircraft Stand/Gate/Busgate/Airside roadway)

Appendix 1 to Annex C

Approval No.: _____

Project Title: _____

<example only>



Site	Location of Work	Facilities[1] to be closed	Date (from/to)	Time (LT) (from/to)	Reasons for Closure	Remarks[2]
	Aircraft Stand E28	Aircraft Stand	01 Jun 2021 To 30 Sep 2021	1000hrs – 1700hrs	PLB Upgrading	FULL CLOSURE

Requested by (Consultant/Contractor):

Name: _____

Designation: _____

Company/Section: _____

Contact No. (H/P): _____

Signature/Date: _____

Supported by (Project Officer):

Name: _____

Designation: _____

Division/Section: _____

Contact No. (H/P): _____

Signature/Date: _____

Approved by (Airside Ops/CAG): **(For Official Use only)**

Name: _____ Signature: _____

Designation: _____ Date: _____

Remarks: _____

1 For aircraft stand, passenger loading bridge/fixed gangway and gate hold room to indicate the exact location of works and areas affected

2 To indicate if closure is full closure or daily closure

CONDITIONS FOR APPROVAL OF CLOSURES

Appendix 1 to Annex C

1 The request for the closures of airside facilities must conform to the requirements and specifications of work stipulated in the Airport Operational and Safety Requirements.

2 All approved closures are subjected to changes and/or cancellation real time. ACC will inform Project Officer at minus 2hrs for any cancellation of works.

3 All works shall be completed within the approved duration of the facility closure. Request for extension to the closure period must be submitted at least **2 hours** before the expiry of the approved closure timing.

4 The Work Party is to call the respective Sections; 30 minutes prior to commencement of work and immediately after completion of work.

Area of Works	Section	Contact No.
Aircraft stand, passenger loading bridge/fixed gangway and gate hold room	Airside Control Centre (ACC)	6541 2257 / 6541 2151
Airside Roadway	Airside Management Centre (AMC)	6451 2275

5 To provide the names and contact numbers of a recovery team which can respond to the emergencies or breakdown within 30 minutes.

For ACC Use Only

The Closure approval has been updated as follows:

1 In RMS*
2 In record of Closure of Airside Facilities*

*Please tick where applicable

Shift: _____ Name: _____ Sign: _____ Date: _____

Remarks:

Annex D

1 SPECIFIC CONDITIONS FOR AIRCRAFT STAND AND PASSENGER LOADING BRIDGE (PLB)

1.1 The Project Officer shall check the general condition of the aircraft stand and PLB before starting work and report immediately to ACC of any irregularities.

1.2 For works to be carried out on the PLB (inclusive of the fixed gangway), the Project Officer shall ensure that an obstruction marker board (see Appendix 1) is placed at the end of the aircraft stand along the centre line to indicate the closure of the particular aircraft stand.

1.3 The work area is to be demarcated with approved barriers. All workers and activities shall be strictly confined within this designated work areas.

1.4 Steady red obstruction lights shall be placed on top of the marker boards and turned "ON" during the hours of darkness.

1.5 Warning signage (see Appendix 2) shall be placed on the affected PLB control console and Aircraft Docking Guidance System (ADGS) operator panel to prevent accidental usage of the systems.

1.6 Obstruction tapes with red and white stripes shall be used to cordon off the emergency stairs of the fixed gangway and the service stairs of the PLB to prevent inadvertent access.

1.7 When works are being carried out on the PLB or fixed gangway, the Project Officer shall assign one Supervisor to be present at site to oversee the work activities and the workers. It is the responsibility of the Supervisor to ensure that the PLB is fully retracted to the designated parking position before vacating it.

1.8 Conditions for Maintenance Work on PLB

The following conditions shall be observed when maintenance work is carried out for PLBs:

a) Only Class A (PLB operations) Airfield Driving Permit (ADP) holders are allowed to operate the PLB;

b) The ADP holders are required to draw the PLB keys from the Inspection team leader at Airside Management Centre (AMC) and returned the key immediately after completion of work;

c) Safety marshallers shall be present to assist the PLB operator;

d) The PLB must not be left unattended when it is closed for maintenance.

1.9 Conditions for Maintenance Work on PLB at Multiple Aircraft Receiving Stands (MARS)

MARS is a type of aircraft stand that allows the flexibility of parking two narrow-body aircraft at each stand. For the closure of MARS, the Project Officer must specifically indicate whether the closure is affecting the main, left or right stand(s) of the MARS.

Annex D

For example:

a) If F52L is closed for works

- F52R can still be used for active parking
- The signs stating PLB under maintenance and ADGS under maintenance to be hung on the ADGS consoles of F52L and operator panel of PLB (outer arm)
- Marker boards to be placed at beginning of lead-in of F52L

b) If F52R is closed for works

- F52L can still be used for active parking
- The signs stating PLB under maintenance and ADGS under maintenance to be hung on the ADGS consoles of F52R and operator panel of PLB (inner arm)
- Marker boards to be placed at beginning of lead-in of F52R

c) If F52 is closed for works

- Main, Left and Right stands cannot be used
- The signs to be hung on all ADGS and PLB consoles and chains put up at the 3 stands
- Marker boards to be placed at the beginning of lead-in lines of all 3 stands.

OBSTRUCTION MARKINGS

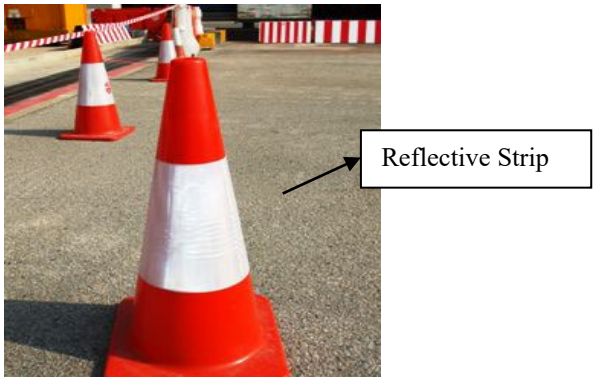
Appendix 1
to Annex D

The work area shall be clearly defined by obstruction markers in the day and shall be lighted during the hours of darkness.

1) Marker board with obstruction lights

2) Water-filled plastic

3) Reflector



4) Traffic Cone with Reflective Strip

5) Yellow Flashing Light

6) Metallic Barrier

CLOSURE SIGN

Appendix 2
to Annex D

Closure sign on PLB Control Panel

Attachment A16

APPLICATION FOR PERMIT TO CARRY OUT WORKS ON INNER FENCING OF SINGAPORE CHANGI AIRPORT

WORK PARTY:
PROJECT TITLE:
LOCATION OF WORKS: (To attached plans of affected areas)
REMARKS:
WORK DURATION:
I/We hereby apply for a permit to commence inner fencing works as stipulated in the above location and undertake to comply with the requirements as specified in the checklist and guidelines attached.
APPLICANT: NAME OF PROJECT DIRECTOR/MANAGER: _____ SIGNATURE: _____ DATE: _____

APPROVED ☐ **NOT APPROVED** ☐

Supported by (CAG Engineering & Development Cluster)	**Approval by CAG Aviation Security Unit:**
Civil/PIDS Officer: _____ SIGNATURE AND DATE: _____	CAG AVSEC OFFICER: _____ SIGNATURE AND DATE: _____

Attachment A17

REQUIREMENTS FOR WORKS IN AIRSIDE SELETAR

1. INTRODUCTION

1.1 Works in the airside may impact the availability and safe usage of airside facilities for aircraft operations.

1.2 No activities shall take place in the airside unless approval has been granted by CAG Seletar Airport Operations.

2. DETAILS

2.1 All works carried out in the airside of Seletar Airport shall comply with the requirements stipulated in this document.

- Refer to Annex A for requirements associated with the application for Airport Work Permit for works in the airside.
- Refer to Annex B for terms and conditions for works in the airside.

3. GENERAL

3.1 The requirement for works in the airside may be changed. The appointed contractor could engage the relevant CAG Seletar officer at the point of application.

Annex A

Requirements For Airport Work Permit (AWP) Applications

1 Works in the Airside

1.1 Construction works in the airside refer to works that result in physical changes to infrastructure in the airside, e.g. new buildings, roads, pavements, fixtures, systems, etc.

1.2 The Project Officer who is managing works in the airside shall ensure that the Contractor carrying out the works are properly briefed and informed of the requirements stipulated in the latest edition of the Airport Operational and Safety Requirements (AOS).

2 Conditions for Approval of Works – Airport Work Permit

2.1 The Project Officer is required to engage Seletar Safety Team and Seletar Airport Operations on the scope of works to be carried out in the airside **at least 1 month** prior to the targeted commencement of works. Please contact the following personnel for information on Airport Work Permit:

Name / Designation	Email Address
Jess Law / Manager	jess.law @changiairport.com

Name / Designation	Email Address
Glenn Phuah / Senior Manager	Glenn.Phuah@changiairport.com
Hairulnizam Bin Mohd Said / Senior Associate	hairulnizam@changiairport.com

2.2 The purpose is to assess the impact on operations and to confirm the need for closure of affected airside facilities, if any. The Project Officer is required to engage Seletar Airport Operations (SAO) on the requirements.

