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OUR REF: OPS/127/MTG/SARS/LTR GEC 200308

22 August 2003

Mr Patrick NIP
 SARS Expert Committee
 c/o Health, Welfare and Food Bureau
 19/F Murray Building
 Garden Road
 Hong Kong

Dear Mr Nip

SARS (Severe Acute Respiratory Syndrome) Expert Committee

Your recent telephone conversation with [REDACTED] of the Secretariat of the Hong Kong Institution of Engineers (HKIE) in regard to submissions of the Institution on issues pertaining to SARS to the Government Department refers.

The Institution is committed to contribute to the community at large and we took the initiative to set up an Ad Hoc Task Force on SARS Matters in early May 2003 to offer our professional knowledge to the Government and the community in the fight against SARS. During the past few months, we have been in contact with various Government Departments and co-ordinated with universities and other professional bodies to contribute our professional advice on the design of drainage system, air-conditioning system for hospital dealing with SARS and infrared fever screening system, etc.

We understand that the SARS Expert Committee has examined and reviewed the SARS outbreak earlier in Hong Kong and recommendations will be made to the Chief Executive for consideration. In an effort to give the Committee a clear picture of the works that have been done by the Institution and the Government in this respect, we are pleased to attach a summary of the major achievements of the Task Force and the following documentation for your information and reference:

- ◆ Submission to the joint meeting of the LegCo Panel on Housing and LegCo Panel on Planning, Lands and Works held on 16 May 2003 on "General Comments on the design of sewerage system of residential buildings in Hong Kong" **Encl 1**
- ◆ Letter to the Director of Buildings dated 7 June 2003 on recommendations on "Enhancement to our Drainage System" **Encl 2**
- ◆ Letter to the Chief Secretary for Administration dated 20 June 2003 on areas the HKIE could provide assistance to improve environmental hygiene in Hong Kong **Encl 3**

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"Ir"乃香港工程師學會法定會員的專稱，讀音為"engineer"

"Ir" pronounced as "engineer" is the abbreviation for the prefix of Corporate Members of the HKIE

- 2 -

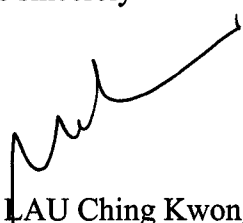
22 August 2003

Mr Patrick NIP

- ◆ Report on “Air-conditioning System for Hospitals Dealing with SARS” which had been submitted to the Chief Secretary’s office and the Hospital Authority respectively **Encl 4**
- ◆ Report of the work of the Ad-hoc Advisory Group on Infra-red Thermometry Against Severe Acute Respiratory Syndrome Comprising representatives from the Department of Health, the Electrical and Mechanical Services Department, and the HKIE **Encl 5**

We look forward to working closely with the Government to improve Hong Kong’s public health system. My colleagues and I will be happy to furnish you further information where necessary.

Yours sincerely



Ir Dr LAU Ching Kwong
Chairman
Ad Hoc Task Force on SARS Matters

Encl

Summary of Major Achievements of the HKIE Ad Hoc Task Force on SARS Matters

In early May 2003, the Task Force considered a list of SARS projects that the engineering profession could undertake to assist in the combat of SARS. The Task Force decided that three projects were of great public interests and should be implemented urgently. The relevant Divisions of the Institution and research organizations were appointed to undertake these projects and to provide the necessary deliverables. The three projects were residential drainage system, air-conditioning system for hospital dealing with SARS and infrared thermal scanner.

Residential Drainage System

There have been serious concerns about the drying up of the trap of floor drain which contributed to the spread of SARS in Amoy Gardens. The filling of the trap by hand is not reliable due to human error and the use of diluted bleaching solution is also not environmental friendly as more chemicals will be discharged to the eco-system. The Task Force in collaboration with IVE (Tsing Yi) had developed an automatic filling system for trap of floor drain that would provide a permanent solution to the problem.

The HKIE held a press conference to present the project on 5 June 2003 in the Lecture Theatre of IVE (Tsing Yi). Following the press conference the reporters were very interested inspecting the testing rig. There was good news coverage on the following day.

