

Singapore Institute of Architects
Institution of Engineers, Singapore
Ministry of the Environment

jointly present

ENV Plan Submission Procedures and Requirements

Date	**:**	**25 July 2003 (Friday)**
Time	**:**	**2.00pm to 5.30pm**
Venue	**:**	**Civil Service College** **Auditorium – Level 1** **31 North Buona Vista Road** **Singapore 275983**

ENV Plan Submission Procedures and Requirements

Time	Programme	Speaker
1.30pm	Registration	
2.00pm	Opening Address	Mr Lau Kwong Chung
2.10pm	Overview of ENV Plan Submission Procedure - Overall approach - Key issues in environmental plan submissions	Mr Lim Kew Leong Chief Engineer
2.30pm	Pollution Control - Procedure for submission of industrial plans - Common requirements raised at pre-consultation sessions - Omissions found at spot checks during building plan and CSC stages	Mr K Suresh
2.50pm	Environmental Health - Common requirements raised at pre-consultation sessions - Omissions found at spot checks during building plan and CSC stages	Mr Anselm Gonsalves
3.10pm	Sewerage - Common requirements raised at pre-consultation sessions - Omissions found at spot checks during building plan and CSC stages	Ms Koh Mei Leng
3.30pm	Tea Break	
4.00pm	Drainage - Common requirements raised at pre-consultation sessions - Omissions found at spot checks during building plan and CSC stages	Mr Tay Boon Hai
4.20pm	Noise Control - Developments next to aboveground MRT tracks and major roads - Noise from mechanical equipment	Mr Koh Kim Hock
4.40pm	Noise Control - Design considerations to minimise noise transmission from buildings to adjacent neighbourhood and vice versa	Prof Lee Siew Eang — Acoustic C.
5.00pm	Q & A	

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Ministry of the Environment

Seminar Paper on

Overview of ENV Plan Submission Procedure

- Overall approach
- Key issues in environmental plan submissions

By Mr Lim Kew Leong

Plan Submissions to Central Building Plan Unit (NEA) – an Overview

Presented by
Mr Lim Kew Leong
Chief Engineer (CBPU),
Pollution Control Dept
Jul 03

Outline

- Background
- Plan Submission Procedure
- Common Errors in Plan Submissions
- Useful Tips / FAQs

Background

- To achieve clean air, clean water and clean land, an overall strategy for environmental management was adopted
- Strategy comprises:
  - Prevention
  - Enforcement
  - Monitoring
  - Education
- Architects, engineers and other professionals in the construction and building industry have key roles under "prevention" category

Prevention

- **Environmental Infrastructure**
  - Comprehensive public sewerage system
  - Efficient solid waste management system
- **Planning Control**
  - Landuse Planning
  - Judicious siting of industries
  - **Development and building plan control – ensure design and technical measures are incorporated**

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serve 100% population
& wastewater reclaimed on plant
~~treat~~

pollutive industries to be sited
away from residential development

Plan Submission Procedure

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Plan Submission Procedure

2 categories of plan submissions:

- **Plan Registration**
  - Building Plan on Environmental Health
  - Detailed Plan on Sewerage
  - Detailed Plan on Drainage
- **Plan Checking**
  - BP/DP on Pollution Control

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Plan Registration

Mean Platform level

- QP applies for DIP/SIP/MPL
- QP submits DC plan if the site is affected by:-
  - drainage reserve or public sewer within the lot
  - minimum platform level
  - health & safety / nuisance buffer of adjacent industrial development / above ground MRT line

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Plan Registration

- QP prepares and checks that plans complied with the codes of practice on EH, SEW, DRN
- QP submits plans and a completed application form containing standard endorsements (latest forms can be download from CBPU's website)
- CBPU registers plans within 1 working day without checking

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Plan Checking

- Applicable to DP/BP on Pollution Control
- Generally involves industrial developments
- QP should check that PCD's clearance on the use of the industrial premises had been obtained
- QP consults CBPU on the preparation of plans and seeks waivers, if required
- QP checks and submits plans to CBPU
- CBPU checks and clears plans within 10 working days

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Summary of Performance

Plan Registration

- > 95 % of plans submitted were registered within 1 working day.
- Common errors will be covered in next section.

Plan Checking

- > 95 % of BPs/DPs on PC were granted clearance/processed within 10 working days
- Common errors will be covered in next section.

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Common Errors

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Common Errors

Plan Registration

- **DIP/SIP**
  - QPs did not apply for DIP/SIP to check if a site is affected by DR/MPL requirement or public sewer (no(%) of cases in 2001 - 119 (1 %); *2002 - 106 (1%))*
- **DC Stage**
  - QPs did not submit DC plans for checking for compliance with setbacks from DR/MPL, public sewers, MRT tracks and factories; (no(%) *of cases In 2001* – 164 *(1.3%); 2002 - 232 (2.2 %))*

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Common Errors

DP/BP on Pollution Control

- **IA Clearance**
  - No clearance from PCD for the proposed industrial activities *(no&% of cases in 2001 – 38(5%); 2002 – 31(5%))*
- **Incomplete submissions**
  - No details of activities, fuel burning equipment, etc*(no&% of cases in 2001 – 378 (49.7%), 2002 – 219(35.5%)*) QP should use the checklist CBPU-PCD-99 as a guide

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Useful Tips / FAQs

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Pre-consultations

- CBPU holds walk-in pre-consultation sessions Mon to Fri, 9 am to 12 noon
- QPs could make use of these sessions to seek clarification and to discuss possible waivers from specific requirements
- At the end of each session, main points discussed and/or agreed will be documented and a copy given to the QP
- Simple queries may be made via e-mail or phone

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Application Forms

- Standard application forms for BP/DP and TOP/CSC clearances should be used
- These forms can be downloaded from CBPU Web Page
- Internet address of CBPU Web Page is :- *http://www.nea.gov.sg/info/cbpu*
- Web Page also contains guidelines and information on plan submissions and procedures

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Electronic Submissions

SIP/DIP

- QPs are encourage to apply for SIP/DIP electronically via **http://www.yellowpages.com.sg**
- In Apr 03, about 60 % of SIP/DIP applications were made electronically.

Corenet E-Submissions

- In Apr 03, about 30 % of plan submissions to CBPU were made via the Corenet System

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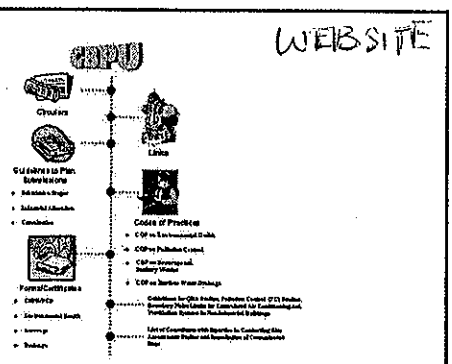

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Frequently Asked Questions

1 Must CBPU be consulted before submission of plans ?

Not necessary unless QP wishes to apply for waivers or to seek clarification on NEA /PUB's requirements.

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Frequently Asked Question

2 Are QPs required to attached checklists to for BPs on pollution control and environmental health and DPs on sewerage and drainage?

QPs are not required to attached the checklists with their plans when submitting to CBPU. However, they are encouraged to use the checklists to conduct self-checks on their plans.

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Frequently Asked Question

3 How many sets of plans are required for DC submission ?

Only one set of DC plan incorporating environmental requirements on pollution control, environmental health, sewerage and drainage is required.

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Thank you

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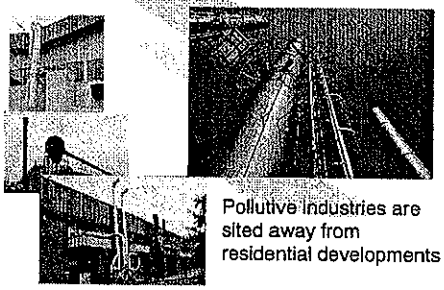
Siting of Industries



Pollutive industries are sited away from residential developments

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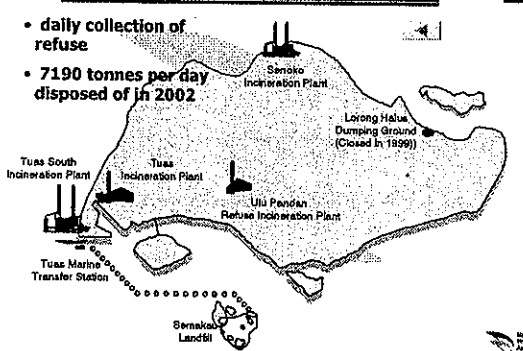
Infrastructure for Solid Waste Disposal

- daily collection of refuse
- 7190 tonnes per day disposed of in 2002



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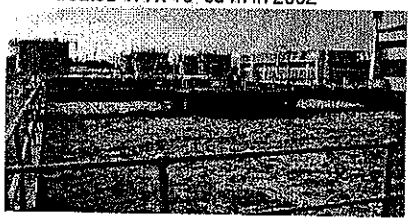
Sewerage Infrastructure

- serves 100 % of population
- 6 Wastewater Reclamation Plants
- treated 477x 10^6 cu m in 2002



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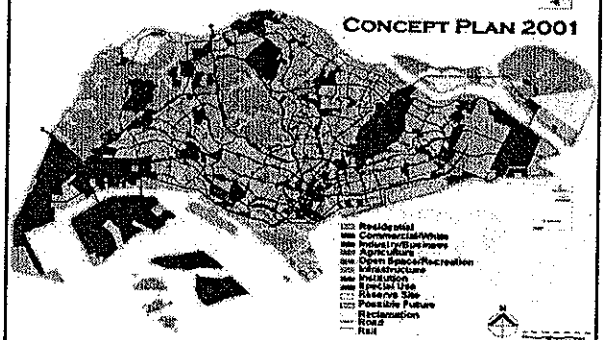
CONCEPT PLAN 2001



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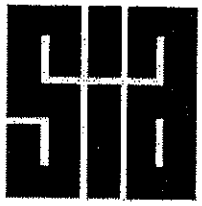

