



Sainsbury's Store Case Study

Matt Edwards, Greg Uhrich

“First Project to achieve a maximum score of 31 points under the Building Research Establishment Environmental Assessment Method in 1999...”



Building / Site Description

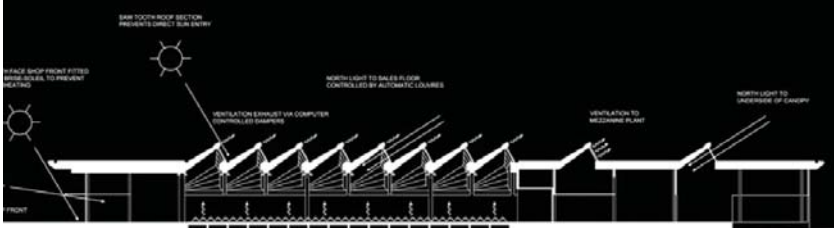
The Sainsbury's store located on the Greenwich Peninsula is the worlds first low energy supermarket. Influenced by the clients extensive and progressive environmental policy, the store pushes the boundaries of commercial sustainable design. The store attempts to break the mold of traditional food stores by using natural ventilation, daylighting, night cooling, and energy recycling.

- Awards:**
- Channel 4 Building of the Year Peoples Choice 2000
 - RIBA Stirling Prize 2000 Millennium Product Shortlisted
 - RIBA Regional Award 2000
 - BIAT Award for Technical Excellence 1999
 - Retail Week Store Design of the Year 2000
 - Structural Steel Design Award 2000

- Project Manager:**
RBCM Ltd.
- Architect:**
Paul Hinkin and Ann Gibson.
- Engineers:**
Oscar Faber Consulting
- Building-Use Summary:**
Supermarket.
- Completion Date:**
2000.



Exterior view Roof Monitors



Interior view Roof Monitors



Constructed Lagoon

What the Project Does:

*Utilizes natural ventilation by taking in cool air close to the ground and exhausting hot air through roof ventilation.

*One third of a mile of north-facing roof monitors to naturally light the store space

*The floor uses radiant heating warmed by waste heat from the supermarket's own gas fired power station.

*Large wind driven turbines (3.6 metres in diameter and 12 metres high) and solar panels located at the store entrance generate power.

*The refrigeration is run on a propane based ozone friendly system.

*Earth banks (5 metres high) surround the store insulating it from summer heat and winter cold.

*The landscape surrounding the store is planted with native woodland species and drought tolerant plants.

*The store's own reed bed cleans rainwater from the service yard before it is released into a lagoon at the back of the store.

*Rainwater is recycled to irrigate the landscaped area that surrounds the store.

*The toilets are flushed with water drawn from the water table below the store via 75 metre deep boreholes.

*The store provides free recharging sites for electric vehicles.

Regeneration Based Checklist

		Project:										
		degeneration			sustainability				regeneration			
		-100	-75	-50	-25	0	25	50	75	100		
		always	usually	sometimes	a bit	balances	a bit	sometimes	usually	always		
the site	pollutes air										cleans air	
	pollutes water										cleans water	
	wastes rainwater										stores rainwater	
	consumes food										produces food	
	destroys rich soil										creates rich soil	
	dumps wastes unused										consumes wastes	
	destroys wildlife habitat										provides wildlife habitat	
	imports energy										exports energy	
	requires fuel-powered transportation										requires human-powered transportation	
	intensifies local weather										moderates local weather	
	the building	excludes daylight										uses daylight
		uses mechanical heating										uses passive heating
		uses mechanical cooling										uses passive cooling
		needs cleaning and repair										maintains itself
		produces human discomfort										provides human comfort
uses fuel-powered circulation											uses human-powered circulation	
pollutes indoor air											creates pure indoor air	
is built of virgin materials											is built of recycled materials	
cannot be recycled											can be recycled	
serves as an icon for the apocalypse											serves as an icon for regeneration	
is a bad neighbor											is a good neighbor	
is ugly											is beautiful	
		-200		negative score 2200 possible 200/2200 possible		positive score 2200 possible 1000/2200 possible		+1000				
		final score: 800/2200 possible										
		+800										

