Corporate Sustainability Report 2007

13 Years of Environmental Accomplishments (1994-2007)

Indah Water

Indah Water Konsortium Sdn Bhd
(Wholly Owned by the Minister of Finance Incorporated)
(211763-P)

objective

This report outlines Indah Water Konsortium Sdn. Bhd.'s (Indah Water or the Company)background and environmental, economic and social impacts within Indah Water's operating and services areas. It is a disclosure of our corporate responsibility and performance via standard information sharing to enlighten our internal and external stakeholders in a transparent manner.

Indah Water foresees the value of information sharing to the local communities and the world through technology development by establishing our company's first website (www.iwk.com.my) in year 2004. Our webpage consist of company background, services, contacts, general sewerage knowledge, practices in Malaysia for easy browse through, and reference. This report, which incorporates Indah Water's 13 years environmental performances and social achievements, further highlights and complements our webpage as a contribution towards further transparency, improvement, and sustainable growth.

target audience

Our target audience are all stakeholders, including but not limited to government leaders, regulators, employees, business partners, consultants, contractors, suppliers, academics, non-governmental organisations, environmental groups, community leaders, individuals with interests in the sewerage and water sectors and the communities in which we operate.

contents

A Message from Our Director

It is with great honour that I present the Indah Water's first inaugural Corporate Sustainability Report.

Suhaimi Kamaralzaman
Director/Chairman of Management Committee
Indah Water

It is with great honour that I present the Indah Water's inaugural Corporate Sustainability Report. This report maps out Indah Water's environmental policy, objectives and several approaches employed in meeting the regulatory standards and serves as a benchmark for continuous improvement in providing its services. The report also highlights Indah Water's achievements in the past 13 years of its participation in the country's sewerage services, to improve and contribute to the environmental quality.

Sustainability is of paramount importance in the water and sewerage industry. A holistic approach, which ensures social, economic and environmental sustainability, is vital to safeguard Malaysia's water resources for its future generation. Hence, Indah Water has set its own roadmap to provide long-term sustainable sewerage services in Malaysia.

For many years, sewage has been identified as the main source of pollution in the river systems and other water bodies. Indah Water was incorporated in 1994 with the mandate to improve the then poorly managed sewerage services in the country. Taking this challenge, Indah Water has drawn its target to meet the objectives of improving the environmental conditions and quality of the public health in the country. Today, the company has far outreached its goals and moving forward to support other environmental objectives such as conservation of the environment quality and water resources for future generation.

Our mission is to provide efficient sewerage services to all our customers and to strive towards establishing a modern national sewerage system. Environmental protection is the responsibility of all citizens and Indah Water on its part will continue to educate the general public on the importance of the preservation and the protection of the environment.

As Malaysia's premier sewerage services provider, we have achieved many "firsts" in the last 13 years of our presence in the country since April 1994. Among our key achievements are:

A Message from Our Director

- *Operation and maintenance of 9,337 public sewage treatment plants and network pumping stations;*
- *Managing close to 17,097 km of public sewerage systems, which serve approximately 16.7 million people;*
- *Provide services including strategic sludge management and ensuring high compliance to the environmental standards;*
- *Affordable tariff structure, billing and collection to sustain national sewerage services;*
- *Nationwide public education and awareness programme to engage community participation;*
- *Formulation of national sewerage standards, technical training and research programmes.*

Looking back to the passage we had taken for the past 13 years, the company has successfully turned around the national sewerage services to a level compatible with other world-class sanitation operators. Indah Water believes that its presence had made significant impact and contribution to the country and will continue improving the environmental quality.

Today, we are proud to share that the national sewerage services has improved tremendously with high level of data inventory related to the sewerage industry and the fast progression towards utilising up- to- date data inventory of our treatment facilities coupled with intimate knowledge of the industry. The company is able to formulate the national sewerage development plan with the aim to meet national objectives by putting high priority on environmental preservation.

This inaugural Sustainability Report presents Indah Water's environmental accomplishments between 1994 to 2007. We will continue to build momentum to achieve further environmental excellence in the years ahead. Thus, contributing to our share of environmental improvements and excellence at the national level and will become a brand name recognised by both the public and the world.

On behalf of the Board of Directors, I would like to record our gratitude and appreciation to the Sewerage Services Department for stewardship of the company and National Sewerage Development.

I would like to thank all employees, for their continued loyalty and dedication to the Company. Working together, I am sure we can look forward to an even more productive year ahead in the future.

Finally, I wish to extend our sincere appreciation to our regulators, business associates, business partners, clients and government authorities for their strong support throughout the years.

Suhaimi Kamaralzaman
Director/Chairman Management Committee
Indah Water Sdn Bhd

Executive Summary

The publication of Indah Water's first Corporate Sustainability Report is a reflection of the company's accomplishments, achievements and challenges in managing the sewerage services that fully meet environmental demands. Safe environmental practices are central to Indah Water's operation and through the years, Indah Water has fully focused its time and efforts within its limited resources to meet these demands. The company's commitment to the preservation of the environment is internalised in its daily operations. Sewerage services positively contribute towards the environment, and more than just collecting and treating of sewage to meet the required effluent standards, it also entails proper planning and policy making that support continuous improvement of the sewerage sector.

Sewage is treated to reduce and remove organic matter, solids, nutrients, pathogens and other pollutants. This has been Indah Water's responsibility towards protection of public health, ensuring good quality of the environment and efforts to preserve the natural water resources. In the year 2007 alone, more than 65% of the 8,697 sewage treatment plants of various types were able to comply fully with the effluent standards specified under the Environmental Quality Act, 1974. In its 13 years of operation, the number of treatment plants handed over to Indah Water for operation and maintenance continues to grow, but Indah Water has managed to increase the percentage of compliance to effluent standards both in Standard A and Standard B catchments. The high percentage of plants, which fail to comply with the discharge standards, can be attributed to the inability of the plants to meet the required oil and grease levels, which is largely due to inherent design deficiencies.

Refurbishment, upgrading and rationalisation programmes to bring back the non-complying treatment plants, which were taken over from the local authority, had significantly increased effluent compliance. To date, 59% of the identified plants have been refurbished involving capital expenditure of close to RM352 million.

Indah Water has also drawn up its sludge management strategy emphasising the need for environmentally safe sludge disposal practices, utilisation of appropriate technology in managing sludge and incorporating the 3R concept - reduce, recycle and reuse of sludge to minimise waste returned to the environment. Today, a total of RM66 million has been spent to provide over 47 sludge facilities nationwide.

Improvement and development of the sewerage sector needs to take place in tandem with the country's growth. Since the privatisation of the sewerage services to Indah Water, it has been facing many challenges in sustaining the business, and a major part of it is in relation to financial affordability.

Modernisation and social development have increased environmental awareness, which demands more investment and effort to fulfil this need. However, with tariff being revised downward four times over the past thirteen years, the challenge to provide services to fully comply with environmental requirements has become greater forcing government to intervene and provide financial support. Capital investment is necessary to ensure plants consistently meet standards.

Aside from that, efficient operation and maintenance are also critical, and for this, Indah Water has met the challenge of fully utilising its 2,629 strong work force to operate and maintain more than 9,337 treatment plants and network pumping stations and approximately 17,097 km of sewer network. Affordability will not be an issue when the public realises the benefits of properly managed sewerage services. After 13 years of existence, Indah Water still has a long way to go in changing the mindset of the public to willingly pay for the services and convincing them on how the sewerage charges collected are utilised to benefit the environment. The challenges for Indah Water in the sewerage sector do not stop at this but also extends to requiring good understanding and cooperation with regulators, enforcement agencies and other stakeholders.

Indah Water's services have expanded to the wider public with establishing 17 unit offices nationwide. In order to deliver efficient sewerage services at affordable prices, while maintaining the quality of service delivered to customers and protecting the environment, more funding will be required and the potential sources will have to be from increase in tariff rate and continuous commitment as well as financial support from government.

Our Vision & Mission

Our Vision

" To Be The Most Efficient & Environment Caring Sewerage Company"

Our Mission

"We Are Highly Committed to Provide Efficient Sewerage Services to All Customers Besides Striving Towards Developing The National Sewerage System That Will Collectively Contribute Towards A Sustainable & Friendly Environment ".

Indah Water's Environmental Policy Statement

Our environmental policy statement centres around the "Business" we manage, i.e. "Sewerage".

- **Sustainable Service**
  Indah Water is totally committed towards providing total sewerage services sustainable in terms of social, environment and economic balances;

- **Environmental Friendly**
  Indah Water provides services, which are consistently carried out in an acceptable and environmental friendly manner;

- **Waste Management**
  Indah Water ensures all waste generated is managed in accordance with the regulatory requirements;

- **Engineering and Operational Excellence**
  Indah Water practices good engineering and operational procedures to meet environmental goals;

- **Research and Development**
  Indah Water undertakes research and development and also promotes transfer of environmentally sound technology and management methods throughout the sewerage services industry;

- **Adopt Triple R - Reduce, Recycle and Reuse**
  Indah Water adopts waste management principles by formulating and enforcing strategies that includes reduce, recycle and reuse treated water and sludge;

- **Good Liaison With Authorities and Customer Friendly**
  Indah Water continuously cooperate and work closely with authorities and enforcement agencies to provide support towards improving the environment in its quest to deliver customer friendly sewerage services;

- **Engage in Community Education and Awareness**
  Indah Water works closely with the community to disseminate environmental education and instil awareness and understanding on the importance of good sewerage service for the environment.

Indah Water's Near You

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Customer Charter

The Customer Charter outlines Indah Water's commitment in providing sewerage services and ensuring the standard of customer service that each customer can expect.

Accordingly, we will ensure efficient sewerage services by :

- Operating and maintaining all public sewerage systems to meet the requirements and conditions set by the Sewerage Services Department (Regulator) and the Department of Environment;
- Desludging all customers' septic tanks on a scheduled basis once every two years or on request by customer;
- Conforming to environmentally sound practices in the treatment and disposal of sewage and sludge;
- Using appropriate technology and applying cost effective measures in all areas of our operations.

We will ensure high standards of customer service by :

- Being on call 24 hours a day, 7 days a week to respond to service emergencies;
- Responding to service complaints within 24 hours;
- Responding to requests for desludging of septic tanks within 48 hours;
- Replying to all written billing and operation enquiries within 3 working days;
- Answering all calls to our dedicated customer service lines within 15 seconds;
- Keeping service appointments to within 30 minutes of agreed time and notifying customers when delays are experienced, if customers can be contacted.

We are accountable to our customers in complying with the above standards, which are regulated and monitored by the Sewerage Services Department.

toll free **1-800-88-3495**	sms **36399** type **iwk<space>message**
email **care@iwk.com.my**	visit **www.iwk.com.my**

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Indah Water's Health & Safety Policy Statement

" Indah Water is committed to safeguarding and improving its health and safety performance by conducting its business activities in an organised and responsible manner by adopting a certified health and safety management system. We will endeavour to see that our activities, services and products do not harm employees, customers and members of the public who may be affected by our activities. We believe it is necessary to adopt sound management practices of which the integration of health and safety principles are of the highest priority "

Corporate Responsibilities

In undertaking its business activities it is the expressed policy of Indah Water to :

- Provide and maintain facilities, plant, equipment and systems so as to ensure we operate a safe place of work with adequate welfare and first aid facilities;
- Establish effective communications that enable employees and their representatives to participate in developing and promoting effective measures to ensure the highest standards of health and safety at work are maintained;
- Undertake to train and educate employees of the risks to which they may be exposed;
- To make available to each and every employee appropriate safety and protective equipment;
- To prepare and review annual health and safety plans;
- To comply with all relevant occupational safety and health national laws and regulations as a minimum, promoting performance standards that reflect best international practice;
- To develop, maintain and review emergency procedures in accordance with the requirement of law and the needs of relevant external agencies and local communities;
- To ensure health and safety will be a significant factor in the selection process of external suppliers or contractors; and
- To continually improve the performance of the health and safety management system.

UTAMAKAN KESELAMATAN
SAFETY FIRST

Indah Water's Core Values

Our core values are based upon the name of 'INDAH WATER' which stands for the following 10 values. 'INDAH' is a Malay word for beautiful, whilst 'WATER' as our core business to 'beautify' wastewater which means to add value and improve water quality by reducing pollutants to meet regulatory standards and improve public health and environmental concerns.

- **Integrity**
  Uphold professional responsibilities and accountabilities in the trustworthy manner

- **Nurture**
  Provide diverse training programmes and hand on training facilities for workforce and the overall sewerage industries

- **Dedication**
  Committed at all times to deliver quality sewerage services and output

- **Astute**
  Apply knowledge, practical experience, holistic overview and effective decision making to ensure sustainable sewerage development and environmental protection

- **Holistic**
  Holistic approach and management of sewerage development and environmental protection

- **Wisdom**
  Provide timely and appropriate recommendation and problem solving actions/ output

- **Authentic**
  Ethical and devoted to enlighten sewerage activities for safety, health and environmental protection

- **Teamwork**
  A corporate effort of many expertise and support with one mind

- **Endeavour**
  Act by available means and resources to upkeep sustainable sewerage development and environmental awareness to all stakeholders

- **Resourceful**
  Systematic planning, development, implementation and monitoring to ensure stakeholders satisfaction

Our Challenges

- ***Plan, develop sewerage master plan, asset management and assist regulators while incorporating on stakeholders management;***
- ***Educate staff and create public awareness on sewerage and environmental protection;***
- ***Tracking performance of asset, compliance and workforce;***
- ***Integrating health, safety and environment into corporate culture and work activities;***
- ***Monitoring effluent discharge, level of services and customer satisfaction;***
- ***Manage sludge disposal and environmental compliance.***

Sewage Treatment Plants (STPs) evolved in line with the existing technology and constructed at the time by the developers then handed over to Indah Water to operate the asset. Through this evolution, there are different treatment process technology and equipment used to treat sewage. Indah Water, as the major player of sewerage industry eventually will take-over and operate these assets where some of the systems are already obsolete which requires upgrading or complete refurbishment to meet the current effluent discharge standards.

Majority of the sewerage facilities were not built by Indah Water whereby the type of system and type of equipment used in the proposed treatment system are selected by the consultants or contractors appointed by developers. Due to evolvement of sewerage systems, construction and equipment selection by others, Indah Water eventually has to operate diverse type of systems, where variation could be in treatment process as well as assorted type of equipment used.

As the main operator of these facilities, Indah Water embraces the challenge to integrate building planning, engineering, operation and maintenance workforce capacity to suit diverse type of treatment process and equipment. Subsequently, Indah Water will ensure adequate training facilities, programmes and safe work culture to ensure the individual health and safety of workforce whilst maintaining the plants' performance in reducing water pollution.

Structural and equipment quality of the treatment plants and sustainable sewerage development depends on cooperation of stakeholders (the developers, consultants, contractors, system suppliers) working together according to the sewerage master plan, guidelines, standards and best code of practices. Of the total existing STPs, the developers constructed more than 99% of them. Projects proponent main concerns are on the quality of houses or apartments constructed for the buyer as their main customer and least priority given to the provision of sewage conveyance and treatment system. Indah Water addresses the extensive challenges by providing technical support in the planning, developing a sewerage master plan and working together with the regulators towards integration of various stakeholders to ensure high quality of sewerage facilities handed over to Indah Water for sustainable sewerage management and environmental protection.

Since the early 90's STPs in Malaysia evolve towards higher performance efficiency and mechanical equipments dependant. As of December 2007, there are 4,494 mechanical treatment plants and pump stations in Malaysia. Most of the time, locations of the STPs are located far away from public areas and remote to avoid public nuisance. Unfortunately, these equipment and instruments are becoming the target of brigands.

Disappearance of equipment will affect system performance and/or even in worst cases where total system shutdown due to missing major and critical equipment caused by theft. Moreover, power interruption and extreme weather such as flood and/or lightning may also cause shut down of plants' operation. Indah Water enfolds this stumbling block by working within available budget to ensure higher security of sewerage facilities, provision of early

Our Challenges


Caj minimum pembetungan


Folks now understand IWK's services

warning system, increase effluent monitoring frequency and swift remedial action to replace stolen and damaged equipment, massive cleaning (if required due to flood) and resume plant operations to ensure reduction of water pollution within allowable standards.

Indah Water, as the major operator of sewerage facilities, is not able to control the amount of incoming sewage load and quality into treatment systems. Any irresponsible person may simply pour illegal or hazardous waste into the existing sewerage system via any open access in household plumbing or directly discharge into roadside manholes. Some premises and sewers may be at risk as a means of illegal discharge and extreme loading to the treatment plants. Consequently, the sewer lines may be subjected to blockages whilst the plants will not be able to treat the extra loading based on the intended design and/or in the worst scenarios where the illegal loading content destroys microorganism in the plant and eventually causing total collapse of the treatment process. Unfortunately, Indah Water will have to pay the contravention licenses and/or receive summons for any non-compliance to effluent discharge standards due to irresponsible actions of others, not to mention the number of complaints received from the public due to malodorous problems. It is a reckoning challenge for Indah Water striving to revive and improve 'dead plants' due to surcharge of loading and 'sudden death' of biological processes to ensure reduction of water pollution and the discharges are within the allowable limit.

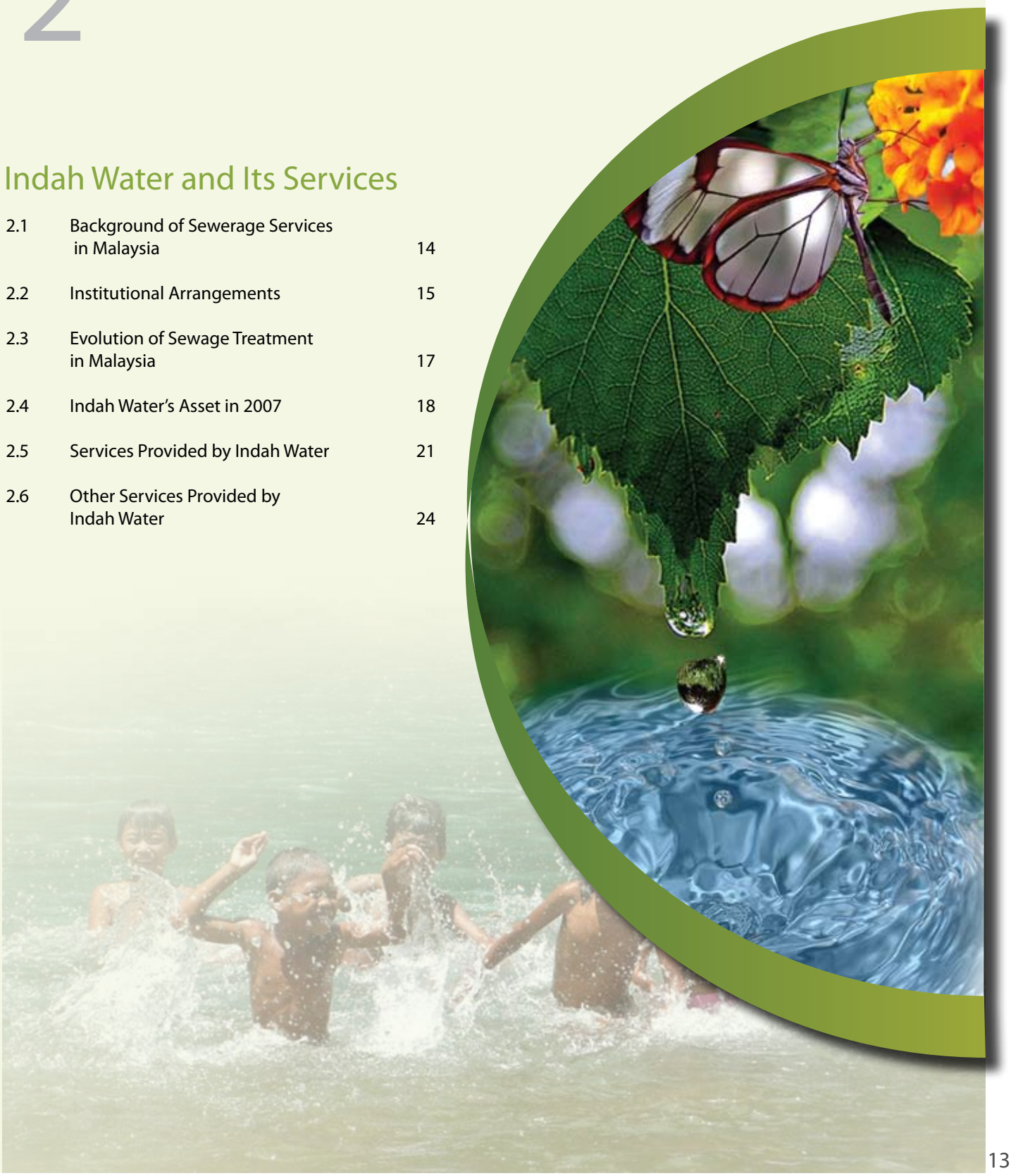
Sludge is the by-product of sewage treatment and was initially not included in the sewerage master plan. Recognising the critical impacts of sludge disposal, Indah Water has also developed sludge strategy and continuously collaborated with regulators to ensure sustainable environmental protection via proper monitoring of sludge disposal sites. However, Indah Water faces challenges in implementing its sludge strategy among which is difficulties in getting suitable disposal sites, public objections, and high capital investments.

Public awareness of sewage treatment for environmental protection and sustainable development was relatively low in the early 90s. Indah Water is continuously committed to educate the public on environmental protection and sustainability. Over the years, Indah Water has spent millions implementing public awareness programs to educate consumers on the importance of proper sewage treatment process as part of the nation's sustainable development. Proudly, the name 'Indah Water' is acceptable as a brand and synonymous to an environmental caring organisation.

Risk of STP Failures to Compliances

2

Indah Water and Its Services



Indah Water and Its Services

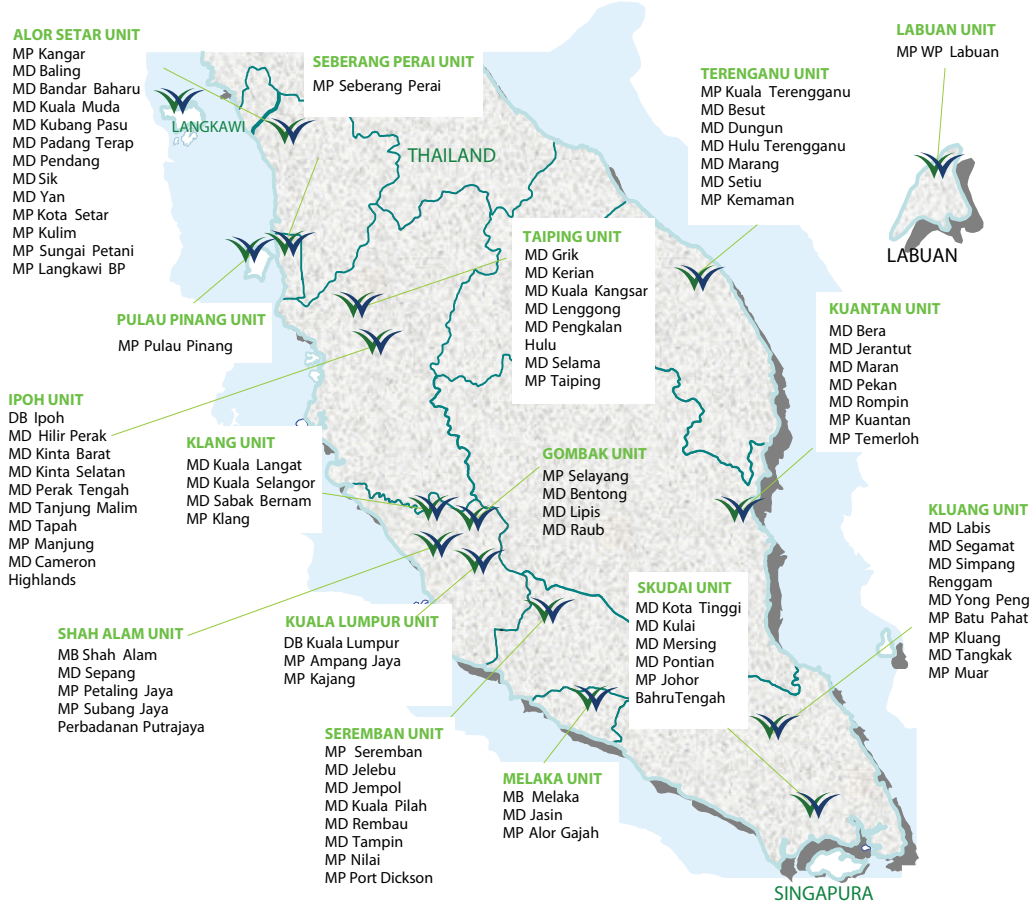
" Preservation of the environment is integral to our organisation. In providing the essential sewerage services to the customer, Indah Water will strive to continuously protect and improve the environment. "

~ Puan Hajah Hanifah Hassan- Chairman, Indah Water ~

2.1 Background of sewerage services in Malaysia

The World Health Organisation (WHO) describes a person as having access to proper sanitation if one has at least a pour flush toilet.

Before 1994, sewerage services in Malaysia fell under the jurisdiction of the local authorities. There are 144 local authorities in the country and the level of expertise and financial capabilities between these local authorities varied widely. The local authorities were also responsible for many other infrastructures and amenities for their respective administrative areas beside sewerage. Developments of the sewerage services in the country were also slow due to financial constraints. The tariffs level, which were absorbed under the property assessment tax collected by the local authorities, were insufficient to fund capital-intensive projects, allocate adequate manpower to provide satisfactory operation as well as maintenance of the facilities.



- *Operations only cover 86 of 144 local authorities in Malaysia.*
- *The entire states of Kelantan, Sabah, Sarawak, Johor Bahru & Pasir Gudang not taken over although provided in Concession Agreement.*
- *Regional development authority areas such as KETENGAH &KEJORA are excluded*

In realising the urgent need to upgrade the sanitation level in the country, the management of the sewerage systems in the country was federalised. The Sewerage Services Act was enacted in 1993 to empower the Federal Government to regulate the sewerage industry and the Department of Sewerage Services was formed as the regulator of the sewerage industry. Indah Water was formed in April 1994 after being awarded as the national sewerage services concessionaire, to undertake the management of the sewerage services in the country.

To date, Indah Water has 17 unit offices nationwide and taken over the management of sewerage services in local authorities operational areas within Peninsular Malaysia, except in Majlis Bandaraya Johor Bahru and Kelantan. Amongst the responsibilities of Indah Water are :

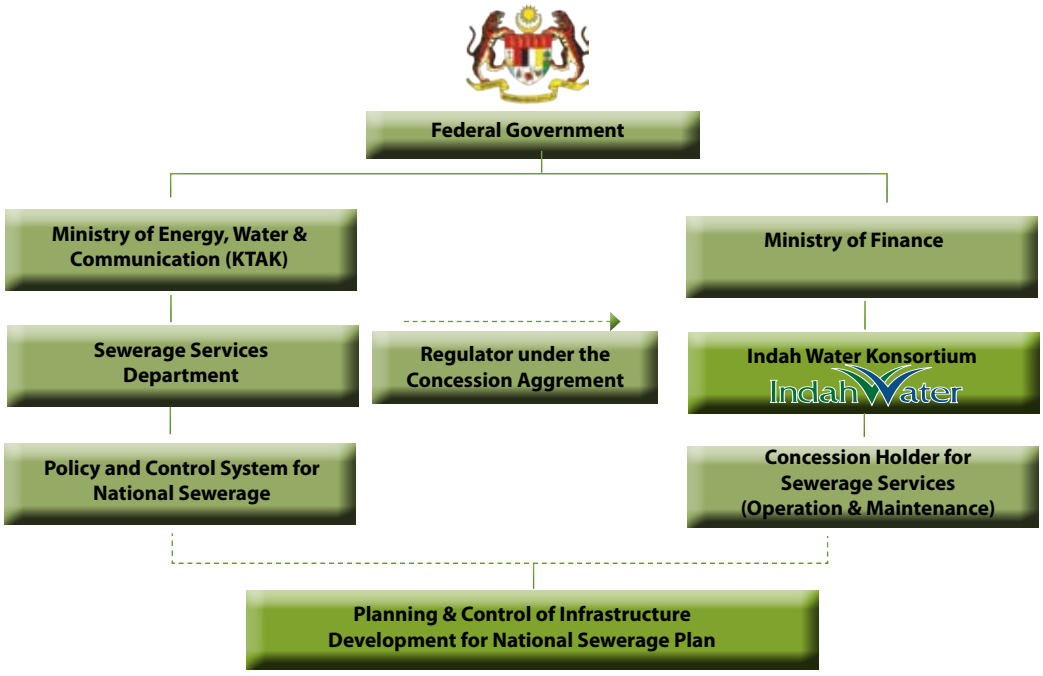
- To operate and maintain the public sewerage systems;
- To refurbish and upgrade existing public treatment plants and sewers to ensure acceptable performance level;
- To provide desludging services for septic tanks;
- To work closely with the Sewerage Services Department in sewerage planning and development and also to execute sewerage projects at national level;
- To ensure consistent and sustainable level of sewerage services at national level.