The Building Services Division developed a guidance note on the ventilation requirements for bathroom and a press conference was held on 22 May 2003 to disseminate the information to the public.

On 7 June 2003, the President wrote to the Director of Buildings, recommending the Government to implement the following provisions:

- ◆ Provision of automatic filling system for trap of floor drain,
- ◆ Requirement for submission to BD by competent person for modifications to existing drainage system,
- ◆ Mandatory inspection by competent person of drainage system once every 5 years, and
- ◆ Registration of licensed drainage workers.

The Buildings Department had responded positively to our pledge. A practice note (PNAP No. 277) was issued in late June promulgating the concept of automatic filling system for the trap of floor drain.

City University and IVE (Tsing Yi) continued to conduct further researches exploring alternative filling methods that would satisfy PNAP No. 277 and at the same time would function under different site constraints. The final outcomes of these researches would be available in early August 2003. Based on these findings, a guidance note would be published for the use of our members and the general public. The Task Force intended to hold a press conference to publicize these works in August 2003.

██████████ and ██████████ represented HKIE attending the Working Group on Building Design for a Clean and Health Environment organized by the Buildings Department. The first meeting was held on 2 July 2003.

Air-conditioning System for Hospital Dealing with SARS

In response to the concerns of doctors and nurses on the effectiveness of the air-conditioning system in hospitals dealing with SARS, an Expert Group (SARS-Busters) has been formed with experienced engineers both within and outside the Institution to investigate and develop an air-conditioning system that is suitable for SARS wards.

The SARS-Busters had studied the present system and developed a better system taking into account of all the recommendations of the WHO, CDC, the Chartered Institution of Building Services Engineers (UK), the American Society of Heating, Refrigerating and Air-conditioning Engineers and local practices in the handling of infectious diseases. The new design aimed to minimize cross infection among patients and health care workers inside a hospital which admits suspected and probable SARS cases.

Extensive computational fluid dynamics simulation of the new system had also been carried out to verify the airflow pattern and effectiveness of the system in minimizing air mixing and virus spread. After several rounds of simulation trials, it was found that the system would perform effectively to remove suspended particulates originating from infected patients. The proposed system would help reduce infection among patients and health care workers inside SARS ward.

With the design of a new air-conditioning system for SARS ward completed in early May 2003 by the SARS-Busters, the Task Force announced the new system to the media and the design report was provided to the Hospital Authority in mid May 2003. The Hospital Authority acknowledged the needs for improvement to the existing air-conditioning system in hospitals handling SARS patients and had commenced the design of improvements and alterations to some of the wards based mainly on our recommendations.

A full scale mock-up air-conditioning system in HKU was fully commissioned. Smoke visualization demonstrated that the design of the SARS-Busters could provide an effective airflow pattern that would prevent cross contamination within the ward.

As an appreciation of the contribution of the SARS-Busters and the donors of the engineering equipments and hospital furniture, a presentation of the project including smoke visualization demonstration was conducted for them on 9 July 2003. A press conference on the full scale mock-up was held on 11 July 2003 in HKU. Following the press conference, a smoke visualization demonstration was conducted for the press. There was good press coverage on 12 July 2003. The mock-up could be used to test various systems proposed by the Hospital Authority.

Infrared Thermal Scanner

An Ad-hoc Advisory Group (AAG) was formed under the Biomedical Division (BMD) to enhance the many sets of infrared thermal scanners installed across the land border and ferry terminals to safeguard the influx and spread of SARS through temperature screening of suspected SARS passengers. Due to design limitation, the infrared scanners installed at the border check points were not efficient.

The BMD started research work jointly with the Biomedical Engineering Centre, HKU to improve the efficiency of the thermal scanners by the provision of position indicators. The position indicator provides a signal to the immigration officer that the passenger has stood in the right position for not less than 3 seconds.

The AAG developed a position indicator system and successfully demonstrated the system to the Department of Health. The final report of the proposed position indicators for the infrared thermal scanners would be available in August 2003. A press conference would be held after the receipt of the final report.

