

Regulations and Standards on Decentralized Domestic Wastewater Treatment

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NATIONAL WATER SERVICES COMMISSION
MALAYSIA





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Decentralized Domestic Wastewater Treatment in Malaysia

02

Standardization & Certification of On-Site Domestic Wastewater Treatment System

03

Septage Management of On-Site Domestic Wastewater Treatment System

04

Challenges & Way Forward



OVERVIEW

EVOLUTION OF SANITATION IN MALAYSIA

Prior to 1950-s TECHNOLOGY



Early Days in Malaya



Pour Flush



Septic Tank



Imhoff Tank



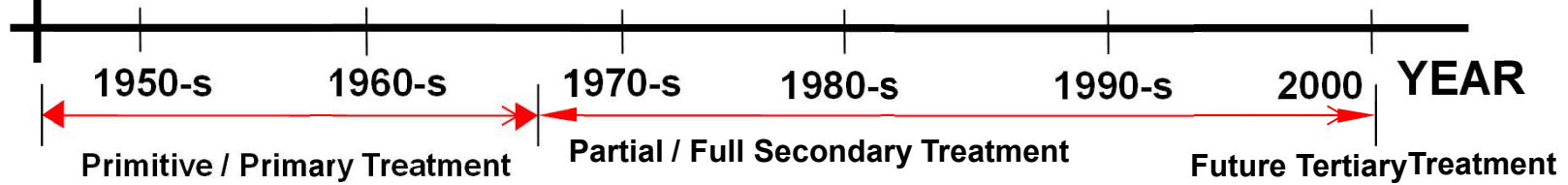
OP/AL



Activated Sludge/
Biological Filters



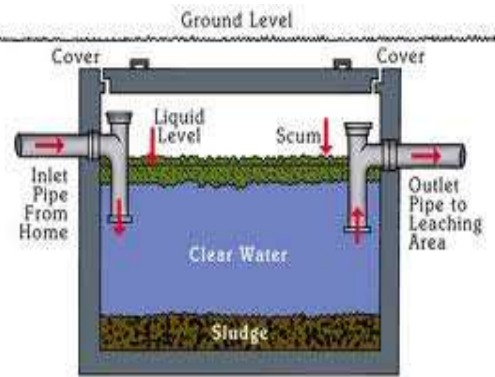
Fully Mechanised
Plant



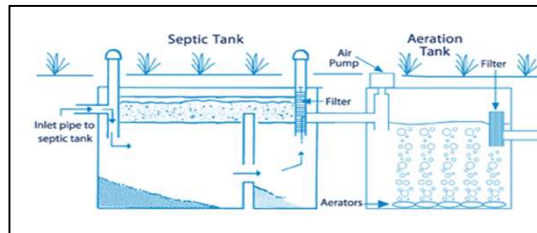
(Address Public Health)

(Address River Pollution)

(Address Environment)



Septic Tank

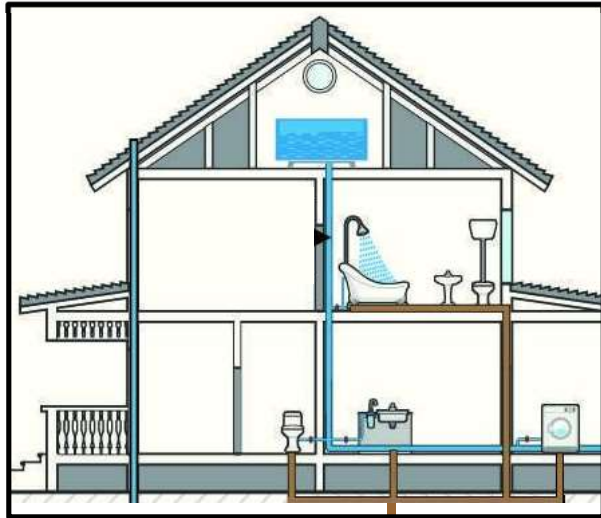


Decentralized Domestic Wastewater Treatment





DECENTRALIZED (ON-SITE) TREATMENT SYSTEM



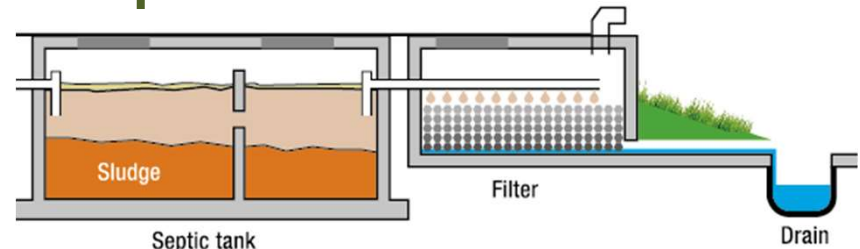
On-site treatment systems designed to treat and dispose of effluent from single premise and/or single ownership development with total capacity less than 150 PE (33.75m³)



1,024* nos (82,789 PE)
Small Sewage Treatment System



1,154,592 nos (5,772,960 PE)
Cess pit (Obsolete)



1,343,439 nos (6,859,823 PE)
Individual Septic Tank

4,386 nos (532,076 PE)
Communal Septic Tank (Obsolete)

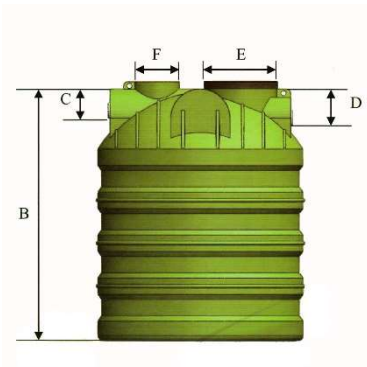
• Estimate installation of SSTS since year 2008
1 PE = 0.225m³



PLANNING ASPECT OF INDIVIDUAL SEPTIC TANK

Single Development Up To 30 Units Or 150PE In Total

- Septic tanks regarded as temporary treatment system
- Owner of system shall provide the following
 - 150mm by-pass pipe from last inspection chamber before septic tank
 - By pass pipe extended it to the drain outside the premises
 - The pipe shall be end capped for future connection



Individual Development Outside The Local Authority Areas

Owners must be compelled to adhere to rules and requirement

- Product must be approved by SPAN
- Complying with determined effluent standard
- Trenches to be provided for final effluent discharge
- Raised soak away shall be provided if water table is high
- Desludging activities must be provided by registered desludging contractor

All soak away shall be located 5m downstream of wells for domestic consumption



INDIVIDUAL SEPTIC TANK

LIMITATION

Limitation in providing primary treatment

Treatment performance is inconsistent to meet the required standards

PERFORMANCE MEASUREMENT



Performance is subjected to retention which is affected by quantity of settled solids which accumulated over time

EFFLUENT QUALITY

Design for effluent discharge downstream of water intake points

Average effluent quality

- BOD : 50 mg/l
- Suspended Solid : 100 mg/

MAINTENANCE OF THE SYSTEM

Design shall allow regular desludging

Desludging shall be at least once every 3 years.