2.2 Institutional Arrangements

Sewerage services in the country are regulated by Department of Sewerage Services (DSS), which is set up under the Ministry of Energy, Water and Communications (MEWC). In 2001, the Federal Government through the Ministry of Finance (Inc.) acquired the entire private equity of Indah Water.

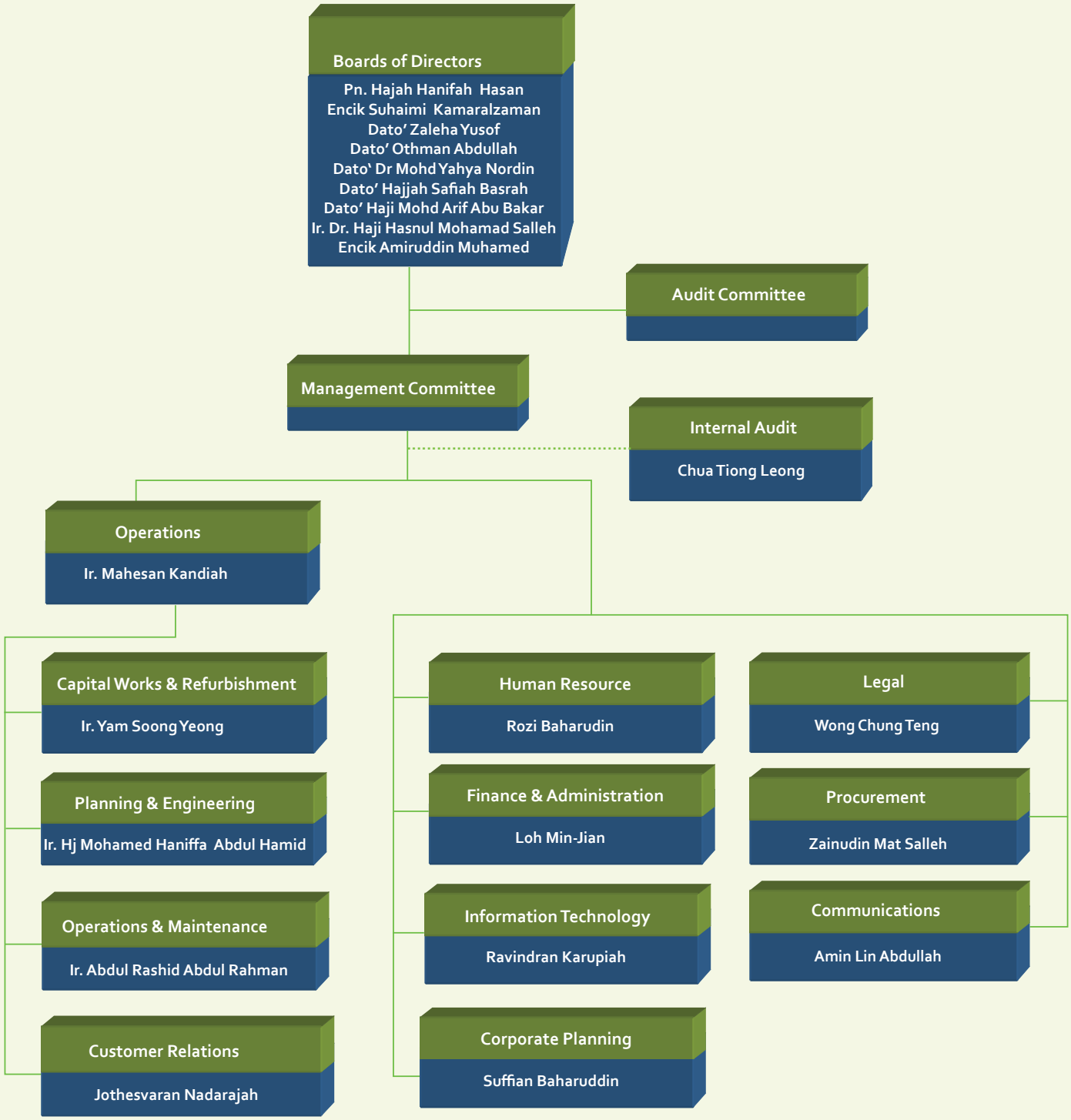
Indah Water is currently operating in 86 out of 96 local authority areas in Peninsular Malaysia. Nationwide, it has 17 operating unit offices and 14 regional planning and certification units.

Organisation chart of Sewerage Management



Indah Water and Its Services

Indah Water's Organisation Structure



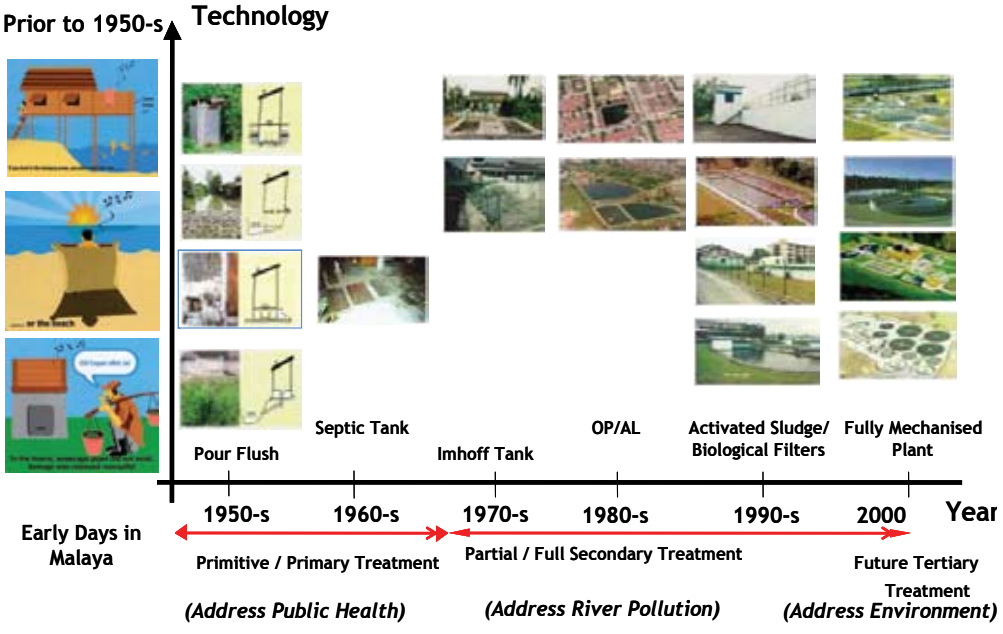
2.3 Evolution of Sewage Treatment in Malaysia

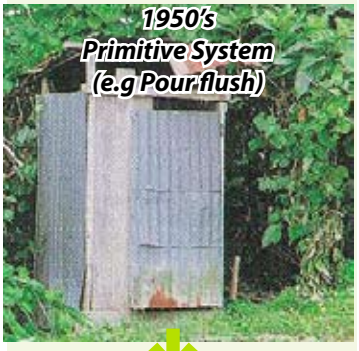
Malaysia has seen the evolution of its sewerage industry over the last half a century. Before its independence in 1957, there were few proper sewerage systems in Malaya due to the low population densities and very limited urbanised developments. Sewage treatment was mainly by way of primitive methods, such as pit and bucket latrines, over-hanging latrines and direct discharge to rivers and beaches. When Malaya began to develop and move from an agricultural based to an industrial based country, the need for proper sanitation gained importance. In the 1950's, sewage treatment systems in the form of individual septic tanks and pour flush systems were introduced while small communal systems involving mainly primary treatment, such as the Communal Septic Tanks and Imhoff Tanks were used in the 1960's. In the 1970's, the technology expanded to biological treatment processes in the form of oxidation pond systems utilising natural means of treatment.

Later in the 1980's, mechanised systems started to be introduced and oxidation ponds were converted to aerated lagoon systems. The late 1980's and early 1990s, saw the accelerated development of fully mechanised sewage treatment systems.

In the late 1990's mechanical treatment systems, which allow for process optimisation proliferated and the industry is expected to move forward in line with technological advancement towards advanced secondary as well as incorporation of tertiary treatment systems. Today, construction of a STP faces the challenge to meet the increasing concern on the expectation of environmental standards and the skill levels in the design, construction and operations of sewerage works.

For the past 13 years since the existence of Indah Water in the country, sludge handling and management have progressively improved to include sludge management strategies, acquiring dedicated and controlled sludge disposal sites, continuous research and development programs for sludge reuse.





Asset Status and Service Coverage (December 2007)	
Sewerage Asset	**Status**
Sewage Treatment Plants	8,697 units
Pumping Stations	640 nos
Lenght of Sewerage Pipes	17,097 km
Resources and Area of Coverage	
Staff	2,629
Vehicles (Tanker, Lorry, Van)	569 units
Central Lab facilities	3 units
Sampel/yr	81,674
Unit Offices	17 units
Customers	2.75 mil.
Local Authorities	86

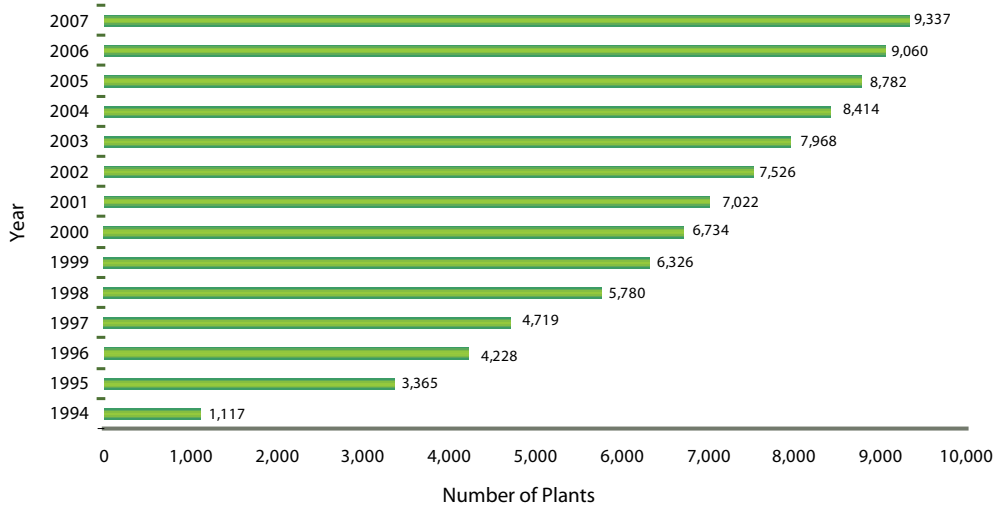
2.4 Indah Water's Asset in 2007

Indah Water has progressively streamlined its business to meet the concession target to increase connected sewerage services, whilst rationalisation of selected treatment systems takes place. With the construction of more centralised and permanent treatment facilities under the capital works program, it is expected that the national sewerage industry to move to a higher level of sewerage management.

As the key sewerage concession company responsible for operating and maintaining sewerage assets, massive asset databases have to be established to ensure proper asset tagging and systematic asset monitoring. Throughout the 13 years of Indah Water's establishment (as at December 2007), we have developed a holistic database system incorporating planning and sewerage master plan data, GIS mapping database of existing sewer lines, pump stations and STPs, details customer database and payment history, asset equipment tagging and finally effluent quality databases.

Indah Water has spent millions to continuously improve its database management to be on par with technology development. Indah Water will continue to update these databases and integrate them to an overall master plan as well as on the ground sewerage facilities for continuous improvement to strategize the future of sewerage development in the country.

No. of STPs taken over since 1994 (Cumulative)

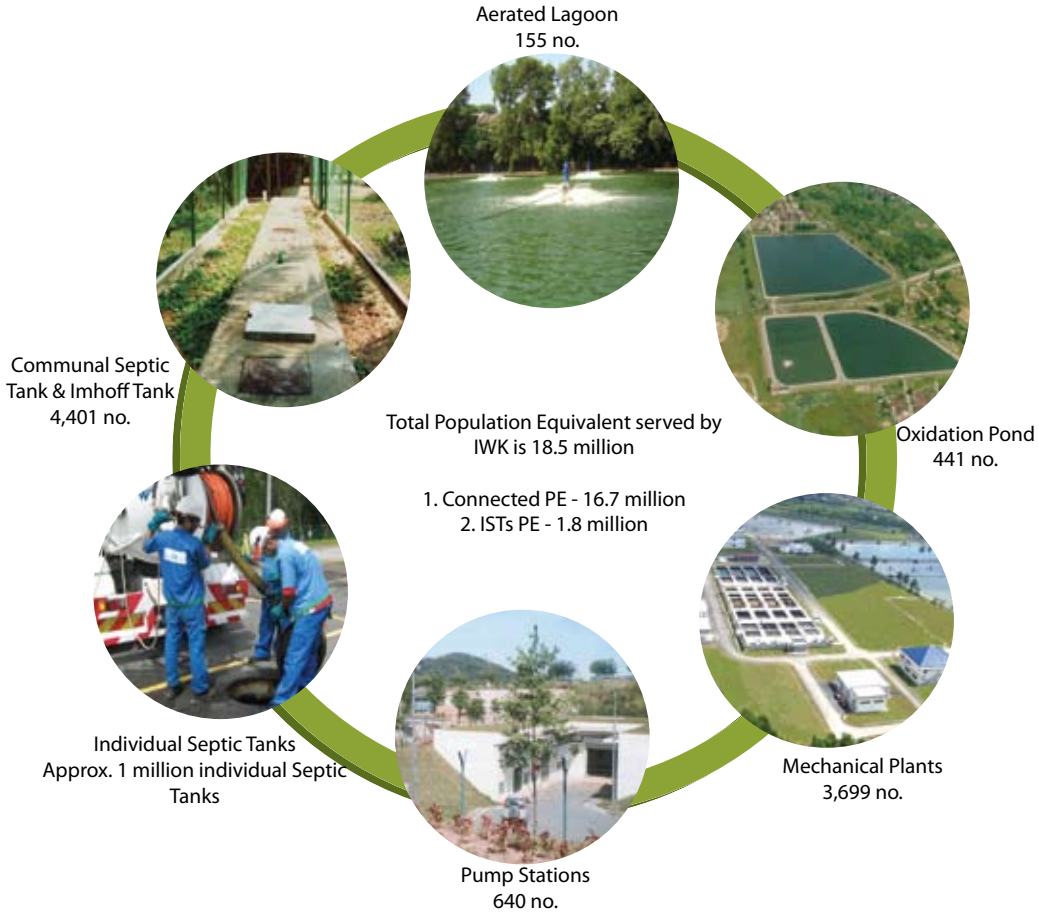


*** Numbers are inclusive sewage treatment plants and network pumping station*

Indah Water's Asset Management System is very helpful to the specified users within the department to provide accurate and complete data input and output. Asset database format available can be integrated, presented in the specified standard format and accessible by specified users to update, monitor and analyse. The following are the general benefits of the holistic asset database management system :-

- Facilitate management control and improve business reporting output and accuracy.
- Record and maintain historical data of asset, equipment tagging, monitoring & performance, customer database and payment history, taking over documentation, assets, customer list, payment history, etc.
- Fast retrieval of archived drawings, scanned documents, historical and latest data, available reports, etc.
- Data register in one system with ability to be integrated with other system and accessible by input operator, monitoring observer, analyst, manager, etc.
- Enhances effective communication and accurate presentation
- Improves effectiveness in planning, monitoring and data analysis
- Increase system and reporting reliability and reliance
- Provide user friendly interface for general inquiry on screen and printed reports

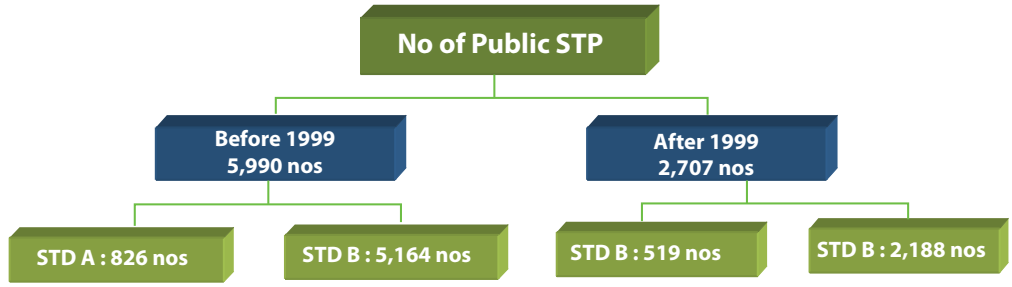
IWK Asset Profile for Year 2007



2.4.1 Category of Indah Water's STPs

Public STPs, operated by Indah Water can be divided into two categories differentiated by the date the plants are approved. In January 1999, the Department of Sewerage Services had published and enforced the usage of design guides in the "Guidelines for Developers : Sewage Treatment Vol. IV, Second Edition with the main objectives of treatment plants are able to meet environmental standards and are in satisfactory operable conditions with adoption of up to date technology.

Background of STP Category

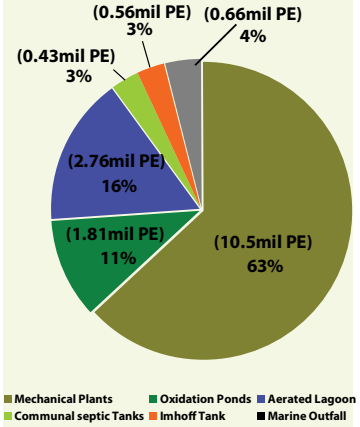


- Approved and taken over for maintenance by local authorities
- Varied in design, construction, quality and products
- Majority not designed to meet the EQA effluent standards
- Majority failed in complying to most of the parameters i.e. BOD, COD, SS and O&G

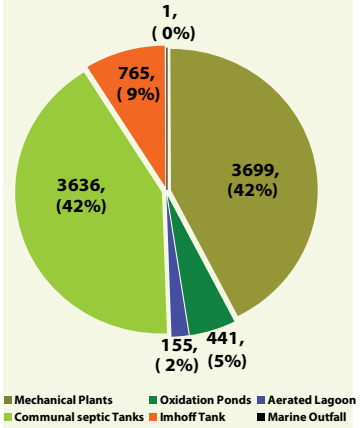
- Approved and taken over by JPP/IWK
- Uniformity in design and construction were enforced
- However the design of these plants were still unable to meet the absolute compliance to the EQA standards particurly for oil & grease ("non detectable" for standard A plants & 10 mg/l for std B plants

The greatest challenge for IWK will be to comply to the EQA effluent limit for oil & grease especially for treatment plants located in Std A catchments

Population Equivalent catered by Treatment plants (December 2007)



Type of Treatment Plant (December 2007)



2.4.2 Types of Indah Water's STPs

In general, STPs can be categorised as plants with primary, secondary and tertiary treatment process. Examples of plants with primary treatment are individual septic tanks (IST), communal septic tanks (CST) and Imhoff Tanks (IT), while oxidation ponds (OP) and majority of the mechanical plants provide secondary treatment. Only a small number of mechanical plants provide tertiary treatment.

The number of plants designed with primary treatment is more than half of the total number of Indah Water's treatment plants however the population equivalent served is small and less than a quarter of the total population equivalent serviced by Indah Water.

At the end of 2000, a total of 8,697 STPs nationwide (excluding network pumping stations) are under Indah Water where 15% or 1,345 are located in Std A areas while 85% or 7,352 are located in Std B catchment.

TYPES OF STP	STANDARD A				STANDARD B			
	Nos.	%	PE	%	Nos.	%	PE	%
Communal Septic Tank	491	36.5	46,534	2.0	3,145	42.8	385,557	2.7
Imhoff Tank	96	7.1	50,379	2.1	669	9.1	512,737	3.6
Oxidation Pond	87	6.5	181,648	7.7	354	4.8	1,624,053	11.3
Aerated Lagoon	19	1.4	158,070	6.7	136	1.8	2,597,203	18.1
Mechanical Plants	652	48.5	1,923,940	81.5	3,047	41.4	8,601,850	59.8
Marine Outfall	-	0.0	-	0.0	1	0.0	663,527	4.6

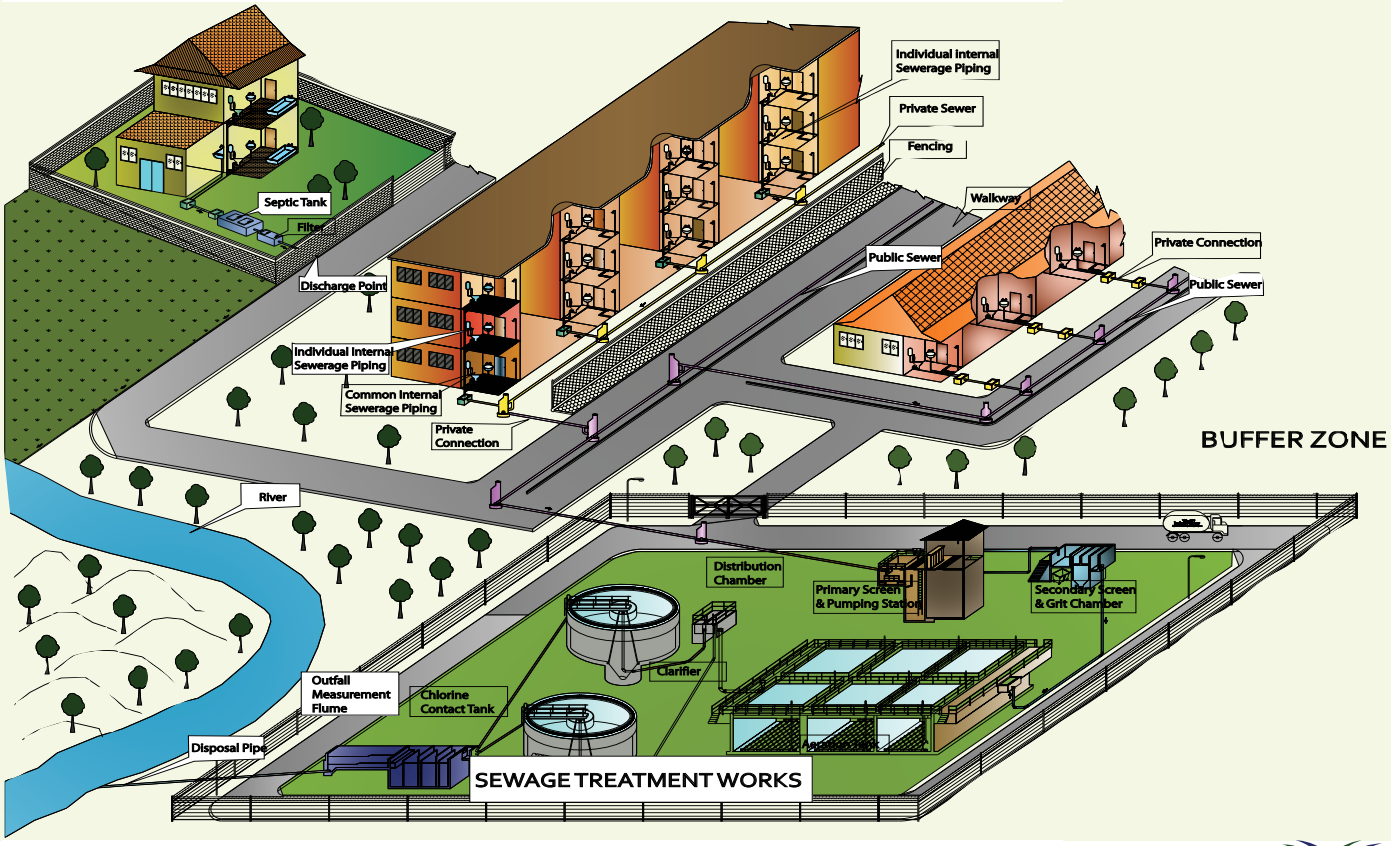
The table provides details on various sewage treatment systems available in the country

2.5 Services Provided by Indah Water

Indah Water provides sewerage services to two main customer groups i.e. customer with connected systems and individual septic tank customers. At the end of 2007, Indah Water has an estimated 2.75 million customers. In Peninsular Malaysia, Indah Water 's services cover most areas except for the state of Kelantan, the city of Johor Bahru, Sabah and Sarawak.

Indah Water offers a variety of services to cater for the nation's increasing demand for sewerage and services. Among the core services provided by Indah Water are :

- Operating and maintaining public sewerage systems which include sewer lines/ networks, public sewage treatment plants for connected sewerage systems;
- Provision of desludging services for individual septic tanks and private plants;
- Refurbishing and upgrading existing sewage treatment facilities;
- Planning and building new sewerage infrastructure.



Indah Water and Its Services

i. Connected Sewerage Systems

Sewerage services encompass the conveyance of sewage from connected properties to treatment plants to discharge of effluent from the treatment plants and delivery of sludge generated by the sewage treatment to the ultimate sludge disposal locations. End products from sewage treatment processes will be in liquid form i.e. treated effluent discharged to the drainage systems and water bodies while the solids form is waste generated from screenings, grit, scum and sludge from sewage treatment processes and this form of waste will finally be disposed off.

To date, Indah Water's asset data indicated that 60% of the country's population are connected to facilities operated by Indah Water. The company's objective is to connect 84% of the population by the end of the concession period. The services provided by Indah Water are :

- Sewage and Sludge Treatment Technology and Process Optimisation;
- Housekeeping, aesthetics maintenance and safety of treatment plants;
- Repair works of sewage treatment facilities, equipment, structures, fences, internal roads etc.;
- Operation and monitoring of equipment;
- Routine preventive maintenance;
- Laboratory analysis of effluent and sludge;
- Manage and dispose solid waste (i.e. sludge, screenings, grit, etc.) generated from the treatment plant.

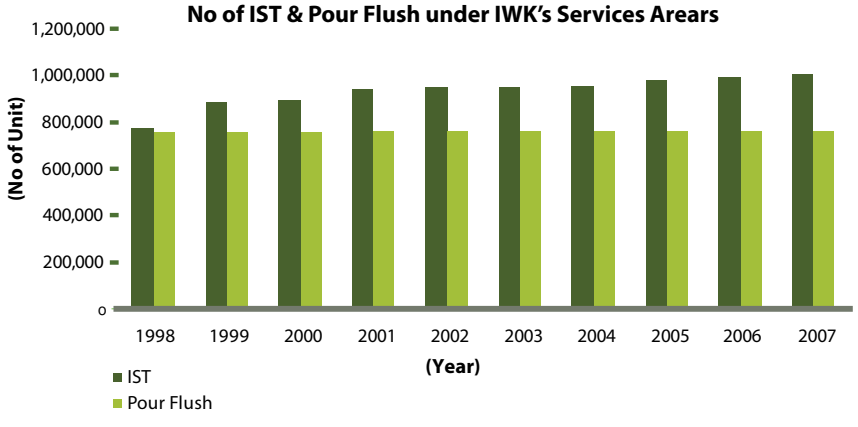
ii. Network Systems

As at December 2007, Indah Water maintained approximately 17,097 km of sewer pipelines. Basic network services include :

- Corrective maintenance - Attend to public complains relating to blockages, sewage overflow, missing/ damaged manhole covers.
- Preventive maintenance - Sewer and manhole cleaning and inspection, and high pressure jetting

iii. Desludging Service for Individual Septic Tanks, Pour Flush and Private Plants

Indah Water is responsible for the provision of desludging services to septic tank customers, private plants, or individual owners of sewage treatment systems in the country.

