Nominate a candidate

To nominate an organization, individual or project for this year's award you can do one of the following:

- Fill in the online nomination form on the website at http://www.unhabitat.org/whd
- Download the form on the website at www.unhabitat.org/whd and email it to whd@unhabitat.org, or
- Complete the nomination form on below, and send it to: World Habitat Day Coordinator, Information Services
  Section, P O Box 30030, Nairobi 00100, Kenya; Fax: +254 20 762 3477

NOMINATION FORM

Details of individual/project, organizations being nominated:

Indicate if nomination is for: ☐ Project ☐ Individual ☐ Organization

Name of individual/project/organization: Stormwater Management And Road Tunnel (SMART)

Address: 41 (ground floor), Jalan SS 23/15, Taman Sea, Petaling Jaya

Zip code: 47400 City: Selangor Country: Malaysia

Daytime telephone: +603-7880 7802 / +6012 815 9550

Mobile telephone number: +6012 615 9550

Fax: +603-7880 7870

Email: jieelian024.com.my / jieelian02@gmail.com (pls email to both emails)

Short description of main achievements:

1) Saved Kuala Lumpur city of flood
2) Prevent and serve as a highway alternative to the city centre.
3) Saved city municipal social cost savings estimate USD 13 - 151 million from flood damages

Nominee details:

Name: Ms. ONG JEE LIAN (MMC - GAMUDA BERHAD)

Address: (same address as above)

Zip code: City: Country:

Daytime telephone:

Mobile telephone number:

Fax:

Email:

What is your connection with the individual/project/organization that you are nominating? Assistant Corporate Communications Manager for SMART

Please note that nominees will have to provide more details about their achievements in line with the submission format outlined in this guide.
SMART

Stormwater Management and Road Tunnel (SMART)

The World’s First And Malaysia’s Pride

A highly innovative solution to mitigate flood and traffic congestion in Malaysia capital
1. BACKGROUND
Substantive information about the organization / individual being nominated including their mission, goals, history, size, length of experience in human settlements field.

Stormwater Management And Road Tunnel (SMART) is an extraordinary and genuinely unique project that is specific to the urban community of Malaysia’s capital – Kuala Lumpur. SMART is a high performance and iconic infrastructure solution to Kuala Lumpur’s two major problems – mitigating flood and alleviating traffic congestion.

The company that developed SMART is MMC-Gamuda, a joint-venture between Malaysia’s largest engineering companies – Gamuda Berhad and MMC Corporation Berhad. As an industry pioneer, MMC-Gamuda is one of Asia’s foremost infrastructure developer having delivered innovative solutions towards meeting communities’ needs which help improve the standard of living and quality of life.

It has always been MMC-Gamuda’s goal to be a part in Malaysia’s socio-economic progress. Its projects have impacted the lives of many and in the advancement of the country for over 30 years through large-scale engineering projects such as urban highways, dams, water supply and treatment plants, hydropower, ports, airport and property development.
2. DESCRIPTION OF THE INITIATIVE OR PROJECT

Situation or problem addressed, objectives, target beneficiaries, investment in the project in terms of human, material and financial resources, activities undertaken, duration project, achievement and outputs (provide photographs/evidence of outputs) lessons learnt, best practices from the project.

Objective of SMART

SMART is a 9.7km dual-purpose tunnel that mitigates seasonal monsoon flood and alleviates traffic congestion. SMART was the Government of Malaysia’s ambitious engineering answer that would attempt to solve both these problems. To optimize SMART’s function to serve more than just a flood mitigation facility during the rainy season, a double-deck motorway was integrated with the stormwater tunnel. During the dry period when SMART is not used as a stormwater tunnel, SMART serves as an alternative route for motorists entering and exiting the main southern gateway of Kuala Lumpur (from KL-Seremban Highway, Federal Highway, Besraya East-West Link) – among the most heavily used roads in Malaysia.

Development period of SMART

| Development (planning & construction) period | 4.5 years |
| Construction completion                    | March 2007 |
| Public opening of SMART motorway           | May 2007  |
Human capital investment
In total during construction period, SMART employed about 1,800 workers with another 200 management staff. 600 - 700 of workers were from Philippines, India, Vietnam, Thailand and Indonesia. In addition, SMART also had a specialized team of 72 staff for it tunnel boring machines comprising expatriates and Malaysians.

