

7. MAKING A START

While your organisation is creating a C&D waste management plan there are many simple, effective and immediate steps that can be taken to help reduce waste and operate more sustainably, for the benefit of everyone. These include:



Making someone responsible for C&D waste management on site



Establishing hazardous waste collection points



Planning and conducting training sessions to educate site staff, including external contractors and suppliers, about alternatives to conventional construction and demolition waste disposal and the objectives of these practices



Segregating construction waste into recyclable and non-recyclable



Segregating asbestos from construction & demolition waste



Introducing materials with a percentage of recyclable content



Transferring waste using only registered environmental service providers (ESP)



Identifying which materials can be saved and reused

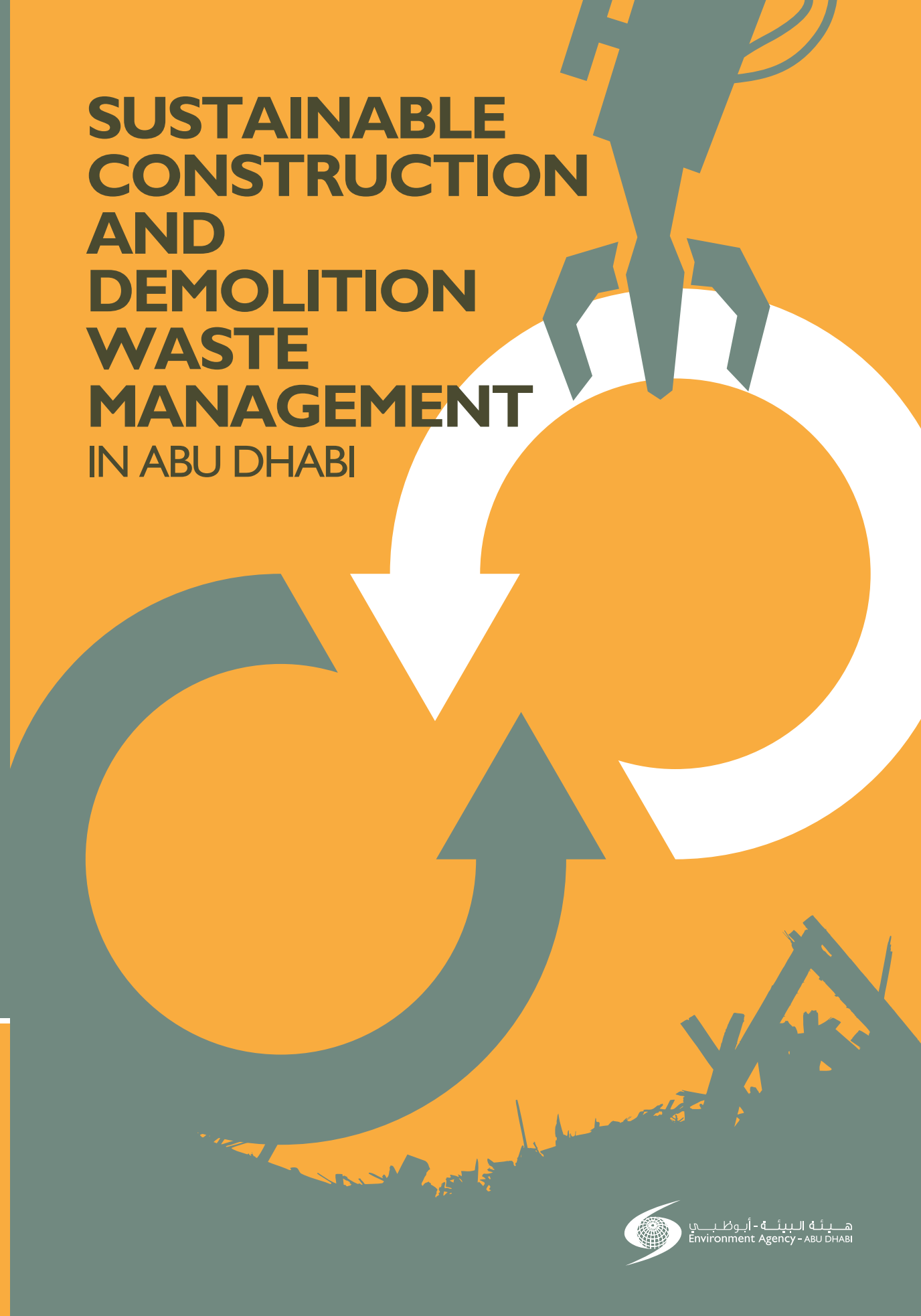


Tracking waste transport vehicles



Maintaining manifests of all waste types onsite

SUSTAINABLE CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT IN ABU DHABI



8. LEARN MORE

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The sources of data in this publication are from: Abu Dhabi Plan 2016-2020, Waste Reuse, Recycling, Resource Recovery, Treatment and Disposal Policy (EAD-EQ-PR-P-05), 2015; Waste Classification Technical Guideline (EAD-EQ-PR-TGD-01), 2015; Sustainable Waste Management for Organisations Guideline, 2015; Standard Operating procedures for licensing of C&D waste in the Emirate of Abu Dhabi from the Center of Waste Management (Tadweer), Waste Statistics in the Emirate of Abu Dhabi 2016, Statistics Center - Abu Dhabi

The Environmental Agency - Abu Dhabi (EAD) was established in 1996 as a government entity responsible for protecting the environment. EAD accomplishes its mandate through scientific based research, policy development, regulation development and enforcement, and by educating its stakeholders about the environment.

A key issue linked to the rapid development of the emirate how to manage the inevitable Construction and Demolition (C&D) waste that comes with this development, in order maintain a high quality of environment for everyone.

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I. INTRODUCTION

Construction and Demolition Waste Management in Abu Dhabi:

EAD issued a number of policies related to waste management aimed at reducing and handling waste in a manner which has the least negative impacts on the environment. The policies will be used to develop regulations and guidelines for handling all types of waste including Construction and Demolition (C&D) waste.