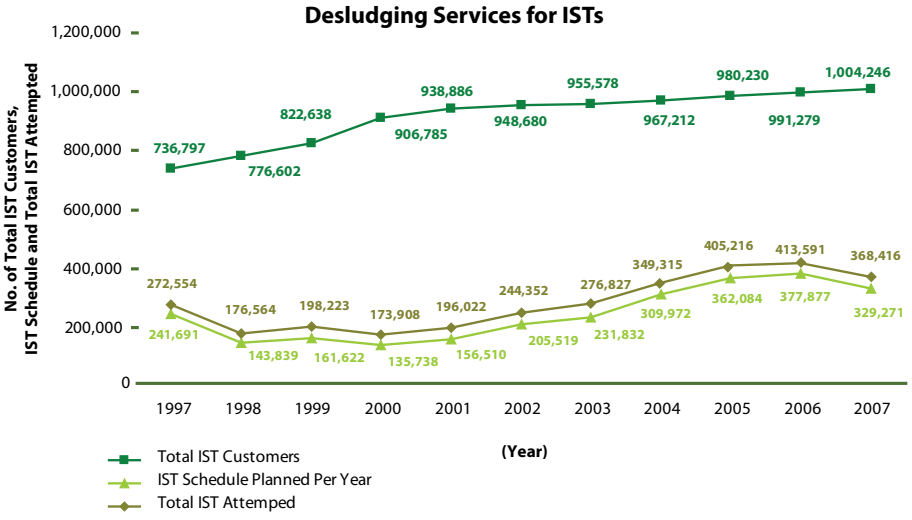


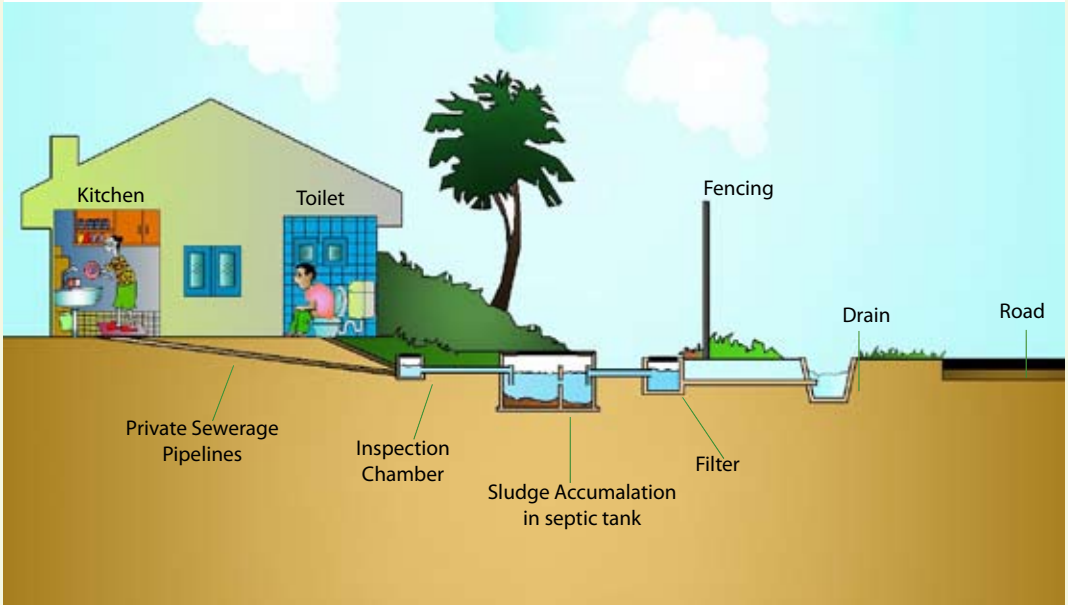
To date, there are approximately one million septic tanks within Indah Water operational areas, which are serving more than five million population. Pour flush, a basic sanitation system introduced back in 1960's, still serves about 760,610 population nationwide of which a majority is in rural areas.

Septic tank owners are required to desludge their tanks once in every two years failing which, untreated sewage and sludge solids will be released into rivers causing environmental problems.

Indah Water has categorised desludging services as follows:

- Scheduled desludging - Services received by customers through scheduling done by Indah Water, once in every two years.
- Demand desludging - Services received by customers upon request, 2 months before the due date for next cycle of desludging
- Repeat desludging - Services received by customers upon request, within the period of 22 months from the last desludging date.
- Responsive IST or pour flush desludging - Services requested by IST users outside Indah Water's concession area or pour flush users.





2.6 Other Services provided by Indah Water

Apart from operational services, Indah Water is also committed to provide the following sewerage related services :

i. Planning Services

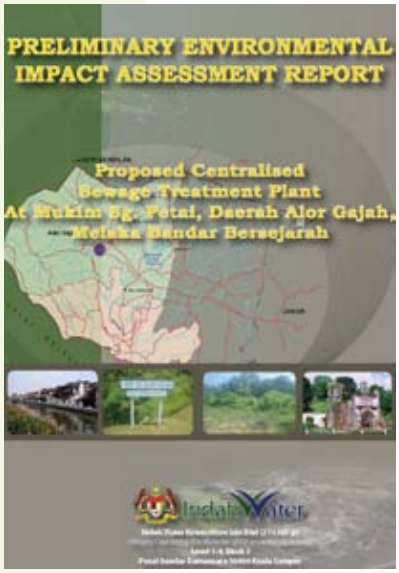
- Development of nationwide integrated sewerage catchment strategy;
- Development of nationwide sludge management strategy;
- Development of Sewerage Project Implementation Planning;
- Develop and manage Asset database, GIS system and mapping, life cycle plans and liaison with local and state planning authorities.

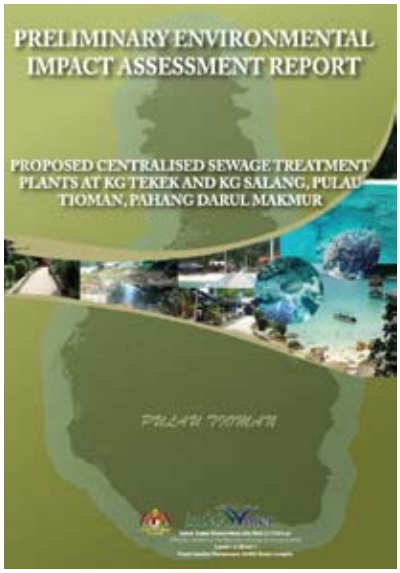
ii. Certification Services

- Development of quality assurance/ control for property development and integration with sewerage development;
- Development of certification procedures, monitoring and audit of sewerage systems for property development and liaison with local authorities and technical agencies;
- Ensure quality of sewerage facilities in line with regulatory requirement and standards;
- Development and monitoring of sewerage development database;
- Assisting sewerage regulator in monitoring sewerage system integration with development control and liaison in one-stop agency meetings.

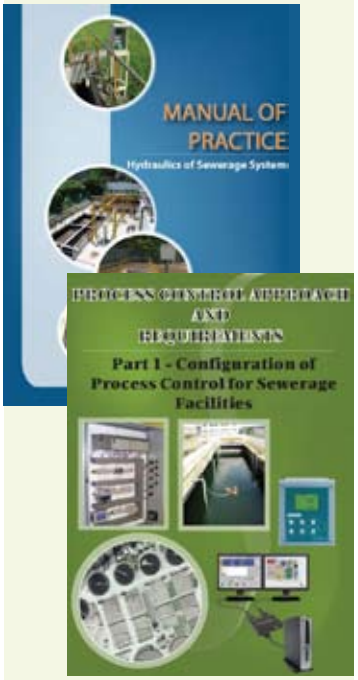
iii. Engineering Consultancy Services

- Development of Environmental Impact Assessment (EIA) report for municipal sewerage projects and liaison with DOE;
- Coordinate, provide technical input and assist sewerage regulator on municipal sewerage project implementation;
- Conduct HAZOP studies and report development for major sewerage and water supply projects;
- Support operational offices through optimization and energy saving works, environmental assessment reporting to the regulator.





iv. Quality and Development Services



- Assist sewerage regulator in the development of Sewerage Guidelines for Developers (Sewerage Policy, Sewerage Development Procedures, Network and Pump Stations, STPs and Septic Tanks);
- Development of continuous technical skill and related hands on training modules for sewerage sector;
- Recommended bioremediation pilot trials and R&D profile related to sewage and sludge.

v. Land Services

- Identify suitable sewerage land sites, facilitate the transfer, acquire to the Federal Government and gazette of reserved lands;
- Manage land issues, payment of acquired/ lease lands for the company and sewerage services department;
- Manage survey works for new acquired sites;
- Liaison on land matters with Federal, State and Local Authorities.

vi. Project Management Services

- Facilitate document tendering, construction and commissioning of capital works and refurbishment programs;
- Provide technical expertise and project management support;
- Ensure project is in compliance with regulators' requirements, best engineering practice and within specified time frame.

vii. Overseas Consultancy Services

- Sewerage technical planning and urban sanitation training and consultancy services to suit local requirement
  - *Comparative Study and Workshop on Urban Sanitation Planning under USAID ESP Program* ; for Malang City, Surabaya City and Jawa District Local Authorities – 5 to 9th December 2005*Comparative Study and Workshop on Urban Sanitation Planning under USAID ESP Program* ; for Medan, Bandung and Jakarta Local Authorities – 15 to 20th May 2006
  - *Sanitation Strategic Planning Workshop*; conducted at Jakarta, Indonesia – 22nd to 25th August 2006
- Operational sewage treatment plant audit and sewerage services audit of local area and recommendation plan for improvement
  - *Technical Assessment on Operation and Management of Existing Wastewater Treatment Plants in Medan; conducted in Medan, Indonesia - 3rd to 16th July 2006*

Indah Water and Its Services

- *Full Operational Audit of Wastewater Services in Madinah City - August to September 2006*

- Training on Design, Operation and Maintenance of Wastewater Treatment Technologies
  - *Seminar on Design, Operation and Maintenance of Appropriate Wastewater Treatment Technologies organized by USAID-ASIA; conducted in Makati, Philippines – 24th to 26th April 2007.*
  - *Technical Training of theoretical and practical of operating of aerated lagoon and associated works for Denpasar Sewerage Development Project (DSDP).*
  - *Attended by officers from Indonesian Ministry Public Works and BLUPAL – 14th to 12th June 2007.*
  - *Regional Workshop on Cooperation to Strengthen Wastewater Treatment Plant Operation and Maintenance (SBR) under USAID-ASIA; conducted in Ha Long, Vietnam – 13th to 16th August 2007.*
  - *Planning, Training Facilities and Customer Handling Workshop for Oman Wastewater Services Company (SAOC) - 10th to 12th September 2007.*

- Technical briefing, sewerage development workshop and visitation to wastewater treatment plant and related sewerage works
  - *Workshop and visitation for Denpasar Sewerage Development Project (DSDP) from Bali, Indonesia; attended by BLUPAL officers (wastewater management body in Bali) – 18th to 20th September 2006.*
  - *Workshop and visitation for TAIZ Water and Sanitation Local Corporation (TWSLC); 22nd to 26th January 2007.*

- Short technical briefing and visitation to wastewater treatment plant and related sewerage works
  - *Briefing and visitation of NGO's bodies from various city of Philippines –14th September 2006*
  - *Briefing and visitation for NGO's bodies from Jakarta City, Indonesia –14th December 2006*
  - *Briefing and visitation for Hitachi Plants Technologies, Japan – 3rd January 2007*
  - *Briefing and visitation for Breman Overseas Research and Development Association (BORDA) and NGO's from Indonesia – 7th September 2007*




vii. Monitoring of Effluent

- Sample at regular interval and provide laboratory report and analysis using standard methods
- Update effluent database and upload for selected stakeholders for regulatory compliance and reporting

** *Control testing on sample collected from an treatment plants operated and managed by IWK*

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3

Environmental Regulations

Environmental Regulations

" Environmental protection is the key driving force in our business and with this in mind, the company has to gear its environmental objectives towards delivering sewerage services of the highest quality."

~ Ir. Haniffa Hamid - Head of Planning & Engineering Department ~

3.1 Environmental Regulations and Guidelines Pertinent to Indah Water

Indah Water is committed to deliver sewerage services of the highest quality to meet all environmental regulations and contribute towards environmental protection. Our commitment to environmental protection is measured by the level of compliance to the regulated environmental standards. The performance of our sewage treatment plants and sludge management are mainly to meet the existing national legislation, regulations and guidelines.

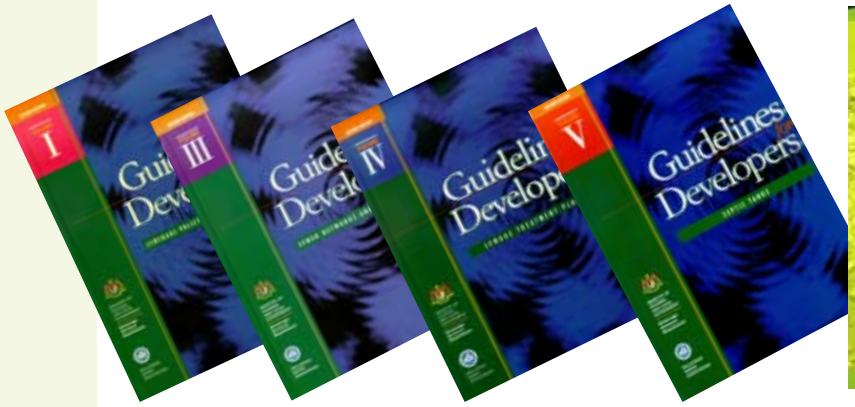
Among the major environmental statutes and guidelines that the company adheres to are:

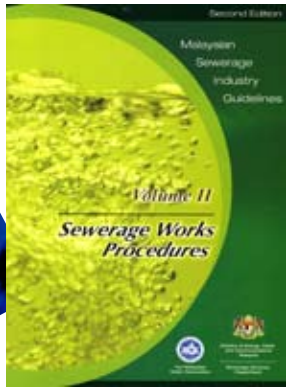
ACT AND REGULATIONS

- Environmental Quality Act 1974 (Act 127);
- Environment Quality (Clean Air) Regulation, 1978;
- Environmental Quality (Sewage and Industrial Effluents) Regulations, 1978;
- Factories and Machinery Act 1967 (Act 139);
- Factories and Machinery (Noise Exposure) Regulations, 1989;
- Factories and Machinery (Mineral Dust) Regulations, 1989;
- Water Services Industry Act, 2006;
- Sewerage Services Act, 1993;
- Occupational Safety & Health Act 1994 (Act 514);
- Occupational Safety & Health (Control of Industrial Major Accident Hazards) Regulation, 1996

GUIDELINES

- Schedule 1 - Maximum Permissible Sound Level of Receiving Landuse for Planning and New Development by DOE;
- The Malaysian Ambient Air Quality Guidelines;
- Guidelines for Developers (Vol I, III, IV and V) by Sewerage Services Department;
- Malaysian Sewerage Industry Guidelines (Vol II) by Sewerage Services Department;
- DOE's Site Selection Guidelines for Sludge Disposal;
- Interim Guidelines for Utilisation of Biosolids as a Fertiliser for Non-food Crops (draft);
- National Guidelines for Raw Drinking Water Quality by MOH; Revised December 2000.





3.2 Effluent Discharge Standards

The regulations stipulate two sets of limits and criteria for discharge of effluent, namely Standards A and Standard B limits.

Standard A - for discharges upstream of water intake points or any sensitive areas such as recreational, coastal areas with tourism interest and areas with high ecological values such as marine parks or wet lands.

Standard B - for discharges downstream of water intake points or any other areas that do not fall under Standard A.

Indah Water monitors and reports on the STPs' compliance to the DOE, Malaysia on a regular basis. The sewerage systems in the country are designed to treat only domestic sewage hence, Indah Water monitors and reports on the compliance level of four (4) parameters i.e.

- BOD_5,
- COD,
- SS and
- O&G

At present, Indah Water monitors approximately 80,000 grab samples annually across the country. The company has three dedicated laboratories of high standards in operation to serve the northern, central and southern regions of Malaysia.

Effluent Discharge Standards To Malaysia Influent		
PARAMETERS (mg/l)	MAXIMUM PERMITTED VALUE	
	STANDARD A	STANDARD B
Temperature (^{0}c)	40	40
pH	6.0-9.0	5.5-9.0
BOD_5 at 20^{0}c	20	50
COD	50	100
Suspended Solids	50	100
Mercury	0.0	0.1
Cadmium	0.0	0.0
Chromium, hexavalent	0.1	0.0
Arsenic	0.1	0.1
Cyanide	0.1	0.1
Lead	0.1	0.5
Chromium, trivalent	0.2	1.0
Copper	0.2	1.0
Maganese	0.2	1.0
Nickel	0.2	1.0
Tin	0.2	1.0
Zinc	1.0	1.0
Boron	1.0	4.0
Iron	1.0	4.0
Phenol	0.0	1.0
Free Chorine	1.0	2.0
Sulphine	0.5	0.5
Oil & Grease	Not detectable	10.0

Environmental Regulations

Taking samples for testing of odour level

Aerators Installed in Oxidation Pond

Blower Unit in Treatment Plant

3.3 License to Contravene

In cases of non-compliance to DOE's Standard A or B limits, the Environmental Quality (Sewage and Industrial Effluent) Regulations, 1979 allows for license to contravene (LTC). The license is applied from DOE for :

- STPs (majority taken over from local authorities) which are not designed to meet the current regulated environmental standards
- Mechanical plants which are experiencing issues of faulty design or equipment
- Plants undergoing refurbishment and upgrading works which need to discharge raw or partially treated sewage

3.4 Noise Level and Odour

Noise level generated by treatment plants is required to comply with DOE and DOSH Factories and Machinery Regulations (Noise Exposure), 1989. Under Schedule 1, Maximum Permissible Sound Level of Receiving Landuse for Planning and New Development by DOE, noise level generated from plant's operation shall not exceed the limits stipulated in the respective receiving landuse category. Under the Factories and Machinery Regulations (Noise Exposure), 1989, all noise generating equipment within the sewage treatment plant should not produce noise level of more than 65 dBA outside of the building. The DOE's Guidelines for the Siting and Zoning of General Industries (under Category B) recommended provision of buffer zones to attenuate noise transmission.

The impact of odour from sewerage related activities are mainly monitored via the number and frequency of public complaints made. The buffer requirements specified in the Guidelines for the Siting and Zoning of General Industries (under Category B) also serves to mitigate odour impact.

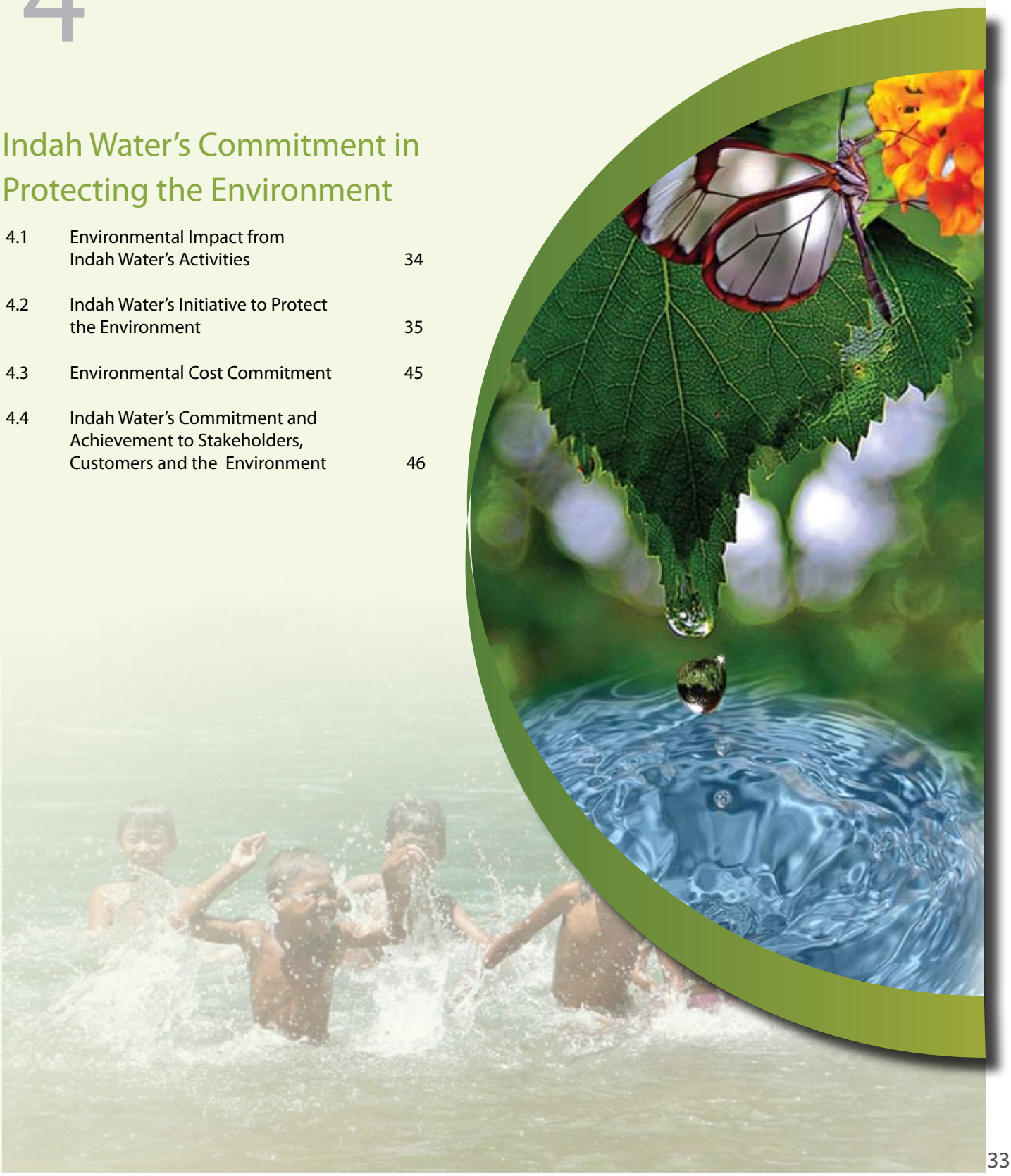
3.5 Guidelines for Sludge Disposal

Before commissioning, all sludge disposal sites require Environmental Assessment Report (EA) is to be submitted and approved by DOE. Among the approval conditions given by DOE to Indah Water is the requirement to monitor ground and surface waters quality commencing from the date disposal activities take place at site. Monitoring result is to be submitted to DOE on a periodic basis. At present, there is no local standard for ground water. As such, the baseline level of ground and surface water taken before any activities commencing at disposal site are used to gauge any impact or damage to the environment from the sludge disposal activities.

Additionally, Indah Water observes all other DOE's approval conditions which may also be related to impacts on economic and social of the affected public, communities and other stakeholders. Sludge disposal activities practice by the company also closely follow recommendations and guidelines as stipulated in the Interim Biosolids Utilisation and Application Guidelines by Sewerage Services Department.

4

Indah Water's Commitment in Protecting the Environment



Indah Water's Commitment in Protecting the Environment

" Our operations are centered towards achieving the highest customer satisfaction and observing minimal environmental interference."

~ Ir. K. Mahesan - Management Committee of Indah Water ~

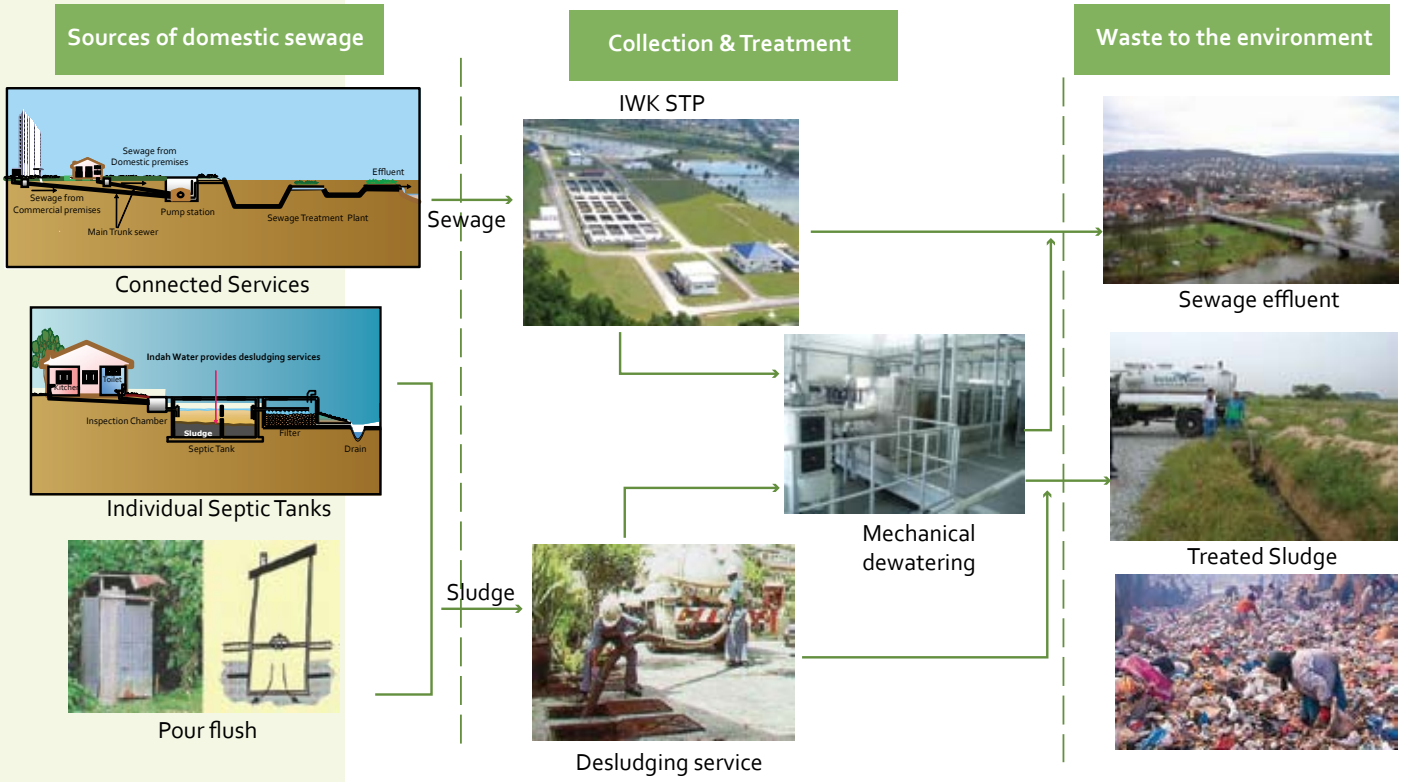
4.1 Environmental Impact from Indah Water's Activities

The environmental commitments of Indah Water are encapsulated in its vision "To Be the Most Efficient and Environmental Caring Sewerage Company". Indah Water has integrated environmental related issues into its day-to-day operations. There are many ways that Indah Water activities can affect the environment and the community. In general, sewage treatment processes produce two stream of waste i.e. :

- Liquid from the continuous effluent discharged by STPs
- Solid generated as sludge or biosolids resulting as the end product of sewage treatment processes

The impacts from Indah Water's activities affects the following environmental components :

- Surface/ground water
- Noise Level
- Odour Level
- Community




'It may stink but it's safe to drink'

'No harm done'

Bahan buangan IWK tidak cemari sungai

Until today, sewage has always been identified as one of the main water pollution sources. The country's sewerage services were privatised as a measure to improve the sewerage management thus, reducing the impact on the environment and minimising its contribution to pollution.

In the past, majority of the STPs were designed and built without taking into consideration the preservation of water quality and water resources as well as other environmental impacts from sewerage services. Efficient operation and maintenance of the plants were also given minimal importance resulting in many of the plants being left in dilapidated conditions leading to nuisance and disturbance to the surrounding community. Therefore, Indah Water has to go the extra mile to improve the systems to a higher level of sewerage management in the country.