SMART was built by local contractors and a local workforce who benefitted from knowledge pass on by experienced European firms. The project team was faced with issues and problems of various kinds and in solving every one of them, our team of engineers became experts in their own fields. This project created a team of tunneling engineers and provided employment opportunities for both the highway and stormwater operations.

Financial investment
The total investment for SMART was RM1.8 billion. 2/3 of the project construction cost (RM1.2 billion) was borne by the Government of Malaysia under the flood mitigation project undertaken by the Department of Irrigation and Drainage. 1/3 of the project construction cost (RM600 million) was borne by MMC-Gamuda as part of the construction for the motorway within the stormwater tunnel. The internal cost of funding for this project is 6.0% per annum.

Achievement – social impact
Turning vision into reality was the real achievement for SMART. Since its opening in 2007, southern Kuala Lumpur has been flood free. To put this
into perspective, rehabilitation cost by the town council for flooding in 1971 amounted to RM36 million, while in 2003 was RM100 million.

SMART has significantly improved the quality of life for the local community, residences, businesses, and commuters around these areas.

SMART is also an alternative route in and out of the city centre and has helped reduce travel time from 60 minutes to 15 minutes during peak hour traffic. On normal period, traffic flow has been smoother as motorists have a viable alternative.

Achievement - country image
SMART has also attracted worldwide attention for its innovative design which has put Malaysia on the map of international engineering. SMART's successful completion has won MMC-Gamuda international accolades from the most recognized builder's awards. Considered the 'Oscars' of the construction industry – British Construction Industry Award lauded SMART with the best international project award for excellence in innovation and engineering. SMART has beaten the likes of Shin-Marunouchi Towers (Japan), Beijing International Airport (China), Bijilmer Arean Station (Netherlands) and Kensington Oval Cricket Ground (Barbados).

SMART is a national icon that demonstrates the degree of urban development Malaysia has achieved and has become an example for other developing countries to emulate.

3. MAIN PARTNERS
List partners and their roles and levels of participation in the planning, design, implementation and funding of the project.

SMART was given national importance by the then Prime Minister of Malaysia, Tun Dr Mahathir Mohamad. The Department of Irrigation and Drainage Malaysia (DID) and the Malaysian
Highway Authority (MHA) were jointly appointed to implement this project on behalf of the government. Both DID and MHA jointly supervised the works due to SMART’s dual intent, which incorporates a stormwater channel and a motorway passage in a single large diameter tunnel.

The stormwater management component of SMART was undertaken as a ‘design and build’ contract by MMC-Gamuda, while the road tunnel component of SMART was also undertaken by MMC-Gamuda under a ‘build, operate, and transfer’ agreement with the government.

4. IMPACT

Estimated number of beneficiaries, types of beneficiaries (women, children, poor, war victims), impact on beneficiaries’ living conditions, eg – social, economic, health, education, employment, security of tenure, crime reduction, community involvement in decisions / governance. Provide qualitative and quantitative values.

Since SMART’s opening in 2007, SMART has been used 86 times (about 28 times a year / twice a month). SMART has diverted up to 1.2 million cubic metres of stormwater from Klang River to Kampung Berembang’s retention pond to prevent the occurrence of a flood at the confluence of Klang River/Ampang River and Klang River/Gombak River. Such has saved Kuala Lumpur city from flood that sums a social cost savings of RM45 - RM500 million per year.

As of 2010, an average of 36,000 commuters uses the SMART motorway daily. The number of cars using the motorway has doubled from 5 million in 2007 to 10 million cars in 2009. This illustrates that SMART is serving as an effective and efficient highway alternative for intra-urban
travelling at the south of Kuala Lumpur. Travelling time between Sungai Besi and the city centre has been cut down from 30 minutes to an approximated travel time of 5 minutes.

Smart tunnel can withstand quakes

Circular shape gives it added strength

5. SUSTAINABILITY

Describe how the initiative has created lasting change (by enacting new legislation/policy by promoting capacity building and community empowerment, by strengthening the institutional framework, by enforcing efficiency, accountability and transparency). Indicate how long the positive impact has been sustained so far.

In terms of project management of SMART, it was a very tight programme. The scope and complexity of this job is very much different from other infrastructure projects as SMART is one of the largest civil construction project undertaken in Malaysia.

What were the key reasons for the success of development?