LEED 2009 Checklist

20 Sustainable Sites		Possible Points: 26	Materials and Resources, Continued			
Y	Prereq 1	Construction Activity Pollution Prevention	2	Credit 4	Recycled Content	1 to 2
1	Credit 1	Site Selection	2	Credit 5	Regional Materials	1 to 2
3	Credit 2	Development Density and Community Connectivity	?	Credit 6	Rapidly Renewable Materials	1
	Credit 3	Brownfield Redevelopment	N	Credit 7	Certified Wood	1
4	Credit 4.1	Alternative Transportation—Public Transportation Access				
1	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms				
3	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles				
2	Credit 4.4	Alternative Transportation—Parking Capacity				
1	Credit 5.1	Site Development—Protect or Restore Habitat				
1	Credit 5.2	Site Development—Maximize Open Space				
1	Credit 6.1	Stormwater Design—Quantity Control				
1	Credit 6.2	Stormwater Design—Quality Control				
	Credit 7.1	Heat Island Effect—Non-roof				
1	Credit 7.2	Heat Island Effect—Roof				
1	Credit 8	Light Pollution Reduction				
7 Water Efficiency			10 Possible Points: 10			
Y	Prereq 1	Water Use Reduction—20% Reduction				
3	Credit 1	Water Efficient Landscaping	2 to 4			
2	Credit 2	Innovative Wastewater Technologies	2			
2	Credit 3	Water Use Reduction	2 to 4			
21 Energy and Atmosphere			35 Possible Points: 35			
Y	Prereq 1	Fundamental Commissioning of Building Energy Systems				
Y	Prereq 2	Minimum Energy Performance				
Y	Prereq 3	Fundamental Refrigerant Management				
14	Credit 1	Optimize Energy Performance	1 to 19			
5	Credit 2	On-Site Renewable Energy	1 to 7			
?	Credit 3	Enhanced Commissioning	2			
?	Credit 4	Enhanced Refrigerant Management	2			
?	Credit 5	Measurement and Verification	3			
2	Credit 6	Green Power	2			
7 Materials and Resources			14 Possible Points: 14			
Y	Prereq 1	Storage and Collection of Recyclables				
	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3			
?	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1			
2	Credit 2	Construction Waste Management	1 to 2			
1	Credit 3	Materials Reuse				
			10 Indoor Environmental Quality			
			15 Possible Points: 15			
Y	Prereq 1	Minimum Indoor Air Quality Performance				
Y	Prereq 2	Environmental Tobacco Smoke (ETS) Control				
1	Credit 1	Outdoor Air Delivery Monitoring				
1	Credit 2	Increased Ventilation				
?	Credit 3.1	Construction IAQ Management Plan—During Construction				
?	Credit 3.2	Construction IAQ Management Plan—Before Occupancy				
?	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants				
?	Credit 4.2	Low-Emitting Materials—Paints and Coatings				
1	Credit 4.3	Low-Emitting Materials—Flooring Systems				
?	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products				
1	Credit 5	Indoor Chemical and Pollutant Source Control				
1	Credit 6.1	Controllability of Systems—Lighting				
1	Credit 6.2	Controllability of Systems—Thermal Comfort				
1	Credit 7.1	Thermal Comfort—Design				
1	Credit 7.2	Thermal Comfort—Verification				
1	Credit 8.1	Daylight and Views—Daylight				
1	Credit 8.2	Daylight and Views—Views				
			1 Innovation and Design Process			
			6 Possible Points: 6			
?	Credit 1.1	Innovation in Design: Specific Title				
?	Credit 1.2	Innovation in Design: Specific Title				
?	Credit 1.3	Innovation in Design: Specific Title				
?	Credit 1.4	Innovation in Design: Specific Title				
?	Credit 1.5	Innovation in Design: Specific Title				
1	Credit 2	LEED Accredited Professional				
			NA Regional Priority Credits			
			4 Possible Points: 4			
?	Credit 1.1	Regional Priority: Specific Credit				
?	Credit 1.2	Regional Priority: Specific Credit				
?	Credit 1.3	Regional Priority: Specific Credit				
?	Credit 1.4	Regional Priority: Specific Credit				

Total: 66 LEED GOLD



Building Redesign

- * Implement Solar panels on the store rooftop, which was allotted space in the design but has not been executed.
- * Replace poorly weathering materials with recycled composite panels or locally obtained recyclable materials.
- * Replace parking lot paving with a permeable paving system to reduce heat island effect as well as increase storm water management.
- * Implement bioswales with additional tree cover in the parking lot area to increase shade as well as additional filtering of parking lot storm water.
- * Implement a composting toilet system to reduce blackwater contribution to the city system as well as create fertilizer for on site plantings.
- * Increase the number of wind turbines on the site.
- * Supplement the on-site gas power plant with geothermal energy harvesting as well as using biofuels in the plant.

Regeneration Based Checklist Redesign

Project:		degeneration								sustainability				regeneration			
		-100	-75	-50	-25	0	25	50	75	100							
		always	usually	sometimes	a bit	balances	a bit	sometimes	usually	always							
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-100 negative score positive score **+1125**