Potential impacts on the environment from IWK's activities

4.2 Indah Water's Initiative to Protect the Environment

Indah Water is committed to ensure our environmental performances are aligned with the company's goals towards sustainable sewerage development and environmental protection. Environmental performance is significant to provide measurable values as indicators of our company achievements to meet and drive beyond the regulatory requirements and compliance. With these goals in mind, Indah Water monitor various environmental performances from its' diverse services and activities which are as follows;

- Manage and monitor Indah Water's Assets
- Monitoring of effluent samples taken from sewage treatment plants and compliance to the regulated standards

Indah Water's Commitment in Protecting the Environment

- Manage and monitor Operational Efficiencies
- Manage and monitor Implementation of Capital Works and Refurbishment Programmes
- Manage and monitor River Water Improvement Programme
- Manage and monitor Status of Research and Development Programme
- Manage and monitor Sludge Handling and Management
- Development of Sewerage Guidelines, Training and Awareness Programme
- ISO 9001:2000 Certified to selected department and selected treatment plant and further initiative is made towards ISO 14001 and ISO 18000.

4.2.1 Managing Sewage Pollution Loads in Discharge Effluent

To date, Indah Water has taken over and managed more than 8,500 STPs and the numbers have been increasing annually as the country experiences domestic development growth. Sewage treatment discharges into the drainage systems that eventually end up in the lakes, rivers and coastal waters. The sewage pollution load becomes detrimental to river systems when the amount is high and reaches beyond the river's self purifying capabilities.

Sewage treatment processes are designed and approved based on compliance to the DOE's effluent standards. Facilities located upstream of water intake points, recreational and environmentally sensitive areas need to comply with Standard A limit, whilst those downstream need to comply with Standard B limit. There are 1,345 and 7,352 public STPs managed by Indah Water located in the Standard A and Standard B catchment areas respectively. Approximately 1,764,856 ISTs and pour flush latrines located within Indah Water's operational areas contributing to sewage pollution into the river systems daily.

To improve Indah Water's compliance to the regulated effluent standards and reducing its contribution to water pollution, the following initiatives are implemented by the company:

- Retrofitting and upgrading non- performing plants
- Rationalisation of non- performing plants into regional or centralised facilities
- Refurbishment of plants to ensure plants are in working condition and meeting performance standards

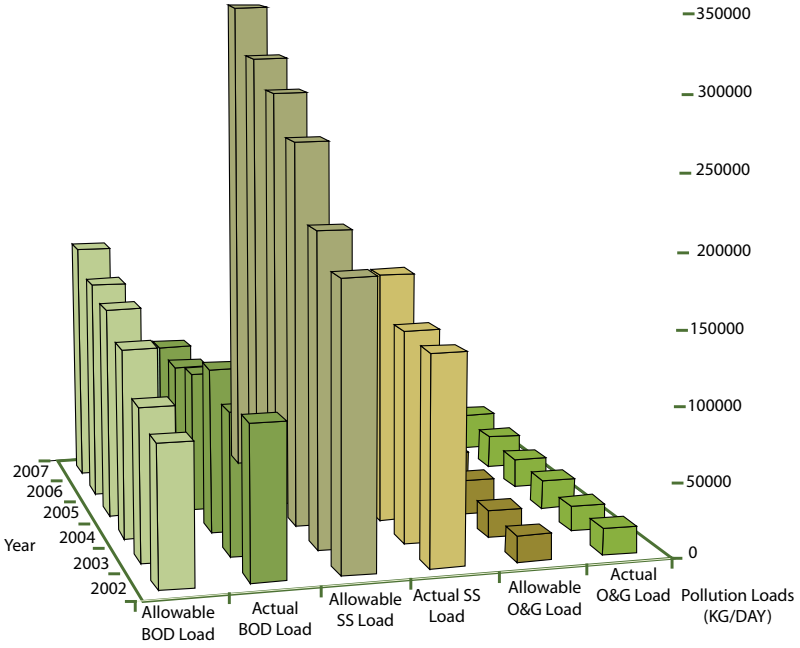
Indah Water is also moving towards adopting technologies which are able to treat and remove organic nutrients i.e. Nitrogen and Phosphorous and oil and grease in sewage.

Indah Water is also actively involved with the DSS and DOE to jointly eradicate illegal discharge of toxic and hazardous waste into the public sewer systems that could affect the sewage treatment processes.

From 2002 to 2007, the total load from Indah Water's plants for BOD, SS and Oil and Grease are consistently below the allowable load for Standard A and Standard B catchment. River water quality in the country is showing improvement trend annual and this is partly contributed by the reduction of pollution from sewage effluent discharged. The concerted efforts by various enforcement agencies working closely with Indah Water should also be given the merit to successfully reduce the sewage pollution into the water bodies.

Illegal Industrial detergent discharge into STP

Allowable and Actual Pollution Loading from IWK's Treatment Plants



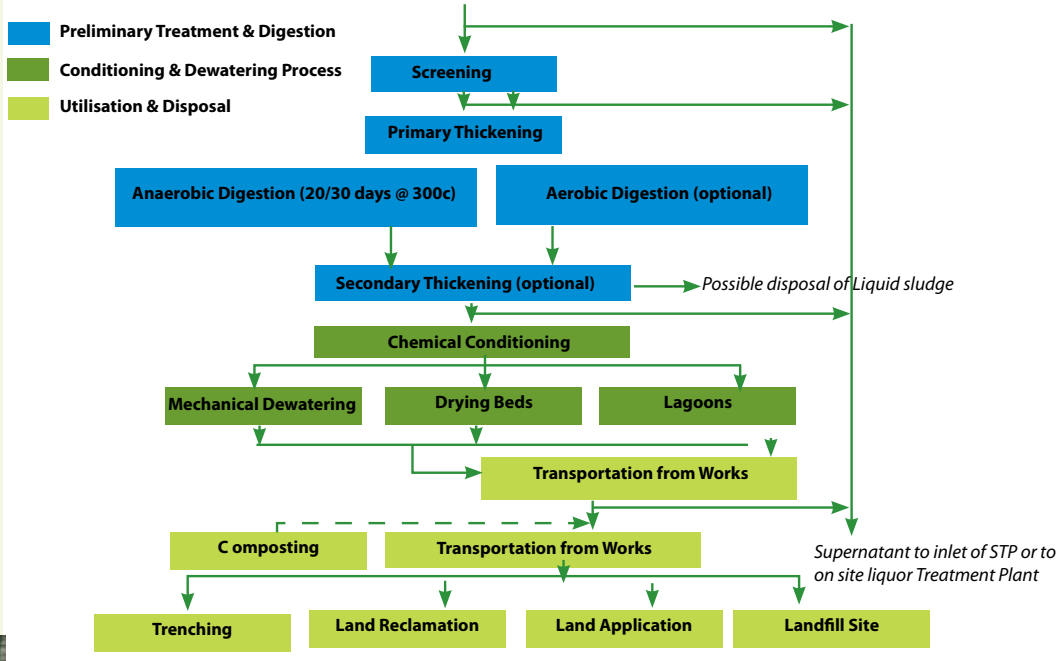
4.2.2 Sludge Management

Sludge is the by-product of sewage treatment and needs to be disposed off in an environmentally safe manner. Sludge may be disposed off in two physical forms i.e. liquid sludge or dewatered sludge with moisture content ranging from 25% to 40%. Sludge collected from septic tanks, private plants and pour flush is disposed at sludge disposal sites approved by DOE while STPs has its own sludge treatment and dewatering facilities. Dewatering process can reduce the amount of sludge that needs to be disposed. Dewatered sludge (or biosolid) will be sent to the solid waste disposal site or dedicated sludge disposal site approved by DOE for final disposal. Environmental impacts from the sludge disposal activities include groundwater and surface water contamination, odour and aesthetic impairment.

Sludge from sewage Treatment Processes

Desludging of Septic Tanks

Chronology of Sludge Handling and Management Practiced by IWK



Monitoring of odour level at Sewage Treatment Plant

4.2.3 Monitoring of Noise Level

Equipments such as blowers and pumps affecting people residing close to the plants often generate noise from STPs. Indah Water ensures that noise generating equipment selected for the plants comply with DOSH specifications and DOE requirements at all time. Installing silencers or acoustic enclosures and siting of equipment at locations that will create the least impact and further reduce noise. The guidelines for treatment plant design recommend buffer zone requirements to attenuate high noise level from treatment plants.

4.2.4 Odour Control

Odour impact may arise from sewer pipes leakage or surcharge of raw sewage in manholes, malfunction of processes or equipment in treatment plants and improper treatment of sludge before disposal. Indah Water is committed to respond to such incidences and to reduce any potential impact from odour. The guidelines for treatment plant design and siting of sludge disposal sites specified buffer zones requirement, which serves to minimise odour impact, if any.

4.2.5 Visual and Aesthetic Enhancement

Preferably, STPs should be located at locations obscured from public view since treatment plants tend to be of low aesthetic value. The cleanliness and safety of the plants is maintained to avoid hazard to the public and complaints from the surrounding community. Aside from this, the guideline for treatment plant design recommends the provision of buffer zone that should be landscaped to enhance the aesthetics of STPs.

4.2.6 Increase Public Awareness

Public awareness and support for Indah Water is essential for the company to continuously provide sewerage services that advocate the government effort on achieving sustainable development, which preserve the environmental quality in the country. The public needs to be aware of the linkage between efficient sewerage services and the environment quality. To date, the public awareness is still low on issues such as:

- Relationship between efficient sewerage management systems and environmental preservation;
- Desludging requirement for septic tanks to reduce pollution loads into the environment that will preserve the water quality and water resources;
- Acceptance towards reuse or recycling of biosolids and biosolids usage as a resource rather than waste materials;
- Operational failure at treatment plants due to illegal disposal of chemical and toxic substances into the public sewer line;

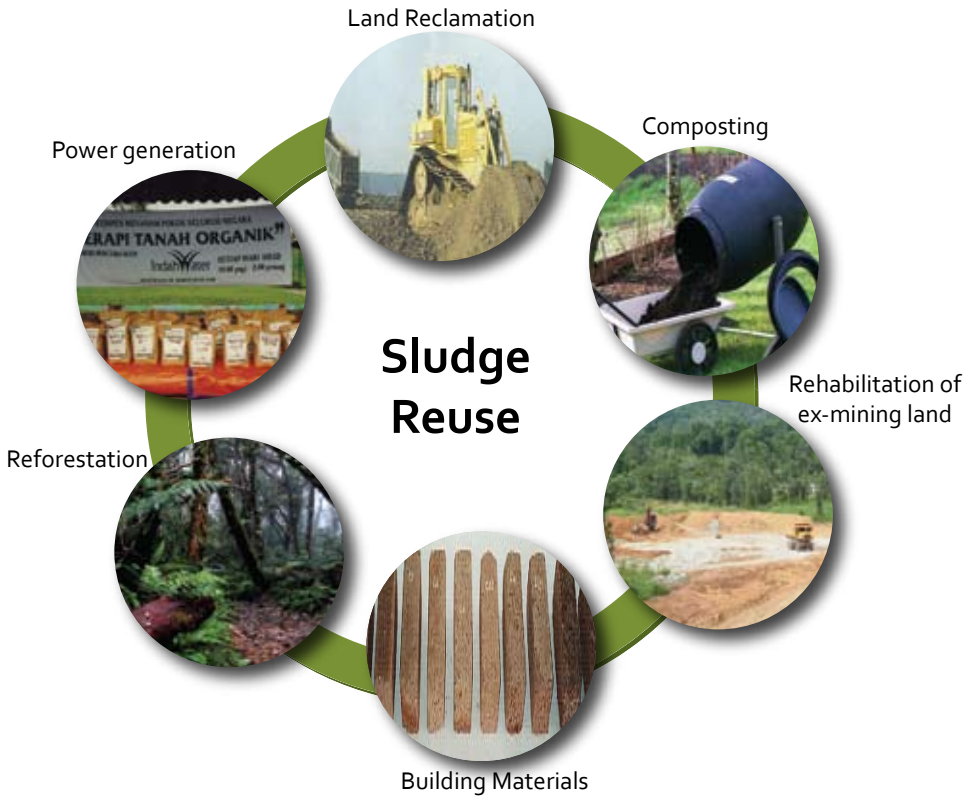
Most importantly, the public needs to be aware of the fact that financial resources will be the important element to continuously sustain a good and efficient sewerage management services as well as maintain high compliance to the environmental standards. With limited financial assistance from the federal government, Indah Water has to be financially sustainable to meet the growing demand required on its service level and on the environment.

Hence, Indah Water has the responsibility to instil public awareness on the necessity to pay sewerage bills to ensure continuity and quality of the sewerage services provided. The public awareness campaigns by Indah Water are disseminated through various channels of communications, namely the mass media, pamphlets, exhibitions, briefing/dialogues sessions, schools programme and observation/site tours.

The educational programmes have been implemented through advertisements in television, radio and newspapers. Indah Water has always incorporated educational messages in all advertisements and jingles. Besides that, environmental documentaries and news on television as well as advertorials in newspapers were found to be effective in disseminating educational message to the public at large. When the internet was introduced, Indah Water launched its official website in 2003 as one of its channels of communication with users. Continuous improvement had been undertaken on the website to create more user- friendly and interactive environment. The number of visitors has increased from an average of 1,000 to 14,000 a month. It has also successfully attracted many enquiries from abroad, namely developing countries. The website is designed with comprehensive information on the outlook of sewerage industry and technical details on sewerage systems. It has been a source of reference to many students of higher learning institutions in completing their research assignments.

4.2.7 Continuos Research and Development Programme

Continuous efforts on research and development will provide the support for the company to meet its objectives in protecting the environment. Research and development are implemented to develop innovative, cost saving and environmentally friendly means to improve and upgrade the sewerage services. Research and development projects undertaken cover various aspects of the sewerage systems, such as process and treatment technology to improve and upgrade the quality of discharged effluent, minimisation of energy consumption, optimisation of the treatment processes and waste reduction and reuse.



4.2.8 Climate Change Concern and Initiative

Over the past decades, leading experts have developed conclusive scientific evidence on the changing global climatic patterns as well as changes on the ground. Climatic change is attributed to the global warming phenomena that many believed is due to increase accumulation of Greenhouse Gases (GHG) particularly carbon dioxide or CO_2 emission from anthropogenic sources.

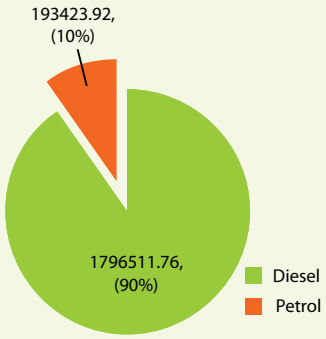
Indah Water, admittedly is at an infant stage in minimising carbon footprint. We are working aggressively to identify ways to minimise carbon dioxide emission, reduce our energy cost and fossil fuel consumption.

Indah Water recognises that energy and fuel consumption of our tankers and vehicles are the major sources of GHG emissions. Indah Water has yet to determine the precise quantity of carbon emission. We monitor our fleet tankers and company vehicles diesel consumption through monitoring fuel usage cards.

i. Diesel and Petrol Consumption

Generally, Indah Water emission activities are attributed largely to diesel consumption by fleet tankers to desludge septic tanks within urban and rural areas and transport to nearest sludge treatment facilities and disposal sites.Total estimated CO_2 emission in 2007 is 6857 tonnes. We have 'standard operating instruction' on 'Vehicle Maintenance, Repairs and Inspection', 'Desludging Tanker Operating Instruction', 'Vehicle Tyre Care, Safety, Maintenance and Replacement' and 'Vehicle Safety and Safe Driving' to ensure vehicles are roadworthy, safe, economical, efficient in order to reduce unnecessary down time. Operating instruction also include daily, monthly and annual vehicle checks whilst our fleet tankers routes are also properly planned and managed to optimise efficiency, time spent and operating cost.

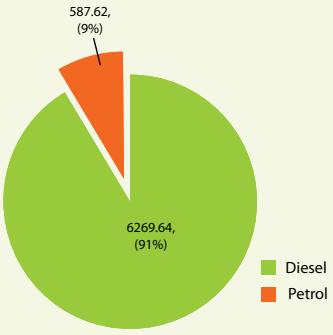
Fuel Consumption in 2007 (litres)



Indah Water services demand increase with growth of population and development. The energy and fuel consumption depends on type and dispersion of sewerage services available in the area. City areas, such as Kuala Lumpur, Penang and Putrajaya with high population density and centralised sewerage facilities have the least numbers of desludging demands as compared to sub-urban and rural areas.

As part of our initiatives to reduce carbon emission, Indah Water has collaborated with the local government to incorporate centralised sewerage system into it's development master plan to reduce desludging needs in the future. Indah Water also has successfully assisted the Sewerage Services Department to implement a rationalisation program of disperse septic tanks and small sizes STPs within Negeri Sembilan, Melaka, Pulau Pinang, Selangor, Kuala Lumpur, etc.

CO_2 Emission in 2007 (tonnes)



ii. Methane generation from Sewage Treatment Plants

Methane is the principal by-product of anaerobic decomposition of organic matter in wastewater treatment process. Normally, insignificant amount of methane is generated in untreated wastewater because even a small amount of oxygen is toxic to the organisms responsible to produce methane. However, occasionally there is an insignificant inert methane gas generated in sewer because of anaerobic decay in accumulated bottom deposit.

Sewage and sewage sludge treatment processes generate GHGs (e.g. CH_4 and N_2O). Sewage treatment activities also consume energy (which is usually fossil fuel based) thus indirectly responsible for causing CO_2 emissions. These GHGs emissions contribute towards global warming and Climate Change impacts. The direct and indirect impacts are described in the following.

In treatment plant, methane source is from anaerobic treatment process used to stabilise wastewater sludge. Some possible sources are from:

- Primary digester and incomplete flaring of gas for energy recovery;
- Open secondary digestion where methane escapes directly to atmosphere;
- Anaerobic sludge lagoons, long term storage of raw sludge generate methane directly to atmosphere;
- Methane from on-site septic systems (ISTs/CSTs).

Indah Water's Commitment in Protecting the Environment

Indah Water has several digesters nationwide, however not all of them are operating due to still new and/or do not have enough sludge for cost effective operation/ flaring. Indah Water has yet to measure the amount of fugitive methane since the systems are mostly new and/or not run as proper digester. As part of climate change initiatives, Indah Water is recommended to carry out a study of the fugitive methane from these digesters and other possible sources of GHG emission.

In relation to common disposal practice in Indah Water, liquid sludge trenches may be a source of methane generation, however its extent of contribution to overall national GHG emission may be insignificant.

iii. Energy Consumption

Continual increase of energy costs, population growth and stringent environmental requirement further affects the total cost of operating sewerage treatment facilities in Malaysia. Energy conservation has become an issue of increasing importance to Indah Water. Some key components of effective energy management plan implemented by Indah Water are:

- Monitor energy cost
- Optimising operating cost based on size and actual loading criteria
- Manipulate aeration equipment and pumping requirement as part of optimisation process

iv. Water Consumption

Wastewater treatment is the core business of Indah Water. Conserving water quality to meet effluent discharge standard is our priority. Our water consumption is at minimum for washing and cleaning purposes only. Some of our plant's effluent is recycled back for cleaning or landscaping purposes.

We are interested in reuse application of our by-product from treatment process; effluent and sludge, and have engaged local universities to conduct research on both by-products. Universiti Teknologi Malaysia has successfully confirmed of Indah Water's effluent usage for landscaping purposes. Reclaimed water, or reuse, is highly treated wastewater effluent that has been treated and disinfected. Reuse water is ideal for many non-drinking water applications such as landscape and crop irrigation, dust control and other similar uses. Reuse is beneficial in several regards. It provides an environmentally sound means of effluent disposal and its application can take the place of non-essential uses of drinking water. Indah water has recycled effluent water for a recreational pond in front of our Pantai Unit Office.

Reuse effluent for landscaping at Pantai STP

v. Biodiversity Conservation

Without a proper sanitary system, our rivers will be polluted with faeces, faecal coliform, high BOD and ammoniacal nitrogen, etc. Centralised STPs are able to treat these pollutants and eliminate diverse sources of pollutants and wastewater to the required standard whilst conserving the biodiversity of the receiving watercourse and rivers.

As part of natural biological indicators, several types of fish naturally breed in our oxidation ponds and facultative ponds. The biodiversity of the natural

habitat and fish will be maintained as it is, as long as nutrients and required oxygen is naturally available in our ponds. In several parts of receiving water bodies, we have seen all sorts of fish varying in size, approach our effluent discharge area within the receiving water bodies.

vi. Material Used

Indah Water does not use any chemical to treat sewage and wastewater. The biological treatment involves keeping nutrient and healthy bacteria happy by introducing oxygen into the wastewater by natural means (oxidation pond system) or mechanical means (aerators, diffusers, etc.).

Most of the new plants have a chlorine contact tank available, however actual usage of chemical such as sodium hypochloride for disinfection purposes only applicable to minimum selected plants within sensitive area. Other chemical used by Indah Water is organic polymer to assist dewatering of sludge. The polymer is biodegradable material to thicken and flocculate the sludge to ease separation of solid and water.

vii. Waste reduction

Our plants remove garbage, grit and grease from incoming wastewater from residents or commercial areas, to an approved landfill site. Initially, all garbage screened at primary and secondary screenings will be removed to an approved municipal landfill site. Grit, oil and grease accumulated from incoming flow will also be removed at pre-treatment process. Consequently, after removal of trash, garbage, grit and grease, Indah Water treats the wastewater and by injecting oxygen naturally or mechanically into the system then separates the solid and liquid to meet regulatory requirement.

Indah Water has engaged local universities to conduct studies on reuse of sewage treatment by products; effluent and biosolids. Both studies are successful and give positive outcome for biosolid reuse as compost or soil conditioner, whilst the effluent is reused for irrigation of tree planting, garden and landscape. Indah Water has yet to commercialise both of its by- products of wastewater treatment, and we always welcome any interested parties to reuse our effluent and biosolids. Currently, Indah Water is working together with a commercial composting company to convert our dewatered sludge from oxidation ponds and aerated lagoons to fertiliser or compost.

Properly planned use of municipal wastewater alleviates surface water pollution problems and not only conserves valuable water resources but also takes advantage of the nutrients contained in sewage to grow crops. The availability of this additional water near population centres will reduce transportation cost to end-users. The nitrogen and phosphorus content of sewage might reduce or eliminate the requirements for commercial fertilisers. It is advantageous to consider effluent reuse at the same time as wastewater collection, treatment and disposal are planned so that sewerage system design can be optimised in terms of effluent transport and treatment methods. The cost of transmission of effluent from inappropriately sited STPs to distant agricultural land is usually prohibitive. Additionally, sewage treatment techniques for effluent discharge to surface waters may not always be appropriate for agricultural use of the effluent *(source: Food and Agriculture Organisation of United Nation)*.

Many countries have included wastewater reuse as an important dimension of water resources planning. In the more arid areas of Australia and the USA wastewater is used in agriculture, releasing high quality water supplies for potable use. Some countries, for example the Hashemite Kingdom of Jordan and the Kingdom of Saudi Arabia, have a national policy to reuse all treated wastewater effluents and have already made considerable progress towards this end. In China, sewage use in agriculture has developed rapidly since 1958 and now over 1.33 million hectares are irrigated with sewage effluent. It is generally accepted that wastewater use in agriculture is justified on agronomic and economic grounds but care must be taken to minimise adverse health and environmental impacts *(source : Food and Agriculture Organisation of United Nation)*.

4.2.9 Emergency Response Plan

Emergency preparedness is critical. Its application in Indah Water is made in a holistic manner throughout the sewerage development projects, which incorporate proactive action during planning, design, project implementation and operations stages. Indah Water has instilled emergency protocols, including assignments and responsibilities trough periodic staffs training and monitoring by their superiors. The last resort is the preparation of emergency response plan at the operational stage.

Indah Water participates in conducting hazard and compliance identification during early planning and design stages, through checklist of personnel or proper study team to vet through each proposed project layout and detail design drawings. Any hazard and non-compliance will be detected up front and remedial comments and necessary action highlighted or recommended to reduce or eliminate hazard will be considered and recorded for sustainable safety, health and environmental protection. These processes further continue during implementation stage whereby trained personnel during construction carry out inspection, commissioning and operational stages via available standard checklist and works instruction procedures such as;

- Improved engineering design for new plants (noise barrier, acoustic door, silencer, installation of odour scrubber, no asbestos roofing, no usage of halon containing in fire fighting equipment, etc.);
- Standby power equipment or generator is provided for large plants and capable to run major pumps and critical aeration equipment. Portable generator may applicable for smaller plants.
- Work Instruction for contractors is available for clear scope and responsibilities via 'Safe Working by Contractors' that include safety inspections, HSE programmes, accidents reports and Investigation, fire prevention and protection, confine space requirement, etc.
- Reporting of noise assessment for desludging and jetting vehicle are carried out in year 2007
- Emergency procedures also build in works instruction for 'Entry Into Confine Spaces' which include accident procedure in sewer, emergency procedure in sewer, on top of sewer entry permit and checklist, entry into gas check areas, routine checks, forced ventilation of confine space, recommended of protective clothing and equipment, task specific guidelines, atmospheric hazards, etc.

- Emergency response plan also available for unit operation offices
- Standard working operation instruction is available on emergency overflow
- Emergency Instruction, health & fire explosion hazard and first aid also build in site sampling requirements for handling spillage
- Emergency response is build in work instruction procedure for desludging and sludge disposal, for IST customers facing blockage or flooding problems
- Decommissioned STPs and network pumping stations due to major capital works or rationalisation
- Traffic Accident Procedure which also include send injured party to nearby hospitals, lodge Police report and notification to Fleet Operation
- Provision of PPE, fire extinguisher, escapes route, proper signage, periodical appointed safety committee meeting and inspection within Indah Water headquarters office.

4.3 Environmental Cost Commitment

Indah Water takes our responsibility seriously in audaciously protecting the environment particularly water quality and to be the authentic bearer of 'Indah Water' brand name to execute converting wastewater to meet regulatory standards. As a holistic sewerage company, we continuously incorporate all environmental cost concerned and monitoring within our daily activities revolve from planning, design, implementation, testing, commissioning, certifying, operation and maintenance, audit, etc on top of our health and safety policy.

We firmly believe that through continuous investment somehow it will bring changes to the sewerage development, the public perception, sewerage awareness and impact in Malaysia. The following are our continuous effort in investing environmental cost towards sustainable sewerage management and environmental protection in Malaysia.

Money Spent from IWK's Activities

IWK Activities	2003 (RM Mil)	2004 (RM Mil)	2005 (RM Mil)	2006 (RM Mil)	2007 (RM Mil)
1. Operating Expenditure – Operation & Maintenance	152.12	200.81	243.65	294.68	350.09
– Planning & Engineering (R&D, Design, Certification etc.)	11.73	12.66	13.04	11.18	16.93
– Project Management (Capital Works & Refurbishment)	5.31	5.78	6.17	5.68	6.76
– Health & Safety	0.33	0.32	0.31	0.29	0.43
– Corporate Social Responsibilities (CSR)	3.73	4.15	5.42	5.36	4.67
2. Investment in Sewerage Related Asset (including vehicles)	57.67	40.09	29.59	25.51	29.26
Total (RM Million)	**230.89**	**263.81**	**298.18**	**342.70**	**408.14**

4.4 Indah Water's Commitment and Achievement to Stakeholders, Customers and the Environment

Indah Water has continuously support the sewerage industry stakeholders towards sustainable sewerage development and environmental protection. Our achievements throughout 13 years are as follows:

i. Commitment and Achievement to Our Stakeholders

- Assist policy makers, Sewerage Services Department, Local Authority and relevant agencies in providing sewerage technical input.
- Collate sewerage development status, sewerage asset status, and sewerage operation and maintenance status through centralised database and GIS mapping
- Manage sewerage related issues and liase with relevant agencies to resolve issues, reduce and eliminate impacts
- Assist DOSH in 'Mentor –Mentee' programmes on health, safety and environment
- Assist DOSH in preparation of Code of practice for working in confine space
- Assist SSD in the preparation of updated Sewerage Guidelines for developers, development submission procedures and certification process
- Assist local authorities in providing a sewerage development catchment strategy/ master plan.

ii. Commitment and Achievement to Our Customers

Customer Service hot line available via : -

– ***Toll free : 1-800-88-3495***
– ***Sms : 36399 type iwk<space> message***
– ***Email : Care@iwk.com.my***
– ***Website : www.iwk.com.my***

- Customer service representative to assist you over the phone, on line e-mail, sms, and over the counter at all 18 head and unit offices nationwide
- Pre-printed free leaflet of Indah Water unit offices and services charge/ rate attached together with half yearly bills
- Radio and television advertisement of our services and contacts
- Continuous advertorial in newspaper
- Monthly meet the customers event at major shopping complexes where the customers can make inquiries, pay their bills, lodge complaints, etc.
- Over 400 tankers available to desludge individual and communal septic tanks from suburban and rural areas nationwide
- Trained personnel to assist to clear sewer blockage, desludge septic and sludge holding tanks
- Online sewerage knowledge, diagrams and descriptions, customers service contact name, phone and address, service rate and charges, etc available in the Indah Water webpage.