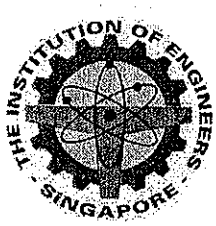

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Seminar Paper on

Pollution Control

- Procedure for submission of industrial plans
- Common requirements raised at pre-consultation sessions
- Omissions found at spot checks during building plan and CSC stages

By Mr K Suresh

POLLUTION CONTROL REQUIREMENTS

by

K Suresh
Central Building Plan Unit
NEA

Agenda

- **Procedure for Submission of Industrial Plans**
- **Common Requirements Raised at Pre-consultation Sessions**
- **Errors Made in Industrial Plan Submissions**
  (Advice/suggestions to help QPs achieve even faster clearances)

Procedure for Submission of Industrial Plans

Submission Stages

Industrial Allocation

⬇

Application for Sewerage & Drainage Information

⬇

Development Control

⬇

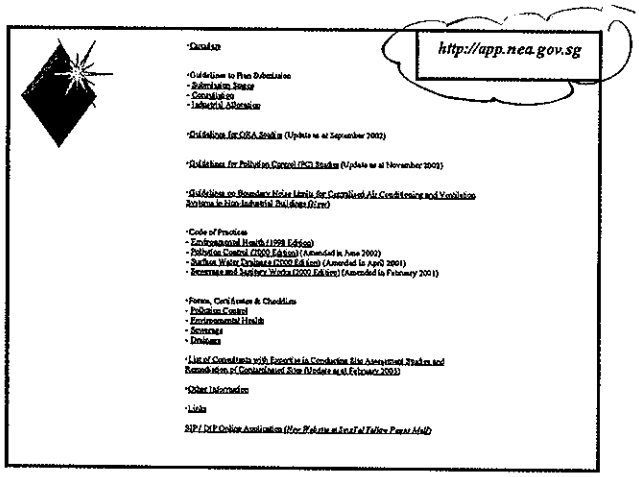
Building Plans & Detailed Plans

⬇

Application for Temporary Occupation Permit

⬇

Application for Certificate of Statutory Completion

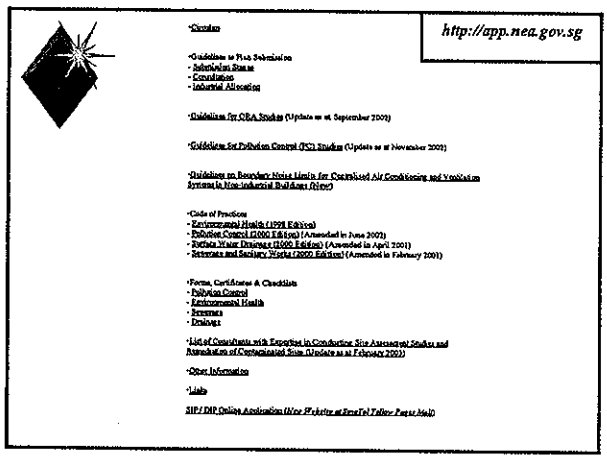


Development Control

- At DC stage, CBPU checks layouts of developments for compliance with the following requirements:
  - **Adequate building setbacks are provided between MRT above ground tracks, factories and residential buildings;**
  - Buildings/structures do not encroach into public sewers, pumping mains, drainage reserves or common drain;
  - Platform level of the development is raised above the minimum platform level for effectual land drainage;
  - **Land is set aside for the provision of sewage treatment plants in areas where public sewer is not available; and**
  - Minimum crest level provided for the underground linkage to MRT station or underground linkage to development having underground linkage to the MRT station.

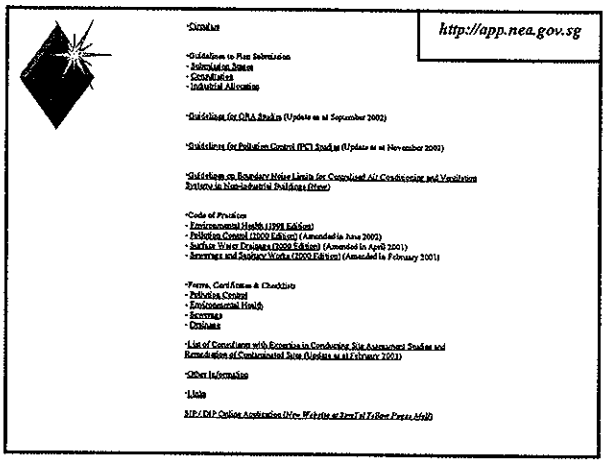
Development Control

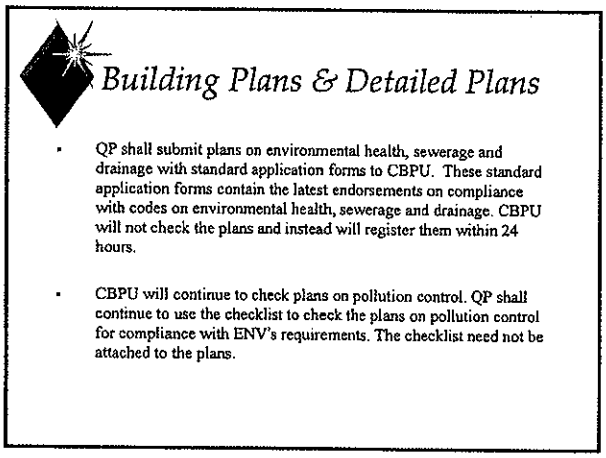
- CBPU will reject DC plans if QP has not applied for SIP & DIP for the development site.
- QP should consult CBPU on the preparation of DC plan of the proposed development and seek waivers (if required) before making a submission.
- QP shall use the checklist to check that their DC plans are in compliance with ENV's requirements. The checklist need not be attached to the submission

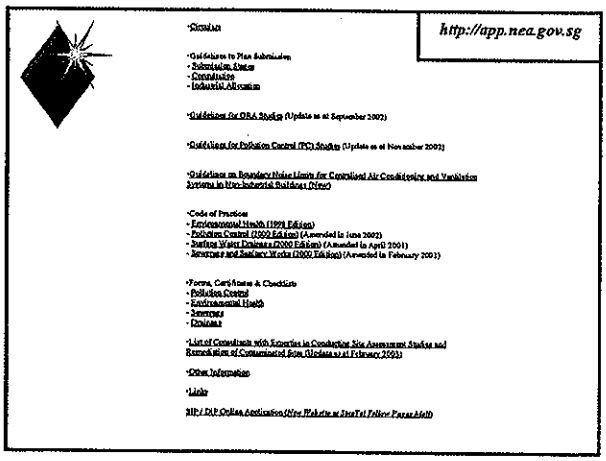


Building Plans & Detailed Plans

- At this stage, QP shall prepare building plans (BPs) on PC and EH building works and detailed plans (DPs) on Sewerage and Drainage buildings works in compliance with ENV and PUB codes of practice NEA
- CBPU will reject building plans and detailed plans if QP has not obtained DC Clearance (if required)


http://app.nea.gov.sg
•Circulars
•Guidelines to Plan Submission
- Submission Routes
- Consultation
- Industrial Allocation
•Guidelines for ORA Studies (Update as at September 2002)
•Guidelines for Pollution Control (PC) Studies (Update as at November 2002)
•Guidelines on Boundary Noise Limits for Centralised Air Conditioning and Ventilation Systems in Non-Industrial Buildings (New)
•Code of Practices
- Environmental Health (1998 Edition)
- Pollution Control (2000 Edition) (Amended in June 2002)
- Surface Water Drainage (2000 Edition) (Amended in April 2001)
- Sewerage and Sanitary Works (2000 Edition) (Amended in February 2001)
•Forms, Certificates & Checklists
- Pollution Control
- Environmental Health
- Sewerage
- Drainage
•List of Consultants with Expertise in Conducting Site Assessment Studies and Remediation of Contaminated Sites (Updated as at February 2003)
•Other Information
•Links
SIP / DIP Online Application (New Website at StarTel Yellow Pages Mall)


Building Plans & Detailed Plans
QP shall submit plans on environmental health, sewerage and drainage with standard application forms to CBPU. These standard application forms contain the latest endorsements on compliance with codes on environmental health, sewerage and drainage. CBPU will not check the plans and instead will register them within 24 hours.
CBPU will continue to check plans on pollution control. QP shall continue to use the checklist to check the plans on pollution control for compliance with ENV's requirements. The checklist need not be attached to the plans.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•Other Information
•Links
SIP / DIP Online Application (New Website at StarTel Yellow Pages Mall)

Application for TOP

- QP shall use the TOP form to apply for TOP clearance for a completed development after he has inspected and confirmed the following:
  - The sanitary/sewerage works have been completed in accordance with the registered DPs on Sewerage & a Certificate on Supervision/Completion of Sanitary/Sewerage Works has been submitted to Sewerage Department;
  - The pollution control works have been completed in accordance with the BPs on PC.

Application for CSC

- QP shall use the CSC form to apply for CSC clearance for a completed development after he has inspected and confirmed the following:
  - TOP requirements are met
  - Building works related to environmental health have been completed in accordance with the registered BP on EH. A Certificate on Supervision/Completion of related building works has been submitted to CBPU; and
  - Surface water drainage works have been completed in accordance with the registered DPs on Surface Water Drainage. The required Certificate of Supervision/Completion has been submitted to Drainage Department.

To Operate a Factory

- After Obtaining TOP/CSC the Owner May Apply to PCD for clearance, written approval, license and permit required to operate a factory
- Guidelines and forms on the application for clearance, written approval, licence and permit are available on the NEA web-site at:

http://app.nea.gov.sg
(Service Centre)

Pre-consultation Sessions for QPs

- QPs may walk in to consult CBPU on the preparation of the plans should they need clarification or seek waiver on requirements on every Monday to Friday morning (9.00 am-12 noon).
- There is no need for QPs to make prior appointments for pre-consultation sessions.
- Besides the pre-consultation sessions, QPs can also contact / e-mail CBPU officers at other times for advice.

http://app.nea.gov.sg

- Circulars
- Guidelines to Plan Submission
  - Submission Status
  - Consultation
  - Industrial Allocation
- Guidelines for CRA Studies (Update as at September 2007)
- Guidelines for Pollution Control (EC) Studies (Update as at November 2007)
- Guidelines on Boundary Noise Limits for Centralised Air Conditioning and Ventilation Systems in Non-Industrial Buildings (New)
- Code of Practices
  - Environmental Health (1998 Edition)
  - Pollution Control (2002 Edition) (Amended in June 2007)
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Common Requirements Raised at Pre-consultation Sessions

Water Pollution Control

- Trade effluent shall be treated to the allowable limits before discharge into a public sewer or watercourse. The limits for the discharge of trade effluent into a public sewer and watercourse are given in Appendix 9 of COPPC.
- Trade effluent containing Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) exceeding the allowable limits may be discharged into a public sewer subject to payment of trade effluent fees as given in Appendix 10 of COPPC.