The Hong Kong Institution of Engineers**LegCo Panel on Housing and LegCo Panel on Planning, Lands and Works****- Joint meeting on 16 May 2003 -****General Comments on the design of sewerage system of residential buildings in Hong Kong**

The Hong Kong Institution of Engineers (HKIE) is of the opinion that the Department of Health's report on the investigation of the outbreak of SARS in Amoy Garden does not contain sufficient evidences to support their findings that the building sewerage system was a probable transmission path of the disease as many problems identified were due to poor maintenance and improper use or modification of the drainage system. We believe that the outbreak was more prone to direct and indirect contact, pest infestation and environmental contamination. Nevertheless, the investigation had identified that certain aspects of the sewerage system should be improved to account for the misuse and to maintain good hygiene standard of our living conditions.

The following items are submitted for consideration:

Dried up U-trap of bathroom floor drains

In order to avoid foul smell and insects in the soil stack from entering the bathroom, the U-trap of bathroom floor drains must be always filled with water. We recommend that the Government should take immediate action to educate the general public to regularly pour water into the floor drains. We suggest that this is done at least once a month.

For the longer term, we recommend that the drainage system be slightly modified so that the floor drain U-traps are automatically and continuously primed. One possible solution is to connect the wash basin discharge pipe in between the floor drain grating and its U-trap, as illustrated in Figure 1. Such arrangement is widely adopted in Singapore, Malaysia and some part of the Mainland China. Other alternative means of automatic priming may be considered.

Although it is not a statutory requirement to provide floor drain inside bathrooms and kitchens, such provision has its obvious merits and we do not recommend to remove this provision.

Improper modification of the drainage system

It was found that U-traps in some apartments had been removed by the residents during alteration and redecoration of their bathrooms. Such improper modification is not in accordance with the Building Regulations and residents should reinstate the missing U-traps immediately.

Under the current Building Ordinance, there is no requirement for statutory approval of any modification work on the drainage system after the building has been occupied. Moreover, there is no licencing requirement for workers undertaking building drainage works. We recommend that such inadequacies in the existing legislations should be rectified.

Faulty pipework

Leaky joints and broken pipe of the drainage system are the result of lack of regular inspection and maintenance. The faulty pipework should be repaired immediately to stop leakage of effluents and foul air from contaminating the environment.

We recommend that a mandatory inspection of the building drainage system should be carried out by licenced building drainage workers at an interval of not more than five years. In this respect, the Government should take the lead to carry out such inspection for all housing estates and Government buildings.

Also, property developers should be encouraged to provide permanent means for carrying out regular inspection, maintenance and repair of the building drainage system, such as gondola/building maintenance units, davit arms or inspection platforms.

In addition, the HKIE has reviewed other aspects of the current building drainage design and come up with the following recommendations:

One-pipe system Vs two-pipe system

One-pipe system (i.e. combined soil and waste stack) has been commonly used in Hong Kong and other countries for decades. Although the adoption of separate stacks for soil and waste (i.e. two-pipe system) could minimize the risk of cross contamination, it is not considered a practical and cost effective solution because it does not resolve the problem of drying up U-trap. Moreover, the amount of vertical stacks will be doubled therefore incurring significant additional cost, imposing a lot of spatial constraints on the congested re-entrant and light well space, and the solid waste in the two-pipe system cannot be properly flushed due to insufficient flushing water. Technically, one-pipe system is better because of the flushing effect by water discharged from the bathtubs and wash basins. In our opinion, a properly designed, installed and maintained one-pipe drainage system is considered adequate.

Internal pipework Vs external stacks

A common problem related to repair and maintenance of internal pipework is the difficulties in gaining access from resident's area. Locating the drainage pipework on the exterior of buildings has the advantage that maintenance can be carried out with minimal disturbance to the residents. However, locating the pipework internally is also considered acceptable if adequate pipe duct space can be provided with proper access from the public areas (e.g. common corridor) for inspection, maintenance, repair and future replacement.

