

**Panel on Housing  
Panel on Planning, Lands and Works  
Joint Meeting on 16 May 2003**

**DRAINAGE SYSTEMS OF  
RESIDENTIAL BUILDINGS IN HONG KONG**

**PURPOSE**

This paper:

- (a) sets out current design and standards provisions regarding drainage systems for residential buildings in Hong Kong;
- (b) examines whether there is a need to amend the Buildings Ordinance (BO) (Cap. 123) as a result of the outbreak of Severe Acute Respiratory Syndrome (SARS) at Amoy Gardens; and
- (c) reports on the actions taken by the Buildings Department (BD) and the Housing Department (HD) on drainage systems subsequent to the outbreak.

**DESIGN AND STANDARDS REQUIREMENTS**

2. The Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (BDR) under the BO govern the design and standards of drainage systems. Drainage systems are broadly divided into above-ground drainage and underground drainage. The BDR stipulate requirements on :

- (a) sanitary fitments such as number and supply of water;
- (b) above-ground drainage such as materials, shape, size and fixing of pipes, standards on water seal traps, connexions of pipes, access for cleaning, inspection and maintenance as well as design of pipe ducts;

- (c) underground drainage such as materials for drains, laying of drains, protection against corrosion, size of drains, treatment of effluent as well as construction, shape and location of manholes; and
- (d) testing of drainage works.

These requirements seek to ensure effective disposal of soil and waste from buildings in a sanitary manner.

3. Under the BDR, water seal traps (also known as “U-traps”) and vent pipes are essential parts of the drainage system. Water seal traps are required under all the soil and waste fittings to guard against the escape of foul air from the drainage system into the living areas. Vent pipes prevent the breaking of water seal in sewer traps caused by pressure fluctuations in the discharge system.

4. Under the BDR, both the “one pipe” system and the “two pipe” system are allowed. The “two pipe” system conducts the soil and waste in separate pipes whereas the “one pipe” system uses the same pipe to collect the discharge. As regards the siting of drainage pipes, flexibility is allowed for designers to arrange the pipes either inside or outside the building. Where drain pipes are fixed in a duct within a building, access panels shall be provided of such size and so situated that adequate access is available to facilitate proper maintenance and repair.

5. The design standards under the BDR are aimed at preventing foul smell and any contaminated droplets from the drainage system gaining entry into the living areas. They are compatible with those adopted in many other parts of the world, such as Australia, the United States of America and the United Kingdom.

## **BO REQUIREMENTS VIS-A-VIS AMOY GARDENS REPORT**

6. The Government has conducted an investigation into the outbreak of SARS in Block E at Amoy Gardens. According to the report, no one single factor could account for the outbreak and it is likely to have been the result of a combination of factors, including a minor crack in a horizontal

air vent, combined with the presence of a highly infectious index patient and the infected persons being subject to a sufficient dose to cause the onset of the disease. The presence of empty water seal traps could also have facilitated the transmission of the disease.

7. In the light of the Amoy Gardens report, we have reviewed the relevant provisions of the BDR. We have concluded that these provisions are adequate for preventing drainage systems from causing environmental or health problems. The requirement for water seal traps should guard against the escape of foul air from the drainage system into the living areas. In addition, the requirement for vent pipes should prevent the breaking of the water seal in sewer traps caused by pressure fluctuations. If drainage systems are constructed according to the standards stipulated in the BDR, and are properly maintained and repaired, they should not bring about any environmental or health problems.

8. We, therefore, do not consider that there is a need to amend the current regulation regarding drainage system in residential buildings as a result of the outbreak of SARS at Amoy Gardens. Nonetheless, we will continue to listen to the views of professionals and the industry on the subject, and keep track of the latest developments in international building design and standards to see if there is scope for improvement.

## **PUBLIC HOUSING STANDARDS**

9. The drainage systems in public housing estates have been designed to comply with the standards of the BDR. “One pipe” system is used in most public housing blocks. All soil and waste installations are fitted with proper water seal traps and vent pipes. The width of all the re-entrants<sup>1</sup> also complies with the standards of the Building (Planning) Regulations.

