The Green and Gracious

Builder Guide v2

Building and Construction Authority

We shape a safe, high quality, sustainable and friendly built environment.

Version 1.0 2009

Version 2.0 2014

Version 2.1 2015

Foreword

BCA launched the Green and Gracious Builder Scheme in February 2009. The scheme was introduced to raise the environmental consciousness and professionalism of builders. It is also a benchmark of a builder's corporate social responsibility to the environment and the general public. Apart from setting standards for green practices, it also sets standards for gracious practices. These gracious practices will improve the image of our builders and the construction industry particularly among neighbours and residents, some of whom may have been affected by construction activities near them.

To complement the scheme, BCA has produced this 2nd version of Green and Gracious Builder Guide to share with the industry, best practices of builders in addressing environmental concerns and mitigating possible inconveniences to the public caused by construction work. These best practices were compiled from on-site observations of various builders certified under the Green and Gracious Builder Scheme.

In order to stay abreast with the latest development in construction technology and methodology, this guidebook highlights the green technologies and methods that builders used to reduce/ reuse/ recycle, save energy and reduce water consumption on construction sites. It also illustrates some of the gracious best practices that builders have adopted to enhance accessibility, public safety, reduce noise and vibration, and improve communication and manpower management on site. In addition, manpower management practices have been revised to focus on practices that would minimise impact on site and surroundings, as well as development and retention of better staff that could contribute to good site management.

Green and gracious construction practices are vital in our objective to achieve in a gracious manner, a truly sustainable built environment in Singapore. This guide should come in handy to those who are unsure how to do it but want to make a start. There is nothing better than learning from those that have embarked on and excelled in the same journey.

Tan Tian Chong
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Technology Development Group
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Acknowledgement

"Green and Gracious Builder Guide" was developed with inputs from main contractors, public agencies and industry associations.

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Gammon Pte Ltd
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Kay Lim Construction & Trading Pte Ltd
Koon Construction and Transport Co. Pte Ltd
Lian Beng Construction (1988) Pte Ltd
Lum Chang Building Contractors Pte Ltd
Shimizu Corporation (Singapore Office)
Straits Construction Singapore Pte Ltd
Tiong Aik Construction Pte Ltd
Tiong Seng Contractors (Pte) Ltd
Unison Construction Pte Ltd
Woh Hup (Pte) Ltd
Yau Lee Construction (Singapore) Pte Ltd

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1 INTRODUCTION

BCA's efforts at developing a sustainable built environment have gained sufficient momentum and been well accepted by the industry. Many have responded enthusiastically to the BCA Green Mark Scheme – a scheme that recognizes the efforts of developers, architects and engineers in contributing to environmental sustainability in their development projects. However, one of the key players in the construction value chain, the builders, has not been well recognized. They also do contribute to environmental sustainability and environmental protection when they go green and adopt 'friendlier' construction site management and practices. Given the high visibility and impact of construction works, it is also important for builders to be socially responsible to the environment, the neighbours and general public by gracious practices during construction. Hence the Green and Gracious Builder Scheme was introduced to raise the environmental consciousness and professionalism of builders. Together with the BCA Green Mark Scheme, this scheme will form part of the holistic framework to shape a sustainable built environment for Singapore.

This guidebook sets out the best green and gracious practices to assist builders in addressing environmental concerns and mitigating possible inconveniences to the public caused by construction works. The green and environmentally friendly best practices encourage the use of recycled materials and reduction in energy and water consumption on site. The gracious best practices encourage builders to address the public needs and concerns, such as enhanced communications, consideration for public accessibility, mitigating noise and vibrations, minimizing, if not eradicating disturbance in the vicinity and neighbourhood. Several innovative green solutions or technologies that address energy efficiency in the site office, green and conducive site environment and innovative gracious practices are also highlighted.

All the practical examples in this Guidebook have been gathered from the builders which participated in the Green and Gracious Builder Scheme. It is useful guide for builders who wish to benchmark their projects for environmental sustainability and corporate social responsibility to the environment and the general public.

Details of the Green & Gracious Builder Criteria are shown in the Appendix A.

2 GREEN PRACTICES

2.1 Company Policy

2.1.1 The builder should have a policy and implemented measures to raise awareness, educate and inculcate green best practices across all levels of staff. Some of these practices can include briefing sessions, sharing sessions, in-house quiz and green campaigns.

GREEN & GRACIOUS CODE

Considerate
All works are to be carried out with positive consideration to the needs of traders, vendors, site personnel, visitors and the general public.

Environment
Be aware of the environmental impact of our site and minimise as far as possible the effects of noise, water and air pollution. Efforts should be paid to waste management. Reuse and recycle construction materials, office stationery, and water where possible. Avoid unnecessary fuel and electricity consumption.

Cleanliness
Working site to be kept clean and in good order at all times. Site facilities, hoardings, offices, toilets & canteens should always be maintained to good standards. Surplus material and rubbish should not be allowed to accumulate on site or spill over to surroundings. Dirt and dust from construction operations should be kept to a minimum.

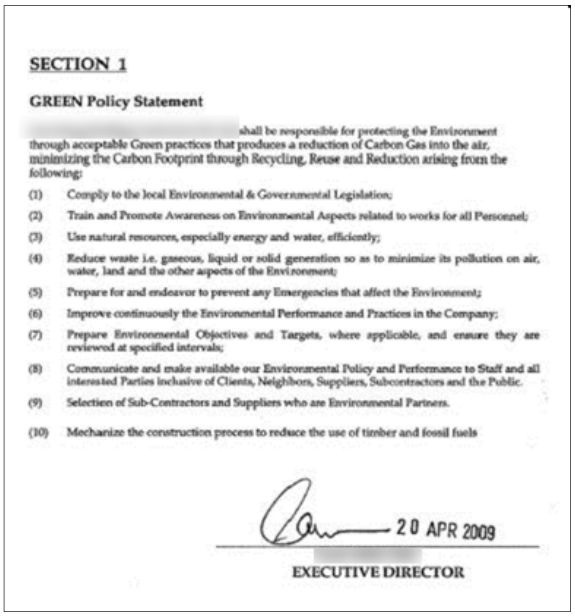
Good Neighbour
General information regarding the progress of works should be made known to neighbours or the general public. Regular communication with adjacent residents should be maintained from start to completion.

Safe
Construction operations and site vehicle movements are to be carried out with care and consideration for the safety of site personnel, visitors and the general public. No building activity should be a danger and security risk to others. Always reflect and innovate on methodologies of construction with a focus on safety, and to reduce wastage and resources.

Respectful
Respectable and safe standards of attire, behaviour and language should be maintained at all times. Pride in the management and appearance of the site and surroundings is to be shown at all times. Relevant site staff should be instructed in dealing with the general public.

Responsible
Ensure that everyone associated with the site understands, implements and complies with this code.

Photo 2.1.1a: A builder sets up a *Green & Gracious Code* to inculcate green best practices across all levels of staff.



SECTION 1

GREEN Policy Statement

[redacted] shall be responsible for protecting the Environment through acceptable Green practices that produces a reduction of Carbon Gas into the air, minimizing the Carbon Footprint through Recycling, Reuse and Reduction arising from the following:

(1) Comply to the local Environmental & Governmental Legislation;
(2) Train and Promote Awareness on Environmental Aspects related to works for all Personnel;
(3) Use natural resources, especially energy and water, efficiently;
(4) Reduce waste i.e. gaseous, liquid or solid generation so as to minimize its pollution on air, water, land and the other aspects of the Environment;
(5) Prepare for and endeavor to prevent any Emergencies that affect the Environment;
(6) Improve continuously the Environmental Performance and Practices in the Company;
(7) Prepare Environmental Objectives and Targets, where applicable, and ensure they are reviewed at specified intervals;
(8) Communicate and make available our Environmental Policy and Performance to Staff and all interested Parties inclusive of Clients, Neighbors, Suppliers, Subcontractors and the Public.
(9) Selection of Sub-Contractors and Suppliers who are Environmental Partners.
(10) Mechanize the construction process to reduce the use of timber and fossil fuels

20 APR 2009

[redacted]
EXECUTIVE DIRECTOR

Photo 2.1.1b: Another builder demonstrates the top management's commitment through a *Green Policy statement*.

Photo 2.1.1c: Briefing session on the company's green policy conducted for the management staff.

Photo 2.1.1d: Workers received recyclable goodie bags and trained on the concept of recycling at the same time.

Photo 2.1.1e: The training for workers tends to be more hands on and visual. This could be done through tools like the recycling bins and posters.

2.1.2 In addition to educating their management staff and workers, the builder is also recognized for their effort in selecting suppliers and subcontractors that are conscious about green issues. This could be achieved through setting specific green criteria during the pre-qualification or evaluation of the suppliers and subcontractors.

2 GREEN PRACTICES

2.2 Reduce/ Reuse/ Recycle

2.2.1 Measures to reduce, reuse and recycle construction and office waste are an integral part of a builder's green practices. The builder should separate, recycle and reduce construction waste such as timber, plastic packaging and other related waste. While the main focus is on construction waste, the builder should also go the extra mile to recycle office waste.

Photo 2.2.1a: The segregation of waste into construction, organic, or timber waste, metal cans, papers or plastic is the first step in Reduce/ Reuse/ Recycle.

Photo 2.2.1b: Regular campaigns and training will help to cultivate recycling mindset in workers.

Photo 2.2.1c: The management and project staff can also play their part by recycling paper in the site office.

Photo 2.2.1d: Milled waste is recycled to cover access road on site. This practice greatly reduces environmental dust pollution generated on site.

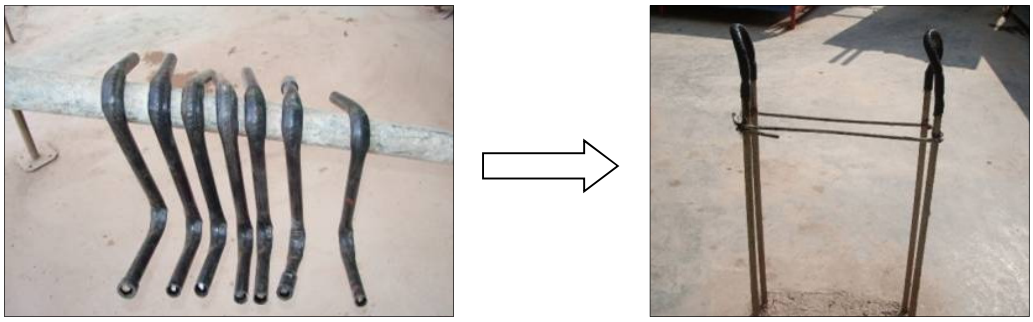


Photo 2.2.1e: Instead of throwing unwanted electrical wire hooks away, a builder can recycle them as rebar protectors on site.

2.2.2 It is important that the builder keeps track of waste management on the site. This can be monitored through key indicators like concrete wastage, rebar wastages and waste disposal cost. Through this monitoring, the project team can initiate measures to tackle and reduce wastage.

