



Changi Airport Landside Roadway Manual

| Version | Summary of Changes | Party |
|---------------|---|---|
| 18 Oct 17 | <ul style="list-style-type: none"> Reorganised sections of the Landside Roadway Manual | Tan Yin Yun |
| 31 Aug 18 | <ul style="list-style-type: none"> Update SOPs to include new application procedures on OneCalendar portal Update Section 2.3 to include One Map as means of checking land ownership Update Section 3 to 6 with revised document submission requirements Update Section 7 to include new reporting procedures New Section 9 on standards on how to submit proper documents Annex A: Revamp of CAG Project Officer's Checklist with clarity in requirements in Section 9 | Tan Yin Yun Meredith Koh |
| 10 Dec 2018 | <ul style="list-style-type: none"> Update Section 2.1 with new SOP: Road works on roadways under CAG's jurisdiction and up to 2km from South Cross 2 aerobridge on roadways under Singapore's Land Transport Authority (LTA) need to apply for the Landside Road Work Permit Update Section 3.7.2: Permissible lane closure hours Update Section 4.3: More detailed requirements for Construction vehicles Update Section 5: Height Limit Works Requirements Update Section 7: Revised guidelines post Airport Boulevard drain incident in September 2018 Update Section 9: Application guidance, with templates for Landside Road Work Permit in Annexes | Meredith Koh Tan Yin Yun |
| 20 March 2020 | <ul style="list-style-type: none"> Update Section 2.2, 7.3.1 and Section 9 with 2 new permit types Update Section 2.3 with new permit application process for Urgent works and Regular Maintenance work permit New section 3.6.1, 3.6.2, 3.6.3 on standards for road markings and excavation of the roadway Update section 6.5 and 6.7 with updated horticultural requirements | Meredith Koh Ling Hua Choo Vasanthan Santhirasegaram |
| May 2020 | <ul style="list-style-type: none"> Update Section 2.3 and Section 10 with new permit application process on OneCalendar New Section 7 on External Low Tension System Requirements for Relocation/ Diversion works. The sections that followed were thus renumbered Update to Annex A – CAG Project Officer Checklist on horticulture requirements | Meredith Koh Liew Keen Hao Atmas Shue |

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1. INTRODUCTION TO THE LANDSIDE ROADWAY MANUAL

1.1 SCOPE

This manual sets out the standards and procedures for the planning of *landside* roadway activities around Changi Airport. These include, but are not limited to, road works & road-related facilities, road closures, oversized heavy vehicle movements and goods delivery & construction vehicle movements. This manual also explains the steps to apply for Landside Road Work Permits prior to activity commencement.

1.2 OBJECTIVES

The objectives of this document are to:

- a) Prescribe the approval process for Landside Road Work Permits;
- b) Set out the guidelines and regulations for landside roadway activities; and
- c) Educate CAG Project Officers (POs) and Contractors on road safety and traffic control.

1.3 ABOUT THE MANUAL AND THE PERMIT

The Landside Roadway Manual plays an important role in ensuring all CAG POs are aligned in upholding road safety around the Airport via standardized guidelines. This indirectly helps minimize any operational disruptions in the Airport (e.g. passengers missing flight due to accident at work site).

Landside Road Work Permits are instruments that ensure adherence to the guidelines. Submitted to the Roadway Unit (RWU) for approval, these applications serve two purposes: 1. Ensure compliance to guidelines; 2. Provide the RWU visibility of landside road works around the Airport for coordination / de-conflicting of works.

Please note that the above documents are governed by the Landside Roadway Unit (RWU).

1.4 ABOUT THE ROADWAY UNIT (RWU)

The RWU was formed in 2015 with the objective of managing Changi Airport's landside roadway activities. This need arose due to the increasing amount of construction work being done in tandem with Changi's development (e.g. Jewel, T4, T5).

The RWU comprises officers from various related portfolios, each contributing their domain expertise to ensure all aspects of the roadway are considered:

Roadway Unit group email: roadway.unit@changiairport.com

1.5 DEFINITIONS

The following definitions shall apply throughout this document, unless the context otherwise requires:

- “Airport” refers to Changi Airport;
- “Contractor” refers to the person appointed to carry out the project on-site;
- “Emergency works” refer to works that must be carried out immediately in order to end or prevent any circumstances likely to cause serious danger to any person or property;
- “Project Officer” or “PO” refers to the CAG officer in-charge of the assignment;
- “Project Manager” or “PM” refers to the main contractor’s point-of-contact.

1.6 USEFUL REFERENCES

- a) Street Works Act (obtain from: <http://statutes.agc.gov.sg>)
- b) LTA Code of Practice for Works on Public Streets
- c) LTA Code of Practice for Traffic Control at Work Zone
- d) LTA Standard Details of Road Elements

The LTA documents can be obtained from their website:

<https://www.lta.gov.sg/content/ltaweb/en/industry-matters/development-and-building-and-construction-and-utility-works/street-proposals.html>

2. APPLYING FOR LANDSIDE ROAD WORK PERMITS

2.1 WHO NEEDS TO APPLY?

In general, activities that disrupt road traffic flow along roadways under CAG's jurisdiction and up to 2km from South Cross 2 aerobridge on roadways under Singapore's Land Transport Authority (LTA) need to apply for the Landside Road Work Permit. This is to create visibility of road works around airport to our operations teams. Some examples are: road works, lane closures, excavations, tree pruning, landscaping works, oversized vehicle deliveries and heavy vehicle movements.

2.2 TYPES OF PERMITS

There are 3 different types of Landside Road Work Permits

1. Ad Hoc Works Permit
2. Urgent Works Permit
3. Regular Maintenance Works Permit

Ad Hoc Works Permit

This permit is meant for works that meet the following criteria

- One-off improvements or rectifications
- Heavy vehicle movement (e.g. PLB transportation)

And this criteria: work start date is > 5 working days away from the date of application.

Urgent Works Permit

This permit is meant for works that meet **any of the** following criteria

- Rectification of safety issues (e.g. cracked road)
- Rectification in preparation for last-minute special event (e.g. Trump-Kim summit works)
- Rectification of sensitive issues which may damage Changi Airport's reputation

And this criteria: work start date is < 5 working days away from the date of application.

Note: Works that become urgent due to improper project planning will not be entertained.

Regular Maintenance Works Permit

This permit is meant for works that meet **all** of the following criteria

- Able to complete within 1000H to 1600H or 0100H to 0500H
- Low risk and frequent in nature (e.g. sweeping, watering plants)
- Vehicle is stationary for < 20min during the works (e.g. vehicle moving on a route with location changing at short duration)
- Vehicle can park and go upon request
- Project officer has engaged the roadway unit for the creation of a specific Regular Maintenance Work permit type for the works.

- The permit owner is responsible for approving works within the pre-determined boundaries of the regular maintenance permit

2.3 OVERVIEW OF PROCESS

The following diagrams outline the permit application processes.

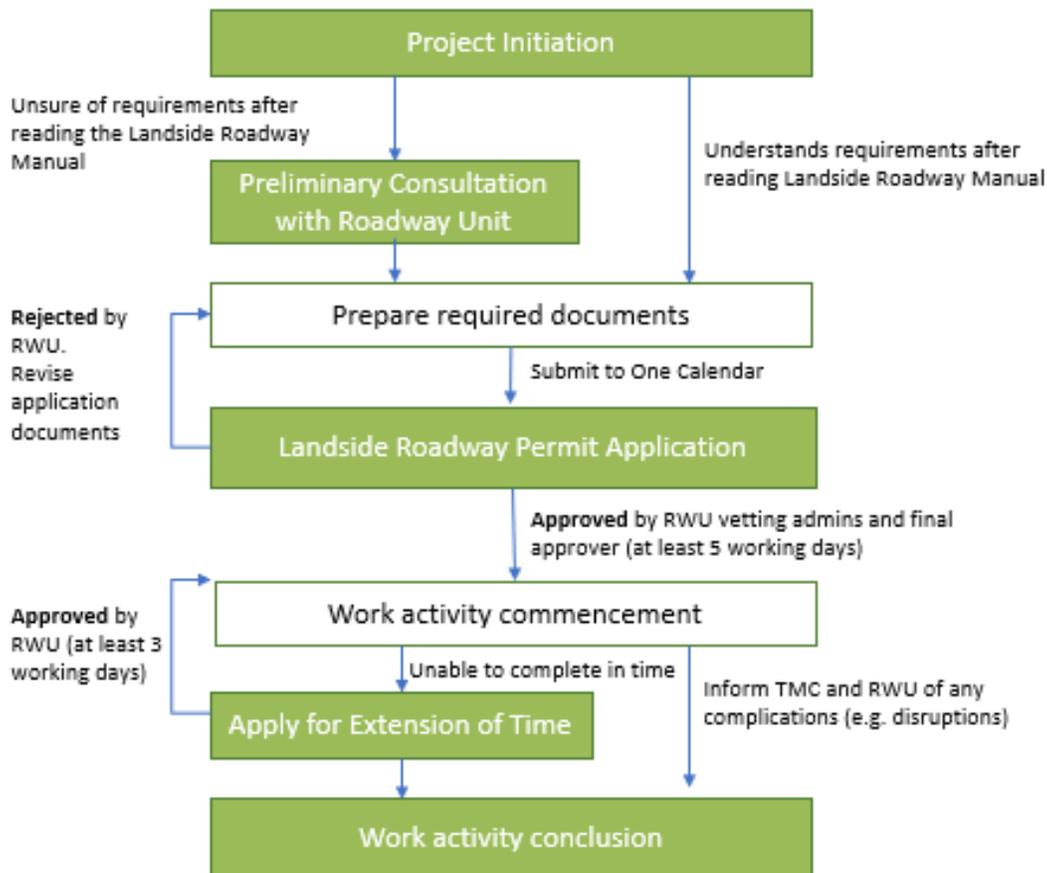
OneCalendar Portal

Contractors are to apply for the permit using the OneCalendar portal (<https://oc.changiairport.com>). Contractors are to abide by the requirements stated in the landside roadway manual when applying for permits. Incomplete and inaccurate permit applications will be rejected.

The user guide for Contractors can be found at this link: <https://cag-one-calendar.s3.amazonaws.com/user-guide/contractor.html>.

If unsure, please contact the CAG project officer or email RWU.

Ad Hoc Works Permit



Project Initiation: Contractors and POs should first read this manual to understand the requirements for the project and ensure compliance to the requirements stated in this manual.

Preliminary Consultation: If a Contractor or PO is unsure of the requirements put forth in the manual, he/she should approach the RWU via roadway.unit@changiairport.com for a preliminary consultation. Contractors and POs should note that preliminary consultation with the RWU does not amount to approval of the proposed works.

Preliminary Fact Finding: All Contractors are responsible for doing a traffic situation survey (site recce) which includes traffic count survey and analysis, complete with pictures and/or videos of the proposed work site. The rationale is to ensure that the Contractor gathers the needed information to make an assessment on the operational impact of the works. Traffic Impact Assessments (TIAs) done from the data collected from survey must be reasonable and accepted by the Vetting Admins and Final Approvers (e.g. if vehicles on the road are normally travelling at 70km/h, the TIA should use this as an assumption in calculations and not 50km/h or otherwise).

