For discussion **PWSC(2018-19)44**
on 27 March 2019

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 703 – BUILDINGS
Support – Others
190GK – Flight Simulator Training Centre of the Government Flying Service

Members are invited to recommend to the Finance Committee the upgrading of **190GK** to Category A at an estimated cost of $112.1 million in money-of-the-day prices for the construction of a Flight Simulator Training Centre of the Government Flying Service.

PROBLEM

We need to construct a Flight Simulator Training Centre ("FSTC") for the Government Flying Service ("GFS") in order to support the essential professional training for its helicopter aircrew.

PROPOSAL

2. The Director of Architectural Services, with the support of the Secretary for Security, proposes to upgrade **190GK** to Category A at an estimated cost of $112.1 million in money-of-the-day ("MOD") prices for the construction of a FSTC in the car park area of the GFS Headquarters.

PROJECT SCOPE AND NATURE

3. The proposed works site occupies an area of 670 square metres (m^2) in the GFS Headquarters (i.e. part of the existing car park) located at the Hong Kong International Airport ("HKIA") at Chek Lap Kok for setting up a helicopter

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flight simulator training device ("the Simulator") to provide an environment with high fidelity to the real flying conditions for GFS to conduct pilot training that could meet the international civil aviation standards and its operational needs. The scope of the project includes –

(a) construction of a building to accommodate a simulator hall for installing the Simulator, and general support facilities for operating the Simulator, including a computer server room, a classroom, a Simulator equipment room, a control room, a store room and other supporting facilities for service operations; and

(b) provision and maintenance of a temporary car park for use by GFS during the construction period and reinstate the area concerned back to the original land after completion of the construction works.

4. The site and location plan, ground floor plan, sectional drawing and an artist's impression for the works project are at Enclosures 1 to 4. Subject to the funding approval of the Finance Committee, we plan to commence construction in the fourth quarter of 2019 for completion in the fourth quarter of 2021.

JUSTIFICATION

5. The GFS was established under the Government Flying Service Ordinance (Cap. 322) in 1993 to provide a wide range of flying services, such as search and rescue, air ambulance, fire-fighting, aerial survey and support for law enforcement, etc., for various government departments and people in need. The GFS uses the helicopter fleet to carry out various major services, such as in-shore and mountain search and rescue, air ambulance and fire-fighting. The annual flying hours of the GFS helicopter fleet account for approximately 75% of the total flying hours of the department. Given the demand of helicopter services, the number of helicopter pilots of the GFS accounts for the majority of the staff establishment of pilots.

6. Flight safety is always the primary consideration of GFS's operations. All current operations of the department are carried out in strict accordance with relevant laws, regulations and international standards. As far as the training of helicopter pilots is concerned, in addition to using real helicopters to conduct training and assessments, the department is also required, in accordance with the licencing and renewal requirements of the Civil Aviation Department ("CAD"), to regularly arrange for its pilots to undergo various emergency procedural exercises and assessments at training centres installed with simulator of the relevant helicopter model. As there is no training centre equipped

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with helicopter simulators in Hong Kong, in order to comply with the CAD's current licencing and renewal requirements for pilots operating the GFS's seven Super Puma AS332 L2 and EC155B1 helicopters, the department needs to send each of its helicopter pilots to undergo simulator training or assessments overseas every 12 to 18 months. Taking into account the travelling time of a round-trip, it takes about one week for each pilot's overseas training trip.

7. In 2013, the GFS was approved to create a new commitment of $2,187.5 million to replace the seven Super Puma AS332 L2 and EC155B1 helicopters and associated mission equipment. The new H175 helicopters are being delivered to Hong Kong in batches and all seven new helicopters will become fully operational in 2019. In accordance with CAD's licencing and renewal requirements for pilots of new helicopter types (including the H175), after the arrival of the new helicopters in July 2018, each GFS pilot operating the new helicopter is required to undergo flight simulator training and pass the relevant assessments every six months, which is more frequent than the previous requirement of 12 to 18 months. At present, the only H175 helicopter simulator is in France. In order to meet CAD's requirements, the GFS needs to significantly increase the time for arranging helicopter pilots to undergo overseas flight simulator and other training in future. The number of hours available for pilots to stay in Hong Kong to carry out daily emergency missions, undergo real aircraft training and assessments, and perform other daily tasks will be reduced accordingly.