2.3 The Project Officer is required to contact Jess Law, Seletar Airport Operations Safety Team (SAO Safety Team) at jess.law@changiairport.com for the latest forms and requirements pertaining to the Airport Work Permit applications.

2.4 For Construction works in the Airside, the Project Officer shall note that there are requirements pertaining to the following areas.

1. Project officer/contractor shall ensure that an escort is present with the worker at all times to oversee that the works are carried out in accordance with airside regulations.

2. Identified escort shall meet the following criteria:
   i. Supervisory level;
   ii. Holds seasonal Seletar Airport Pass;
   iii. English Speaking;
   iv. Has attended escort briefing.

3. Seasonal airport passes are to be provided to Seletar Airport Operations (SAO). Only escorts that have attended the escort briefing are allowed to collect the airport passes from SAO prior to commencement of work and return the airport passes at the end of each workday.

2.5 For maintenance works in the airside, the Project Officer shall ensure that contractor establishes a procedure for airport pass control.

2.6 Work activities shall not commence until the work permit is issued. Upon approval, the Project Officer must ensure that works are conducted within the approved duration and authorised daily working hours at the approved work site(s).

2.7 The Project Officer shall ensure that the approved work sites are well maintained and hazards are kept under control.

2.8 A fresh application for any construction works is required whenever there are any changes to the scope of work based on which an earlier Airport Work Permit has been approved.

3 General Instructions

3.1 Any hazards and incidents in the airside must be reported to SAO at 6481 5077 immediately.

3.2 During the course of works, SAO may issue instructions to stop work arising from non-compliance, e.g. unauthorised works, failure to abide by aerodrome safety requirements, etc. Upon receiving stop work instruction, the Project Officer shall take immediate actions to clear all equipment and personnel from the work area. The Project Officer shall provide an update to SAO as soon as the work area is cleared.

TERMS AND CONDITIONS FOR WORKS IN THE AIRSIDE

1 INTRODUCTION

1.1 This document contains the conditions for works to be carried out in the airside. The airside organisation with the intention to carry out works or which are engaging external contractors to do works at the aircraft stands and roadways (hereafter to be referred to as "airside") shall comply with the conditions prescribed in this document.

1.2 The airside organisation (hereafter referred to as "Project Officer") shall ensure that the personnel engaged to carry out the works are properly briefed and is informed of the requirements to comply with the conditions as stated further in this document.

2 CONDITIONS FOR WORKS

2.1 Approval For Works At The Airside And / Or Shutdown Of Airside Facilities

2.1.1 The Project Officer shall seek the approval of CAG(S) Seletar Airport Operations (hereafter to be referred to as "SAO) as part of the airside work permit approval procedure. The purpose would be to seek approval to perform works in the airside and/or shut down airside facilities, including any part of the roadways and/or access points for vehicles and drivers into the airside.

2.1.2 Work shall not commence until an airside work permit is approved.

2.1.3 Upon Approval, the coordinator assigned by the Project Officer shall inform SAO via telephone at 64815077 daily prior to the commencement of works. At the end of each day, the assigned coordinator shall report the progress back to the same office.

2.1.4 All daily works shall be completed within the approved duration. No extension of closure period is allowed unless prior approval had been granted by CAG(S) SAO. Requests for consideration for extension of works must be submitted **at least one hour before** the end of the previously approved closure timing up to a maximum of 3 hours.

2.2 Closure of Aircraft Stand

2.2.1 Should closure of the aircraft parking stand be necessary to facilitate the intended work, the Project Officer must inform Seletar Airside Ops (SAO) at least 7 working days prior to the commencement of works.

2.2.2 For works carried out in the airside involving any part of the movement area (Apron, Parking Stand, Runway and Taxiways, the Project Officer shall ensure that an obstruction marker board is placed along the work area. The specifications of the marker board is as follows:

(i) Height: 0.5 metres
(ii) Length: 3.0 metres;
(iii) Width: 1.0 metres;
(iv) Marked with alternate red and white or orange and white stripes
(v) Steady red obstruction lights shall be placed on top of the
(vi) Marker boards and turned on during the hours of darkness.

2.2.3 When works are being carried out in the airside, the Project Officer shall ensure that at least one Supervisor is present at the work area at all times to have oversight on the activities and the workers. The Supervisor shall ensure that the work area is clear of FOD prior to vacating the work area.

2.3 Airfield Driving Permit (ADP)

2.3.1 All drivers operating any vehicle in the airside shall possess a valid Seletar Airport Airfield Driving Permit (ADP) and comply with the Civil Aviation Authority of Singapore (Seletar Airport) By-Laws 2009, Rules and Regulations Handbook for Airside Drivers and/or Driving into Manoeuvring Area & Standard Phraseology (Seletar Airport). Drivers are not permitted to enter the runway nor taxiways at all times unless they minimally possess a Seletar Airport Category 1 ADP/ Category 1R ADP.

2.4 Airfield Vehicle Permit (AVP)

2.4.1 Vehicles operating in the airside shall possess a valid Seletar Airport Airfield Vehicle Permit (AVP) and shall comply with the Civil Aviation Authority of Singapore (Seletar Airport) By-Laws 2009 and it's Second Schedule on Requirements for a Vehicle Operating within Airside. Vehicles are not permitted to enter the runway nor taxiways unless they are certified with a Category 1 AVP.

2.4.2 Vehicles shall be sufficiently insured for operating in Seletar Airport Airside.

2.4.3 Vehicles, equipment and machinery used for the approved work shall be parked within the work site.

2.4.4 The Project Officer shall apply for approval from the Civil Aviation of Singapore (CAAS) Airspace Policy Division (CAAS ASP) if tall hoisting equipment and other tall equipment are required for the intended work.

2.4.5 In the event of a breakdown or malfunction to the equipment, the contractor must be able to provide a recovery team to salvage the vehicle or equipment as soon as possible.

2.5 Temporary Entry Permit (TEP) For Vehicles

2.5.1 Any vehicle intending to enter the airside on an ad-hoc basis to set down personnel, deliver heavy equipment, construction material, goods or for other approved purposes may apply for a TEP issued by CAG(S) SAO. TEP applications can be submitted to CAG(S) SAO during office hours.

2.5.2 Such vehicles shall be sufficiently insured for operation in the Seletar Airside.

2.5.3 Vehicles with a TEP will only be allowed to operate in the airside for up to a maximum of 60 days within the calendar year. Under no circumstances will extensions be granted.

2.5.4 All TEP vehicles when operating in the airside must display an approved type of checkered flag and a flashing yellow light at the highest point of the vehicle.

2.5.5 The vehicle shall be accompanied by a holder of valid ADP who shall act as the steersman if the driver is not an ADP holder or escorted by an ADP, CAT 1 ADP or CAT 1R ADP holders according to the location of the worksite.

2.5.6 In the event of a breakdown or any incident, the contractor must be able to provide a recovery team to attend to the vehicle or equipment as soon as possible.

2.6 Roadway Closure

2.6.1 Where the closure of a roadway is approved by SAO, the Project Officer shall provide road marshallers at the two ends of the closed lane with 'GO / STOP' signs to regulate the traffic.

2.6.2 When a roadway is to be closed, the Project Officer shall provide a traffic marshaller.

Placing of any work material including items such as water hoses, pipes etc across roadways are not permitted as this would impede the movement of vehicles and ground support equipment.

2.7 Signage/Obstruction Markings

2.7.1 The work area shall be clearly defined by approved type of obstruction markers in the day and shall be lighted during the hours of darkness with steady red obstruction lights.

2.7.2 For roadways, reflective discs shall be placed at every 2-metres interval on the diverted roadway. Water-filled plastic barriers are preferred for placement at edge of diverted roadway or works adjacent to an active roadway.

2.7.3 When an aircraft stand is closed, an approved type of obstruction markers shall be placed along the aircraft stand apron boundary line.

2.7.4 The Project Officer, granted with approval to carry out the work, is to ensure that all obstruction markings/signage are secured and maintained in an orderly manner at the designated location. The Project Officer shall immediately rectify any markings/signage that have been damaged, misplaced or toppled. The markings/signage is to be removed promptly on completion of the work.

2.7.5 The Project Officer shall inspect the obstruction sign, e.g., marker boards, reflective discs, barricades etc. The Project Officer shall report any observations to SAO. The Project officer is to respond immediately when aircraft operations are affected.

2.8 Underground Services

2.8.1 Damage to any services/facility that may impede the safety of airside operations especially aircraft operations shall be reported immediately to SAO. The coordinator shall respond immediately to the site to take immediate actions in order to prevent further damage and disruptions.

2.9 Personnel/Equipment

2.9.1 The Project Officer shall conduct random checks on the workers under his contract to ensure validity of original work permits and verification of workers with the name list and file a copy of the check result for future reference.