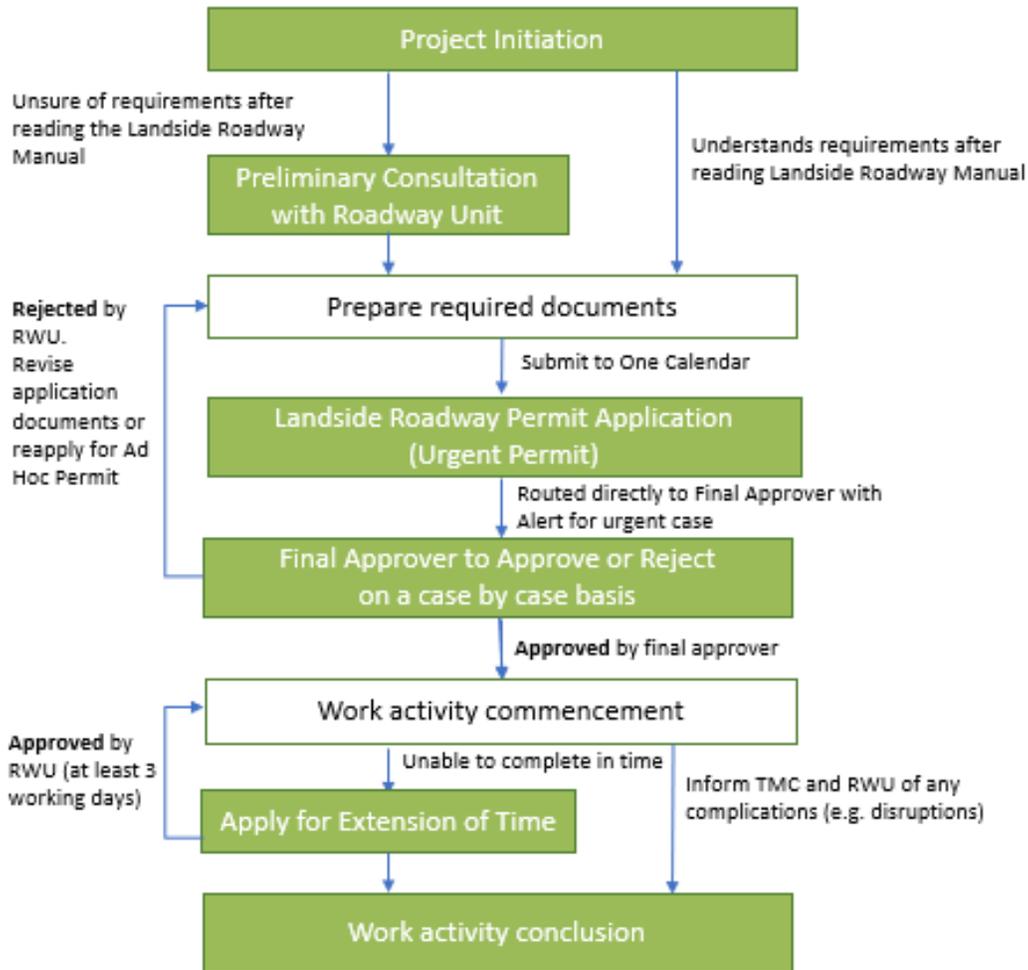
Preparation of Documents & Notification: Once a PO and his/her Contractor are clear on the requirements of their landside roadway activity, they shall jointly prepare the required documents and notification (if any). It is the onus of the PO to vet through the documents and ensure Contractor's compliance before submitting them to the RWU. Refer to **Section 10 on Application Submission Guidelines** for the permit.

Landside Road Work Permit Application: Contractors are to apply for the landside roadway permit via OneCalendar. Contractors are to log in or register for an account and will have to provide a valid email addresses during registration to receive email notifications from OneCalendar. Contractors will need to take and pass FAB (Fire Alarm Briefing) prior to submitting any work permit request. The FAB will be valid for one (1) month and will need to retake the FAB once it expires. Contractors may approach the OneCalendar Support Team via support@weeswares.com for any issues encountered or to seek advice on the functionalities on OneCalendar. Should there be concerns raised during the application approval process, POs and their Contractors are to revise the application in line with the comments and resubmit. All comments given by the RWU constitute part of the requirements to be adhered to. Please note that without approval from the Roadway Unit, the requested roadway activities must not commence.

Work Activity Commencement & Conclusion: Upon approval, a work permit will be generated. The Contractor can commence work, and has to get approval from the Terminal Management Centre (i.e. TMC) prior to the commencement, and to notify TMC after completion of works. Should TMC make a ground assessment that works should not be carried out due to various reasons, including but not limited to heavy traffic, the requested roadway activities must not commence. The PO and the Contractor should also keep the TMC and RWU informed of any complications or deviations of the work activity as declared in the "Work Sequence and Contingency Plan" submitted.

Should there be a need to extend the period of work, the contractor is to apply for an Extension of Time via OneCalendar.

Urgent Works Permit



Preparation of Documents & Notification: Even though a work is urgent, some key documents are still required for basic understanding of operational impact and for visibility of works on the roadway. Refer to **Section 10** on **Application Submission Guidelines** for the permit.

Landside Road Work Permit Application: Contractors are to apply for the permit using OneCalendar. The work will be fast-tracked to the Final Approver.

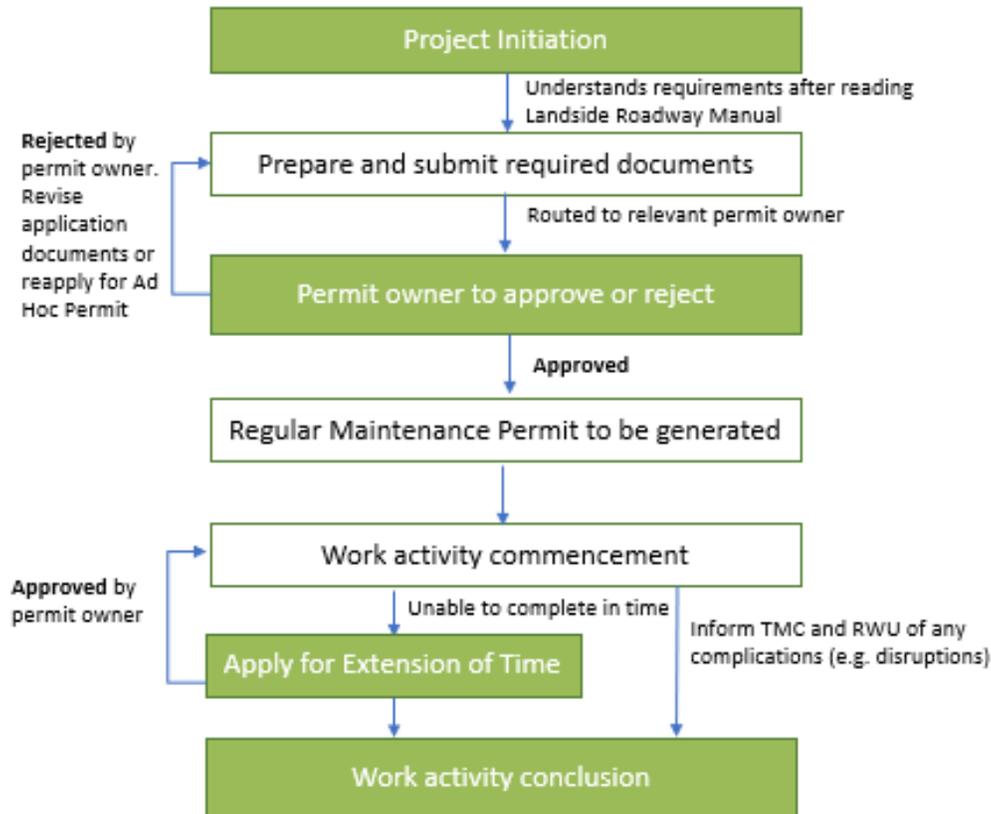
Work Activity Commencement & Conclusion: Upon approval, a work permit will be generated. The Contractor can commence work, and has to seek approval from Terminal Management Centre (TMC) prior to the commencement, and after completion of works. Should TMC make a ground assessment that works should not be carried out due to various reasons, including but not limited to heavy traffic, the requested roadway activities must not commence. The PO and the Contractor should also keep the TMC and RWU informed of any complications or deviations of the work activity as declared in the “Work Sequence and Contingency Plan” submitted.

Should there be a need to extend the period of work, the contractor is to apply for an Extension of Time via OneCalendar.

Regular Maintenance Works Permit

Regular maintenance works permit would be a one-time application on OneCalendar that is valid up to 6 months.

Application for Regular Maintenance Permit



Preparation of Documents & Notification: Refer to **Section 10** on **Application Submission Guidelines** for the permit.

Landside Road Work Permit Application: Contractors are to apply for the Regular Maintenance Work permit using OneCalendar. A separate permit will be required for each type of works (eg. 1 permit for tree pruning and 1 permit for plant watering).

Work Activity Commencement & Conclusion: Upon approval, a work permit will be generated. Whenever the Contractor needs to commence works, the Contractor is to request for permission to do works from TMC stating the permit number, with information on the route and location of works. However, the allowable working hours can be superseded by road work blackout periods (e.g. ASEAN Summit)

If traffic congestion results due to the regular maintenance works / there is deviation to the works, the Contractor is to stop work and inform RWU (office hours) and/or TMC.

Note: RWU reserves the right to revoke the regular maintenance work permit should there be any improper use of the permit

2.4 RELATED WORK PERMITS

CAG Internal Work Permits

Should there be trial holes, excavation works and / or piling works as part of the landside roadway activity, the CAG PO is to ensure that their Contractor gets the necessary permits related to these activities before submitting an application to RWU via OneCalendar. Please refer to the Airport Operations Safety manual (AOS) for the application forms (Attachment 7-1, Attachment 7-2, Form A, B, C).

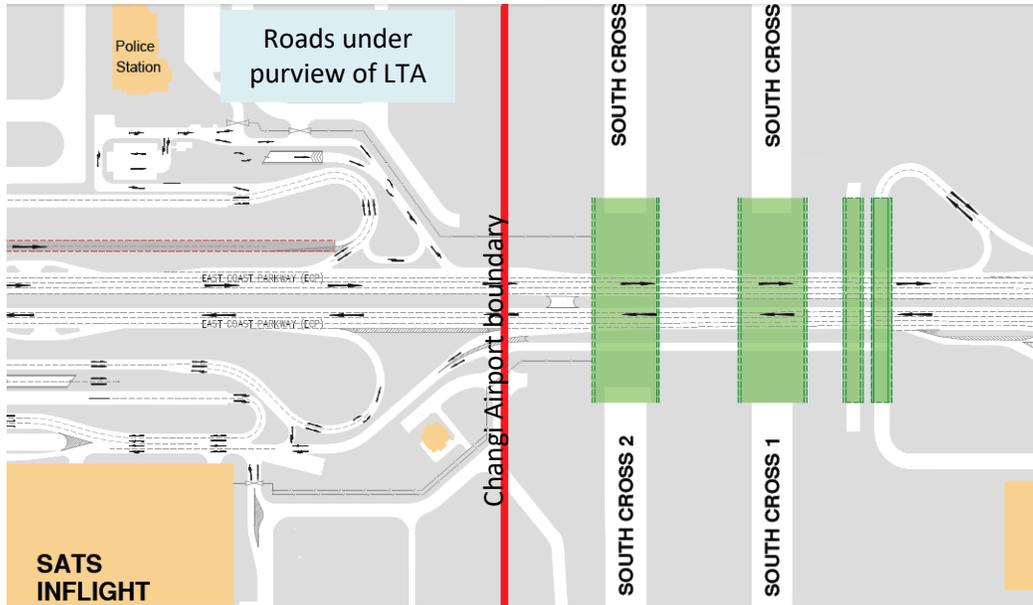
The Contractor must have obtained approval for these permits before the RWU approves the Landside Road Work Permit. These should be appended to the Landside Road Work Permit application. The CAG PO is to provide the Contractor with the latest version of the AOS from EDG's Safety Management Team / downloaded from Newforma.