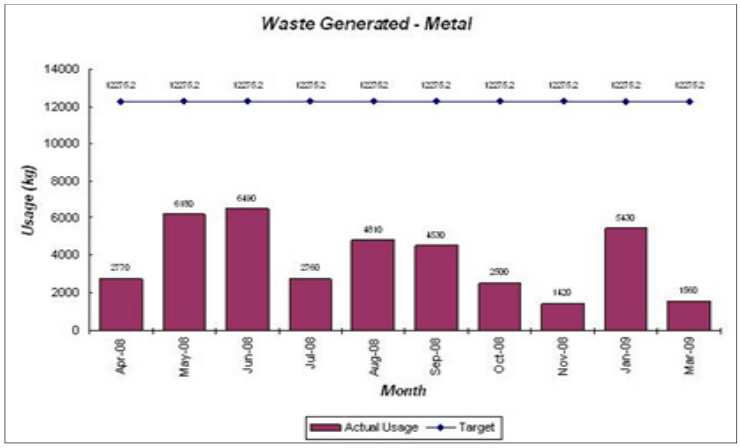


Chart 2.2.2a: Example of using monthly monitoring chart to track metal waste on site.

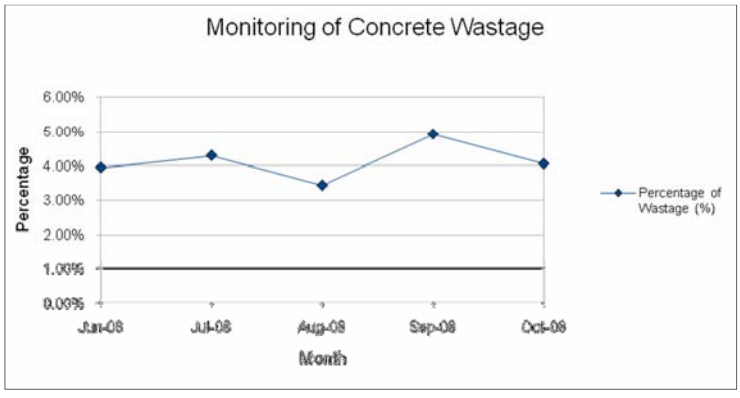


Chart 2.2.2b: Example of monitoring concrete waste on site.

2.2.3 Use of technologically advanced formwork and platform systems can help to reduce the use of timber formwork on site. These formwork and platform systems are highly recyclable, more durable and require less manpower to install and dismantle than conventional timber form. In some cases, they also mitigate other issues such as noise and dust generation.

Photo 2.2.3a: The Integrated Modular Formwork is highly recyclable and requires less manpower to install and dismantle.

Photo 2.2.3b: The jump form and table form result in reduction of use of timber formwork.

Photo 2.2.3c: Usage of drywalls will reduce masonry works on site.

Photo 2.2.3d: The climbing cage system results in reduction of use of scaffolding.

2.2.4 In line with sustainable construction efforts, the builder is recognized for using recycled and sustainable materials for non-structural applications.

Photo 2.2.4a: Precast drains can use recycled aggregates and is popular among builders.

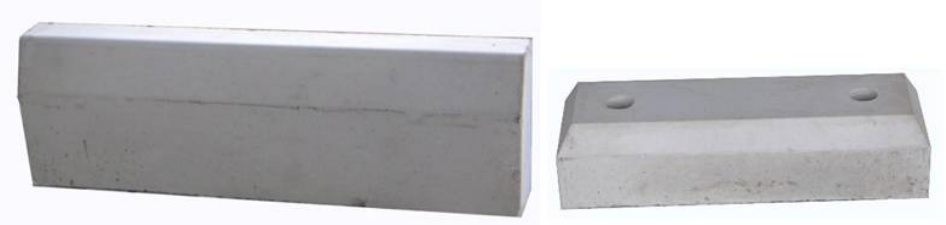


Photo 2.2.4b: Precast road kerbs and wheel stoppers are examples of non-structural elements that can use recycled materials.

2 GREEN PRACTICES

2.3 Energy

2.3.1 The builder should track energy consumption on the site. This can be done through monitoring key indicators like the electricity and diesel consumption. This will enable the builder to set strategies to reduce energy consumption and increase cost saving.

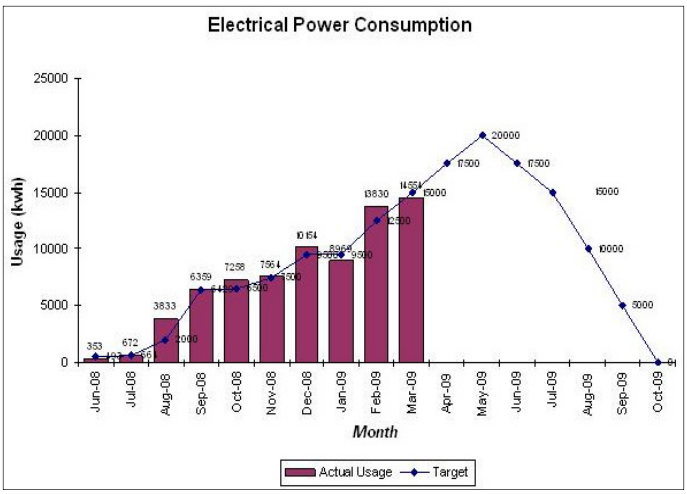


Chart 2.3.1a: An example of a monthly monitoring chart to track electrical power consumption on site.

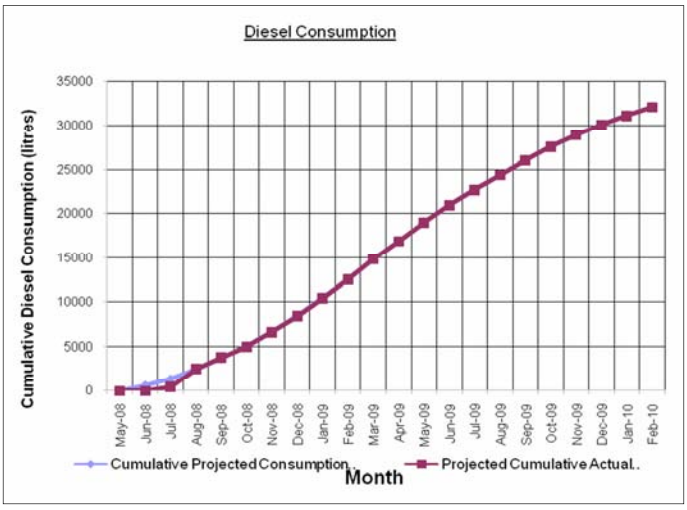


Chart 2.3.1b: Another example of monitoring diesel consumption.

2.3.2 The builder is recognized for their effort in reducing energy usage in the site office. This can be achieved through the use of energy saving equipment like energy efficient lightings, energy efficient air conditioning systems and Green Label appliances.

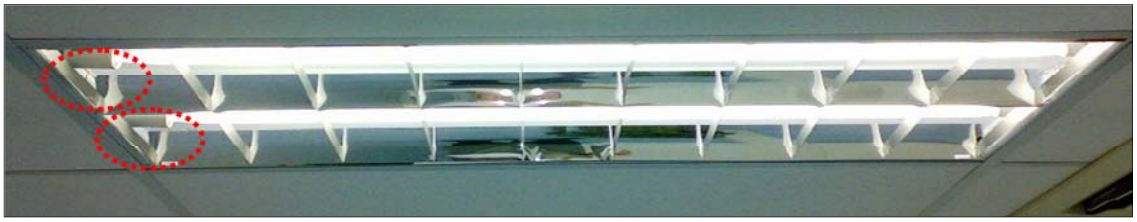


Photo 2.3.2a: The use of T5 lighting reduces energy consumption in the site office.

Photo 2.3.2b: Energy efficient air conditioning systems that comply with the Singapore's Energy Labeling Scheme helps to save energy in site office.

Photo 2.3.2c: Energy efficient refrigerator that complies with Singapore Green Labeling Scheme helps to save energy in site office.

2.3.3 Alternative renewable energy or fuel for construction machinery and equipment should be used. Solar cells and biodiesel can be used instead of non-renewable diesel fuels.

Photo 2.3.3a: Use of solar panels to help power the site office.

Photo 2.3.3b: Use of solar panel to power the noise meter.

Photo 2.3.3c: Experimental use of solar cells to help power the water treatment plant.

Photo 2.3.3d: Biodiesel, a combination of bio-fuel and diesel, helps to reduce the usage of diesel and also cause less air pollution.

2.3.4 Diesel powered generators are not as efficient as AC Grid power supply and can cause air and noise pollution. The builder should connect to AC Grid power supply whenever feasible and alternate usage to optimize energy use.

Photo 2.3.4a: Energy usage can be optimized through good management of alternating use of AC Grid power supply and diesel powered generators.

2 GREEN PRACTICES

2.4 Environment/ Water

2.4.1 Water consumption and Total Suspended Solids (TSS) readings on site should be tracked. Monitoring these key performance indicators will enable the builder to develop plans to reduce water consumption and keep the waterways clean.

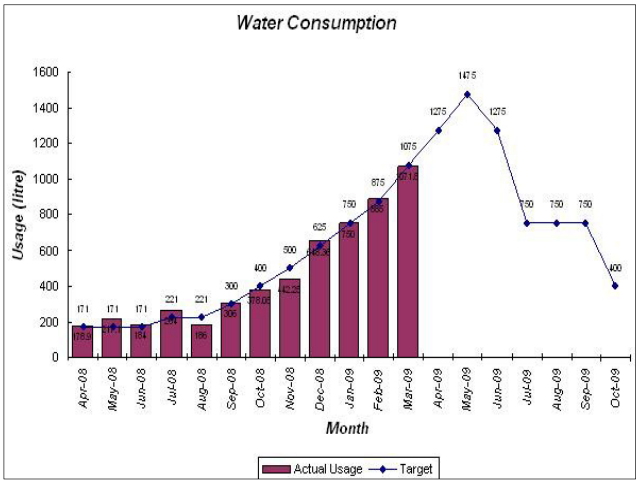


Chart 2.4.1a: An example of using a monthly monitoring chart to track water consumption on site.

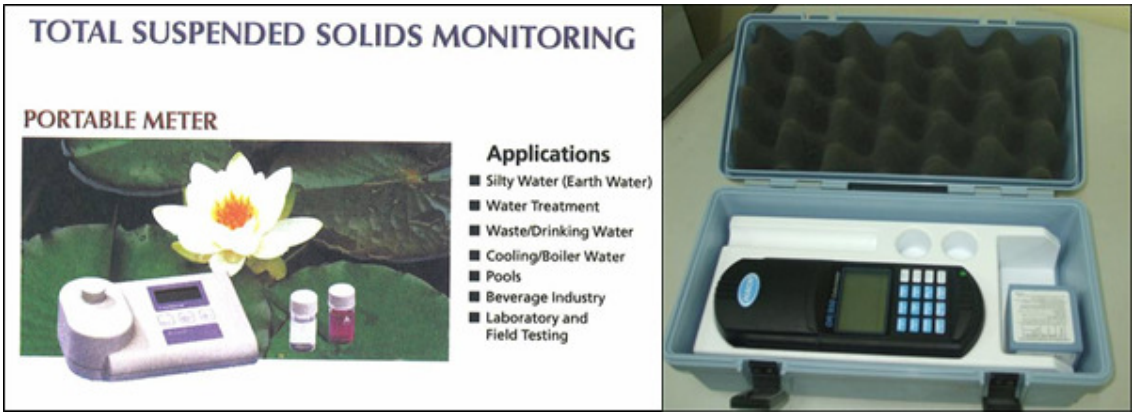


Photo 2.4.1b: Simple tools/equipment to monitor TSS readings.