2.9.2 The Project Officer shall ensure that all personnel working in the airside have a valid airport pass issued by the Airport Police, and Visitor Pass holders are escorted at all times.

2.9.3 The Project Officer shall ensure that all seasonal airport passes are surrendered to SAO after the completion of each workday. He may collect the passes at the start of the next working day for workers who are present.

2.9.4 The Project Officer shall ensure that all visitor passes are returned after the completion of each workday.

2.9.5 The Project Officer shall ensure that the personnel engaged to carry out the work do not bring in or consume food and drinks in the airside. The workers' attire shall not resemble the state security personnel uniform. The workers shall dress presentably at all times.

2.9.6 The Project Officer is required to deploy a Supervisor to be present where lifting machines / cranes / maintenance platforms are in use and ensure the display of a valid safety inspection certificate on the lifting equipment. Such equipment shall be operated only by holders of the respective competency certificates. The Project Officer is to ensure that his personnel and subcontractors comply with the rules and regulations issued by MOM and CAAS from time to time. Regular checks for height limits of such equipment are conducted regularly. The Clearance Letter obtained from CAAS ASP shall be made available at the worksite at all times.

2.10 Safety and Cleanliness

2.10.1 The Project Officer shall ensure the contractor abide by the airside safety rules and regulations.

2.11 Security

2.11.1 The Project Officer shall ensure that the organization comply with Airport Police (APD) requirements with regards to structures adjacent to the security fencing or gates.

2.11.2 The Project Officer is to take necessary measure to ensure no stray animals enter the airside through any access / gates approved to facilitate the works in the airside.

2.12 Wildlife Management and Control

(i) Contractors shall take appropriate measures to avoid attracting birds, dogs, cats and other wildlife to the airport. In addition, Contractors shall conduct regular checks to ensure that their workers adhere to these measures.

(ii) No person shall consume any food or beverage in the airside. No person shall feed any bird or animal within the airside.

(iii) Contractors shall avoid damaging turf in the course of their activities as ponding could lead to the growth of insects and other invertebrates which in turn attract birds.
(iv) Contractors shall minimise the presence of stockpiles or poles or wires and other such items which could act as perches for birds at worksites.
(v) Contractors shall ensure that there are no gaps or holes in the hoardings, drain gratings, security grilles, gates and fences that could permit dogs, cats and other stray animals to enter the airfield.
(vi) Contractors shall be required report any wildlife hazards and attractants (eg flocks of birds, presence of non-avian wildlife species, such as cats and dogs, presence of bird nests and fruit bearing trees) found within their worksites to CAG Seletar Airport Operations immediately.

2.13 **Additional Conditions**

2.13.1 The Project Officer shall ensure that all personnel comply with any directions, verbal or otherwise given by the SAO Officers.

2.13.2 The Project Officer & all staff must comply with CAAS (Seletar Airport) By-laws at all times.

2.13.3 During the course of works, SAO can issue instructions to stop work if there are any deviations from the requirements set in this document despite a previous approval. The site coordinator is required to take immediate measures to rectify all irregularities and report to SAO upon completion.

2.13.4 The Project Officer shall report all incidents/accidents in the airside to SAO immediately.

3 CONTACT NUMBER OF CAG (S) SELETAR AIRSIDE OPERATIONS UNIT

Duty phone: 6481 5077 / 9753 3361
Fax: 64831754

4 Please bring the content of this notice to all your staff and contractors concerned.

Annex B

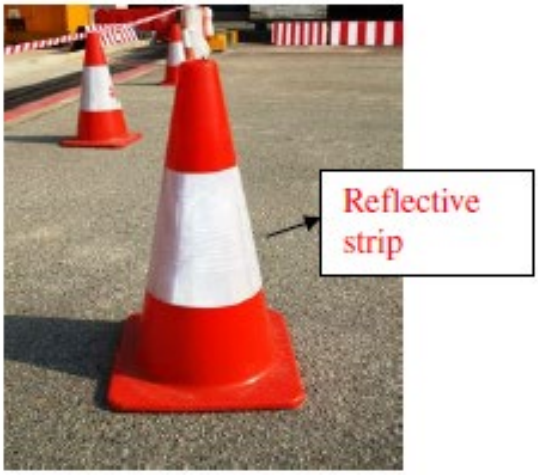
OBSTRUCTION MARKINGS

The work area shall be clearly defined by obstruction markers in the day and shall be lighted during the hours of darkness.

1) Marker board with obstruction lights

2) Water-filled plastic barrier

3) Reflector



4) Traffic Cone With Reflective Strip

5) Oscillating Light

6) Metallic Barrier

Attachment A18

Workplace Safety and Health (WSH) Requirements for Contractors

S/N	WSH Requirements
1	**Workplace Safety and Health Act** The contractor/ supplier/ installer/ erector including its subcontractor shall comply with the Workplace Safety and Health Act and any subsequent amendments thereto, its regulations and any other subsidiary legislation in force for the time being (collectively "WSHA") and shall take so far as is reasonably practicable, such measures to ensure the safety, health and welfare of any and all persons (including members of public) at the workplace. They in doing so shall bear all costs and expenses consequent thereon or incidental thereto.
2	**Kick off meeting.** All contractors /vendors/suppliers shall meet up with Changi Airport Group ("CAG") project officers before work commencement so as to be fully aware of the task requirements, as well as the safety requirements.
3	**In-house safety rules and other requirements** The contractor/ supplier/ installer/ erector including its subcontractor shall follow and comply with in-house safety rules and any additional safety related requirements (by CAG, other authorities or as stated in the risk assessment) where applicable. Failure to comply may result in work suspension without compensation.
4	**Safety Personnel** The contractor/ supplier/ installer/ erector including its subcontractor shall ensure that its competent safety personnel carry out safety and health supervision on work activities they are engaged to perform. The safety personnel shall be at on-site at all times and be in charge of the safety and health of their workers, as well as any and all persons (including members of public), throughout the duration of its work activities.
5	**Training** The contractor/ supplier/ installer/ erector including its subcontractor shall ensure that all their workers are competently trained to conduct work activities carried out by them, as required under the WSHA, before allowing such persons to perform any work.
6	**Maintenance of equipment's, machinery and tools** The contractor/ supplier/ installer/ erector including its subcontractor shall ensure that all machinery, equipment, and tools brought to the workplace are properly maintained and are safe for use.
7	**Risk Assessment, Safe Work Procedures and Method Statements** The contractor/ supplier/ installer/ erector including its subcontractor shall be responsible, at its own costs, for carrying out risk assessment for all work activities which may pose safety and health risks to any person who may be affected by these work activities. They shall also ensure that all works are carried out in accordance with safe work procedures and method statements. In this regard, the contractor/ supplier/ installer/ erector including its subcontractor shall furnish the said risk assessments to CAG before commencing work and provide the said procedures and method statements to CAG upon request.
8	**Personal Protective Equipment (PPE)** The contractor/ supplier/ installer/ erector including its subcontractor shall provide its personnel with appropriate and adequate PPE, as well as train and ensure that the PPE are correctly used while at work.

Attachment A19

In-House Safety, Health and Environmental Rules for Contractors

1. The contractor shall abide and comply with all applicable legal requirements and relevant Code of Practice when working in the airport, including but not limited to:
   - Workplace Safety and Health Act and its Regulations;
   - Fire Safety Act and its Regulations;
   - Environmental Protection and Management Act and its Regulations; and
   - Environmental Public Act
2. Contractors shall ensure that all workers and site staff deployed on site, be it permanently or on an ad hoc basis are properly and adequately inducted before commencement of works.
3. Contractors shall submit approved risk assessments to CAG for both routine and non-routine tasks prior to work commencement.
4. Obtain all necessary permits (e.g., hot work permit, work at heights permit, lifting permit, and/ or confined space entry permit) prior to work commencement.
5. Submit copies of Safety Data Sheets (SDS) for all hazardous materials such chemicals being brought on-site to CAG prior to work commencement, ensure that SDS of chemicals are available at work area at all times and ensure that only competent persons are permitted to handle chemicals. SDS shall be revised at least once every 5 years.
6. Ensure PPE are in good condition, wear or use appropriate PPE during work whenever necessary.
7. Provide or ensure sufficient fire extinguishers are available at work areas.
8. Workers and site staff are to eat, drink, rest and smoke only in designated areas.
9. Obtain prior written approval from CAG before any area is used for storage of work materials or equipment, and not to store amounts above what is specifically approved by CAG.
10. Perform housekeeping in work areas during and after work and dispose of waste materials at designated waste disposal areas and into appropriate receptacles.
11. Ensure that only competent, trained and authorised persons are allowed to operate, repair or alter any equipment or machinery.
12. Ensure all statutory equipment (i.e., equipment whose requirements and specifications are set out under the law) brought on site in relation to the work have been examined and maintained with current licence clearly displayed.
13. Do not enter any area other than assigned work area, unless authorised to do so.
14. Do not throw any objects from height.
15. Do not engage in horseplay while working.
16. Do not obstruct fire exits or evacuation routes, as well as fire-fighting and other emergency response equipment such as fire hydrants, fire extinguisher and water hose reels.
17. Personnel who is unwell shall seek medical attention if not feeling well.
18. Immediately report any unsafe act or unsafe condition observed to your supervisor or management for corrective action.
19. The work party shall fulfil their due diligence to minimise pollution and health and safety risks.
20. Ensure that adequate earth control measures are put in place and where necessary, engage a QECP to regularly review the earth control management plan for the site.
21. Keep a register of toxic industrial waste (TIW) generated and disposed in accordance to the requirements as stipulated by NEA.
22. All waste products must be stored safely until they are disposed. Waste products must be sorted and disposed of correctly.
23. Waste generated during the contractor's course of work must be collected by the contractor and disposed of properly in accordance to applicable legislative requirements. The disposal certificates must be kept and shown to the CAG upon request.