In summary, the HKIE is of the view that the current design of the building drainage system is up to international standards. We have identified certain areas where improvements of the design could be made to enhance users' requirements but more importantly, we consider that more attention should be paid on inspection and maintenance of the building drainage system and we recommend that the Government should implement legislations for the licencing of building drainage workers, statutory approval of post occupation modification work and mandatory inspection of the building drainage system.

The HKIE also strongly recommends that the Government should publish a Code of Best Practice for design, installation and maintenance of building drainage system. We are prepared to provide assistance on the drafting of the code.

Finally, we urge the Government to consider restoring the confidence of the public on our drainage system and prevent from any further announcement that the propagation of the Urbani Coronavirus is via the drainage system itself as we strongly believe that adequate inspection and maintenance are essential to ensure proper functioning of the drainage system.

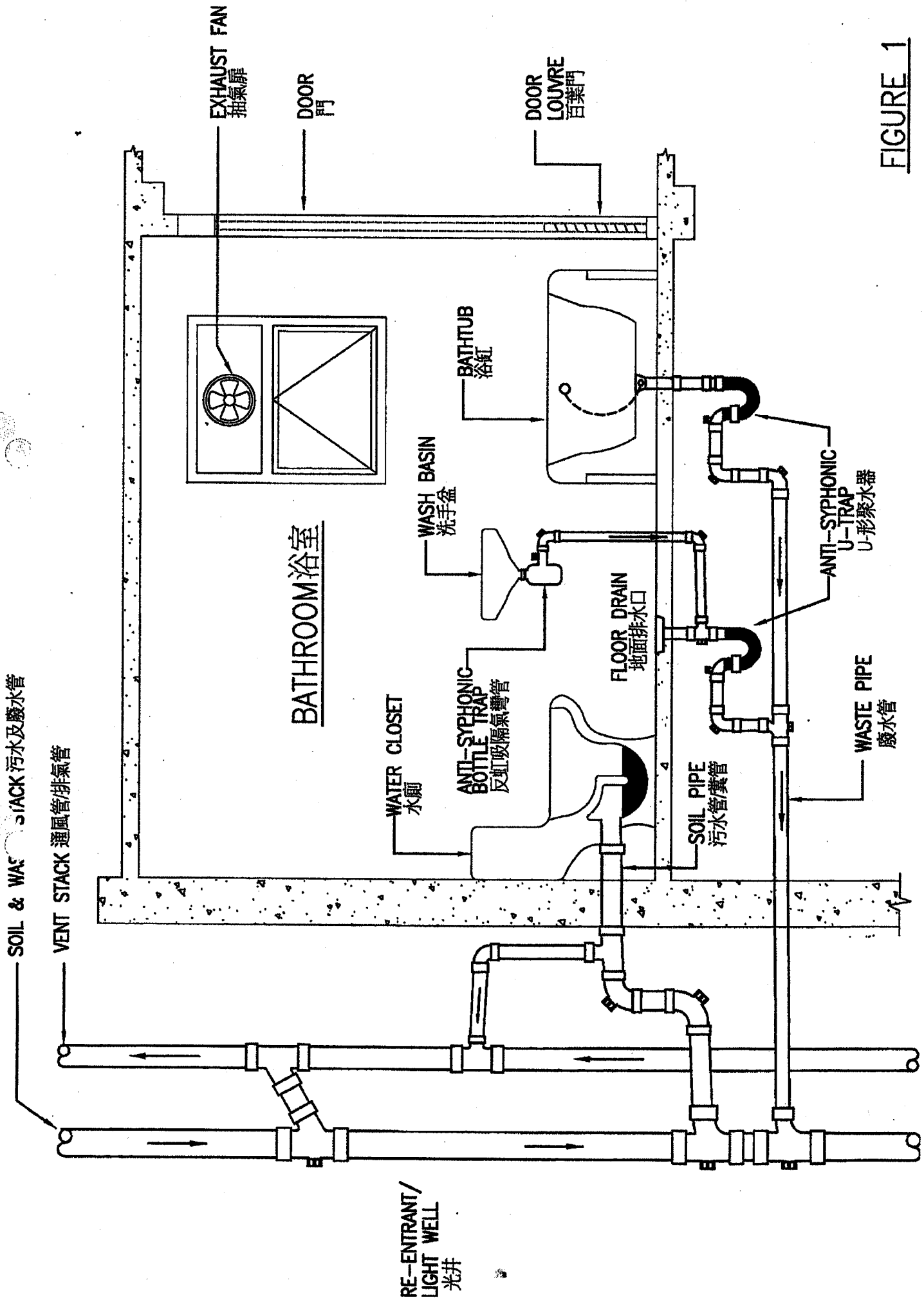


FIGURE 1

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 會長 劉正光博士、工程師



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President Ir Dr LAU Ching Kwong JP BSc MSc PhD

HKIE R.P.E. CEng FICE FStructE FIHT FHKIHT MASCE

Director of Buildings
 18/F, Pioneer Centre,
 750, Nathan Road,
 Kowloon.

7 June 2003

Dear

Marco

Enhancement to our Drainage System

There have been serious concerns in Hong Kong about the lack of inspection and maintenance of drainage systems. While we are satisfied that the new drainage installations are generally acceptable, but there are many aspects of the existing systems that need improvement. Recently, there have been immense public interest on this issue and I and other members of the Hong Kong Institution of Engineers have been repeatedly interviewed by the press. Our suggestions to the press for enhancement to our drainage system are:

1. Provision of Self filling system for trap of floor drain,
2. Requirement for submission by competent person for modifications to existing drainage system to BD,
3. Mandatory inspection by competent person of drainage system once every 5 years, and
4. Registration of licensed drainage workers.