8. On the other hand, in response to the increasing demand for services and to enhance the standards and efficiency of pilot training, the GFS is expanding the establishment of its pilot grades as planned. It is estimated that the approved establishment of helicopter pilots of the GFS will increase by 59% from 39 to 62 by mid-2021 as compared with mid-2015. Given the increased number of junior pilots, the department's demand for helicopter simulator training and assessment will continue to increase in the future.

9. The GFS currently does not have a dedicated training facility for helicopter pilots. In addition to sending staff overseas for flight simulator training and assessments, arrangements are usually made for pilots of the helicopter fleet to use the seven operational helicopters for actual flying training when there is no emergency mission. The establishment of a FSTC within the GFS Headquarters will improve the conditions and efficiency of training helicopter pilots significantly. We expect that the FSTC will bring the following benefits to the training of helicopter pilots –

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(a) **Enhancement of the safety level of operation and training:** Through the use of the Simulator, pilots under training will not only be able to perform the general helicopter operations and procedures, they will also have more opportunities to practise repeatedly on the handling of more complicated situations in a realistic and safe manner, including those operational procedures which cannot be conducted in real helicopters for safety or design reasons (e.g. double engine or tail rotor failures, total electric failure and bad weather.), thereby enhancing their competency in handling these situations in real helicopters and ensuring flight safety.

(b) **Increased manpower resources for pilot deployment:** The establishment of the FSTC in the GFS will reduce the need for deploying pilots overseas for the relevant training, and the travelling time saved can be used for performing duties. Conducting simulator training and assessment at the FSTC will be more flexible than sending staff for overseas training. The department can have more flexibility in arranging or changing the time for training and assessments having regard to the overall operational needs, thus improving the tight deployment situation of pilots.

(c) **Improving training and assessment efficiency:** Currently, local training and assessments on operational helicopters are easily affected by a number of uncontrollable factors, such as weather conditions, unavailability of training slots due to continuous increase in air traffic at the HKIA and urgent operational commitment or maintenance, which can cause serious delay in the training schedule of pilots. In future, such training can be conducted in the Simulator and it will minimise the impact of such uncontrollable factors such as weather conditions. The overall training time for individual pilots to achieve operational status can be reduced.

(d) **Availability of helicopters for operations:** When the Simulator becomes operational, some training and assessments which are currently conducted on the operational helicopters can be conducted on the Simulator instead. The helicopters can thus be released for operations and the fuel required for conducting the relevant training and assessments can be saved.

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10. The GFS will procure the Simulator, to be charged under a new item of the General Revenue Account-funded Capital Account of Head 166 Government Flying Service Subhead 603 Plant, vehicles and equipment in the 2019-20 Estimates, in parallel with the implementation of this capital works project for installing into the proposed FSTC. The proposed setting up of the Simulator includes the procurement of the full flight simulator hardware (consisting of a main module together with the visual system, hydraulic/electric motion system, environmental unit, connecting bridge, computer server, etc.) and all software required for the operation of the Simulator; the installation of the Simulator in the proposed FSTC; the implementation services to customise the software for the operational environment of the GFS; and the training and certification for pilot instructors as well as maintenance/system administration staff.