SMALL SEWAGE TREATMENT SYSTEM

DESIGN CAPACITY For 31 – 149 PE
(6.975 – 33.525 m³/day)

TREATMENT PRINCIPLES:

Limited to development with small population size

Additional aeration process at the second tank for removal of BOD

Provide only a partial treatment

Low energy consumption

The function of key components does not require intensive energy and technical ability for operation





SMALL SEWAGE TREATMENT SYSTEM

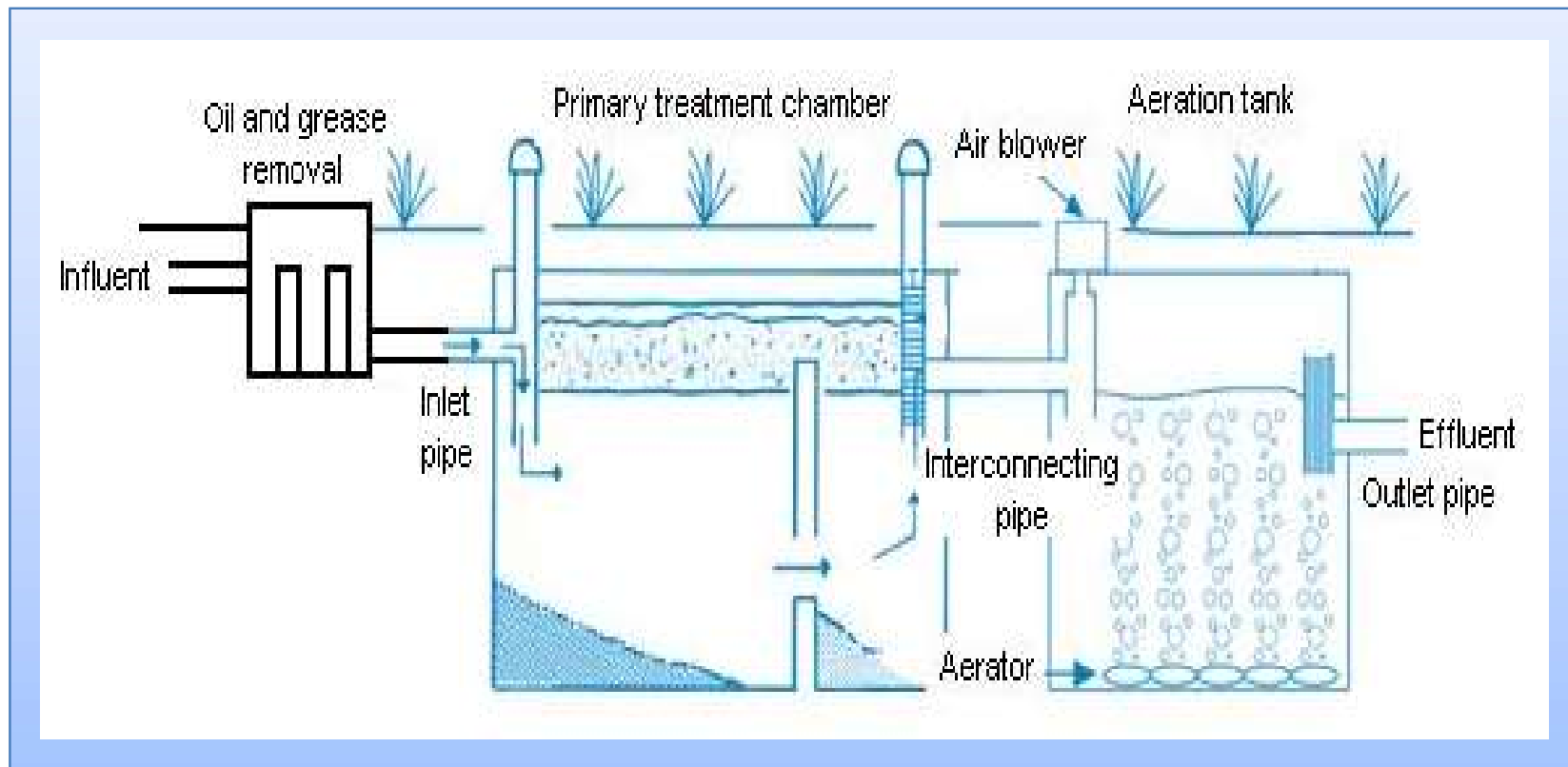


Diagram : Schematic Diagram of SSTS



MS ISO/IEC 17025
CALIBRATION
SAMM NO. 070



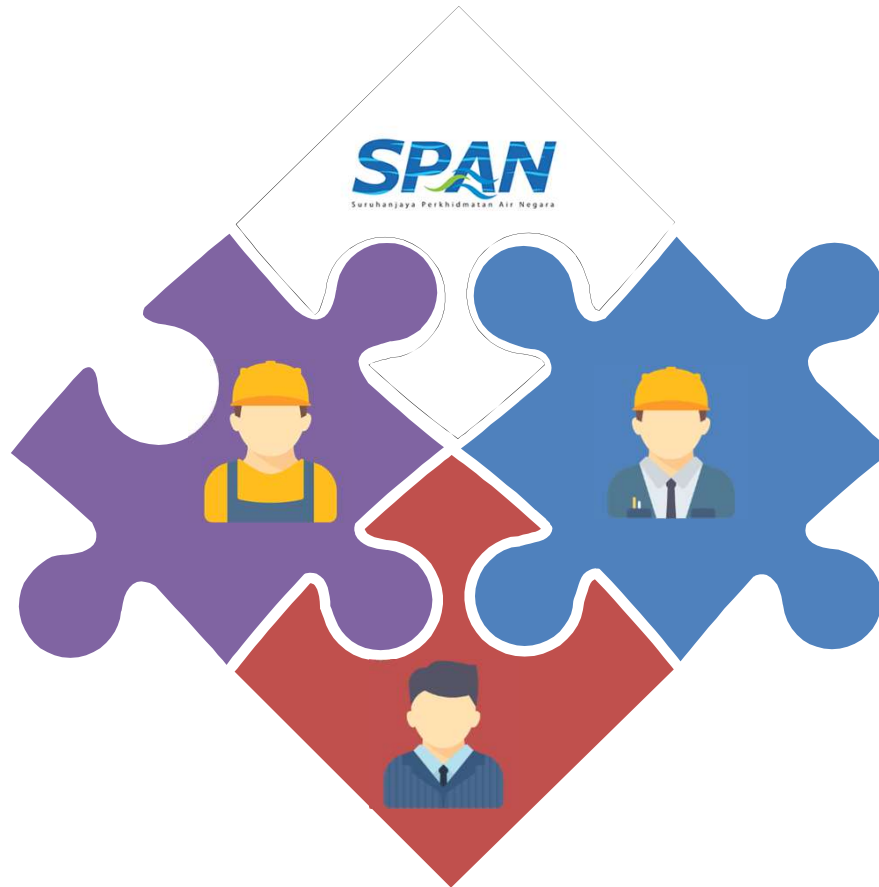
Standardization & Certification of On-Site Domestic Wastewater Treatment





OBJECTIVE OF STANDARDIZATION

**Service Licensee/
Operator**
Performance &
Durability

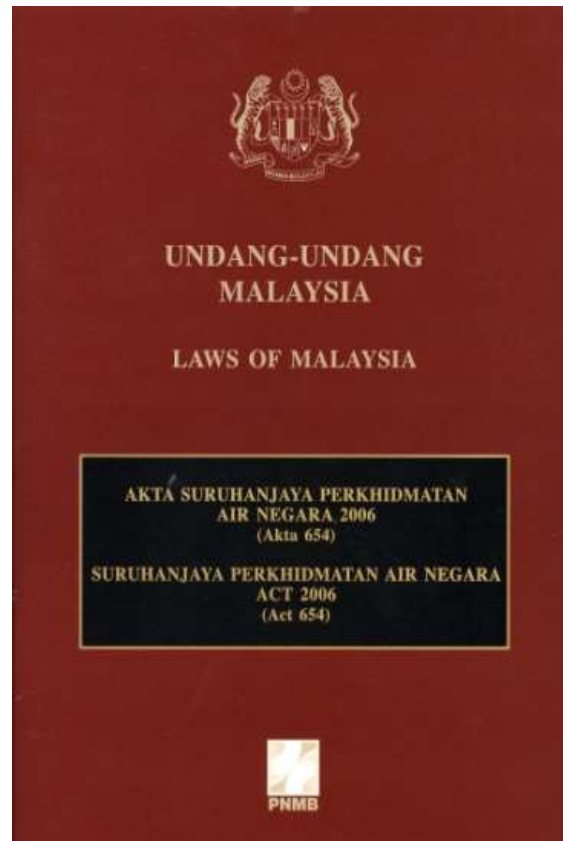


Facility Licensee
Quality & Need for
the Industry

Certification Bodies
Compliance to Specifications



PROVISION OF LAW WATER SERVICES INDUSTRY ACT 2006



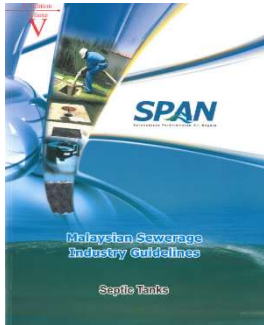
SECTION 45

- Plans and specifications for the construction of sewerage systems and septic tanks require the approval of the Commission