This guide explains the steps that should be taken by organizations in the construction sector to reduce the amount of waste they produce on site. It also addresses how they can take responsibility for the collection, segregation, transfer and disposal of their waste. Finally, it highlights the rewards of an integrated professional and efficient waste management system.

This guide is one of a series created by the Environmental Agency - Abu Dhabi that explores the key environmental sustainability challenges facing the Emirate of Abu Dhabi and management of C&D waste.

CHALLENGES

According to Statistics Centre - Abu Dhabi (SCAD) data during the period of 2009-2015, the Construction and Demolition sector was identified as one of the largest waste generator in the Emirate. C&D waste collection and transportation is, to a large extent, performed by construction firms themselves or private sector service providers.

Large quantities of C&D waste are mixed with other types of waste and therefore made unsuitable for recycling, resulting in the waste being taken to landfill sites and losing opportunities to recover valuable resources.

Without the correct actions to improve the way we organise and regulate our C&D waste management activities, the amount of C&D waste will cause risks to public health and environment.



2. GOVERNMENT VISION

Abu Dhabi aims to be a leader in waste management, as part of its overall goal *“to preserve and enhance Abu Dhabi’s natural heritage and pass it on to future generations, acting as a regional leader in the efficient use of resources and contributing to a better quality of life for all.”*

ABU DHABI PLAN 2016 - 2020 HAS BEEN DEVELOPED TO FULFIL THE EMIRATE’S LONG-TERM VISION.

THIS FIVE-YEAR PLAN AIMS TO ENSURE PROPER STRATEGIC COHERENCE AND ALIGN GOVERNMENT EFFORTS TOWARDS COMMON AND AGREED GOALS. WITHIN THE CONTEXT OF THE ENVIRONMENTAL OBJECTIVE OF THE ABU DHABI PLAN, A SPECIFIC PROGRAMME IS DESIGNED TO ACHIEVE INTEGRATED WASTE MANAGEMENT. THE TARGET FOR THIS PROGRAMME IS THAT 60% OF WASTE GENERATED IN ABU DHABI IS MANAGED AND TREATED IN ENVIRONMENTALLY AND ECONOMICALLY SOUND MANNER BY 2020.

TARGETS AND OBJECTIVES

Abu Dhabi Emirate is set to build a world class sustainable waste management system through developing and establishing well-defined policies, strong regulations and clear licensing controls. These measures will ensure a professional and thorough approach to governing a wide array of users and providers.

We will transform our approach to C&D waste management by encouraging construction companies and individuals to take more responsibility for their waste and to be accountable for its safe and legal disposal.