RM15,000 boost from Indah Water

iii. Commitment and Achievement to Our Environment

- ISO 9001:2000 Quality Management System
- Main sponsor of 'The Malay Mail Big Walk' since year 2000 to 2007
- Participated in primary and secondary schools sponsorship programme with New Straits Times (NST) –British Council- Indah Water Photojournalism Projects – " Water : Life Itself"

- Papers presented and exhibition in ASIA Water 2007
- Participate in 'World Water Monitoring Day' from 16th to 18th November 2007
- Successfully completed Research and Development Projects with local Universities (UTM and UPM) on effluent and sludge/ biosolid characteristics, feasible applications and towards 3R; reduce, reuse and recycle.
- Sub-working group committee for Inventory of Green House Gases on Waste Sector/ Waste from Domestic & Commercial Wastewater Treatment for Second National Communication (NC2) under United Nation Framework Convention on Climate Change (UNFCCC).
- Assist SIRIM as committee member for working group for development of '*Malaysian Standard Water Quality Sampling*' MS1850 –Part 1 and Part 9 ' *Code of Practice for Sanitary System*' MS 1402 : 1996 (review), '*Internal Sanitary Plumbing By-Laws*', '*Code of Practice for Design and Installation of Sewerage System*' MS 1228 (review).
- Assist NAHRIM in ' Water Environment Partnership in Asia' for database development
- Represent Malaysia in development of ISO (International Organisation for Standardisation) a worldwide federation of national standards bodies on '*Activities relating to drinking water and wastewater* services' ISO 24510 , ISO 24511 and ISO 24512
- Assist DOE in Global Programme of Action for the Protection of the Marine Environment from Land Based Activities (GPA) on relevant inputs on *GPA-Related Activities in the East Asian Sea Region (2007-2011)*.

Award winning recognitions

- *Malaysian Water Award for Management 2005 –'for excellence in total water management and operation efficiencies in providing efficient sewerage services to all Malaysians, valuable contribution towards protecting public health, preserving the water resources and the environment'*
- *'Thank you' awards from The Bandar Sri Damansara Residents Association, 22 February, 06*
- *Health and Safety Award 2006 from Department Occupational, Safety and Health*

INDAH WATER WINS MALAYSIA WATER AWARD FOR MANAGEMENT 2005

The Citation:
"For excellence in total water management & operation efficiencies in providing efficient sewerage services to all Malaysians, valuable contribution towards protecting public health, preserving water resources and the environment"

In his acceptance speech, Suhaimi Kamaralzaman, the CEO of Indah Water Konsortium said the untiring work by Indah Water – which is to improve the quality of life in this country through more efficient sewerage management – has finally been formally recognized. "Rightfully, the truly deserving recipients of this auspicious award are the 2,200 highly committed people behind Indah Water. They are the unsung heroes who carry out the dirty work to serve over 14 million users while being hurled with accusations and abuse."

Suhaimi also mentioned that in the course of this work, Indah Water has sailed through rough and troubled seas. For Indah Water, it has not been merely about showing a positive balance sheet but being custodian of the national sewerage systems. "We ensure sewage is appropriately and adequately managed to safeguard public health and to protect our

CEO of IWK receiving the Malaysia Water Award for Management 2005 from the Minister.

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Indah Water's Commitment Towards Environmental Performance

Indah Water's Commitment Towards Environmental Performance

" Indah Water has enhanced sewerage services in the country by upgrading treatment facilities, increasing service coverage and improving service levels."

~ Ir. Abd Rashid Abd Rahman - Head of Operations and Maintenance Department ~

5.1 Performance of Indah Water's Services

Thirteen years of effort by Indah Water has certainly made a marked improvement in the management of sewerage services in the country and this has significantly contributed to minimising the sewage pollution to the environment. Among the environmental impacts that Indah Water had significantly improved are :

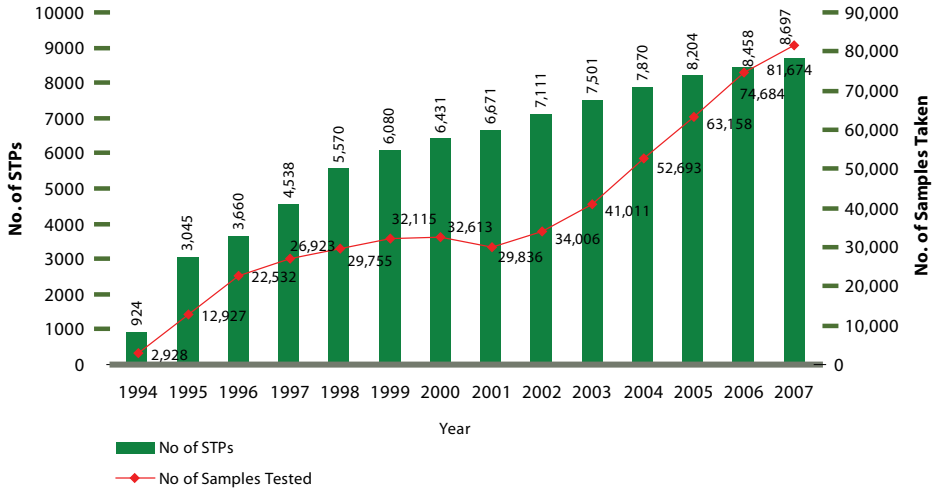
- Quality of effluent discharged from STPs and amount of pollution loading discharge into the water bodies;
- Efficient sludge handling and disposal which reduces impacts to the soil and ground water quality;
- Visual and aesthetic of the treatment plants;
- Reduces nuisance due to odour and noise generated from STP for the public and community well- being; and
- Increase public awareness and high emphasis on health and safety requirements.

5.2 Monitoring of Effluent Samples Taken from STPs

Under the Environmental Quality Act, 1974, compliance of effluence standards is applicable for plants that produces more than 6 kg/day of BOD or alternatively, plant with population equivalent of more than 150. Although the number of STPs in 2007 is 8,697, the amount of samples taken to monitor the quality of effluent discharged are 5,681 indicating that 3,016 plants have the capacity of 150 PE or lower.

The frequency of effluent samples taken differs from plant to plant depending on the size or capacity of the plant. For bigger capacity plants, samples will be frequently taken ,ranging from every week to every month. However, smaller plants are sampled at least once in every 6 months. In year 2007, a total of 81,674 samples are taken from 5,681 plants.

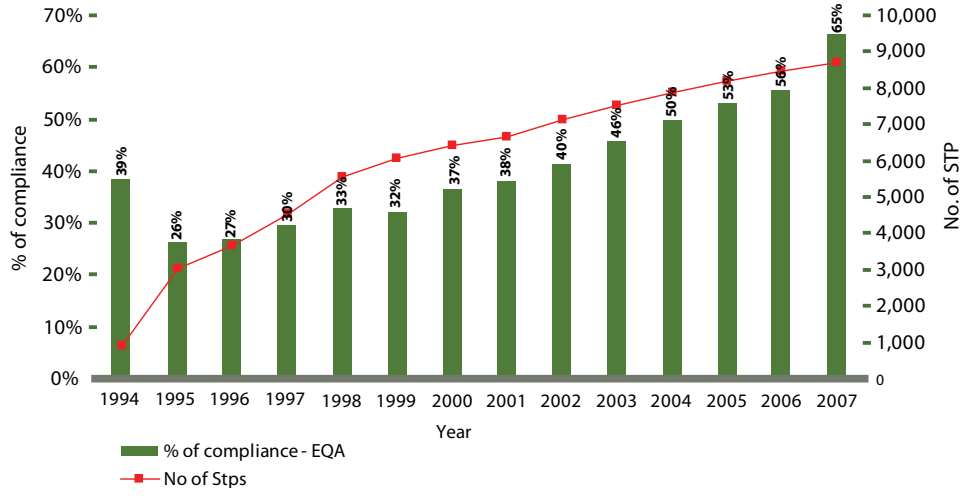
Number of Effluent Samples Taken from Year 1994 to 2007



5.3 Compliance of Discharge Effluent to Regulated Standards

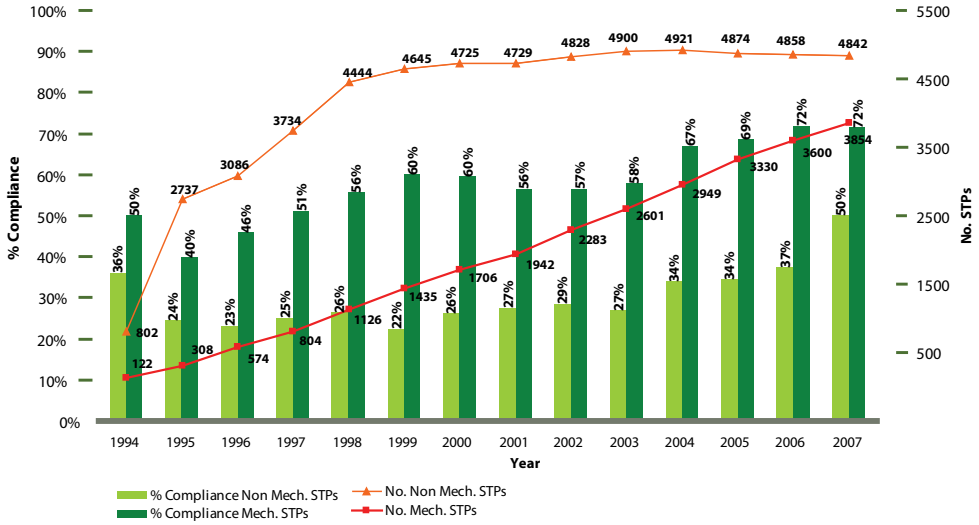
For the past thirteen years, Indah Water had managed to increase the percentage of compliance to effluent standard for its treatment plants despite the increasing number of plants handed over to be operated. From year 1994 to 2007, the number of plants had increased almost eight times but each year their overall performance improved from 39% in 1994 to 65% in year 2007.

Number of Plants Sampled and Percentage of Plants Meeting DOE's Standard



The compliance performance of the non-mechanical plants (i.e. communal septic tanks, imhoff tanks and oxidation ponds) had shown only slight improvement over the years. These types of plants are designed with primary or partially secondary treatment processes hence unable to consistently comply with the effluent standards unlike the mechanical plants that show consistency in compliance performance. As end of 2007, the percentage compliance is 50% and 72% for non-mechanical and mechanical plants respectively. Mechanical treatment plants cater about three quarters of Indah Water's customers and emphasis has always been given in optimising the performance of mechanical plants due to the number of population they cater and amount of pollution load they produced.

Effluent Discharge - % Meeting EQA Standards for Mechanical and Non- Mechanical Plants

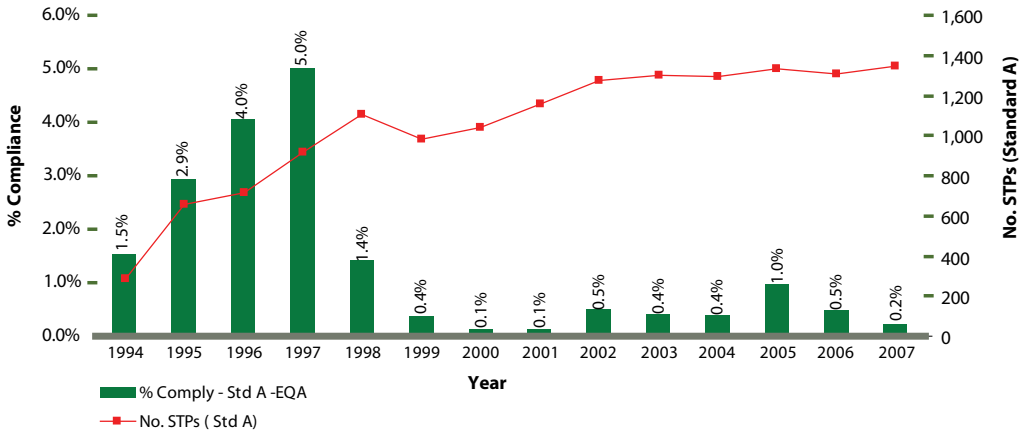


Indah Water's Commitment Towards Environmental Performance

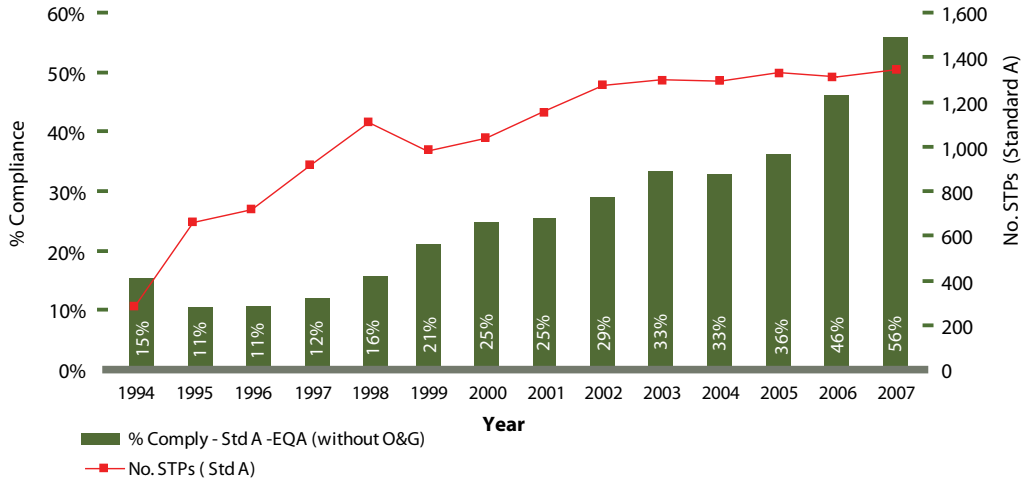
Effluent discharged from Indah Water's STPs are required to meet DOE's effluent standard, either Standard A or B, and compliance is required for all the following five parameters namely,. pH, BOD, SS, COD and O&G. The overall compliance level of Indah Water's STPs (based on effluent compliance to all 4 parameters i.e. BOD, SS, COD and O&G) located in the Standard B catchment are much higher compared to plants located within Standard A areas.

The high number of non-compliance for STPs located in Standard A catchment are due to the requirement of "non detectable" for oil and grease parameters in the discharged effluent. Evaluation of the treatment plant compliance by excluding the oil and grease parameters results in a higher compliance percentage for treatment plants especially those located in the Standard A catchment. By excluding oil and grease parameters, the percentage of compliance for plants in Standard A catchment increases significantly from 0.2% to 56%.

Effluent Discharge - Percent of Treatment Plants in Standard A Catchment Meeting DOE's Effluent Standard (Year 1994 - 2007

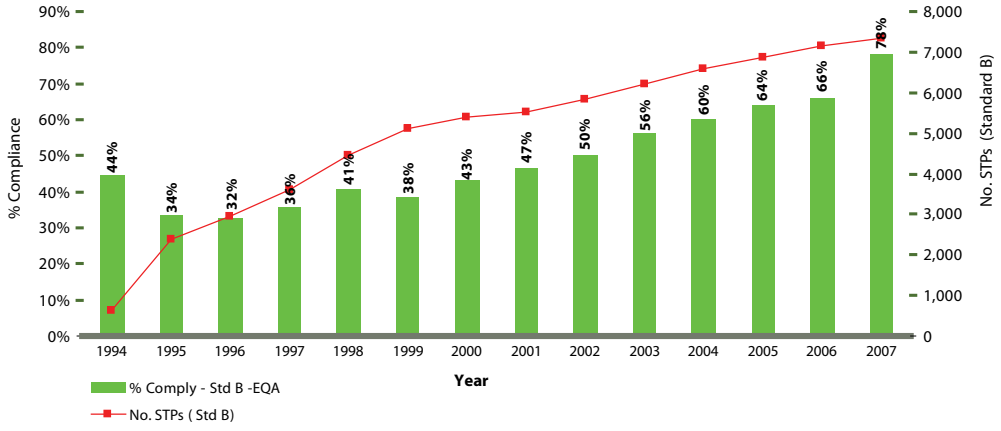


Effluent Discharge - Percent of Treatment Plants in Standard A Catchment Meeting DOE's Effluent Standard by Excluding the compliance to Oil & Grease Limit (Year 1994 -2007)

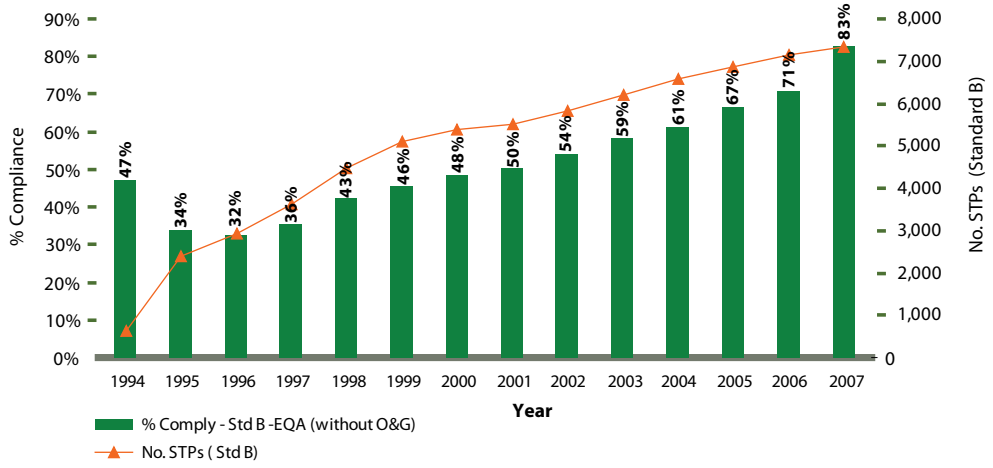


While for plants in Standard B catchment, the percentage of compliance increases from 78% to 83%, by excluding the compliance to oil and grease limit.

Effluent Discharge - Percent of Treatment Plants in Standard B Catchment Meeting DOE's Effluent Standard (Year 1994 - 2007)



Effluent Discharge - Percent of Treatment Plants in Standard B Catchment Meeting DOE's effluent Standard by Excluding the Compliance to Oil & Grease Limit (Year 1994 - 2007)



5.4 Increase in Operational Efficiencies

One of the factors why sewerage services often cannot meet the regulatory standards is the lack of manpower to fully operate and maintain the sewerage systems. Operational strategy plays an important role in reducing environmental pollution from the wastewater sector and therefore is one of the key areas that need to be strengthened. Among the initiatives taken in this regard are:

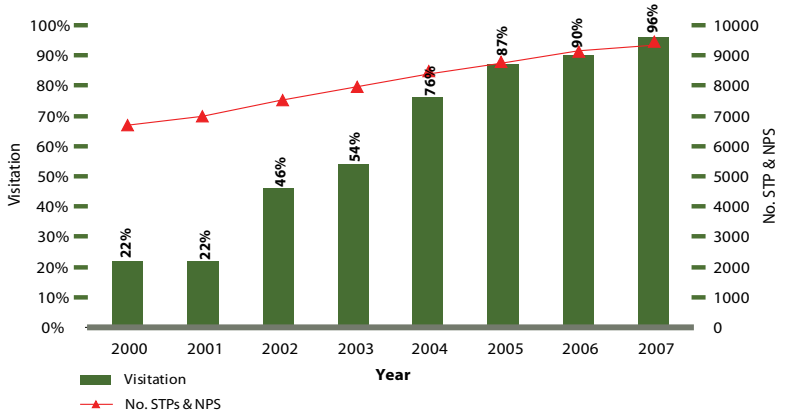
- Outsourcing of plant maintenance and visitation to treatment plants
- Scheduled Desludging of Individual Septic Tanks
- Installation Of Early Warning System to warn any malfunction of equipments that will produced untreated effluent or overflow of raw sewage
- Resolving public complaints within satisfactory response time
- Scheduled Cleaning And Maintenance Of Sewers
- Increase number of staffs to increase service level and operational efficiencies
- Outsourcing repair of Equipments
- STP Desludging

Indah Water's Commitment Towards Environmental Performance

i. Outsourcing to Increase Treatment Plant's Visitation

STPs need to be regularly attended to so that any malfunction of the treatment process and equipment can be attended to immediately. Currently, there is a small ratio of staff to number of plants. The increasing number of plants taken over by Indah Water each year will compound this scenario. Indah Water found that the most cost efficient way to deal with this is to outsource the plant visitation. Despite the increasing number of plants, there had been increase in the percentage of visitation whereas at end of 2007, 96% of the scheduled visitations to plants were achieved.

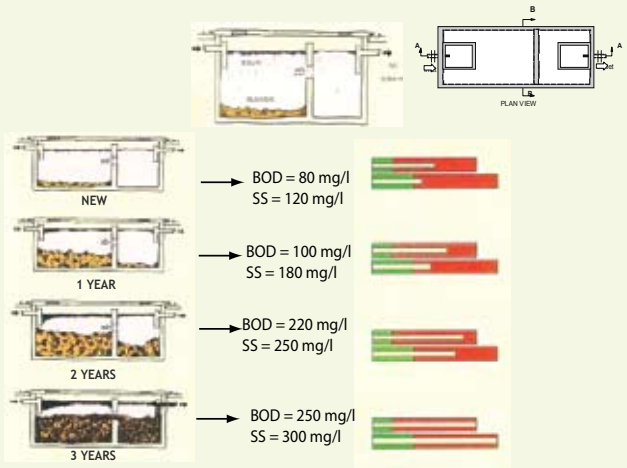
Percentage Visitation vs Number of Plants



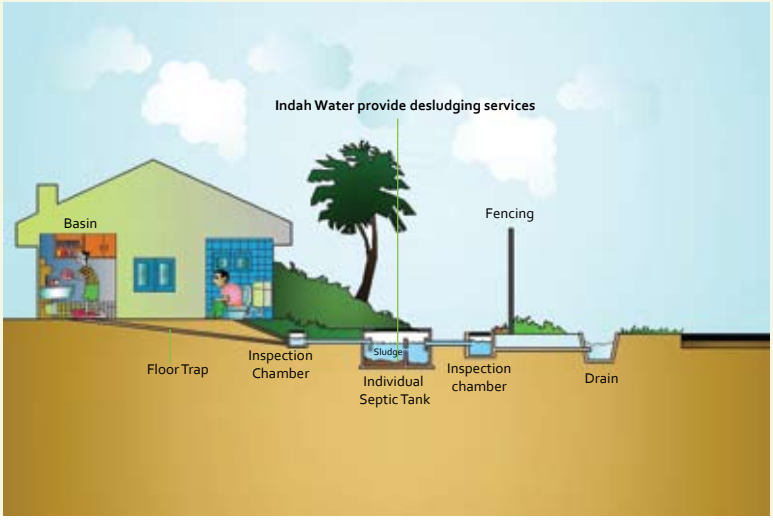
ii. Increased in Scheduled Desludging of Individual Septic Tanks

Septic tank is designed to provide only basic sewage treatment and the system treatment efficiency is reduced with the increase of sludge volume accumulated in the tank. To ensure sewage is treated, sludge needs to be removed from the tank, ideally once in every two years. Impact from pollution loading in effluent discharged from an individual septic tank, which is not desludged, is not significant however, cumulatively the pollution loading from septic tanks can be alarming. Discharge from septic tank is not regulated under the Environmental Quality Act, 1974 since the BOD loading from this type of treatment system is

BOD & SS Concentration in effluent from Individual Septic Tank which is not Desludged as scheduled



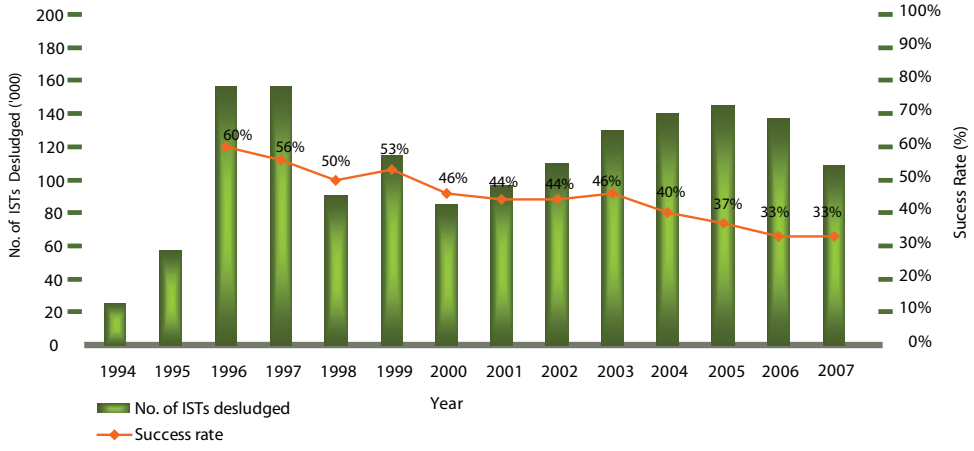
Individual Septic Tank



less than 6 kg/day and septic tanks is catering for population equivalent of less than 150 PE. To date, it is estimated that there are 1 million individual septic tanks in Indah Water service coverage areas.

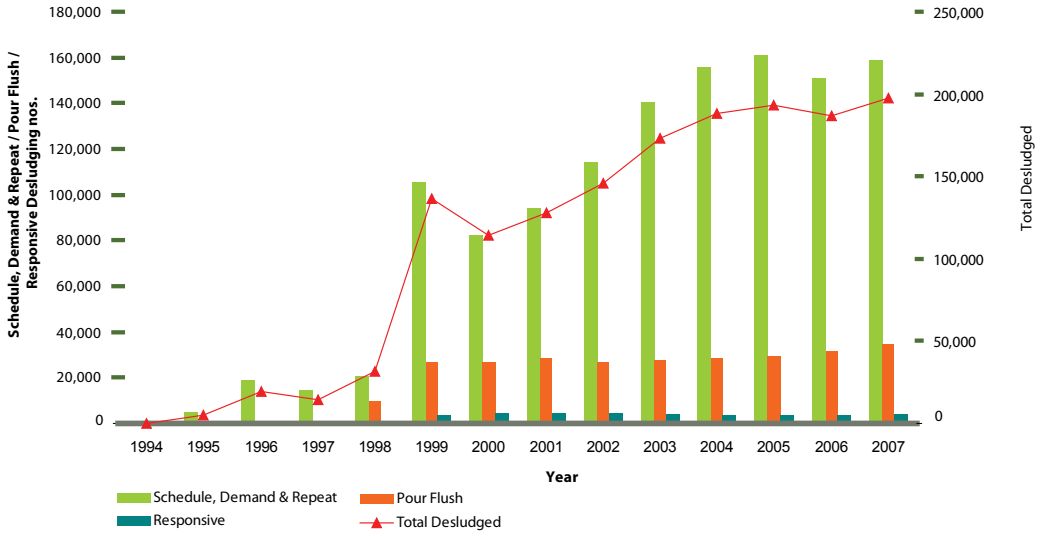
Indah Water is experiencing low acceptance rate for desludging service from individual septic tank owners at an average of 33% in the year 2007. Efforts had been taken to increase the customer's acceptance including joint enforcement with DSS. Indah Water itself had purchased vehicles and equipments, acquired new sludge disposal sites and contract out some of the services to licensed contractors as initiatives to handle increase sludge volume from desludging works.