SECTION 180(a)(i)

- The Commission may make such rules to provide for the minimum standards and specifications which shall be used in the design, construction, installation, protection, operation and maintenance of any water supply system or sewerage system

STANDARDS & GUIDELINES FOR ON-SITE WASTEWATER TREATMENT



MALAYSIAN SEWERAGE INDUSTRY GUIDELINES VOL. 5 – SEPTIC TANKS

- 3rd Edition January 2009
- Published by SPAN



MALAYSIAN STANDARD ON SITE TREATMENT UNITS PART 1 : PREFABRICATED SEPTIC TANKS SPECIFICATIONS

- Publish on June 2012

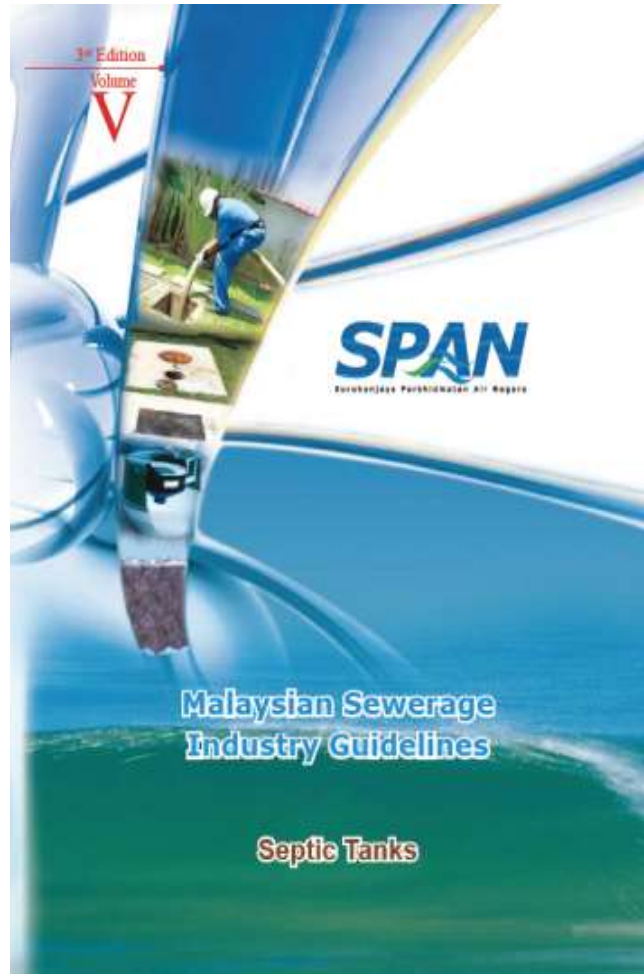


MALAYSIAN STANDARD ON SITE TREATMENT UNITS PART 2 : PACKAGED PREFABRICATED SMALL SEWAGE TREATMENT SYSTEM SPECIFICATIONS

- Publish on June 2014

MALAYSIAN SEWERAGE INDUSTRY GUIDELINES VOL. V

SEPTIC TANKS



PURPOSE

- To set up the requirements of SPAN for design and construction of Individual Septic Tank

APPLICATION

- Development with population equivalent size up to 150 PE
- For single development shall not more than 30 PE



CONTENTS

GENERAL GUIDELINES

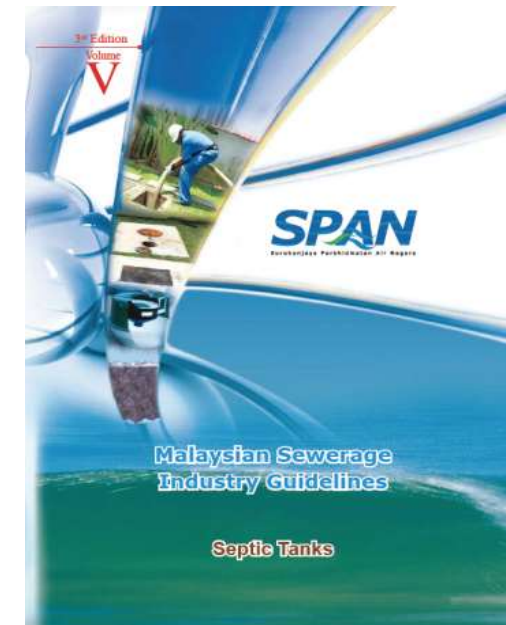
- Initial consultation
- Condition where public sewer available and not available
- Homestead Developments