2.4.2 Efforts in using water saving or recycling equipment to conserve water usage are recognized. This can be achieved through water recycling plants to treat and recycle water for non-potable and construction use.

Photo 2.4.2a: Water treatment & recycling plant that utilize membrane (left) and chemical (right) technology.

Photo 2.4.2b: Recycled water is commonly used for flushing toilets on site.

Photo 2.4.2c: Recycled water used for washing vehicles at washing bay and watering plants.

Photo 2.4.2d: Recycled water used for grouting, waterproofing and tiling works.

2.4.3 Environment friendly products like non-toxic pesticides and cleaning products should be used.

Photo 2.4.3a: Use of non-toxic pesticides helps to reduce adverse impact on the environment.

Photo 2.4.3b: Use environment friendly cleaning products to lessen impact on environment.

2 GREEN PRACTICES

2.5 Housekeeping & Air Quality

2.5.1 Good housekeeping procedures and a well maintained site not only produce a pleasant working environment but it also enhances site productivity and safety. One possible measure is to implement a management procedure that encourages subcontractors to adopt good housekeeping practices. Another measure can be designating proper storage space to ensure materials are properly stored on site.

Photo 2.5.1a: A good housekeeping program will ensure all subcontractors adopt good housekeeping practices.

Photo 2.5.1b: Designated storage spaces allow materials to be properly stored on site.

2.5.2 Measures that mitigate generation of dust are recognized. This can be done through various simple measures.

Photo 2.5.2a: Covering stock piles with sheets help to mitigate dust generation on site.

Photo 2.5.2b: Spraying water on site access roads and during hacking works will reduce dust generation. This is especially effective during dry days.

Photo 2.5.2c: Spray water to dampen dust generating materials and cover them properly during transportation.

Photo 2.5.2d: Pavement sweeper is a useful equipment to clean up public roads or surrounding areas.

2.5.3 Measures that address refuse collection can be done thru inculcating good practice among staff and workers and simple ways such as keeping the food waste bin close at all times.

Photo 2.5.3a: Keep refuse bin closed and properly covered.

2.5.4 Builder should be proactive in taking vector control measures on site. This could be achieved through implementing preventive measures or giving out incentives to encourage staff participation.

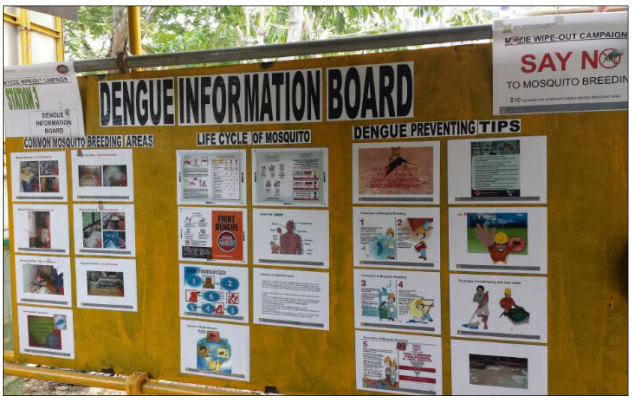


Photo 2.5.4a: Information board educating about mosquito prevention.

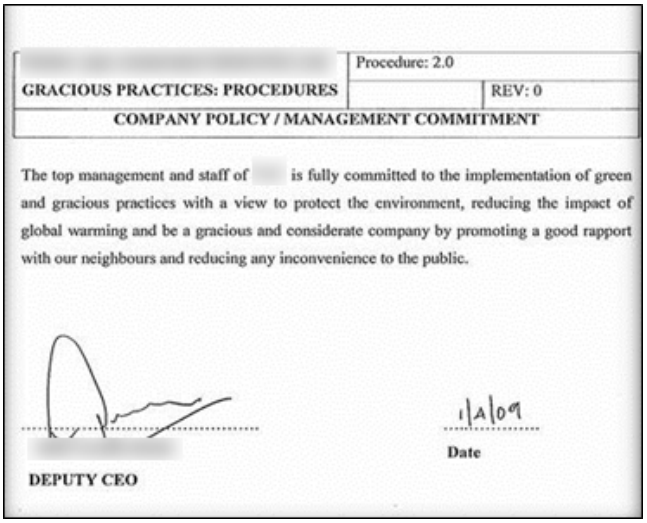
2.5.5 The human factor plays a crucial role in ensuring proper housekeeping and cleanliness on the site. This can be achieved by designating site personnel or controller to oversee, implement and inspect housekeeping on site.

Photo 2.5.5a: Designated personnel are important in ensuring proper housekeeping and cleanliness on site.

3 GRACIOUS PRACTICES

3.1 Company Policy

3.1.1 The builder should set up a policy advocating gracious best practices in construction. Procedures should be instituted to raise awareness, educate and inculcate gracious best practices across all levels of staff. The practices can include briefing and sharing sessions, in-house quiz and gracious campaigns.



[redacted]	Procedure: 2.0
GRACIOUS PRACTICES: PROCEDURES	REV: 0
COMPANY POLICY / MANAGEMENT COMMITMENT	

The top management and staff of [redacted] is fully committed to the implementation of green and gracious practices with a view to protect the environment, reducing the impact of global warming and be a gracious and considerate company by promoting a good rapport with our neighbours and reducing any inconvenience to the public.

[redacted]
DEPUTY CEO

1/2/09
Date

Photo 3.1.1a: An example of a green and gracious company policy by a certified green and gracious builder.

Photo 3.1.1b: Briefing session on company's gracious policy conducted for management staff.

3.1.2 In addition, the builder should set up a system for gathering feedback from staff, suppliers and subcontractors on gracious practices.

Photo 3.1.2a: Train suppliers, subcontractors and workers and gather feedback from them on gracious practices.

3 GRACIOUS PRACTICES

3.2 Accessibility

3.2.1 The entrance and access to a construction site is particularly important as they are clearly visible to the public. The builder should maintain the site entrance properly and ensure it is unobstructed. Access to site office should be properly documented to facilitate entry by staff, workers and visitors.

Photo 3.2.1a: A clean and unobstructed site entrance portrays a positive image of the builder to the public.

Photo 3.2.1b: Proper signages provide guide to visitors.

3.2.2 It is also good practice to provide barrier free access at passageways used by the public.

Photo 3.2.2a: A temporary ramp helps pedestrians at a walkway affected by construction works.

Photo 3.2.2b: A temporary ramp besides site hoardings is also useful to public users.

Photo 3.2.2c: A ramp has also been built near the site office.

3.2.3 The builder should implement measures to address possible causes of traffic obstruction. This can be effected by deploying traffic controllers to ensure smooth traffic flow in and out of the site. They also play an important role in guiding traffic during concreting operations or material delivery to minimize inconvenience to other road users.

Photo 3.2.3a: The traffic controller guides traffic during concreting operations or materials delivery.

Photo 3.2.3b: A traffic mirror can be used to show blind spot.

3.2.4 Signages to guide motorists and pedestrians whenever there are road or traffic diversions should be put up. The builder should also ensure that existing directional signs are not blocked by hoardings or construction works.

Photo 3.2.4a: Some examples of good signages around the construction site.

Photo 3.2.4b: Variable message sign (VMS) system complements role of traffic controller and usage of signages. This helps to minimize inconvenience to the public.

3 GRACIOUS PRACTICES

3.3 Public Safety

3.3.1 Covered walkways should be provided for areas that are heavily used by the public. This provides the public with a safer environment adjacent to the site and acts as a shelter during bad weather. In addition, the hoardings around the site should be well maintained and clean. It is worth noting that hoardings that are aesthetically pleasing tend to be more pleasant and acceptable to the public.

Photo 3.3.1a: Covered walkways around the perimeter as well as within the site provides protection and shelter.

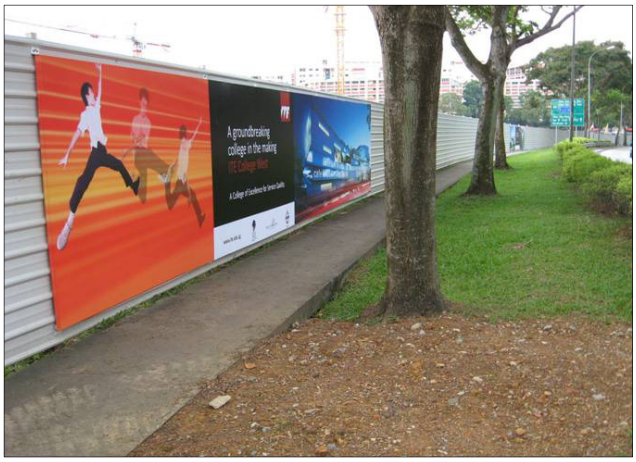


Photo 3.3.1b: Well-designed hoardings are aesthetically pleasing to the environment.

Photo 3.3.1c: Hoardings are maintained in good and clean condition through regular maintenance.

Photo 3.3.1d: Hoardings with vertical greens can look pleasing to the public.

3.3.2 Providing full height safety netting and catch platform can mitigate risk of falling debris.

Photo 3.3.2a: The catch platform and safety netting work hand in hand to mitigate risk of falling debris.

3.3.3 Passageways around the construction site should be sufficiently wide to handle the volume of human traffic. Alternate routes should be provided when existing passageways are obstructed due to construction works. Provision of vehicular barriers should be provided at passageways which are located near to roads.

Photo 3.3.3a: Some examples of passageways provided around construction site.

3.3.4 Site safety information should also be made available and clear to visitors. This information should include fire or emergency response plans.

Photo 3.3.4a: Safety information and emergency evacuation routes are essential items to display to both staff and visitors on the site.

3.3.5 It is also important that the builder carries out comprehensive assessment and monitoring of surrounding buildings to prevent settlement, movement and damage to surrounding buildings.

Photo 3.3.5a: Comprehensive monitoring of surrounding buildings can be done through the use of inclinometers, tilt meters, vibration meters and settlement markers.

3 GRACIOUS PRACTICES

3.4 Noise & Vibration

3.4.1 The builder should track noise and vibration generated by the site. This can be done through monitoring results from the noise and vibration meters. This will enable the builder to plan and schedule noisy work and take corrective action when the level goes beyond permissible limits.

3.4.2 A noise management plan can assist the builder to plan ahead through identifying the site neighbours, considering possible works and their expected noise level and developing mitigation measures and communication strategies. This could reduce the site neighbours' complaints and builder workers' exposure to noise.

3.4.3 The same expectation in terms of noise management applies for the piling subcontractor. The builder is recognised for its effort in reviewing the environmental impact analysis and method statement of the piling subcontractor and the effectiveness of their noise control measures.

3.4.4 Noise and vibration can be minimized or mitigated through careful scheduling of noisy activities and locating noise source away from residents. Other effective measures include containing noise at source and putting up noise barriers at noisy work areas.

Note:

The Quiet Construction Fund by National Environment Agency can assist builders in the purchase of noise barriers. For more information, please refer to http://app2.nea.gov.sg/grants-awards/quieter-construction-fund.