11. The Simulator is a highly complex training facility consisting of large-sized and high technology hardware, software, and specialised supporting equipment and components, which must be accommodated in a purpose-built structure. The existing GFS Headquarters building is unable to meet the requirements for accommodating the Simulator. The limited space of the hangar has been fully utilised for parking of the fixed-wing aircraft and helicopter fleet, as well as aircraft inspection and maintenance work. It is also not practicable to modify the existing GFS Headquarters building to accommodate the Simulator, as the hangar is the only possible area inside the GFS Headquarters building for installing the Simulator, but flight operations and safety, as well as the aircraft maintenance work of the GFS will be adversely affected if construction works are to be carried out in the hangar. The stability of the GFS's emergency rescue services will also be seriously undermined. Taking into account the above constraints, the GFS proposes to construct a standalone purpose-built new structure in the car park area of the GFS Headquarters for accommodating the Simulator. This arrangement can facilitate the management and use of the dedicated structure while not affecting the daily operation of the GFS.

12. During the construction period and after completion of the project, some parking spaces in the car park area of the GFS Headquarters will be affected. The GFS has obtained approval in principle from the Airport Authority Hong Kong to use part of the vacant land along the South Perimeter Road outside GFS Headquarters to set up a temporary open car park for the department during the construction period. After the completion of the project, the temporary open car park will be reinstated to the original land.

FINANCIAL IMPLICATIONS

13. We estimate the capital cost of the project to be $112.1 million in MOD prices, broken down as follows –

			$ million (in MOD prices)
(a)	Site works		2.3
(b)	Foundation		4.6
(c)	Building		39.0
(d)	Building services		17.7
(e)	Drainage		3.7
(f)	External works		18.6
(g)	Additional energy conservation, green and recycled features		0.2
(h)	Furniture and equipment [1]		0.2
(i)	Consultants' fees for		6.9
	(i) contract administration	6.2	
	(ii) management of resident site staff (RSS)	0.7	
(j)	Remuneration of RSS		8.7
(k)	Contingencies		10.2
	Total		112.1

14. We propose to engage consultants to undertake contract administration and site supervision for the project. A detailed breakdown of the estimate for consultants' fees and RSS costs by man-months is at Enclosure 5. The construction floor area ("CFA") of this project is 666 m^2. The estimated

/construction …..

[1] The estimated cost is based on an indicative list of furniture and equipment required.

construction unit cost, represented by the building and building services costs, is $85,135 per m^2 of CFA in MOD prices.

15. Subject to funding approval, we plan to phase the expenditure as follows –

Year	$ million (in MOD prices)
2019 – 2020	2.1
2020 – 2021	39.6
2021– 2022	46.2
2022– 2023	13.3
2023– 2024	7.6
2024– 2025	3.3
	112.1

16. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period 2019 to 2025. We will deliver the construction works through a lump-sum contract as the scope of the works can be clearly defined in advance. The contract will provide for price adjustments.

17. We estimate the annual recurrent expenditure arising from this project to be $3.2 million.

PUBLIC CONSULTATION

18. We have introduced the project to the Islands District Council by circulation of paper. The Islands District Council did not raise any adverse comment about the project.

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19. We consulted the Legislative Council Panel on Security on 8 January 2019. Members of the Panel generally supported the project.

ENVIRONMENTAL IMPLICATIONS

20. The project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). It will not cause long-term adverse environmental impact. We have included in the project estimate the cost to implement suitable mitigation measures to control any potential short-term environmental impacts.

21. During construction, we will control noise, dust and site run-off nuisances to within established standards and guidelines through marking terms in the relevant contract and requesting the contractor to implement mitigation measures including the use of silencers or mufflers, the implementation of acoustic lining or shields and the building of barrier wall for noisy construction activities, frequent cleaning and watering of the site, and the provision of wheel-washing facilities to prevent dust nuisance.