DESIGN GUIDE

- Planning
- Design
- Non-proprietary systems
- Proprietary systems

SEPTIC TANK LOCATED IN SENSITIVE RECEIVING WATERCOURSE

- Further treatment methods for achieving higher effluent quality
- Disinfection



MS 2441-1:2012

ON SITE SEWAGE TREATMENT UNITS – PART 1 : PREFABRICATED SEPTIC TANKS SPECIFICATION

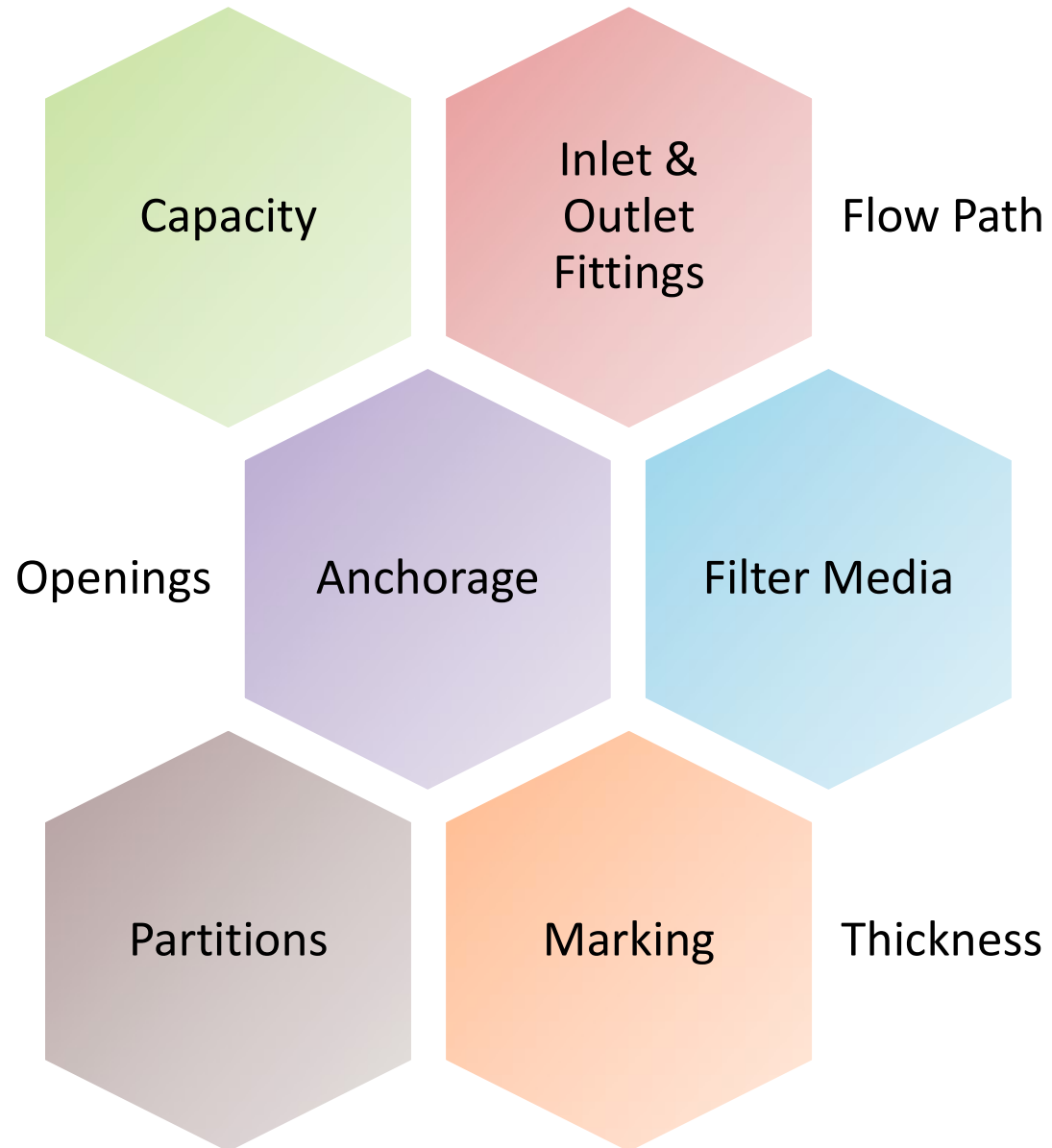


SCOPE

- Requirement for prefabricated septic tanks and their associated fittings
- Treatment of sewage for up to 30 PE
- Installed below ground level
- Serve one premise only
- Two materials covered, FRP & PE
- Intended for use by consultants, designers, manufacturers, certifying bodies, installers, regulators and other interested parties



MAJOR SPECIFICATION REQUIREMENTS





STANDARDS & OTHER REFERENCES

- ✚ AS/NZS 1546 : 2008 - On-site domestic wastewater treatment units Part 1: Septic Tanks
- ✚ EN 12566: 2007 - Small wastewater treatment systems for up to 50 PE Part 1: Prefabricated Tank
- ✚ CAN/ CSA B66 : 2005 - Design, material and manufacturing requirements for prefabricated septic tanks and sewage holding tanks
- Malaysian Sewerage Industry Guidelines, Volume 5 - Septic Tanks
- Water Services Industry Act 2006
- Water Services Industry (Desludging and Septage Discharge) Regulations 2008 [Draft]

ON SITE SEWAGE TREATMENT UNITS – PART 2 : 2014, PACKAGED PREFABRICATED SMALL SEWAGE TREATMENT PLANT SPECIFICATIONS



SCOPE



**MALAYSIAN
STANDARD**

On site sewage treatment units -
Packaged Prefabricated
Small Sewage Treatment System
Specifications

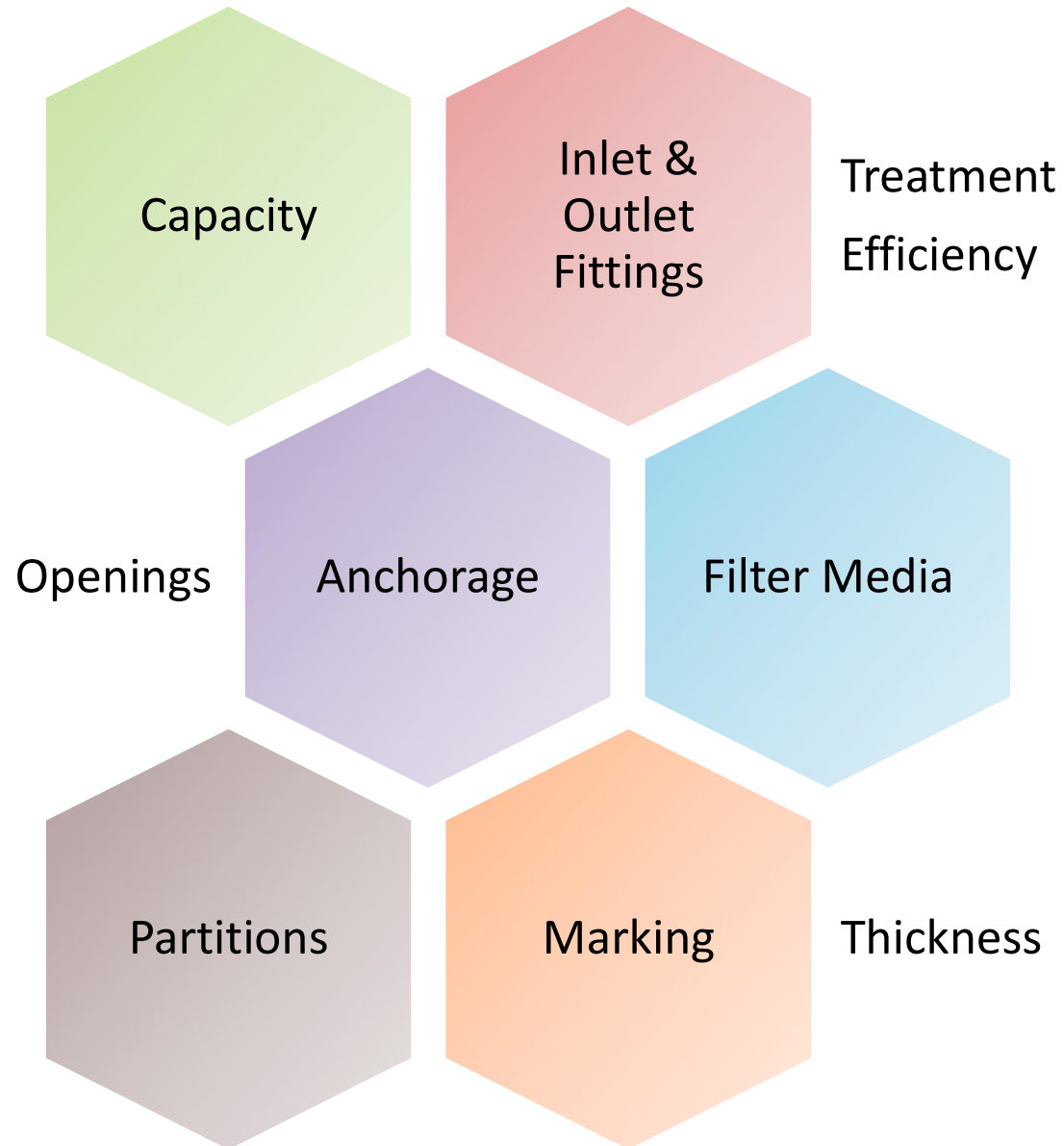
DRAFTING

DEPARTMENT OF STANDARDS MALAYSIA

- Requirement for packaged prefabricated small sewage treatment system (SSTS) and their associated fittings
- Designed for sewage flow of 31 up to 149 PE
- Installed below ground level
- No vehicle load and not installed in high water table area
- Two materials covered, FRP & PE
- Off-site assembled
- Intended for use by consultants, designers, manufacturers, certifying bodies, installers, regulators and other interested parties