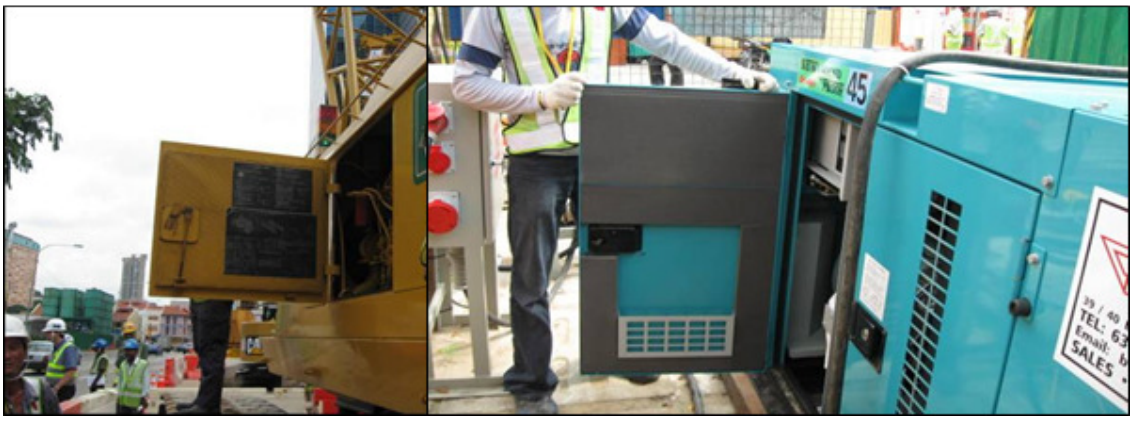


Photo 3.4.4a: Use of sound proof materials for machinery can help to contain noise at source.

Photo 3.4.4b: Noise barrier panels around generators and machinery help to reduce the noise transmitted.

Photo 3.4.4c: Use of movable noise barriers can also reduce the noise transmitted from machinery.

Photo 3.4.4d: High noise barriers can help reduce noise transmitted from the construction site.

3.4.5 Regular maintenance of machinery and training of workers to properly handle machinery play an equally important role in mitigating noise and vibration.

Photo 3.4.5a: Machinery is regularly maintained and workers are properly trained to handle them.

3.4.6 The builder should mitigate possible issues arising from work at night or weekend. The builder could put up notices to inform their neighbours of noisy work or practice a system which is similar to permit to work system for night work to assist in managing feedback with regards to noise.

3.4.7 Alternative construction methods that reduce noise and vibration should also be considered. This includes use of non-percussion piling methods, low noise generators, robotic crushers, etc.

Note:

There are some machines that are used primarily to enhance productivity. However, they can also indirectly generate lesser noise and thus are quieter than their conventional counterparts. For such equipment, builder can tap on the BCA MechC Scheme that provides funding for equipment which improves productivity. For more details, please refer to http://www.bca.gov.sg/MechC/mechc.html.

The Quiet Construction Fund by National Environment Agency can also assist builders in the purchase of quieter construction equipment. For more information, please refer to http://app2.nea.gov.sg/grants-awards/quieter-construction-fund.

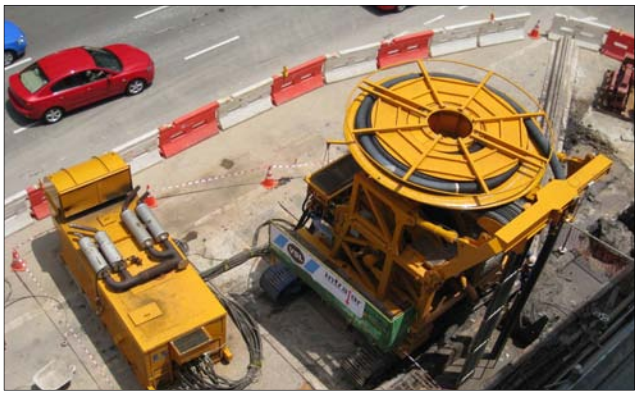


Photo 3.4.7a: State of the art technology cutter machine transmits little noise during operation.

Photo 3.4.7b: Silent jack in piles greatly reduce noise and vibration produced.

Photo 3.4.7c: Proper selection of piling system will mitigate noise and vibration felt by surrounding residents.

3.4.8 Installing noise and vibration monitoring meters can also help to ensure corrective action can be taken once the threshold limits are exceeded.

Photo 3.4.8a: Noise and vibration meters are installed for monitoring purpose.

3 GRACIOUS PRACTICES

3.5 Communications

3.5.1 The builder should set up a procedure that ensures pro-active communication to the various segments of the community around the site. This can be done by sending letters to neighbouring residents informing them about key milestones of the project or even visiting them personally.

Photo 3.5.1a: Distributing newsletters to neighbouring residents to update them on progress of project creates better understanding.

Photo 3.5.1b: Pro-active visits to neighbouring residents with gifts during festive seasons help foster better rapport with residents.

Photo 3.5.1c: Where construction works affect business tenants, it is important that the builder hold regular meetings with the tenants to communicate the project progress and gather feedback.

3.5.2 Putting banners or posters containing the builder's hotline number can open up and facilitate communication between members of the public and builder.

Photo 3.5.2a: Banners with hotline number(s) at prominent locations allow public to contact the builder to give feedback.

3.5.3 The builder should develop a set of guidelines to handle feedback and keep proper records of feedback. Designated site personnel should be appointed to manage the feedback and ensure all valid feedback are attended to expeditiously.

Public Complaint Form Date:

Information About You: (Optional)

Name :

Address:

Phone : (H) (O) (H/P)

Email :

Complaint Issue: -

Noise	Dust	Traffic	Earth control	Others

Date / Time / Location: -

Elaboration: -

For Office Use Only

Name of Person In-Charge: Dept:

Signature: Date: Time: am / pm

Nature of Action Taken: - Date:

Photo 3.5.3a: Tools like “feedbacks forms” or “suggestion box” placed at strategic locations can help to facilitate feedback from the public.

Photo 3.5.3b: A designated site personnel should be appointed to handle feedback from the public.

3.5.4 The builder is also recognized for their effort to implement measures to enhance security on site and in the site's neighbourhood.

Photo 3.5.4a: CCTV can be used by the builder to enhance the security on site and minimize security concerns of neighbouring residents.

3 GRACIOUS PRACTICES

3.6 Manpower Management

3.6.1 Builders can show care for their site personnel's welfare by providing proper working gear and facilities. They can also show consideration by putting in place measures to ensure that the working environment is safe and conducive.

Photo 3.6.1a: The provision of Personnel Protective Equipment enables site personnel to work safely.

Photo 3.6.1b: A clean and conducive worksite can be created with the use of precast pavement.

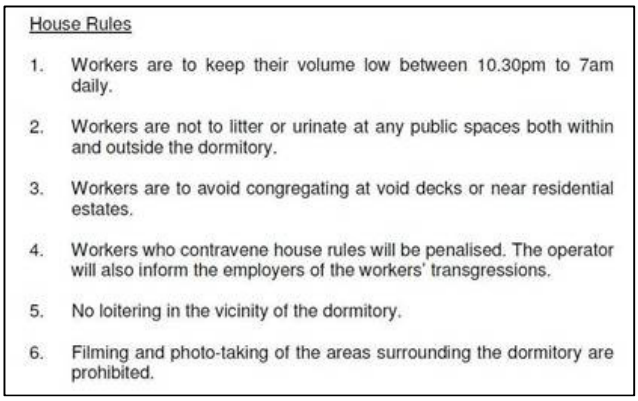
Photo 3.6.1c: Builder could show care for their site personnel's health by providing clean toilets, site canteen and hot and cold water points.

3.6.2 Enhancing living conditions of site personnel can help improve hygiene and harmony. This can be done through the provision of welfare facilities and introduction of house rules at site personnel's quarters.

Photo 3.6.2a: Installation of nettings at on-site dormitory windows could aid in dust reduction and pest control of the rooms.

Photo 3.6.2b: Providing of cooking stoves, fridges could promote healthy living and increase convenience.

Photo 3.6.2c: Recreational facilities such as badminton courts and gym encourage leisure activities and cohesion among site personnel.



House Rules

1. Workers are to keep their volume low between 10.30pm to 7am daily.
2. Workers are not to litter or urinate at any public spaces both within and outside the dormitory.
3. Workers are to avoid congregating at void decks or near residential estates.
4. Workers who contravene house rules will be penalised. The operator will also inform the employers of the workers' transgressions.
5. No loitering in the vicinity of the dormitory.
6. Filming and photo-taking of the areas surrounding the dormitory are prohibited.

Photo 3.6.2d: Introduction of house rules help to reduce conflict and minimizes disturbances to neighbourhood. Rules can be printed in site personnel's native language and displayed on notice boards for effective communication and serve as a constant reminder.

3.6.3 For site personnel management, builders can put in place systems to inform them about site operation procedures, regulations and conduct on-site.

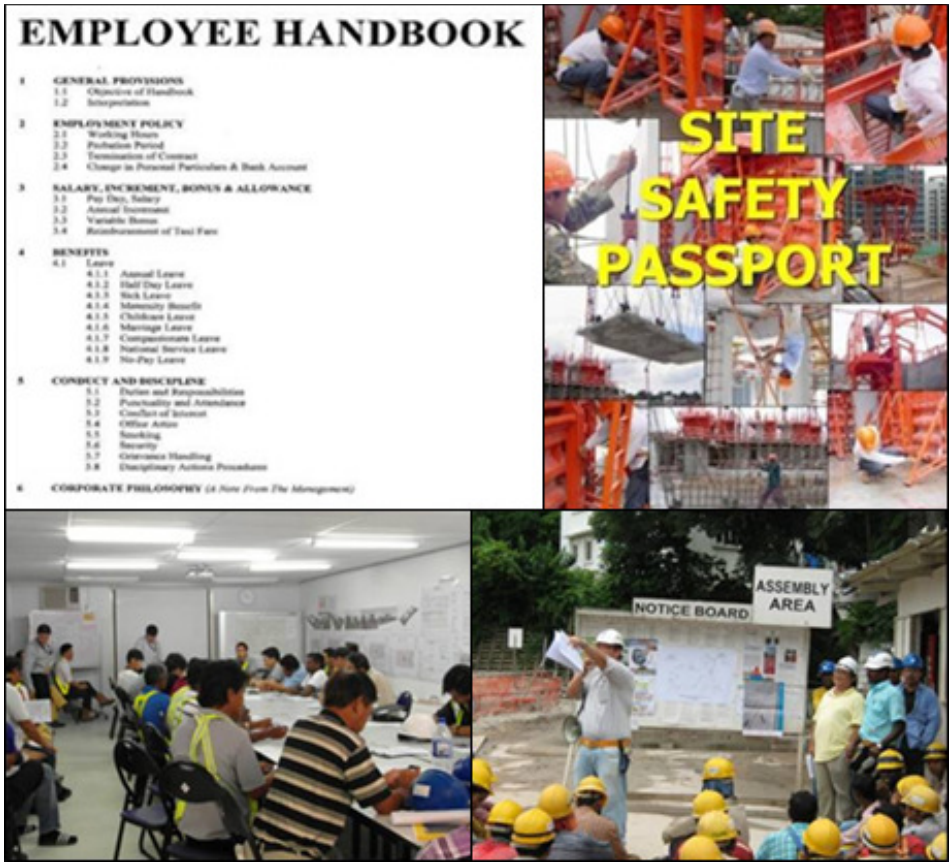


Photo 3.6.3a: Provision of employee handbooks and safety guidebooks, and conducting tool-box briefings can help the builder better manage both staff and site personnel.

