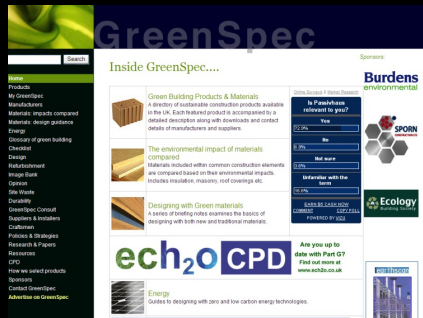


Sustainable Infrastructure

Just a superficial skim above the surface,
from a **greenie's** perspective of course



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Infrastructure, Innovation & Info

Infrapenny inforapound Sustainable Infrastructure?

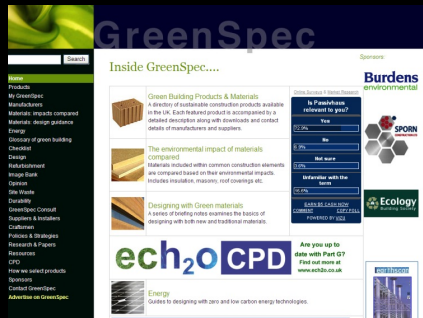
Just a superficial skim above the surface,
from a **greenie's** perspective of course

15/10/2012

2

This & contained presentations

- **Scribd:** www.scribd.com/brianspecman
- **> collection > Infrastructure**
- <http://www.scribd.com/doc/32152901/>
- http://www.scribd.com/document_collections/2401889



Presented to:

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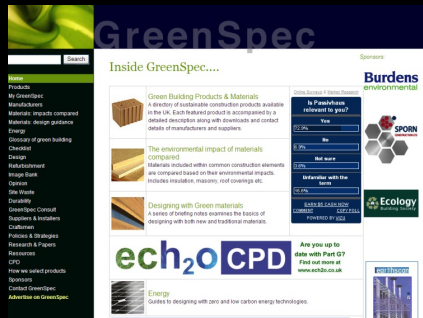
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- NISP workshop
- Wyboston off A1 East Of England



Scope of talk

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- Sustainable Infrastructure
- Standards and misinformation
- Information resources
- Big data Open data
- Surveys and GIS
- Digging holes & filling them
- Plaining and resurfacing
- Road sweeping & Gully Guzzling
- Fly-tipping
- Aggregates
- Cement replacement
- Biodiversity & infrastructure
- Energy generating pavement
- Street lighting and switching
- Water permeable pavement
- Green/Brown roofs
- Deducing waste in design,
- Simplified traffic management,
- Sustainable integrated transport



Are you Green
or Violet?

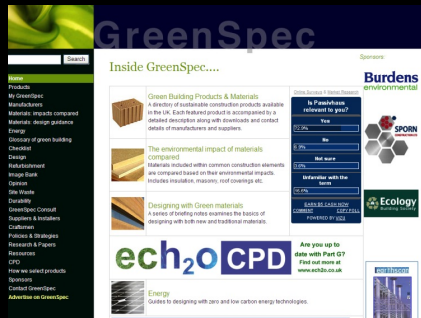


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Another GreenSpec CPD file to download
www.scribd.com/brianspecman

What is infrastructure?

- A Hot topic: conferences everywhere
- Impossible to list exhaustively
- Roads & pavement , airports, rail and waterways, and all that creates and maintains them
- Green grids and blue ribbons
- Towns and rural places
- All transport, distribution & consolidation systems
- Food, drink & good distribution and storage
- Waste in all forms and disposal/recycling/recovery
- Local government activity
- Public places, buildings and their consumptions
- Utilities & Renewables (Autonomy)



We have ours

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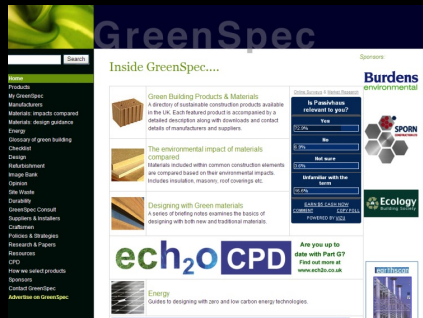
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- The Romans ahead of our time
- The Victorians create much of it
- It has done a great job
 - but much of it is past its best
- Some is replaced and others left to fail
 - Cost of repair outweighs Cost of water supply and potential fines
 - Shareholders need feeding



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3rd world doesn't

- Has managed without one for a century
- Now its benefits from the outputs of and leapfrogs the 1st world
- With PV for power & Chargers
- Satellite for TV,
- Mobile phone networks for email and internet
- Most of the infrastructure is still human and animal powered
- Still carry water and animals haul goods over poor roads,
- Open sewers are common

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Why is infrastructure Important?

- Zero Energy/Carbon/Emissions/Waste Lifestyles are impossible without addressing Infrastructure
 - Zero E/C/E/W homes: are possible
 - Until people move in and start consuming and wasting
 - Zero E/C/E/W food: is possible
 - If all is grown in own vegetarian gardens and allotments
 - If all food waste is composted or AD locally
 - Zero E/C/E/W employment: is possible
 - If Z E/C/E/W travel and Z E/C/E/W non-domestic building is possible
 - Zero E/C/E/W travel: possible
 - If roads and transport are Zero E/C/E/W
 - Zero E/C/E/W non-domestic buildings: possible
 - When Government sets the rules CfSB & CfSR
 - Until people move in and start working consuming & wasting