MAJOR SPECIFICATION REQUIREMENTS





STANDARDS & OTHER REFERENCES

- ✚ MS 1225-2:2006, Polyethylene (PE) tanks for cold water storage - Part 1: Capacity more up to 600 gal (first revision)
- ✚ AS/NZS 1546.1: 2008, On-site domestic wastewater treatment units - Part 1: Septic tanks
- ✚ AS/NZS 1546.3: 2008, On-site domestic wastewater treatment units - Part 3: Aerated wastewater treatment systems
- ✚ BS EN 12566-3+A1: 2009, Small wastewater treatment systems for up to 50 PT - Part 3: Packaged and/or site assembled domestic wastewater treatment plants
- ✚ CAN/ CSA B66: 2005, Design, material and manufacturing requirements for prefabricated septic tanks and sewage holding tanks
- Malaysian Sewerage Industry Guidelines, Volume 5 - Septic Tanks
- Water Services Industry Act 2006
- Water Services Industry (Desludging and Septage Discharge) Regulations 2008 [Draft]



Septage Management of On-Site Domestic Wastewater Treatment System



PROVISION OF LAW WATER SERVICES INDUSTRY ACT 2006



LAWS OF MALAYSIA

Act 655

WATER SERVICES INDUSTRY ACT 2006

Chapter 3

*Duties and obligations applicable to licensees
providing sewerage services*

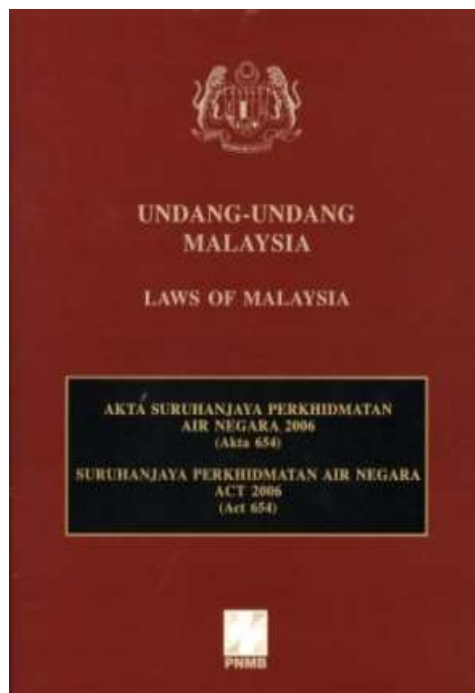
Septic tanks to be desludged

44. (1) The service licensee operating and maintaining a public sewerage system shall desludge the septic tanks in its sewerage services areas from time to time as may be prescribed.

(2) The service licensee who fails to comply with its obligations under subsection (1) commits an offence and shall, on conviction, be liable to a fine not exceeding fifty thousand ringgit.

Sec 65 (1) ...Service licensee or permit holder must be given access for the purpose of servicing and desludging

Sec 44 (1) –
Obligation of service licensee to desludge septic tanks as prescribed





PROVISION OF LAW

Two major contractor are licensed by SPAN to provide desludging services

Indah Water Konsortium Berhad



Majaari Services Sdn Bhd



Desludging activities can only be carried out by Permit E contractor registered by SPAN

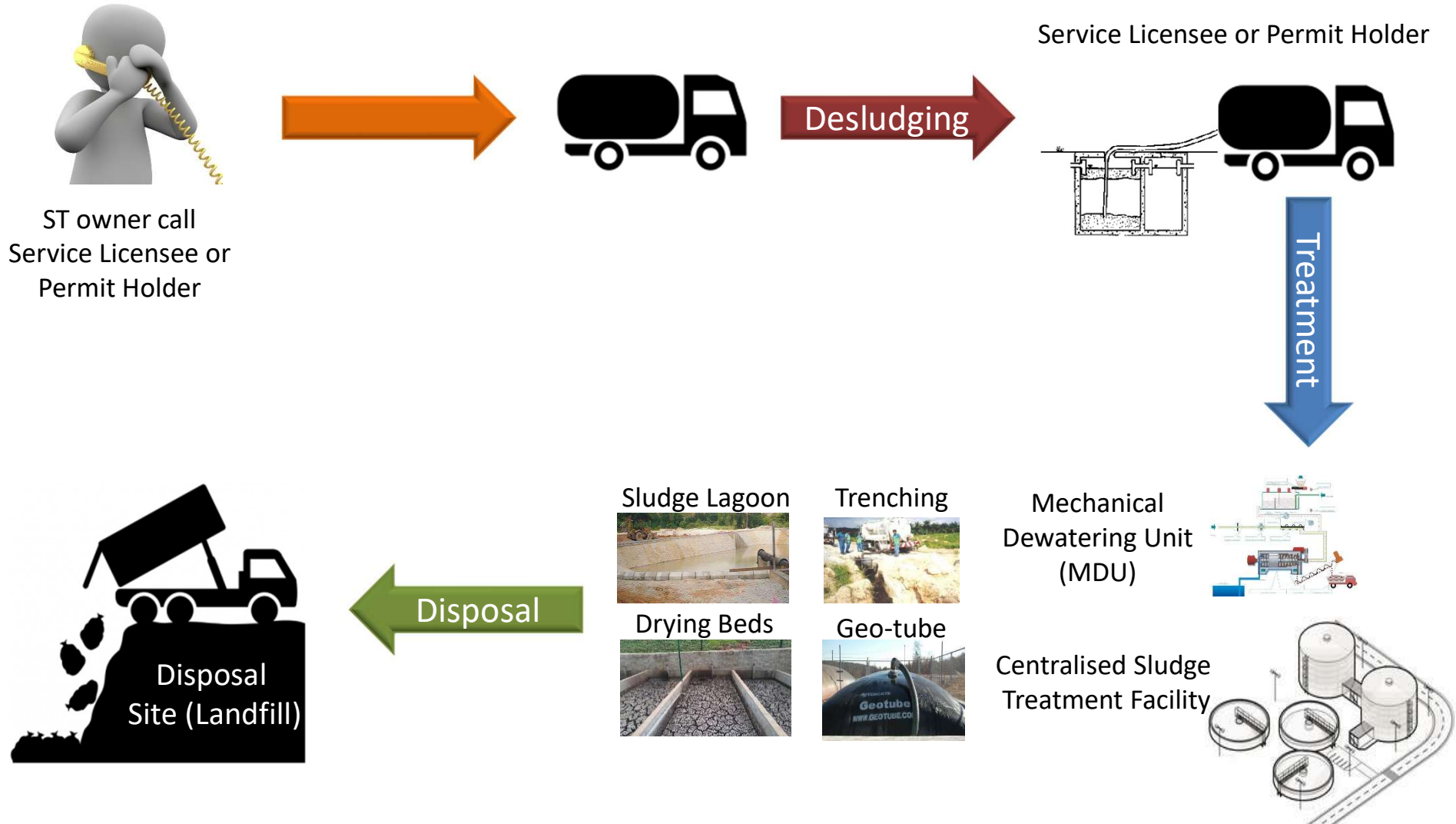
APPLY PERMIT
CLICK HERE

SPAN
e-permit

PERMIT HOLDER	PERMIT	DESCRIPTION	NOs
Plumber	A	to carry out any construction of, connection of, modification of or repairs to water pipes and water fittings which convey or will convey water from the public mains	13,186
Contractor	B	to carry out any works necessary to connect a private connection pipe to a sewer or sewage treatment works	941
	C	to carry out any construction of, installation of or modification to any part of a water supply or sewerage system	11,882
	D	to carry out maintenance services for a water supply system or a sewerage system but which does not involve the operation of such system	8,683
	E	to undertake, provide or make available sewerage desludging service	388
	Total		35,080



