



PROGRAMME

EXPLORING THE ENERGY OF
BOLT'S FARM



FIGURE 5.1
REMEDICATION
POTENTIAL
(Author , 2016)

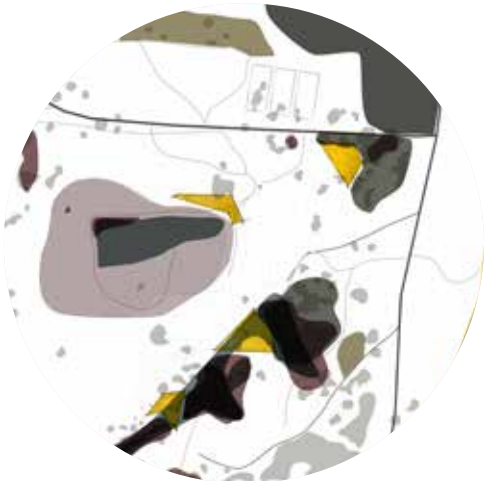


FIGURE 5.2
EDUCATION
POTENTIAL
(Author , 2016)

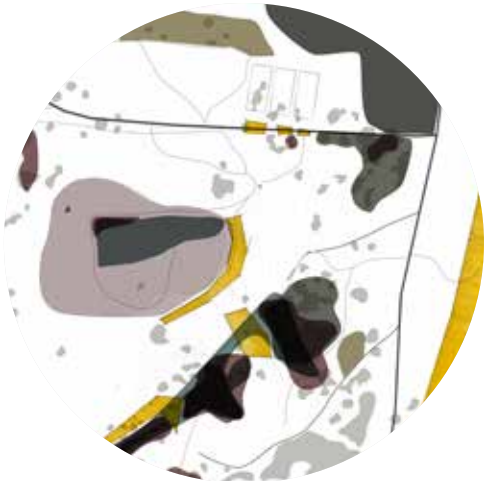


FIGURE 5.3
RECREATION
POTENTIAL
(Author , 2016)

5

EXPLORING THE ENERGY

OF BOLT'S FARM

The proposed development of the Greensleeves portion of Bolt's Farm is based on a response to the inherent energy of the site brought about by the confluence of the historical, economic and social landscapes. The threat of the current state of the landscape on the Schreiber's long-fingered bat, served as the basis for future development, as the Chiroptera family has been part of the historical landscape, is threatened by the economic activity of the larger landscape, and holds the potential to build on the social landscape of the Cradle of Humankind in the form of tourism.

The programme is centred around the areas on site with high energy, thus, areas where existing activities, bio-diverse habitats, and pressures of the site intersect. The heritage and tourism value of the Cradle, and more specifically, Bolt's Farm, also forms part of the larger system in which the programme is developed.

The programme further aims to consider what the area and surrounding community is lacking, such as the education on the diffuse threats to the karst system. The programme is divided into three fundamental categories, the first being the remediation of the karst system and landscape. A recreational programme is then introduced as a funding model to the remediation of the site, as well as a way to bring focus to the value of the landscape. The third part of programme is devised through the presence of new activity on site, serving as an educational programme. The educational programme

connects to existing educational activities onsite i.e. archaeological and geological research, introducing the public to the historical, economic, and social layers of the landscape.

The areas on site with high energy are seen as areas where interventions would be most viable, demarcating spaces where architecture could be placed to further the remediation, promote education, and serve as recreational spaces. Where these spaces coincide, various parts of the programme will be developed.

5.1 VISITOR CENTRES

Visitor centres are defined as distinctive purpose-built tourism facilities, to serve as multi-functional infrastructure to use and manage tourist attraction resources. Visitor centres differ from museums, as the emphasis is not on the display of artefacts, but rather on the convening of information and enhancing of a travellers' experience of the region (Pearce 2004:8).

Visitor centres typically have one or more of four primary functions, undertaken to various degrees. The four primary functions are defined as the promotion and orientation of a tourism region, the convening of information and enhancement of the visitor's experience, the control and filtering into the region, and interpretation (Fallon and Kriwoken 2003:290).