Utilities v Autonomy

- **Water, Power, Heat, Sewerage, Communications**
- **Generation and distribution**
 - including generation inefficiencies and transmission losses
 - Dispersed generation
 - ESCos and MUSCos
 - Renewables on site, off site and off shore
- **Extraction, cleaning and distribution**
 - Harvesting, bio-cleaning, recycling and reusing
- **Rainwater, roof, pavement and land drainage**
 - SUDS Sustainable Urban Drainage Systems
- **Sewerage, mains and treatment plants**
 - Alternative sewerage systems (but rarely CO2 competitive)
- **Mains**
 - Private wire (power, communication and/or heat)
 - ITC & Communication systems,
- **WiFi, Radio, IR,**
 - Satellites
- **Waste**
 - Segregate, Divert from landfill, Reclaim, repair, reuse, recycle, recover, rejuvenate,

Sustainable Infrastructure:

- how new ones could be created
- how old ones could be maintained
- What is one?
 - One in which the true costs to the environment are accounted for in the costs
 - to the developer
 - and in turn to the consumer

Infrapenny Infrapound

- Value Engineering: Pennies well spent?
- Everybody looks for a penny (d) here and a pence (p) there of cost savings
- Forgetting that we need to be chasing pounds (lb) or kilos (kg) of CO₂
- well actually tonnes (t) of CO₂
- Tonnes (t) of CO₂ for Pounds (£) spent

Big Data Open Data

- **Government Ambition**
 - Big Society Open Data
- **Local authority lead**
 - All departments data in public domain
 - Accessible for scrutiny
 - Accessible to build opportunities
- **GIS logging of data to maps**

Data Mapping: Local Energy

- Energy producers (required & excess)
 - Heat, Power and Coolth
 - Renewable Energy, Anaerobic digestion & others
 - All public buildings
 - (plant capacity, locations)
- Energy consumers
 - Pre and post: CRC, ECO, GreenDeal
- Fuel/biomass producers & stock pilers

Data Mapping: Local Energy

- Map demands and supply over day night and time and seasons
- Gap analysis plant sizes and locations
- Map potential private well insulated heat and power mains
- Optimise use of plant in existing buildings allowing for distribution losses
- Develop software to use the heat and power effectively.

Data Mapping: Local sourcing

- Resource producers, growers
- Manufacturers, stockists,
- Remanufacturers, Reclaimers, Exchange websites,
- Accredited (and non-)
 - Installers and applicators
- Of environmentally sound products and materials

Data mapping: Local Waste & Reuse

- Waste generated
 - Location quantities quality frequency
 - Municipal, commercial, construction
 - Leaves, turf, topsoil, tree/bush cutting
- handlers/segregation/recyclers/recovery/exchange sites/websites
- Compost, soil improvement generators
- Potential consumers (including LA)
 - Public: encouragement
 - LA: Coercion to specify recycled
- Local NISP database

Data Mapping: Local Water

- Water harvesting capacity
 - Victorian tanks common in Peterborough
 - View to bring back in to use for gardens
 - New tanks
- Permeable pavement
 - Existing or installed
- Open space capacity
- SUDS in developments

Data Mapping: Local Biodiversity

- BCT's Biodiversity for Building/
Landscape
- Map existing wild life
- Gap analysis species and population
- Map existing provisions for wildlife
- Gap analysis food source nests roosts
- Enable designers to compliment
existing with appropriate provisions to
encourage missing wild life

Local Domestic Reuse Centre

- Replace 'recycling' with 'reuse' center
 - Locate in poor end of town
 - Wide open space with defined walkways
- People bring stuff they don't want anymore and place it to show
 - Labels to say if okay or US, and what is faulty
- Others come to collect stuff
 - No financial transactions or a gate fee
- Most stuff goes home with new owners
 - Very little left at end of day goes to landfill
- Others might offer repair services: small fee

Data mapping: Local Food

- Learning centers: growing, cooking
- Producers:
 - Farmers, Allotments, Home growers,
- Logistics:
 - Consolidation and transport, food baskets, home deliveries/storage
- Retailers:
 - Chains, Independents, specialists, allotments & local producers markets
 - (less emphasis on international food)
- Local food & farm restaurants,

Environmental Assessments

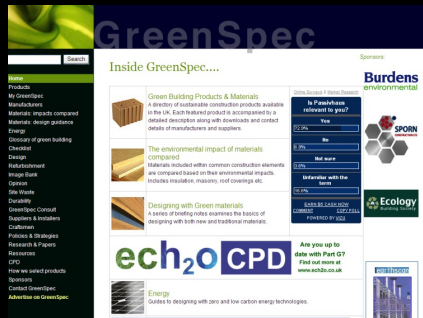
- EIA Environmental Impact Assessments
- Environmental Assessment Method
 - CEEQUAL
 - DREAM (Defense Related EAM)
- LCA
 - BRE's Green Guide to Specification
 - Loughborough student MSc or PhD in LCA:
bypass v no action
 - Later: LCA of creating a bypass v carrying
out a road upgrade

Standards & misinformation

- DoT standards: permit recycled (years ago)
- Dissemination: or lack of it
- BAU & SQP: Engineer's assumption
- Engineers: Permit, but do not require
- City Engineer's need re-education
- EA are educated but are they engaged?
 - 'Anti-recycling league'
 - Inconsistent interpretation: Postcode lottery
 - Conflict of interest? Too many roles
 - Scared of their own shadows

Information resources

- WRAP
 - AggRegain website
 - Weak specification policy
- Envirowise
 - Website, Publications,
 - Business visits, Analysis, Suggested Improvements,
- Recoup
 - Recycled Plastics
- GreenSpec (downloads soon)
 - Specification and Appendix
 - CPD Seminars
- Material Exchange (many)
- Earth Exchange (small competitor to NISP)²⁵