LTA Permission to Work

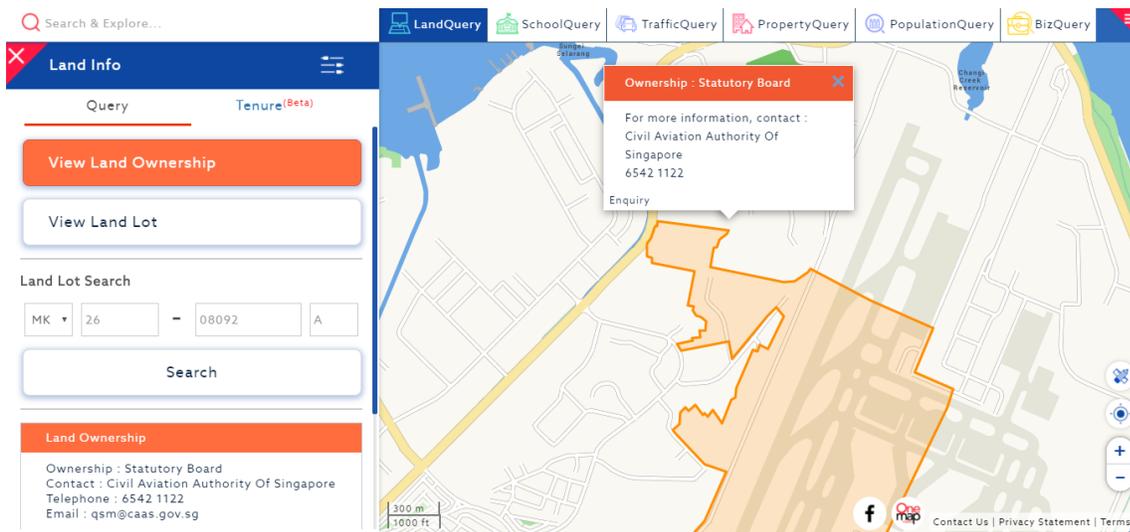
If works are being done on the East Coast Parkway (ECP) before South Cross 2 aerobridge, these areas belong to Singapore's Land Transport Authority (LTA) and fall outside the purview of CAG and the RWU. Please obtain the permission from LTA via LTA PROMPT: <https://prompt.lta.gov.sg/WebUIPWAS/login.aspx>. LTA has 3 types of permits: 1. Permit to Carry Out Works; 2. Notification of Road Closure; 3. Permit for Vehicle Movement.

Nonetheless, all works on the roadways that are conducted from the "Welcome to Changi" Sign/ South Cross on Airport Boulevard to PIE exit to Upp Changi Ave and ECP exit 2A (on both City and Airport bound), which is approximately 2km from the boundary, **should still adhere to the allowable working hours on Airport Boulevard.** The allowable working hours are from 0000h to 0500h and 1000h to 1600h. These allowable working hours are subject to change should there be a change in roadway conditions.

In addition: Approval for works within this zone should also be sought from RWU before commencement because even though it is LTA land, it is the same road that leads to Changi Airport and should be treated with equivalent standards of approval. (CAG POs are to apply for Ad Hoc Works Permit)



For exact details on the “areas declared as Changi Airport”, please refer to this link: [https://www.caas.gov.sg/docs/default-source/pdf/civil-aviation-authority-of-singapore-\(changai-airport\)-notification-2009.pdf](https://www.caas.gov.sg/docs/default-source/pdf/civil-aviation-authority-of-singapore-(changai-airport)-notification-2009.pdf). Alternatively, POs can use One Map (www.onemap.sg) to query land ownership before embarking on their projects.



SPF Road Closure Permit

For event organizers, if the road needs to be closed for the event (e.g. Chingay, OCBC Cycle), a road closure permit is to be obtained from SPF. Please read <http://www.police.gov.sg/e-services/apply/licenses-and-permits/road-closure-permit> for more information. This is not required if the event is on CAG land.

3. GENERAL STANDARDS & REGULATIONS FOR LANDSIDE ROADWAY ACTIVITIES

3.1 GENERAL REQUIREMENTS

- a) The Contractor must obtain an approved Landside Road Work Permit from the RWU before the commencement of any landside roadway activities. These are defined as any work located at landside that may cause operational impact and road congestion. Some examples are: road works, lane closures, excavations, tree pruning / planting, landscaping works, oversized vehicle deliveries and heavy vehicle movements.
- b) All works shall comply with prevailing statutory requirements stated in this manual and in LTA's Code of Practice for Traffic Control at Work Zone.
- c) The PO shall ensure that a site inspection is conducted with the Contractor to verify the condition of the site before the commencement of any work. Any discrepancies or complications must be highlighted to the RWU.
- d) The Contractor shall inform the RWU and TMC of the commencement and completion dates of the proposed works.
- e) For any unforeseen site issues likely to affect operations of the airport (e.g. last minute extension of road works duration), the Contractor is to inform the CAG PO, who will then obtain approval from RWU or TMC.
- f) After the completion of the work, the Contractor shall be responsible for maintaining the new and existing installation in proper working conditions and keeping all drawings updated at all times.
- g) Work site must be kept tidy, and all debris must be removed from the Airport by the Contractor daily.
- h) If a portion of the road works are on LTA's roads (but near Changi Airport), the Contractor is required to forward the Written Permission from LTA before the actual work commences. The PO and Contractor are also required to submit an application for Ad Hoc Work Permit on OneCalendar for the works within the stipulated zone from the "Welcome to Changi" Sign/ South Cross on Airport Boulevard to PIE exit to Upp Changi Ave and ECP exit 2A (on both City and Airport bound) which is approximately 2km from the boundary.

3.2 WORKPLACE SAFETY REQUIREMENTS

- a) The Contractor shall, at its own cost and expense, comply with all laws and statutes now or hereafter in force including, but not limited to, the Workplace & Safety Health Act (Cap 354A) and any other orders, rules, regulations and notices thereunder. Without prejudice to the generality of this Clause, the Contractor shall comply at all times with such procedures and

measures and any rules, regulations, notices, orders or directions which CAG may make, review and update from time to time relating to the work.

- b) The Contractor shall, at its own cost and expense, ensure that its employees and all other persons at the site take all reasonable steps to safeguard their own safety and the safety of other persons who may be affected by their actions or omissions. The Contractor agrees to absolve CAG from liability for and to indemnify and keep indemnified CAG from all and any claims, losses, damages, liabilities, obligations, costs and expenses (including solicitor and client costs) whatsoever arising from any loss, damage or injury caused to CAG or any third party by the Contractor, its employees and/or such other persons in this regard.
- c) The Contractor shall, at its own cost and expense, ensure that the site and all machinery, equipment, plants, articles and substances used for work are safe and without risk to the health of workers and any person within the site. The Contractor shall implement risk controls based on risk assessment conducted prior to commencement of work, in accordance with the Workplace & Safety Health (Risk Management) Regulations.

3.3 HOARDING REQUIREMENTS

Works exposed to members of public for long periods of time are required to have hoardings. The requirement to have hoardings will be assessed by RWU.

The work site shall be hoarded up before commencement of works. All works shall be confined within the hoarded area. The hoarding must be certified by a Structural Qualified Person. The material used must be weather-proof and have an even surface. The graphics printed on the surface must also be approved by CAG.

The following documents are to be submitted as Supporting Documents for permit application:

- Hoarding layout plan
- Graphics/artwork of the hoarding
- Details of installation of hoarding, such as the method statement & the road closure schedule (if road closure is required to install the hoarding)

3.4 SAFETY BARRIER REQUIREMENTS

Concrete barriers that are in sight of the main traffic must be painted in black and yellow.

- Straight lines for straight road



- Arrows for road bends



In general, all safety barriers (be it concrete or water barrier) must be in good condition and be of the same size/height. In addition, blinker lights and cones are to be used at critical junctions to give adequate warning to fast-moving vehicles.

3.5 HOUSEKEEPING REQUIREMENTS

The CAG PO and his/her Contractor is to supervise and maintain the cleanliness of the roadway and turf area within and around the vicinity of temporary road access and work site during the entire duration of works.

Immediate remedial actions must be taken to clear any spillage onto the surrounding roadways and turf area resulting from the works, failing which the RWU may clear the spillage and recover all cost incurred from the Contractor.

There shall not be any parking of vehicles or deposition of debris, building materials etc. on the roadways, including the turf area.

Any damage to the road pavement, lane markings, road surface and other road furniture caused by the works shall be made good immediately at the Contractor's expense. The Contractor shall ensure that the work site has been reinstated to its original condition upon completion of the work.

3.6 TRENCHING / EXCAVATION / PILING WORKS

As mentioned in Section 2.3, if the roadway activity involves trenching, excavation and / or piling, the relevant approved permit for the above works must be submitted with the Landside Road Work Permit application to the RWU for information. The requirements stated in Section 3 still apply.

Open trenches, pits and large excavations on non-pavement area shall be hoarded up with appropriate barricades approved by CAG.

Note: For contingency purposes, the Contractor must always have steel plates ready to cover the hole in the event of traffic build-up or extension of works.

3.6.1 GENERAL

The Contractor shall avoid all existing roadways for excavation whenever possible.

3.6.2 REMOVAL OF ROAD MARKING

The contractor shall ensure non-destructive method (e.g. water blasting) is used for the removal of the existing road marking. In the event destructive method (e.g. grinding) is used, the contractor is required to resurface the affected area as per the standard resurfacing procedure and requirements. No painting/blackening over the existing road markings is allowed.

3.6.3 EXCAVATION OF ROADWAY

Reinstatement to roads (if affected)

For reinstatement to roads, all premix/asphalt road to conform to LTA standard and specifications. The edges of premix surface shall be neatly cut with straight edge and the finished level flushed with the existing road surface even if the surface is to be milled-and-patched later on. All backing material should be new and comply to LTA standard. The area for milling and patching shall cover the full width of the affected lane within this area. If the opening cuts across lanes, mill-and-patch shall cover a minimum width of 5 metres across the affected lanes/ road. Affected road markings shall be re-marked/ restored with existing paint used on the current roadways.

Contractor shall be responsible to reinstate defects or undulation etc at the reinstatement of the trench area or road during DLP of 1 year.

Similarly, semi-rigid and concrete road finishing shall be reinstated and shall cover the full width of the affected lane within this area.

3.7 LANE CLOSURE REQUIREMENTS

3.7.1 GENERAL

For works that require partial or total road closures, the Contractor is required to take measures that minimize the impact of road works on traffic flow. These include but are not limited to:

- Using the one-for-one lane replacement method. Contractors are required to open up a new lane for every lane closed for road works. This will ensure that traffic can flow as per normal during the road works period. However, this method can only be used at sites where there is sufficient space for replacement lanes.
- Using the steel decking method. This involves the placing of steel decks over trenches to allow traffic to flow normally across the steel decks.
- Allowing only one traffic lane to be closed when road work is being carried out, unless otherwise approved by the RWU on a case-by-case basis
- Keep any traffic cones within the closed lanes, and not on lane markings
- Executing road works only during permissible lane closure hours (refer to Section 3.7.2)
- Stopping work if the work is found to cause traffic congestion.

Contractors are also required to ensure safety for road users while works are being carried out. Contractors are required to:

- Place signage and traffic cones (according to LTA standards) to provide motorists early warning of the road works ahead
- Engage site supervisors trained in road safety and road works to oversee the works.

If partial or total road closure is required during the course of works, the Contractor is to submit a Traffic Management Plan as part of the Landside Road Work Permit supporting documents.