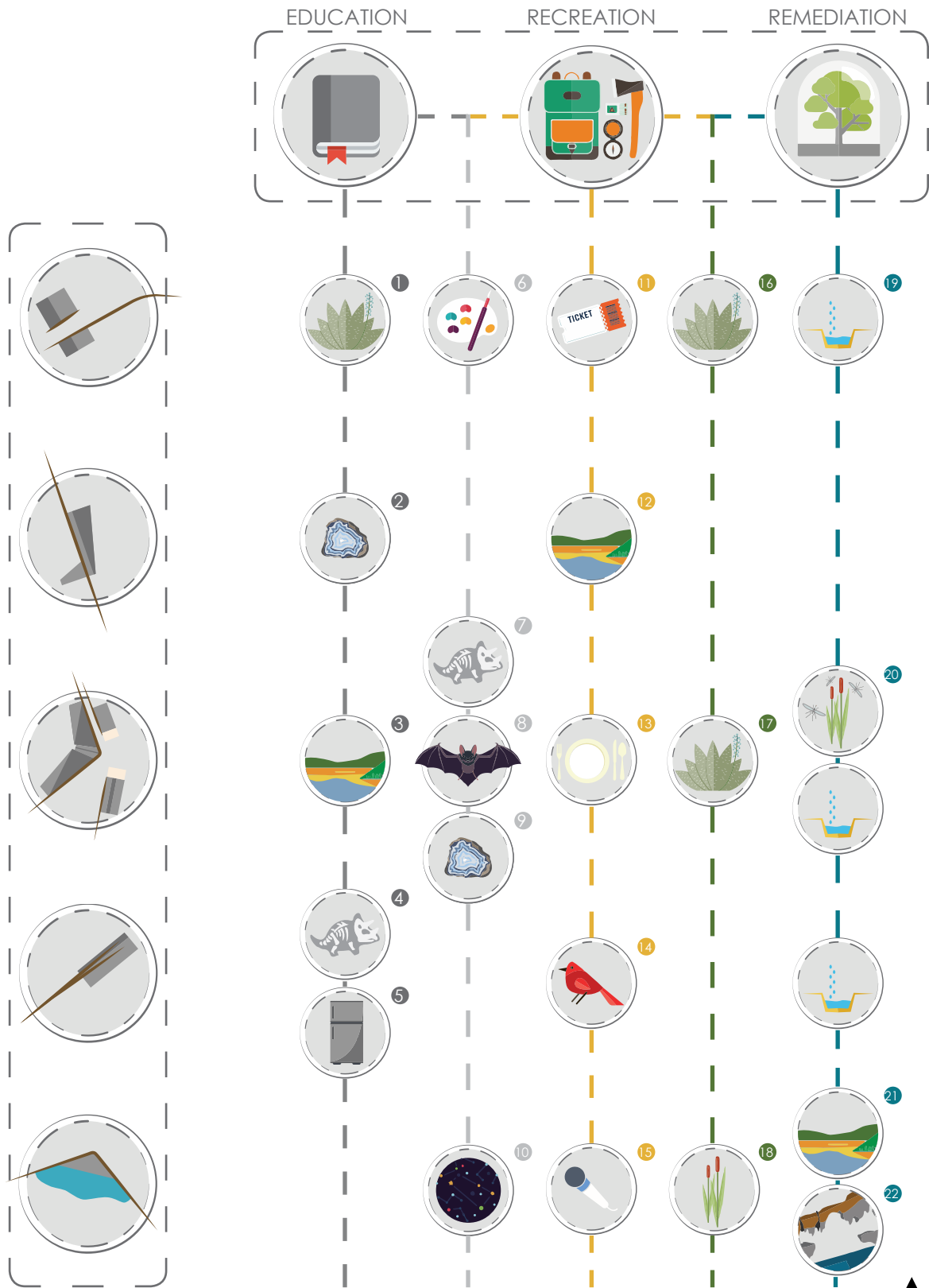


FIGURE 5.4
PROGRAMME
(Author , 2016)



▲ FIGURE 5.5
PROGRAMME
POTENTIAL
(Author , 2016)



PROMOTION &
ORIENTATION



INFORMATION &
ENHANCEMENT



CONTROL & FILTERING



INTERPRETATION

FIGURE 5.6
VISITOR CENTRE
FUNCTIONALITY
(Author , 2016)



5.1.1 PROMOTION & ORIENTATION

The role of promotion is to stimulate the tourist demand within a region, where its aim is to increase visitor expenditure within the defined area (Pearce 2004:2009). This includes providing orientation and guiding the visitor what to do, suggesting attractions and activities within the tourism region (Fallon and Kriwoken 2003:290).

5.1.2 INFORMATION & ENHANCEMENT

The role of providing information places less emphasis on the economic gain associated with tourism activities, and more on the value of the attractions themselves. Information conveyed through visitor centres attempts to inform the general visitor about the region to promote responsible behaviour (Pearce 2004:10). The provision of information also aims to improve the quality of the visitor's experience, through creating an understanding of the value of the region (Fallon and Kriwoken 2003:290).

5.1.3 CONTROL & FILTERING

The control of flow of visitors into a region or area is put into place in order to reduce the pressure on resources and to limit destructive visitor behaviour. The location of a visitor centre has the possibility to concentrate a large group of visitors away from fragile sites and provide the needed understanding of the site, as well as to shape the visitors' attitude towards more responsible and sensitive behaviour (Pearce 2004:11).

5.1.4 INTERPRETATION

Interpretation centres partly serve as substitution for the attraction, but also serve as substantial attraction in its own right. Interpretation centres are often developed when the resources are fragile, sites are inaccessible, as in the case of marine or demanding terrestrial environments, or are scattered across a vast area, such as historical battle sites, or a series of fossiliferous discoveries (Fallon and Kriwoken 2003:291).

Apart from these four primary functions, visitor centres can encompass a multitude of programmes, to function beyond the realm of tourism. Visitor centres can, for example, function as community facilities to host local cultural and social events, or act as educational facilities to the community and visitors (Pearce 2004:11).

The functioning of visitor centres can be improved by providing a facility that can be easily and clearly read by the visitor, a facility which has a clear programme, catering to visitors, staff, and the community, and a facility which is designed for the future, able to adapt to its vicissitudes.



▲
 FIGURE 5.7
 TWYFELFONTEIN
 VISITOR CENTRE
 (Afritecture 2015)
 (Esposito 2011)
 (Grahl 2012)
 (Lanting n.d.)

PRECEDENT STUDY: TWYFELFONTEIN VISITORS CENTRE

LOCATION Twyfelfontein, Namibia
ARCHITECT Nina Maritz
Dennis Mc Donald
CLIENT National Heritage Council of Namibia (NHC)
COMPLETION 2005

ATTRACTION Twyfelfontein, located in the Northwest region of Namibia, is home to one of the largest concentrations of petroglyphs, or rock engravings, in Africa. The barren valley in which the rock engravings are found is characterised by little rainfall, high temperatures, and poor soil, with red coloured sandstone cliffs surrounding the valley (Afritecture 2015). The engravings found against the sandstone cliffs include six painted elephants, ostriches and giraffes, as well as drawings of human and animal footprints, forming an extensive, high-quality record of the San rituals over more than 2 000 years (UNESCO World Heritage Centre 2007).

FUNCTION The visitor centre not only acts as tourism resource, but also as a tool to preserve the engraving and the walking routes, as well as fuelling income generation for the local community.