Services

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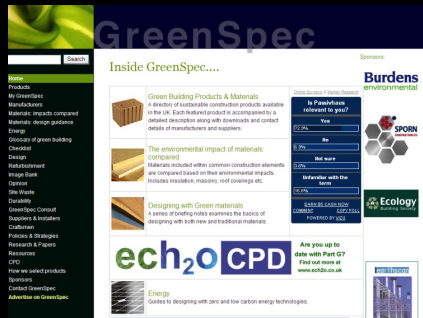
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- **Envirowise (free with business card exchange)**
 - Resource Efficiency
- **Salvo**
 - Salvage & reuse
- **NISP (best performing agency)**
 - Reuse & Recycling
 - Swaps: 1 man's waste is another man's resource
- **WRAP: (head of the organisation tree)**
 - Recycling focus moving towards resource efficiency
- **BRE (flyers are free)**
 - Waste management, SMARTWaste data logging kit
- **CE (your time donated)**
 - Checklist, KPIs and EPIS, Knowledge Exchange



Surveys & GIS

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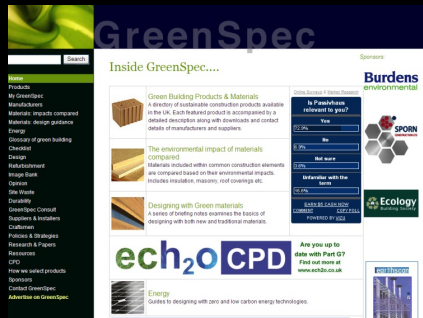


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- Digging up HV Cables is not very bright/creates brownouts
 - Cutting through gas mains provides a torch
- Computers are often clever typewriters
 - We can do better than that, But can't be asked
- Mapping of 3D model at and below the surface:
 - roads and hard surfaces
 - mains, pipes and cables, valves, boxes
 - Drains, chambers, etc.
 - underground tunnels and chambers
 - polluted soils, hazardous waste backfill
 - UXB Unexploded bombs
- Google Released new 3D Buildings Layer for Google Earth

GIS accessibility

- Hand held computers
 - can add data as:
 - surveys are carried out
 - roads are dug up
 - pipes and cables altered
- Can see data on:
 - your mobile, iphone, ipod or ipad
- National pipelines GIS complete



Digging holes,

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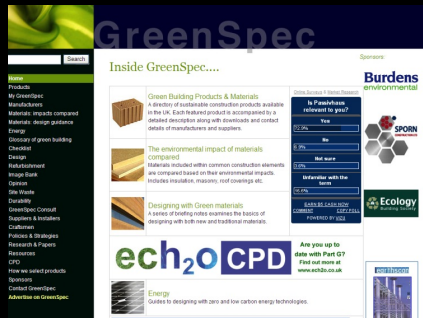
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- GIS plans
 - coordinated planning of opening up
 - All interested parties become team!!!!
 - Pro-actions not reactions
 - Short opening up: all in, all out
 - In London the holes are open for month/ years at a time with no activity
 - Fines for delays? Yes please.
 - Incentives for short term open and close:
- renting lanes soon



Filling holes

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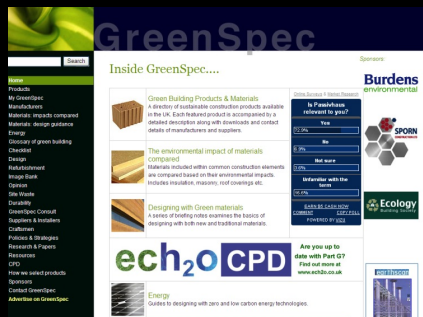
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- Arising: Not waste but resource
 - Quality Protocols: to set standards
 - Specifications and City Engineers to permit
- Add healthy ingredients or additives
 - Not hazardous, not soluble
- Refill
 - Stabilization and consolidation
- Resurface with recycled product



H&S DS

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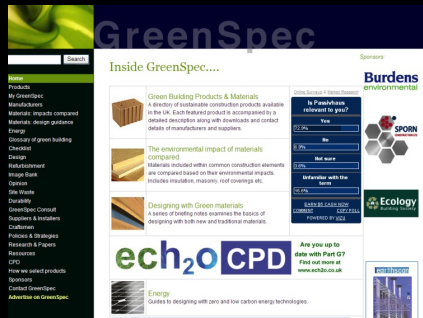
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- Health and Safety
 - Product Data Sheets
 - Interrogate the health risk information
- Question specifiers
 - if hazardous to anybody or anything
- CHIP (Transporting)
- COSHH (Handling & Application)
- CDM (Constructing & Maintaining)
- RoHS (Light fittings and controls)
- REACH (Sourcing & Manufacturing)



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Bio Remediation

- Polluted sites, idle land
 - waiting to be developed
 - Waiting for planning enquiry outcome
- Removed agricultural use
- Plant species to draw out the pollutants
- Harvest the pollutants
- NISP help you sell minerals & chemicals
- Clean the site in 3 years
- In place of 20 low loaders of plant to site

Bio Engineering not Civil Engineering

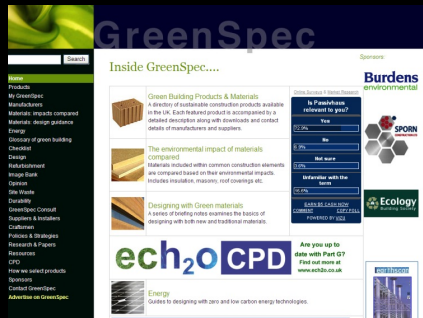
- Planting to stabilise unstable ground
- Ground cover: Slopes, embankments
- Tree roots: take care: water extraction
- Avoid cement and aggregates
- Avoid bituminous binders
- Avoid plastics
- Clay as a DPM or pond liners

Who pays: Frost Damage?