24. Contractors shall pay attention to the use, presence and/or creation of hazardous substances such as flammable materials, release of harmful, obnoxious vapours, creation of dust and use of corrosive materials at the worksite. Care must be taken to ensure that the concentration of such fumes/ vapours does not exceed the permissible limits

for safety. Temporary mechanical ventilation system for treatment shall be used. Contractors are to refer to Safety Data Sheet (SDS) and educate the workers on the use of and protection to be taken against such hazardous substances.

25. Any spillage or leakage of oil, chemicals, or materials shall be controlled and cleaned up immediately.
26. Contractors shall ensure that no toxic wastes, hazardous substances, chemicals, oil-based products, diesel, petrol and/or any material that might pollute the environment be discharged into any drain, waterways, or the soil. Anyone found to have discharged such materials, shall be liable to clean up at their own cost within a time frame agreed upon with CAG. CAG reserves the rights to hire third party contractors to perform the clean-up if no action is taken by the errant contractor within a set timeline for rectification and the cost of such clean-up shall be recovered from the errant contractor.
27. Any compressed gas cylinders shall be used in accordance with standard code of practices, including the use of flashback arrestors, non-return valves, securing cylinders, appropriate use of regulators, leak checks, etc.
28. Any chemicals used shall not cause harm to the environment and the immediate habitat.
29. Immediately report any work-related occurrences and emergencies to the CAG project officer(s) in charge and Airport Emergency Service (AES) Changi (Contact No: 6541 2525), AES Seletar (Contact No: 6481 3377) or AES Fire Safety (Contact No: 6541 2535).
30. For any incidents/ accidents, the work party is required to submit a detailed incident / accident investigation report to their respective CAG representative within 3 working days.

Acknowledgement

On behalf of my organisation, I hereby acknowledge that I have read and understood, and will comply with the above requirements and rules.

Signature : _____

Name : _____

Designation : _____

Organisation : _____

Date : _____

Attachment A20

CHECKLIST FOR UNDERGROUND SEWERAGE & SANITARY SERVICE DIVERSION WORKS IN CHANGI/SELETAR AIRPORT

Objective: To carry out a thorough & complete sewerage & sanitary service protection and/or diversion works at the subject site

Item:		**Check boxes when Completed** (or indicate as "Nil" if not applicable or required)
1.	Engage qualified registered & competent contractor of the relevant trade & work head.	☐
2.	Engage Registered Plumber (LP) registered under Singapore Plumbing Society (SPS), who holds a valid water service plumber licence.	☐
3.	Consult CAG E&D Utilities Team and/or PUB(WRN)/NEA to obtain approval or written clearance on proposed works in vicinity of existing sewerage system (within influence zone or 25m corridor for sewers & 36m for DTSS)	☐
4.	Have a copy and follow latest Guideline & comply with PUB's Advisory Notes on: - "General Requirements for the Protection of Sewers" - "Prevention of Damage to the Sewerage System"	☐
5.	Engage PUB registered CCTV contractor to carry out and submit pre & post construction CCTV inspections & reports (with CCTV video (DVD)) for any existing/new sewer within or adjacent to development lot to PUB(WRN)	☐
6.	Engage Registered Surveyor to verify/set out/peg & prepare endorsed setting out plan for sewer alignment, pile positions, TERS alignment etc on site.	☐
7.	Ensure no utilities services (cable, gas pipe, water pipe etc) shall over-cross/undercross within 1m from outer edge of sewers unless written clearance from CAG E&D Utilities Team and/or PUB(WRN) is obtained before any works at site.	☐
8.	If reuse of existing sanitary/sewerage system is required – a thorough investigation by qualified person to ensure adequate capacity & good condition and an endorsed inspection report is to be submitted to CAG E&D Utilities Team and/or PUB(WRN)	☐
9.	Coordinate with CAG E&D Utilities Team and/or PUB(WRN) for sewerage diversion services to be carried out by PUB(WRN)	☐
10.	To notify or report to FMC, CAG E&D Utilities Team, CAG Project Officer and/or PUB-24 Hour Call Centre hotline at **1800-2846600** immediately should any sewerage service be damaged, exposed or any sealing work is required.	☐

Applicant

Name of PD/Mgr: _____

Signature/Date: _____

Approval by CAG

Name of Project Officer: _____

Signature/Date: _____

Supported by Consultant:

Name of QP: _____

Signature/Date: _____

Attachment A21

CHECKLIST FOR UNDERGROUND WATER SERVICE DIVERSION WORKS IN CHANGI/SELETAR AIRPORT

Objective: To carry out a thorough & complete water service protection and/or diversion works at the subject site

Item:		**Check boxes when Completed** (Or indicate as "Nil" if not applicable or required)
1.	Engage qualified registered & competent contractor of the relevant trade & work head.	☐
2.	Engage Registered Plumber (LP) registered under Singapore Plumbing Society (SPS), who holds a valid water service plumber licence.	☐
3.	Consult CAG E&D Utilities Team and/or PUB(WSN) on proposed works & detected existing water mains for advice on whether diversion is required.	☐
4.	Coordinate with PUB(WSN) for water mains diversion services to be carried out by PUB(WSN).	☐
5.	Coordinate with CAG E&D Utilities Team and/or PUB(WSN) to obtain clearance/advice prior to commencement of diversion or connection works to existing water mains.	☐
6.	Engage Registered Surveyor to verify/set out/peg & prepare endorsed setting out plan for water mains alignment, pile positions, Earth Retaining and Stabilizing Structure (ERSS) alignment etc on site.	☐
7.	Ensure no utilities services (cable, gas pipe, sewerage pipe etc) shall over-cross/be erected over any or a drain undercross a water main within a clearance of 0.5m(dia<300mm) & 1m(dia>500mm).	☐
9.	Ensure no manhole is allowed on top of any water main and there is a horizontal clearance of 1m between the manhole and water main.	☐
10.	To notify or report to FMC, CAG E&D Utilities Team, CAG Project Officer and/or PUB's 24-hour Call Centre at Tel No. **1800-2846600(24 Hrs)** immediately in the event of damage to any existing water main or water quality & supply pressure issues or possible contamination of the water supply downstream.	☐
11.	To notify FMC and Terminal Mechanical Team before shutting and reopening valve.	☐
12.	To request for CCTV inspection.	☐
13.	To request for water quality test.	☐
14.	To coordinate with respective Terminal Mechanical Team to check the condition of water before discharging into tank.	☐

Applicant

Name of PD/Mgr: _____
Signature/Date: _____

Approval by CAG

Name of Project Officer: _____
Signature/Date: _____

Supported by Consultant:

Name of QP: _____

Signature/Date: _____

Attachment A22

CHECKLIST FOR UNDERGROUND GAS SUPPLY SERVICE DIVERSION WORKS IN CHANGI/SELETAR AIRPORT

Objective: To carry out a thorough & complete gas service protection and/or diversion works at the subject site

Item:		**Check boxes when Completed** (or indicate as "Nil" if not applicable or required)
1.	Engage qualified registered & competent contractor of the relevant trade & work head.	☐
2.	Engage EMA Licensed Gas Service Worker (LGSW) who holds a valid gas service worker licence.	☐
3.	Consult CAG Project Officer and/or PowerGas or CityGas on proposed works & detected existing gas mains for advice on whether diversion is required.	☐
4.	Coordinate with PowerGas or CityGas through email at gasenquiry@singaporepower.com.sg for gas diversion services to be carried out by PowerGas or CityGas.	☐
5.	Engage Registered Surveyor to verify/set out/peg & prepare endorsed setting out plan for gas mains alignment, pile positions, TERS alignment etc on site.	☐
6.	Contractor(s) to attend safety briefings by PowerGas or CityGas on precautions & mitigation measures to prevent damage to existing gas lines during excavation & earthworks.	☐
7.	All excavation works in the vicinity of identified gas transmission lines to notify and be supervised by PowerGas or CityGas.	☐
8.	To notify or report to CAG Project Officer and/or PowerGas or CityGas Customer Service Centre at Tel No. **1800-7521800** promptly if any existing gas pipe is damaged or gas leak pipe is detected.	☐