PROMOTION & ORIENTATION

The centre does not promote the area in a traditional sense, as there are few other tourist attractions in the immediate vicinity of the visitor centre, but rather focuses on the preparation of the visitor for the experience of the engravings along the route (Afritecture 2015).

INFORMATION & ENHANCEMENT

Other than the information of the engravings communicated through the interpretation programme, the architecture itself communicates the sensitivity of the site, through its environmentally sustainable approach (Afritecture 2015).

CONTROL & FILTERING

The entrance to the visitor centre is through a narrow slit, leading the visitor into the foyer and souvenir shop: visitors are then received by guides behind the reception counter, regulating the circulation by leading groups of ten or less people on walking routes. Visitors waiting their turn, reside in the dining area, which is served by a small kiosk (Afritecture 2015).

INTERPRETATION

As the visitors move through the building, they are prepared for engagement with the rock engravings. The series of spaces refer to the different stages of trance ritual associated with the indigenous San culture (Esposito 2011). The first stage of the ritual resembles the phases a person experiences during a malarial attack, where phosphenes appear to the shaman, these retinal images appear in the shapes of spirals, circles, and



FIGURE 5.8
TWYFELFONTEIN
VISITOR CENTRE
(Afritecture 2015)
(Esposito 2011)
(Grahl 2012)
(Lanting n.d.)

parallel lines, creating abstract patterns.

This stage is then followed by the 'little death', where the shaman starts to shiver and sweat, resembling the symptoms displayed by a wounded animal as it is dying. This stage is characterised by a feeling of weightlessness and is followed by the third and final stage.

In the third stage, when the shaman reaches a stage of full trance, the shaman leaves his/her body to merge with the animal, to enchant the animal, either for hunting or to make it rain (Afritecture 2015).

CONTEXTUAL RESPONSE

The narrow vertical slits created by two large slabs and rocks, and the curved overhangs from shallow caves of the Twyfelfontein landscape, where influential elements in determining both the construction method and form of the visitor centre. The plan of the visitor centres is based on one of the San metaphors for the third stage of the trance ritual, and is reminiscent of an antelope curled up.

The armoured cladding reminds one of antelope spoor-shaped mopane tree leaves, insect carapaces, and animal skeletons, and was constructed from recycled oil drums (Esposito 2011). Over 600 second-hand oil drums were sourced from all over Namibia, each drum then sandblasted, to remove the paint and start the rusting process, before installation. The tiles for the roof cladding were constructed by quartering the oil drums, then overlaying and installing the tiles in a Roman tile fashion, where concave tiles are fixed to purlins, and convex tiles to the exterior to close the roof (Afritecture 2015).

The project also made use of gabion baskets filled with recycled rubble and loose stones gathered from the area to construct solid masonry walls. This labour-intensive process of filling each gabion basket brought much-needed employment to the area (Afritecture 2015). Thus, this project not only created economic opportunity for the local community in tourism-related labour, but also in the form of labour required for the construction of the visitor centre.



▲
 FIGURE 5.9
 STONEHENGE
 VISITOR CENTRE
 (ArchDaily 2013)
 (Daily Mail 2013)
 (Lovair 2015)
 (Macarthur 2014)
 (The Hub 2016)

PRECEDENT STUDY: STONEHENGE VISITORS CENTRE

LOCATION Stonehenge, Amesbury, UK
ARCHITECT Denton Corker Marshall
CLIENT English Heritage
COMPLETION 2013

ATTRACTION Stonehenge in Wiltshire is among the most famous groups of megaliths in the world. The sanctuary is arranged in circles of menhirs, in patterns that have astronomical significance. Stonehenge, together with Avebury, is seen as a holy place, harking back to prehistoric times (UNESCO World Heritage Centre 2008).

The Stonehenge visitor centre is located 1.5 miles west of the stone circle, falling within the World Heritage Site, but is invisible from the monument. The visitor centre is designed with a light touch on the landscape, consisting of three simple enclosures, sheltered by a perforated

FUNCTION The three enclosures are all finished in different materials, the first and largest box is clad in chestnut timber, and houses the museum display of artefacts and interpretive audio-visual presentation. The second largest is made up of glass and contains the café, shop and classroom education centre. The smallest box sits between the two larger enclosures, and is clad in zinc. This box provides the ticketing and guiding facilities, and also leaves room for a view (Macarthur 2014).

PROMOTION & ORIENTATION

The visitor centre at Stonehenge has long been anticipated, and there have been many attempts and competitions to design a suitable visitor centre. The design of the centre was awarded to Denton Corker Marshall's architects, and was formally opened in December 2013. Although the visitor centre does serve to promote Stonehenge as well as the surrounding Neolithic settlement remains, the substantial hike in ticket prices to view Stonehenge has dampened visitor enthusiasm (Macarthur 2014).

CONTROL & FILTERING

The building provides external access and circulation to accommodate the varying amplitude of flow of visitors to the site. The arrival foyer and ticket queues are placed on the exterior of the building, and are covered by the undulating canopy (Macarthur 2014). All visitors to this World Heritage Site must pass through the visitor centre, before walking, or taking a ten-minute shuttle ride to Stonehenge. As visitors move towards to East, the henge slowly emerges, until the visitor centre disappears behind the visitor.



FIGURE 5.10
STONEHENGE
VISITOR CENTRE
(ArchDaily 2013)
(Daily Mail 2013)
(Lovair 2015)
(Macarthur 2014)
(The Hub 2016)

INTERPRETATION

The design of the visitor centre aims to act as a prelude to Stonehenge, intending not to diminish the sense of timeless strength and powerful sculptural composition of the stones themselves. The visitor centre was designed to accommodate dedicated facilities on site for the education of the public and the interpretation of Stonehenge. Dr. Simon Thurley, the chief executive of English Heritage has said: "For too long, people's appreciation of Stonehenge is this mysterious, impressive but anonymous monument. The Neolithic period itself is pretty much a murky expanse of time, shrouded by many outdated notions. We want people to come here and take away a fresh view" (ArchDaily 2013).

