

**Sustainable Urban Social Thinking**  
 The thinking behind our sustainable designs for Green Park Station has had to incorporate many factors. It was necessary to consider the needs and desires of the many stakeholders that the development of GPS would affect. The following information outlines these factors in more detail and presents our suggested solution for Green Park Station.



## Bath

- World Heritage City
- Roman Baths
- Georgian architecture
- 5000 listed buildings
- Cultural centre
- University city

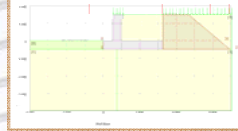
## History of GPS

- Construction of the terminal building was completed May 1870.
- The very last train departed from Green Park Station on 7th of March 1966 and soon after the station fell into disrepair.
- November 1971 the building was listed as Grade II and a year later in July 1972 it was bought by the Bath City Council.
- 2nd October 1979 planning permission was granted and the Green Park site was leased for a retail store as well as a total renovation of the Green Park Station building.

## Geotechnical Design

The excavated exhibition area required geotechnical design.

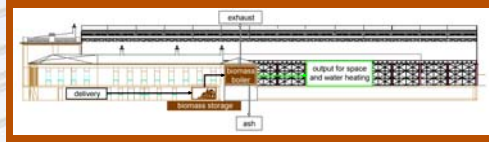
- 1.5m deep excavation
- 28x12 m<sup>2</sup> plan area
- Exhibition superstructure supported on retaining wall (10kN per column @ 3m centres)
- Ground conditions assumed to be drained fill ( $\gamma = 20kN/m^3$ )
- The retaining wall was designed and checked using OASYS Greta



Oasys

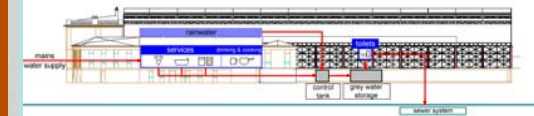
## Biomass Wood Chip Boiler

Biomass is a carbon neutral fuel because the carbon released when CO<sub>2</sub> is given off will have been absorbed from the atmosphere during growth. The capital cost of a biomass wood chip boiler at GPS would be £50,000, but with the potential of a Clear Skies grant the cost could be reduced to £25,000. The biomass boiler would provide a possible energy output of 115,000 kWh/yr and there would be a CO<sub>2</sub> emission saving of 31 tonnes/yr.



## Grey Water System

Any water that has been used in the home, except water from toilets, is called grey water. Dish, shower, sink, and laundry water comprise 50-80% of residential wastewater. This, together with rainwater collected from roofs, may be reused for other purposes such as landscape irrigation or toilet flushing. Approximately 30% savings in water can be made.



- Grey water can replace fresh water in many instances, saving money and increasing the effective water supply where irrigation is needed.
- Less energy and chemicals are used due to the reduced amount of both freshwater and wastewater that needs pumping and treatment.
- They require maintenance for filter cleaning.
- Care must be taken to avoid cross-contamination with the potable mains supply.

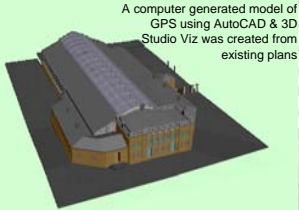
## Western Riverside Development

- Brownfield regeneration project
- £1 billion estimated investment
- 15-20 year project
- International model of sustainable urban regeneration
- B&NES and South West Regional Development Agency
- Mixed use development
- Rapid Transit link via GPS



## Green Park Station

- Owner: B&NES
- Leaseholder: Envolve 50 yrs
- Sainsbury's currently owns 50 car parking spaces within GPS
- Grade II listed
- Public thoroughfare to Sainsbury's
- Weekly farmer's markets



A computer generated model of GPS using AutoCAD & 3D Studio Viz was created from existing plans

## Proposed Design Plan

- Retail Units**
- Café with outdoor terrace

- Retail Units**
- New shop units created
  - All businesses expected to run sustainably
  - Rent/sale of units funds management of GPS

## Glass End Wall

A new glass end wall encloses the structure increasing security and reducing sound propagation.