3.6.4 For employees' professional development, builders can send them for skills or qualifications upgrading. This helps employees to become more competent in managing projects and also help to fulfil their aspirations to obtain professional certifications in their area of work. As for new employees, implementing on-boarding can help them adjust into a new environment by putting them through an induction or orientation programme.

Photo 3.6.4a: Examples of employees' professional development includes training organised by builder's in-house CET training centre, attending suppliers' training and/ or training provided by external institutions.

Photo 3.6.4b: Employees attending induction/ orientation programme are being briefed about the company, its culture, management styles and expectations. It helps employees to fit into the organization and the roles that they will undertake.

3.6.5 Builders should provide more avenues to communicate with employees, understand their challenges faced, and also garner their feedback to improve working conditions on-site.

Photo 3.6.5a: Modes of communication like management's tea session with young managers provide platforms for employees to give feedback and management to convey company's messages.

Photo 3.6.5b: Other modes of communication like company information session are a good platform for builders to share company goals, policies, direction and achievements with their employees. Employees could be also invited to air their views afterwards.

3.6.6 Builders can better manage employees' performance through implementation of HR initiatives like performance feedback and progression opportunities to its employees.

Assessing performance can be done via conducting appraisal for both management staff and site personnel. This will spur them towards achieving work productivity targets and acts as a gauge to reward good performers in an equitable manner.

Creating career progression opportunities like promotion by designation, exposure to different project types, and identifying and coaching employees for senior or leadership positions allows them to grow professionally.

3.6.7 Implementing recruitment policies and initiatives can help builders attract new entrants into the built environment sector.

Photo 3.6.7a: Apart from recruitment ads, builders can reach out to new entrants via recruitment talks and job fairs (e.g. organized by BCA or other agencies).

Photo 3.6.7b: To secure long-term manpower pipeline, builders can participate in scholarship/sponsorship programmes e.g. the BCA-industry scholarship/sponsorship programmes to attract new entrants to join them.

3.6.8 Implementing HR policies like rewards and compensation allow builders to offer a suite of incentives as part of their employee retention strategies. This can be in the form of attractive remuneration package like performance-based bonus or profit-sharing with employees. Builders can also accord recognition to its employees' and their contributions through long-service awards, employee of the month/ year awards, safety awards, etc.

Photo 3.6.8a: Examples of awards given out to motivate employees e.g. long service, safety and other awards given out during annual company award events

3.6.9 Taking care of employees' well-being also contributes towards good retention strategy. It helps to promote loyalty, possibly improves productivity, and decreases distraction from inherent job challenges when performing tasks on site.

This can be attained via the provision of (i) pro-family policies like flexible working hours/ part-time work arrangements, (ii) non-mandatory leave entitlements like family care leave, study/ exam leave to help employees manage personal or family related issues, and as well as professional development needs should they undertake part-time studies to upgrade their skills/ qualifications.

Photo 3.6.9a: Builders can organize activities like health screenings, healthy lifestyle activities, company's outings (e.g. incentive trips), and community service to enhance their employees' well-being.

Note:

The information listed in Appendix B will be helpful to firms which are interested to build up their HR capabilities and implement good HR policies/ practices within their organization.

4 INNOVATION AND EXEMPLARY PRACTICES

4.1 Energy Efficient Green Site Office Features

4.1.1 The builder should set strategies to reduce energy consumption on site and thus increase cost savings. Setting up an energy efficient site office and the ability to reduce energy usage in the site office forms an important part of the overall plan.

Photo 4.1.1a: The site office is oriented in the north-south direction with the longer side, where there are more windows, facing north-south. This will reduce the heat intake into the site office and thus reduce energy consumption.

Photo 4.1.1b: The roof of the site office is painted with a heat shielding coating to reduce heat intake. The same can be done to the site office facades.

Photo 4.1.1c: Solar panels can be used to power part of the site office and thus reduce the electricity bill.

Photo 4.1.1d: The bigger capacity generators can be used in the day when the energy consumption is higher while the smaller capacity generator can be used at night when energy consumption is lower. This will optimize the usage of diesel and results in cost savings.

Photo 4.1.1e: Use of blinds and application of UV films on windows will help to reduce the heat transmitted into the site office. Thus less energy is needed to cool the site office.

Photo 4.1.1f: Combining use of energy efficient T5 lightings and motion sensors can greatly reduce energy consumption in the site office.

4 INNOVATION AND EXEMPLARY PRACTICES

4.2 Green and Conducive Site Environment

4.2.1 The builder should build a green and conducive working environment on the construction site for its staff, subcontractors and workers. This will be a clear demonstration of the environmental friendliness and graciousness of the builder staff and workers on site.

Photo 4.2.1a: The greening of hoardings not only builds a conducive working environment for staff and workers, it also portrays a positive image to the public.

Photo 4.2.1b: The conservation of trees on site helps preserve the environment and provides shade and greenery for site staff. Specialists may need to be employed to monitor and recommend ways to preserve the health of the trees.

Photo 4.2.1c: Where space is available, plants and flowers can be planted extensively to beautify the site environment. These plants can also double up as erosion control measures to enhance the quality of water discharged out of the site.

Photo 4.2.1d: A small roof garden above site office helps to cool the office.

Photo 4.2.1e: A vegetable patch managed by workers for harvesting vegetable for consumption.

Photo 4.2.1f: Netting and false ceiling for canteen area ensure staff and workers can rest and eat in a cooler and dust free environment.

Photo 4.2.1g: Providing washing and drying facilities enable workers to have clean and dry clothing faster and the site would look tidier without rows and rows of hanging wet clothes.

Photo 4.2.1h: Recreational spaces and equipment for workers could promote healthy lifestyle and hence improve their productivity.

4 INNOVATION AND EXEMPLARY PRACTICES

4.3 Other Exemplary Practices

4.3.1 In addition to the gracious practices mentioned in the earlier chapters, some builders have implemented innovative practices related to noise and vibration control.

Photo 4.3.1a: Movable noise barrier can be used extensively at various locations where construction works are ongoing. It is an effective and easy way to reduce noise transmission to the public. There is also cost saving as no permanent noise barrier needs to be installed.

4 INNOVATION AND EXEMPLARY PRACTICES

4.4 Demolition Protocol

4.4.1 The demolition protocol helps contractors to better plan their procedures to maximise recovery of concrete waste for beneficial reuse/recycling. In most cases, a building structure is taken down in the fastest, most economical and convenient way, resulting in difficulty in sorting the various demolition wastes later. Having a demolition protocol facilitates segregation of concrete from other building materials, minimizes contamination and significantly improves the quality of recovered concrete waste. It comprises 3 components: pre-demolition audit, sequential demolition and site waste management.

4.4.2 Pre-Demolition Audit, Sequential Demolition and Site Waste Management Plan

1. Pre-Demolition Audit

The Pre-Demolition Audit enables materials capable of being recovered for recycling to be identified e.g. concrete, bricks, metals, wood/timber, etc. This helps to identify potential resources and the level of material segregation required. The audit covers:

- Types of waste generated on-site
- Quantity of waste
- Recovery/ Recycling Target

Sample of Pre-Demolition Audit Plan

Types of Wastes	(A) Estimated Quantity (tons)	(B) Recovery Rate (%)	Target Quantity Recovered [A x B] (tons)	(C) Actual Quantity Recovered (tons/ truckloads)	(D) Proposed Usage/ Course of Action
Concrete Components					
Beams					
Columns					
Ground Slabs					
Pile Caps					
Walls					
Floor Slabs					
Others, please specify (e.g. roof slabs)					
Masonry Components					
Bricks					
Tiles					
Others, please specify (e.g. drywall)					
Metals					
Structural Steel					
Re-bar					
Others, please specify (e.g. frames)					
Timbers					
Doors					
Parquet					
Others, please specify					
Plastics (e.g. PVC, sockets, pipes, etc)					
Miscellaneous					

2. Sequential Demolition

The demolition process is separated into phases in which one type of material is carefully dismantled at one time and salvaged for reuse and recycling. The wastes generated are of similar types and contamination by non-recyclable items can be significantly reduced. The sequence of demolition is principally carried out in reverse order to the construction process. The plan should allow separation and sorting of building materials.

The principal phases involve:

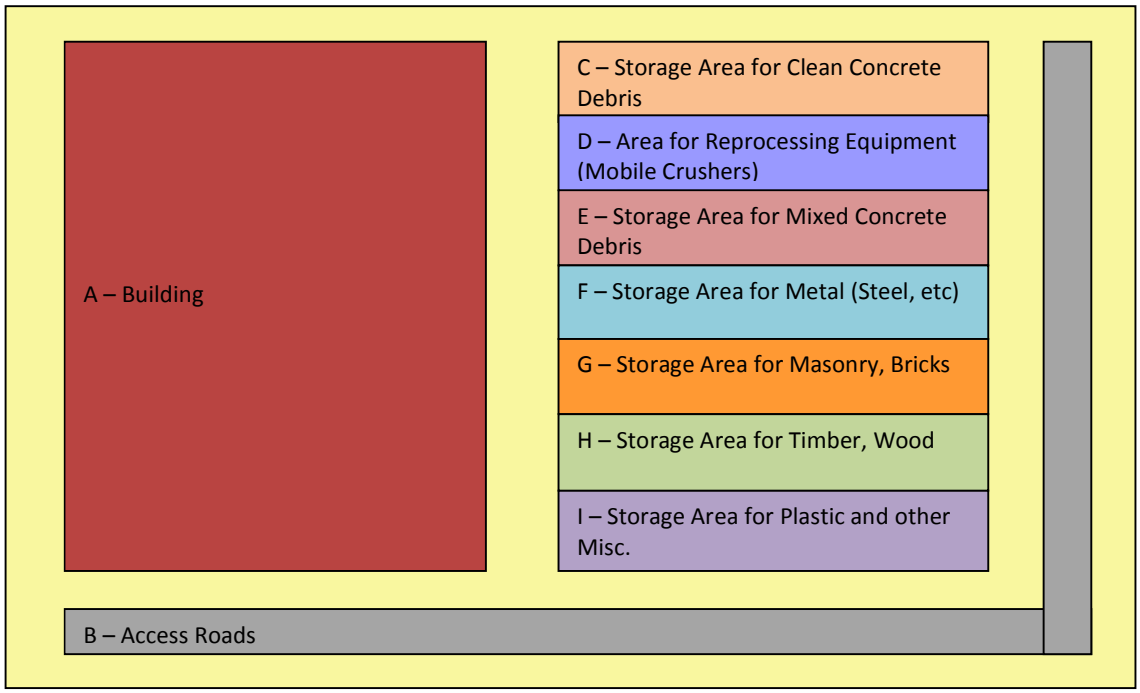
a. Demolition of part of building structures with higher concrete content (such as concrete parapet walls, etc)
b. Stripping of deleterious materials (such as bricks, tiles, etc) which may contaminate clean concrete debris of building bearing structure.
c. Step-by step demolition of bearing and main structure by dismantling part of structures of similar materials to avoid contamination of clean concrete debris and allow separation of concrete debris from other demolition waste.