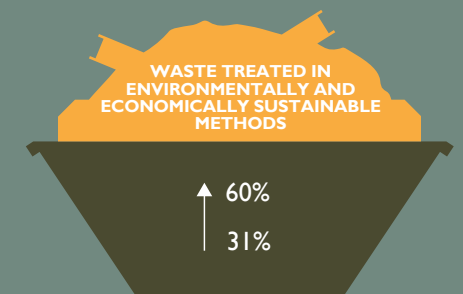
Together, our aim is to reduce the amount of C&D waste we generate, divert more waste from landfill sites and encourage the recycling of materials instead. Recycling puts less pressure on the need to extract and process raw materials for building, thereby saving energy and reducing carbon emissions.

We are committed to the creation of state-of-the-art facilities that prevent the loss of these valuable resources, discourage illegal dumping and the flouting of our laws.

To achieve the transformation we are calling upon government and private sector companies and individuals to work together with renewed commitment. We can deliver significant benefits for our economy, our society and the environment too by considering C&D waste as a potentially valuable resource.

OUR TARGET FOR 2020

THE WASTE MANAGEMENT PROGRAMME WITHIN ABU DHABI PLAN HAS SET A TARGET TO INCREASE THE PERCENTAGE OF WASTE TREATED USING ENVIRONMENTAL AND ECONOMICAL SUSTAINABLE METHODS FROM 31% TO 60% BY 2020.



Source: Abu Dhabi Plan 2016-2020



3. SUSTAINABLE C&D WASTE MANAGEMENT

Abu Dhabi government ensures the proper application and sustainable use of natural resources and encourages a reduction in the production of C&D waste, in addition to monitoring all activities related to waste management in order to overcome the environmental and economic damages resulted from improper disposal of waste.

Consequently, an increasing need for a safe and effective waste management system emerges along with waste recycling that conserves the environment and contributes economic benefits to society and its economic sectors.

C&D waste is classified into different types produce from different sources or activities, such as: construction, demolition, excavation, refurbishment of houses, and road refurbishment. However, several factors may lead to variability of C&D waste, such as: varying relevant regulations to C&D waste management industry, variety of disposal options including illegal dumping, different cost of conventional landfill disposal, and inconsistent composition of C&D waste.

Typical C&D waste components arising from construction and demolition activities may include all or some of the items listed in Table I below

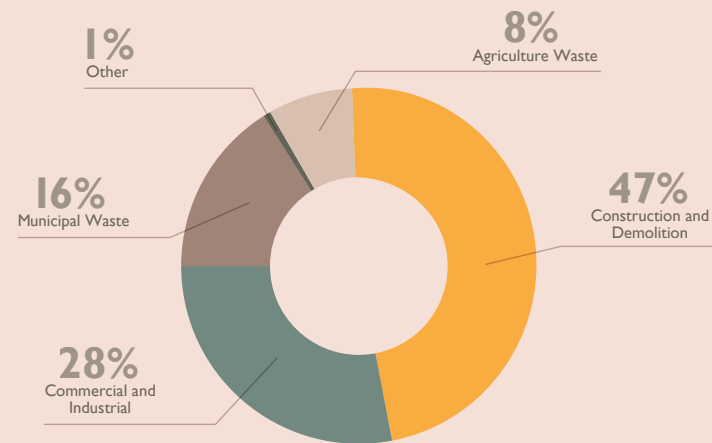
TABLE I	TYPICAL C&D WASTE COMPONENTS	
	Mixed Solid & Food waste	 Metal / scrap steel
	Cardboard and Paper	 Pallets
	Masonry	 Roofing (Asphalt)
	Plastics	 Wood
	Asphalt	 Ceiling tiles cuttings
	Concrete and Glass	 Gypsum / Drywall

C&D WASTE QUANTITIES AND ITS TREND

The total amount of the waste generated in Abu Dhabi has been rapidly varying in recent years. The official figure for 2016 was about 9.6 million tonnes of solid waste produced (more than 26,000 tonnes/day). The vast majority of waste, about 47%, came from our many construction and demolition sites concentrated in and around the vibrant Abu Dhabi City area itself.