Water Pollution Control

- Contaminated rainwater from process areas shall be collected and treated before discharge into the watercourse.
- Secondary containment facilities shall be provided for storage tanks containing oils and chemicals to contain accidental release of the entire content of the largest storage tank.

Air Pollution Control

- Developments which can generate air impurities, are required to install, operate and maintain air pollution control equipment designed to comply with the allowable emission standards in Appendix 19 of COPPC.
- For air impurities with no prescribed emission standards, best practical means shall be adopted to minimize air pollution.
- Exhaust gases from the pollution control equipment shall be emitted into the atmosphere through an appropriately designed discharge stack to ensure safe dispersion.

Air Pollution Control

- Fuel burning equipment shall be efficiently operated and maintained. The fuel burning equipment shall use fuel cleared by PCD. From
- A chimney of an approved height shall be provided for the safe dispersion of flue gases from fuel burning equipment.

Air Pollution Control

- Sampling ports shall be provided for manual installation of portable sampling equipment. The ports shall be installed such that they are accessible.
- Alternatively, monitoring equipment may be provided at the discharge stacks and chimneys to monitor air impurities emitted.

Noise Pollution Control

- All practical noise abatement measures shall be adopted to comply with boundary noise limits for factory premises. The allowable limits are given in Appendix 20 of COPPC.
- For clean or light industries located adjacent to noise-sensitive and residential developments, mechanical equipment (e.g. air compressors, chillers, cooling towers and air-conditioners) shall be sited as far away as practical from the noise-sensitive and residential buildings.
- Noise abatement measures, if required, shall be provided to comply with the allowable boundary noise levels.

Land Pollution Control

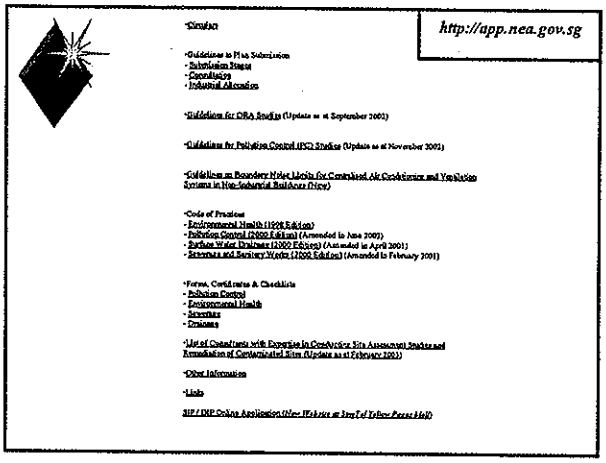
- A new section on Control Of Land Pollution And Remediation Of Contaminated Sites has been included in COPPC.
- The framework documents the current procedure and practice adopted by PCD in advising developers, owners and occupiers on this issue.

Land Pollution Control

- In essence, PCD's requirement is as follows:
  - When a site that is used for **pollutive activities** is to be redeveloped, rezoned or re-used for a **non-pollutive** activity, a study shall be conducted on the site to assess extent of land contamination.
  - If the site assessment study shows that the site is contaminated, the contaminated site shall be cleaned up to standards acceptable for the intended use.

Land Pollution Control

- Owners/occupiers or the prospective buyers/lessees may carry out the site assessment study and clean up using in-house or second party experts. The use of in-house or second party experts is subject to approval from PCD.
- Alternatively, they may engage a third party specialist consultant with recognized competence in site assessment studies and remediation of contaminated sites to carry out the site assessment study and clean up of the site.



Errors Made in Industrial Plan Submissions

(Advice/suggestions to help QPs achieve even faster clearances)

Trade Effluent Treatment Plant

Error	Advice
Explanatory notes on the concept of operation of the trade effluent treatment plant not submitted	Explanatory notes would help us understand the effectiveness of the proposed treatment system
Location of trade effluent treatment plant, pH monitoring system, sampling sump not highlighted on BP	To be highlighted in red on BP and labelled

Air Pollution Control

Error	Advice
No explanatory notes on proposed air pollution control equipment submitted	Explanatory notes would help us understand the effectiveness of the proposed treatment system
Proposed air pollution control equipment not indicated or highlighted on BP	To be highlighted in red on BP and labelled
Exhaust stack does not terminate above roof of a building or meet the minimum height requirement stipulated in COPPC	To ensure safe dispersion, the minimum height of an exhaust stack is 3m above roof or 15m above ground level whichever is higher

Fuel Burning Equipment

Error	Advice
Information on fuel burning equipment not submitted	A list of equipment, type of fuel used and fuel consumption rate to be submitted
Calculations for chimney height not provided	To submit calculations for chimney height taking account of the heights of building in the vicinity
Locations of fuel burning equipment and chimney not indicated on plan	To be highlighted in red on BP and labelled

Chemical/Oil Bulk Storage Tanks

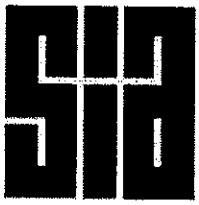
Error	Advice
No calculations showing that secondary containment can contain the capacity of the largest tank	To submit calculations
Location of the bulk storage tanks and secondary containment not indicated on BP	To be highlighted in red on BP and labelled
Elevated storage tank not provided with measures to contain a shooting jet of chemical/oil escaping from a leak/rupture in the tank.	To be highlighted in red on BP and labelled

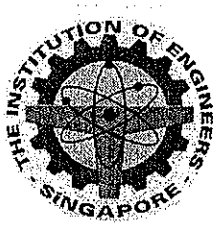
Chemical Warehouses

Error	Advice
Separate compartments not provided for the storage of substances that can react dangerously with one another	To highlighted in red on BP and labelled
A retention basin for fire fighting water not provided	A retention basin of adequate capacity to be provided
The floor of the warehouse is not coated with a layer of chemical-resistant material	To be indicated / labeled on BP

Thank You







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Seminar Paper on

Environmental Health

- Common requirements raised at pre-consultation sessions
- Omissions found at spot checks during building plan and CSC stages

By Mr Anselm Gonsalves

ENVIRONMENTAL HEALTH REQUIREMENTS – Common Issues and Errors

Presented by
Mr Anselm Gonsalves,
SE (Non-Industrial)
CBPU, PCD

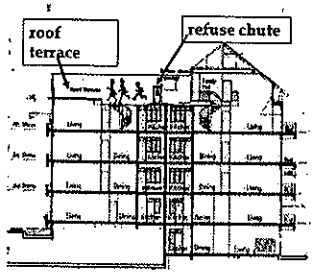
Scope of Presentation

- Refuse chute terminating in private roof terrace/garden
- Refuse hopper design
- Bin centre
- Public toilet
- Food shop
- Swimming pool

Refuse Chute in Private Roof Terrace/Garden

Common Error

- Siting of refuse chutes within private roof terrace/garden
- Owners using the roof terraces complained about odour and safety problems



Refuse Chute in Private Roof Terrace/Garden

Clarification

- Refuse chute is ventilated at roof level to allow foul air to be dispersed safely into the atmosphere without posing nuisance to surrounding developments
- Ventilation of chute will also prevent foul air entering the apartment units when the refuse hopper is opened for disposal of rubbish
- QPs have to pay close attention to the use of the surrounding roof space and maintenance requirements of the refuse chute when deciding on its location

Refuse Chute in Private Roof Terrace/Garden

Suggested Guideline

- Terminate the refuse chute at the highest roof level(for building with staggered roofs), wherever feasible.
- Locate refuse chute within common service areas (*to facilitate access for sprinkler system maintenance*) with ventilation openings facing away from roof terraces/gardens.
- Where it is technically not feasible to re-site the refuse chute outside private roof terrace/garden, it shall be raised and screened so as not to pose odour or safety problems

Refuse Hopper Design

Common Issue

- Minimum height of the hopper
- Hopper sited above kitchen counter

Clarification

QP free to decide on the hopper height and location, taking into consideration safety and hygiene

Bin Centre: Refuse Output

Common Issue	Clarification
For a development undergoing A/A work, can the existing bin centre be demolished if total refuse output is less than 1000 litres/day	•Where the total refuse output is less than 1,000 litres/day, an existing bin centre may be demolished under the A& A works •Approval shall be obtained from EHD prior to the demolition work/ submission of BP.

Bin Centre: Refuse Output

Common Issue	Clarification
Where the total refuse output is more than 4000 litres/day, can two or more smaller bin centres be provided in lieu of a single bin centre fitted with a compactor	• Centralising refuse storage at a single bin centre with compactor is meant to facilitate refuse collection and mechanisation. •In general, multiple bin centres will not be supported •For large-scale developments requiring multiple bin centres, QP shall consult CBPU for approval before BP submission.