Numbers of Individual Septic Tanks Desludged and Acceptance Rate for Service by Customers



From 1994 to 2007, there is an increasing trend in the number of desludging works carried out by Indah Water on individual septic tanks. In 2007, a total of 158,922 desludging works has been carried out for septic tanks. In the same year, a total of 197,346 desludging works has been completed and this includes desludging of septic tanks, pour flush and private sewage treatment plants.

O&M Performance : Total Desludging Work in Year 1994 - 2006



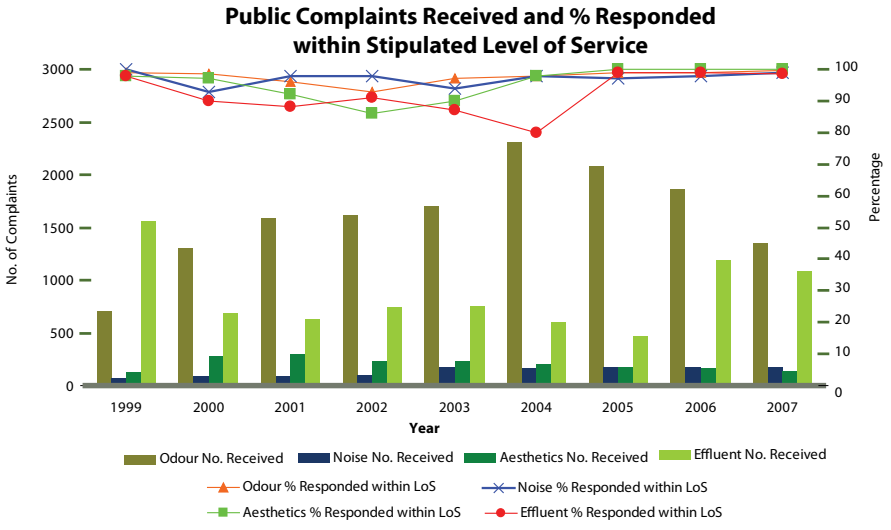
Indah Water's Commitment Towards Environmental Performance

Buffer Zone

Noise Odour

iii. Resolving Public Complaints within Satisfactory Response Time

Environmental impacts and public nuisance such odour, noise and aesthetics from a STPs are easily noticeable by the public and usually result in complaints. Indah Water is proactive towards not only responding to public complaints immediately but also reducing the number of complaints it received. From 1999 to 2007, data indicated that a majority of the complaints are odour related followed by effluent, noise and aesthetics. Indah Water has set operating service level to deal with complaints due to the above impacts and to date, has managed to respond within the level of service in more than 98% of public complaints received.



iv. Cleaning and Maintaining of Sewers

Among other efforts to enhance, operational efficiencies are to increase the interworks dealings and to meet the level of service in attending to the sewer blockages and collapses, which causes surcharge and leakage of sewage. Among the common causes of sewer leakages/burst are blockages in the sewer pipes and damages that may be caused by tree roots and construction activities. In 2007, Indah Water managed to attend and resolved 99% of the sewer blockages and collapsed incidences within the required period or level of service set by the company.

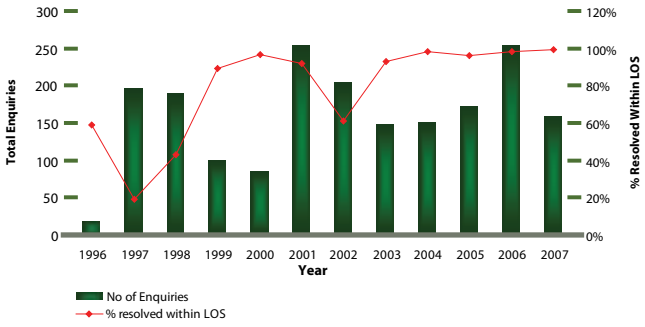
Sewer Blockage

Damage by sheet pile

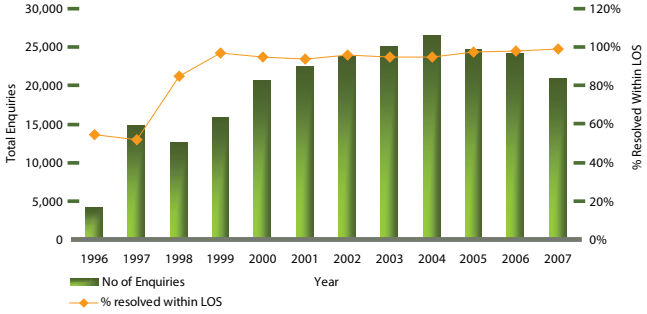
Root Penetration of sewers

Overflow of sewage from manhole

Cases of Sewer Collapse Attended within the Level of Service (LOS)



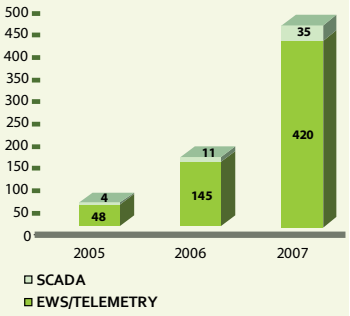
Public Blockages Attended within Level of Service



v. Installation of Early Warning Systems

Early warning system (EWS) involves a process for generating maximally accurate information about possible future events or a perceived threat in order to mitigate or prevent harm, damage or public nuisance in timely manner. Indah Water has installed device / system at the selected or critical STPs and network pumping stations (NPS) to monitor the operational status of the plant, equipment and power supply system in order to prevent sewage from overflows and flooding at the pumping stations. Additional features to monitor theft cases at STPs and NPS are necessary to improve the security of the asset inside the STPs and NPS. To date, 455 plants have been installed with EWS.

No of EWS/Telemetry & Scada System installed in Treatment Plant



vi. Increase in The Number of Staff

Each year, Indah Water has to increase its manpower to meet the above efficiencies in operating and maintaining the sewerage system in Indah Water's service areas and to meet the growing number of asset managed by the company. The manpower has been steadily growing from a mere 512 staff when Indah Water was formed to 2,629 staff today.

Number of Staff in Indah Water

5.5 Implementation of Capital Works Programme towards Regionalisation of Sewerage Services

The sewerage infrastructure and facilities in the country has gradually moved towards regionalisation with construction of plants with advanced treatment facilities. Through financial support given by government through each Malaysia Plan, rationalisation and upgrading of existing plants had paved ways for centralised facilities incorporated with state of the art sewage treatment technologies i.e. tertiary treatment that can remove nitrogen and phosphate and mechanical sludge dewatering facilities, to be built. This can help to further reduce the environmental impacts from sewage sources. Although the capital work programme is implemented by DSS, the plants and other sewerage infrastructure built under this programme are operated and maintained by Indah Water. To date, some of the regional facilities constructed and completed are:

- STP and Centralised Sludge Facility at Port Dickson, Negeri Sembilan
- Centralised Sludge Facility at Padang Matsirat, Langkawi, Kedah
- STP at Kuah Town, Langkawi, Kedah
- STP at South West Coast, Langkawi, Kedah
- STP at Bayan Baru, Pulau Pinang
- STP at Sungai Besi, Kuala Lumpur
- STP at Bandar Tun Razak, Kuala Lumpur
- STP at Taman Mawar, Puchong, Selangor

Sewage Treatment Plant at Sungai Besi, Kuala Lumpur

Centralised Sludge Facility at Port Dickson, N. Sembilan

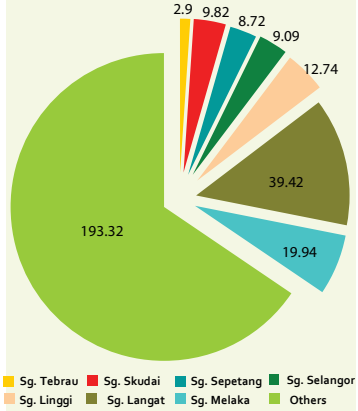
Sewage Treatment Plant at Bayan Baru, Pulau Pinang

5.6 Refurbishment Programme

Despite the company's financial constraint, Indah Water took the challenge to develop innovative and cost effective method of retrofitting inefficient plants to an acceptable treatment system that produces good quality effluent. Indah Water's refurbishment programme includes activities to repair/replace equipment, improve safety and operability to substantially reduce occupational health and safety risks, improve working conditions for plant personnel, address defects and further improve the reliability of plant operations. Priority are given to plants which are not in working condition and located in critical areas such as river catchment, upstream water intake points or polluted river and nearby residential houses. There has been marked improvement in the number of refurbished plants complying with effluent standard and reduced public complaints.

Refurbishment priority has always been given to mechanical plants compared to plants in the group of communal septic tank and Imhoff tank since pollution loading to the environment is much significant for mechanical plants. As at the end of 2007, a total of 4,086 Indah Water plants or 59% have been refurbished with a total cost of approximately RM352.4 million. A further RM293.5 billion will be required to complete the refurbishment of the remaining 41% of Indah Water plants and this allocation will be progressively acquired under the Malaysia Plan funding.

Budget allocated for Refurbishment and upgrading of plants located at critical river basins (RM388.88 Mil)

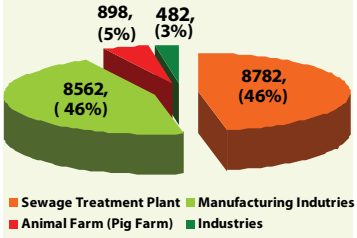


Summary of Refurbishment Works Implemented by IWK (As at December 2007)

No	Category of Refurbishment Works	No of Plants under Refurbishment Program	No of Plants Refurbished	Cost of Refurbishment Works (RM Mil)	% of Plants Refurbished
1	Safety, Security, Cleanliness, Aesthetics	3,798	2,307	21.32	61%
2	Safety, Security, Cleanliness, Aesthetics, M&E Serviceability	3,101	1,757	303.94	57%
3	Major Treatment Performance (Total Upgrading / Replacement of Plants	46	22	27.10	48%
TOTAL		6,945	4,086	352.36	59%

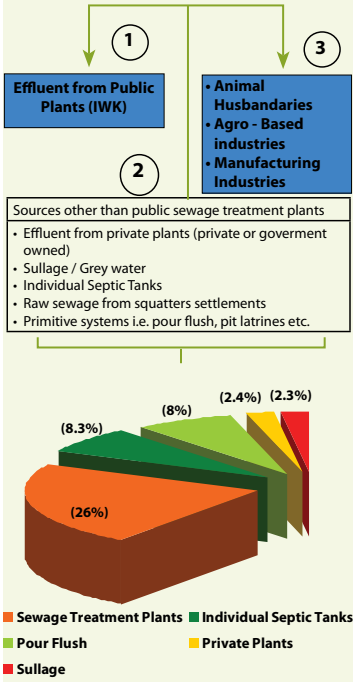
Before & After Refurbishment

Composition of Water Pollution Sources by Sector, 2005



Source :
The Malaysian Environmental Quality Report 2005 published by DOE

Sources of Sewage Pollution From Effluent Discharge



5.7 Contribution to River Water Quality Improvement Programme

Indah Water actively participated in various river rehabilitation programmes in the country and continuously contributes in providing technical support and data concerning sewage pollution. To be in line with the government objectives to rehabilitate the quality of the rivers and preserve the water resources in the country, Indah Water has planned its operation to be consistent with the action plan carried out by regulatory agencies.

With frequent incidences of water supply shortages early this year due to detection of high level of pollutants at intake points in the river water, constantly the blame is placed on effluent discharged from STPs operated by Indah Water. As being reported in the Malaysia Environmental Quality Report 2005, published by DOE, STPs are contributing close to half (47%) of the sources of water pollution in the country.

Looking at this alarmingly high percentage in pollution contribution, Indah Water felt it is imperative to work closely with the regulatory agencies and river authorities to ensure effluent discharged from STPs operated by Indah Water do comply with the regulated standards at all times by routinely providing effluent information to the regulators.

However, Indah Water realised that not all of the sewage generated in this country is under the responsibility of Indah Water since it is only managing the public STPs under its operational areas. Even within its operational areas in the country, Indah Water is only directly responsible for the sewage connected to public treatment plants. To date, only approximately 60% of the country's population enjoys connected sewerage services operated by Indah Water.
In general, sewage pollution originates from three sources namely public STPs, other public STPs (privately owned, pour flush, septic tanks, primitive systems, direct discharges) and animal husbandry. Based on the country's population and the numbers in Indah Water's coverage areas, it is estimated by DOE that Indah Water is directly responsible for only 26% of the total 46.7% water pollution sources.. The rest, representing 21% of sewage pollution comes from sources, which are not under the purview of Indah Water.

The company will continuously inform, collaborate and instil awareness in enforcement agencies, river authorities and the public on other sources of sewage pollution, which are not managed by Indah Water. Currently, there are substantial number of private plants that are not regulated to comply with the effluent standards, septic tanks and pour flush, not desludged according to schedule , thereby polluting the water ways in the country. Indah Water will continue to cooperate and work together with enforcement agencies to ensure pollution from sewage into the rivers and waterways in the country is reduced.

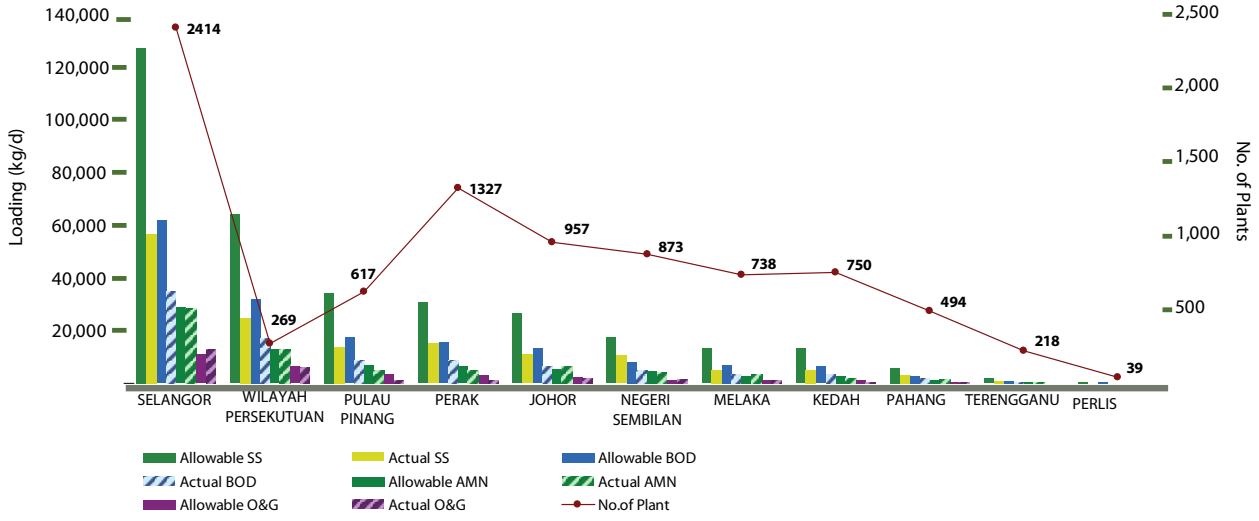
i. Study on Sewage Impact on River Water Quality

As committee members, Indah Water has given important contributions by providing data and information related to sewage pollution in many of the river rehabilitation programmes and studies conducted by various government agencies. At the same time, Indah Water also initiated its own programme to provide water model and quality, specifically on the impact of sewage pollution to selected river water quality. As at the end of 2007, it has developed four river water models and completed the study on water quality for Sg. Langat, Sg. Selangor, Sg. Tebrau, Sg. Skudai and Sg. Linggi.

ii. Pollution Loading into Rivers

The amount of pollution loads discharged from Indah Water's treatment plants into selective major rivers in the country was considered to give an indication on the impacts on the river water quality. This information is useful for Indah Water to focus into critical areas within the river catchment and identify non-performing plants or other possible sources of sewage pollution within the river catchment. Generally, pollution loads in effluent discharged from Indah Water's plants are below the allowable loads for parameters BOD and SS while oil and grease occasionally exceed the allowable limits especially for plants having to comply to Standard A.

Average Loading (kg/d) for year 2007 by State



5.8 Sludge Handling and Management

With the development growth in the country, volume of wastewater generated will increase annually and volume of sludge produced from wastewater treatment processes will proportionately increase. Sludge originates mainly from desludging of individual septic tanks, communal septic tanks, imhoff tanks, oxidation ponds and from public and private sewage treatment plants. Disposal of sludge involves acquiring of land or obtaining approval/permit from private or municipal landfills. Currently, sludge from septic tanks is disposed at Indah Water's dedicated sludge disposal sites.

There are many challenges that the company is facing in managing and handling sludge and these challenges need to be addressed in a socially, environmentally and financially responsible manner. The priorities given by Indah Water in managing sludge from sludge collection to ultimate sludge disposal has become apparent where each year, budget allocation for sludge facilities provided nationwide keep increasing. To date, Indah Water had spent more than RM66 million for this purpose. It is estimated that at least another RM3.1 billion will be required to provide adequate sludge facilities by end of the concession period in 2035.

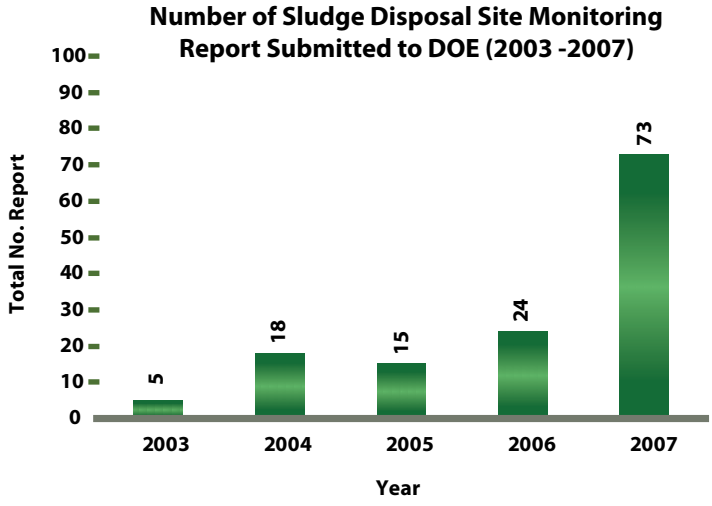
In 2007, the volume of sludge generated by approximately 1 million individual septic tanks nationwide is recorded to be close to 1 million m3/yr. There are also 8,697 public plants serving 16.75 million PE, and these plants produced 5.9 million m3/yr of sludge in 2007. It is estimated 470,000 m3/yr sludge is produced by private plants obtaining desludging service from Indah Water.

i. Indah Water Sludge Disposal Sites

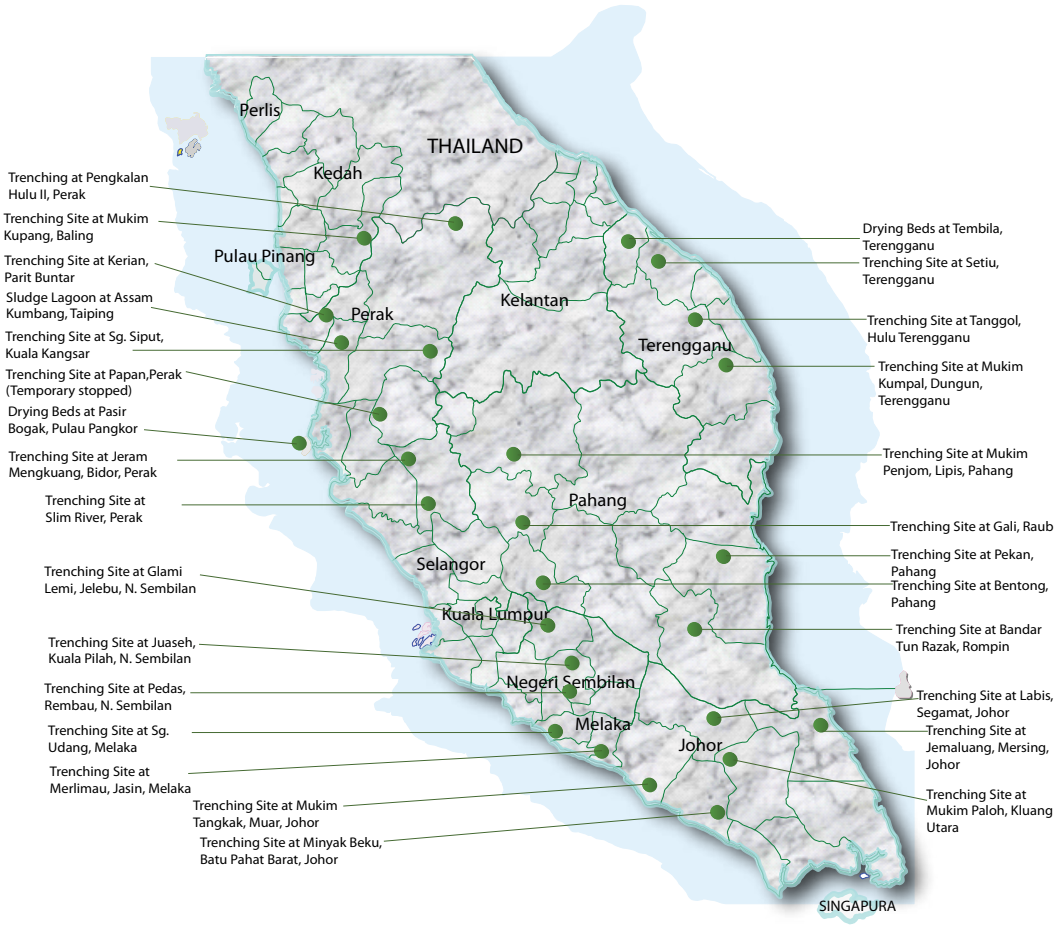
Indah Water had drawn up its sludge management strategy, which was revised from time to time. The strategy targets to provide at least one-sludge disposal site for each local authority area where Indah Water is operating. Currently, there are 24 sludge disposal sites nationwide adopting trenching method. As part of the long-term strategy, Indah Water has constructed few mechanised sludge treatment facilities (i.e. Mechanised Dewatering Unit (MDU) and Integrated Sludge Reception Facility) to improve the current sludge handling and management. By utilising the mechanical dewatering facility, the amount of water in sludge that needs to be disposed can be reduced up to 80%.

ii. Performance of Sludge Disposal Sites

EA Report must be submitted to DOE for approval to dispose sludge at Indah Water's dedicated sludge disposal sites. Indah Water monitors any pollution due to the sludge disposal activities at the sites by submitting to DOE the monitoring data for ground and surface water quality. The information is submitted periodically commencing from the operating date of the sites.

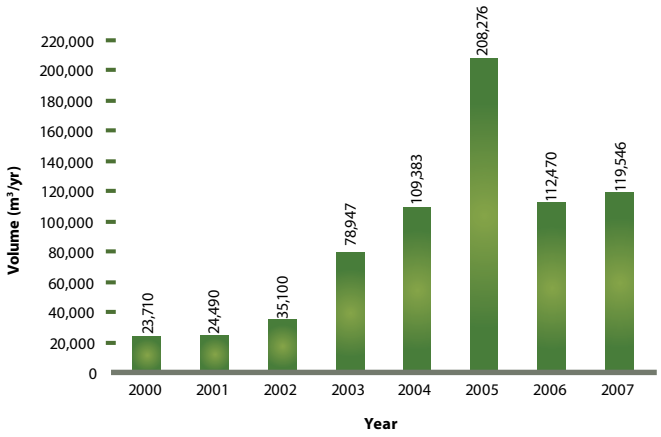


Current Sludge Disposal Sites in Malaysia



The volume of sludge managed by Indah Water has grown steadily in the past thirteen years. As at end of 2007, Indah Water managed close to 120,000 cubic meter of sludge. Indah Water will continue to improve on its disposal practice and look into innovative technologies to minimise sludge disposal volume by drawing up a sludge strategy programme that is periodically reviewed to ensure the company's objectives in managing sludge are met.

Total Sludge Volume Disposed at IWK's Disposal Site Nationwide



5.9 Status of Research and Development (R&D) Programme

In thirteen years of its operation, Indah Water had emphasised on the needs for local research to develop the sewerage industry. The company's long-term aspiration is research and innovation towards environmentally sustainable sewerage services.

i. Status of R&D Programme in Improving the Quality of Discharged Effluent

To date, Indah Water had initiated collaborative R&D programmes with the local universities and product suppliers with the objectives of finding new approaches and technologies that are able to increase the treatment performance and quality of effluent discharged from sewage treatment plants. The priority research areas include cost efficiency, treatment process optimisation, energy efficient technology and effluent and reuse applications.

In 1998, Indah Water had signed the Memorandum of Understanding (MOU) with Universiti Teknologi Malaysia (UTM) to carry out research related to sewage treatment.

R&D 1 : Charaterisation of Process Design Parameters

Topics : Determination of per capita load and water consumption in treatment design To determine the actual loading of various parameters in raw sewage e.g. BOD5, SS, COD, TKN, P, NH3 and oil and grease. **Benefit :** 1. Identification of local design parameters that will provide more economical and efficient design basis for Malaysian sewerage system. 2. Eventual savings to the building industry in general.	**Topics :** Inflow & Infiltration in Sewerage System To investigate the causes and associated relationship between the quantity of in flow and infiltration in the sewer system. **Benefit :** 1. Identification of inflow and infiltrationquantity and sources. 2.Eventual increased efficiency of sewer and plant operations

Collection of sample at Inlet

V-notch installed at inlet of STP for flow measurement

Computer and data logger was use to monitor daily flow rates

Flow meter and automatic sampler at site for 14 days

R&D 2 : Treatment Optimisation

Topics : Magnetic Technology in Sediment Investigate the application of magnetic technology to various type of sewage treatment plants. **Benefit** 1. Alternative to microorganisms in treatment processes.	**Topics :** Cost effective Upgrading Techniques of Oxidation Pond System Identify cost effective methods of oxidation ponds upgrading. The study proposed to install baffles improve hydrodynamic flow in the oxidation pond. **Benefit** 1. Existing Oxidation ponds be upgraded and could undertake higher loading

Series of permanent magnets for single and circulated magnetic treatment

R&D 2 : Treatment Optimisation - (cont')

Benefit 2. Enhance formulation to achieve the desired effluent quality	**Benefit** 2. Enhance formulation to achieve the desired effluent quality.
Topics : Biochemical Product Application Identify the type of chemical technology which are applicable for sewage treatment. **Benefit** 1.Provide alternative in optimising existing STPs 2. Reduce capital expenditures for refurbishment & upgrading.	

Identify the type of chemical technology

R&D 3 : Management and Planning

Topics : Permissible Limits of Industrial Effluent into Sewerage Systems Investigate the effects of accepting industrial effluent to the treatment process in sewage treatment plants. **Benefit** 1. Assist the regulators in monitoring & regulating industrial wastewater connected to the public sewer system. 2. Assist the industries to find alternatives for disposing their wastewater	**Topics :** Modelling of Sewage Load and Self Purification Capability of Selected Malaysian Rivers Investigate various river systems in Malaysia and systematically monitor the pollutant levels and its self-purifying capacity. **Benefit** 1. More effective and efficient STPs could be built. 2. Better prioritisation of capital expenditures which lead to better overall river water quality.

Water sampling for Laboratory analysis

R&D 4 : Effluent Reuse

Topics : Potential Application of Effluent Reuse in Malaysia Landscaping & Industry
Identify potential application of sewage effluent in Malaysia including the cost effective method to improve the quality of sewage effluent for suitable reuses.

Benefit
1. Supply for landscaping and industry
2. Reduce pollution and degradation of river water quality.

Successfully application of sewage effluent for landscaping in UTM

ii. Status on Research and Development in Sewage Sludge

Indah Water had initiated collaborative R&D programmes with the local universities and product suppliers on topics related to the potential reuse of sewage sludge.

In 1998, Indah Water signed an MOU with Universiti Putra Malaysia (UPM) to carry out research pertaining to sludge. Planned over a period of 5 years, the MOU with UPM is on the research of treatment, disposal and reuse of sewage sludge. There were originally eight (8) research topics initiated under the agreement between Indah Water and UPM, all of which focus in the areas of sewage sludge treatment and reuse.