3. Site Waste Management Plan

All demolition materials should be separated into different groups e.g. concrete, bricks, metals, wood/timber, etc. To facilitate sorting, a site waste management plan is required to allocate on-site temporary storage points for each material generated from the demolition before disposal to an accredited recycling facility for processing into recycled products.

See Annex for more details of each stage of demolition protocol.

Sample of Storage Area for Waste Segregation On-Site



DEMOLITION CHECKLIST FOR RESOURCE RECOVERY **ANNEX**

1. Before Demolition: Pre-Demolition Audit & Method Statement

- Obtain set of building plans of structures to be demolished.
- Assess construction method, structural framing system, and critical building elements that need special treatment during sequential demolition.
- Assess types of material used in the construction of the building through desk study of building blueprint and site visits.
- Conduct Pre-Demolition Audit by:
  - Identifying types of waste that can be recycled e.g. concrete, bricks, metals, wood/timber, etc
  - Calculating respective quantity of demolition waste to be generated
  - Setting targets for maximum resource recovery of demolition waste
- Develop Method Statement for Sequential Demolition by:
  - Identifying part of building structures with higher concrete content (such as concrete parapet walls, ground slabs, carparks, etc)
  - Establishing most effective demolition sequence to reclaim clean concrete without cross contamination with other waste materials such as bricks, timber, etc. State clearly the sequence of demolition of structural elements on each floor, i.e. parapets, brickwall, slabs, beams, columns, walls, etc
  - Identifying existing fixtures and fittings that may affect the demolition progress and need to be removed prior to commencement of demolition works (such as false ceiling, air conditioning units, doors, wooden floors, partitions, ceilings, windows, and other mechanical services).
  - Identifying potential removal of materials which may contaminate the clean concrete debris (such as bricks, tiles, etc) and the level of material segregation/sorting required.
- Develop Method Statement for Site Waste Management Plan by:
  - Measuring the available working spaces on-site for waste segregation based on site constraints
  - Drawing up site plan of the building/structures to be demolished, indicating available temporary storage space for different types of waste materials, and feasibility for mobile/on-site recycling
  - Planning of traffic route for debris handling, including provision of lorry car parks

<u>Deliverables</u>

- Submit a Pre-Demolition Audit which identify waste types and quantities
- Establish recovery / recycling target (e.g. 70% recovery rate of the concrete waste quantity declared)

- Submit a method statement for Sequential Demolition specifying clearly the order of demolition with realistic schedule to deliver the specified target without compromising safety
- Submit a method statement for Site Waste Management Plan to achieve proper waste segregation on-site

2. During Demolition

Phase 1: (can be done before demolition commences)

- Removal of existing fixtures and fittings (such as false ceiling, air conditioning units, doors, wooden floors, partitions, ceilings, windows, and other mechanical services).
- Stripping of deleterious materials which may contaminate the clean concrete debris of building bearing structure (such as bricks, tiles, etc).

Phase 2: Sequential Demolition

- Demolition of the bearing and main structure to be progressed in conformance with the method statement approved by the Qualified Person
- Demolition of part of the building structures with higher concrete content (such as concrete parapet walls, etc)
- Step-by step demolition of the bearing and main structure by dismantling part of the structures that are of similar materials to avoid contamination of clean concrete debris and allow separation of concrete debris with other demolition waste

Phase 3: Site Waste Management Plan

- Separation of demolition debris into different groups (such as concrete, bricks, metals, wood/timber, plastic, etc).
- Proper labeling and storage of sorted waste generated in the demolition process

Deliverables

- Production of cleaner quality of concrete demolition waste on-site
- Establish temporary storage areas for various categories of waste generated in the demolition process

3. After Demolition: Book-keeping

- Record details of debris disposal in terms of the amount and types of demolition waste generated weekly from the site
- Record details of debris management system and the movement of the waste from the site (either used for hardcore, or for road access, or sent to an approved disposal facility and/or accredited recycling facilities for further processing into recycled products and aggregates for beneficial reuse/recycling)

Deliverables

- Submit details of debris disposal and management system
- Evaluation of resource recovery and recycling target from demolition wastes

Appendix A

GREEN AND GRACIOUS BUILDER SCHEME CRITERIA – SUMMARY

Criteria	Points (Max)	Weightage
Green Practices	**50**	**40**
Company Policy	4	
Reduce / Reuse / Recycle	19	
Energy	12	
Environmental / Water	10	
Housekeeping & Air Quality	5	
Gracious Practices	**70**	**50**
Company Policy	3	
Accessibility	8	
Public Safety	12	
Noise & Vibration	18	
Communication	9	
Manpower Management	20	
Innovation & Exemplary Practices	**10**	**10**
Total	**130**	**100**
Plus: Bonus Points	**5**	**5**
Total Possible Points	**135**	**105**

Green Practices (40%)

Green Practices Criteria		Maximum Possible Points
Company Policy		**Subtotal: 4**
Procedure / Planning	Procedures to inculcate and raise awareness to all levels of staff Examples (including but not limited to): a) Briefing session – site personnel b) Sharing session – staff c) In-house quizzes d) Green campaigns	1
	Specific goals and KPIs to address the following factors: a) Reduce / Reuse / Recycle b) Energy c) Environment / Water d) Housekeeping & Air Quality	2
Practices	Include "Green" as one of the considerations during selection of suppliers and subcontractors Examples: Including green consideration or awareness of sustainability during the pre-qualification of suppliers and subcontractors	1
Reduce, Reuse, Recycle		**Subtotal: 19**
Procedure / Planning	Procedures or measures to encourage recycling or reduction of construction waste and office waste Examples: a) Setting up procedures to segregate waste on site b) Implementing segregation of waste on site c) Implementing arrangement to recycle office waste	3
	Monitoring system of wastage on site for the following: a) Concrete wastage b) Re-bar wastage c) Waste disposal cost d) Office waste	1
KPI	Performance rating of waste for recent completed projects (up to 3 years) a) Concrete wastage b) Re-bar wastage c) Waste disposal cost	4
Technology	Use of systems and technology to reduce waste	6
Practices	Use of recycled and sustainable materials for site applications during construction stage	5

Energy		**Subtotal: 12**
Procedure / Planning	Monitoring system for energy consumption on site a) Electricity consumption b) Diesel consumption	1
KPI	Performance rating of energy consumption for recent completed projects (up to 3 years) a) Electricity consumption b) Diesel consumption	3
Technology	Use of energy saving/efficient or Green Label appliances, equipment and/or devices (both site and site office; minimum 50% usage for site office) Examples: a) Use of Energy efficient light fittings such as T8 or PLCs lightings (or other types of lightings with at least 60 lumens/watts) or T5 or LED lightings (or other types of lightings with at least 100 lumens/watts) b) Use of Energy efficient air conditioning systems with Singapore Green Label Scheme c) Use of Green label appliances, equipment or devices	4
	Alternate use of energy/fuels on site Examples: a) Use of solar cells b) Use of other alternate energy eg. bio-diesel, wind	2
Practices	Use of AC grid power instead of diesel generators for site offices and equipment	2
Water / Environment		**Subtotal: 10**
Procedure / Planning	Monitoring system for water consumption and total suspended solids (TSS) readings on site	1
KPI	Performance rating of water consumption for recent completed projects (up to 3 years)	2
	Performance rating of total suspended solids (TSS) readings on site	2
Technology	Water saving or recycling equipment or devices to conserve water usage (both site and site office; minimum 50% use in site office) Examples: a) Use of Water recycling equipment that are of chemical type or membrane type b) Use of Water efficient fittings such as press tap and dual flush water cistern	2
Practices	Ways which treated water is recycled for construction activities	2

	Environmental friendly products used at site and site offices (eg. pesticides, cleaning products)	1
Housekeeping & Air Quality		**Subtotal: 5**
Procedure / Planning	In-house procedures to encourage good housekeeping at site Examples: a) Designated storage space at site b) Implementing good housekeeping measures at site	1
Practices	Measures to address dust generated from material storage and construction vehicles Examples: a) Cover dust generating materials during storage/transportation b) Provide water sprays to dampen dust generating materials during storage/transportation c) Paved//precast concrete planks for access at site d) Spray main haul road with water e) Control vehicle speed at site f) Cover and secure all loads on vehicles before leaving site	1
	Measures to address refuse accumulation and collection Examples: a) Provide properly covered receptacles for food waste b) Provide suitable designated refuse points c) Inculcate good practice among staff, including subcontractor staff d) Store refuse that is pending removal in receptacles with close fitting covers	1
	Proactive vector control measures at site	1
	Appointment of designated site personnel to oversee housekeeping and cleanliness at site	1

Gracious Practices (50%)

Gracious Practices Criteria		Maximum Possible Points
Company Policy		**Subtotal: 3**
Procedure / Planning	Policy statement to adopt gracious practices	1
	Procedures to inculcate and raise awareness of gracious best practices to all levels of staff Examples: a) Conducting briefing session for site personnel b) Conducting sharing session with staff c) Implementing in-house quizzes	1
	Procedures to address (with regards to gracious practices) a) Continual improvement and feedback to management and site staff b) Communicating such procedures and requirements to suppliers and subcontractors	1
Accessibility		**Subtotal: 8**
Practices	Well signed site with clean and unobstructed site access/entrance Examples: a) Keeping site access properly maintained and unobstructed b) Providing signage from entrance to site office to facilitate entry by visitors c) Providing conspicuous/effective signage	2
	Consideration given to wheelchair accessibility around site Examples: a) Designing passageways/walkways that include barrier free consideration around site b) Well-designed and effective passageways/walkways that include barrier free consideration around site (gradient 1:12)	2
	Measures to address possible causes of traffic obstruction Examples: a) Identify and address factors such as parking, location of rubbish skips, delivery routes b) Provide trained traffic controllers to ensure smooth traffic in and out of site c) Set restricted delivery times to avoid causing obstruction during peak hours d) Provide traffic mirrors for blind spot	2
	Ensure sufficient and effective signages around site to guide both motorists and pedestrians Examples: a) Put up signage and directional signs to guide motorists and pedestrians	2

	b) Ensure that existing road names, signboards, directional signs are not blocked by hoardings or construction works c) Present signage in different languages d) Provide variable messaging system	
Public Safety		**Subtotal: 12**
Practices	Provide covered walkways within site and around site for passageways that are used heavily by general public	2
	Sufficiently designed and well-maintained hoarding and walkways Examples: Providing well-maintained walkway with adequate lighting	2
	Provide full-height safety netting and catch platform to mitigate risk of falling objects	2
	Consideration given for the provision of footpaths in the following: 1) Sufficient width to cater for pedestrian volume/demand 2) Provision of alternate footpath when existing footpath is being used for construction works	2
	Provide vehicular barriers at passageways located close to/near to roads Examples: a) Providing effective barriers b) Providing temporary barriers for pedestrians	2
	Clear site safety information to visitors on site Examples: a) Displaying safety information on site, including dos and don'ts b) Displaying fire and emergency evacuation routes on site	1
	Comprehensive assessment and monitoring of surrounding buildings	1
Noise & Vibration		**Sub-total: 18**
Procedure / Planning	Set specific goals and KPIs to address the following factors: a) Noise b) Vibration	1
	Provide noise management plan for construction projects	2
	Procedures and standards to manage piling subcontractors in terms of noise and vibrations Examples: a) Reviewing the environmental impact aspect analysis and method statement b) Providing procedures to review the effectiveness of noise control measures	1