Applicant

Name of PD/Mgr: _____

Signature/Date: _____

Approval by CAG

Name of Project officer: _____

Signature/Date: _____

Supported by Consultant:

Name of QP: _____

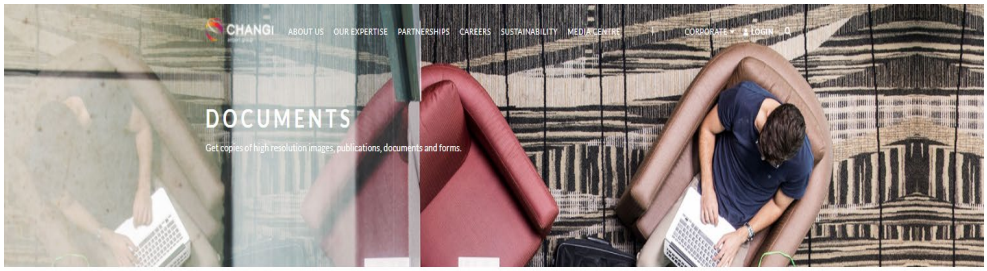
Signature/Date: _____

Attachment A23

TERMS AND CONDITIONS OF WORKS IN LANDSIDE

1. Please refer to the Landside Roadway Manual for detailed requirements.

   This can be found on CAG Website → Documents → Airside Management → Landside Roadway Manual:
   https://www.changiairport.com/corporate/e-services/documents.html



2. All works on landside require a permit. CAG project officers are to apply for a permit on behalf of their contractors using the One Calendar portal

   One Calendar: https://onecalendar.changiairport.com

   Shared accounts have been provided for various divisions. If unsure, please email roadway.unit@changiairport.com

3. The height limit for roads in Changi Airport can be found in obtained from the respective CAG Project Officers.

Attachment A24

CHECKLIST FOR CARRYING OUT DAILY INSPECTION IN CHANGI/SELETAR AIRPORT

Day	Night

Weather Condition:	Please state: _____

*please indicate when the inspection was conducted

Prior to the end of each day's work and / or daily before dusk, the Work Party's representative (e.g.: RTO) or every once a week, the CAG representative shall inspect the worksite in the vicinity of the aircraft movement areas or in assigned work areas to ensure that all mandatory items specified in AOS Manual are checked as followed (non-exhaustive listing):

No	Check Item	Checked OK	Checked Not OK	NA	Not Checked	Remarks
1	Work area adequately demarcated to prevent workers from straying out of work area or unauthorized access to site.					
2	No material storage adjacent to the security fencing or gates without prior approval of CAG and APD.					
3	Works to be carried out and / or material storage shall be kept at least 3m away from airport fences?					
4	No storage of flammable materials or other hazardous substances on site.					
5	Excavated trenches and pits are adequately barricaded to prevent personnel / vehicle from falling into such trenches / pits.					
6	Warning signs for road diversion, deep excavation, keep out zones are displayed.					
7	Unserviceability lights consisting of a 50-50 mix of types running on two different power sources are installed and functional. (Checks should be conducted just before dusk or at end of work shift)					
8	Marker boards are properly weighed down.					
9	Unserviceability markerboards of at least 0.5m in height, 3.0m length painted in 7 bands of alternate red and white vertical stripes, starting with and ending with red, are provided to serve as guidance to pilots, warning them of closed area.					
10	Unserviceability lights placed across access/egress to the closed area at intervals not exceeding 3.0m.					
11	Lightings used to illuminate the work area are shielded and pointed downward to prevent glare to pilots.					
12	Existing lead-in line leading into the closed aircraft parking stand are blackened for closure more than 3 days continuously, but less than 3 months.					
13	Existing lead-in line leading into the closed aircraft parking stand are grinded or water-blasted off for closure more than 3 months.					

No	Check Item	Checked OK	Checked Not OK	NA	Not Checked	Remarks
14	Booms of machineries / equipment are lowered when not in operation.					
15	Red obstacle lights are installed at highest point of equipment / machineries and turned on at dusk.					
16	Fences within the work area are checked to ensure no mean of access is created that may allow wildlife to enter the airside.					
17	All sites, vehicles, machineries or equipment are checked to ensure that no foreign object debris (FOD) would be generated.					
18	Work area does not encroach into aircraft operational areas.					
19	Valid hotwork / fire protection isolation permit for any works that may cause fire hazards.					
20	Availability of updated aerodrome maps. (dated: _____)					
21	Adequate and appropriate PPE are used at all times.					
22	Vector control measures are put in place to prevent mosquito breeding.					
23	Gas cylinders are properly secured and stored.					
24	Safe means of access and egress is provided and maintained on site.					
25	Scaffold if provided on site, is inspected by competent person a least once every 7 days and after adverse weather.					
26	Electrical cables are elevated at least 2.0m above ground and not in contact with any metallic surfaces.					
27	Unserviceable equipment and / or tools are tagged to prevent misuse.					
28	Electrical tools are checked by Licensed Electrical Worker (LEW) at least once a month.					
29	Lifting equipment and lifting gears possesses valid LG / LM Certificate.					
30	CAAS height clearance approval letter displayed.					
31	Chequered flags displayed on highest point of TEP vehicle and equipment.					
32	Yellow flashing lights on vehicles are switched “ON” when in operation.					
33	No consumption of food and drink within the airside.					
34	No feeding of wildlife within airside.					
35	Has the turfing within the worksite been checked to ensure no overgrown vegetation is present					

Others (Please specify items checked that are not included in the checklist):

Follow up actions taken:

Project / Site Location:

Date Inspected

Inspected By (Name, Company, Sign):

Checked By (Name, Company, Sign):

Attachment A25

HORTICULTURE OUTDOOR REQUIREMENTS

1 GENERAL

The Contractor shall avoid all existing trees and shrubs whenever possible. If works on Irrigation pipes, landscape Area and / or less than 2m from the tree collar, please submit photos of affected plants in relation to the surroundings.

2 REMOVAL OF PLANTS / CUTTING OF TREE ROOTS

The Contractor shall ensure that no shrubs / trees are to be removed from site and no tree roots are to be cut without prior approval from CAG Horticulture.

3 TRANSPLANTING OF PLANTS

Trees / shrubs identified to be salvaged shall be transplanted either to a different location on site or containerized and brought to CAG Horticulture nursery. The Contractor shall ensure that the plants are handled as per proper arboricultural / horticultural practices.

Plants to be transplanted shall be trenched and prepared as directed by CAG Horticulture. Plants shall be lightly pruned, have their rootball size determined and approved by CAG Horticulture, trenched to the required depth and filled with either sand or mulch. Plants shall be allowed to stabilize in the ground for the required period of time or as instructed by CAG Horticulture before being dug out and transplanted.

In transplanting, the rootball of transplanted plants shall be trimmed to remove damaged roots, be cleanly cut, and securely wrapped to prevent drying of roots and breakage of the rootball. Thereafter, it shall be containerized or planted in the ground as directed by CAG Horticulture. All necessary efforts and precautions shall be taken to ensure that the plants are not damaged during transplanting and replanting.

Plants to be re-planted, straightened or re-potted shall be trimmed or pruned as required by CAG. The plants shall thereafter be replanted on site as required and properly staked. Plants required to be transplanted shall be loaded and transported carefully to the receiving hole or container so that the rootball does not disintegrate.

The Contractor shall prepare the receiving planting hole or the container in advance so that the transplanted plant can be immediately planted after removal from the growing site. The plant shall be carefully planted using approved soil mixture and staked with proper stabilizing and firming of the planting area. The Contractor shall provide proper staking or bracing at his own expense whenever instructed by CAG Horticulture.

4 PROTECTION OF TREES ON SITE

Any trees that are to remain on site shall be within a protected area called the tree protection zone (TPZ). The radius of the zone is determined by measuring the diameter of the tree trunk (cm) at 1.5m above ground and multiplying it by 10. This radius should then be measured from the edge of the tree trunk in all directions, forming a circular protection area.

Once the TPZ is determined the Contractor must take the following measures: -

a) Install fixed fencing (e.g., chain-mesh) to protect the TPZ.

b) No entry of people, vehicles or machinery into the TPZ.

c) No stockpiling of building materials, debris, or soil within the TPZ.

d) No storage / bringing in of fuel, oil dumps or chemicals within the TPZ.

e) No altering of soil levels within the allocated TPZ.

f) No open trenching within the TPZ.

g) Pruning only allowed on dead, broken or overgrown branches.

h) A tree shall not be used to attach temporary service wires, nails, screws or any other fixing device or as a winch support or anchorage.

i) Take care to ensure no damage to tree trunks, roots and structural branches.