DESLUDGING COMPONENT





EXISTING DESLUDGING CHARGES

Charges: Required for services rendered

- Executed upon premise owner's request
- No official agreement between IWK and the premise owner



RM 6 / per month
by IWK

- Under the abolished Sewerage Services Act 1993, desludging works is required to be performed once in every 24 months (2 years)

RM 6/ per month @
RM6 x 24 months
= RM144



RM 6/ per month
includes sludge
disposal charges



DEVELOPMENT OF RULE

DRAFT RULE PENDING TO BE APPROVED & GAZETTED

Charges for
desludging
services

- Desludging based on request
- At least once every 3 years (base on the design specification)



1

RM 230 (*for permit E holders*)

- For septic tanks with volume up to 2 m³

2

RM 300 (*for service licensee - IWK*)

- For septic tank with volume up to 2 m³ (allowed payment in instalment)

3

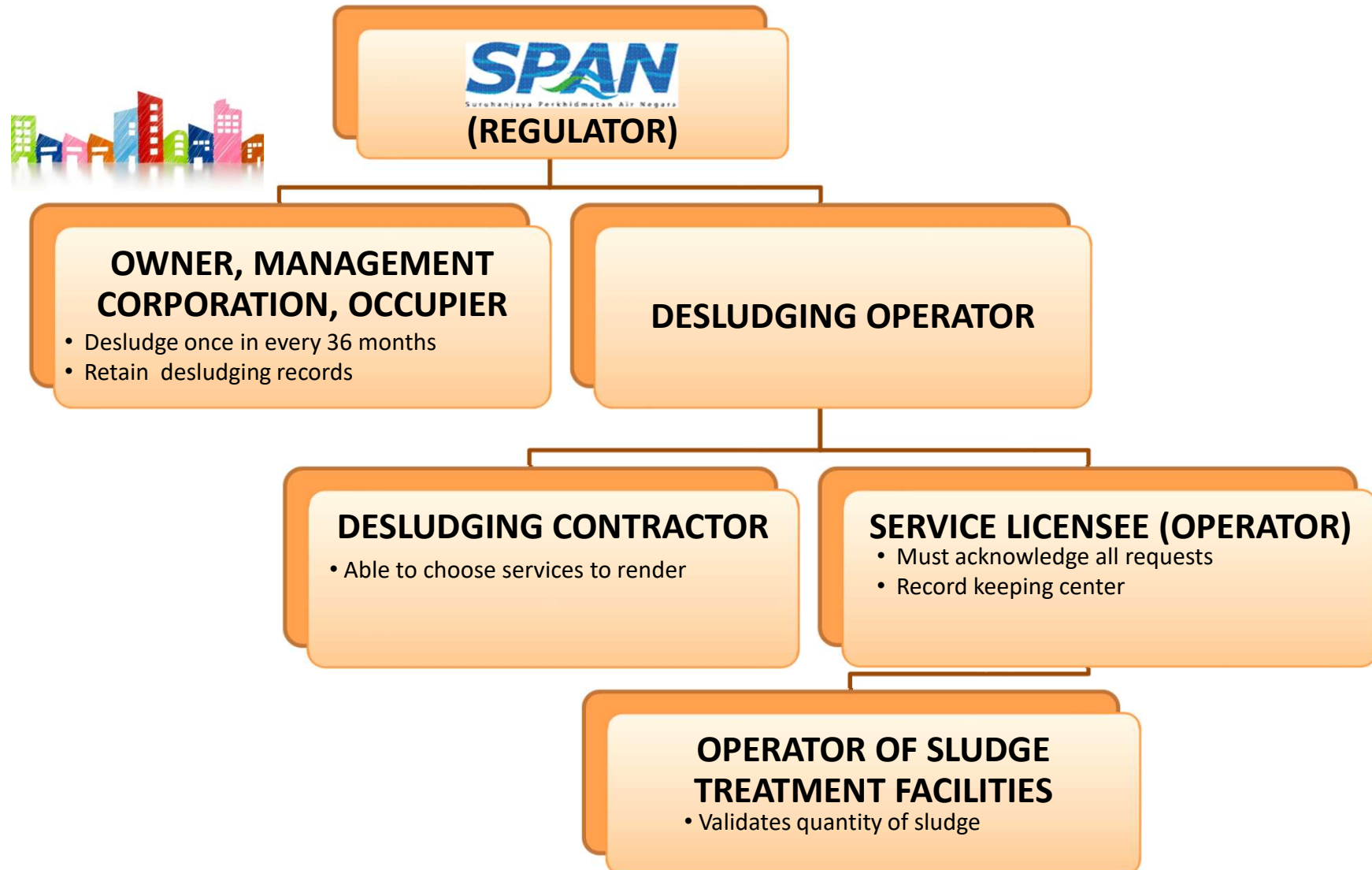
RM 115/m³

- every meter cubic after the first 2 m³



DEVELOPMENT OF RULE

ROLES OF UPSTREAM STAKEHOLDERS





ROLES OF DOWNSTREAM STAKEHOLDERS

Provide proper access to septic tank for desludging activities by IWK/Majaari or other contractors

Shall ensure that the septic tank is desludged once in every thirty six (36) months. Penalty for negligence is not exceeding RM 50,000.

Retain the desludging services works completion copy

Sludge must be disposed at an authorized site, approved by DOE/SPAN

Shall not discharge, dispose and place non-domestic waste into septic tank. Can be charged not exceeding RM 100,000 or imprisonment for term not exceeding 1 year



ISSUES, CHALLENGES & WAY FOWARD



ADVANTANGE & DISADVANTANGE OF ON-SITE TREATMENT SYSTEM

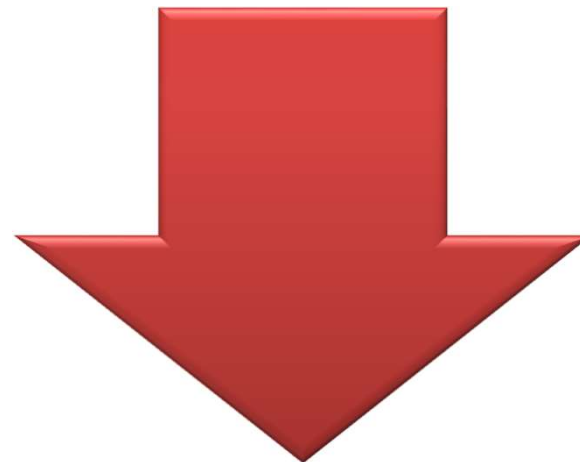


ADVANTAGES

- Low installation cost
- Easy installation
- Serving a single premise

DISADVANTAGE

Inconsistent treatment performance
Require regular desludging frequency of once every 3 years
Capacity allowed only up to 30PE (septic tank per premise)
Lacking of Enforcement





SEWAGE CHARACTERISTICS AND EFFLUENT QUALITY

COMPONENT	PE RANGE	CAPACITY RANGE (m ³ /day)	PARAMETER/CONCENTRATION (mg/l)						
			BOD	COD	SS	TN	NH3-N	Oil & Grease	P*
(IDEAL) INFLUENT	All	All	250	500	300	50	30	50	
EFFLUENT			BOD	COD	SS	NO3-N	NH3-N	Oil & Grease	P*
INDIVIDUAL SEPTIC TANK	5 - 30	1.12 – 6.75	50	200	100	N/A	N/A	N/A	N/A
SMALL SEWAGE TREATMENT SYSTEM	31 - 149	6.97 – 33.52	35	160	75	N/A	N/A	7.5	10