Together with the interior museum and interpretation centre, an outdoor gallery space was introduced. The gallery includes three reconstructed early Neolithic houses, based on the forensic evidence recorded from the nearby surroundings (ArchDaily 2013). The reconstruction of the settlements, together with the insight provided by the visitor centre, provides visitors with a new understanding of the context in which Stonehenge was built.

CONTEXTUAL RESPONSE

With the site's close proximity to the stones, the placing of a discreet building, which does not detract from the monument, became a challenge. The architect, together with English Heritage proposed a principle of "reversibility", resulting in a building which has minimal foundations and excavations to minimally disrupt the site, which is of ongoing archaeological interest. The design of the building was based on two principles: where the stones are exposed and purposely positioned, the centre is sheltered, lightweight and informal; and where the stones are embedded in the earth, the centre is lightly placed on the surface of the landscape (Macarthur 2014).

Where possible, local, recycled and renewable materials were used, including locally grown sweet chestnut timber used for cladding, and Salisbury limestone (ArchDaily 2013). Two hundred and eleven slender columns are clustered in uneven intervals, and lean slightly in different directions, alluding to the trunks of forest trees. These columns support the roof in the form of an irregular aerofoil, which mimics the rolling, sheep-grazed hills of Salisbury. Macarthur has stated of it that "the centre does not seem jaunty and wilful, as it might easily have done, and there is a kind of calm and not overstretched homology of the roof and the landforms, the columns and trees and fence posts, that brings together the building and landscape" (2014).

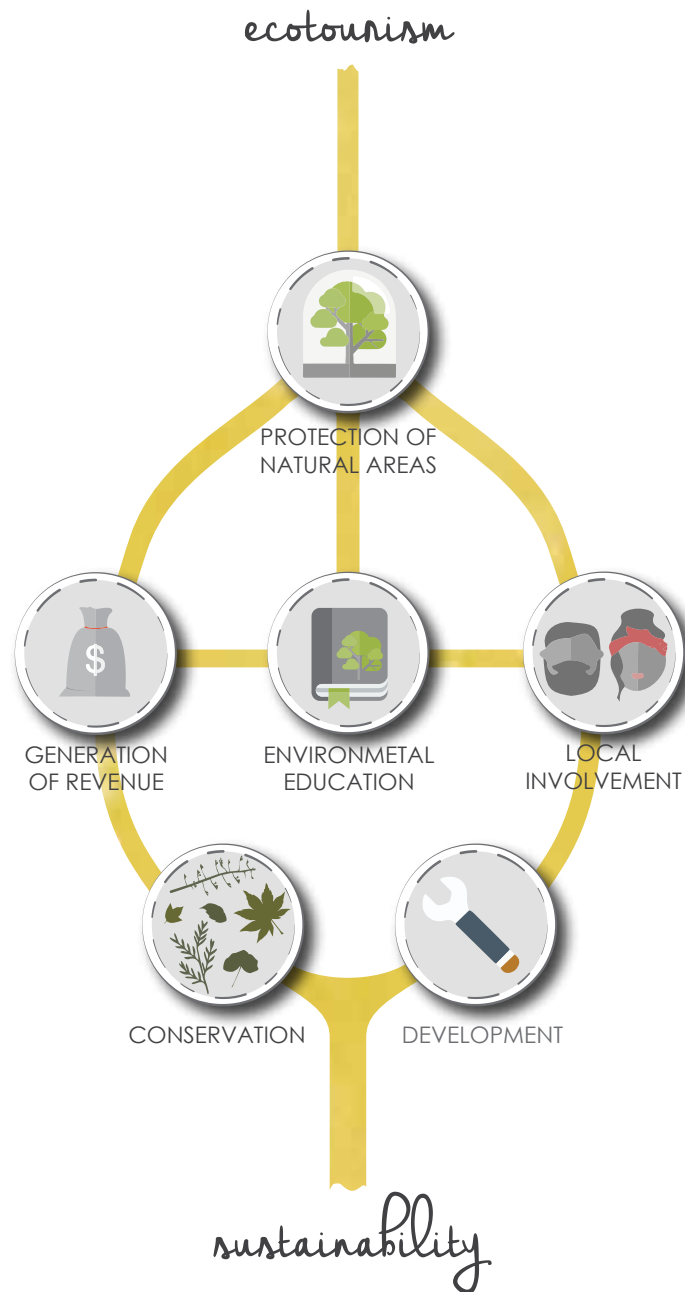


FIGURE 5.11
ECOTOURISM AS
SUSTAINABLE TOURISM
Image adapted from
(Ross and Wall 1999, p.124)

5.2 ECOTOURISM

Ecotourism is defined by the Ecotourism Society as “purposeful travel to natural areas to understand the culture and the natural history of the environment; taking care not to alter the integrity of the ecosystem; producing economic opportunities that make the conservation of the natural resources beneficial to local people”. The World Conservation Union (IUCN) defines ecotourism in a similar way as “environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature and any accompanying cultural features, both past and present, that promotes conservation, has low visitor impact, and provides for beneficially active socio-economic involvement of local populations” (Ross and Wall 1999:124).

These definitions suggest that in ecotourism, the introduction of responsible tourism serves to create a symbiotic relationship between the ecological tourism resource and the local community. Through environmental education, the generation of income and the involvement of the local community, ecotourism is seen as a conservation tool to protect sensitive or undisturbed areas (Ross and Wall 1999:124).