- Large opening swivel doors maximise the possible entrance area
- One panel can pivot creating a large vehicular access to the building

## Basement

- Storage for retail units
- Grey water holding tanks

## Exhibition Area: 'Mini GPS'

- Excavated enclosed space
- Highlights the importance of sustainability through design and exhibits
- Superstructure mimics arched roof of GPS
- Sustainability processes running in GPS are illustrated and visualised in the exhibits
- Video of installation of the sustainability elements

## Retail Units

- Organic clothes shop
- Organic farm shop (e.g. Riverford)
- Energy efficient electrical appliances

## Adaptable Space

- Area needs to remain to accommodate farmer's market
- Green corridor through building to direct flow of people to create a natural environment
- Moveable planting and seating areas to make the area more welcoming and adaptable
- Possible uses include:
  - concerts
  - exhibitions
  - fashion shows
  - performing arts
  - outdoor cinema

## Step & Ramp Design

- Flow through the exhibition area is a key to the gateway concept of the design
- Disabled access is possible via the ramps
- Step, Ramp and Handrail design is in accordance with Approved Document M – Access to and use of Buildings (2004 Edition)

## Foyer

Larger entrance required

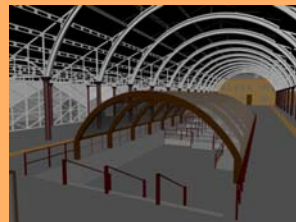
## Existing Stone Structure

- Remains as offices and retail units

## Structural Design

The renovation works to the building requires structural design.

- Designed for pre-fabrication off-site
- Glass roof – curved laminated glass using cold bending process
- Glulam beams used for arches to support the glass roof of the exhibition area
- Wood and glass used for their aesthetic properties and their accessibility of sustainable sources



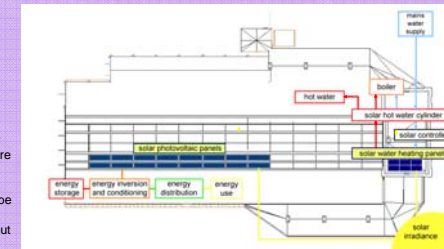
3D Studio Viz model of exhibition structure

## Solar Photo Voltaic (PV) and Solar Water Heating Panels

Glass-glass PV laminates would be installed on the south facing side of the GPS skylights, as this is the most visible option to the public. This can be represented on the exhibition superstructure so that the public can easily see its application.

The maximum cost of the laminates would be £420,000 and cover an area of 550m<sup>2</sup> with a pitched angle of 30°. The annual energy output using this scheme would be 23,000 kWh and 10 tonnes of CO<sub>2</sub> would be saved. There would be a grant available to Envolve through the Government's Major PV Demonstration Programme of up to 60% of total installation costs, therefore reducing the cost of the installation to £168,000.

The optimum location for solar collectors is on the Brasserie roof. Space will be required for solar pre-heat tank and some internal works. Once installed, system should be virtually maintenance free. There is a potential energy output of 7,000 kWh/yr and CO<sub>2</sub> saving of 4 tonnes/yr. The solar water heating system proposed is estimated to cost £12,000 and with a Clear Skies grant the capital cost of the solar water heating system would be £6,000.



Stakeholder Grid

Power ↑	High	Keep Satisfied	B&NES Envolve
	Medium	National Government	J Sainsbury plc Local Residents
	Low	World Heritage	English Heritage GPS Tenants
	Low	Monitor	Keep Informed
		Low	High
		Low	High

Media, WRD Master Planners, Bath Civic Society, Tourists

## Envolve

"Envolve is an innovative organisation, pioneering new approaches to help people live in more sustainable ways." They currently own a fifty-year lease on Green Park Station and their long term aim is to develop Green Park Station into a showcase centre for sustainability.

## B&NES

Bath and North East Somerset Council are the overall owners of Green Park Station. They lease it to J Sainsbury plc who in turn sub-lease the space to Envolve. Consultation was carried out with Councillor Darracott, and his associate Rhodi Samuel to discuss their vision of the building. B&NES are also in charge of WRD and want to use GPS as a new hub of Bath and as the main entrance way to the new development.

## Local Residents

The views of the local people of Bath are very important in our design process since they will be the primary users and source of long term income for the building. A public opinion survey was carried out in the early stages of the project in order to determine the value that is given to the station and to sustainability in general.

## J Sainsbury plc

For the purposes of the project it was assumed that the supermarket would not be a major factor and that the car parking spaces could be reclaimed by the station.