This plan should highlight the following (this is not exhaustive) on a map / photos:

- Location of work equipment (e.g. lorry crane)
- Extent of road closure (eg. distance for works, safety distance, and number of lanes affected)
- Type of equipment for traffic control (eg. Cones, concrete barriers)
- Placement of traffic control elements (e.g. advanced warning signs, cones, road marshallers)

| S/N | Conditions | Items Required |
|-----|--|---|
| 1 | Works along roadways where the average speed is above 70km/h | The provision of sufficient Truck Mounted Attenuators to be placed at strategic locations to ensure traffic safety |
| 2 | Works that require lane closure | To ensure proper and sufficient placement of cones and advance warning signs, contractors are to adhere to the following guidelines: <ul style="list-style-type: none"> • To ensure that the distance of tapering complies with that of the average speed along the roadway. (eg. If the average speed is 50km/h, 50m of tapering is required) |

| | | |
|--|--|--|
| | | <ul style="list-style-type: none">• To ensure sufficient advance warning signs, including but not limited to:<ol style="list-style-type: none">1. “Caution”, “Works Ahead”, <Drawing of lane closure>2. VMS to be placed upstream for early warning |
|--|--|--|

3.7.2 PERMISSIBLE LANE CLOSURE HOURS

Ad Hoc Works Permit

All Contractors are responsible for doing traffic situation survey (site recce) which includes traffic count survey. The rationale is to ensure that the Contractor gathers the needed information to make an assessment on the operational impact of the works. This is part of the **Preliminary Fact Finding** step in the permit application process.

The results of the traffic situation survey are to be submitted as part of the permit application documents.

In the event of a clash of roadway activities, works must be rescheduled.

The Contractor is to propose the working hours based on the table guideline below. The RWU will then make an assessment and confirm the proposed working hours.

| Location | Non-peak hours |
|--|---|
| Main Airport Boulevard and up to 2km away from South Cross 2 | <ul style="list-style-type: none">• Day works : 1000H to 1600H• Night works : 0000H to 0500H• Works only allowed on weekdays, excluding public holidays |
| All other roads | <ul style="list-style-type: none">• Day works : 1000H to 1600H• Night works : 0000H to 0500H |
| Roads leading to and from Basement | <ul style="list-style-type: none">• Night works : 0100H to 0500H |

4 DRIVING REQUIREMENTS

4.1 CLASSIFICATION OF VEHICLES

- Class 3A Motor cars with unladen weight of 2500 kilograms and below with automatic transmission
- Class 3 a) Motor cars with unladen weight of 2500 kilograms and below
b) Motor tractors with unladen weight of 2500 kilograms and below
- Class 4 a) Load/passenger carrying vehicles with unladen weight exceeding 2500 kilograms and not exceeding 7250 kilograms
b) Motor tractors, mobile passenger steps, skyloaders, etc. with unladen weight exceeding 2500 kilograms and not exceeding 7250 kilograms
- Class 5 Non-load/passenger carrying vehicles with unladen weight exceeding 7250 kilograms
- Class A Passenger Loading Bridges (Aerobridge)
- Class F Forklifts or fork trucks

Heavy vehicles include the following:

- Construction vehicles (Tipper truck, cement trucks, trailers, etc.)
- Oversized vehicles
- Goods delivery vehicles (Class 5 & above)

4.2 GENERAL

Should any of the projects involve heavy vehicle movement, the Contractor is to submit a Landside Road Work Permit application. Before the movement of vehicles into the Airport, the PO and the Contractor must:

- Ensure that the driving route of the vehicles does not violate any height limit restrictions around the airport. (The height limit for roads in Changi Airport can be found in CAG SWIFT portal)
- Check the loading of structure(s) (e.g. bridges, flyovers) that the vehicle may be driving on as part of the driving route and ensure that the vehicle's unladen weight does not exceed the maximum loading of the structure(s).
- Ensure that a valid swept path analysis has been done for long vehicles to ensure that the vehicle is able to manoeuvre through the proposed route.
- Ensure that all drivers (from the Contractor or its sub-Contractors) coming to the airport are properly briefed on the planned delivery routes at the Airport beforehand.
- If entering the basement, the CAG PO has to submit the Basement Access form (<http://intranet.changiairport.com/web/avsec/>)

4.3 REQUIREMENTS FOR CONSTRUCTION VEHICLES

If construction vehicles are involved, applicants shall submit the following to the RWU as part of Supporting Documents:

Vehicle Details

- License plate
- Vehicle model
- Dimensions: Height x Width x Length
- Description of load

Vehicle Routing

- Illustrate vehicle path on official CAG roadway map
- Swept path of route (if vehicle has to navigate tight turns to get to the site). Applicant to sign on the swept path confirming that vehicle path is feasible and will not hit existing height limits and other roadway infrastructure

Vehicle Schedule (for each vehicle)

- Start time of vehicle movement into Changi Airport
- End time of vehicle movement out of Changi Airport

Vehicle Management Plan (if traffic needs to be stopped)

- Measures that the Contractor will take to minimize roadway disruptions (e.g. traffic controllers deployed)
- POs shall ensure that appropriate traffic control plans are implemented to expedite entrance clearance and directed to specific unloading points within the work site.

4.4 REQUIREMENTS FOR OVERSIZED VEHICLE MOVEMENT

The use of oversized heavy vehicles on the road requires auxiliary police officers as escorts during the vehicle movement:

- Overall vehicle height exceeding 4.5 metres
- Vehicle laden weight of 80,000 kg or more
- Overall vehicle width of 3 metres or more
- Rear overhang of load is more than or equal to 40% of the vehicle length or 1.8 metres, whichever is lesser

If oversized vehicle movements are involved, the Supporting Documents required is the same as those required for Section 4.3.

Note: In addition, Contractors must submit application to LTA via LTA Prompt (one-stop online portal). (Source: Land Transport Authority (LTA) – Administration of Oversized Heavy Vehicle Movement)

4.5 REQUIREMENTS FOR GOODS DELIVERY

Loading / unloading of goods for terminal-related activities is to be done at the basement of the terminal, unless approval is obtained from the Departure (Security) team for loading/unloading at the kerbside. Kerbside approval will only be given for vehicles that cannot enter the basement or for oversized goods that cannot fit into elevators. Drivers of all delivery vehicles assigned to enter the basement loading / unloading bays must check the height limits prior to arrival at the airport. For reference, the height limits are:

| Loading Bay | Height Limit |
|-------------|---|
| Terminal 1 | 3.8 metres |
| Terminal 2 | 3.8 metres |
| Terminal 3 | 3.8 metres 3.6 metres (Crowne Plaza loading bay) |
| Terminal 4 | 3.8 metres |

Drivers must have with them an approved Basement Entry Form. This form can be downloaded from the following link: <http://intranet.changiairport.com/web/avsec/>, and must be approved by the CAG PO with whom the delivery company is liaising with. The form should also be CC-ed to Departure (Security) team for information. When the driver is away from the vehicle, he is to clearly display it on the vehicle windscreen so as to avoid the issuance of a notice of offence.

Delivery vehicles should not be parked at unauthorised bays, and drivers are to abide strictly by the designated routes provided in the following section. If any deviation from the designated routes is required, PO has to submit the planned route to Roadway Unit for approval.

4.6 GUIDELINES FOR COMPLIANCE BY CONTRACTORS & DRIVERS

- a) Drivers must strictly adhere to all traffic rules, speed limits and height limits of the assigned route.
- b) Drivers are not allowed to leave their vehicle unattended with the engine running.
- c) Drivers must not deviate from the route plan.
- d) Contact the site person in-charge for further instruction or rendered assistance for unexpected incidents.
- e) Drivers must ensure goods are properly labeled and secured to their vehicles to prevent the goods from toppling.
- f) Drivers must only conduct their loading and or unloading activities at the Loading Bays
- g) Drivers must not park vehicles in unauthorised parking zones.
- h) Drivers must retain a copy of the road safety brochure in the vehicle when arriving at the airport.
- i) Drivers must be contactable via the contact information given in the application form, at any time of the day during the duration of the actual work.

5. HEIGHT LIMIT WORKS REQUIREMENTS

5.1 INSTALLATION OF STRUCTURES

In general, the structure installed should not alter the height limit dedicated for the route. Guidelines:

- a) For permanent overhead gantries, the minimum vertical clearance from soffit of structure to road level shall be 5.7m as per [LTA Civil Design Criteria for Road and Rail Transit Systems](#).
- b) Structures hanging overhead along the roadway should not be less than the height limit dedicated for that route.
- c) Temporary structures (erected for decoration) along the roadway should not be lower than the existing height limit of the roadway.
- d) Protruding structures by the side of the road should be at least 0.6m away from the kerb.
- e) For height restriction gantries that function as a protection to the overhead structure or any object above the carriageway, a minimum vertical clearance of 0.3m shall be allowed for between the lowest point of the gantry frame and the overhead structure or any object above the carriageway.

5.2 MODIFICATION OF CEILING HEIGHT

- a) Any works that directly or indirectly modify the effective floor-to-ceiling height of any external terminal building (above any roadway) shall be declared in the Landside Road Work Permit for approval.
- b) The dimensions of the height limit structure(s) installed must be measured and the as-built submission of the final height clearance to be submitted upon completion of the works.
- c) If modification of the ceiling involves changes in height limit along the affected route, proper signage needs to be installed.

5.3 WORK FLOW PROCESS FOR HEIGHT LIMIT RELATED WORKS

The CAG PO and his/her Contractor should clear the method statement with EDG Structures team first before applying for the Landside Road Work Permit. The method statement should describe how the temporary / new height limit structure will be installed.

After the method statement is approved, the PO is to submit the following Supporting Documents for permit application:

- a) Risk Assessment;
- b) Traffic management plan; and
- c) Photos of height clearance from the roadway to soffit of new structure.

Note: All efforts required to update the height limit should be costed into the project works

6. HORTICULTURE OUTDOOR REQUIREMENTS

6.1 GENERAL

The Contractor shall avoid all existing trees and shrubs whenever possible.

6.2 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.

6.3 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.

6.4 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.



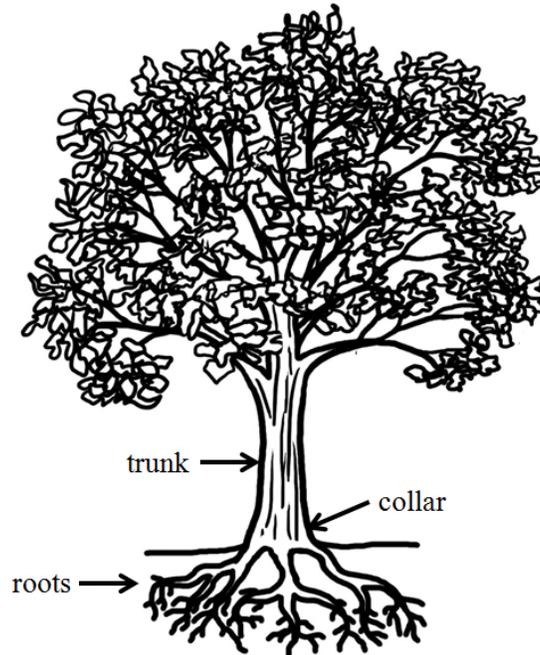
Example of TPZ Preparation



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.



6.5 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 turf / groundcovers, 0.6m for all on-grade shrubs and flowerbeds; and 1m deep for all on-grade trees / palms.

6.6 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.

6.7 REINSTATEMENT OF TURF

All turf supplied by the Contractor shall be healthy, vigorous and be of approved type and quality (*Axonopus compressus*). The grass shall be at least 50mm thick.