CHALLENGES IN DETERMINING THE DESIGN INFLUENT PARAMETERS

The influent parameter in Malaysia mostly diluted due to infiltration and illegal discharges from rain gutter

Note :

1Only applicable for effluent discharge to stagnant water bodies such as lakes and ponds



DESLUDGING TREND IN MALAYSIA

BACKGROUND

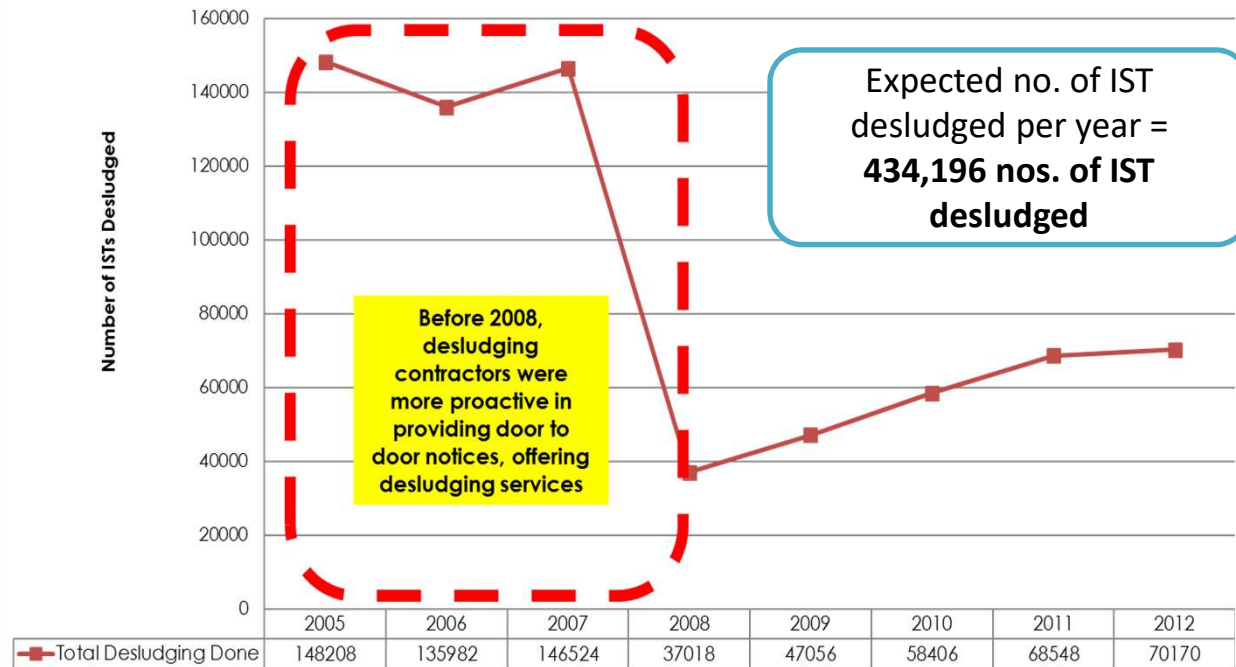
In January 2008, Water Services Industry Act 2006 became enforceable

Responsibility of desludging individual septic tank falls under the owner

Prior to WSA mandatory scheduled desludging was in place

A substantial **DECLINE** in exercise as shown

CHART 1: INDIVIDUAL SEPTIC TANK (IST) DESLUDGING TREND (2005 - 2012)



Expected no. of IST desludged per year = **434,196 nos. of IST desludged**

Before 2008, desludging contractors were more proactive in providing door to door notices, offering desludging services

Actual no. of IST desludged per year = **70,170 nos. of IST desludged**



DESLUDGING TREND ANALYSIS

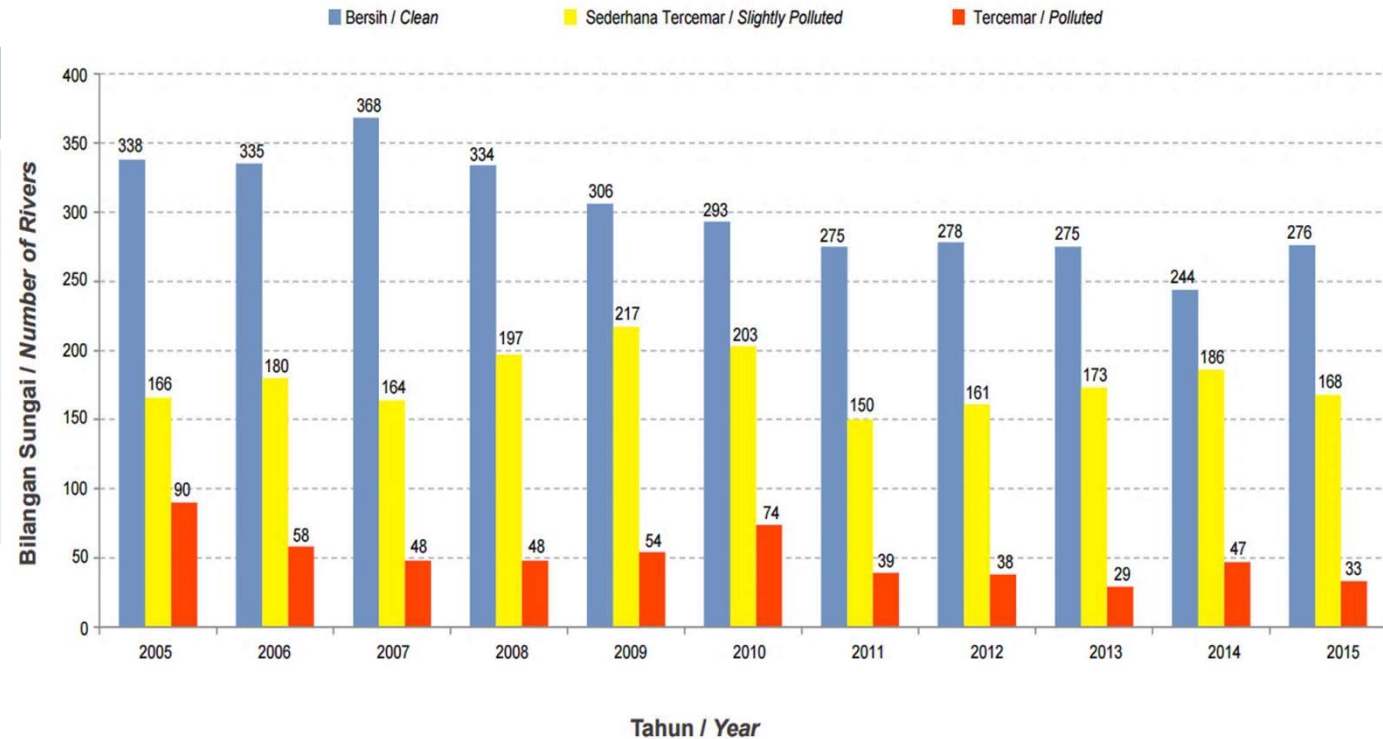
SOCIAL ISSUES & CHALLENGES

Social Issues

- Refusal From Owners
- Septic Tank Cover Sealed
- Inaccessible, etc

Impact

- Higher risk of being confronted with water borne diseases
- Quality of water resource will be affected, etc



Clean rivers dropped from 63% in 2007 to 57% in 2015.



