

LANDMARKS

For construction of the biomes, SGB constructed the largest birdcage scaffold structure ever built, which comprised 12 levels, measured 25 metres across and used 230 miles of scaffold poles.



Photographs courtesy, APEX www.apexnewspx.com



And Man

Rosie Gordon reports on the remarkable team work behind the construction of the world's greatest greenhouse

The Eden Project opened in Cornwall in March 2001 to instant and apparently unanimous approval from the British public. By June an incredible one million visitors had passed through its gates. At the site huge 'biomes' provide a space age landscape for a worked-out china clay pit, creating a renewed industry for the area, not to mention a revival of interest in botanical studies.

But, for the purpose of *Cranes & Access*, the focus is not upon what is growing inside, so much as how those gigantic greenhouses came into being.

Revelations

In 1994 Tim Smit was driving through

the quarries of St Austell in Cornwall when he conceived a vision for the world's largest greenhouse. He scribbled the idea on the back of a cigarette packet and set about finding an ideal site. A year later he discovered a pit at Bodelva, which was sheltered, south facing and had a crater large enough to hold 35 football pitches. It was also the shape of an inverted cone, had no soil and was unstable and prone to floods. Undaunted by this, and a lack of £86 million required to fund the project, Smit and his architects were determined to turn the vision into reality.

An extraordinary number of professionals and companies gave their services to Eden free of charge, including Alfred and Sir Robert McAlpine. Joining together for the first time in 28 years, the contractors worked for 18 months with no contract or payment, as well as giving the project a significant loan. Keith Titman of McAlpine Joint Ventures was the deputy project manager and design and build co-ordinator. "We started back in 1995 with Smit, who part-owns the Heligan Gardens, another successful horticultural venture in the county", he explains. "The first grant for the build

was for £25,000 from the Borough of Restormel Council, which kick-started an original scheme based on Nicholas Grimshaw and Anthony Hunt's design for Waterloo station. The government had advertised a millennium commission; in the end that funded half of the contract with £43 million."

The Great Flood

Building got underway in 1998. But, in December that year, torrential rain flooded the site with 43 million gallons of water and stopped work. "One of the main problems encountered in building the Eden Project was the water-logged soil", says Titman "The site is in a clay pit about 60 metres deep. The big challenge was trying to control water when doing earthworks at the beginning. We moved around 800,000 cubic metres of material and the bottom of the pit was about 20 metres below the water table level. We developed a series of cut-off drains and regimes of large holding lakes. Now the Project has big storage tanks underground - to be used for irrigation, toilets etc. Any spare water gets pumped off site." The water collection system now collects an average of



A total of 22 'sky monkeys' professional abseilers were called in to place huge air cushions over each of the biome's 635 hexagonal frames.

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space available”, remembers Cameron McQuarrie of McSalvers. This went on for a full seven months, in which time the crane was joined by at least two other cranes at any one time – although over the course of the project MacSalvers entire fleet was used.

Another distinction of the Eden Project build was its record breaking use of scaffolding. To put up the biomes, SGB constructed the largest birdcage scaffold structure ever built. It had 12 levels, measured 25 metres across and used 230 miles of scaffold poles.

Had the structure been glazed with glass, it would have been incredibly heavy. Instead, a highly transparent foil

created Eden

22 litres per second, or 20,000 bathtubs full per day.

“Once the pit was reshaped”, Titman continues, “we built a big ringbeam all the way around where the base of the biomes would go. These were 858 metres long, 2 metres wide and 1.5 metres thick, on the bottom of the pit and up the back wall.” A Krupp KMK40-70 from local crane hire firm MacSalvers was used for boring ring beams for the foundations – chosen for its reach, wheel drive and steer in some very wet conditions, according to MacSalvers' Cameron McQuarrie.

The Creation

The biomes themselves arrived at the site as a 'flat pack'. The kit consisted of light-weight tubular sections, each unique and cut by a computerised production line to the exact shape requirement.

The steel for the biomes was built in sections by Mero and shipped over from its German facility, ready for erection by sub contractor SGB. Alan Tindale oversaw SGB's work. “We used about 16 men, Manitou rough terrain forklifts, a crawler crane and a tower crane from Hewden Stuart. They put up the tower

crane and we erected the scaffold around it. The tower crane lifted the scaffold components for the higher layers, before raising the steel sections of the biome itself.”

The tower crane used was a 3.3 tonne capacity Wolff WK2-80EC with a 70 metre jib and a under hook height of 47 metres. To erect the tower crane Hewden called upon its 250 tonne capacity Demag AC755 mobile crane, comprising a 42 metre main boom, 44 metre luffing fly and 53 tonnes of ballast. Duties were set at 12.4 tonnes at a 37 metre radius. It took two days to erect the tower crane on a level concrete base in the middle of Dome A, while in Dome B, the first dome to be erected, a 110 tonne capacity NCK C110 crawler crane was positioned to do 'the extremities' – about 30 percent of the work.

McSalvers provided craneage for the majority of work, which comprised erecting the enormous steel structures of the biomes. “The machine most heavily relied upon was a 50 tonne capacity Grove GMK3050 – a small, compact and manoeuvrable crane, with long boom and luffing fly, which was able to lift adequately in the awkward

was used, which holds just 1 percent of the weight of glass. Huge air cushions were constructed to fill each of the 625 hexagonal frames, the largest being 10.98 metres across. They were put in place by a troupe of 22 'sky monkeys' professional abseilers. The fact that the foil is so smooth means that, when it rains, it cleans itself, eliminating the need for any special access equipment for cleaning.

Just the beginning...

At present there are three biomes. One is 'roofless', relying upon the favourable Cornish climate. Under wraps, so to speak, are the warm/temperate and humid tropics. The latter is the largest and measures 240 metres long, 55 metres high and 110 metres wide, with no internal supports. Apparently it could comfortably house the Tower of London. Plans are in place for a dry/tropics or desert climate biome in the future – although when this will be suitably funded to get underway is another question. McAlpine is up against another bidder for the work. Prepare for more space age developments in the Cornish quarries soon. ■