Bin Centre: Location & Facing

Common Error

•Bin centre facing frontage of landed houses



•Odour and noise nuisance caused to neighbouring premises

Bin Centre: Location & Facing

Clarification

- Siting of bin centre and its facing shall take into consideration the surrounding land use
- This is to ensure the bin centre does not pose odour and noise problems to neighbouring developments

Public Toilet: Development Type

Common Issue	Clarification
QPs not sure what type of developments require provision of public toilet	• Developments requiring public toilets are specified at Appendix 2 of COPEH • Public toilets also required in MRT station and airport(not in Appendix 2) • All other developments not required to provide public toilets • QP free to decide the number of water closet, wash basin and urinal for developments in consultation with developer/owner

Public Toilet: Auto Sensor

Common Issue	Clarification
Automatic flushing devices for non-public toilets	• Only water closets and urinals in public toilets shall be fitted with an automatic flushing device • PUB does not allow automatic flushing devices in non-public toilets in order to conserve water

to write to PUB for waiver

Public Toilet: Manual Over-ride /Bypass

New requirements for auto-sensor operated flush valves

- Spelt out in EHD circular dated 24 Dec 03
- Urinal – fitted with manual over-ride feature
- Water closet – fitted with manual over-ride and bypass feature

Rationale

- To allow urinal/water-closet to be flushed should the sensor mechanism fail to operate

Public Toilet: Manual Over-ride/Bypass

Implementation – From 1 Jul 2003

- All building plan submissions for new developments with public toilets
- Existing public toilets undergoing renovations, repairs or other works involving replacement of flush valves or flushing cisterns

Public Toilet: Manual Over-ride/Bypass

Implementation – From 1 Jul 2004

- All new projects
- Ongoing projects which have not obtained TOP by 1 Jul 2004.
- In the event of delay for ongoing projects, QP may apply for waiver to EHD. Waiver will be granted on a case by case basis, subject to developer/QP substantiating the delay.

Foodshop: Wash Area

Common Error	Clarification
Centralised wash area not provided for foodshop with individual stalls	•Centralised wash area is required for washing of soiled crockery • Objective is to mechanise washing operation so as to improve standard of hygiene

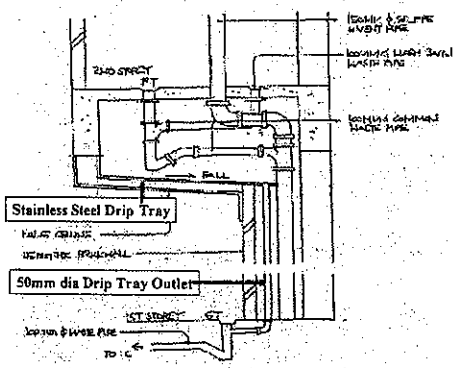
Foodshop: Wash Area

Common Error	Clarification
• One centralised kitchen to serve two or more foodstalls	• Centralised kitchen is allowed only for a single foodshop without individual foodstalls; eg. restaurant. • For foodshops with two or more stalls, every foodstall shall have its own individual kitchen with a minimum area of 5 sq m.

Foodshop: Grease Trap/IC

Errors	Clarification
• Grease trap/inspection chamber(IC) located inside kitchen	• Not allowed as they will affect the standard of food hygiene and pose risks to public health(ie. food posisoning).
• Sanitary plumbing system/toilet sited over kitchen of a foodshop	• Strictly prohibited for new developments • For A&A to existing buildings, the grease trap/IC shall be segregated with a low wall. Containment facilities such as double floor slab, drip tray should be provided for overhead sanitary pipes

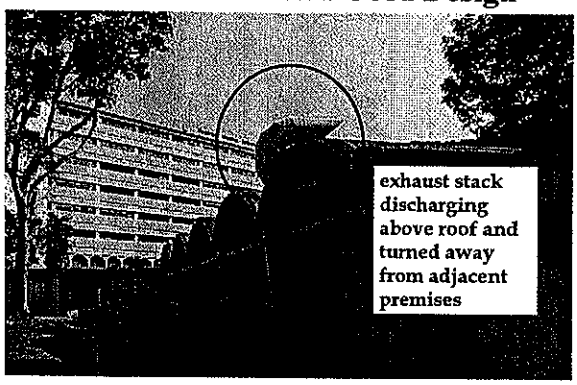
Foodshop: Grease Trap/IC



Foodshop: Flue Exhaust Stack

Common Error	Clarification
• Flue exhaust stack of foodshop is not terminated above roof level and facing adjacent premises	• Flue exhaust shall be terminated above roof level and the outlet shall be directed away from neighbouring premises
• Smoke, heat and odour nuisance caused.	• If flue exhaust cannot be discharged at roof level, air cleaning system shall be provided.

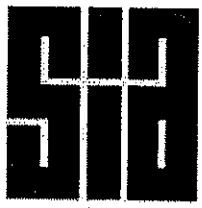
Flue Exhaust Stack: Good Design



Swimming Pool: Sanitary Facilities

Common issue	Clarification
• Changing room sanitary facilities	• Swimming pool in condominium/apartment is not classified as public pool
• Reduction/deletion of sanitary facilities in changing room of existing condominium or apartments	• QP free to decide on the sanitary facilities in consultation with developer (for new developments)/MCST (for existing developments)

End of Lecture

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Seminar Paper on

Sewerage

- Common requirements raised at pre-consultation sessions
- Omissions found at spot checks during building plan and CSC stages

By Ms Koh Mei Leng

Sewerage Requirements – Common Issues and Errors

Presented by
Ms Koh Mei Leng
EE (Non-Industrial)
CBPU, PCD

Outline

Sanitary Plumbing System (Part 1)

- Fire-rated Access Panel
- Plumbing System for Strata Units
- Sanitary Piping over Water Tanks / Transformer / Switchgear
- Siting of Ventilation Stacks at Roof Level
- Portable Grease Trap for Foodshops
- Basement Plumbing System

Sewerage Requirements (Part 2)

- Sewer Connection
- Minor Sewer

Sewerage Requirements (Part 3)

- Salient Details in Sewerage Interpretation Plan
- Simplified Work Procedure for Minor Sanitary Work

Sanitary Plumbing System (Part 1)

Central Building Plan Unit July 2003

Sanitary Plumbing System Enclosed in Fire-Rated Service Duct

Common issue

QPs face difficulty in providing access panels for sanitary piping housed within fire-rated service ducts or enclosures.

Clarification

- Access panel is required to facilitate clearing of blockages at the connection between the discharge pipe and the vertical sanitary stack.
- Requirement may be waived if cleaning eye on the discharge pipe is relocated outside the service duct.service duct.

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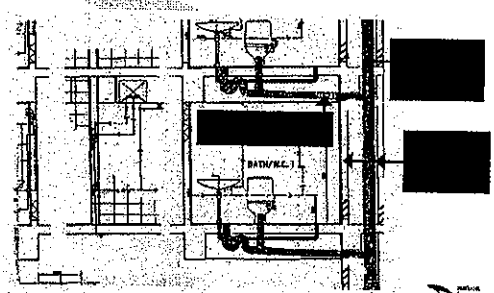
Sanitary Plumbing System Enclosed in Fire-Rated Service Duct



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Sanitary Plumbing over Bed / Living / Dining Rooms and Kitchen

Common Error

In buildings under Land Titles (Strata) Act, sanitary pipes are sited over bedrooms, living room, dining room or kitchen of the strata unit below.

Clarification

- Pipe leakage and maintenance work would pose nuisance conditions and inconvenience to owners of lower level strata units.
- Sanitary pipes shall be routed away from such places.
- Maintenance duct with access taken from common areas shall be provided if dry areas cannot be avoided.

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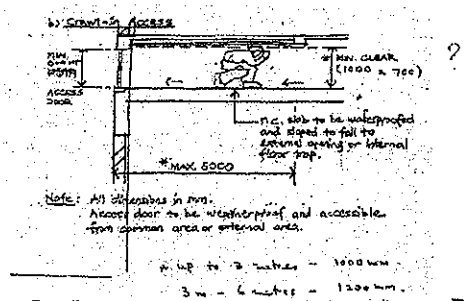
Sanitary Plumbing over Bed / Living / Dining Rooms and Kitchen



Details of Double Floor Slab / Maintenance Duct

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Sanitary Plumbing over Water Tanks / Transformer / Switchgear

Common Error

- Sanitary pipes sited over water tanks, transformer and switchgear

•Leaks from sanitary pipes could contaminate water tanks etc.

Clarification

- Sanitary pipes shall not be located over water tanks, transformer, switchgear or other places where it can cause health and safety hazards.

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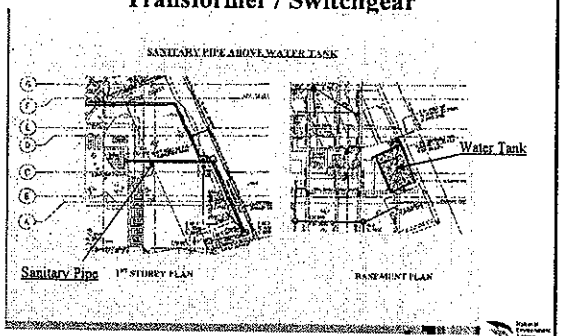
Sanitary Plumbing over Water Tanks / Transformer / Switchgear



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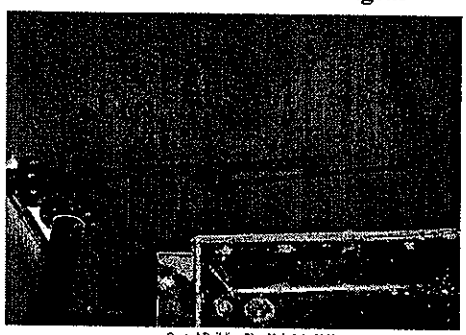
Sanitary Plumbing over Water Tanks / Transformer / Switchgear



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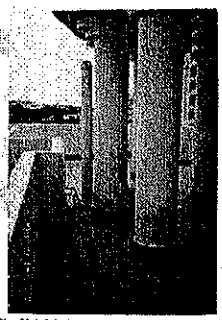
Ventilation Stack Terminating at Roof Level

Common Error

Ventilation stacks terminate at communal or private roof terrace / garden causing foul odour nuisance to residents.



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Ventilation Stack Terminating at Roof Level

Clarification

- Ventilation stack shall terminate at the highest roof level and shall be sited in common service areas outside private roof terraces / gardens.
- This will facilitate maintenance work and minimise inconvenience and nuisance to occupants.

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Ventilation Stack Terminating at Roof Level

Clarification(Cond't)

- To avoid vent pipes terminating in the private roof terraces / gardens, the vent pipe may be offset and extended for termination at the highest point of the building or other suitable location that will not cause smell nuisance or health hazard to the occupants.