The role of ecotourism is not only to provide an enjoyable visitor experience of nature, but to protect natural areas, generate income, serve as an educational tool, and build a relationship between local authorities and communities. The objectives of ecotourism are intertwined, as is the success or failure of one objective influences the success of another. When all of the objectives are met to a certain degree, ecotourism mediates the tension between resource exploitation and resource conservation, creating a

sustainable tourism environment, which can be enjoyed by generations to come (Ross and Wall 1999:125).

5.3 TAKE-HOME VISITOR EXPERIENCE

In recent years, the expectation of the tourism industry to aid in the adoption of environmentally sustainable principles has increased. This is especially true in the niche market of nature and wildlife tourism, where visitors have the opportunity to directly interact with nature or wildlife, either in a natural habitat, or in captivity (Ballantyne et al. 2011:770). Nature and wildlife tourism can potentially impact visitors short- and long-term attitude of the environment, by developing their respect and appreciation for wildlife and nature, by raising awareness of environmental issues, by promoting environmentally sustainable attitudes and actions, and by building visitors capacity for longer term adoption of sustainable living practices (Ballantyne et al. 2011:770).

The stimulation of tourism in a given area can also have a positive impact on the environment, by generating income for the protection and sustainable management of wildlife and their habitat; it also encourages visitors to contribute to environmental causes, financially or otherwise, and influences the behaviour of visitors during the tourism experience. The educational aspects of the tourism experience not only contribute to the behaviour of the visitor during and after the visit, but also contributes to visitor satisfaction of the experience (Ballantyne et al. 2011:771).

Visitors to nature and wildlife-based tourist attractions typically respond to and recall their experience on four levels. These levels include:

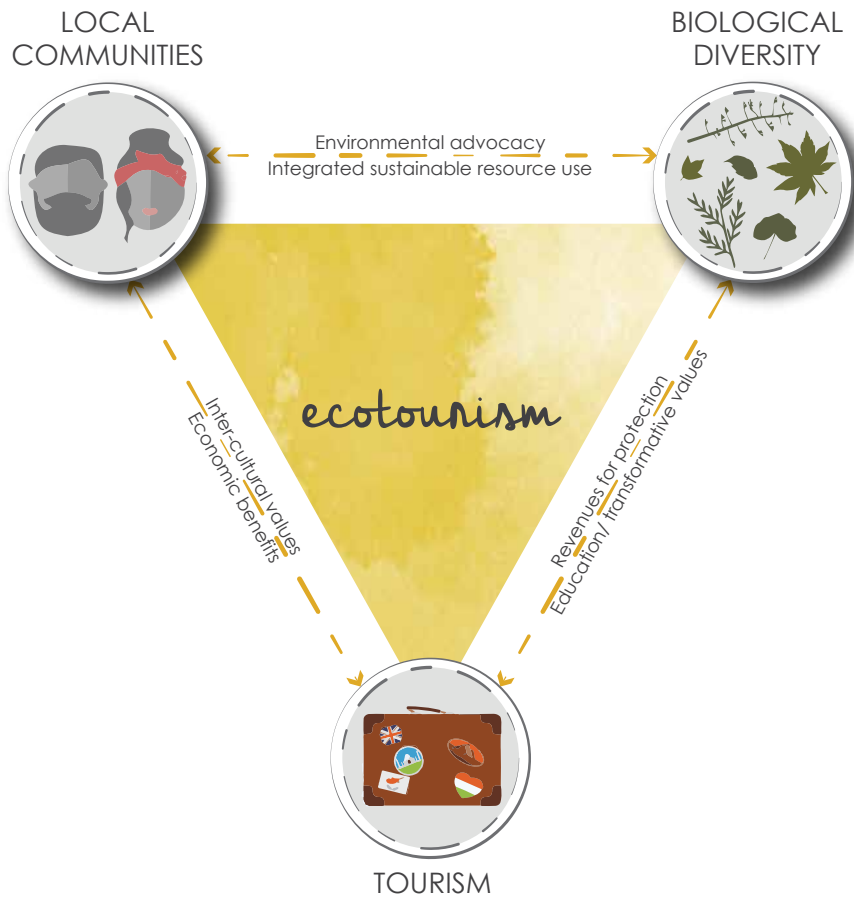


FIGURE 5.12
ECOTOURISM AS
CONNECTOR
Image adapted from
(Ross and Wall 1999, p.126)

- the visitor's sensory impression, recalling vivid visual, auditory, and olfactory memories of their experience;
- the emotional affinity visitors experience during the visit, including emotional responses to and forming an emotional connection with the animals;
- a reflective response to the experience, where the visitors gain new insight; and
- a behavioural response, where visitors alter their behaviour as a post-experience response.

5.3.1 SENSORY IMPRESSIONS

Visitors to nature and wildlife tourism attraction often recall the experience with vivid sensory impressions. These sensory impressions are not only of the animals themselves, but also include sensory impressions extended to the environment in which the animals are situated. Ballantyne et al. (2011) speculate that it might be the multi-sensory element of the "real-life" experience that these attractions provide, which is captured in the minds of the visitors long after the experience.

5.3.2 EMOTIONAL AFFINITY

Together with visitors' sensory impression, visitors also refer to emotional content when recalling a wildlife tourism experience, with these emotional events often being the visitors' strongest memory of the experience (Ballantyne et al. 2011:773). Visitors also convey a sense of empathy, when recalling the experience, identifying with the animals and forming an emotional connection, as the visitors start to become concerned with the viewed animals' well-being (Ballantyne et al. 2011:774).

