ESD

The Lark Quarry buildings have been built using ecologically sustainable design principles. These ensure minimal impacts on our local and global environments, while benefiting the local community. While we can look at ESD elements individually, they all work together — the sum is bigger than the parts.

There are environmental and economic costs in generating, collecting, purifying, transporting, processing, and disposing of water and waste. Water, energy and waste efficiencies underlie all aspects of design, materials, construction and operation at Lark Quarry.

Conservation is the trackways building's prime function. To halt further damage to the trackways, the building minimises temperature and humidity fluctuations, stops water running over the tracks, and keeps humans and animals off the fragile trackways.

the brief

Architects brief: design and build a cost-effective and energy-efficient building in a remote location to conserve the internationally significant Lark Quarry Dinosaur Trackways.

Temperature regulation

Conservation issue: Rock expansion–contractions cause cracks. Daily temperature fluctuation is some 20 degrees in summer, not great conditions for humans or fossils!

Sustainability issue: Air conditioning uses massive energy.

Solutions:

- Create high thermal mass via rammed earth walls, the ground. Thermal mass takes longer to heat up and cool down, stabilising the temperature
- Reduce heat absorption by insulating, shading, reflecting using sunscreens, insulated panels, verandas

Damage to trackways

Conservation issue: dust, dirt, and people and wildlife damaging track surfaces.

Solutions:

- Dust minimisation: sealed walls halt windborne dust, walkway grids remove shoe grit
- Walkway design and visitor management keep people off tracks

Energy generation

Conservation issue: the supply via the powerline is not reliable. Site needs continuous power.

Sustainability issue: conventional electricity generation creates greenhouse gases. Much electricity is lost in transmission.

Solutions:

- Solar generation as main power supply, stabilising and augmenting mains power
- Utilise energy-efficient, and minimal, equipment (light, pumps, etc)

Water and waste efficiency

Sustainability issue: water is scarce, has a high cost to purify, transport, treat. Disposal of waste and wastewater on site creates problems with weeds and pollution.

Solutions:

- Cut water use by using minimum flush toilets
- Collect pure rainwater from roofs (no treatment needed)
- Overflow from storage tanks mimics site's natural water runoff
- Process wastes via toilet system and then remove off site

Construction impacts

Conservation issue: damage to site during construction.

Sustainability issue: need to benefit local economy via jobs and materials.

Solutions:

- Site construction plan dictates minimal impacts
- Prefab components maximise labour on site — benefit local economy, minimize transport and wastage
- Rammed earth — local material, needs far less manufacture and transport than concrete

conserving the past

Fossil trackways conservation and repair is a new area of expertise. Research has to be done to test new conservation methods and materials, before working to restore fossils. Perhaps the best approach might be to simply protect them from further deterioration!

Over the next few years, while the building "settles down" the temperature and humidity fluctuations will be monitored. Cracking monitors will be installed. During this time Queensland Museum scientists will decide whether to clean and repair the trackways, or if it is best to leave them as is.