- Severe prolonged wintery spells
- Potholed roads
- Who pays? nobody and nothing done
- LA are working on up to 250 year cycle resurfacing programmes
- You pay for car repair damage
 - UK £1.2bn/annum
- Your insurer pays
 - You pay in premiums in the long run
- Should insurers pay LA & HA to repair sooner?
- UK Budget 2011: £100 m for repairs

Waste-free road planing and resurfacing

- **Planing 50 mm.**
 - Generates waste to landfill
- **Resurfacing 50 mm.**
 - Requires more aggregates and binder
- **Single action machines**
 - Plane, re-melt, correct recipe, relay
 - On the hoof
 - No waste



Urban Logistics

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- Consolidation Centres
 - Materials in by 'milk round'
 - Waste out by same vehicles
- Delivery of only what is needed
 - For the days work
 - To within x meters of work place
 - By logistics experts
- Skilled labour: kept active

Empty Buildings/Sites

- Database of empty sites and buildings
- Potential as:
 - logistics centers
 - Material Exchanges
 - Architectural Salvage
 - Construction Reclaim
- T&C Planning
 - Temporary Permission for temporary uses
 - and some permanent

JIT Just In Time delivery

- No idling, No down time
- Buffer parking places nearby
- No circulating in city
- Not supply chains
 - Create demand chains
 - Lean thinking
- Minimise
 - Packaging
 - Waste

Material Exchange

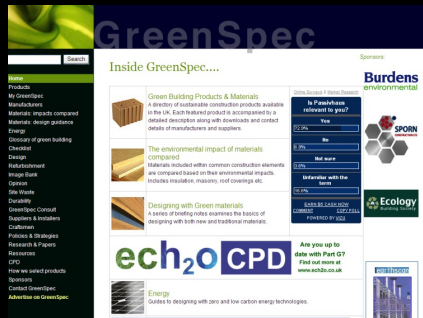
- Take back schemes
- Excess to requirements: Not waste
- Virtual Websites
 - E.g. Earth Exchange
- Real yards
- Architectural Salvage
- Construction reclaim
- NISP marrying wants and haves

Services Corridors

- Every road built could have a services common trench or culvert
 - Services need not be built in
 - provision to add them later
- Provision for moving water from wetter to drier parts of country
- Collection of rainwater and ability to move it to other parts of the country
 - Not pumping or add CO₂ load
- Avoid overhead cables
 - Run 11,000 V cables in central reservation
 - Destroy reception for radio, SatNav, TV
 - Some lights on all day (even when switched off)
 - At least you will know when your brain is being fried

Biodiversity related to infrastructure

- GI Green Infrastructure:
- Green Grids:
 - Green spaces and natural corridors
- Natural Corridor:
 - Footpaths, Cycle ways, Bridleways, buffer zones, hinterlands, hedgerows
- Blue Ribbons:
 - Rivers, Canals, Dykes, water bodies
- Navigation by hedgerows and boundary walls and fences: reinforce if damaged



Aggregates:

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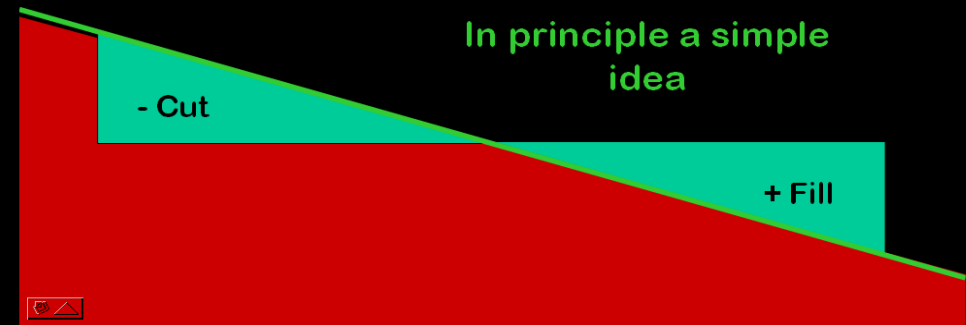
- Virgin
 - Levy, energy & emissions burden
- Secondary
- Recycled
 - Diverted from landfill, avoided landfill tax
 - Energy burden
 - Glass sand
 - Glass Aggregate in sub-base and base layers
 - Paper fiber as road reinforcement
- Manufactured
 - Carbon Sequestration

Subsoil and Aggregates

- Clean subsoil and aggregates arisings
- Material Quality Protocols
 - Avoid becoming waste
- Cut and Fill: in required amounts
- Excess to requirements
 - Earth Exchange
 - NISP
- Used somewhere else, locally

Reuse of what you find on site

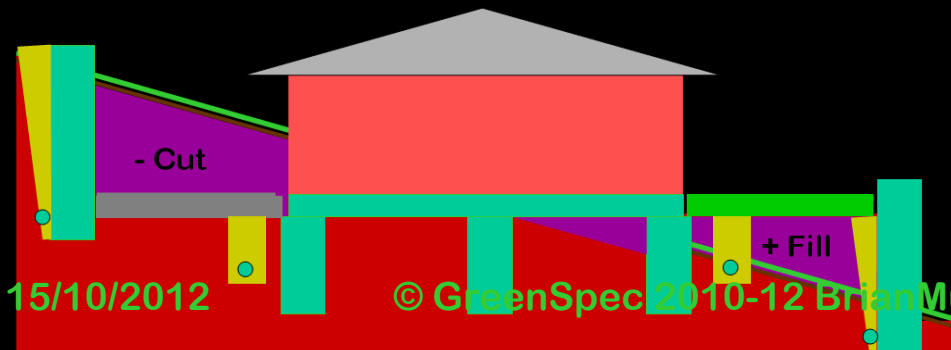
Cut and Fill



Cut and Fill



Allow for site strip, design fill size to accommodate excavated materials from:
Cut, retaining walls, land drains, foundations, floor slabs, services and drain trenches and paved areas, allow for bulking