Smart tunnel effective in preventing floods

The development of SMART involved a vast number of activities across a wide field of engineering from tunneling and deep cut excavations to procurement of hydro mechanical equipment, flood forecasting systems, hydraulic systems, mechanical and electrical works. There
was also the responsibility of reporting to the Board of Project and Concession, and government authorities, to working with design and construction teams and managing supply chains.

6. TRANSFERABILITY AND UPSCALING

Indicate whether this is a replicable best practice and show where it has been replicated and how this was done.

The construction of SMART as well as the maintenance of the project over its life cycle required huge consumption of energy. In effort to reduce the consumption of energy during construction and maintenance of the project, excavated materials from SMART’s tunnel boring machine such as rocks, sand and slurry were reused. By doing this, less purchase of materials were required for the project.

Given SMART is a dual-purpose tunnel – a stormwater way and a highway, maintenance for both ways differ.

Maintenance of the stormwater tunnel:
The design of the project was to have a system in place to filter waste and large particles from entering the tunnel:

- River booms (or floats) were installed at the rivers that would divert water into the holding basin. Water barriers were put in place at the inflow (water intake from river) to prevent any chunks of mud or rocks from entering the pond.
- Filters and traps were installed at the mouth of the tunnel to prevent particles from entering the tunnel.
- Inside the tunnel, a special paint coating and submersible equipment were used to minimize damage.

Maintenance of highway tunnel:

- High powered ventilation fans for renewal of air quality.
- Ventilation shafts at strategic locations to renew air quality (Saccardo ventilation system)
- Special tarmax for minimal damage to road.
- Special coated paint for prevention of fire inside the tunnel.
7. INNOVATION

Describe the main innovations aspects of the initiative

SMART is the world’s first and Malaysia pride. A highly innovative solution to mitigate flood and traffic congestion in Kuala Lumpur. The key success of this dual-purpose SMART infrastructure is the simplicity and uniqueness of the project. In a single engineering solution, SMART has solved two of Kuala Lumpur’s major problems – mitigating floods, and alleviating traffic congestion at the south of Kuala Lumpur city.

The innovation of SMART is the ability of the multi-purpose tunnel. Driven by the urgent need to solve Malaysia’s capital devastating flood problems, SMART was the answer. The solution of building a 9.7km tunnel under the city was made economically viable when 3km was designed also to be shared with motorway traffic which serves as an alternative route at the city’s southern gateway.

The realization of SMART marks a milestone in engineering and technological innovation. Building a good and road tunnel facility in a single structure is a world’s first. It demands extraordinary construction and operational design. The challenge was to design a watertight road structure within a flood relief facility.

SMART’s dual purpose concept pioneers a new level of maximizing capacity and functionality of future tunnels. The SMART system was designed to work on a three-mode operation based on the flood levels of the Klang River / Ampang River confluence and the operation status of the motorway. SMART has 3 modes of operation:
Mode 1:
Under normal condition where there is no storm or low rainfall, no flood water will be diverted into the system. The double-deck motorway is open to traffic.

Mode 2:
The second mode is activated when there is a moderate storm. The flood water is diverted into the bypass tunnel in the lower channel of the motorway tunnel. Up to this stage, the double-deck motorway section is still open to traffic.

Mode 3:
At this third mode of operation, the motorway will be closed to traffic in major storms. Sufficient time will be given to allow vehicles to enter the motorway before the automated water-tight gates are opened to allow flood water through. The motorway will be reopened to traffic within 48 hours.
8. RECOGNITION OF THE INITIATIVE

Provide a list of references, articles, publications, media reports about the initiative starting with the most recent ones and where possible, send copies of the actual articles as an annex.

- FIABCI-Malaysia Property Special Award 2010 (National Contribution)
- FIABCI Prix d’Excellence Special Award 2011 (Specialised Project Purpose Built)
- Institute of Engineers Malaysia Outstanding Engineering Achievement Award 2010 (Construction and Design)
- Malaysian Road Engineering Excellence Award 2010 by Road Engineering Association of Malaysia (Excellence in Road Engineering)
- British Construction Industry Award 2008 (Excellence in innovation and engineering – International category)
- Association for Consultancy and Engineering Excellence Award 2008 (Large project and water)
- CIDB Malaysian Construction Industry Excellence Award 2008 (Best contractor)
- Association of Consulting Engineers Malaysia 2008 (Engineering)
- CIDB Malaysian Construction Industry Excellence Award 2007 (Innovation and excellence)
- CIDB Malaysian Construction Industry Excellence Award 2007 (Best Practices in environmental excellence)