2200 possible 2200 possible

100/2200 possible 1125/2200 possible

final score: **+1025**

1025/2200 possible

LEED 2009 Checklist Redesign

22	Sustainable Sites	Possible Points: 26	Materials and Resources, Continued
Y	Prereq 1 Construction Activity Pollution Prevention	1	Y ? N Credit 4 Recycled Content 1 to 2
1	Credit 1 Site Selection	1	2 Credit 5 Regional Materials 1 to 2
5	Credit 2 Development Density and Community Connectivity	5	1 Credit 6 Rapidly Renewable Materials 1
N	Credit 3 Brownfield Redevelopment	1	1 Credit 7 Certified Wood 1
4	Credit 4.1 Alternative Transportation—Public Transportation Access	6	
1	Credit 4.2 Alternative Transportation—Bicycle Storage and Changing Rooms	1	
3	Credit 4.3 Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3	
2	Credit 4.4 Alternative Transportation—Parking Capacity	2	
1	Credit 5.1 Site Development—Protect or Restore Habitat	1	
1	Credit 5.2 Site Development—Maximize Open Space	1	
1	Credit 6.1 Stormwater Design—Quantity Control	1	
1	Credit 6.2 Stormwater Design—Quality Control	1	
N	Credit 7.1 Heat Island Effect—Non-roof	1	
1	Credit 7.2 Heat Island Effect—Roof	1	
1	Credit 8 Light Pollution Reduction	1	
9	Water Efficiency	Possible Points: 10	10 Indoor Environmental Quality
Y	Prereq 1 Water Use Reduction—20% Reduction		Y ? N Prereq 1 Minimum Indoor Air Quality Performance
4	Credit 1 Water Efficient Landscaping	2 to 4	Y Prereq 2 Environmental Tobacco Smoke (ETS) Control
2	Credit 2 Innovative Wastewater Technologies	2	1 Credit 1 Outdoor Air Delivery Monitoring 1
3	Credit 3 Water Use Reduction	2 to 4	2 Credit 2 Increased Ventilation 1
26	Energy and Atmosphere	Possible Points: 35	1 ? Credit 3.1 Construction IAQ Management Plan—During Construction 1
Y	Prereq 1 Fundamental Commissioning of Building Energy Systems		1 ? Credit 3.2 Construction IAQ Management Plan—Before Occupancy 1
Y	Prereq 2 Minimum Energy Performance		1 ? Credit 4.1 Low-Emitting Materials—Adhesives and Sealants 1
Y	Prereq 3 Fundamental Refrigerant Management		1 ? Credit 4.2 Low-Emitting Materials—Paints and Coatings 1
17	Credit 1 Optimize Energy Performance	1 to 19	1 ? Credit 4.3 Low-Emitting Materials—Flooring Systems 1
7	Credit 2 On-Site Renewable Energy	1 to 7	1 ? Credit 4.4 Low-Emitting Materials—Composite Wood and Agrifiber Products 1
?	Credit 3 Enhanced Commissioning	2	1 Credit 5 Indoor Chemical and Pollutant Source Control 1
?	Credit 4 Enhanced Refrigerant Management	2	1 Credit 6.1 Controllability of Systems—Lighting 1
?	Credit 5 Measurement and Verification	3	1 Credit 6.2 Controllability of Systems—Thermal Comfort 1
2	Credit 6 Green Power	2	1 Credit 7.1 Thermal Comfort—Design 1
10	Materials and Resources	Possible Points: 14	1 ? Credit 7.2 Thermal Comfort—Verification 1
Y	Prereq 1 Storage and Collection of Recyclables		1 ? Credit 8.1 Daylight and Views—Daylight 1
N	Credit 1.1 Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3	1 ? Credit 8.2 Daylight and Views—Views 1
?	Credit 1.2 Building Reuse—Maintain 50% of Interior Non-Structural Elements	1	
2	Credit 2 Construction Waste Management	1 to 2	
2	Credit 3 Building Reuse	2 to 2	
1			1 Innovation and Design Process
			Possible Points: 6
			? Credit 1.1 Innovation in Design: Specific Title 1
			? Credit 1.2 Innovation in Design: Specific Title 1
			? Credit 1.3 Innovation in Design: Specific Title 1
			? Credit 1.4 Innovation in Design: Specific Title 1
			? Credit 1.5 Innovation in Design: Specific Title 1
			1 Credit 2 LEED Accredited Professional 1
			NA Regional Priority Credits
			Possible Points: 4
			? ? N Credit 1.1 Regional Priority: Specific Credit 1
			? ? N Credit 1.2 Regional Priority: Specific Credit 1
			? ? N Credit 1.3 Regional Priority: Specific Credit 1
			? ? N Credit 1.4 Regional Priority: Specific Credit 1

Total: 78 almost... **LEED PLATINUM**

Sainsbury's Building Before...



Sainsbury's Building Redesign





In Conclusion:

The Sainsbury's Store in Greenwich is most likely the most sustainable and environmentally conscious grocery store in existence. It utilizes a large number of sustainable practices and design elements that contribute to an existing Regeneration checklist score of 800 and a LEED score of 66. Through a number of fairly small changes to the overall site and building of the Sainsbury's Store, mainly focusing on storm water management, site design modifications, and PV panel and wind turbine additions, we increased the Regeneration checklist score to 1025 and the LEED score to 78. While these changes may seem small, they contribute to the projects already high level of sustainability.