5.3.3 REFLECTIVE RESPONSE

A reflective response from visitors is often not only based on the factual information received during the wildlife tourism experience, such as interpretive content talks or signage, but includes the sensory and emotive experiences, or discussions facilitated through social interaction (Ballantyne et al. 2011:774). The combination of the processing of factual information and the emotional affinity developed during the experience, leads to a greater concern and respect for the viewed species and their environment, thus making environmental issues more relevant to the individual visitors.

A greater awareness of the threats and dangers to the viewed species is also developed, as visitors recall the threats to "their" animals in greater detail than other information provided about the species, with many visitors becoming more aware of the impact they as individuals might be having on the environment (Ballantyne et al. 2011:774).

By providing opportunities for socialising, with companions, staff members or volunteer guides during the visitors experience, the visitors process and reflect on the experience, grounding the information received in their minds. The social interaction allow for the visitors to formulate and communicate their own thoughts and feelings, with the comments by others stimulating curiosity, and feelings of comradery and security within the group contributing to the positive emotions associated with the tourism experience (Ballantyne et al. 2011:775).

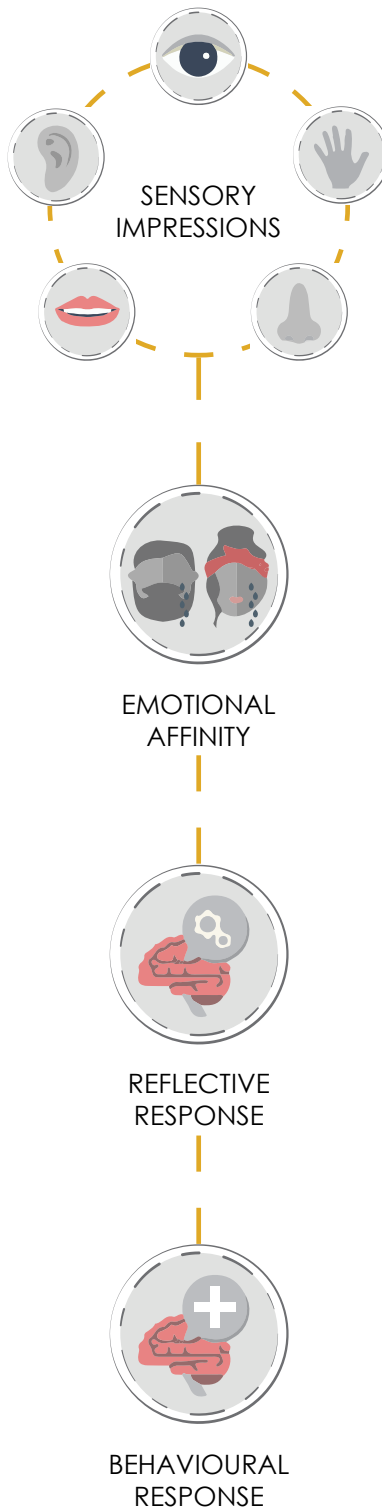


FIGURE 5.13
VISITOR RESPONSE TO
WILDLIFE TOURISM
(Author , 2016)



5.3.4 BEHAVIOURAL RESPONSE

Following on the reflective response of visitors, one of the key goals of nature and wildlife tourism attractions is a positive behavioural change by the visitors, taking home and altering their everyday behaviour (Ballantyne et al. 2011, :776). In this way, nature and wildlife tourism contributes to environmental conservation, by raising community awareness, with the hope that visitors not only take home and apply the message to their own lives, but further the adaption of environmentally conscious living within their own communities.

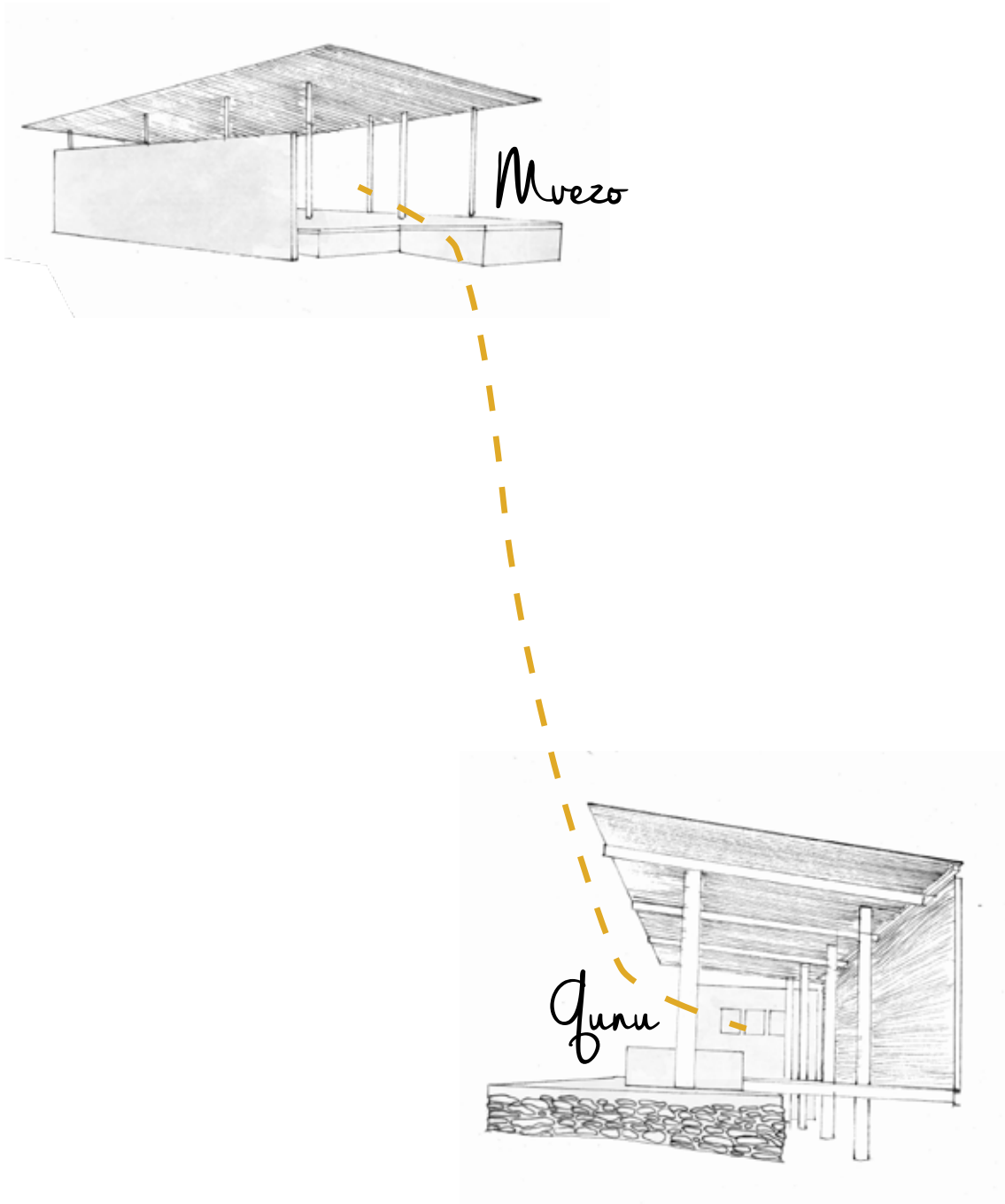
- the provision of information about the threat and dangers to the viewed animal;
- setting aside time and providing a space for visitors to reflect on the meaning of the experience;
- providing opportunities to socialise with peers, staff and guides; and
- providing resources that visitors can access post-visit.

