

# Sustainable Construction



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# What is Sustainable Construction

- Social progress, which recognises the needs of everyone
  - Effective protection of the environment
  - Prudent use of natural resources, and
  - Maintenance of high and stable levels of economic growth and employment



# Defining Sustainability

Sustainability can be defined using the following comparison:

## Traditional Criteria

Performance

Quality

Cost

## Sustainability Criteria

Resource depletion

Environmental degradation

Healthy environment



# What can the construction industry do?

Re-use existing building assets.

Design for minimum

Aim for Lean Construction

Minimise energy in construction

Minimise energy in use

Do not pollute

Conserve water sources



# Environmental Considerations

- Energy use, global warming and climate change;
- Resources, waste and recycling;
- Pollution and hazardous substances;
- Internal environment; and
- Planning, land use and conservation.



# Environmental Considerations

## More selective of building materials

The following considerations need to be taken into account:

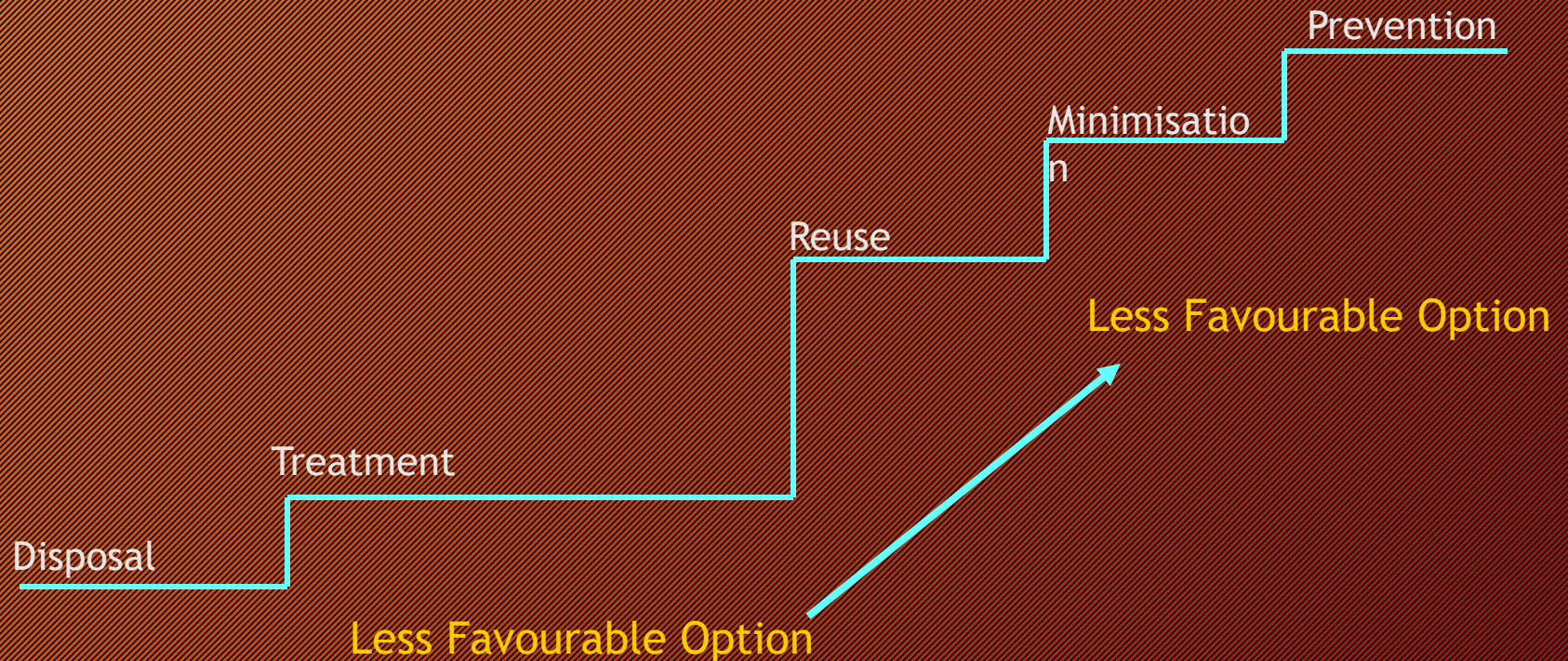
Environmental performance of the processes used by manufacturers and suppliers generally;

- Use of recycled materials;
- Re-usability of materials and items; and
- Recyclability of materials and items.