All turf supplied should be free from weeds especially *Mimosa pudica*, *Imperata cylindrica* (alang) and *Eleusine indica*;

Turf shall be laid abutting unless otherwise directed by CAG Horticulture, with no appreciable spaces between adjoining turfs. Each sod shall be properly pegged down to prevent movement or displacement of any kind, and the turfing shall thereafter be firmed down, top-dressed and rolled or compacted (except on slopes) with a suitable hand roller. Upon completion, the turfed area shall present a uniform and regular appearance; Turf level shall be 50mm lower than the pavement and top surfaces of kerbs.



Example of Close Turfing including Topdressing

6.8 REPLACEMENT 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.

6.9 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.

6.10 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 / turf 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 / turf for maintenance. The Contractor will have to replace, at his own cost, plants / turf 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.

7. EXTERNAL LOW TENSION (LT) SYSTEM REQUIREMENTS FOR RELOCATION/ DIVERSION WORKS

7.2 GENERAL REQUIREMENTS

The Contractor shall exercise caution while working at areas with existing LT systems and shall be held accountable for any damages to the property during their course of work.

LT systems shall include but not limited to OG box, junction box, lamppost, lighted signage, underground LT Cables etc.

7.3 RELOCATION OF LT SYSTEMS

The Contractor shall ensure that no LT systems are to be relocated from site without permission or prior approval from CAG.

7.3.1 RELOCATION OF LAMP POST

The Contractor shall ensure that uniformity of the light distribution on the road shall be at least 0.3 for all types of road and achieve required lux level as shown in table below.

| Type of Roads | Minimum Illuminance (at floor level) |
|--------------------------|--------------------------------------|
| Major Road | 20 lux |
| Major Road conflict area | 1.5x (e.g. 30 lux) |
| Minor Road | 10 lux |
| Minor Road conflict area | 1.5x (e.g. 15 lux) |

All physical lux measurements between lighting poles shall be taken at minimum of 9 reference points and be attended and witnessed by CAG/Appointed Maintenance Contractor. Lux report to be submitted upon completion of relocation.

In the event where new concrete footing is required to replace the existing to facilitate the relocation, the Contractor is required to submit structural details showing PE calculations and endorsement for CAG's review.

The Contractor shall ensure all the bolts and nuts of the footer are to be concealed with PVC cast with cement.



Example of Lamp Post Footer

7.3.2 RELOCATION OF LIGHTED GANTRY AND/OR SIGNAGE

Prior to relocation, the Contractor shall submit necessary drawings which fulfill the following requirements for CAG approval:

- a) The Junction box serving the lighted gantry / signage shall not be mounted on the footer. It shall be installed as close as possible to the gantry/signage for ease of maintenance.
- b) In the event the length of existing cable is insufficient for the new relocated point, the Contractor shall replace the whole cable and shall be XLPE/SWA/PVC armored underground cable. Under circumstances whereby it is practically not possible to replace the whole set of cables, the Contractor shall submit necessary documents including proposed routing etc. to CAG for review and approval.
- c) In the event where new concrete footing is required to replace the existing to facilitate the relocation, the Contractor is required to submit structural details showing PE calculations and endorsement for CAG's review. The Contractor shall ensure there is a gentle gradient slope grouting on the footer and all the bolts and nuts of the footer are to be concealed with PVC cast with cement.
- d) Bitumen coating shall be applied internally and externally to the base section on top of the galvanized coating by means of dipping. It shall also be applied to the pole from the base section and extended for a distance of 200mm above the top of the footer.

7.3.3 DIVERSION OF LT CABLES

The Contractor shall identify and submit a list of underground LT cables to be diverted with proposed routing to CAG for approval. Cable detection shall be carried out accordingly to ascertain the routing and systems that will be affected. No cable joint is allowed.

The Contractor shall carry out meggar test before and after the diversion works to verify the condition of electrical insulation and submit the report accordingly. In the event the diverted cable is damaged or found to be in low insulation, the Contractor shall replace with new cable.

7.3.4 INSTALLATION OF SERVICES/ACCESSORIES ON CAG LAMP POST

The Contractor shall identify and submit a list of lamp post(s) to be used to CAG for approval prior to any installation.

The Contractor shall submit the Method of statement and ensure that there is PE endorsement that certifies that the proposed method of installation on lamp posts along Airport Boulevard is safe, and in accordance with conservation principles and good engineering practice.

The Contractor shall exercise caution while carrying out the installation work and is held accountable for any damage to the lamppost(s) during their course of work.

7.3.5 TAPPING OF POWER SUPPLY

The Contractor shall seek approval from CAG prior to any tapping of power supply from any OGs. The contractor shall submit all necessary documents which include but are not limited to the following.

- a) Electrical Load Calculation
- b) Endorsed SLD by LEW
- c) Certificate of Compliance (Prior to turn on)

The Contractor shall take into consideration and provide necessary protection at their equipment to avoid unnecessary tripping to upstream.

8. EXECUTION OF ROAD WORKS

8.1 NOTIFYING THE AIRPORT COMMUNITY

Depending on the extent impact to the landside roadways, the PO must ensure all stakeholders and users of the roadways are informed in advance. The following table acts as a guide to the communication plans:

Level of Notification Required

| Category | Extent of road closure | Communication Channel (where applicable) |
|----------------|---|---|
| Level 1 | <ul style="list-style-type: none"> • Full Road Closure • Road Diversion with a reduction in traffic handling capacity • Partial Road Closure at arterial roadways (Airport Boulevard, ingresses to T1, T2, T3, T4) with reduction in traffic handling capacity | <ul style="list-style-type: none"> - Airport Information Circular (AIC) - Airport Facilitation Committee (AFC) meeting (held monthly) - Notices displayed at car park lobbies (text message to be approved by CAG CMC) - Notice on Changi Airport website (landing page), apps & social networks (to be approved by CMC & RWU) - National Taxi Association and taxi operators - Private Hire companies - Public transport companies* - Other affected stakeholders (e.g. APD, LTA, Dnata, SATS) <p><i>*Where scheduled bus routes are affected by the works, the applicant shall liaise with the relevant bus operators to ensure minimum disruption to the bus services.</i></p> |
| Level 2 | <ul style="list-style-type: none"> • Partial Road Closure, no diversion involved | <ul style="list-style-type: none"> - Airport Information Circular (AIC) - National Taxi Association and taxi operators - Private Hire companies |
| Level 3 | d) Partial Road Closure (Inner road) with 50% reduction. | <ul style="list-style-type: none"> - Email notification to identified stakeholders |

Please contact RWU should you need assistance / advice on how to notify the relevant stakeholders. RWU will also needs to vet the AIC.

Protocol for Publishing AIC

1. Obtain a reference number from Ms Zaridah Abdul Hamid (People Services).
2. Draft the AIC using the template, an example is shown in [Annex K](#)
3. Email the completed AIC to intranet@changiairport.com for it to be uploaded onto the intranet. Copy Roadway Unit (roadway.unit@changiairport.com) & Ms Zaridah (Zaridah.abdul.hamid@changiairport.com) in your email for information.

8.2 AVAILABILITY OF THE CAG PO & CONTRACTOR

The CAG PO and the Contractor's Project Manager shall make themselves readily contactable via the contact information provided in the Landside Road Work Permit application, any time of the day during the duration of the actual work.

Depending on the complexity of the works as assessed by RWU, the CAG PO is expected to be on-site minimally for the first day of works as the ground commander.

His / Her role is to:

- Ensure work follows the planned schedule
- Raise deviations in roadworks truthfully
- Decide to continue or to abort works, especially once it reaches the point of no return

RWU can be present on first night of works to assess the progress of the works.

8.3 REPORTING TO TERMINAL MANAGEMENT CENTRE

8.3.1 COMMENCEMENT & COMPLETION OF ROAD WORKS

Depending on the complexity of the work, the CAG PO is to set up a Whatsapp group chat with the AOCM (9183 8879), TMC Duty Phone (9800 5863) to keep Airport Operations (AO) team informed of the work progress.

This is applicable to works done within CAG roadways, and works done on LTA land up to 2km from South Cross 2 aerobridge.

Should works be done on land under LTA's jurisdiction, the CAG PO is to first seek approval from TMC prior to seeking approval from LTA for work start.

Each party to have the following responsibilities:

- CAG PO to update the chat on the progress of the works.
- AOCM and TMC to periodically check in to ensure that works are on schedule
- AOCM and TMC to be aware of the "point of no return" and the "decision making cut off time" to allow them to make the decision to stop the works if necessary

Before work commence and after work completion, the Contractor shall seek approval from TMC via text at 9800 5863 using the following template:

Prior to work start

[Hi, this is (name) from (company). This is to seek approval to commence works at (location). Roadwork permit reference (permit #). For your info please.]

Upon completion

[Hi, this is (name) from (company). This is to inform of work completion at (location). Roadwork permit reference (permit #). For your info please.]

8.3.2 LAST MINUTE AD HOC ROAD WORKS

For works that have not been approved on OneCalendar or not applied on OneCalendar (be it ad hoc works / urgent works / regular maintenance works), TMC **will not approve by default**.

The Contractor is to contact CAG Project Officer (PO) who will then obtain approval from RWU (office hours) and/or TMC. Should approval be given by the former, The Contractor is to inform TMC as per commencement and completion procedure above (7.3.1).

Should works be approved, the Contractor is to log the works into OneCalendar upon work completion.

8.3.3 DEVIATION FROM ROAD WORK SEQUENCE

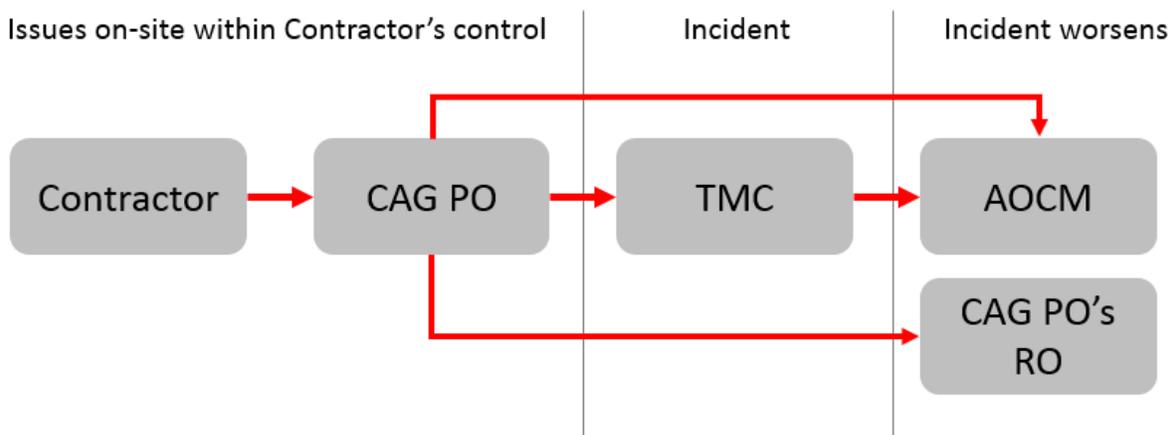
- a) The Contractor or CAG PO is to call off the works based on the approved cut-off time OR
- b) The Contractor or CAG PO to make an assessment to extend the works. If so, the Contractor or CAG PO is to seek approval from RWU (office hours) and/or TMC. TMC to approve based on impact on ground assessment.

8.3.4 NOT ADHERING TO SCHEDULED WORK DURATION

TMC reserves the right to issue a stop work order where necessary. For instance, should there be an emergency and / or heavy congestion situation, TMC has the right to instruct the Contractor to reopen one of the lanes it had closed previously. In unforeseen circumstances, the Contractor should implement their contingency plans as per submitted during application of road works requests.