22. At the planning and design stages, we have considered measures to reduce the generation of construction waste where possible (e.g. using metal site hoardings, scaffolding and signboards so that these materials can be recycled or reused in other projects). In addition, we will require the contractor to reuse inert construction waste (e.g. use of excavated materials for filling within the site) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities[2]. We will encourage the contractor to maximise the use of recycled/recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

23. At the construction stage, we will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

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[2] Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap 354N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

24. We estimate that the project will generate in total about 2 950 tonnes of construction waste. Of these, we will reuse about 480 tonnes (16.3%) of inert construction waste on site and deliver 2 160 tonnes (73.2%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 310 tonnes (10.5%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at public fill reception facilities and landfill sites is estimated to be $0.2 million for this project (based on a unit charge rate of $71 per tonne for disposal at public fill reception facilities and $200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

25. This project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

26. The project does not require any land acquisition.

ENERGY CONSERVATION MEASURES

27. This project will adopt various forms of energy efficient features and renewable energy technologies, in particular -

(a) variable refrigerant volume air-conditioning system; and

(b) solar powered light fittings.

28. For greening features, we will provide planting areas for environmental and amenity benefits.

29. The total estimated additional cost for adoption of the above energy conservation measures is around $0.2 million (including $0.1 million for energy efficient features), which has been included in the cost estimate of this project. The energy efficient features will achieve 3.5% energy savings in the annual energy consumption with a payback period of about eight years.

/**BACKGROUND** …..

BACKGROUND INFORMATION

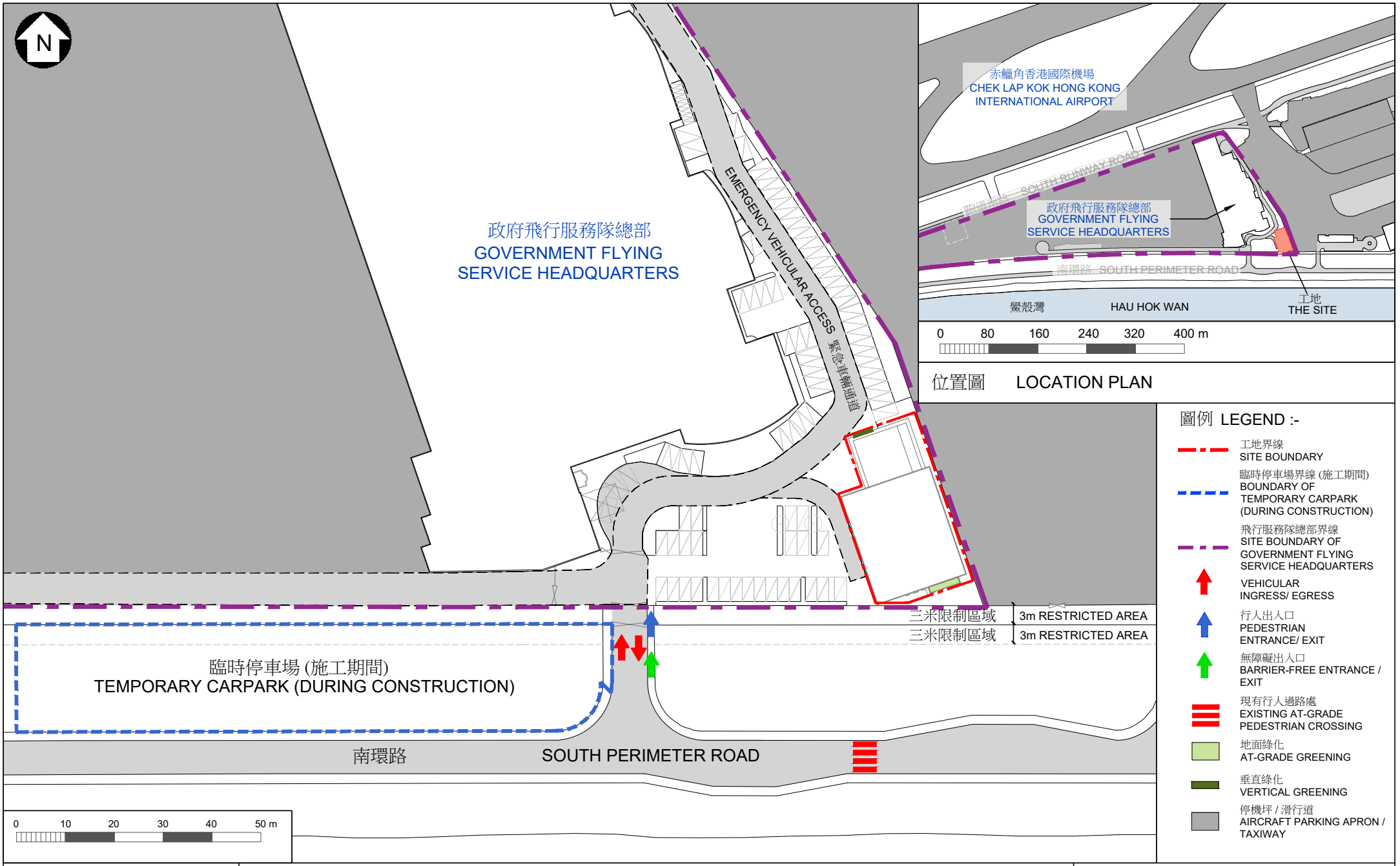
30. We upgraded **190GK** to Category B in June 2018. We engaged consultants to undertake various services, including layout and detail design in June 2018, topographical and utilities survey, acoustic assessment and traffic study in July 2018, ground investigation works in September 2018 and preparation of tender documents in November 2018, at a total cost of about $5.2 million. The services and works by the consultants were funded under block allocation **Subhead 3100GX** "Project feasibility studies, minor investigations and consultants' fees for items in Category D of the Public Works Programme". The topographical and utilities survey, ground investigation, traffic study, layout and detail design have been completed.