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Sanitary Plumbing System for Foodshop

Common issue

Can portable grease trap be used for foodshop?

Clarification

- Standard grease trap shall be used wherever possible.
- Portable grease trap will be allowed on a case by case basis due to space constraints, non-availability or inadequate capacity of grease trap serving existing buildings.
- Portable grease trap shall be equipped with a skimming device to separate oil and grease.

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Basement Plumbing System

Common Error

Basement toilets connected by gravity flow to inspection chamber

Clarification

- Wastewater from sanitary fittings in basement shall be connected to the sanitary drainage system via a sewerage pumping appliance.
- To prevent backcharge/overflow of sewage into the basement in the event of blockage in the sanitary drainage system at the first storey / ground level.

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Basement Plumbing System

Clarification

- Sewage Ejector - for wastewater from toilets and refuse chutes / chambers
- Sewage Divertor - for wastewater from foodshops located in basement (sewage ejector can be used if there is provision of grease trap at the upstream of the pumping installation)
- Pump Sump - for wastewater from covered car parks not exposed to weather (including car washing areas)

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Basement Plumbing System

Common Issue

Is sewage pump sump required for sullage water from basements with openings or voids exposed to rain?

Clarification

- Floor wastes and basement pump sump are not required.
- Scupper drains shall be provided to collect and channel sullage water from floor washing into the drainage pump sump provided for rainwater.

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Sewerage Requirements (Part 2)

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Sewer Connection

Common issue

Can a development have more than one sewer connection?

Clarification

- In general, only one sewer connection is permitted per development.
- This is to minimise
  - number of road openings
  - inconvenience to neighbouring properties when public sewer is located in adjacent property
  - disruption to sewerage system due to interruption of sewage flow

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Sewer Connection

Clarification (Cond'd)

- Where it is not practicable to provide a single sewer connection; in particular for large development sites or sites constrained by invert level of existing public sewer, QP shall pre-consult CBPU and obtain waiver in writing upfront.

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Sewer Connection

Common Issue	Clarification
Can y-junction connection be provided for condominium, commercial or industrial developments?	• Y-junction connection is allowed only for landed housing not exceeding 10 units because of the low discharge rate. • For condominiums, commercial and industrial developments, connection to sewer shall be made via an existing / proposed manhole because of the high discharge rate and the attendant risk of blockage.

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Sewer Connection

Common Issue	Clarification
Can a new connection be provided for a development if the existing sewer is located in neighbouring property?	• Existing sewer connection shall be re-used whenever possible. • Where a new sewer connection is required because of development layout, it is necessary to obtain written consent from the owner of adjacent lot prior to submission of DP. • Approval shall also be obtained from CBPU for waiver of re-usage of existing sewer connection.

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Sewer Connection

Common Issue	Clarification
Sewer connection affected by subdivision of land	• QP shall pre-consult CBPU for all subdivision cases. • This is to safeguard sewer connection for the sub-divided land parcels. • Existing drainline / sewer within the subdivided plots shall not be abandoned / diverted without written approval from CBPU.

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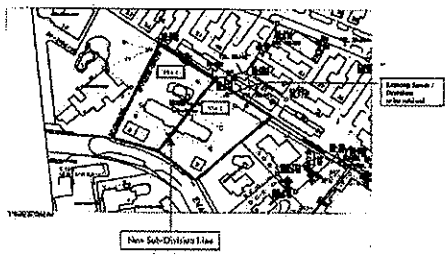
Sewer Connection



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Minor Sewer

Common Issue/Error	Clarification
Siting of building over public sewer	• In general, this is not permitted. • Allowed only for in-filled landed residential premises where sewer diversion is not practicable. • For ease of sewer maintenance, a reinforced concrete trench shall be provided to house the sewer.

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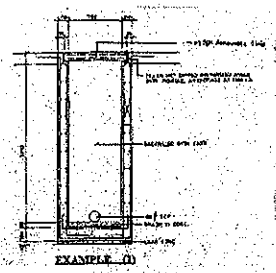
Minor Sewer



Typical Sewer Trench

- Trench will allow easy access to carry out maintenance and repair to the sewer under the building.
- A set of photograph of the completed trench shall be submitted to PUB (Sewerage Department) prior to the backfilled of the trench with sand.

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Minor Sewer

Common Issue	Clarification
Are demountable structures allowed to be sited over sewer?	• Light and easily removable structures which do not form an integral part of the building would be allowed to be sited over sewer. Examples are awnings, planting troughs, linkways with demountable roofs, compound drains, etc..

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Building Setback from Sewer / Pumping Main

Common Issue	Clarification
Difficulty complying with building setback from sewer imposed at SIP stage	• QP shall pre-consult CBPU and apply for waiver before submitting DP. • Waiver will be considered on a case by case basis. • Sewer trench may be imposed in lieu of required setback to facilitate maintenance.

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Sewerage Requirements (Part 3)

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Sewerage Interpretation Plan (SIP)

- SIP indicates the approximate location and alignments of public sewers / pumping mains in the vicinity of the development.
- SIP may not show details of the existing sewer connections at the development. QP shall ascertain / verify details of the sewer connections on site.

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Minor Sanitary Work – Existing Premises with no Sanitary Facilities

- DP Submission to CBPU is not required for sanitary works, involving new wc, urinal, grease trap, sanitary pipework, diversion or demolition of STP provided BP approval from BCA is not required for the works.
- Owner / Occupiers and contractor shall submit sketch plan with application form to PUB (Sewerage Department) for record.

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Minor Sanitary Works To Existing Sanitary Facilities /Appliances

- Minor sanitary works such as repair, removal / replacement of wc, floor trap and defective / corroded sanitary piping, or any addition to existing sanitary facilities / appliances, plan submission to CBPU or PUB(Sewerage Department) is not required.
- In the case of addition /deletion of wc /urinal, owner / occupier shall inform PUB (Sewerage Department) on the revised quantity of wc / urinal in the premises for adjustment of the Sanitary Appliance Fees.

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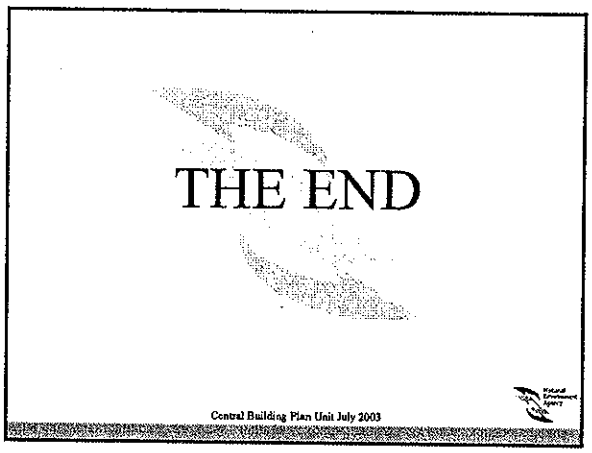
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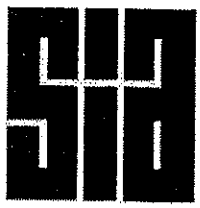


Singapore Institute of Architects
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Ministry of the Environment

Seminar Paper on

Drainage

- Common requirements raised at pre-consultation sessions
- Omissions found at spot checks during building plan and CSC stages

By Mr Tay Boon Hai

Drainage Requirements

Principles of Designing a Drainage System

✓ Ensure platform levels of the development site are not lower than the road level/ ground level at the outlet discharge point or the specific minimum platform level imposed by the Department (whichever is higher)

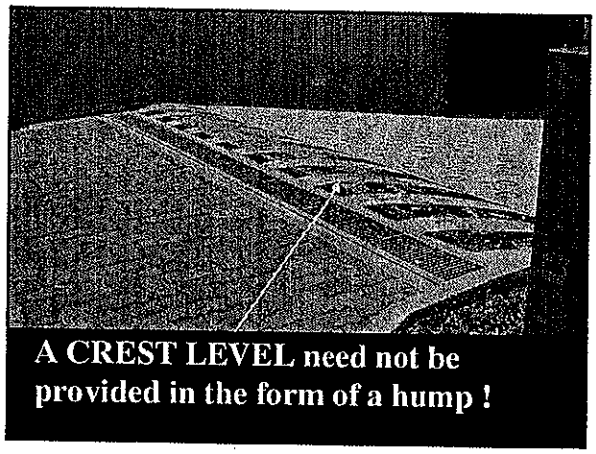
✗ Platform levels within the development site lower than the adjacent road / ground levels at the outlet discharge point.

Principles of Designing a Drainage System

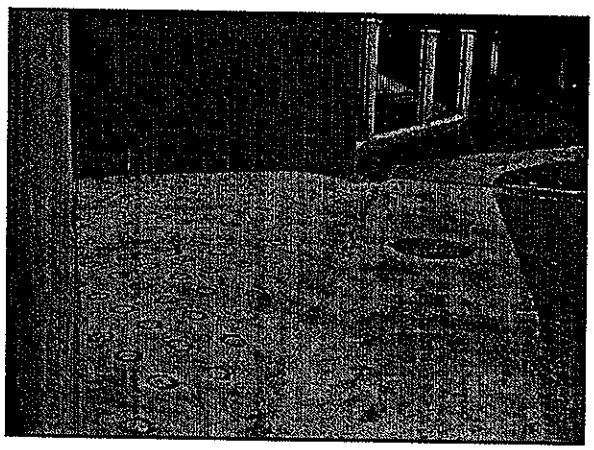
✓ Provide crest levels at all openings (eg ventilation openings, stairways, pipelines, voids, rampdown etc to basement served by pumped drainage system.

✗ The crest level does not comply with the requirements as specified in the Code of Practice on Surface Water Drainage.

✗ No crest level provided



A CREST LEVEL need not be provided in the form of a hump !



Principles of Designing a Drainage System

- Select the outlet discharge point at the roadside/outlet drain where the adjacent road/ground level is the lowest.
- The existing outlet discharge point(s) at the development site shall be adopted.
- If the roadside drain is located on a sloping road, the proposed internal drain should be connected to the downstream end of the roadside drain fronting the development site.