8.4 INCIDENT REPORTING & ESCALATION

An incident report shall follow the process below:



- a) CAG PO to notify TMC via the group chat of the incident and extent of disruption.
- b) TMC will assess the nature of the incident with the PO and trigger the existing activation protocol for the situation.
- c) If incident escalates out of control, CAG PO to escalate to AOCM, RWU, and the former's Reporting Officer (RO). AOCM will disseminate information to internal stakeholders (e.g. CMC, BCP) and external stakeholders (e.g. Airlines, GHAs).

Conditions to Convene Incident Action Group (IAG)

- 1. Roadway infrastructure has been damaged (e.g. bridge collapse)
- 2. Chain collision resulting to total Airport Boulevard (in & out) closure

Important contact numbers:

- AOC: 9183 8879
- TMC: 9800 5863
- FMC: 6541 2424

8.5 POSSIBLE SCENARIOS OF INCIDENTS / ACCIDENTS

| Incident/Accident | Traffic Management Plan |
|--|--|
| Delivery vehicles unable to find designated site | Vehicle to stop by road shoulder <ul style="list-style-type: none"> • Call Project Manager to escort the vehicle to designated site |
| Delivery vehicles hit height limit gantry | Vehicle to stop by road shoulder <ul style="list-style-type: none"> • Call TMC hotline • CAG PO and coordinate with EDG contractors and TMC for repair works • Project Manager to escort delivery vehicles to designated site |
| Traffic accidents, eg. collision with other vehicles | <ul style="list-style-type: none"> • Project Manager to assist TP/APD and TMC for traffic management, recovery and investigation |
| Vehicle breakdown | <ul style="list-style-type: none"> • Driver to inform Project Manager & CAG PO • CAG PO to inform TMC • Project Manager to assist TP/APD and TMC for traffic management, recovery and investigation |
| Spillage of concrete | |
| Damage to road surface etc | |

9. NON-COMPLIANCE WITH REQUIREMENTS

9.1 DISPLAY OF WORK PERMIT

The Contractor should readily furnish the original copy of the work permit at the work site when demanded by the CAG PO to avoid the issuance of a temporary stop work order.

9.2 TEMPORARY STOP WORK ORDER

The Contractor is deemed to have read through the Landside Roadway Manual and complied with the requirements. If the Contractor fails to comply with any of the requirements given and/or any other instructions given by CAG, the RWU / CAG duty operations officer may issue **a stop work order immediately**. The Contractor is to rectify the issue immediately **within the next 2 hours**, with photo evidence proving the rectification action. The case will then be highlighted to RWU for further deliberation with the CAG PO. **Even if the Contractor has rectified the issue, the temporary stop work order will only be lifted with the approval of the RWU.**

In addition, CAG may change the temporary stop work order to a withdrawal of the Landside Road Work Permit if the duty operations officer deems that the road traffic condition around the work site has worsened due to the deviation from the agreed work arrangements.

The work permit will only be re-issued when the RWU is satisfied with the remedial action(s) taken by Contractors and upon receiving the written commitment by the CAG PO on the measures to be put in place by the Contractors to prevent a repeated occurrence.

9.3 DEVIATIONS FROM THE APPROVED WORKS

If the road activity deviates from the approved work arrangement and the Contractor fails to update the CAG PO and / or RWU of any deviations from the approved works, a temporary stop work order will be issued. **Until thorough investigation and explanation is provided on why the deviation was not communicated by the CAG PO, this stop work order will not be lifted.**

Depending on the extent of deviation, the Contractor may need to amend the application documents for resubmission.

9.4 MAJOR SAFETY BREACH

A Stop Work Order and / or Board of Inquiry will be carried out in the event of a safety breach and / or major accident(s) during the course of the work.

10. APPLICATION SUBMISSION GUIDELINES

Templates will be provided in the Annexes.

Compulsory Documents

| Document | Guidelines |
|------------------------------------|--|
| CAG Project Officer's Checklist | <ul style="list-style-type: none"> Refer to Annex A |
| Method Statement | <ul style="list-style-type: none"> Sequence of events of work / Illustrate work processes Accompanied by photos of past projects of similar work May contain mock-up of the installation (if applicable) Must have taken into consideration the airport environment Not accepted: Generic / template method statements |
| Work Sequence and Contingency Plan | <ul style="list-style-type: none"> Line by line detail on work stages, accompanied by contingency plan at each stage. To highlight points of no return in which work cannot be stopped at short notice. Refer to Annex B for Excel template |
| Work Location | <ul style="list-style-type: none"> Photos showing overview of work site so that surroundings and location can be identified easily Not accepted: Overly zoomed in photos Refer to Annex C for examples of well-taken photos |
| Traffic Situation Survey | <ul style="list-style-type: none"> Data such as traffic count supporting the working hours proposed |
| Risk Assessment (RA) | <ul style="list-style-type: none"> 2 types of RA to be provided: Operations RA and Technical RA (Refer to Annex D for sample) To follow the format provided by the Ministry of Manpower Not accepted: Generic / template risk assessments |

Supporting Documents (where applicable)

| Nature of Works | Supporting Document |
|--------------------------------|---|
| Lane closure | <p>Traffic Management Plan showing:</p> <ul style="list-style-type: none"> Location of work equipment (e.g. lorry crane) Extent of road closure Placement of traffic control elements (e.g. advanced warning signs, cones, road marshallers) <p>Format of Traffic Management Plan</p> <ul style="list-style-type: none"> Line drawings / plans based on official CAG roadway map Photos of work site with traffic control elements superimposed Not accepted: Generic and hand-drawn maps <p>Refer to Annex E for sample</p> |
| Road closure (road impassable) | <p>Traffic Diversion Plan</p> <ul style="list-style-type: none"> Illustrates alternative route(s) that motorists can take Annotations made on official CAG roadway map <p>Refer to Annex F for sample</p> |

| | |
|-------------------------------|--|
| Excavation | Approved Excavation Permit using latest forms from AOS manual |
| Height Limit Changes | <ul style="list-style-type: none"> • Dimensions of the height limit structure(s) installed with as-built drawings (upon work completion) • Traffic management plan (if installation requires lane closure) • Photos of height clearance from roadway to soffit of new structure Refer to Annex G for sample |
| On Turf | <ul style="list-style-type: none"> • Photos of affected plants in relation to the surroundings • Approval from NParks (if part of affected zone of works is in areas governed by NParks) |
| Heavy Vehicle Movement | <p>Vehicle Details</p> <ul style="list-style-type: none"> • License plate • Vehicle model • Dimensions: Height x Width x Length • Description of load <p>Vehicle Routing</p> <ul style="list-style-type: none"> • Illustrate vehicle path on official CAG roadway map • Swept path of route (if vehicle has to navigate tight turns to get to the site). Applicant to sign on the swept path confirming that vehicle path is feasible and will not hit existing height limits <p>Vehicle Schedule (for each vehicle)</p> <ul style="list-style-type: none"> • Start time of vehicle movement into Changi Airport • End time of vehicle movement out of Changi Airport <p>Vehicle Management Plan (if traffic needs to be stopped)</p> <ul style="list-style-type: none"> • Measures that the Contractor will take to minimize roadway disruptions (e.g traffic controllers deployed) Refer to Annex H for templates |
| Hoarding Plan | <ul style="list-style-type: none"> • Hoarding layout plan • Graphics/artwork of the hoarding • Method statement of hoarding • Road closure schedule (if required to install the hoarding) Refer to Annex I for sample |
| Electrical Cabling (External) | <ul style="list-style-type: none"> • State affected OG boxes / junction box / traffic light / lighted signboard / street lighting / underground LT cables etc with photos • Mark location of the above on the official CAG Roadway Map • Indicate the shifted items / diverted cable routing (if applicable) Refer to Annex J for template |
| Communications | <ul style="list-style-type: none"> • Draft of AIC Refer to Annex K for template |

Urgent Work Permit

For Urgent Work Permits, these are the key documents to be submitted. Due to time constraints Contractors are not required to submit the whole set of documents. However, if work is deemed

by Final Approver to be not urgent in nature, the Contractor is to reapply for Ad Hoc Work Permit.

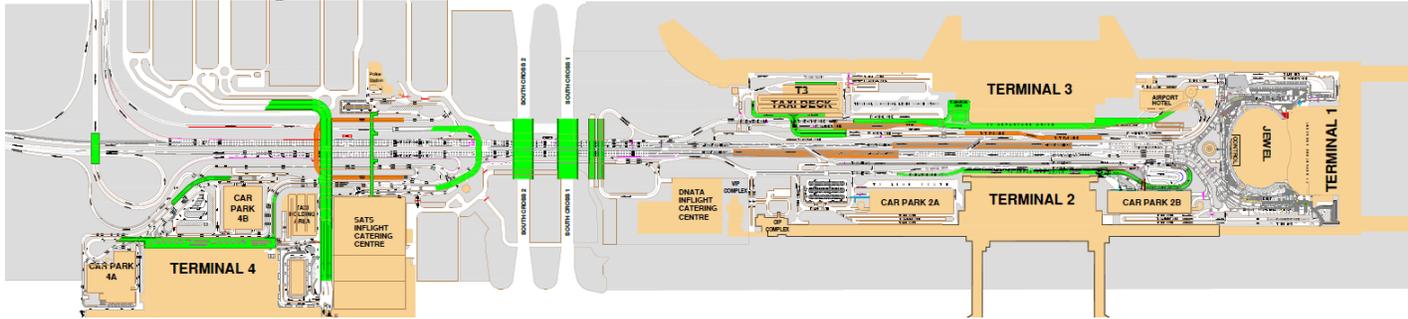
| Document | Guidelines |
|--------------------------------|-----------------------------|
| Risk Assessment (RA) | Refer to above requirements |
| Lane closure | Refer to above requirements |
| Road closure (road impassable) | Refer to above requirements |

Regular Maintenance Works Permit

| Document | Guidelines |
|------------------------------------|---|
| Method Statement | Refer to above requirements |
| Work Sequence and Contingency Plan | Refer to above requirements |
| Vehicle Details | License plate of regular maintenance vehicles |

Official CAG Roadway Map

Please obtain latest version from Master Planning (refer to below on how it looks like). The latest Aerodrome Map can also be used.