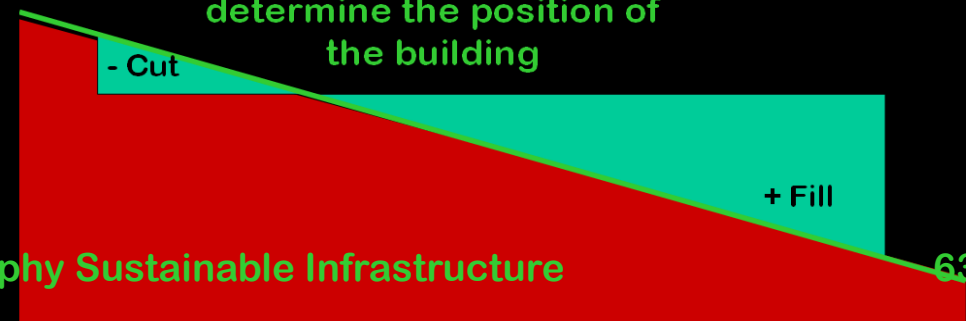


Cut and Fill

Check all your quantities first and determine the level



Or decide the level and determine the position of the building



Recycled Concrete

- As a recycled aggregate for concrete
- As large aggregate for:
 - Gabion filling (no cement)
 - Rock piling (no cement)
 - Permeable pavement sub-base (no cement)

Ashes: Aggregates

- PFA Pulverised Fuel Ash
 - Cement replacement
 - Aggregate substitution
- IBA Incinerator Bottom Ash
- FA Fly Ash

Low Carbon Cement Replacements

- GGBS Ground granulated blast furnace slag
 - Ground to fine powder
 - Slower set, Programme burden?
- PFA Pulverised Fuel Ash
 - No additional processes?
- Others (no carbon cement)
 - BRE investigating
 - Non-UK players: will they get a look in?
 - Will UK Cement/Conc/Agg sector resist?
 - £12m/annum marketing: probably

Road sweeping & Gully Guzzling

- Hazardous waste
 - Sharps, recreational drugs paraphernalia
 - Pathogens: Hazardous
 - Sewage:
 - rocket fuel for trees
 - LESA Lightweight expanded sewage aggregates
 - Hydro-carbons: waste to fuel
- Or useful arisings
 - Glass: recyclable as aggregates or insulation
 - Cigarette butts: Nicotine: chemical uses
 - Gravel: Recycled aggregates
 - Exhaust fumes: extract metals

Energy generating Pavement

- Pavement
 - Footpath light & footfall energy generators
 - Concentrate footfall
 - Lights in floor generate power for information signs
- Make them switch on pavement lights
 - With time delay
 - Or switch off

Energy generating margins

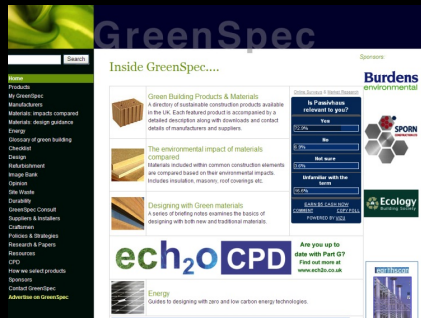
- **Hard shoulder**
 - Solar panel pavement
 - Interseasonal thermal store
 - Thaw out winter roads
- **Central reservations**
 - VAWT: Vertical axis wind turbine
 - Wind from passing vehicles
 - Air source heat pumps: Warm wind?
 - Noise: energy source?
 - Infrared panels: heat source night & day

Water permeable pavement

- Rainwater harvesting
 - Filter membranes
 - Hydrocarbon filters
 - Hydraulic pressure pushes water through not HCs
 - Granite aggregate bed (not glass-sand)
- Solar thermal collectors: Store heat for winter thawing
 - Road surface not parking spaces
- GSHP in sub-bases or WSHP in stored water
- HEP Hydro electric power?
 - Sloping road, sloping pipes,
 - hydraulic pressure?
- Microbes in sub-bases to keep stored water healthy

Living Green/Brown roofs

- Performance benefits
- Contribution:
 - climate change adaptation
 - Solar protection/evaporation cooling
 - Avoiding urban heat island effect
 - Albedo effect reinforcement
 - green infrastructure
 - rainwater surge mitigation
 - ecosystem services
 - Biodiversity: Nectar bars



Green walls

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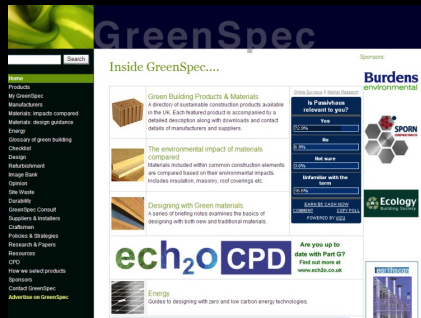


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- Wall coverage
 - From the ground
 - Ground based frames
 - Wall cladding: Rainscreen approach
 - Wall hung troughs
- Freestanding:
 - Hedgerows
 - Hedge-bank walling
 - Fences,
 - Living Fences
 - Hedge laying/making

Green Boundaries

- Acoustic barriers
 - Not trees
 - Green walls
 - Hedges with soil between
- Hedge bank walling
 - Boulders and turf mortar
- Traffic Slowdown/acoustic hedging
- Green retaining walls
 - Gabions for nature
 - Open timber grids
 - Soil retaining Fabric edges
 - Twig bale retainers
- Amphibian boundaries
 - Frogs and Newts, one directional, not boundary



Flytipping



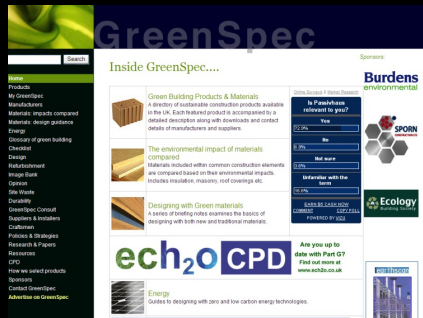
- Roadside dumping
- 'Resource mining'
- Reuse:
 - Aggregates & Subsoil
- Recycle
 - Metals
- Recovery
 - Landscape waste: Compost
 - Plastics: Energy or Fuel