Beyond the MOU, another research project was pursued with UPM. The project was initiated to explore the opportunities on Expansion of sludge reuse studies to land applications at rubber plantation in Labis Johor.

Indah Water's Commitment Towards Environmental Performance

R&D Topic 1

Utilisation of Sewage Sludge as Fertiliser for Various Crops

Objective : To assess the potential application of treated sludge as fertiliser and/or soil amendment.	**Benefit :** Produce cheap and safe-organic based fertiliser. Safe and cheap method of sludge disposal.

R&D Topic 2

Co-composting of sewage Sludge and Municipals Solid Waste

Objective : To develop a technology for producing compost from sewage sludge and municipal solid waste for use as soil conditioner.	**Benefit :** Convert solid waste and sludge to good quality compost. Safe and cheap method of sludge and solid waste disposal

R&D Topic 3

Production of Cheap and Safe Sludge- based Organic Fertiliser and Soil Amendment.

Objective : To assess the potential usage of treated sludge for rehabilitation of ex-mining land.	**Benefit :** Convert solid waste and sludge to good quality compost. Safe and cheap method of sludge and solid waste disposal

R&D Topic 4

Dewatering and Composting of Sewage Sludge

Objective : To develop an efficient technology for the production of compost from waste sludge.	**Benefit :** Produce cheap and safe-organic based fertilizer. Safe and cheap method of sludge disposal.

R&D Topic 5

Effectiveness of Sludge Lagoons in Malaysia

Objective : To study the parameters that affect the effectiveness of sludge lagoons for septic tank sludge stabilisation and dewatering.	**Benefit :** Efficient stabilisation and dewatering of sludge. Develop methodology for sludge lagoon operation

R&D Topic 6

Development of Environmentally Friendly Strategies for Rehabilitation of the Ex-mining Land and Depleted Forest Land.

Objective : To elucidate the efficiency of using sewage sludge in rehabilitation of degraded forest.	**Benefit :** Environmental friendly strategy for reforestation. Safe and cheap method of sludge disposal.

R&D Topic 7

Sludge Thickening and Dewatering with a Natural Local Polymer

Objective : To identify factors which affect the use Moringa oleifera (kacang kelor) seed as a natural polymer for waste sludge thickening and dewatering.	**Benefit :** Develop cheaper local polymer for sludge treatment. Reduce pollution in effluent water with higher sludge capture.

R&D Topic 8

Sludge Digestion using Autoheated Thermophilic Aerobic Digestion(ATAD)

Objective : To develop the sludge digestion process using the ATAD technology to produce stabilised and pathogen free end products.	**Benefit :** Produce stabilised and pathogens free sludge. Lower capital cost for sludge treatment with smaller digester.

5.10 Continuous Development and Improvement Programme to Improve the Environmental Quality

Indah Water will continuously develop and improve its services in the sewerage industry and contribute towards improving the environmental quality and standards in the country. The main focus is to ensure high compliances and performances of its services. To achieve this, Indah Water works closely with the DSS and other agencies to develop guidelines, specifications and standards that will ensure environmental concerns are always given the highest priority. The company also believes that education and awareness program is equally important to educate the public and major stakeholders on the relationship of sewerage services and the environment. Development of comprehensive training program to develop skill and competent staff also has its share in improving the sewerage services and the environment quality.

i. Development of Guidelines, Specifications and Standardisation

Detailed guidelines and specifications for sewerage design are essential to drive the industry towards providing sewerage infrastructures that are able to meet high operation, maintenance, health and safety and environmental requirements. Absence of local design guidelines, which are driving the industry towards standardisation of the sewerage systems, has resulted in many inconsistencies in the design and installation of sewerage systems in the country. With the increasing number of treatment plants and sewerage infrastructure to be operated and maintained each year, Indah Water struggles for high performance in meeting the regulatory standards and compliances. As an initiative to standardise the design and installation of sewerage systems nationwide, Guidelines for Developer Vol. I, III and IV was published in 1999 and many more documents pertaining to sewerage industry in the country will be produced for the benefit of the sewerage industry.

ii. Development of Training

The sewerage industry is presently considered a highly skilled profession that requires well-trained personnel who have knowledge of chemistry, microbiology, hydraulics, and other related subjects. Indah Water aims to develop skilled, knowledgeable, competent and customer friendly workforce through a structured training and development program, which addresses the needs and demands of all stakeholders.

Indah Water has established Technical Training Centre (TTC) located within the compound of Sg. Besi Regional Treatment Works, Bukit Jalil in February 2006. The training centre is a dedicated location for technical training on sewerage system that focuses on theory and practical for staff and the wider public. Hands-on application training, live and passive demonstration and simulation could be used to complement and facilitate training and teaching at the Indah Water TTC. This is made possible by the training centre being located within the Regional Sewage Treatment Works and is equipped with a sewerage product display room and an experimental laboratory as well as mock sewerage facilities. The laboratory could accommodate teaching and training of fundamental laboratory techniques. The mock sewerage facilities allow participants to experience closest-to-real working situation.

Indah Water offers a diverse range of courses (more than 30) that are designed to

suit the needs and demands of the sewerage sector. The courses are offered to both the internal staff as well as external customers (public). The training centre is also outfitted with appropriate presentation technology and classroom facilities with a total capacity of 70 to 100 people depending on the training delivery method. i.e. classroom, practical, workshop or seminar.

Course Available	Upcoming Courses
Indah Water offers a diverse range of courses that is designed to suit the needs and demands of sewerage sector. Currently the centre offers the following courses to both the internal customers (wider public) :- • Working in sewer and Confined Space. • Confined Space Entry Refrsher Course. • Authorised Gas Tester (AGT) Course. • Sewer Network Maintenance. • Basic CCTV Inspection of Sewers. • Introduction to Sewage Treatment. • Preliminary Treatment and On Site System. • Secondary Treatment. • Solids Handling, Treatment and Disposal. • Basic Maintenance of Pumps. • Basic Maintenance of Blowers. • Fundamentals of Electrical Control Panel and Maintenance. • Basic Maintenance of Screens. • Basic Maintenance of Surface Aerators. • Extended Aeration System. • Sludge Conditioning Process. • Operation and Maintenance of Oxidation Pond and Aerated Lagoon. • Sampling Techniques and Records. • On-Site Measurement & Testing of Process Control parameters. • Desludging of Individual Septic Tanks - Desludging Works. • Desludging of Individual Septic Tanks - Know Your Tanker.	More technical training courses are being designed and developed for to be offered within the immediate period. The courses include : • Operating Fixed Film System. • Operating Sequence Batch Reactor. • Operating Network Pump Stations. • Operations & Maintenance of Penstock and Valves. • Operation & Maintenance of Sludge Pumps. • Operation & Maintenance of Sludge Thickeners. • Operation & Maintenance of Diffused Aeration System. • Operation & Maintenance of Brush Aerator. • Operation & Maintenance of Grit & Grease Removal Facility. • Operation & Maintenance of Clarifier & Scrapper Mechanism. • Maintenance of Gear & Motor Drive Units. • Operation & Maintenance of Sludge Dewatering Equipment. • Operation & Maintenance of Sludge Reception Facility. • Operation & Maintenance of Mobile Dewatering Unit. • Basic Sludge Treatment & Disposal. • Flow Measurement. • Sampling for Sludge Disposal Sites. • Introduction to Sewer Maintenance. • Operation of Sewer Cleaning Vehicle (SCV) and Water Jettors. • Manhole Survey. • Operation and Maintenance of Vacuum System. • Biological Nutrient Removal. • Basic Methamatic for Desludging Operators. • Basic Microbiology of Sewage Treatment.

iii. Development of Environmental Awareness and Education Programmes

Indah Water has a dedicated department specifically to promote environmental awareness and education on our services. Public understanding on the needs for sewerage treatment and how they can contribute to preserve the environment are vital in our education programmes.

Indah Water has developed education road shows, comprising community events, schools programmes, briefing sessions to residents, STP Open Day, etc. on a regular basis, providing carnival experience of music and games activities. The road shows also provide an opportunity to distribute educational printed materials, pictorial exhibitions on our activities and a customer service counter to bill payments facilitate customer to pay bills and make enquiries.

Indah Water's Commitment Towards Environmental Performance

Since year 2001, over 40,000 students from primary and secondary levels, National Service Camps, and higher learning institutions have benefited directly from Indah Water's awareness and education programmes. Indah Water will continue to contribute to the excellence in learning and instil the environmental awareness. Our community event aimed at educating consumers has been successfully implemented in strategic shopping malls convenient for consumers to interact with us. As part of the attraction during the event, we organise exhibition, games for all ages, karaoke competition, colouring contest and give away free gifts for payment of sewerage bills.

Environmental Awareness and Education Programs Carried Out from Year 2001 until Year 2007

Year	Special School Programme	Advertorials	Radio Advertisement / Talk	TV Advertisement / Appearances	Observation Tours (Sch/Uni/Gov / Company)	Observation Tours (Foreign)	Exhibition	Community Event	Briefing/ Dialogue/ Public/ School/ PLKN
2001	30	24	6	8	53	1	15	16	8
2002	33	38	9	10	50	4	22	1	18
2003	67	0	0	0	61	6	19	1	27
2004	51	72	552	219	31	5	19	3	2
2005	25	0	0	12	43	1	29	0	13
2006	42	7	0	0	51	4	26	9	80
2007	1	0	0	0	39	2	73	17	91
TOTAL	**249**	**141**	**567**	**249**	**328**	**23**	**203**	**47**	**239**

Workshop gets pupils thinking 'green'

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6

Environmental Goal and Target

Environmental Goal and Target

"Financial Resource is very important element to ensure continuous provision of effective sewerage services towards sustainable environmental protection."

~ Mr. Loh Min Jiann - Head of Finance & Administration Department ~

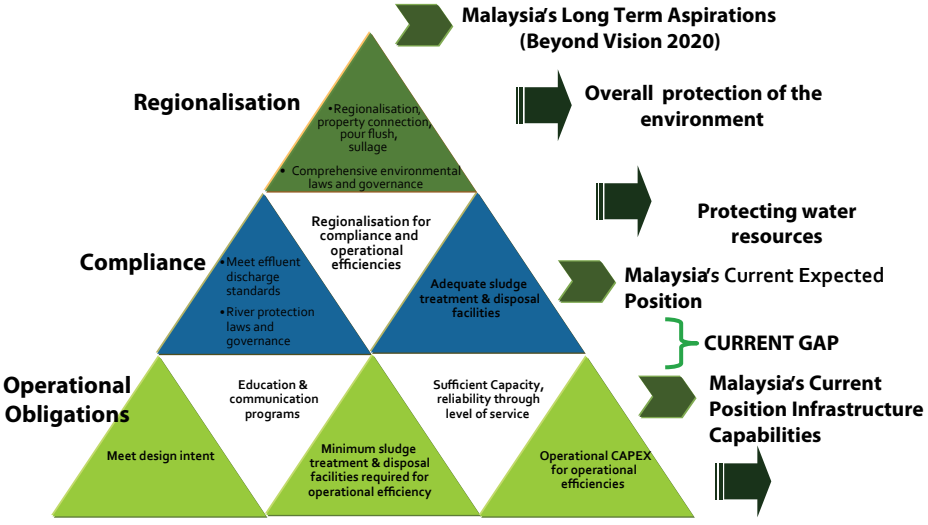
6.1 Sustainable Sewerage Development

As a major sewerage company in Malaysia, Indah Water is seriously concerned on sustainable sewerage development; hence, we are looking at the holistic goal of the sewerage industry. We believe the way forward for the sewerage industry revolves on interconnected action plans, which are:

- Comprehensive environmental laws and governance;
- Regionalisation of properties (inclusive pour flush, IST and sullage) / development;
- Compliance to effluent discharge standards and operational efficiencies, adequate sludge treatment and disposal facilities;
- Facilities build according to the set standards and requirement;
- Effective education and communication programs;
- Sufficient funds for capital expenditure and operational efficiencies.

Sewerage Industry Development

The sewerage industry in Malaysia could meet the ultimate objective of overall protection of the environment by 2035, if plans and actions towards this goal are undertaken immediately.



6.2 Indah Water's Environmental Goal and Targets

After understanding, how the sewerage industry should be driven, the way forward for Indah Water, as a company is to ensure our action plans coincide with the overall picture of how the sewerage industry should be. Our company's goal is clearly stated in our vision and mission. Subsequently, our action plans and the way forward are in line with these set targets, which are:

- Further improvement of environmental compliance and operational efficiency;
- Recycle, Reuse and Reduction of Waste;
- Continuous Environmental Awareness Program;

- Continuous Research and Development;
- Continuous Capacity Building;
- Further improvement towards achieving highest service quality.

6.3 Compliance to Environmental Regulations

Over the years, Indah Water had progressively improved the level of compliance to meet environmental regulations. To date, the company has taken over close to 8,700 sewage treatment plants and 640 network-pumping stations nationwide and this number will continue to grow annually.

Despite the increasing number of plants handed over to IWK, the company manages to grow the percentage of compliance of its treatment plants to the regulated environmental standards each year. As at end of 2007, the overall plant compliance was 65% and commitment will be given by the company to ensure higher compliance performance in the coming years.

Our company's goals are progressively driven towards meeting a higher percentage of the regulatory standards, compliance, and operational efficiency. To meet these ends, Indah Water as a holistic sewerage company, has structured our business plan and activities within available means and drive progressively towards the following targets:

- Develop necessary documents to meet the industries needs
- Continuously upkeep the health, safety and environment within our daily work activities
- Monitor, records and update existing sewerage asset development for reference and update of localised sewerage master plan/ sewerage catchments
- Strategize sewerage activities and company's facilities to be in line with the proposed sewerage master plan
- Plan, drive and implement rationalisation and upgrading works towards the sewerage master plan and sustainable sewerage development
- Ensure strong liaison with regulators, stakeholders and customers
- Continuously review and update sewerage documents, procedures, sewerage catchment master plan and strategy, policy with relevant authorities, etc. for

continuous improvement
- Continuously monitor and manage equipment, process and overall asset performance for optimisation and continuous improvement
- Continuously improve public awareness programmes on Indah Water's activities and environmental protection to drive towards higher collections
- Develop, review training facilities and training programmes to suit internal workforce training needs, external public, professionals and non-professionals within water industries
- Develop R &D programmes and utilise successful findings for continual improvement and sustainable development
- Continuously study and update water quality models of selected critical rivers to ensure Indah Water's awareness of these rivers' water quality and upkeep their livelihood.
- Continuously works together with regulators, stakeholders, customers, suppliers, developers, contractors, and any interested parties to further improve our level of services and environmental performance and the national sewerage industries and standards

6.4 Achieving Highest Service Quality

Indah Water has consistently strived to balance between being an effective partner of the community that it serves by providing the best service level it can offer, protecting the environment and public health and at the same time maintaining the company's financial sustainability. To achieve this, Indah Water closely monitors the compliance level of treatment plants, responds immediately to any complaints made by the public and continuously improves on policies, guidelines and strategies drawn up by the company. Among the key focus areas are:

- Quick response to public complaints on overflows, blockages, malfunctions or odour issues;
- Meeting the Level Of Service (LOS) set by the company for the services rendered;
- Increase frequency of plant visitation to immediately attend to any operational failures;
- Increase in percentage of desludging services and meeting desludging schedule targets;
- Moving towards high technology services to increase efficiency of treatment and quality of services provided;

6.5 Recycle, Reuse and Reduction of Waste Materials Generated

Treated effluent and sludge are by-products and part off waste materials generated from sewage treatment. Treated effluent discharged from treatment plants has the potential to be reused for landscaping, agriculture and domestic usage. Sewage sludge rich in nutrients such as nitrogen, phosphorous and organic matter has a very good potential for agricultural application.

Indah Water had budgeted RM 9.3 Million for year 2008 to update its sludge treatment and disposal technologies. It is estimated that at least another RM3 billion will be required to provide adequate sludge facilities by end of the concession period in 2035. The company has been researching and developing programmes to venture into technologies that will help in reducing sludge volume to be disposed and this includes exploring the potential of sewage sludge reuse.

Reducing the sewage by-products will contribute to alleviating environmental associated problems such as pollution loads into water bodies and impact of sludge disposal onto soil and ground water quality. Currently, Indah Water is working together with a commercial composting company to convert our dewatered sludge from oxidation ponds and aerated lagoons to fertiliser or compost.

6.6 Continuous Research and Development (R&D) Programme

Over the years, Indah Water has subsidised R&D works and collaborative research from public and private research entities. Indah Water also coordinates and facilitates related sewerage research works from vendor and universities student research activities. Our future goals are to realise research findings to field applications towards efficient performance, cost savings, and/ or potential revenue stream and at the same time providing environmentally sustainable sewerage services.

To achieve these goals, our targets are further improvement of education and dissemination of R&D findings, and the receptiveness towards uptake of the R&D findings. Additionally, wider collaborative participation on applied research works projects, from public research institutions and involving various government agencies would further benefit the nation.

6.7 Continuous Capacity Building Development

Indah Water has developed numerous technical training modules to suit workforce requirement, capacity building development and various water industries stakeholders. Our training courses has been endorsed and accredited by Sewerage Services Department for professionals specialised in sewerage field under Sewerage Technical Training Courses (SSTC), Diploma and Master's Degree in Wastewater Treatment from UTM / Indah Water collaborative programme.

Our goal is becoming the centre for capacity building on technical and practical sewerage knowledge to wastewater industries nationwide and Asian region. Our targets are providing structured operator training programme for Indah Water's workforce and qualified persons in the sewerage sectors nationwide, continuously review, update, and improve the programme to be on par with technology development towards sustainable development and environmental protection.

6.8 Continuous Environmental Awareness Programme to the Public

Realising the significant impact of communicating sewerage activities and to create public awareness on requirement of sewage treatment, Indah Water has dedicated a department specific for these purposes. The department's goal is to educate and create public awareness of the company's role and services to maximise bill collection.

Indah Water goal is to continuously educate the public on the importance of understanding requirement of sewage treatment and how public may participate in conserving the water and environment as a whole. It is important to promote public awareness on environmental protection and sense of belonging so that public continue to take responsibility seriously since we value the environment in which we live and the communities we serve.

As part of public understanding and their commitment in protecting the environment, which we all live in, we hope and target that they show their concern by willingly pay the bill for service rendered. Our job will not stop until 100% of our customers understand our services and pay the sewerage bills.

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7

Benchmarking the Sewerage Industry

Benchmarking the Sewerage Industry

" We benchmark our services internally and globally as stimulant towards strategic management for development of best practices, cost effective and optimal resources utilisation."

~ En. Suhaimi Kamaralzaman - Director/Chairman of Management Committee, Indah Water ~

7.1 The Need to Benchmark

Benchmarking generally encompasses the regular comparison of aspects of performance with best practitioners, the subsequent identification of performance gaps and the seeking of fresh approaches to bring about improvements in performance. Equally important is implementing the improvements, monitoring the progress and reviewing the benefits of the changes.

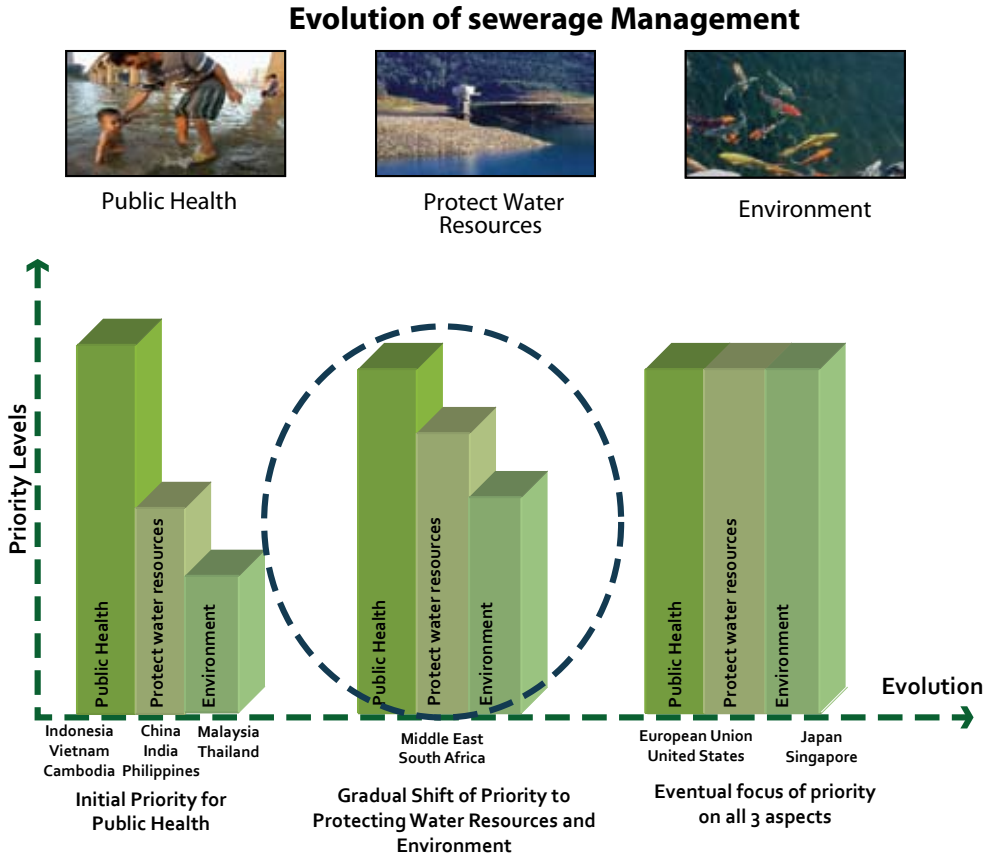
In the early days when Local Authorities managed the sewerage sector, the sector saw little advancement. Since sewerage services were privatised in 1994, the sector has seen spectacular advancement in the last decade, where the administrative set-up has been streamlined, policies formulated, legal frameworks put in place and regulations and guidelines enforced in a uniform manner. Investments in Sewerage Infrastructure have been committed at unprecedented levels and all of these efforts had shown marked departures from the previous situation.

With the privatisation of national sewerage services, Indah Water is required to provide services in a far more comprehensive and transparent manner since the public is now directly paying for the services and there will be continuous demand for satisfactory service to commensurate the charges paid.

Indah Water must ensure that public service obligations are fully taken into account and at the same time, information on the service delivery must be disseminated to various stakeholders. The regulators are interested in protecting the customer by ensuring provision of "value for money" services.

7.2 Benchmarking Environmental Concern

Initially, sewerage services were provided as part of the government's obligation in providing basic sanitation facilities to safeguard public health. Today, sewerage services have evolved and surpassed this objective to focus on protecting water resources and the environment. A substantial amount of financial resources has been invested to improve the sewerage systems in the country. The standard of the sewerage services has been enhanced through systematic operational procedures that support the elevation of overall effectiveness.



Benchmarking is defined as the systematic process of searching for the best practices, innovative ideas and highly effective operating procedures that lead to superior performance, and then applying those practices, ideas, and procedures to enhance the performance of one's own organisation.

Benchmarking the Sewerage Industry

Performance measures are the quantitative measurement of performance in terms of inputs, outputs, outcomes, and the relationships between them and generally addresses issues of cost, reliability and environment/health and community as followings :

- Cost - a goal of any organisation is to perform required tasks more effectively and efficiently and reduce costs;
- Reliability - addresses the issue of level of service where high level of investment in the utility infrastructure should provide a high level of reliability;
- Environment, health and community - recognises that the provision of utility services includes assurance of public heath, environmental compliance and community issues.

To assess performance of this industry, it is necessary to look at services provided locally and compare against service level provided globally, especially in the developed nations. By doing this, the local sewerage services will have an indication of our current standing and an insight of areas for improvement.

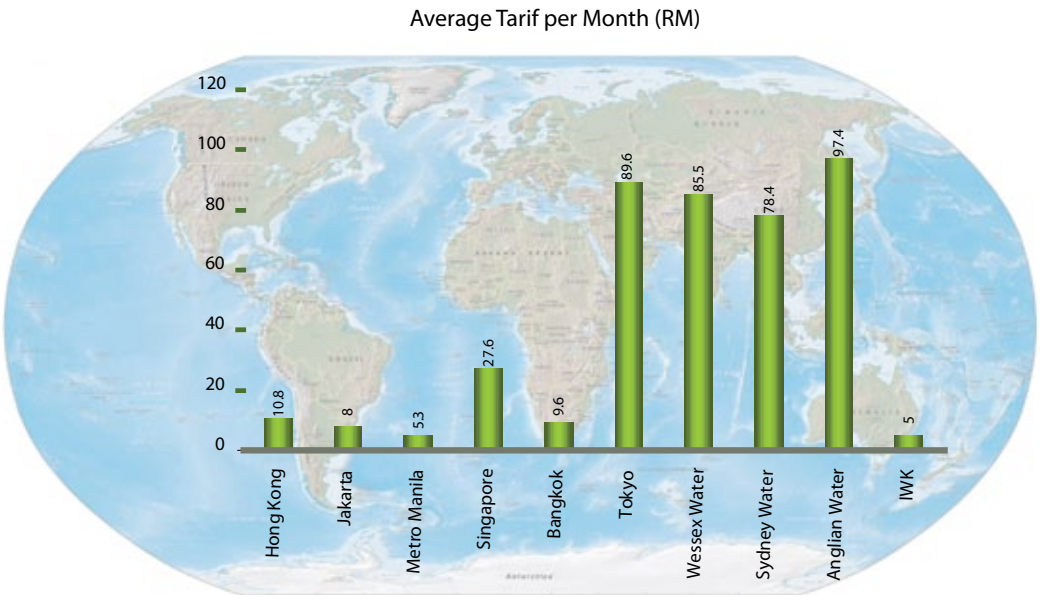
7.3 Comparing Local Sewerage Services with International Practice

Currently, Malaysians are paying one of the lowest domestic sewerage charges in the world ranging from only RM24 to RM96 per year. The sewerage charges collected are still inadequate to cover the escalating operation and maintenance costs of treatment plants. If the financial sustainability cannot be fulfilled, the company may call for cutback on operational resources, which will affect operational targets and legislative compliance level.

Location	Basis	Average Tariff (per Year)	RM Equivalent
Sydney Water	Water Usage	A$384.7	RM 941
Wessex Water	Rateable Value	GBP 151	RM 1026
Anglian Water	Rateable Value	GBP 172	RM 1169
Singapore	Sanitary Appliances fee + Water Borne Fee	SD 144	RM 331
Tokyo	Water Usage	Yen 30,744	RM 1,075
Hong Kong	Water Usage	HK260	RM 130
Bangkok	Water Usage	Bath 1,260	RM 115
Jakarta (2% of city population only)	Area (m^2)	Rp 211,680 (140m^2 type D house)	RM 96
Metro Manila (5% of city population only)	Water Usage	952 pesos	RM 64
IWK	**Flat Rate**	**RM 24 - RM 96**	**RM 24 - RM 96**

Source : Internet Year 2004

Benchmarking the Sewerage Industry



Evaluation of criteria required to set acceptable level of service provision in our sewerage industry is essential. To begin with, the local industry need to look at services provided locally and benchmark against service level provided by other utility companies and wastewater operators in other countries globally.