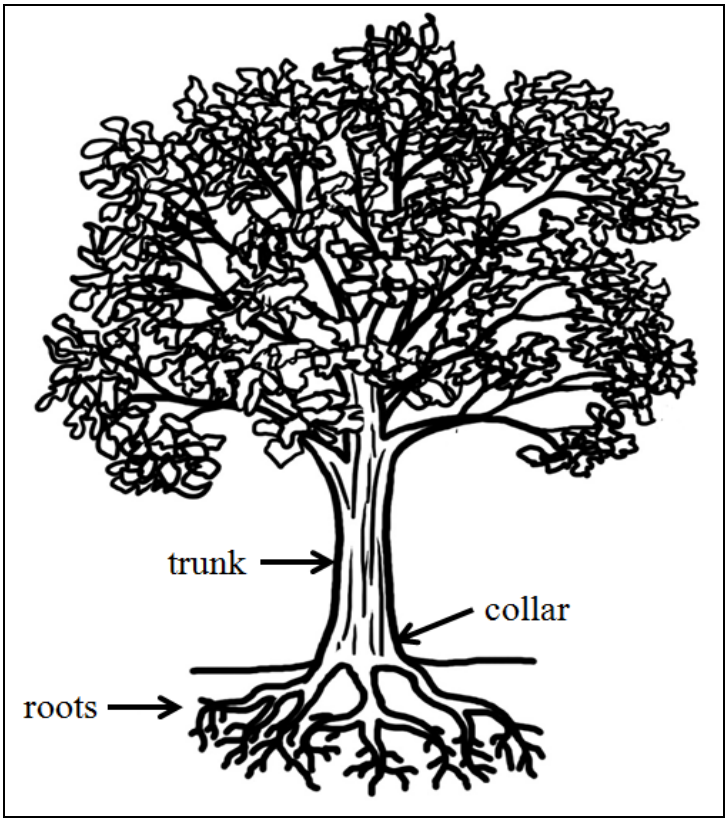
j) Provide supplementary watering to all trees through dry periods during and after the construction process.

Example of TPZ Preparation

Example of TPZ Preparation

If the TPZ is less than 3m, the Contractor shall also provide a 3m radius clearance from the trees (measured from the tree trunk) to the works.

If excavation works are done, they must be kept at least 2m away from the tree collar (see diagram below). Large roots (more than 200mm in circumference) encountered during the excavation should not be severed.



5 GROUND PREPARATION FOR PLANTINGS / REINSTATEMENT WORKS

The Contractor shall use only approved soil mix (3:2:1 volume of loamy soil, compost and washed sand respectively) for all planting works. It cannot be mixed with excavated soil; and all excavated materials must be disposed from the work site at the end of each working day.

The Contractor is not allowed to prepare soil mix on site.

The Contractor shall ensure that the receiving hole / bed is free from water logging and that all water has proper percolation with a reasonable flow rate.

The Contractor shall backfill with approved soil mix to a depth 0.15m for groundcovers, 0.6m for all on-grade shrubs and flowerbeds; and 1m deep for all on-grade trees / palms.

6 CLEANING UP UPON COMPLETION

The Contractor shall upon completion of works, remove all surplus materials from site and reinstate all disturbed work areas in a neat and tidy condition, to the satisfaction of CAG Horticulture.

7 REPLACEMENTS OF DAMAGED PLANTS

The Contractor shall replace any plants damaged during their course of work with good quality plants of similar size. The plant shall be healthy, vigorous, well established with good form, and free from pest and diseases. All replacement plants shall be approved by CAG Horticulture.

8 IRRIGATION SYSTEM

Irrigation lines, solenoid valves and / or water sources affected by the Contractor's work must be reinstated upon completion and must be running properly before handover to CAG Horticulture.

9 OTHER REQUIREMENTS

The Contractor shall provide any other materials that CAG Horticulture may deem required for the above works e.g., planting medium, hormones, seeds, chemicals, water retention gel, etc. as and when directed.

The Contractor will have to maintain the plants after the transplanting / planting works for 4 to 8 weeks or until established. A site inspection will have to be conducted before handing over the plants for maintenance. The Contractor will have to replace, at his own cost, plants that are dead during the course of the transplanting / planting works with the same species, sizes, girth etc. within a specified time to be decided by CAG Horticulture.

Attachment A26

SKYTRAIN PERMIT-TO- WORK (PTW) APPLICATION REQUIREMENTS

1. The Changi Airport Skytrain is an Automated People Mover (APM) System that connects Terminals 1, 2 and 3 in both the public and transit areas.

2. The APM System consists of the workshops, equipment rooms, guideways and Skytrain cars.

3. The contractor shall apply for a Skytrain Permit-To-Work (PTW) for works where:

   a. Work activities are on Skytrain guideway, within 6 metres of Skytrain guideway structure, maintenance/station platforms or inside Skytrain maintenance areas/workshops/equipment rooms;

   b. Work activities are within Skytrain car;

   c. Cranes, excavators, piling, scaffold, permanent/temporary structure and other heavy equipment operates above, below and within 6 metres of Skytrain guideway structure. The Contractor shall conduct a collapse zone analysis of cranes, excavators, piling, scaffold, permanent/temporary structure and other heavy equipment which an item or equipment might fall onto Skytrain guideway structure.

4. No work is allowed without any approved PTW. Access to the Skytrain areas is strictly prohibited due to safety reason and escort will be required. All costs incurred for the escort (Skytrain contractor or APO) will have to be borne by the Contractor.

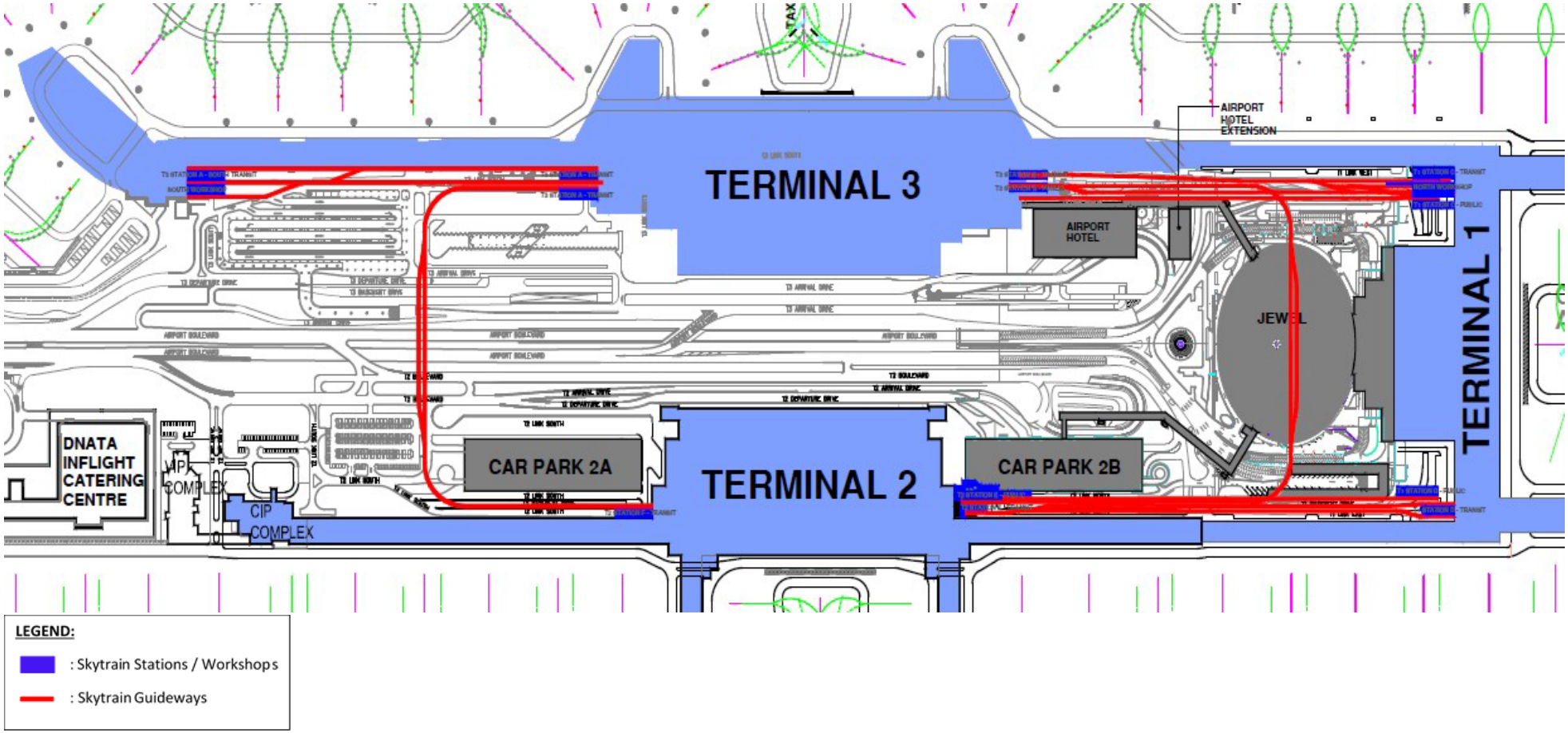
5. The application of Skytrain PTW shall be submitted online at least 3 days prior to the commencement of works with the support of the respective CAG Officer-In-Charge. The Contract shall submit the Risk Assessment, Method of Statement and collapse zone analysis, if any, when applying for the PTW. The approved work permit shall be clearly displayed on site at all times.