Reducing Waste in design

- Modular e.g. pavings
- Modular plus margins
- Insitu margin
- Insitu main: Tarmacadam 'Asphalt'
- Cut edges and curves

Simplified traffic management

- Solve one problem
- Push the problem further down the road
- Simplified junctions
 - Roundabouts seem to work
- Out of town retail parks
 - Use of T junctions and strange car park layouts
- Road hierarchies
 - drive up fuel consumption



Bluewater

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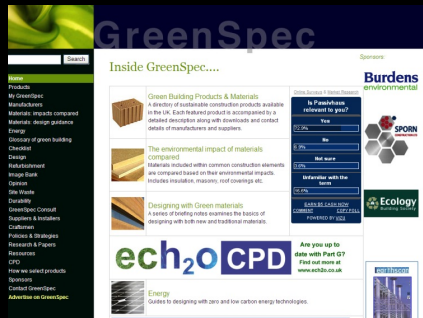


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- Entrance off M2
- Dual Carriageways around site
- Junctions: roundabout with no more than 2 choices,
 - avoid customer panics leaving site
- VMS Variable Message Signs to car parks
- 13,000 car parking spaces ground

Safety & Perception

- UK City Engineer's approach:
 - make it look and feel so safe
 - easier to go faster and break harder
 - risks will be taken
- EU City Engineer's approach:
 - make it look so dangerous
 - that everybody takes extra care
 - and its is safer



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Sign proliferation

- Reduce the number of signs/posts
- Remove them all
 - nobody knows who has priority
 - everybody takes care, slows down
- There are always exceptions
- Place signs on railings and bollards
 - At low level to be seen
 - Avoiding unnecessary posts

Highway/Road Lighting

- Why illuminate urban and rural dual carriageways and motorways?
 - Cars have lights
 - Use retro-reflective road markings
 - Use PV cat's eyes
- Why reduce numbers of lights on at night?
 - To pay for the lights left on in the day
- You only need illuminate where pedestrians/cyclists meet motorised vehicles
 - Use close-to-white light there



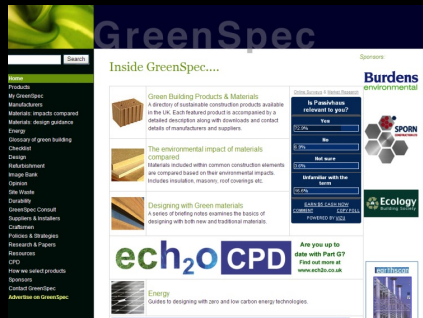
- People do not have lights like cars do
- We don't want people to have to use torches
 - Batteries are hazardous waste toxic in landfill
- Many buildings bleed light onto pavements
- Paths need lighting intervisibility
 - Lights at changes of direction and junctions
 - From one light you can see the next
- PIR activated lighting needs to be
 - fast-on, slow off,
- Pavement foot button to turn light on
- Could be distracting and highlights whereabouts
- PV cats eyes define edges
 - but no need in well illuminated areas

Sustainable integrated transport:

- Routes: desire lines not hierarchy
- Paths:
 - Walking bus, pedestrian and cycle lanes
- Cycle lanes: continuous, to capacity
- Cycle only roads
- Bus lanes: Consider Green lanes
 - Green lanes: Buses, coaches, multiple occupancy cars, low emission, taxis
- Integrated transport: cycle & car parks, buses, trains, trams and underground

Sustainable Transport Information

- Information: where you are, where your heading,
- Maps: located widely at major junctions and at bike parks
- Signs: clear directions
- Signs: at eye level not at 8-10 feet
- SusTrans information signs
- Bike tyre pumps that work with more valves



Green Wheel

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- Wheel rim is okay
- Repair broken, missing and bent spokes
- Provide a hub
- Desire lines not back streets or roads
- Let bikes into the center of town
- Limiting bikes use after 9.00am
 - puts you into conflict with workers arriving before 9.00
 - Define routes and let bikes through



Green Infrastructure

CPD topic

1

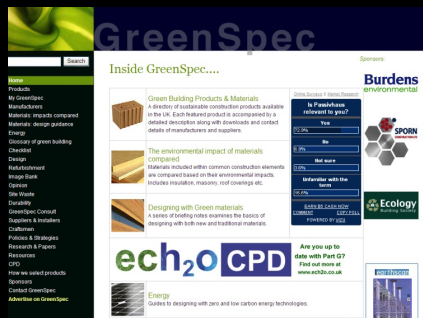
Green Tunnels & Bridges

- Nature tunnels
 - Below ground
 - Overhead
- Green Bridges
 - Flight paths
 - Kent Beyond Tonbridge Wells
 - Mile End Park London
- Wide funnelled entry essential
 - Or they don't find it



Events

From here to end is pasted in unedited information



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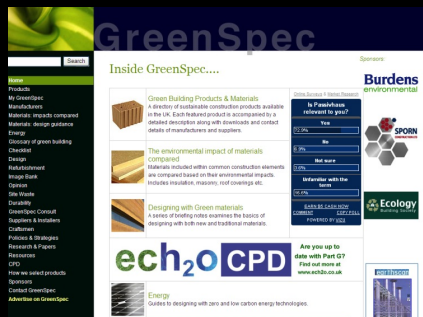
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Smart Grids



Smart Grids

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- Smart Grids & Cleanpower 2010
 - Energy sector transformation:
 - Building the commercial framework
- 24-25 June 2010 in Cambridge UK

Day 1: Smart Grids 2010

- Simon Higgins, Solutions Architect, Arqiva
 - Smart grids: introduction and infrastructure
- Martin Pollock, Dir of M&A, Siemens Energy
 - What's the smart grid for? Who needs it?
- Martin Ansell, *Director*, GE Energy
 - What's happening now: real, smart solutions
- Ian Drew, *VP*, ARM Green technologies