DESLUDGING TREND ANALYSIS

INTERNATIONAL REPORT

LANDSCAPE ANALYSIS AND BUSINESS MODEL ASSESSMENT IN FAECAL: EXTRACTION AND TRANSPORTATION MODEL

BILL & MELINDA
GATES foundation

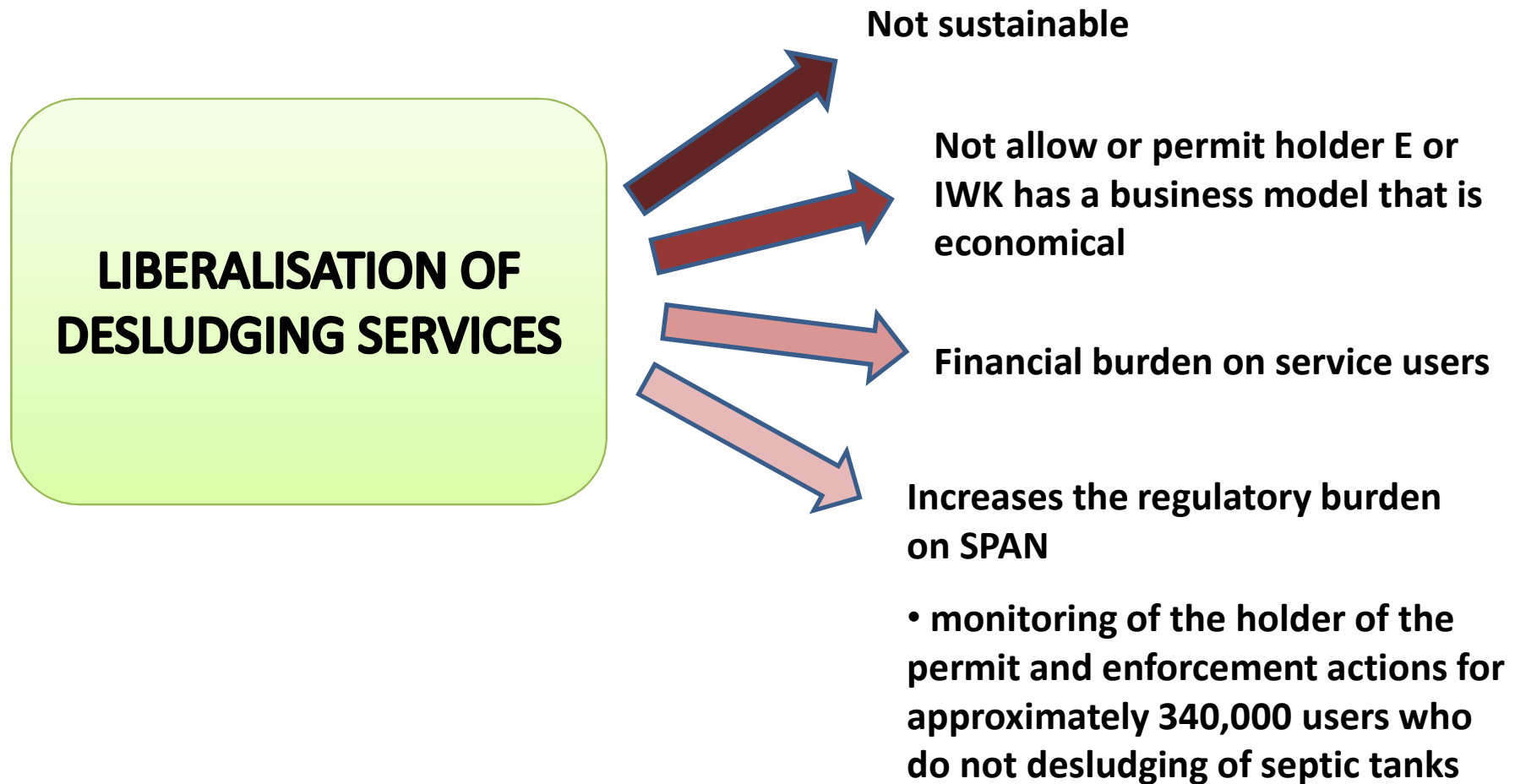
Findings

- New business model based on liberalization has an **adverse effect** on the desludging operators
- If the revenue declines even slightly by 5%, after tax IRR is plunges to 0%
- Expected to **trigger losses** to medium scaled operator within 2 years and large operator such as IWK within 5 years
- 96% of the respondents in the survey conducted for the study are **not willing to pay more than RM 250** for the services



DESLUDGING TREND ANALYSIS

“LIBERALISATION TRIAL PERIOD”





CONTINUOUS AWARENESS CAMPAIGN

ADVERTORIAL

WHY DESLUDGING SEPTIC TANKS IS IMPORTANT

What are Individual Septic Tanks (IST)?

An individual septic tank (IST) is widely used in Malaysia as a method of treating domestic sewage. It can be found within domestic, commercial and industrial premises.

The easiest way to realize whether you have an IST is by identifying the tank covers around the premises. An individual tank has two or three covers in parallel to each other.



Desludging Trend in Malaysia

Since January 2008, when the Waste Services Industry Act 2008 (Act 655) became enforceable, the responsibility to desludge ISTs was handed over to the property owners. Previously, Kuala Lumpur Sewerage Sdn. Bhd. (KLSB) used to provide scheduled desludging of ISTs.

However, since then, there has been a substantial decline in the overall exercise of septic tank desludging as shown in the chart below:



What Happens When You Don't Desludge?

1. Unbearable stench permeating the air
2. Malfunctioning of toilets, sinks and sanitary pipes
3. Higher risk of being contaminated with water borne diseases such as cholera and typhoid
4. Quality of water resources, for example rivers/lakes/streams will be affected.

How Often Do You Desludge?

1. In principle, desludging must be done once in every three years.
2. In Peninsular Malaysia, two major operators are licensed to provide desludging services, namely SWK and Majlis Services Sdn. Bhd. (Majlis Services).

More contractors will be able to provide desludging services in future when the desludge tank service is liberalized. These contractors will be given Permit To Do Professional Waste Services (Permit D/PWS) to provide the services.

For more information about desludging services, please contact SWK at 1-800-88-5496 (for US Telephone Malaysia) or Majlis Services at 99-747 6866 (for Sabah).

The list of other contractors (Permit B holders) is available at www.span.gov.my under the heading "Regulator" and "Permit".

Water Services Authority of Singapore (SPAN)

This message has been brought to you in conjunction with the launching of our new e-Service Tools Desludging Awareness Campaign on 24 June 2011 to assist you.



#2 Mar 2011 June 2011 ID: SPAN0-SPN-N 1st and 2nd case 14/6/2011 4th case 24/06/11; 5th 24/06/2011

AWARENESS PROGRAMME

Campaign being held through Malaysia to encourage Malaysian desludging their IST.

The message brought to public to address **key issues** and awareness in desludge their septic tanks :

KEY ISSUES

Unbearable stench permeating the air

Malfunctioning of toilets, sinks and sanitary pipes

Higher risk of being confronted with water borne diseases

Quality of water resource will be affected



WAY FORWARD



WAY FORWARD

Standardization

To elevate & control the quality of prefab. components produced by manufacturer



To ensure construction & installation is at desirable level to perform as required



To ensure the system would be able to provide treatment efficiency as intended



Desludging

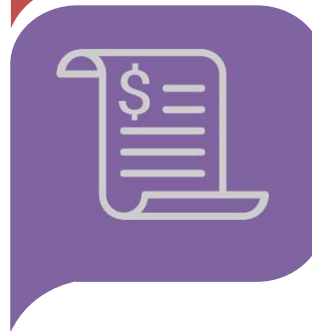
Review Water Services Industry (Desludging and Discharge Sewage Sludge) Rules



Implementation of Scheduled Desludging



The tariff is proposed to be spread over a 3 year period (monthly billing)





THANK YOU

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SEWERAGE REGULATORY DEPARTMENT
NATIONAL WATER SERVICES COMMISSION (SPAN)
MALAYSIA