# Environmental Considerations

Waste minimisation through re-use and recycling.





# Sustainable Design

Energy conservation features

Solar energy utilization

Water conservation features

Incorporation of recycled materials

Low emitting material

Reduced building construction waste

Less environmentally destructive site development



# WHAT CAN YOU DO TO IMPROVE?

## Operational Carbon Dioxide (Energy Consumption)

Whether specifying for new build or refurbishment, in design (for operational costs) and in construction, carbon dioxide emissions from energy consumption impact on the environment and on costs. Ways to reduce carbon dioxide emission include:



# WHAT CAN YOU DO TO IMPROVE?

- Energy efficient equipment (for heating and cooling, lighting - indoor and street, equipment etc.)
- and sensible assessment of internal heat gains
- Simple and effective controls
- Maximising good day-lighting
- Controlling solar gain
- Natural ventilation and the use of passive engineering techniques, such as thermal mass
- Improved insulation and air tightness
- Sources of renewable energy (wind, solar, wave, bio-sustainable fuels)
- Appropriate use of combined heat and power



# WHAT CAN YOU DO TO IMPROVE?

## Embodied Carbon Dioxide (Embodied Energy)

All aspects of component selection are important; design, quantity, production, transport, product

life, and environmental impacts from “cradle to grave”.

Ways of reducing this include:

Lean construction/prefabrication/right first time

Avoidance of waste in design and manufacture

Use of local materials and suppliers and avoidance of CO2 intensive components

Avoidance of CO2 intensive components



# WHAT CAN YOU DO TO IMPROVE?

## Water

### You should consider:

- Use of water saving devices
- Sub-metering (to allow identification and monitoring of high demand facilities)
- Leak detection (to facilitate prompt maintenance)
- Opportunities for grey water recycling and use
- Rainwater collection and use; and
- Use of sustainable drainage systems.



# WHAT CAN YOU DO TO IMPROVE?

## Waste

Significant reductions in waste can be achieved through good design, improved logistics, better onsite

construction practices and re-use/recycling wherever possible.

A hierarchy of waste management should be adopted:

Reduce – design out waste

Re-use – look for opportunities to re-use materials on site (e.g. soils for landscaping rather than

landfill – also reduces transport movements.

Recycle – look for opportunities for others to use your waste

Recover (energy)

Dispose



# WHAT CAN YOU DO TO IMPROVE?

## Biodiversity

Construction does not have to reduce the ecological value of a site in many cases it can be used to enhance it. Habitat can even be created within buildings.

Examples of appropriate actions for wildlife include:

Protecting parts of the site and its surroundings that are important for wildlife from damage during the construction process.

Planting tree species which occur, or could occur, naturally at the site.

Leaving some large grass areas uncut for the benefit of wildlife rather than keeping large lawns.

Minimising the use of herbicides and use biodegradable products.

Using environmentally friendly ways of controlling unwanted pests.

Protecting and enhancing existing ecological features (wildlife, trees, hedges, water courses).

Involving interested local parties is likely to be beneficial.



# WHAT CAN YOU DO TO IMPROVE?

## Transport (for the construction process)

Transport has significant impact on sustainability through the consumption of fuel. Reducing transport reduces environmental impacts and can save money. Careful planning can significantly

reduce transport impacts, including:

Minimising the transport distances of materials

Transport of personnel (promote green travel plans to construction site for site employees, car sharing, minibuses etc.)

Fuel type used for transport (use of cleaner fuels)

Local transport infrastructure (ease of access, public transport, car parking)



# Whole Buildings" Strategy:

Existing R&D programs, building technologies, and components tied together by Systems Integration and Computerized Design Tools.