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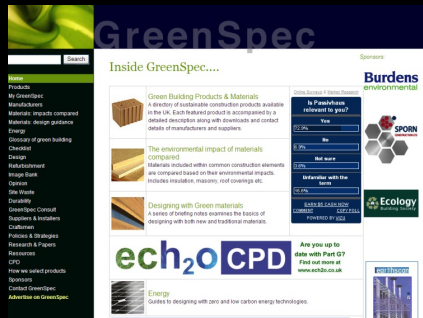
- Ben Kott (live link from Mountain View, CA),
- EMEA Green Business,
 - Google Global green initiatives
- Etienne Pollard, Senior Associate,
 - Good Energies Good investments
- Nick Coutts, CIR Strategy
 - Building Routes to Customers
- Sarah Harrison, Ofgem
 - Sustainability and regulation
- Keith Dickerson ITU (United Nations Agency)
 - Global grid development standards
- Prof Mike Kelly, CU & former DCLG CSA
 - When will Engineering Reality enter the UK Energy Policy

Day 1: Smart Grids

- Digital Smart Grids
- Enabler technologies
- Software: platforms and the consumer;
- Hardware: smart meters, pipes, disconnects, chips
- Consumer demand management and pricing strategy
- Investment, regulation and policy

Participating Companies

- GE Energy, Alstom Power, Google, Siemens, First Solar Inc, Suntech Europe, Renesola China, ARM, AlertMe, Analysys Mason, Cambridge University, Cambridge Carbon Capture, Arqiva, Dialight plc, Green Energy Options, Japan Wind Developments, Moixa Technology, OFGEM, ITU, HG Capital, Rainbow Seed Fund, Tesco plc, Good Energies, Apax, TTP Ventures, Incrops, Green Energy UK, Quiet Revolution, Vestas



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- 2nd Annual
- SMART GRID TECHNOLOGY CONFERENCE 2011
- June 1st-2nd, Crowne Plaza, San Jose, CA Media Partner
- Dear Subscriber,
- Hope all is well. My name is Baruch Hecht and I just took over the Smart Grid Update brand. I wanted to take the

15/10/2012

© GreenSpec 2010-12 Brian Murphy Sustainable Infrastructure

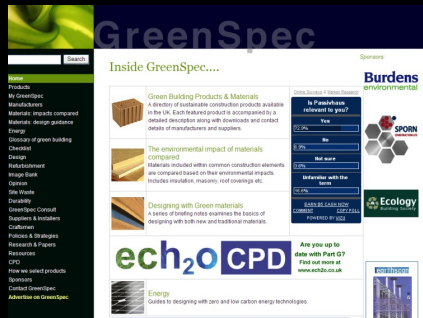
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Energy Infrastructure

- Energy Infrastructure is growing...

Over the next five years, the Government plans to invest some £200 billion into UK infrastructure, with investment in the energy sector almost doubling between 2010 and 2015.

Following the success of
Building magazine's Renewable Energy



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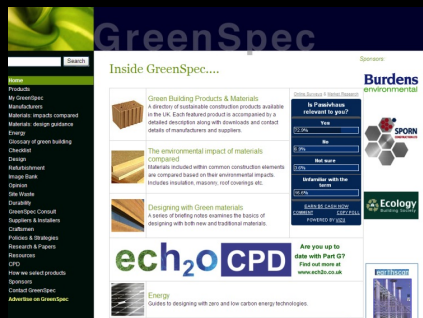
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- **Multi-Stakeholder Business Models For EV Infrastructure Evolution: Realised Case Studies...Trial Results... Practical Realities**
- **Dear Colleague,**
- **With multiple automobile manufacturers imminently planning the roll-out of electric vehicle options for consumers, the urgency and importance of a robust charging infrastructure has never been**



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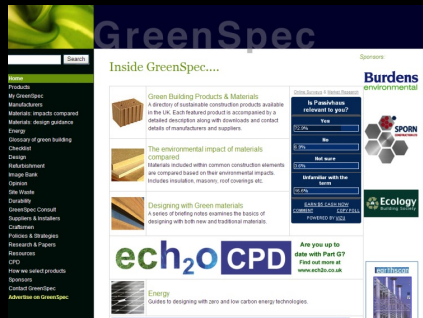
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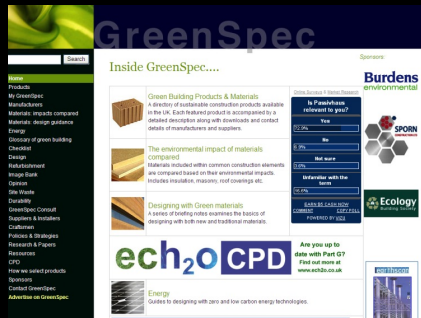


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Intelligent Substation Design

Intelligent Substation Design

- Bentley CAD reseller & developer
- Substation V8i:
- Electric substations are a critical component of the smart grid, with approximately 10% of a utility's revenue spent on building, refurbishing, and operating substations.
- Until now, no single software product has been able to address the challenging requirements for the efficient design and modeling of substations.



Features

- 30% faster design process
- reduces errors and re-works,
- improves the productivity of a utility's substation engineering team.

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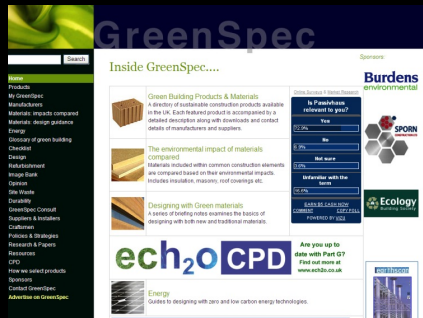
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Users

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- Bentley Substation is a valuable productivity tool for:
- utilities,
- Engineering firms (EPCs),
- rail owner/operators who design and operate substation infrastructure.