7.4 Level of Services Used in Indah Water

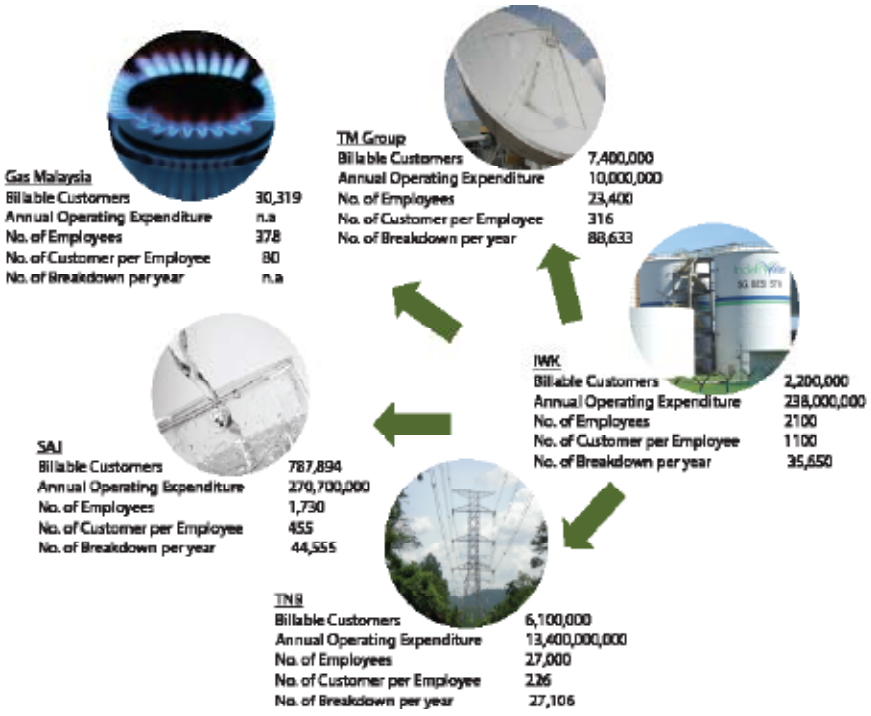
As a mechanism to ensure that any event that impacts onto the environment is attended to immediately, Indah Water has established Level of Service (LOS for all key activities. LOS is a reasonable time- frame to accomplish specific tasks depending on the nature of the problems, types of requests, enquiries or complaints. Events not resolved within the LOS are automatically escalated to senior management within the organisation. The implementation of performance indicators and LOS in Indah Water is aimed at achieving the following objectives:

- Instil accountability amongst staff
- Alert senior management of any inefficiency affecting our services to customers.
- Provides input to implement continuous improvement actions and solutions to prevent recurring problems.

Indah Water has benchmarked its services with local utilities companies, in terms of estimated average annual operating cost, billable customers and available workforce. Indah Water is servicing the customers far beyond the average workforce capability compared to other selected local utilities companies normal rate of customer per employee ranging from 234 to 455. In fact, with the limited workforce, Indah Water has been able to contain within the range of the estimated numbers of annual breakdowns against other utilities companies.

Initially, Indah Water has raised the bar of the national sewerage services as a dark horse and further embarked on raising higher national sewerage service standard to make a mark globally. Even though Indah Water charges are among the lowest against other selected global sewerage charges, we strive to further improve our services and performance to be on par with technology development and beyond. Ultimately, the goal of Indah Water is to be highly effective and successful in both environmental stewardship and business venture.

Benchmarking of Utility Companies in Malaysia



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7.5 Environmental Performance Indicators Used in Indah Water

It is essential to monitor the various activities in order to gauge overall effectiveness. Performance indicators (PIs) are measurement tools in the effort to enhance the environment. Indah Water's PIs were first identified in 1996 as means to gauge performance. Among the PIs set to measure the effectiveness of the set LOS to meet environmental requirements are:

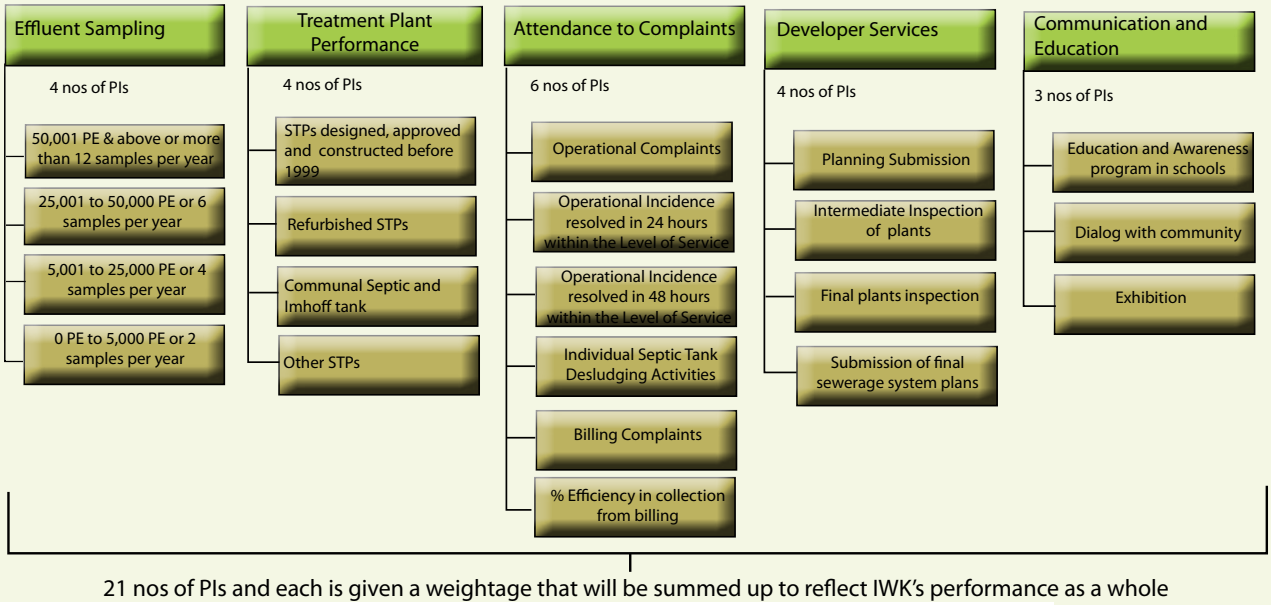
- Percentage of population using connected, on-site IST, and other sanitary facilities;
- Percentage of individual septic tanks regularly/ periodically desludged;
- Percentage of existing STPs refurbished and upgraded to meet the regulated environmental standards;
- Percentage of sludge treated and disposed and environmental monitoring to ensure compliance to standards;
- Percentage of effluent and sludge reused or recycled;

Each department in Indah Water will have its own set of PIs to monitor and evaluate performance. However, a set of 21 selected PIs from various technical and supporting departments are monitored and reported monthly to the regulator. Sewerage Services Department monitors the following five key performance areas:

- Effluent sampling - 4 PIs
- Treatment Plant Performance - 4 PIs
- Attendance to Complaints - 6 PIs
- Developer Services - 4 PIs
- Communication and Education - 3 PIs

From the 5 key performance areas and 21 performance indicators, performance or confidence grading system is developed by assigning weightage that will be summed up to reflect the performance of the company as a whole. Indah Water has demonstrated consistent performance since the performance indicators system was introduced in 2003.

Key Performance Indexes (KPIs) Monitored by Regulators



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8

Business Plan Ahead

Bussiness Plan Ahead

"The public has to be made aware of the needs for sewerage treatments and the linkage among these treatments and effective sewerage management to the environmental quality."

~Amin Lin Abdullah - Head of Communication Department ~

8.1 Sewerage Services Plan Ahead

Initially, the sewerage services in the country were intended to fulfil the obligation of providing basic sanitation and protection of public health. Rapid development took place in the country and provision for sewerage services has expanded beyond its original intention, which was to focus on protecting and preserving the water resources and environment. Privatisation of sewerage services in the country represents the effort taken by the government to protect environmental deterioration and introduce systematic management of sanitation facilities. With the setting up of Indah Water, the sewerage services nationwide will be driven towards a service level at par with developed countries.

To provide publicly acceptable sewerage services is an expensive effort. To achieve satisfactory results, commensurate tariffs have to be charged to the public. Currently, development of the sewerage services in the country relies heavily on government funding. Most countries in the world manage water supply and sewerage services under a single service provider and charges will be based on volumetric rate of water usage, with a fraction of it allocated for sewerage services expenses.

8.2 New Water Industry Structure

In the year 2004, the Federal Government undertook some major reshuffling of its ministries and departments, which saw the Water Supply Department under the Public Works Ministry and the Sewerage Services Department under the Housing & Local Government Ministry to be merged under one new Ministry called Ministry of Energy, Water & Communications . This move opened a fresh direction for the forward progression of the water and sewerage regimes. Two new laws namely, Water Services Industry Act 2006 (WSIA) and National Water Services Commission Act 2006 (SPAN) were gazetted.

The WSIA which came into force on 1st January 2008 applies only in Peninsular Malaysia and Federal Territory of Labuan. It does neither encroach nor affect the general application of existing laws on environmental quality and land matters and existing state powers over the water source. SPAN, the new integrated regulator for water and wastewater services was officially announced on February 2007. The new WSIA envisages a merger between water and sewerage. The WSIA and SPAN legislations have paved the way for integrated approach. Accordingly, Indah Water has to restructure our technical operation, support and services to suit the new water structure. Our forward business plan and strategies also have to follow through accordingly to suit the national requirements and at the same time up keep the environmental performance, goals and targets.

8.3 National Sewerage Development Plan

Indah Water has drawn up the National Sewerage Development Plan (NSDP) which, includes refurbishment, upgrading, rationalisation and operational efficiencies programs. The plan is to be implemented over a 30-year period with focus on the initial

fifteen years. Among issues that need to be addressed under the NSDP are to enable the sewerage infrastructure to be developed to meet the need of the nation are:

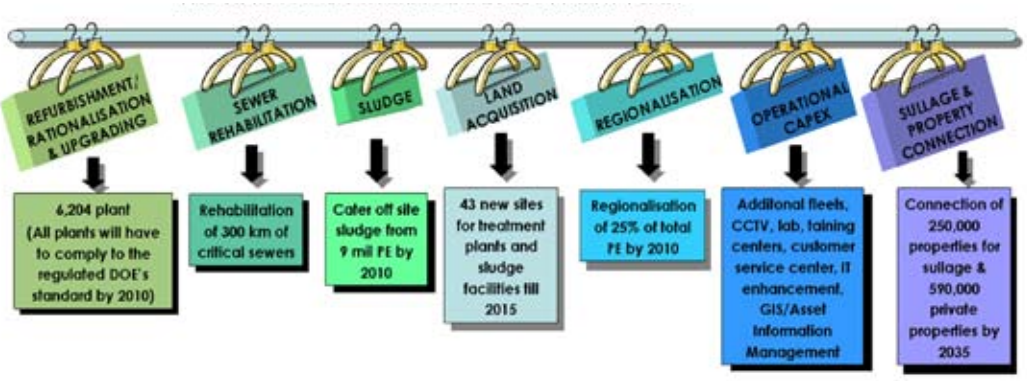
- Refurbishment/upgrading and rationalisation programme to bring non- performing plants to meet the regulated standards and to safeguard public health, protect water resources and prevent environmental degradation;
- Rehabilitation programme of old sewer networks with operational issues;
- Adequate sludge treatment and disposal facilities;
- Historical development of sewerage facilities in the country has resulted in proliferation of STPs causing many operation inefficiencies. Regionalisation projects are critical to rationalise these plants to reduce its number and improve operational efficiencies;
- Existence of large numbers of septic tanks and pour flush systems to be gradually eradicated, replaced or connected to centralised facilities;
- Sullage or grey water contribution to water pollution is comparable to untreated sewage. To connect sullage to the existing sewerage system replumbing needs to be carried out.

To meet all the objectives for the sewerage industry, under the long-term capital expenditure plan to meet the NSDP target, huge financial investments are required. It is estimated that more than RM9.9 billion is needed to meet the priority needs and a further RM23.9 billion is needed to build the necessary sewerage infrastructure that will enhance efficiencies to fulfil environmental requirements by the end of the concession period in 2035 at a national level.

Project Description	Quantity	Target Completion Date	Cost (RM Million)
Refurbish/Upgrade of Sewage Treatment Plants (STP) and Sewers to meet Proposed Effluent Standards a. Standard A (in water catchment areas)	884 STPs	2015	789
b. Standard B (non-water catchment areas	3,748 STPs	2020	3,849
c. Sewer Rehabilitation	1300 km	2010	748
Sludge Treatment Facility Development	22.5 Mil PE	2015	3,105
Regional Sewerage System Development	17.4 Mil PE	2035	18,708
Financing Property Connection up to Private Property Boundary	550,000 Properties	2035	1,265
Pour Flush System Conversion	850,000 Properties	2035	1,475
Re-Plumbing for Sullage Collection	250,000 Properties	2035	287
Grand Total			33,072

**.* Peninsular only*

The National Sewerage Development Plan



8.4 National Operational Improvement Plan

Operational efficiency is one of the key factors that determine satisfactory services are delivered to the customers and sewerage management is efficiently carried out. Optimum operational efficiencies are required to ensure maximum benefits are gained from investment made under the SDP. The main components of operation and maintenance that will be the focus under National Operational Improvement Plan (NOIP) are:

- Operation and maintenance of all treatment plants to meet the required regulated standards;
- All assets including STPs, sludge treatment facilities, sewer pipelines and network pump stations to perform at the optimum levels, and useful life of the facilities are maximised;
- To carry out scheduled desludging for individual septic tanks and managing safe disposal of sludge;
- Response time to address complaints or contingency events within the level of service specified

Indah Water noted its limitations on resources to fulfil the operational requirements. Among the strategies carried out to meet operational requirements are:

- Outsourcing of manpower to increase rate of plant visitation,
- Repair equipments to improve turnaround time,
- Installation of early warning system at pump stations,
- Interwork desludging, increase rate of scheduled desludging,
- Resolving blockages within stipulated level of service
- Intensively carrying out scheduled cleaning and maintenance of sewers.

To implement the above, the estimated operational capital expenditure or CAPEX required is RM350 million which include outsourcing contract and investment to purchase operational equipment and vehicles. However, the revenue from collection of sewerage charges is still not able to fully sustain the company's operational and capital needs and continued government assistance for funding is crucial to keep the service sustainable.

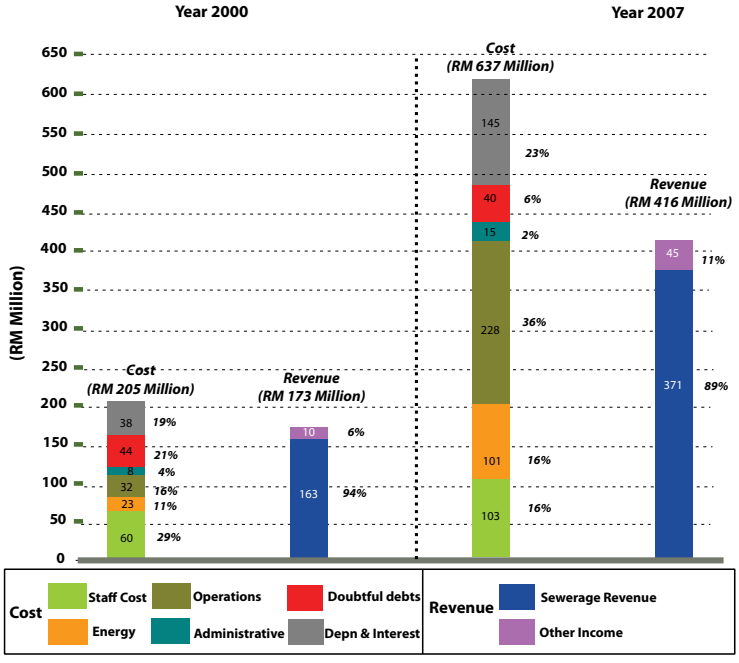
Implementation of Operation CAPEX

Total Operational CAPEX required : RM 350 Million

8.5 Uneconomic Sewerage Tariff Rate

In 2007, sewerage charges billed for Indah Water's services amounted to RM371 million which was an increase from RM163 million billed in year 2000. Each year, Indah Water recorded higher operating cost compared to the revenue billed indicating sewerage tariff charged to customers was unable to sustain the company's operating cost. In year 2000, the operating cost was recorded at RM205 million and this cost escalated each year where in year 2007, the operating cost had increased to RM632 million. Allocation of the operating cost also varied where in 2007, a big percentage of the budget was spent on operations, staffing and energy.

Revenue and Cost Structure



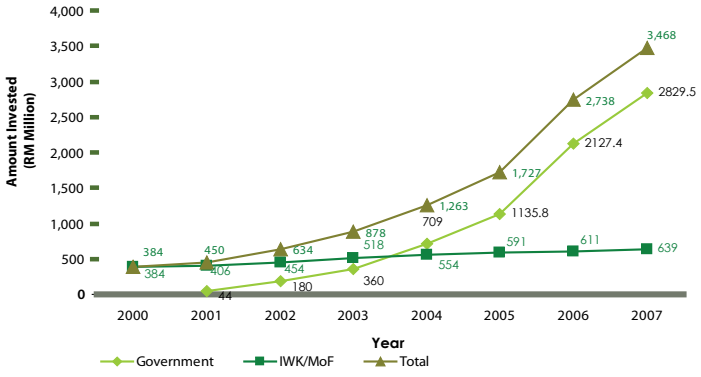
- *Increasing cost attributes to higher operational cost for plant repair & maintenance and sewer repairs*
- *Energy costs has also increased due to increase in number of plants*

8.6 Budget Spent to Date

Before the government took over the national sewerage CAPEX in 2001, the amount of money spent for capital investment and sewerage development was limited due to financial constraints. Indah Water is dependent on the drawdown of government soft loan and collection from revenue to carry on with critical sewerage projects. However, the government injected capital investment in Indah Water when the management was taken over by the government in 2001. To date, a total sum of RM3.47 billion has been spent on investment for sewerage development. Of the RM3.47 billion required, RM2.83 billion came from Government funding while the remaining RM 639 million was from Indah Water's financial resources.

A substantial percentage of the capital investment was allocated for refurbishment/ upgrading programs in priority areas for critically non-performing sewage treatment plants. Various categories of refurbishment works have been carried out with the main objective of bringing these plants to acceptable operating condition and enable them to perform to the required environmental standards. A total of 6,945 plants have been identified under the refurbishment program and to date, a total of 4,086 plants (59%) have been refurbished, where RM352.4 million has been on committed refurbishment projects.

CAPEX Investment on Sewerage Development to Date



Other investment includes the on going JBIC funded projects which cost RM 1. 98 billion, where Phase 1 is RM1.09 billion and Phase 2 & 3 is RM898 mil

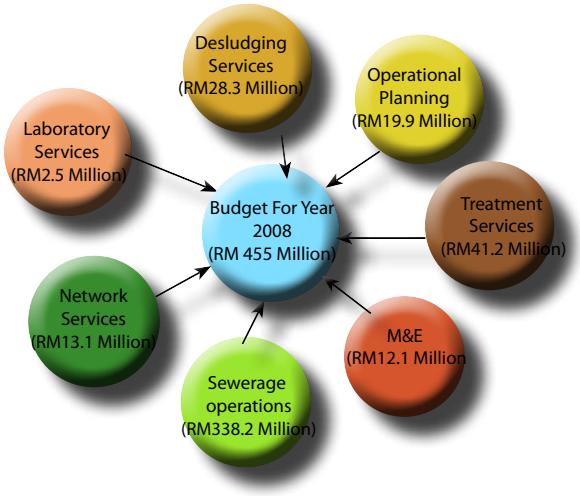
8.7 Major Allocations in Budget 2008

Over the years, sewerage tariff has been reduced four times; hence, Indah Water will not be able to operate under users' fees alone. Sewerage fund based on full cost recovery concept where the tariff fully burdens the customer would possibly cause public outcry. Benchmarking to other countries, reasonable tariff increase (beneficiary principle) combined with polluter pay principle is widely practised and accepted. Treating raw water to drinking water is a lot cheaper than treating wastewater to meeting environmental protection standard due to high costs of sewerage conveyance facilities, wastewater pollutant removal/ treatment facilities and biosolids disposal. However, the basic principle of budgeting for sewerage remains that it should not be compromised with the nation's ability to operate the sewerage system for public health and environmental protection.

As a fully government- owned company under the Ministry of Finance (MOF), Indah Water's budget is an enterprise fund through which we operate and pay for the collection and treatment of wastewater. The fund generally supported by the users' fees, subsidy from the MOF and MEWC for CAPEX sewerage projects. For

2008, the government has allocated RM455 million for overall sewerage management which includes sewerage planning, engineering, sewerage project implementation, M&E services, operation and maintenance services, sewerage pipe services, laboratory services, etc. Long- term budget plan would involves higher capital and operating cost due to higher population growth, which means more sewerage facilities and higher commitment to working with the provinces on tougher, more stringent regulations and controls to address municipal wastewater effluents compliance.

Operational Budget Allocation



Operation and Maintenance

- Expand plant outsourcing from 1,431 to 2,249 .
- Embark on network maintenance outsourcing for highly critical areas.
- Increase in Contracting of Desludging Services
- Outsourcing additional M & E Contract Maintenance i.e. aerators and blowers
- Completion of Enterprise Asset Management System
- Relocation and Expansion of Laboratory Facilities
- Increased Security for STPs
- Upgrading of STPs to address Safety Issues - (DOSH Programme)
- Development of new Courses for Operators' Training

Communications and Customer Services

- Increased Advertising Budget for advertorials and educational campaigns
- Pursue Collection of Long- term outstanding debts:
  - Legal Actions taken on 13,644 Commercial Customers (4,000 Customers Paid)
  - 61,278 Additional Commercial Customers with outstanding amount valued at RM 38.7 million (Ground Visitation in Progress and Instalment Plan Offered)
  - Ground Visitation/Education Program for Domestic Connected Customers
- Upgrading of Customer Service Lines and 3 Customer Care Units
- Additional School Campaigns, educational programs together with Department of Health.

Planning, Certification and Advisory

- Greater integration of Planning and Certification Services at the Regional and State Levels
- Develop more technical training courses and move towards establishing an industrial accreditation standard.
- To review and recommend additional standards and guidelines to further improve the quality of sewerage industry
- Diversification of revenue sources -advisory, outside concession, regional.

GRI Index

GRI #	Index Listing	Page (s)
STRATEGY AND ANALYSES		
1.1	Statement by the Managing Director	2-3
1.2	Key impacts, risks, and opportunities	11-12, 34-75
ORGANISATIONAL PROFILE		
2.1	Name of organisation	14-15
2.2	Primary brands, products and/or services	14-15, 21-27
2.3	Operational structure of organisation	15-16
2.4	Location of headquarters	8
2.5	Countries in which organisation is located	7
2.6	Nature of ownership and legal form	15-16
2.7	Markets served	15, 21-27
2.8	Size of operations	18-21, 57, 89
2.9	Organisational changes in reporting period	86
2.10	Awards received in reporting period	47
REPORTING PARAMETERS		
3.1	Reporting period	Front cover
3.2	Date of most recent previous report	**NA**
3.3	Reporting cycle	**NI**
3.4	Contact point for questions regarding report	Front of back cover
3.5	Process for defining report content	Back of front cover
3.6	Boundary of report	2,3,11-12, 34-75
3.7	Limitations on scope or boundary of report	Back of front cover, 4
3.8	Basis for reporting on joint ventures	**NI**
3.9	Data measurement techniques and the bases of the calculations	**NI**
3.10	Effect of any re-statements of information provided in earlier reports and reasons for such restatements	**NI**
3.11	Significant changes from previous reporting periods in the scope, boundary, or measurement methods	**NA**
3.12	Standard disclosures	92-94
3.13	Policy and current practice with regard to seeking external assurance	**NI**
GOVERNANCE, COMMITMENTS AND ENGAGEMENT		
4.1	Governance structure of the organisation	15-16
4.2	Chair of the highest governance body	15-16
4.3	Members of highest governance body that are independent and/or non-executive	16
4.4	Mechanisms for shareholders and employees to provide recommendations or direction to highest governance body	**NI**
4.5	Compensation for highest governance body	**NI**
4.6	Processes to ensure conflicts of interest are avoided	**NI**
4.7	Expertise of highest governance body	**NI**
4.8	Internally developed statements of mission or values, codes of conduct and principles	5-10
4.9	Procedures of highest governance body for the organisation's identification and management	**NI**
4.10	Performance of highest governance body	**NI**
4.11	Precautionary approach	**NI**
4.12	Externally developed principles which the organisation's endorses	**NI**
4.13	Memberships in associations	**NI**
4.14	List of stakeholder groups engaged by organisation	Back of front cover, 46-47
4.15	Identification and selection of stakeholders	46-47
4.16	Approaches to stakeholder engagement	18-27
4.17	Key topics through stakeholder engagement	45-47
ECONOMIC INDICATORS		
Economic Performance		
EC1	Direct Economic Value	45, 89
EC 4	Financial assistance received from government	90
ENVIRONMENTAL INDICATORS		
Material		
EN1	Weight of materials used	43
EN2	Recycled input materials	42, 74-75
Energy		
EN6	(Add.) Initiatives on energy efficiency or renewable energy	42
EN7	(Add.) Initiatives to reduce indirect energy Consumption	41

GRI Index

GRI #	Index Listing	Page (s)
Water		**42**
EN8-10	Name of organisation	**NI**
Biodiversity		
EN13	(Add.) Habitats protected or restored	42-43
EN14	(Add.) Strategies for managing impacts on biodiversity	42-43
Emissions, Effluent and Waste		
EN18	(Add.) Initiatives to reduce greenhouse gas emissions	41-42
EN21	Total Water discharge by quality and destination	36-37, 50-53
ENN22	Total weight of waste by type and disposal method	61-63
Products and Services		
EN18	Initiatives to reduce greenhouse gas emissions	41-42
EN21	Total water discharge by quality and destination	36-37, 50-53
EN22	Total weight of waste by type and disposal method	61-63
Products and Services		
EN26	Initiatives to mitigate environmental impacts of products and services	35-45
Compliance		
Transport		
EN29	(Add.) Significant environmental impacts of products and services	35-45
Overall		
EN30	(Add.) Total environmental protection expenditures and investments by type	45
SOCIAL INDICATORS: LABOUR PRACTICES AND DECENT WORK		
Employment		**NI**
Occupational Health and Safety		**NI**
Training and Education		
LA11	(Add.) Programmes for skills management and lifelong learning	25-26, 67-68
Diversity and Equal Opportunity		**NI**
SOCIAL INDICATORS : HUMAN RIGHTS		**NI**
SOCIAL INDICATORS : Society Community		
SO1	Programmes that manage the impacts of operations on communities	67- 69

GRI #	Index Listing	Page (s)
Corruption		**NI**
PUBLIC POLICY		
SO5	Public policy positions and participation in public policy development and lobbying	25, 60
Anti-Competitive Behaviour		**NI**
Compliance		**NI**
SOCIAL INDICATORS : PRODUCT RESPONSIBILITY		
Customer Health and Safety		**NI**
Product and service Labelling		
PR3	Type of product and service information required by procedures	21-27
PR4	(Add.) Total number of incidents of non-compliance with regulations concerning product and service information and labelling	**NI**
PR5	(Add.) Practices related to customer satisfaction	46-47
Marketing Communications		**NI**
Customer Privacy		**NI**
Compliance		**NI**

Note : ***NI (Not Included)***
NA (Not Applicable)

List of Abbreviations

BOD	Biochemical Oxygen Demand; (is a chemical procedure for determining how fast biological organism use up oxygen in a body of water)
CAPEX	Capital expenditure
COD	Chemical Oxygen Demand; (is standard method of indirect measurement of amount of organic pollutants in water)
CO_2	Carbon dioxide
DOE	Department of Environment
DOSH	Department of Occupational Safety and Health
EWS	Early Warning System
GHG	Green house gasses
GIS	Geographic Information Systems
GPA	Global Programme of Action
KPI	Key Performance Indicator
IT	Imhoff Tank
ISO	International Organisation of Standards
IST	Individual Septic Tank
LOS	Level of Services
MS	Malaysia Standard
MDU	Mobile Dewatering Unit
MOU	Memorandum of Understanding
NAHRIM	National Hydraulic Research Institute of Malaysia
NC_2	Second National Communication
NSDP	National Sewerage Development Plan
NOIP	National Operational Improvement Plan
NPS	Network Pumping Stations
NST	New Straits Times
OP	Oxidation Pond
O&G	Oil and Grease
PE	Population Equivalent; (is estimate of total number of people on average at one time)
P	Phosphorous
SS	Suspended Solid
STP	Sewage Treatment Plant
TKN	Total Kjeldahl Nitrogen
TV	Television
UNFCCC	United Nation Framework Convention on Climate Change
UPM	University of Putra Malaysia
UTM	Universiti Teknologi Malaysia
SPAN	Suruhanjaya Perkhidmatan Air Negara

2007 Sustainability Report

We would like to extend our appreciation to our article contributors that have been helpful in contributing towards the successful publication of this inaugural report. Special gratitude is also given to all our readers for their encouragement. We look forward to a promising 2008.

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