31. Of the three trees within the project boundary, two trees will be preserved and one tree will be felled. The tree to be felled is not an important tree[3]. We will incorporate planting proposals as part of the project, including the planting of two trees, 200 shrubs and 440 groundcovers.

32. We estimate that the proposed works will create about 40 jobs (35 for labourers and 5 for professional/technical staff) providing a total employment of 875 man-months.

Security Bureau
March 2019

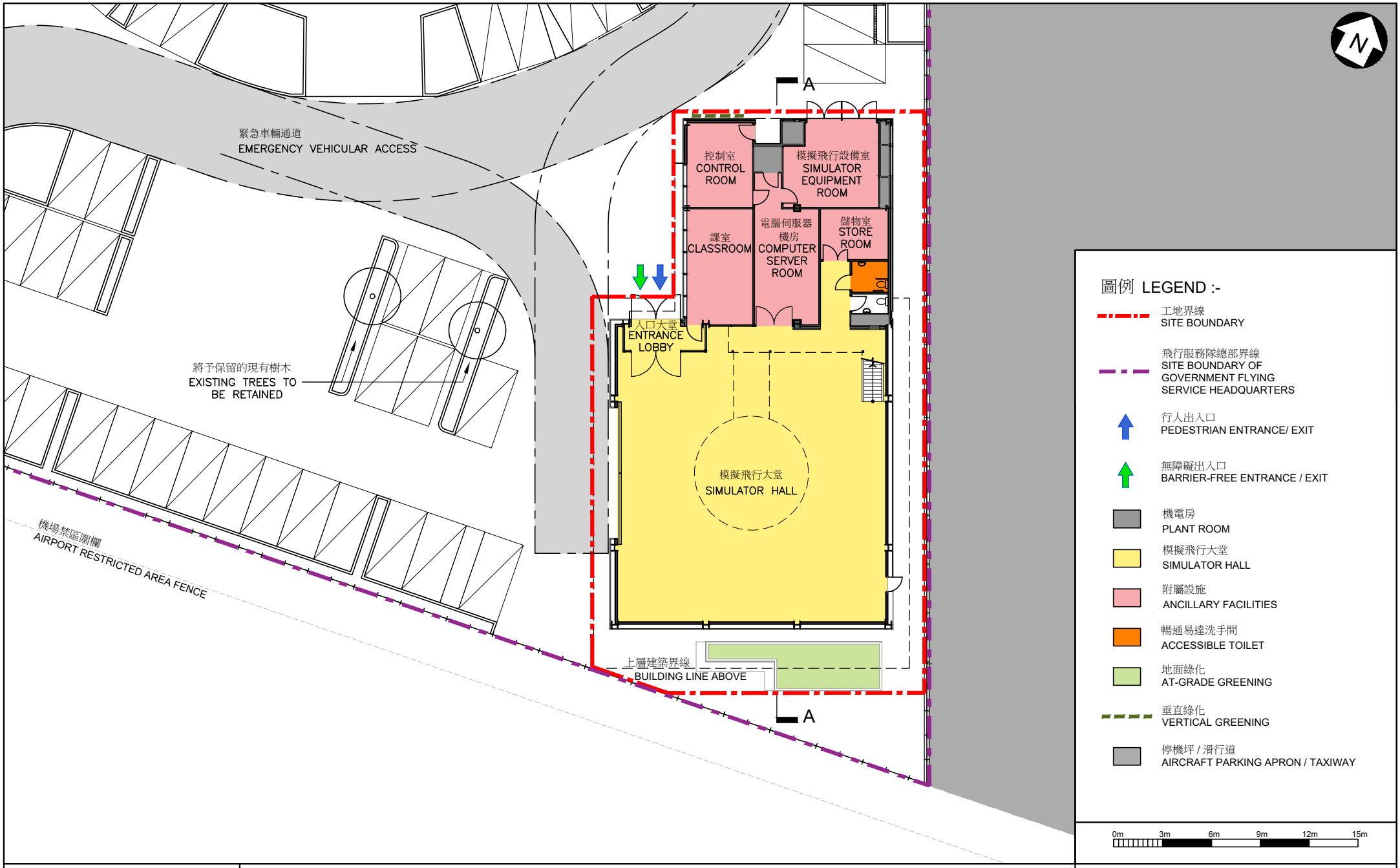
[3] "Important trees" refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –
(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, tree as landmark of monastery or heritage monument, and trees in memory of an important person or event;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
(e) trees with trunk diameter equal or exceeding 1.0 metre (m) (measured at 1.3 m above ground level), or with height/canopy spread equal or exceeding 25 m.



工地平面圖
SITE PLAN

190GK
政府飛行服務隊模擬飛行訓練中心
FLIGHT SIMULATOR TRAINING CENTRE OF THE GOVERNMENT FLYING SERVICE