10. Drainage pipes are located within domestic units for the majority of existing estates. External pipes are adopted in some estates to suit different flat layout. For new estates constructed since the mid-nineties, drainage pipes are located on the external wall in the re-entrant.

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<sup>1</sup> The light well area between two units that is surrounded by three external walls.

11. We have considered the proposal to retrofit the drainage pipes in public housing estates. As mentioned in paragraph 9 above, the drainage pipes within public housing flats comply with BDR standards. With proper maintenance and repair, internal pipes would not cause any hygiene concern. HD has all along been undertaking vigilant surveillance of public housing drainage systems to ensure their proper functioning. We do not consider it necessary to retrofit the drainage pipes but will continue to ensure their upkeep through regular maintenance.

### **ACTIONS TAKEN SINCE AMOY GARDENS REPORT**

12. Apart from the review of the statutory provisions, the Government has undertaken a series of actions since the release of the Amoy Gardens report to promote proper maintenance of drainage system. For example, BD immediately contacted the management company of Amoy Gardens to repair the crack of the sewer vent pipe found at the 4<sup>th</sup> floor level of Block E and to arrange for the inspection of the drainage system of all blocks within Amoy Gardens. BD has also issued a set of guidelines to facilitate the maintenance and repair of drainage systems.

13. To ensure good practice, BD has appealed to all owners' corporations of private buildings as well as major property management companies to check the drainage systems of their buildings or the buildings under their management to ensure that the systems are well maintained. They are required to report within two months the outcome of their inspection and the follow-up actions that need to be taken. It has planned to carry out audit checks on 900 of these buildings to ensure that the inspections arranged by owners' corporations or management companies are properly carried out and necessary repairs are followed up.

14. For buildings without owners' corporations or not under the management of property management companies, BD staff have already commenced a walking survey on the drainage systems of more than 4 600 of all the 12 000-odd buildings. Remaining buildings will be covered in the coming few weeks. Amongst those buildings which have been surveyed, BD has required the owners of 500 buildings to follow up and carry out necessary repairs on their sewage systems.

15. Up to end April 2003, BD has issued orders to owners in 70 cases to repair the defective drainage works. In particular, in 6 emergency or blatant cases, BD has carried out necessary repair works in the first instance and will recover the costs from the owners concerned.

16. Owners in need of financial assistance in carrying out the inspections or any necessary repairs of drainage works may apply for a loan under the Building Safety Loan Scheme.

17. The Government has also stepped up publicity to remind owners about the importance of proper cleansing and disinfection of buildings and households. In conjunction with other departments, including the Home Affairs Department, Food and Environmental Hygiene Department and Department of Health, BD participates in talks and seminars to draw the public's attention to the need of proper repair and maintenance of the drainage systems.

18. In public housing estates, HD has adopted a three-tier approach to prevent disease transmission through contaminated drainage systems.

19. In the short term, inspection has been completed for all foul drainage installations located in common areas and external walls. Any defects detected are repaired immediately. Notices have been put up in every block to encourage tenants to report on drainage defects. Tenants can report through the hotline in their respective estates. A dedicated team with 500 professionals and technical members has been established since April 2003 to conduct emergency checks and repairs within 24 hours of reporting. As at end April 2003, about 4 000 requests for inspection and drain repairs have been received. Follow-up actions on 3 500 cases have been completed, while the remainder are pending erection of scaffolding, appointments with tenants and availability of materials, etc. For these cases, HD will take effective temporary measures to eliminate any health risk before permanent repairs are completed.

20. Flush water tanks in buildings with confirmed SARS cases are disinfected with bleaching agent every day. HD's professional staff will also conduct a thorough survey of the drainage system and arrange immediate follow-up repairs if necessary.

21. In the medium term, in consultation with BD, HD will conduct condition surveys of all public housing drainage systems. On the basis of actual conditions of drainage pipes in individual estates, HD will develop a drainage preventive maintenance strategy and programme.

22. In the long term, HD will continuously improve the drainage design for new public housing estates to facilitate system maintenance and repair. For continuous improvement, HD will liaise with professionals and the industry on possible design improvements, and will keep abreast of latest developments in drainage system designs and soil and waste pipe products.

Housing, Planning and Lands Bureau  
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