5.3.5 TOURISM FACILITY DESIGN & MANAGEMENT IMPLICATIONS

To instil the take-home message in the minds of visitors, the design and management of tourism facilities, act to facilitate the experience of the tourism facility by evoking responses from the visitor. The following are suggestions by Ballantyne et al. (2011) to consider when developing a wildlife tourism facility in order to evoke powerful memories, enhance the visitor experience, and encourage visitors to adapt environmentally responsible behaviours in response to their visit:

- designing interpretation installations with the five primary senses in mind, focusing on sight, sound, smell and touch;
- providing visitors with the opportunity to come in contact with the visitors, within reason and without compromising the animal's well-being;
- providing visitors with the opportunity to view and experience the animals and environment from a different perspective;

FIGURE 5.14
ROUTE BETWEEN
MVEZO & QUNU
(Author, 2016)



PRECEDENT STUDY: NELSON MANDELA MUSEUM PAVILIONS

LOCATION	Mvezo & Qunu, Eastern Cape, South Africa
ARCHITECT	Cohen & Judin Architects TCN Architects
CLIENT	Department of Public Works Department of Arts & Culture
COMPLETION	2000

The Nelson Mandela Museum Pavilions were commissioned by the Department of Arts & Culture to honour both the birthplace and the childhood of former President Nelson Mandela. The design of the pavilions challenged the idea of the museum, as the collecting and displaying of artefacts is not of African origin, commemorating and celebrating a place instead of an object.

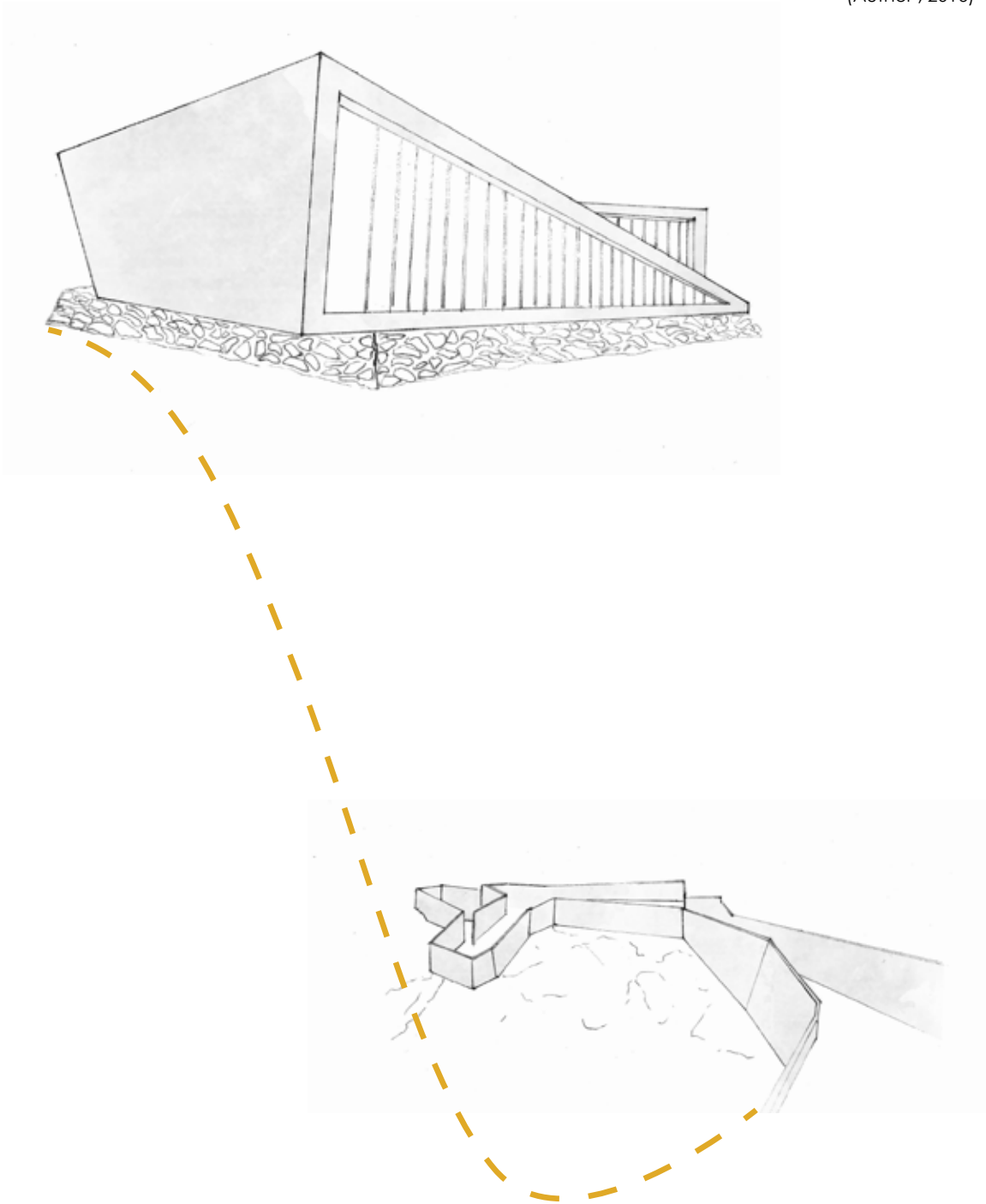
ROUTE The Nelson Mandela commemorative project creates a pilgrimage route between two places of equal importance: Mvezo, the birthplace of Mandela; and 30km further, Qunu, where he spent his childhood. The pilgrimage route continues to a third place of remembrance, Bhunga Building in Mthatha. Although this building connects to the pavilions through the photographic exhibition of Mandela's presidency, it is architecturally unrelated to the pavilions (Fraser 2009:386).