Principles of Designing a Drainage System

- ✓ For development with basement not fully covered, keep the catchment area to the minimum. Runoff from RWDPs should be discharged to 1st storey drain and not into the basement pump sump.
- ✗ Runoff from basement discharges by gravity to roadside/outlet drain which is on higher ground level.
- ✗ Runoff from roofs, rainwater down- pipes and all premises at and above ground level discharges into the basement.

Principles of Designing a Drainage System

- ✓ Ensure runoff within a development site is drained off by internal drains and is not discharged into adjacent premises.

Principles of Designing a Drainage System

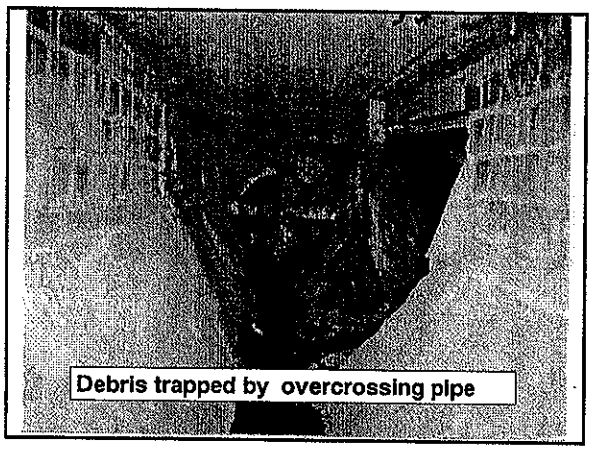
- ✓ Design the drainage system for safety and ease of maintenance besides adequate capacity.

Principles of Designing a Drainage System

- Do not alter or realign existing roadside/outlet/ common drains unless approval is given by the Department.

Principles of Designing a Drainage System

- All services shall undercross the drains at minimum 1.0m (1.5m for earth drains) below the invert levels of the drains.
- QPs shall seek the Department's approval for proposals on services overcrossing.
- Drainage Dept will consider services overcrossing if the Services Providers request it and the services pipes overcrossing drain will not affect the flow or not cause maintenance problem.



Debris trapped by overcrossing pipe

SOME COMMON ISSUES RAISED DURING WALK-IN PRECONSULTATION

Can the Drainage Reserve be Realigned ?

A drainage reserve (DR) may be realigned subject to the following conditions:-

a) The proposed drain diversion is technically feasible.
b) Maintenance access to the upstream and downstream DR is not affected.
c) Concurrence from SLA/URA.

Can the Common Drain be Fenced -In Within Development Lot ?

Drainage Department can consider fencing-in of the existing common drain within the development lot if the access to maintain the existing upstream or downstream common drain is not affected.

Required Sizes of Entrance Culvert/Roadside Drain

QP is to write to the Department for the required size of proposed entrance culvert/roadside drain before submitting the plan to CBPU for registration.

Must Existing Roadside Drain be Realigned to Abut the New Road Reserve Line?

- The existing roadside drain can be retained if it is not required by LTA to be realigned to abut the new Road Reserve Line.
- If the existing roadside drain is to be realigned, it shall be constructed to the required drain size.

Must Roadside Drain be Constructed as Closed Drain?

- The roadside drain can be constructed as closed or open drain.

Can Rainwater Downpipe be Smaller Than 150mm ?

Smaller rainwater downpipes of less than 150mm diameter are allowed in accordance with Singapore Standard CP26:1983 "Code of Practice for Drainage of Roofs" on condition that the roof drainage channels are provided with leaf covers.

THANK YOU

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Institution of Engineers, Singapore
Ministry of the Environment

Seminar Paper on

Noise Control

- Developments next to aboveground MRT tracks and major roads
- Noise from mechanical equipment

By Mr Koh Kim Hock

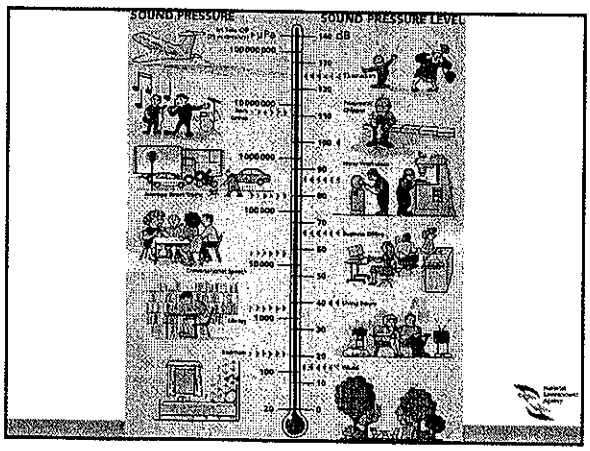
NOISE CONTROL ISSUES

Presented by
Koh Kim Hock
Senior Engineer
CBPU, PCD

Central Building Plan Unit July 2003

Outline of Presentation

- Factory Noise Regulations
- Guidelines for AC Equipment In Non-industrial Buildings
- MRT Noise
- Noise Control Methods



FACTORY NOISE REGULATIONS

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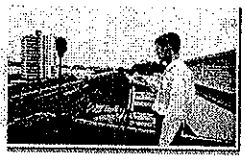
Factory Noise

- The Environmental Pollution Control (Boundary Noise Limits For Factory Premises) Regulations, 1999 controls noise emission from factories



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Noise Receptors

- **Noise limits for four types of premises**
  - Noise sensitive premise
  - Residential premises
  - Commercial premises
  - Factory premises







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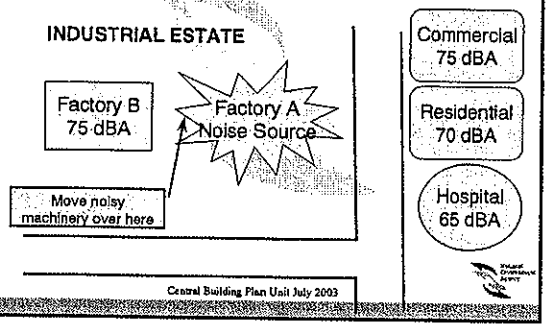
Which Noise Limits To Use



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Periods of Measurement

- Daytime (7am to 7pm)
- Evening time (7pm to 11pm)
- Nighttime (11pm to 7 am)
- Lower noise levels in the evening and nighttime

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Noise Measurement Method

- Equivalent continuous noise level over the specified period (daytime, evening, or nighttime). Gives the average noise levels
- Equivalent continuous noise level over 5 minutes. Gives the peak noise levels
- Type 1 noise level meters are to be used

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Allowable Boundary Factory Noise Limits (specified period)

Affected Premises	Day 7 am – 7 pm	Evening 7 pm – 11 pm	Night 11 pm- 7 am
Noise Sensitive	60 dBA	55 dBA	50 dBA
Residential	65 dBA	60 dBA	55 dBA
Commercial	70 dBA	65 dBA	60 dBA

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Allowable Boundary Factory Noise Limits (5 minutes)

Affected Premises	Day 7 am – 7 pm	Evening 7 pm – 11 pm	Night 11 pm- 7 am
Noise Sensitive	65 dBA	60 dBA	55 dBA
Residential	70 dBA	65 dBA	60 dBA
Commercial/ Industrial	75 dBA	70 dBA	65 dBA

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GUIDELINES FOR CENTRALISED AIRCONDITIONING AND VENTILATION SYSTEMS IN NON-INDUSTRIAL BUILDINGS

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- Extension of the existing limits in the Environmental Pollution Control (Boundary Noise Limits for Factory Premises) Regulations
- Noise measurements would be made over 15 min instead over the specified period of 4, 8 or 12 hours
- 5-min maximum noise levels would not be used
- Standards apply to receptors which are residential and other noise-sensitive premises, not commercial premises.
- Measurement point to take into account the height of the mechanical equipment above ground level.

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PME 75 dbs

select sound transmission loss of 2016A to achieve 50 dbs

Guidelines for Boundary Noise Limits (15 min)

Affected Premises	Day 7 am – 7 pm	Evening 7 pm – 11 pm	Night 11 pm- 7 am
Noise Sensitive	60 dBA	55 dBA	50 dBA
Residential	65 dBA	60 dBA	55 dBA

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Measurement Points

- **For equipment installed at ground level, the noise measurement should be made at the site boundary**
- **For equipment that is installed above ground level e.g. at roof-top, the noise level shall be computed for a point that is at the site boundary and at the same height as the equipment.**

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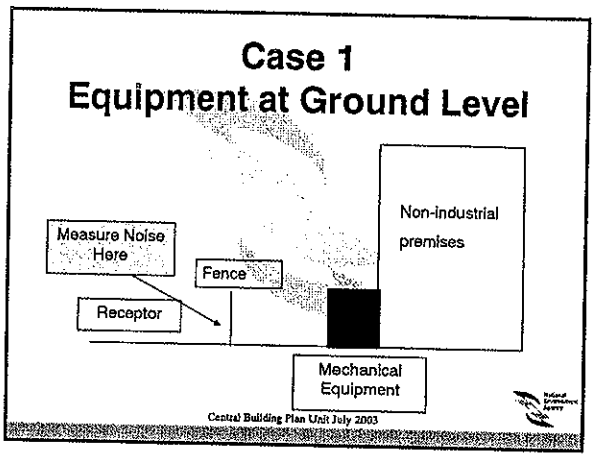
Case 1
Equipment at Ground Level
Non-industrial
premises
Measure Noise
Here
Fence
Receptor
Mechanical
Equipment
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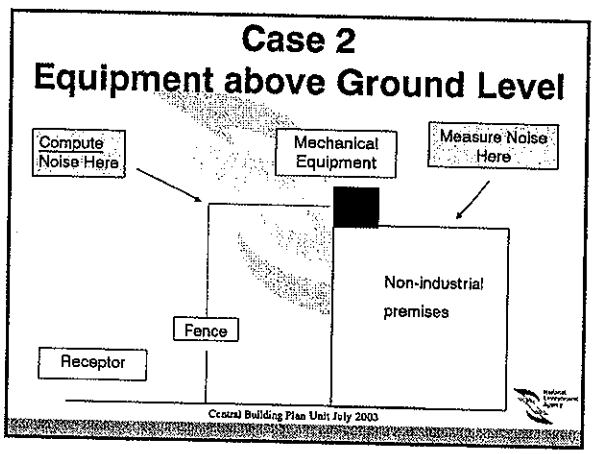
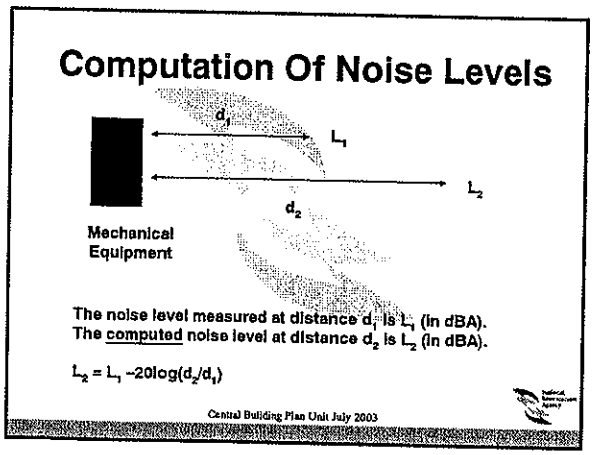