I am sure that we share the common goal of providing clean, safe and healthy buildings for the community. I am therefore addressing this letter for your personal attention hoping these proposals will be considered for implementation soon. Should you wish to discuss our proposals further, I should be happy to do so at any time.

Yours sincerely,

(Signature)
 (Ir Dr LAU Ching Kwong)
 President,
 Hong Kong Institution of Engineers

c.c. Chief Secretary
 Secretary for Housing, Planning and Lands
 Hon. Ir Dr Raymond HO Chung Tai
 Hon. LAU Ping Cheung

"Ir"乃香港工程師學會法定會員的專稱，讀音為"engineer"

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President Ir Dr LAU Ching Kwong JP BSc MSc PhD
FHKIE R.P.E. CEng FICE FStructE FIHT FHKIHT MASCE

20 June 2003

POSTED

[Redacted]
Chief Secretary for Administration of HKSAR
12/F, West Wing Central Government Offices
Lower Albert Road
Central
Hong Kong

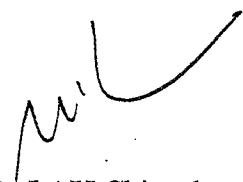
Dear [Redacted]

Thank you for sending me a copy of the Interim Report on Measures to Improve Environmental Hygiene in Hong Kong prepared by Team Clean in May 2003.

The interim report contains many good and timely recommendations of which have our support. There are two issues in the report that I hope the HKIE can provide assistance to the Government. Firstly, I fully agree with the recommendation on page 13 announcing Government's intention to review relevant sections of the Building Regulations to improve the design of drainage systems. You may wish to know that I have written to the Director of Buildings on 7 June 2003 with our recommendations on the relevant issues. A copy of the letter is attached for your reference. Secondly, on the section of URBAN AND BUILDING DESIGN on page 19, while we support the needs to amend the code of practice to enhance the durability of drainage system, I believe, it is also important to examine the current regulations on the minimum size of light well and re-entrant.

There should be plenty opportunities for partnership between the Government and the HKIE. Therefore I would suggest strengthening the existing consultation mechanism between the BD and the professional institutions. My colleagues and I will be happy to discuss further on the ways forward with a view to achieve sustainable healthy living.

Yours sincerely,


Ir Dr LAU Ching-kwong
President

Encl

** The following articles were attached and withheld from disclosure:

1. "Air-conditioning System for Hospitals dealing with SARS"
2. "Report of the Work & Ad-hoc Advisory Group on Infra-red Thermometry Against Severe Acute Respiratory Syndrome"

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