	Measures and efforts to minimise noise disturbance through careful scheduling of noisy construction activities Examples: Scheduling noisy activities in order to avoid sensitive time periods such as early mornings, evenings, weekends and public holidays	1
	Operational procedures in place to mitigate noise and vibrations a) Efforts to plan and locate noise source (Eg. vehicles, generators away from residents) b) Procedures to ensure construction plant & machinery are properly maintained c) Efforts to train workers to handle materials carefully to reduce impact noise d) Use of noise barriers for construction plant & machinery	2
	Procedures and measures and/or rules to mitigate issues arising from night/weekend construction works Examples: a) Implementing procedures to notify neighbours of noisy work b) Permit-to-work system for night construction works	1
KPI	Performance rating of noise and vibration	2
Technology	Use of alternative construction methods/machines to address noise and vibrations Examples (non-exhaustive): a) Non percussion piling b) Low noise generators c) Robotic crusher d) Wire saw e) Hydraulic splitter f) QUI cutter	5
	Installation of noise and vibration monitoring meters both on and off site	2
	Provide enhanced hoardings around site to mitigate noise generated during construction Examples: Providing enhanced hoarding of 4-6 metres	1
Communications		**Sub-total: 9**
Procedure / Planning	Procedure on public communications to residents/tenants (businesses) /town councils around construction site Examples: Setting up procedure that ensure pro-active communication to various segments of the community around the site	1
Practices	Send out letters and memos to neighbouring residents to inform key milestones or major construction works Examples: a) Sending out letters and memos at “some key milestones”,	3

	"most key milestones" or "all key milestones" b) Use of social media eg, Facebook, Twitter, Instagram) Examples of milestones (non-exhaustive): a) Introduction to commencement of work b) Commencement of demolition work c) Commencement of piling work d) Major delivery of materials e) Diversion of traffic	
	Provide designated hotline on company posters and banners for public to call	1
	Clear and proper display of posters and banners Examples: Displaying visible banners, posters and other publicity items to the public	1
	Designated site personnel to handle feedback and complaints received Examples: Appointing a full time PRO	1
	Guidelines and documents on the handling of feedback cases Examples: Keeping proper site record of feedback received and follow-up actions	1
	Measures and procedures to minimise security concerns to neighbouring residents Examples: a) Out of office security measures b) Crime prevention talks c) 24-hr security guard on site d) Providing CCTV around site	1
Manpower Management		**Sub-total: 20**
Site Personnel Management	Caring for site personnel's welfare a) Provide proper facilities and working gear • Hot/ cold water points, • Proper work wear & foot wear, • Recreation facilities/ site canteen • Dedicated on-site female washroom/ changing room b) Initiatives towards safe & conducive working environment • Measures to ensure safe and healthy working conditions • Measures to maintain safe and orderly site conditions • Measures to ensure emergency preparedness	2
	Proper living conditions for site personnel a) Living conditions e.g. • Clean, ventilated dormitory rooms that are not	2

	overcrowded • Provision of proper sanitary facilities • Provision of facilities e.g. cooking/ washing machines/ dryers • Enforcing house rules to control disturbances to neighbourhood b) Provide transportation e.g. lorry or bus	
	Systems in place to manage site personnel a) Site Operations e.g. • Conduct tool box meetings • Provide clear instructions via handbooks, posters & leaflets b) Conduct e.g. • Brief workers on site regulations & conduct • Set-up of disciplinary procedures	2
	Achieved safety results better than industry average a) Accident Frequency Rate lower than industry average b) Accident Severity Rate lower than industry average	2
Training & On-boarding	Help new employees familiarize with working environment and facilitate employee development through training a) Training • Organised in-house training (by firm/ supplier) • Formal training by external service provider • Staff initiated training b) On-boarding • Supervisor briefing • Assigned Buddy • Induction/ Orientation programme	3
Communications	Channels to communicate with employees & get their feedback e.g. avenues to give suggestion/ feedback, staff meeting and etc.	1
Performance Management	System to manage staff performance and development a) Performance Feedback (e.g. informal chat, appraisal, and etc.) b) Progression opportunities • Progression by designation • Exposure to different project type • Identify & coach staff for senior positions	1
Recruitment	Initiatives/policies to encourage new entrants into the built environment sector a) Recruitment e.g. • Job advertisements & interviews • Recruitment talks / fairs • Employee referral scheme b) Career Promotions e.g. • Internships/ Scholarship-sponsorship/ Apprenticeship/ Management Trainee Programmes	1

Rewards & Compensation	Offer attractive remuneration package e.g. annual salary increment/ performance linked bonus/ Annual salary review against market rate/ Profit-sharing with employees	1
	Provision of employee benefits a) Work-related • Transport/ Mobile phone allowance • Retirement benefits • Retrenchment benefits b) Health & wellness • Medical claims • Dental claims • Flexible benefits	1
	Recognition of employee contributions a) For service and exemplary behavior • Long-service award • Employee of the month/ year b) For good performance or results • Safety award • Certificate of good performance	1
Well-being	Provision of non-mandatory leave entitlement/s a) Personal/ Family related e.g. Child Sick Leave /Marriage Leave/ Compassionate Leave/ Family Care Leave b) Development & well-being e.g. Study/Exam leave/Unrecorded leave for medical appointments/Volunteer leave for community service	1
	Organize activities and/or initiatives to enhance employees' well-being a) Activities e.g. company outings or community service for employees b) Initiatives e.g. occasion celebrations or healthy lifestyle activities	1
	Provision of pro-family working environment a) Flexible Work arrangement e.g. Part time/ Flexible working hours b) Facilities & subsidies e.g. tie-ups with nearby childcare facilities/ Child care subsidy	1

Innovative and Exemplary Practices (10%)

Innovation and Exemplary Practices	Maximum Possible Points
Procedures or innovative use of construction technology and/or special construction methods to address environmental concerns, site challenges, best manpower management practices and/or exemplary practices to minimise concerns of the public Guidelines: Practices should not be commonly practised in the industry They should be proposed / counter-proposed by builder “Think out of the box” approach Gracious gestures towards the community and public stakeholders	10

Bonus Points (5%)

Bonus Points	Maximum Possible Points
Recognition and/or awards (both public and private sectors) in recognition for builder’s outstanding performance / achievement Examples: a) Completed Green Mark project (Gold PLUS and above) b) Other environmental related award	5

Appendix B

HUMAN RESOURCE RELATED GRANTS

This section provides examples of existing government schemes that can help builders adopt good Human Resource practices to attract and retain mature workers and back-to-work locals

Targeted HR practices	**Types of Grant**		**Ministry/ Agency**
Performance Appraisal	**WorkPro**	• Age Management Grant	WDA
Recruitment & Retention		• On-the-Job training, New Hire Retention Incentive and Mentorship Allowance	WDA
Staff Wellness (Work-life balance)		• Work-Life Grant	MOM
Productivity		• Job Redesign	WDA
Training	**Enterprise Training Support (ETS)**	• Curriculum Contextualisation & Alignment (CCA), HR Development	WDA
Benefits & Compensation		• Remuneration Review Grant	WDA
Develop Human Resource capabilities	**Innovation & Capability Voucher**		**SPRING Singapore**

<u>WorkPro</u>

1. Age Management Grant

It is a one-time grant, of up to $20,000, to help employers implement age management practices e.g. good re-employment practices, performance management and job redesign.

Example:

ABC Construction Pte Ltd has 5 site coordinators (i.e. mature workers aged 40yrs & above) to help manage its projects. Upon learning about the grant, it applied for Age Management Grant to adopt progressive HR practices for the mature workers.

It received the first payout of $5,000 upon meeting the grant requirements within 6 months. The second payout of $15,000 was disbursed after ABC Construction has implemented a health programme and adopted two age management practices e.g. Performance Management & Fair Employment.

a) Performance Management - ABC Construction introduced a performance appraisal system for its employees and conducted appraisal for its workers aged 40 years and above.

b) Fair Employment - ABC Construction developed an employee handbook for its staff which includes codes for fair recruitment and employment practices.

ABC Construction has up to 1 year to complete the Age Management Grant requirements. It can submit the necessary claims to either NTUC or SNEF for the disbursement of $20,000.

2. Job Re-design Grant

It subsidises the costs of redesigning jobs and work processes to improve the productivity and performance of mature workers and back-to-work locals.

Example:

ABC Construction Pte Ltd's headcount increased due to its volume of projects. It has two existing mature workers (aged 55 yrs & above) handling staff payroll manually, and it decided to automate this process. It invested in a payroll system which costs $8,000 and tapped on Job Redesign Grant as a result. The system helps to redesign the job and improve the HR functions by increasing the speed of data inputs as well as reducing errors. ABC Construction also retained the two mature staff and thus, it can claim $6,000 (i.e. $3,000 per mature staff retained or 80% of costs depending on whichever is lower) upon completion of the Job Redesign project with all other criteria fulfilled.

ABC Construction saved **$6,000** as a result of tapping on WDA funding and completing the project within 1 year.

3. Recruitment & Retention Initiatives (RRI)

The New Hire Retention Incentive (NHRI), OJT Training and Mentorship allowance are aimed at encouraging employers to implement measures to better retain newly-hired mature workers and back-to-work locals. These are added incentives for employers who have tapped on the Age Management or Work-Life or Job-Redesign Grant..Employers can only claim for this component when the workers earn a gross monthly income of not more thatn $4,500 and are hired through employment facilitation touch points (eg. SNEF, e2i, NTUC or WDA career centres).

Example:

Due to high project volume, ABC Construction Pte Ltd hired 3 new staff via their programme partner, e2i. Two of them were employed as site supervisors (i.e. matured workers who were unemployed for 1month) and a quantity surveyor (i.e. a back-to-work local who became unemployed for 1 year when she quit her job after giving birth). As their salaries are below $4,500 (i.e. site supervisor $4,100 and QS $3,800), ABC Construction was able to claim up to $2,000 per employee per initiative.

To help their new staff settle-in, the assistant project manager took on the role as their trained mentor. In doing so, the mentor would receive a mentorship allowance of $100 per mentee. Table 1 shows the detailed and total amount which ABC Construction can claim from this scheme.

Newly Hired Worker/Mentor	New Hire Retention Incentives*	OJT-Training Allowance*	Mentorship Allowance	Amount claimed
Site Supervisors (Mature Workers)	$2,000 x 2 pax = $4,000	N/A	N/A	$4,000
Quantity Surveyor (Back-to-Work)	$1,900	$1,900	X	$3,800
Assistant Manager (Mentor)	N/A	N/A	$300	$300
*OJT & NHRI: Subject to one-month salary cap of $2,000				**$8,100**

Table 1: Monies claimed under RRI scheme

ABC Construction tapped on these funds for recruitment & retention, and saved **$8,100** in the process.

4. Work-Life Grant

It provides funding for the implementation of work-life strategies, particularly flexible work arrangements (FWAs), to help employers attract and retain workers and to better support work-life harmony.