Case 2
Equipment above Ground Level
Compute
Noise Here
Mechanical
Equipment
Measure Noise
Here
Non-industrial
premises
Fence
Receptor
Central Building Plan Unit July 2003


Computation Of Noise Levels
d_1
L_1
L_2
d_2
Mechanical
Equipment
The noise level measured at distance d_1 is L_1 (in dBA).
The computed noise level at distance d_2 is L_2 (in dBA).
$L_2 = L_1 - 20\log(d_2/d_1)$
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Background Noise Correction Factor

The adjusted value for the maximum permitted noise level shall be obtained by adding the correction factor corresponding to the difference between the maximum permitted level and the background noise level to the higher of the 2 noise levels.

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'Modifying Factor' Adjustments

- Noise which contains certain characteristics, such as tonality, impulsiveness, intermittency, irregularity or dominant low frequency content may cause greater annoyance than other noise at the same level.
- A penalty of 5 dBA be added for each of the above characteristics, up to a maximum of 10 dBA.
- Allowance for a single event which occurs for a limited duration.
- See www.nea.gov.sg/cms/pcd/noise_guidelines1.pdf

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MRT NOISE

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Guidelines for MRT Noise

- 67 dBA (Leq-1 hour) at building façade
- Building setbacks for residential developments
  - 35m for building facing MRT tracks
  - 25m for building with end-wall facing MRT tracks

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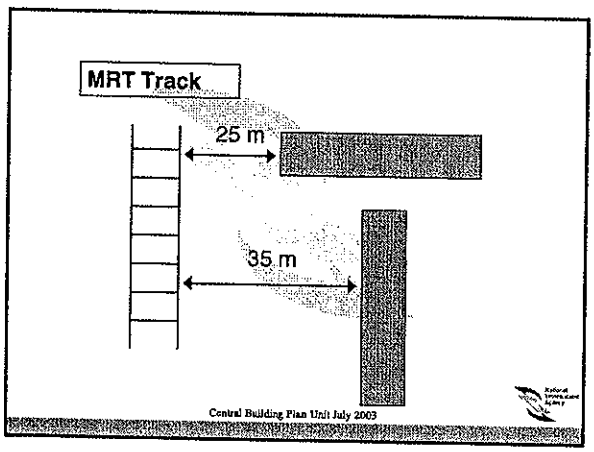

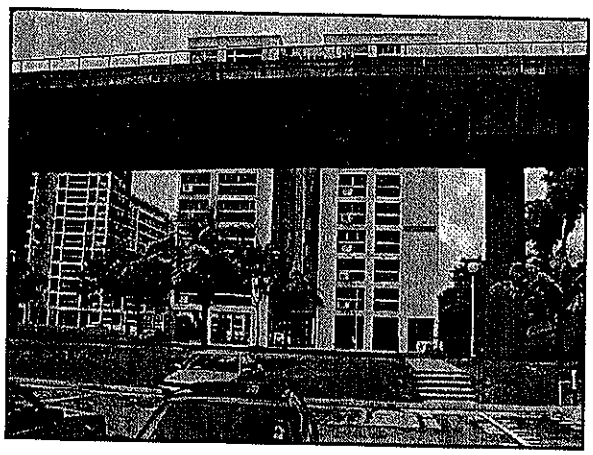



NOISE CONTROL METHODS

Noise Control Methods

- **Basically three types of measures to reduce noise:**
  - At the source
  - Along the path of noise transmission
  - At the receiver.

Control At Source

The QP can play a key role at planning and building plan stage

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QP can play a key role

- Check whether there are any residential or noise-sensitive development nearby
- Check also future development plans
- Use utility rooms, toilets, recreational areas, etc as a noise buffer
- Choice of low noise mechanical equipment
- Judicious siting of the mechanical equipment

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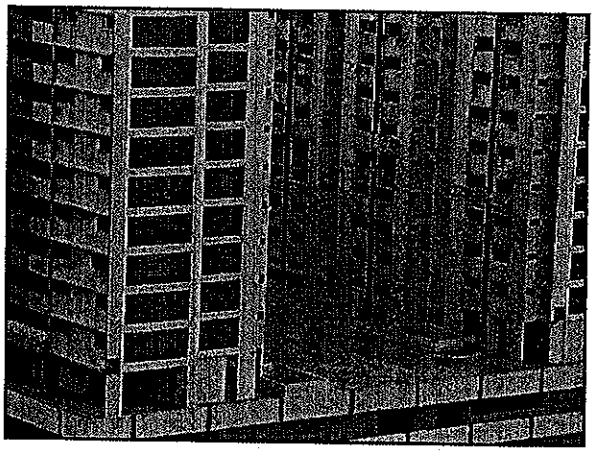

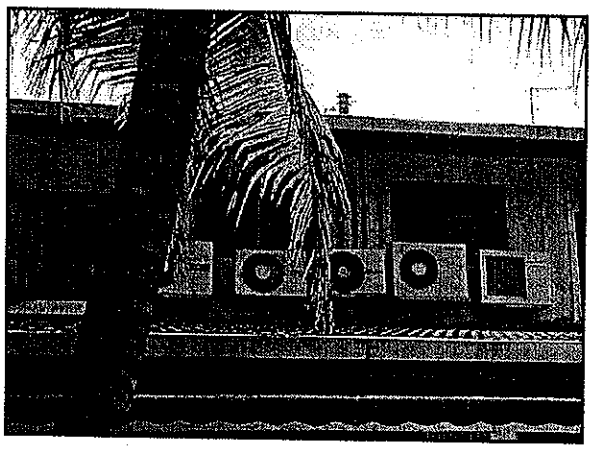

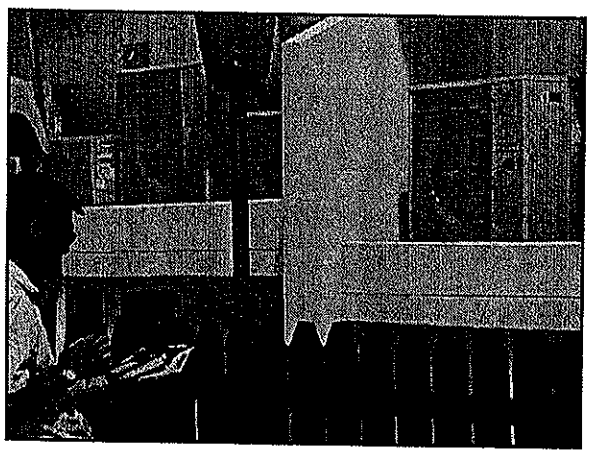



Control Along The Path Of Transmission

- The control of noise along the path of transmission can be achieved by complete or partial enclosure of the source, by placing an acoustical shield or barrier wall between the source and the receiver, or by increasing the distance between them.
- The use of land buffers as a noise abatement measure should be considered only as a last resort.

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Control At The Receiver

- The QP can play a key role at planning and building plan stages
- Innovative building design may be used to prevent or reduce the intrusion of noise
- For example, no window openings facing noise source.
- Use utility rooms, toilets, recreational areas, etc as a noise buffer

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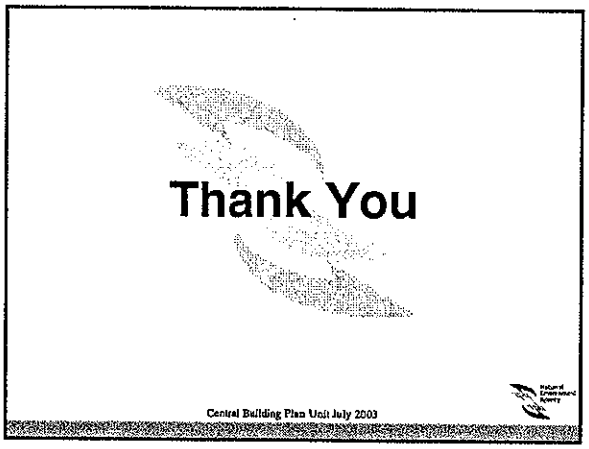
Thank You
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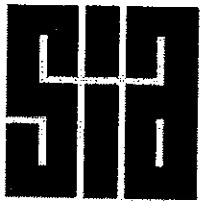

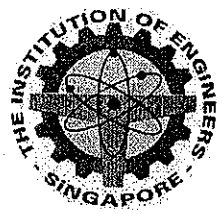

Singapore Institute of Architects
Institution of Engineers, Singapore
Ministry of the Environment

Seminar Paper on

Noise Control

- **Design considerations to minimise noise transmission from buildings to adjacent neighbourhood and vice versa**

By Prof Lee Siew Eang

Centre for Total Building Performance Department of Building NUS

Design considerations to minimise sound transmission from building to its adjacent neighbourhood

By: Lee Siew Eang

Centre for Total Building Performance
Department of Building
National University of Singapore

SIA-IES-ENV Joint Seminar on Environmental Plan submission procedures and requirements.