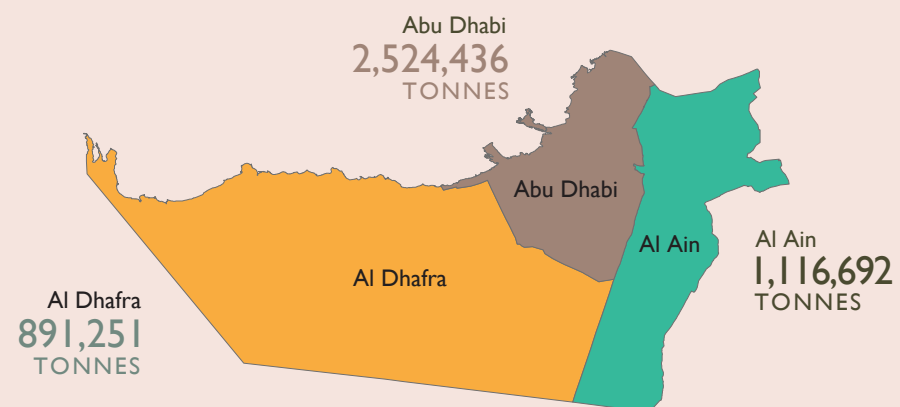
FIGURE 1

PERCENTAGE DISTRIBUTION OF NON-HAZARDOUS SOLID WASTE BY SOURCE ACTIVITY, 2016

The statistics shown in figure 2 indicate that in 2016 the greater Abu Dhabi region generated 2,524,436 tonnes of the C&D waste, compared to 1,116,692 tonnes in Al Ain region and 891,251 tonnes in Al Dhafra region.

Source: Waste Statistics in the Emirate of Abu Dhabi 2016, Statistics Center - Abu Dhabi

FIGURE 2

C&D WASTE GENERATION BY REGION - 2016**C&D WASTE MANAGEMENT**

Waste reuse is an important aspect of waste management that maximises the environmental benefit. If the reuse is done at the source of generation, it significantly reduces the cost resulting from waste collection, transport, treatment and disposal. It involves reusing materials and products in a form that is close to their original form.

The C&D waste management system is based on the principles of waste reuse and recycling. Success of this approach will require systematic information and involvement of the construction companies in segregating the C&D waste from other recyclables such as plastics, wood etc.

Recycling is a process to converting waste into new products to reduce the consumption of virgin / raw materials resulting in reducing the energy required for treatment of waste thereby reducing the environmental impacts due to the conventional waste disposal.

In the Emirate of Abu Dhabi, C&D waste recycling is processed by two Crushing plants (Al Dhafra & Al Ain) with average capacity of 8,000 and 2,000 tonnes/day for Al Dhafra and Al Ain plants respectively.



AL DHAFRA RECYCLING INDUSTRIES

Al Dhafra Recycling industries was Established in December 2008 and operated in May 2010, in Abu Dhabi Emirate.

Al Dhafra Recycling Industries is responsible for the processing of C&D waste materials across the emirate of Abu Dhabi, excluding Al Ain.

The aim of the plant is to reduce the level of construction and demolition waste material being disposed in Abu Dhabi's landfill.

All waste materials sent to the recycling plant are inspected for sustainability before processing. Metal

and other unsuitable materials are extracted before diverting the construction and demolition material to the processing plant, where the material is crushed to create 100% recycled aggregates and asphalt, which have approved specifications of well graded 37.5-0 mm base coarse and sub-base.

Al Dhafra facility produced RCA (recycled crushed aggregates) with average capacity of 8,000 tonnes/day or about 1.5 million tonnes/year.



The recycled material is currently being used as road base for construction in various prestigious projects such as:

- Abu Dhabi Airport Company - Abu Dhabi Airport T3 project
- DoT/ Musanada - Highways and infrastructure projects