Functions

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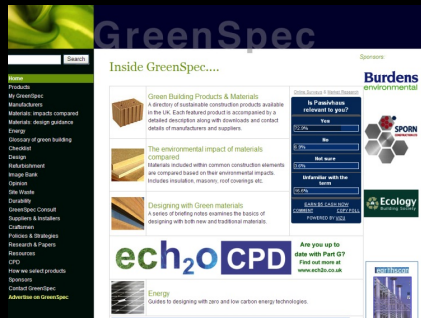
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- Single line diagrams
- Circuit schematics
- 3D substation layouts
- Panel layouts
- Drawing circuits with automatic numbering, cross-referencing, error checking, and adding dynamic parts
- Creation of project documentation, such as cable schedules and purchase order lists
- Automation PLC schematic generation



Website content

- www.bentley.com/substation

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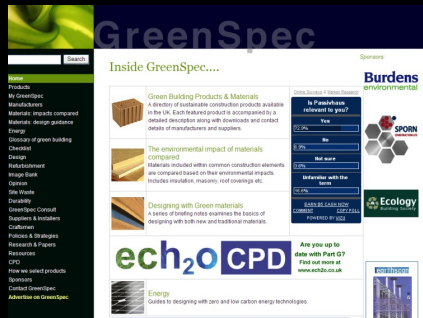
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EV Charging Infrastructure USA

EV Charging Infrastructure USA

- Electric utilities from over 15 urban and rural states of USA uniting with vehicle OEMs, city planners and government regulators
- Assessing impact electric vehicles will have on grid systems
- NRG Energy, Pepco Holdings, Southern Company, Florida Power & Light, Pacific Gas and Electric and DTE Energy
- 2nd International Summit (February 28 - March 1, 2011, San Francisco)
- EV Charging Infrastructure USA
- www.electric-vehicle-charging-infrastructure.com

Event

- Arun Banskota, President, EV Services at NRG Energy discussing business models for making EV charging regimes profitable.
- Saul Zambrano, Director Of Integrated DSM at Pacific Gas & Electric will be explaining the results of their studies into the impact that EVs will have on grid systems and power distribution.
- Randy Johnson, Director Electric Transportation at Southern Company will be analyzing the optimal metering and billing specific to Electric Vehicle charging
- Ana Medina, Manager Electric Transportation and Infrastructure at DTE Energy will look at EV metering and billing strategies in the home.
- Brian Hanrahan, Director Of In-Home Technologies at Florida Power & Light evaluating the optimal locations for public EV charging points,

15/10/2012 federal and municipal regulators will outline how they will support the commercialization of EV charging infrastructure.

Other Speakers:

- Conrad Eustis, Director Advanced Retail Technology, Portland General Electric
- Alex Kim, Director Customer Innovations, San Diego Gas and Electric
- Dave Angel, Manager Delivery and Planning, Idaho Power
- Tony Tewelis, Manager Smart Grid Programmes, Arizona Public Service
- Robert Stuart, Manager Advanced Technology, Pepco Holdings
- Larry Alford, Manager Distributed Generation, Austin Energy
- Jim Parks, Energy Efficiency Manager, Sacramento Municipal Utilities
- Jack Pokrzywa, Director, Ground Vehicle Standards, SAE International
- Jason Rogers, City Planner, Issaquah
- Ron Miguel, Chairman, San Francisco Planning Dep
- Gustavo Collantes, Senior Energy Policy Specialist, Washington State Dept Commerce
- Alan Schriber, Chairman, Ohio State Public Utilities Commission

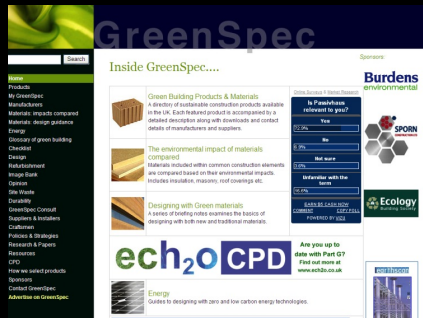
- www.electric-vehicle-charging-infrastructure.com,
- **1-800-721-3915**
- info@american-business-conferences.com
- **Jane Thomas, Conference Director
American Business Conferences**

Infrastructure Costs

- 21 12 2010, Infrastructure UK, a division of HM Treasury, published findings of an investigation into high costs of delivering (construction) & maintaining (management) infrastructure.
- MBE KTN Infrastructure Working Group (IWG)
- <https://ktn.innovateuk.org/web/infrastructure-working/articles/-/blogs/government-publish-report-examining->

Infrastructure Working Group

- IWG is an open group on _connect to promote and disseminate activities of MBE KTN Infrastructure Programme,
 - aims to identify innovation needs within civil infrastructure sector,
 - facilitate formation of new consortia through identification of current and future funding opportunities,
 - showcase current and completed infrastructure-related Knowledge Transfer Partnerships.



Feedback

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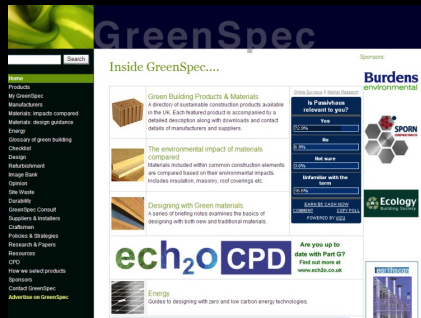
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- These files are created by generalists with a big dollop of green flavour
- These files are updated from time to time
- We are not experts so from time to time these file may get out of date or may be wrong.
- If you feel that we have got it wrong please let us know so we can put it right



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- Brian Murphy BSc Dip Arch (Hons+Dist)
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- Specification Writer by Choice
- Greening up my act since 1999
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- Twitter: <http://twitter.com/brianspecman>
- Scribd: www.scribd.com/brianspecman
- Facebook: <http://www.facebook.com/pages/GreenSpec/77375462337>