11. ANNEX A: CAG PROJECT OFFICER'S CHECKLIST

This checklist is designed to assist the appointed CAG Project Officer in complying with all necessary requirements before submitting the Landside Road Work Permit application to the Roadway Unit.

| S/N | Description | Status (√ if completed, else N.A.) | Reason (if N.A.) |
|--|---|--|------------------|
| General requirements | | | |
| 1 | The Contractor and CAG Project Officer agree that all landside works are bound by the terms and conditions for operation as specified in the Landside Roadway Manual. | <input type="checkbox"/> | |
| 2 | All landside project vehicles and drivers are to comply with the stipulated regulations before they are allowed to operate in the landside vicinity. (<i>refer to AOS, Section H -Landside Regulations</i>) | <input type="checkbox"/> | |
| Location of work | | | |
| 1 | Is the proposed work on LTA roads (i.e. between PIE/ECP to South Cross)? | <input type="checkbox"/> | |
| | If yes, please obtain LTA Prompt approval and inform Roadway Unit of the work in Changi Airport vicinity. | | |
| 2 | Is the work area in view of member of public? (NA for existing work sites) | <input type="checkbox"/> | |
| | If yes, submit the hoarding plan and seek approval from Structure, EDG. | | |
| Trial Holes / Trenching / Excavation / Piling | | | |
| 1 | Do the works involve trial holes / trenching / excavation / piling works? | <input type="checkbox"/> | |
| | If yes, please obtain the required permits (permit to carry out Trial Holes, Trenching works, Excavation and Piling Works) (<i>Refer to AOS, Section C</i>) before applying to RWU and submit as proof. | | |

| S/N | Description | Status (√ if completed, else N.A.) | Reason (if N.A.) |
|---|--|--|------------------|
| Works Involving Lane Closure | | | |
| 1 | Does the work (including loading and unloading works) require lane closure? | <input type="checkbox"/> | |
| | If yes, submit Traffic Management Plan | | |
| 2 | Does the work (including loading and unloading works) involve road closure (road impassable)? | <input type="checkbox"/> | |
| | If yes, submit Traffic Diversion Plan | | |
| 3 | If there is road closure, please notify relevant stakeholders. If AIC needs to be disseminated, please submit AIC draft. | <input type="checkbox"/> | |
| Heavy Vehicle Movement | | | |
| 1 | If heavy vehicles are used, submit Vehicle Details, Vehicle Routing, Vehicle Schedule, Vehicle Management Plan | <input type="checkbox"/> | |
| 2 | CAG Project Officer to check that the heavy vehicle used does not violate any height restrictions for the vehicle route. | <input type="checkbox"/> | |
| 3 | If low-bed trailer used, allowed hours of movement is from 0200H – 0500H, and the Contractor to check with TMC (9800 5863) on traffic situation before sending the trailer to the work site. | <input type="checkbox"/> | |
| 4 | If there are oversized heavy vehicles, the Contractor is to submit an application to LTA via LTA Prompt | <input type="checkbox"/> | |
| 5 | If the vehicle is entering the terminal basements, the vehicle driver is to display the Basement Entry Form approved by CAG Project Officer and / or a Delivery Order. | <input type="checkbox"/> | |
| Height Limit Works | | | |
| 1 | CAG Project Officer has consulted EDG Structures team prior to submission | <input type="checkbox"/> | |
| Works On Landside Turf Area, Landscape Area And / Or Less Than 2m From The Tree Collar | | | |
| 1 | Is work on turf, around shrubs and / or work(s) less than 2m from the tree collar? | <input type="checkbox"/> | |

| S/N | Description | Status (√ if completed, else N.A.) | Reason (if N.A.) |
|-----|-------------|--|------------------|
|-----|-------------|--|------------------|

2 If yes to 1, if the proposed work on LTA roads (i.e. between PIE/ECP to South Cross), please obtain LTA/ NParks approval.

3 If yes to 1, if the proposed work is on CAG land, submit photos of affected plants in relation to the surroundings.

Electrical Works

1 If electrical works are done and affect external electrical fixtures (e.g. OG boxes / junction box / traffic light / lighted signboard / street lighting / underground LT cables etc), submit photos of affected items, and mark location of the items on the official CAG Roadway Map.

2 If external electrical fixtures / cables are shifted / diverted, indicate new locations.

Key Permit Application Requirements

1 The CAG Project Officer will submit all the required application documents in the required formats (Section 10)

2 The CAG Project Officer and the Contractor will comply the Reporting & Incident Management protocols (Section 8) and understands consequences of non-compliance (Section 9)

Declaration

- All the above checklist requirements are fulfilled.
- The CAG Project Officer is deemed to have read through and complied with requirements in the latest Landside Roadway Manual and AOS Manual (where applicable)
- A Stop Work Order and / or Board of Inquiry will be carried out in the event of a safety breach and / or major accident(s) during the course of the work.

| Submitted By: (CAG Project Officer) | | | |
|-------------------------------------|---|-------------|---|
| NAME | : | SIGNATURE | : |
| DESIGNATION | : | DEPT / UNIT | : |
| CONTACT NO. | : | DATE | : |

12. ANNEX B: WORK SEQUENCE AND CONTINGENCY PLAN

| S/N | Task | Start time | End time | Duration | Cut-Off Time | Weather Conditions | Ways to Expedite Works | Can demob immediately? | Contingency Plans & Recovery Time (based on answer in preceding column) |
|--|-------------------|------------|----------|----------|--|---|--|------------------------|---|
| 1 | Describe activity | XXXXH | XXXXH | XX Hours | To abort if work does not reach this step by YYYYH | Describe weather conditions in which the work will go ahead / abort | Describe steps taken to prevent & reduce the works overrunning the duration, in terms of 1. People trained 2. Resources provisioned 3. Work methodology | Yes / No | Yes: State time taken to demob upon activation, steps taken, resources required. No: recovery time taken, describe contingency plan, resources required Contingency plans must be reliable and meet AO's risk appetite of 45 min max recovery time. |
| Segregate steps if there is a "point of no return" | | | | | | | | | |
| 2 | Describe activity | XXXXH | XXXXH | XX Hours | Refer to above | Refer to above | Refer to above | Refer to above | Refer to above |

Declarations that TMC Must Note

1. All traffic management must be set up before approval to start work
2. CAG PO / ground commander to be on site before approval to start work

13. ANNEX C: WORK LOCATION

Examples of good and bad site photos

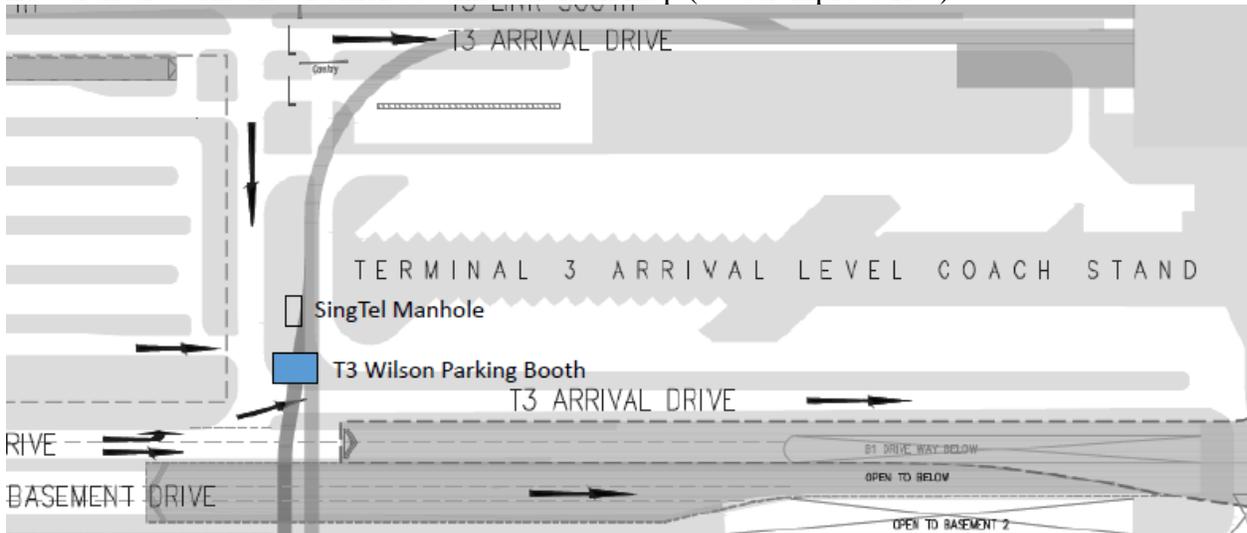


Good Site Photo: Shows surroundings and road elements



Bad Site Photo: Too close-up, unable to identify location

Location of works should include annotation on map (see example below)



14. ANNEX D: RISK ASSESSMENT

Risk Assessment Form
This form is to be compiled and completed by the Work Party upon consultation with ALL Stakeholders.

| | | |
|--|--|---|
| Project Title: | Project Manager/ Organisation: Goh Lian Boon – Senior Project Manager Trans Equatorial Engineering Pte Ltd (TEE) | |
| Project Synopsis: Dismantling and installation of lamp post at Airport Boulevard Road | Assessment Start Date: 21-Nov-2018 | Revised Assessment Date: 20-Nov-2021 |

| Work Activities | Identified Hazards | Consequences | Existing Mitigating Measures And Safety Risk Index | | | Further Action to Reduce Risk And Existing Safety Risk Index | Mitigating measure completed? (Check-off & insert date if completed) | | | | | | | | | | |
|---|--|---|--|-----------------|-----|--|--|-------------|-----|---|---|---|---|---|--|------------------------------------|--|
| | | | S/N | Description | S/N | | | Description | S/N | | | | | | | | |
| General | | | | | | | | | | | | | | | | | |
| A Site Mobilization & Demobilization | | | | | | | | | | | | | | | | | |
| 1 | Heavy /long vehicles moving in and out of site | Hit by moving vehicles | 1a | Physical Injury | 1a | Physical Injury | Fatal | 2 | B | T | Banksman to ensure that the driver drive at designated speed limit. Beacon light on vehicle. Place cone at park vehicle. Maintain the speed limit. | 1 | B | A | Site Supervisor Safety Personnel Traffic Marshal | To be implemented upon phase start | |
| 2 | Loading & unloading materials by lorry crane | Lorry crane topple Failure of Lifting gear or mechanism Injury to | 2a | Physical Injury | 2a | Physical Injury | Fatal | 2 | B | T | Lifting Supervisor to ensure that no hoisting during bad weather Lifting Supervisor to ensure that no hoisting during bad weather | 1 | B | A | Lifting Supervisor Safety Personnel | To be implemented upon phase start | |

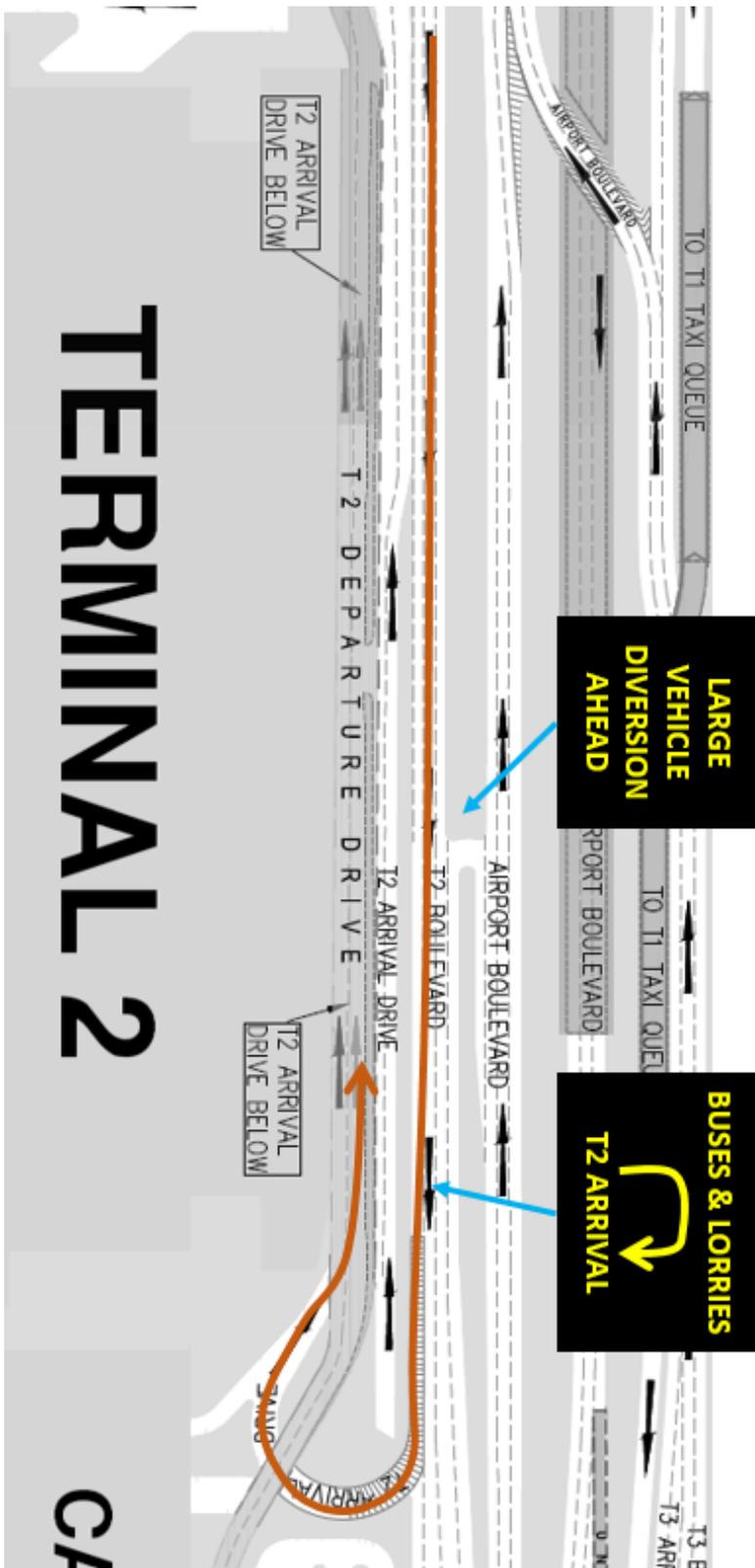
Date: 21 Nov 2018 Ver 1

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16. ANNEX F: TRAFFIC DIVERSION PLAN