Example:

ABC Construction Pte Ltd is committed to creating a work-life friendly culture as they recognise that employees are more productive and can contribute more effectively to the company when they are able to manage both their family commitments and work responsibilities.

It tapped on the grant to hire a HR consultant to identify needs and how to implement **FWAs** like (i) flexi-time, (ii) flexi-place and (iii) part-time. Employee support schemes like lactation room with storage facilities was also implemented to facilitate mothers to return to work earlier.

After implementing the FWAs and employee support schemes, it has 15 out 100 employees utilising the FWAs regularly - 10 employees work on flexi-time and flexi-place, and 5 employees are on permanent part-time.

ABC Construction had formalised the FWAs into its HR policy, and its employees can use the following FWAs:

i. Start work between 7-9am and finish work between 4-6pm;
ii. Work remotely at the client's place after meetings or return to home to continue working;
iii. Work less than 35 hours per week with pro-rated remuneration and benefits.

Items	Funding Quantum	Amount claimed
Work-life consultancy	80% of $10,000	$8000
Work-life training for 10 employees	80% of ($800 X 10)	$6,400
IT infrastructure for flexi-place	30% of $15,000	$4,500
ESS Implemented	30% of $20,000 for lactation room & facilities	$6,000
		$24,900

NB: Developmental Grant under the Work-Life Grant is one off & capped at $40,000 per company.

Table 2: Monies claimed under Work-Life Grant

ABC Construction tapped on the grant to implement flexible work arrangements and claimed **$24,900** in the process.

Contact Details for more information on WorkPro schemes

Singapore National Employers Federation (SNEF) and National Trades Union Congress (NTUC) are the only official programme partners appointed to market and administer WorkPro. Companies should approach only SNEF/NTUC for assistance and advice to apply for WorkPro.

This is a free service at NO cost to all companies. Only applications made by the company applicants themselves and submitted to SNEF/NTUC will be recognised and considered for funding under WorkPro.

Application made by private consultants or external parties to act on a company's behalf will not be entertained. More information can also be found at www.wda.gov.sg/workpro and www.mom.gov.sg/workpro.

SNEF Hotline: 6827 6949
Email: wdm@snef.org.sg
Website: www.sgemployers.com

NTUC Hotline: 6213 8383
Email: workpro@ntuc.org.sg
Website: www.ntuc.org.sg

Enterprise Training Support (WDA Grant)

1. Curriculum Contextualisation & Alignment (CCA) Grant

This grant supports the development of structured OJT in the company.

Example:

ABC Construction Pte Ltd purchased robotic total stations and remote controlled demolition machines to improve workplace productivity (i.e. via BCA's MechC schemes). They recognized earlier on that overtime there will be new workers from various countries hired to operate them. This prompted them to tap on ETS grant to develop structured OJT blue-prints to attain train their workers.

The OJT blue-print for the surveying equipment was developed by a curriculum developer. After that experience, they discovered that WDA's courseware development template is easy to use and decided to develop the OJT blue-prints for demolition equipment. Table 2 (below) shows a computed example of courseware development under the CCA grant.

Newly Hired Worker/Mentor	New Hire Retention Incentives	OJT-Training Allowance	Amount claimed
Curriculum Developer	Robotic Total Station	$2,000	$1,800 (90%)
Do-it-yourself	Remote Controlled Demolition Machines	Salary x Man-hours = $2,400	$2,000 (max cap)
			$3,800

Table 3: Monies claimed under CCA scheme

The contractor claimed $3.8K for two OJT blue-print developments approved by WDA.

2. HR Development Grant

This one-time grant supports organisations in adopting holistic training plans, enhancing learning and development systems or developing a career progression pathway that is tied to the enterprise training roadmap.

Example:

ABC Construction Pte Ltd tracks their employees training record and manually files them into folders. Whenever the senior management request for HR to search for employee's training records, they had difficulty searching for the document due to the many records. This company decided to develop a new system to monitor and administer training records.

They secured the services of a consultant to help them revamp and roll-out a more productive employee training system. They assigned their own staff to work with the consultants to roll-out its new HR system. Table 3 (below) illustrates the computed funding claimed for utilizing this grant:

Items	Costs
• **Invoiced cost of consultation**	=$12,000 x 70% funding Co-funding for consultation = $8,400
• **Actual Manpower cost incurred in developing the system**	Sub-capped at $5,000
Total funding tapped:	**$12,900**

Table 3: Monies claimed under HR Development Grant scheme

After the roll-out, the new system can list down the core competencies required for each employee. Employees can also check their past training records, and a list of upcoming training courses

The contractor claimed a one-time grant of $12.9K for the development of a employees' training system.

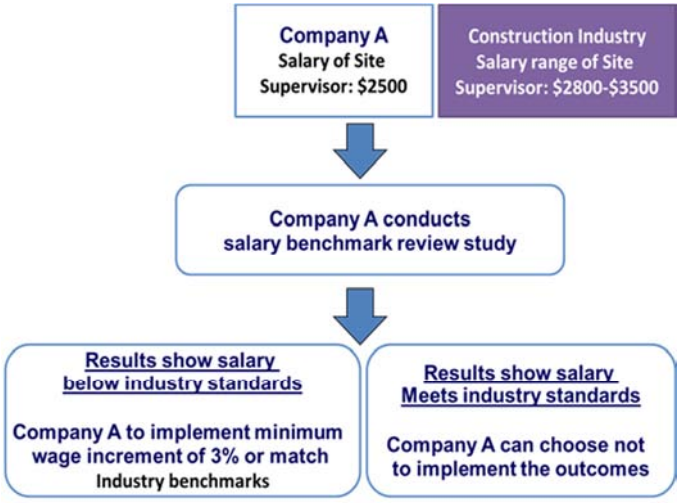
3. Compensation and Benefit System Review Grant

This grant aims to help organisations defray costs associated with consultancy to conduct enterprise-wide industry salary benchmark reviews to restructure wages, so as to better attract local talent and retain them in a tight labour market.

Organisations tapping on this grant will have to commit to one of the following outcomes (see Flow Chart 1):

a) Increase wages to match the recommended salary benchmarks; or
b) At least 3% wage increase for their local employees.

Company A's management observed that its staff turnover rate is relatively high lately. The company's directors felt that they have been paying good salaries to their staff and even after comparing to MOM's salary data they felt that the company is paying fair wages. They have many projects on hand but they are losing good and experienced staff. To plug the leakage, they decided to tap on WDA's compensation & benefit scheme to help them review their employees' salary. They hired a HR consultancy to help them conduct a salary benchmarking exercise for all its positions with the intent to retain its existing and attract new staff. Table 4 (below) illustrates the computed funding utilized under this grant:



Flow Chart 1: Scenario of conducting salary benchmark under the Compensation & Benefit review grant

Items	Costs
• **Invoiced cost of consultation**	=$23,000 x 70% funding Co-funding for consultation = $16,100
Total funding tapped:	**$15,000 (subject to maximum cap per firm)**

Table 4: Monies claimed under Compensation & Benefits scheme grant

Amongst the many positions in the company, the consultants identified that salary for Site Supervisors was way below industry standards. This triggered the firm's management to increase their overall salaries by 10-20% to attract new and retain existing employees.

The contractor claimed a one-time grant of $15K to conduct a salary benching marking exercise to match their employees' salaries according to industry standards.

Contact Details for more information on WorkPro schemes

Organisations who require more information on the Enterprise Training Support scheme can contact the following appointed Programme Managers. More information can also be found at www.wda.gov.sg/ets. Alternatively you may call WDA Hotline at 6883 5885 or e-mail WDA_Enquiry@wda.gov.sg .

Programme Manager	Name	Tel	Email
Singapore National Employers Federation (SNEF) *www.snef.org.sg*	Mr Stephen Yee, Assistant Executive Director	6827 6928	stephen_yee@snef.org.sg
	Mr Don Tiong, Assistant Manager	6827 6926	don_tiong@snef.org.sg
Human Capital Singapore (HCS) *www.hcs.com.sg*	Mr Glen Chan Consultant	6603 8048	glenchan@hcs.com.sg
Capelle Academy *www.capelleacademy.com*	Ms Sim Yee Peng, Senior Partner	6325 4982	yeepeng.sim@ capelleconsulting.com
TUV SUD PSB Learning	Ms Charlene Ang, VP	6885 1488	charlene.ang@tuv-sud-psb.sg

www.tuv-sud-psb.sg			
Training Vision Institute *www.trainingvision.com.sg*	Mr Claudius Ng, Dy General Manager	6325 1066	claudius@trainingvision.com.sg
Singapore Chinese Chamber Institute of Business *www.scciob.edu.sg*	Mr Justin Lee, Divisional Manager	6334 1080	justin@scciob.edu.sg
NTUC Learning Hub *www.ntuclearninghub.com*	Ms Clara Chua, General Manager	6486 7795	clara.chua@nextu.com.sg
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POLWEL Co-operative Society Limited www.polwel.org.sg	Mr Kelvin Low ETS Programme Administrator	6235 6428	Kelvin.low@polwel.org.sg
SME Centre@SMF www.smfederation.org.sg	Ms Jessica Lee, Assistant Director,	6826 3025	jessicalee@smecentre-smf.sg
Singapore Association of Convention and Exhibition Organisers & Suppliers www.saceos.org.sg	Ms Lilian Kuan, Executive Director,	6379 5302	llilian@saceos.org.sg

<u>Innovation Credit Vouchers</u> (SPRING Singapore Grant)

These cash vouchers valued at $5,000 aims to encourage SMEs to upgrade and strengthen their core business operations through consultancy in the areas of innovation, productivity, human resources and financial management.

Apart from consultancy, these ICV also supports SMEs in the adoption and implementation of simple solutions to improve business efficiency and productivity. SMEs can use the ICV to implement solutions under the supportable cost categories of (i) equipment & hardware, (ii) technical solutions, (iii) professional services, and (iv) design & renovation.

Each SME is entitled to a maximum of eight vouchers. Each ICV project must be completed before the submission of a new application. The duration for each project should not exceed six months.

ABC Construction Pte Ltd is excited by this new scheme because it is cash vouchers instead of grant rebates. They decided to utilize vouchers to develop their HR capabilities which they are weak in i.e. compensation & benefits, and learning & development. They do not have systems in place for those two areas and have no idea how to go about establishing them. They use two vouchers to secure the services of a consultant to help them with setting up an attractive salary structure & ranges, variable pay component, and staff benefits, and as well as training roadmap for key job grades based on training needs, and training plan for staff.

For developing HR capabilities, the firm used two cash vouchers worth $10,000.

More information and application at http://www.spring.gov.sg/Enterprise/ICV

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4. Green Contractors Award by Architectural Services Department, Hong Kong Special Administrative Region Government.
5. Comprehensive Environmental Performance Assessment Scheme for Buildings by Buildings Department, Hong Kong Special Administrative Region Government.
6. Guidebook on Erosion And Sediment Control At Construction Sites by Singapore Contractors Association Ltd and Public Utilities Board.
7. Best Environment Practices:- Noise Control at LTA Sites by Land Transport Authority.
8. Singapore Standard SS ISO 14001:2004 Environmental Management Systems – Requirements.