The Centre for Total Building Performance is a BCA-NUS Centre for Tropical Building Research instituted in 25 November 2000

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Centre for Total Building Performance Department of Building NUS

Key Acoustics Specifiers

Space	Problems	Specifier
	Echoes	Reverberation Time (Secs) Noise Reduction Coeff. Sound Absorption Coeff.
	Noisy	Background Noise Level (dB) Sound Insulation (dB) Sound Absorption Coeff.
	Disturbance	Noise Level at Boundary (dB) Sound Insulation (dB) Transmitted Noise (dB)

desired < 1 sec

↳ characteristics of matl

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Appreciate the NOISE ENVIRONMENT before going to the drawing board

Noise Sources

Building is a noise source as well as a receiver

The Facades



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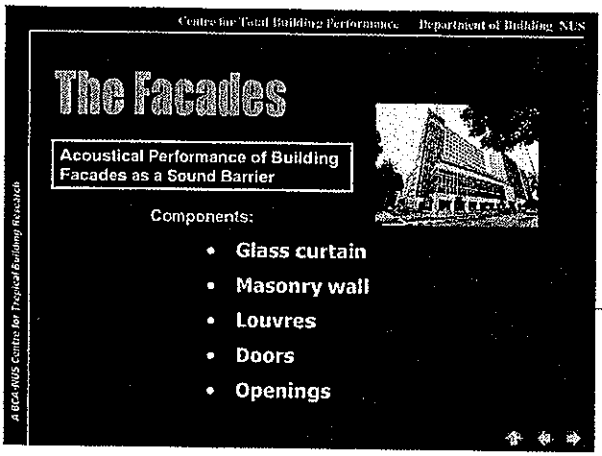
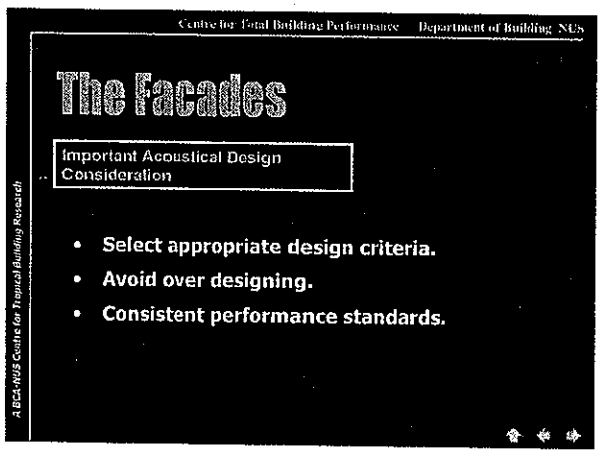
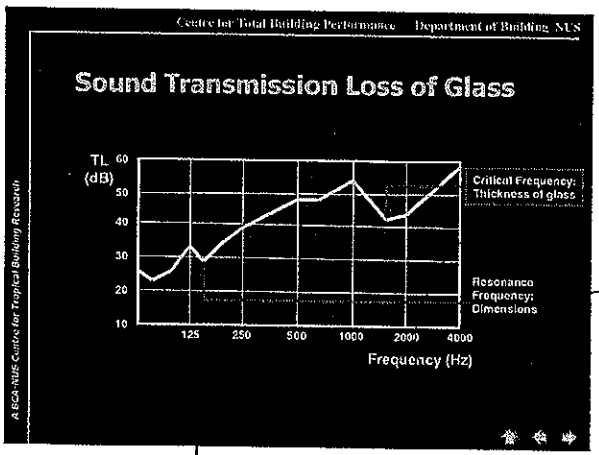


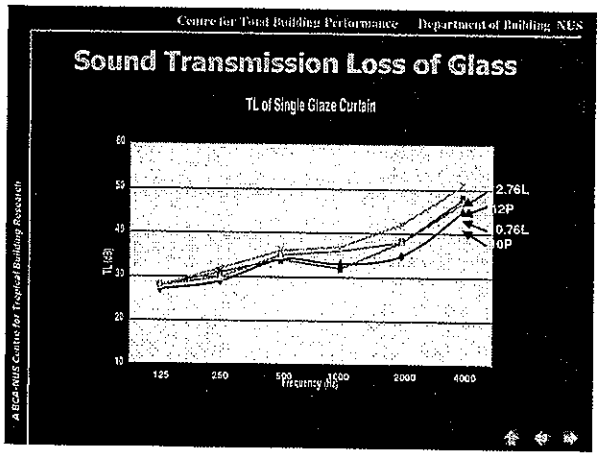
acoustic louvre

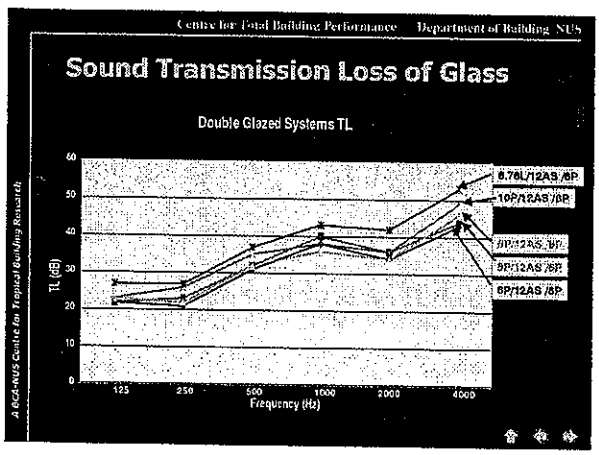




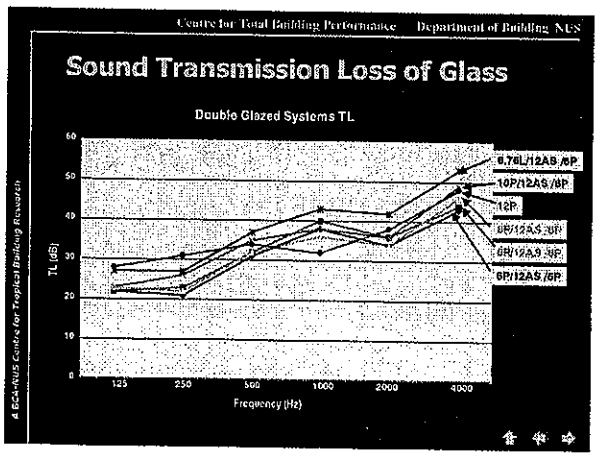
created by size of window
bigger, higher & vice versa

initial window





Single glazed glaze has better acoustic property than double glazed



Measured Airborne Sound Reduction Index of Sample Test Door

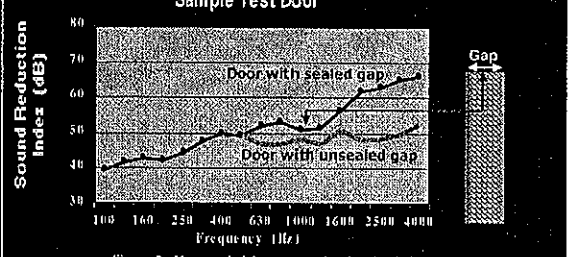


Figure 2: Measured airborne sound reduction index of 240mm thick

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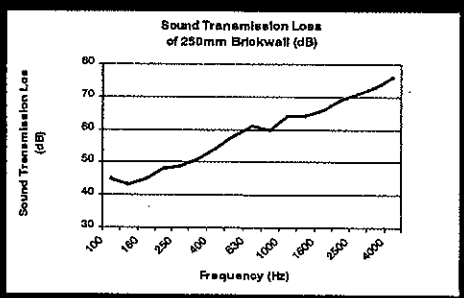
Sound Transmission Loss of Masonry Wall



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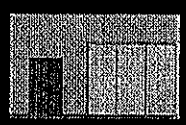
Sound Transmission Loss of Composite Wall



$$TL = 10 \text{ Log } (1/\tau)$$

$$\tau = 10^{\wedge (TL/10)}$$

$$\tau_{com} = \frac{\tau_1 S_1 + \tau_2 S_2 + \tau_3 S_3}{S_1 + S_2 + S_3}$$

$$TL_{com} = 10 \text{ Log } (1/\tau_{com})$$

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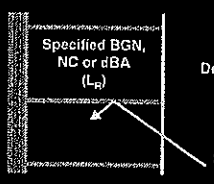
Specifying a Facade



Design Façade's TL= $L_S - L_R$ + Abs

Source Level, L_s dB

Sound Transmission Loss of Façade must be Specified and properly Commissioned.

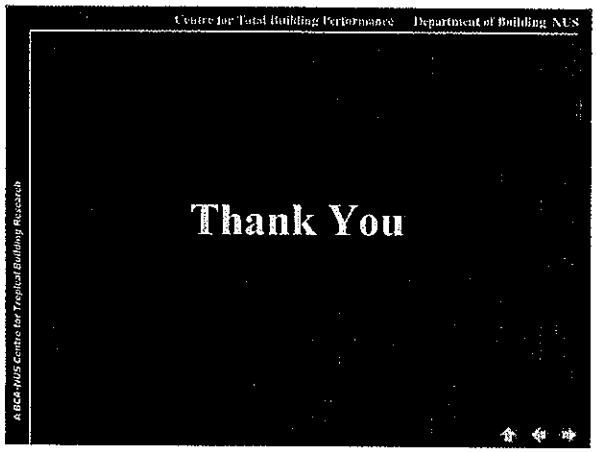
Specifying a Façade: Workmanship

- Specifying materials and construction alone is not adequate.
- Workmanship, supervision and coordination are crucial in delivering the expected performance.
- Some of the common failures in achieving the desired performance are:

- Poor alignment of components.
- Sealants and seals not properly applied or installed.
- Poor leveling of floor or structural members.
- Incompatible design.

Conclusion

- To ensure successful achievement of good acoustics performance the design team must understand the basic principles of acoustical behaviour of space and materials.
- A full treatment is required. Consultant should follow through with design to ensure delivery. Commissioning tests are essentials and should be rigourous conducted.
- Where a need is identified, Acoustical services should be introduced at the earliest possible. Remedial actions are frequently difficult, costly with less success.


Centre for Total Building Performance
Department of Building, NUS
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Thank You