6. The Contractor shall seek clarification with CAG project officer or CAG Engineering Skytrain maintenance team if they are not sure of the above requirements.

7. Please refer to **Attachment A26-1** for the Skytrain Guideway Layout.

Attachment A26-1

SKYTRAIN GUIDEWAY LAYOUT



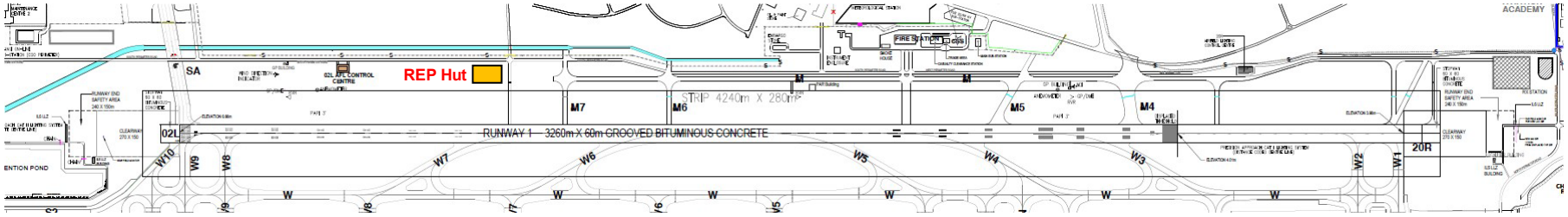
FORM A: CONTRACTOR CHECKLIST FOR WORKS REPORTING TO REP (to be completed by Contractor's

Company: _____ **Purpose:** _____

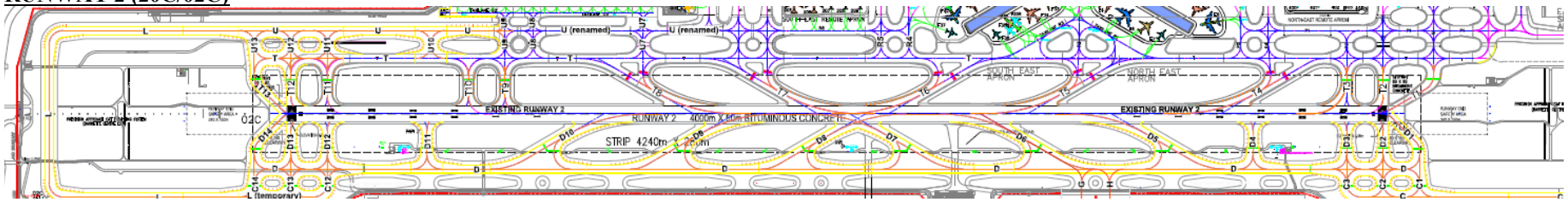
Runway Closure: * Runway 1 / 2 **Date:** _____ **Time of Entering:** _____ **hrs** **Expected Time of Exit:** _____ **hrs**

Contractor to mark out work area:

RUNWAY 1 (20R/02L)



RUNWAY 2 (20C/02C)



Briefly describe type of works:

FORM A: CONTRACTOR CHECKLIST FOR WORKS REPORTING TO REP (to be completed by Contractor's Supervisor)

SUPERVISOR TO ENSURE:

Procedures/ actions of the runway closure:	**(Please circle)**
1. All workers are required to be in proper PPE (with working condition safety vest & safety boots)	YES / NO
2. Smoking & eating is prohibited inside the runway. Do not throw anything inside the runway. Please ensure to clear any FODs found around your working area.	YES / NO
3. To exit or enter runway via REP only (unless work area is within CSA)	YES / NO
4. All workers, vehicles & machinery must sign-in before entering runway and sign-out after exiting runway with no intention to return (FORM A & C).	YES / NO
5. Supervisor must be accountable for all work parties entering and exiting the runway, if any personnel/vehicle/machinery missing, to report to REP Duty Officer immediately.	YES / NO
6. All workers shall look out for orange cones, red & white marker boards and do not go past them.	YES / NO
7. For drivers, please be advised: - You must have an ADP to drive in the airside. If you do not have, you should be escorted at all times. - No speeding on the runway, speed limit at all times is 30km/hr only. - Vehicle must have the latest aerodrome map. - All vehicles yellow flashing lights must be on at all times. - You must collect the vehicle number tags and display them at all times, and to surrender it if you have no intention to return. - When driving inside runway, you must watch out for workers, work areas and give way to emergency vehicles.	YES / NO
8. Action by contractor driver/worker, if unsure of location/ lost (Call REP Duty Officer for assistance)	YES / NO
9. Remind attendees / drivers of Technician doing AFL cleaning and tightening of light fitting and workers carrying out repainting of marking at the runway centre line.	YES / NO
10. Works to pack up 1 hour and report back at REP 30 minutes before runway opening. To call REP Duty Officer if face with any difficulties.	YES / NO
11. Checks on work area for FOD prior to leaving work area at the end of Works	YES / NO
12. All workers are aware of aircraft crossing on closed Runway (if any) and to look out and give way to aircraft	YES / NO / NA
13. Procedures for Emergency runway opening (Supervisors to receive phone call, all work parties shall pack up and leave work site immediately as runway must open **within 30 mins**)	YES / NO

**** DECLARATION BY SUPERVISOR:**

I have attended the runway safety briefing. I am aware of the above procedures/actions of the runway closure and I have briefed the work parties who do not understand English, in their native language.

Name of Supervisor:_____

Contact No.:_____**(This number will be contacted in the event of runway emergency opening)**

Signature of Supervisor

_____

FORM A: CONTRACTOR CHECKLIST FOR WORKS REPORTING TO REP (to be completed by Contractor's Supervisor)

Company:

Call Sign	Vehicle / Equipment Type	Vehicle Reg Plate	*To show & tick by REP Officer*			Tag Number	Pax per vehicle including driver	Driver's Name	Driver's HP Number	Time In	Time Out	If vehicle on TEP, indicate Escort Driver Name & HP Number
			Valid ADP?	Latest map?	Oscillating Lights?							
					TOTAL PAX:							

FORM A: CONTRACTOR CHECKLIST FOR WORKS REPORTING TO REP (to be completed by Contractor's Supervisor)

Company:

Call Sign	Vehicle / Equipment Type	Vehicle Reg Plate	*To show & tick by REP Officer*			Tag Number	Pax per vehicle including driver	Driver's Name	Driver's HP Number	Tim e In	Time Out	If vehicle on TEP, indicate Escort Driver Name & HP Number
			Valid ADP?	Latest map?	Oscillating Lights?							
					TOTAL PAX:							

Attachment A28

FORM C: SAFETY MEETING LOG

(To be completed by Contractor's Supervisor and submitted to REP Officer before entering the closed Runway)

Name of Organisation/ Contractor: _____

Date: _____

Form completed & verified by: _____

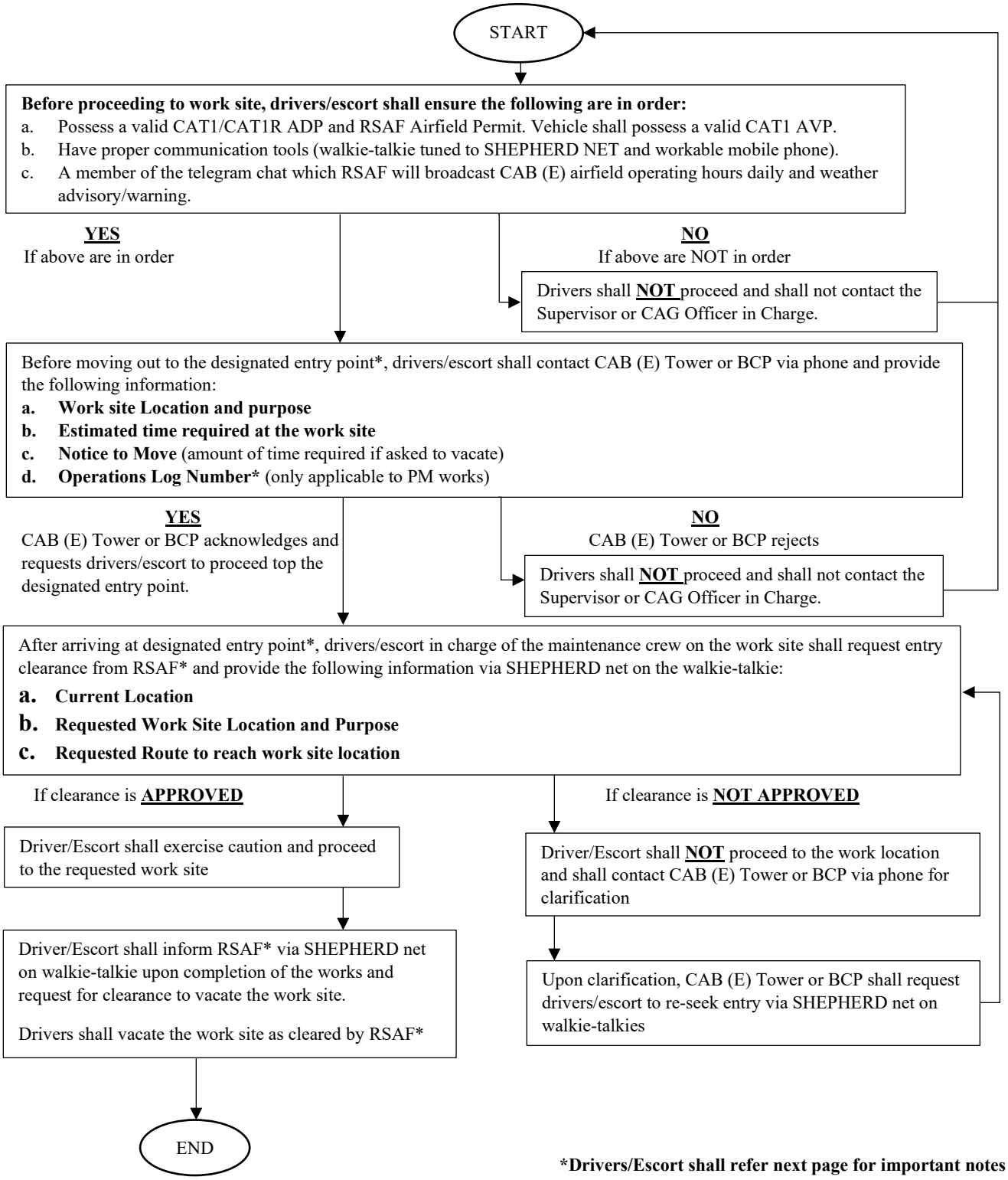
All to note:

- ✓ All work parties entering runway are to fill up table below
- ✓ All work parties must have attended and understood the Runway Safety Briefing (Supervisor to declare in Form A)
- ✓ Supervisors are to also brief your workers in their Native language if they have difficulties understanding English.
- ✓ Full compliance with all safety rules and regulations stipulated within the airfield.

S/N	Full Name	Company *(if different from top)*	ADP Holder? (Y/N)	Time In	Sign In	Briefed on Runway Safety? (Y/N)	Time Out	Sign Out	Remarks

Attachment 29

For all drivers/escort entering TWY A/B/J/K under RSAF control for Preventive Maintenance/Ad-hoc Works



***Drivers/Escort shall refer next page for important notes**

Important Notes

1. Communication to RSAF on SHEPHERD Net* as
   a. **SHEPHERD** when CAB (E) airfield is **in operation**
   b. **WARLORD** when CAB (E) airfield is **not in operation**

   *Note: WARLORD will also control using SHEPHERD net when CAB (E) airfield is not in operation. All movement will always be controlled on SHEPHERD net.

2. All preventive maintenance works shall be cleared at **RSAF Operation Logs** which is held once a month.

3. RSAF important numbers:
   a. BCP (WARLORD): 6586 4033
   b. CAB (E) Tower (LOG CELL): 6424 5668 (Pri)/ 5666 (Sec)
   c. CAB (E) Tower (SHEPHERD): 6424 5656

4. Designated Entry Points (see page 3 for map overview)

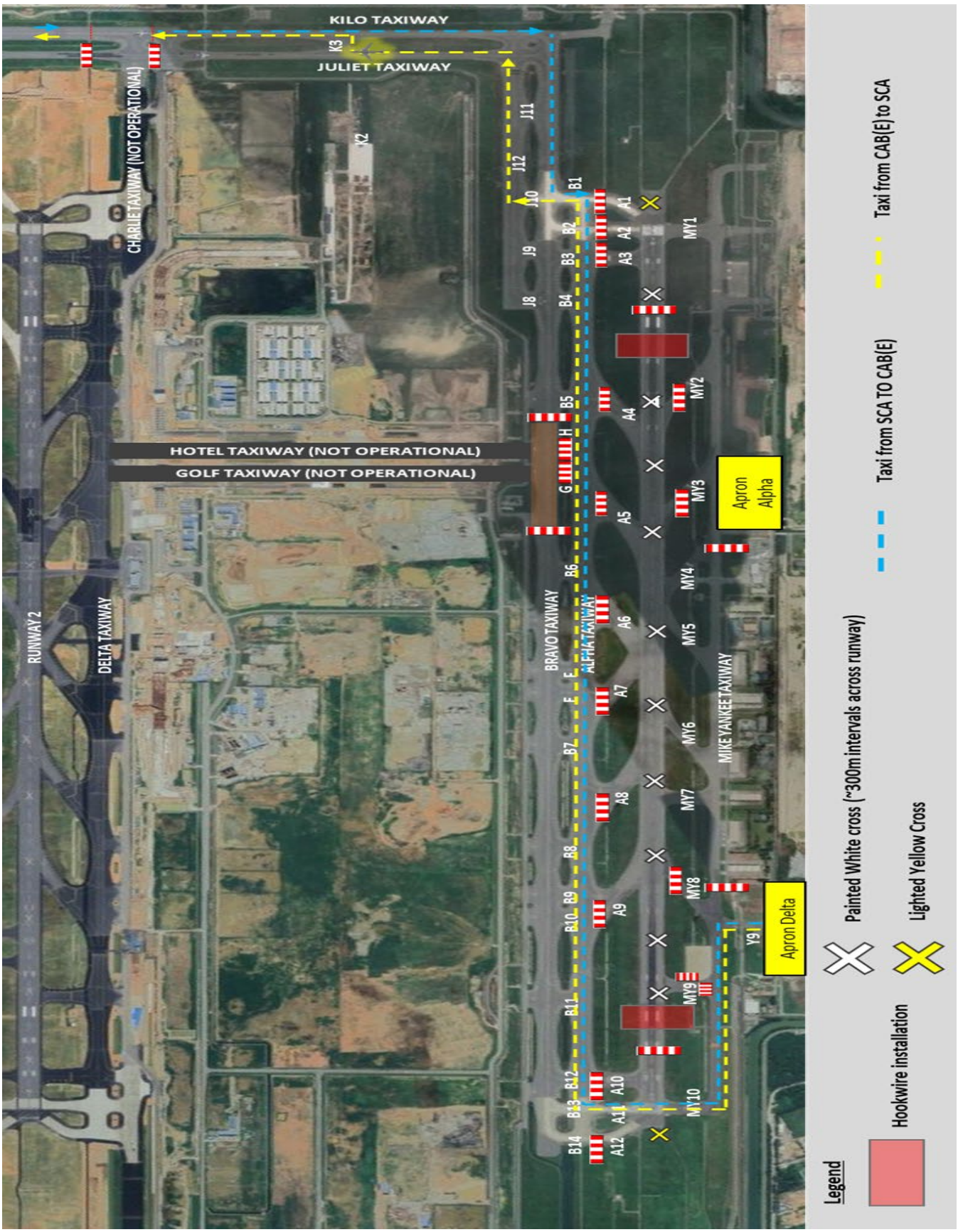
Entry Point	Nomenclature R/T on walkie-talkie
1a	KILO crossing
1b	JULIET crossing
2	REP Hut
3	Southern Perimeter Road
4	Barrier 3

Note: Performing a direct J/K crossing, WITHOUT moving East/West onto the Taxiway from JULIET crossing to KILO crossing and vice versa will follow today's seen-and-be-seen modality.

5. Example for R/T to be used on walkie-talkie:

Template R/T for movement request: (Control Agency), (Your callsign), at (Entry Point), request to proceed to (Location) via (Requested Route) (Provide intention if applicable)

Agency	Sample R/T
Work Party	"SHEPHERD/WARLORD, ROVER__ at KILO Crossing. Request to proceed to taxiway BRAVO ONE via JUILET, JULIET 12, JUILET 10 for pavement inspection."
SHEPHERD/WARLORD	"ROVER __, SHEPHERD/WARLORD. KILO Crossing, proceed to BRAVO ONE via JUILET, JUILET 12, JUILET 10."
Work Party	"SHEPHERD/WARLORD, ROVER __, KILO Crossing, proceeding to BRAVO ONE via JUILET, JUILET 12, JUILET 10."


KILO TAXIWAY
JULIET TAXIWAY
CHARLIE TAXIWAY (NOT OPERATIONAL)
HOTEL TAXIWAY (NOT OPERATIONAL)
GOLF TAXIWAY (NOT OPERATIONAL)
RUNWAY 2
DELTA TAXIWAY
BRAVO TAXIWAY
ALPHA TAXIWAY
MIKE YANKEE TAXIWAY
Apron Alpha
Apron Delta
Legend
Hookwire installation
Painted White cross (~300m intervals across runway)
Lighted Yellow Cross
Taxi from SCA TO CAB(E)
Taxi from CAB(E) to SCA