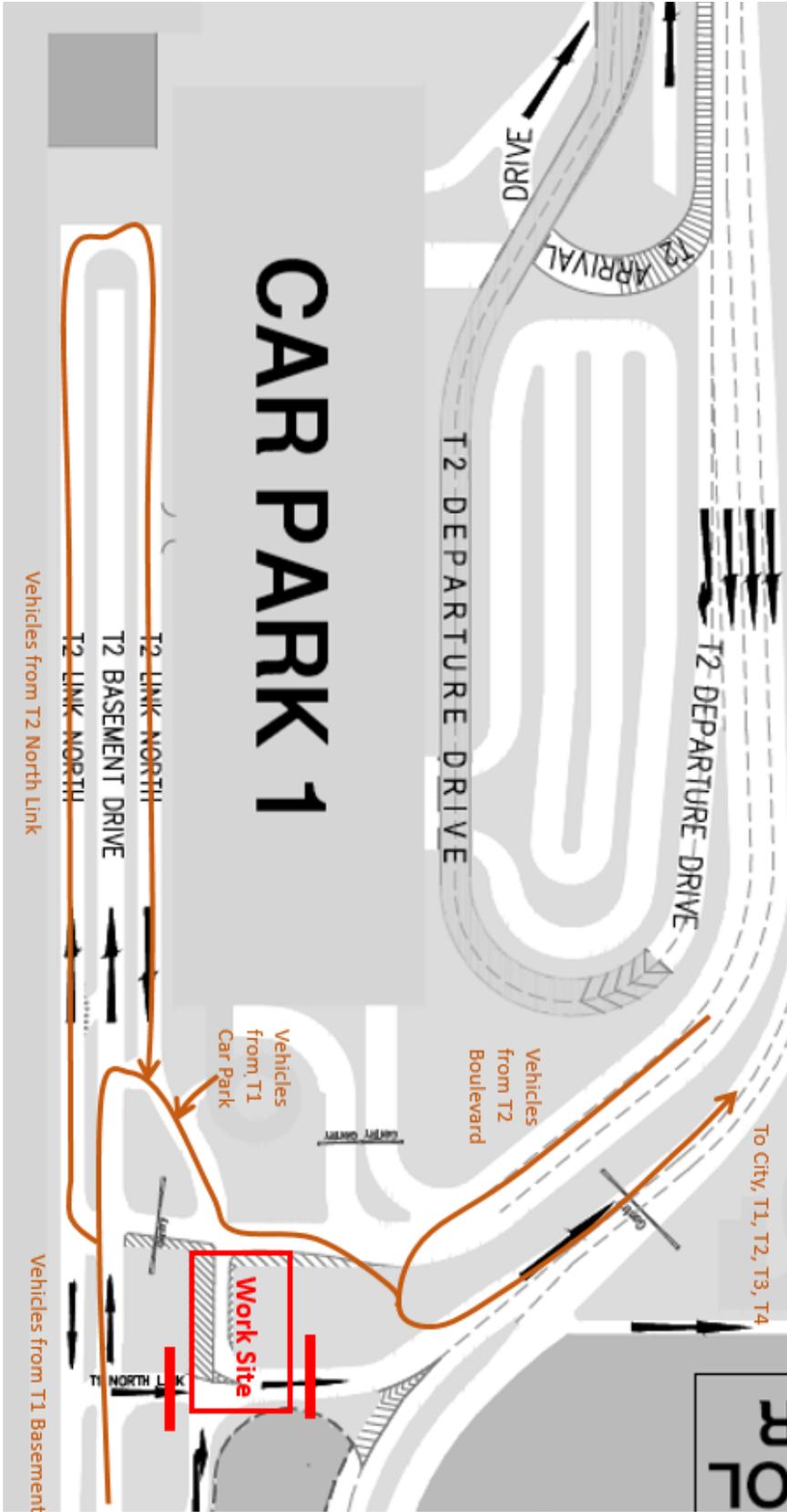
Annex A: T2 Boulevard Diversion Plan

All buses and large vehicles ABOVE 3.8m shall follow the road signs to keep right and turn into T2 Arrival Drive for drop off or e



Annex B: T2 Link North Diversion Plan

During the road diversions at T2 Link North, vehicles shall exit to city via the diverted route.



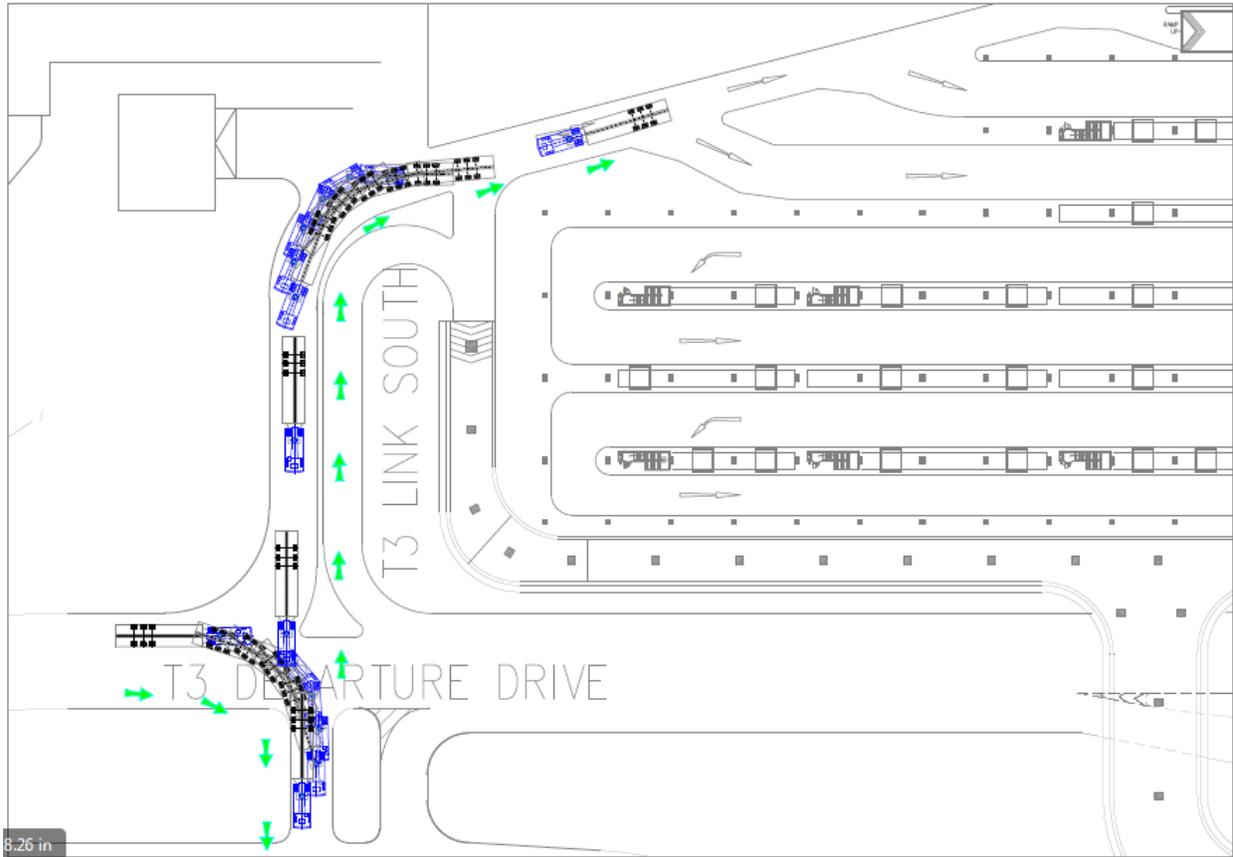
17. ANNEX G: HEIGHT LIMIT CHANGES

To be confirmed. Please check with Engineering Management & Systems Planning team (Roadways)

18. ANNEX H: HEAVY VEHICLE MOVEMENT FORM

This form is designed to assist the appointed CAG Project Officer in complying with heavy vehicle movement before submitting the Landside Road Work Permit application to the Roadway Unit.

| S/N | Description | Details |
|------------------------|--|---|
| Vehicle Details | | |
| 1 | Vehicle Model and license plate (Include all heavy vehicles) | |
| 2 | Vehicle Dimensions without load (Height x Width x Length) | |
| 3 | Vehicle Dimensions with full load on board, including any overhang of load (Height x Width x Length) | |
| 4 | Description of Load | |
| Vehicle Routing | | |
| 1 | Vehicle Schedule (for each vehicle) •Time vehicle enters Changi Airport •Time vehicle exits Changi Airport | |
| 2 | <ul style="list-style-type: none"> Illustrate vehicle path on official CAG roadway map Swept path of route (if vehicle has to navigate tight turns to get to the site). Applicant to sign on the swept path confirming that vehicle path is feasible and will not hit existing height limits | Please send in as attachment. Refer to example on next page |
| 3 | Vehicle Management Plan (if traffic needs to be stopped). State measures that the Contractor will take to minimize roadway disruptions (e.g traffic controllers deployed) | |



19. ANNEX I: HOARDING PLAN

To be confirmed. Please check with Engineering Management & Systems Planning team (Roadways)

20. ANNEX J: ELECTRICAL CABLING FORM

| S/N | Description | Details |
|-----|---|---------|
| 1 | Affected road furniture, with photos | |
| | OG boxes | |
| | Junction boxes | |
| | Traffic lights | |
| | Lighted signboards | |
| | Street lighting | |
| | Underground LT cables | |
| | Etc | |
| 2 | Location of the above on the official CAG Roadway Map | |
| 3 | Indicate the shifted items / diverted cable routing (if applicable) | |

21. ANNEX K: AIC DRAFT

AIC No. : 23/20

Date : 17 March 2020

AIRPORT INFORMATION CIRCULAR

To All Airport Staff

AIRPORT BOULEVARD TRAFFIC DIVERSION EXERCISE

- 1 CAG will be conducting a traffic diversion exercise along Airport Boulevard [direction out of the airport] on 24 March 2020, Tuesday from 1am to 4am.
- 2 Traffic exiting the airport towards the city will be diverted onto lanes 1 and 2 of the airport bound road. Safety signs and road traffic marshals will be deployed to facilitate the traffic flow. Continuous traffic flow will be maintained.
- 3 Please refer to diagram below on the location of the exercise.



- 4 Please bring this circular to the attention of your staff.

Thank you.

Yours faithfully,

Meredith Koh
Senior Associate, Ground Operations

22. ANNEX L: CHANGI LANDSIDE ROAD SAFETY BROCHURE

(Click [here](#) to open the file from CAG Intranet)