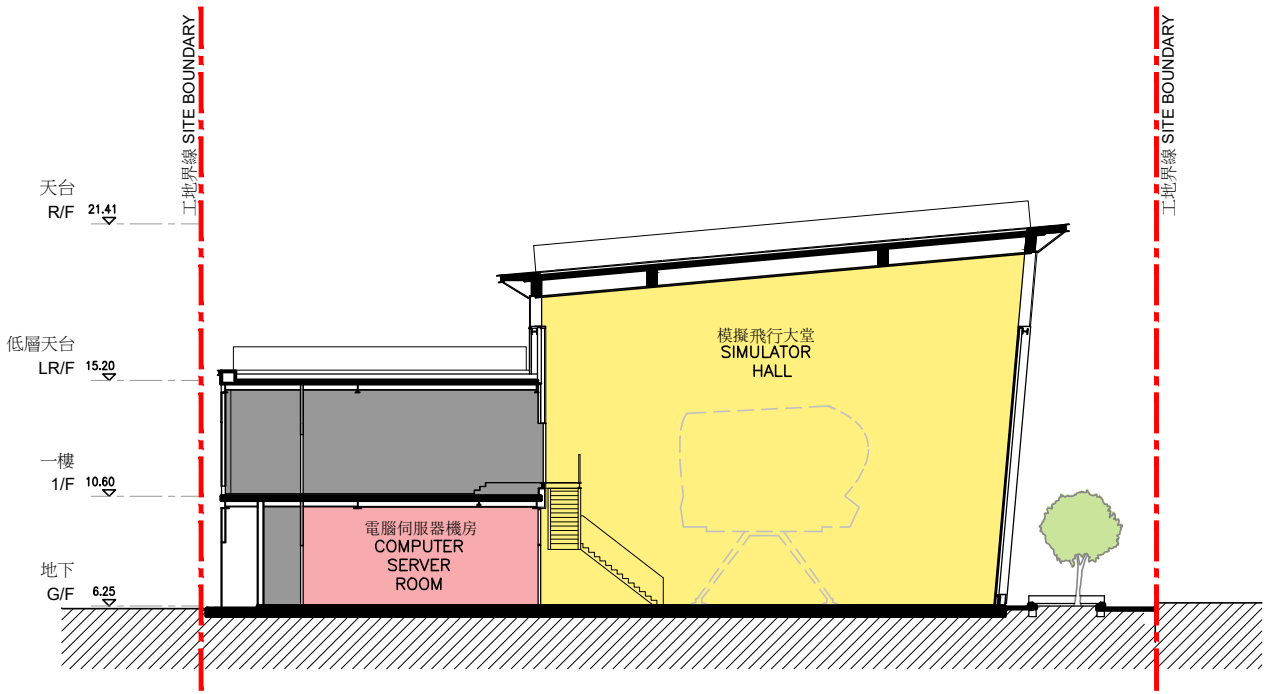
ARCHITECTURAL SERVICES DEPARTMENT 建築署



地下平面圖
GROUND FLOOR PLAN

190GK
政府飛行服務隊模擬飛行訓練中心
FLIGHT SIMULATOR TRAINING CENTRE OF THE GOVERNMENT FLYING SERVICE

ARCHITECTURAL SERVICES DEPARTMENT 建築署



圖例 LEGEND :-

工地界線 SITE BOUNDARY

模擬飛行大堂 SIMULATOR HALL

附屬設施 ANCILLARY FACILITIES

機電房 PLANT ROOM

0m 3m 6m 9m 12m 15m

剖面圖 A-A
SECTION A-A

190GK
政府飛行服務隊模擬飛行訓練中心
FLIGHT SIMULATOR TRAINING CENTRE OF THE GOVERNMENT FLYING SERVICE

ARCHITECTURAL SERVICES DEPARTMENT 建築署

從西面望向模擬飛行訓練中心的構思透視圖
PERSPECTIVE VIEW OF THE FLIGHT SIMULATOR TRAINING CENTRE FROM WEST DIRECTION

構思圖 ARTIST'S IMPRESSION	190GK 政府飛行服務隊模擬飛行訓練中心 FLIGHT SIMULATOR TRAINING CENTRE OF THE GOVERNMENT FLYING SERVICE	ARCHITECTURAL SERVICES DEPARTMENT 建築署

190GK – Flight Simulator Training Centre of the Government Flying Service

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2018 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	–	–	–	3.5
		Technical	–	–	–	1.9
					Sub-total	5.4#
(b)	Resident site staff (RSS) costs (Note 3)	Professional	-	38	-	-
		Technical	178	14	1.6	8.2
					Sub-total	8.2#
	Comprising -					
	(i) Consultants' fees for management of RSS				0.6#	
	(ii) Remuneration of RSS				7.6 #	
					Total	**13.6**

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants. (as at now, MPS salary point 38 = $81,975 per month and MPS salary point 14 = $28,725 per month).
2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for provision of contract administration and site supervision of **190GK**. The assignment will only be executed subject to Finance Committee's funding approval to upgrade **190GK** to Category A.
3. The consultants' staff cost for site supervision is based on the estimate prepared by the Director of Architectural Services. We will only know the actual man-months and actual costs after completion of the construction works.

Remarks

The cost figures in this Enclosure are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 13 of the main paper.