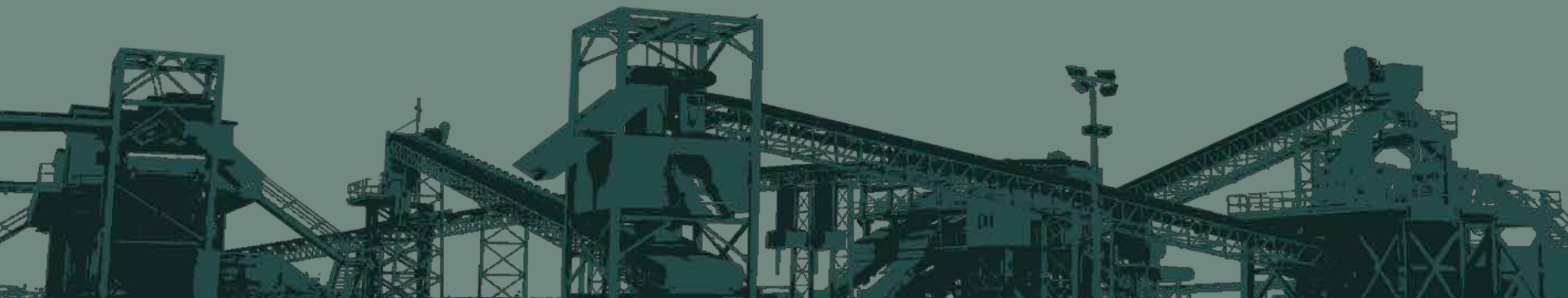
C&D WASTE (RAW MATERIALS)



WET CRUSHED AGGREGATE (PRODUCT)



DRY CRUSHED AGGREGATE (PRODUCT)



4. BENEFITS FOR C&D WASTE MANAGEMENT

Achieving our goals set for the construction & demolition waste management will deliver substantial benefits across Abu Dhabi for business and the economy, for our citizens and their families, for the environment and our natural resources.

The overall outcome will be an improvement in business efficiency and profile that will lead to broader social, environmental and economic benefits.

Such as:

- ☛ Achieving the targets for the treatment of C&D waste and the Abu Dhabi environmental target for diversion of waste away from the landfill.
- ☛ Reducing the environmental and health risk resulting from the improper management of C&D wastes.
- ☛ Encouraging the efficient use of resources in accordance with the principles of sustainable development and life cycle approach.
- ☛ Encouraging sustainable use of recycled products.
- ☛ Positive contribution to the economic development as result of recycling, reusing of C&D waste materials and use of recycled products.
- ☛ Encouraging the government and private sectors to share responsibilities and creating a sense of social accountability, for managing C&D waste.

KEY BENEFITS FOR SUSTAINABLE CONSTRUCTION WASTE MANAGEMENT PRACTISES FOR COMPANIES:

- ☛ Saving on purchased raw materials
- ☛ Savings in landfill fees
- ☛ Ease of compliance with environmental regulations and sound social and environmental practices
- ☛ Increase reuse/recycling of materials
- ☛ Lower levels of material wastage



5. CASE STUDIES

A FIRST FOR THE MIDDLE EAST

The Government's Waste Management Strategic Planning describes a wide range of infrastructure investment projects that will deliver the transformation we seek - and there are already initiatives underway that are taking important steps towards the achievement of ambitious targets.

All new construction developments are now subject to The Abu Dhabi Urban Planning Council's Estidama Pearl Rating System, the first of its kind in the Middle East.

Its rating system sets minimum standards for the planning and construction of buildings and provides incentives for developers who achieve a sliding scale

of targets covering waste segregation, diversion from landfill, recycling, sourcing of building materials and energy and water consumption.

So far more than 40 developments in the Emirate are working to the Pearl Rating System standards and there is a full programme of Estidama training for construction industry professionals to spread best practice and keep Abu Dhabi on target to transform the Emirate into a model of sustainable development.

Masdar city and Six Construct have strict and extensive procedures for segregating reusable and recyclable materials throughout their construction projects.

MASDAR CITY

MASDAR CITY SETS THE SYSTEM FOR CONSTRUCTION & DEMOLITION WASTE MANAGEMENT



Masdar City continues to work towards minimising waste during the construction process by reusing and recycling all waste steel, concrete and wood. In order to achieve this, the majority of Masdar City construction waste is taken by contractors to the onsite Material Recycling Centre (MRC), where it is then separated. Wood is stockpiled for reuse or processing in a wood chipper to benefit the landscaped areas. Steel, other metals and plastics are collected and sent offsite for recycling. Concrete waste is ground down using a crusher for reuse in construction.

Masdar has been working to achieve the maximum waste diversion from landfill, successfully diverting 75% of all construction waste from landfill in 2015 and selling all of its diverted waste to the recycled waste management companies. The funds raised from the sale of waste materials were added to a fund aimed at financing student led sustainability projects in the community.

