

GREEN BUILDING DESIGN STRATEGIES

SUSTAINABLE SITE

Site selection

- Locate near public transit
- Locate on infill or brownfield site

Site treatment and landscaping

- Assess existing ecosystem and minimize their disturbance
- Use plantings to stabilize soils and control erosion
- Landscape using indigenous or edible plants
- Plant trees to shade building and vehicles
- Minimize stormwater runoff
- Plan landscape before the building

Building placement

- Site buildings and infrastructure to reserve undeveloped land
- Provide access and facilities for pedestrian and bicycle users
- Place building to integrate with the community

Quality of exterior

- Use porous material for paving
- Reduce paved areas
- Use light-colored roof and paving materials to reduce heat island effect
- Design living roof system
- Encourage shared parking
- Reduce light pollution

ENERGY AND ATMOSPHERE

Energy source

- Use renewable energy sources
- Use Green Power
- Orient the building to maximize the use of the sun, shading and trees

Mechanical systems and controls

- Design mechanical systems for appropriate use patterns and locate in areas accessible for maintenance and service
- High-efficiency mechanical and electrical systems
- Integrate systems wherever possible
- Commission the building
- Use integrated methods/mechanisms to track energy use
- Plan for ongoing optimization of building energy and IAQ performance
- Use intelligent controls for electric systems
- Allow varied light levels for different tasks

Other

- Use reflective, suspended ceilings
- Super insulation/tight construction
- Design the building to prevent infiltration
- Reduce CFCs in HVAC&R systems

WATER EFFICIENCY

- Water efficient landscaping
- Collect and store rainwater for uses in building
- Use a graywater system
- Specify composting toilets and/or waterless urinals
- Use low-flow water fixtures
- Use an alternative wastewater system

MATERIALS AND RESOURCES

- Reuse an existing building
- Manage construction waste for minimize landfill contribution

Design

- Design for standard sizes
- Design for disassembly at end of life
- Include composting facilities
- Design for occupant recycling program

Material selection

- Reuse materials
- Select materials w/ recycled content
- Select renewable/rapidly renewable materials
- Select low embodied energy use materials
- Select local/regional material
- Select climate appropriate materials
- Use wood products from sustainable forests

INDOOR ENVIRONMENTAL QUALITY

Air Quality

- Ongoing air monitoring
- Increased natural ventilation
- IEQ management plan during construction
- Select low VOC/nonirritant materials
- Ensure good ventilation during high VOC-source applications
- Design building to minimize condensation and water vapor
- Design duct work to allow access for cleaning
- Allow for occupant control of personal environment and access to operable windows
- Plan for use of nontoxic cleaners/procedures
- Design isolated storage closet for cleaning and maintenance products
- Locate building away from external pollution sources

Light quality

- Split task and ambient lighting
- Use daylight

Other

- Design for acceptable acoustic qualities
- Avoid electromagnetic fields
- Radon abatement

GREEN STRATEGIES AT DIFFERENT STAGES

Stage	Issues
INCEPTION	<ul style="list-style-type: none"> • Briefing: identify green design as an issue to be considered • Agree environmental performance targets for the building • Prefer brownfield to Greenfield sites
DESIGN Preliminary Studies	<ul style="list-style-type: none"> • Analyse site for sunlight, shelter and available shading • Research the building type and analyse good practice examples • Consider what is achievable given the cost constraints
Sketch Studies	<ul style="list-style-type: none"> • Site layout: use passive solar strategies, including daylight • Provide solar access to residential living spaces • Use thermal mass to dampen temperature fluctuations • Maximise daylight penetration using plan and section • Consider water supply and waste handling methods • Use locally produced materials • Make iterative studies of design concepts to assess performance
Pre-Project	<ul style="list-style-type: none"> • Consider room heights for cooling, heating and daylighting • Consider thermal mass for building use pattern: intermittent or continuous • Optimise proportion and distribution of external envelope openings with cooling and lighting in mind • Specify design criteria for services • Calculate predicted building performance and assess against targets
Basic Project	<ul style="list-style-type: none"> • Finalise layout (plans, sections, elevations) for statutory approvals: implications for daylight/ventilation/passive and active systems • Select materials and construction methods having regard to thermal mass, openings and shading, sourcing of materials
Execution of Project	<ul style="list-style-type: none"> • Develop specifications for good workmanship and site management • Detail for thermal performance, daylight, controlled ventilation • Specify window and external door frames for environmental performance • Consider internal and external finishes for environmental friendliness • Consider environmental performance in selection of cooling and heating plant, equipment, and control devices • Specify electrical lighting equipment and controls for lowest consumption • Specify sanitary fittings for low water consumption
CONSTRUCTION Tender Procedure	<ul style="list-style-type: none"> • Explain the requirements of green design to tendering contractors • Specify more demanding construction practices and tolerances
Supervision	<ul style="list-style-type: none"> • Protect the natural landscape of the site as much as possible • Ensure completeness of insulation coverings and no thermal bridging at openings • Contractor should not substitute materials or components without approval • Ensure acceptable methods of waste disposal
Acceptance	<ul style="list-style-type: none"> • Make sure client and users understand building concepts and systems (provide maintenance manuals) • Show how to get maximum value from the active systems controls
Defects Liability Period	<ul style="list-style-type: none"> • Monitor active systems for actual as against projected performance
MAINTENANCE AND REFURBISHMENT	<ul style="list-style-type: none"> • Use green finishes materials where these were originally applied • Use environmentally-acceptable cleaning and sanitation materials • Undertake energy audit prior to commencing project • Survey the potential for upgrading of active services • Survey the potential for upgrading of envelope • Consider indoor air quality and healthy building environment

Adapted from: European Commission, Directorate General XVII for Energy, 1999. *A Green Vitruvius: Principles and Practice of Sustainable Architectural Design*, James & James, London. [720.47 G79 E]