SIX CONSTRUCT

SIX CONSTRUCT ACHIEVES THE STANDARDS FOR CONSTRUCTION & DEMOLITION WASTE MANAGEMENT FOR ITS PROJECTS



In line with the legal requirements currently in place for the conservation of the environment, Six Construct ensures the preservation of its surroundings is taken into consideration throughout the construction of all its projects. The Corporate Social Responsibility (CSR) initiative - waste management, recycling and segregation of materials - has been applied to many project sites to decrease the extraction of natural resources and reduce the volume of waste sent to landfill.

The following Projects reflect Six Construct's dedication to implementing its CSR initiative to its construction sites which are categorised in green building project aiming to get LEED and ESTIDAMA certification. The effectiveness of the outcome is measured by the amount of waste percentage diverted from landfills.

- Cleveland Clinic Abu Dhabi: 82.9% percentage of diversion from landfill
- ADNOC General Headquarter: 89.4% percentage of diversion from landfill
- Yas Mall 82.1% percentage of diversion from landfill

6. TIME FOR ACTION

Waste management in Abu Dhabi is changing for the better - and now is the time for everyone in the construction field to take the necessary steps to contribute to a more efficient and sustainable C&D waste management system.

Each construction company must be committed to achieve a sustainable approach to managing C&D waste generated during its projects; by using the following simple, step-by-step model:

CREATE C&D WASTE MANAGEMENT PLAN

Construction companies should prepare and implement a C&D Waste Management Plan that contains the following:

PROJECT INFORMATION: A description of the project that includes information regarding the location, scope, overall project and planned activities as well as project site layout.

WASTE IDENTIFICATION AND MATERIAL MANAGEMENT: An indication as to the anticipated types and quantities of construction waste generated by the project, as well as a specified materials management hierarchy to ensure optimum management of solid wastes.

PERFORMANCE GOALS AND COST/REVENUE ANALYSIS: Specified recycling goals as well as a cost/revenue analysis associated with the waste management practices on site.

ROLES AND RESPONSIBILITIES: Identified roles and responsibilities for team members involved in the waste management process on site that ensures there is a dedicated team for C&D waste management onsite.

IMPLEMENTATION CONSIDERATIONS: The plan should address the implementation requirements; mainly the logistics arrangement and requirements to be followed on site (e.g. number of containers / skips, storage area, transportation schedule, etc.)

DOCUMENTATION AND QUALITY ASSURANCE: There should be a specified reporting mechanism that includes waste reduction by way of recycling, record of sales, record of recycling, etc.

FORMS AND CHECKLISTS: Forms that shall be used to record and calculate waste generation data including transportation and waste reduction calculations, inspection checklist and list of waste management facilities / recyclers planned to be used.



IMPLEMENTATION

IMPLEMENT C&D WASTE MANAGEMENT ACTIONS

- 1 **SOCIAL RESPONSIBILITY & MANAGEMENT SUPPORT**
Company Top Management must provide visible commitment and support for the implementation of C&D waste management plan including overall waste minimisation strategy goals and objectives.
- 2 **WASTE SEGREGATION**
 - a) During construction, all waste material generated onsite should be segregated and placed in clearly recognisable skips for later collection and transportation offsite by designated recyclers/collectors.
 - b) The company shall identify and designate a specific storage area within the site to be dedicated for temporary waste storage.
 - c) The waste storage area shall be clearly marked with signage and storage instructions.
- 3 **WASTE TRACKING AND MONITORING**
All wastes resulting from construction and demolition activities are to be properly tracked in order to document quantities of salvaged or recycled materials and final destination.
- 4 **RECORDKEEPING**
Recordkeeping is a key element of the construction and demolition waste management plan. Details regarding generated waste quantities, their movement and treatment should be recorded and maintained.
- 5 **TRANSPORTATION**
Only waste transporters licensed by the Centre of Waste Management - Abu Dhabi (Tadweer) should be contacted to collect the waste offsite. Wastes are to be transported in covered trucks avoiding busy roads and periods of peak traffic to minimise any health and traffic disturbances.
- 6 **RESPONSIBILITIES, TRAINING AND AWARENESS**
Other than waste handling and minimisation, the company should assign responsibilities and promote good practice awareness as part of health and safety induction/training for workers onsite.
- 7 **PLAN REVIEW AND UPDATE**
Effective waste management is an on-going process. The plan must be reviewed periodically to ensure that it is still appropriate for the types of waste being handled.