When approaching the design, the idea of creating a monumental structure to memorialise the former president did not seem appropriate to the context of this underdeveloped part of the country. Thus, the community was consulted to develop a programme which could contribute to addressing its most pressing needs. As part of the design strategy, the project took into consideration the procurement and enhancement of existing skills, creating a series of water points, which not only generated an income through tourism, but also provided the community with much needed infrastructure (Fraser 2009:386).

ATTRACTION The pavilions at Qunu and Mveso are both humble in scale, and are designed to commemorate Mandela, while serving the current the community. The larger pavilion is located in Qunu, and serves as a community meeting space and a gateway to the area. An open-air gumpole, galvanised steel I-beams and sheet metal structure contains a large gathering space, with a masonry podium as the footprint of the structure.

The pavilion at Mveso is smaller in scale, and is covered by a similar structure. A lattice screen is used as an exhibition space for both Mandela and the landscape, by engaging with the visitors' auditory and visionary senses. The screen captures the sound of the wind, while creating a backdrop for the exhibition of photographs and extracts from Mandela's autobiography (Fraser 2009:386).

FIGURE 5.15
TROLLSTIGEN NATIONAL
TOURIST ROUTE
(Author, 2016)



PRECEDENT STUDY: TROLLSTIGEN NATIONAL TOURSIT ROUTE PROJECT

LOCATION Romsdalen, Rauma, Norway
ARCHITECT Reiulf Ramstad Architects
CLIENT Norwegian public roads administration
COMPLETION 2010

The Trollstigen National Toursit route is located on Norway's west coast. The panoramic site sits within a dramatic pass between the deep slivers of ocean formed by the fjords that characterise the landscape (Frearson 2012). As a result of the severe winter weather of the region, the route can only be constructed and visited during the summer. The project aims to enhance the visitors' experience of the landscape, drawing attention to the nature and the location on the plateau (Reiulf Ramstad Architects 2012).

ROUTE The route is designed to connect the various, otherwise inaccessible, tourism based programmes of Trollstigen, forming a pathway between a mountain lodge with restaurant and gallery, flood barriers, water cascades, bridges, pavilions and platforms with a view of the breathtaking scenery (Frearson 2012).

The various architectural interventions are sculpted from the landscape, with a thin thread guiding the visitor from one overlook to another. The route not only gives the visitor a view of the landscape, but aims to submerge the visitor into their environment (Frearson 2012).

ATTRACTION The intention of the architect was to develop a clear architectural language, emphasising the transition between the planned zones and the natural landscape. The collection of tourism facilities is functional, in response to the site character, and serve to augment the visitors' view of the landscape. At a conceptual level, tension was created between water as a dynamic element, and rock as a static element, manifesting in the form of a series of spaces magnifying the spatiality of the landscape (Reiulf Ramstad Architects 2012).



5.4 HABITAT

5.4.1 THE VIVARIUM

The vivarium, a constructed artificial habitat for the study of animals, is a specialised building typology, which accommodates the control of small scale environments for the care and maintenance of animals under research (Stark et al. n.d.). Vivaria are related to but are distinct from other research laboratories, and aim to support research programmes that promote the health and well-being of the animals under study, as well as the researchers that occupy the vivaria (Hessler and Lehner 2009:98).

Vivaria has become an essential extension of the laboratory of animal research facilities, moving from merely a support structure to an integral part of the research programme (Hessler and Lehner 2009:109). Vivaria can be embedded within the laboratory building, accommodated by a separate structure connected to the laboratory or in a free standing structure, depending on the size of the reached animals and their habitat requirements (Stark et al. n.d.).

Vivaria are among the most functionally driven typologies within the scientific research field, with the complexity and cost of designing and constructing for the technical requirements often overshadowing the aesthetic of the space (Hessler and Lehner 2009:109).

5.4.2 HABITAT FOR CHIROPTERA

When designing an artificial habitat or roost for bats, a number of factors come into play in order to create the ideal habitat

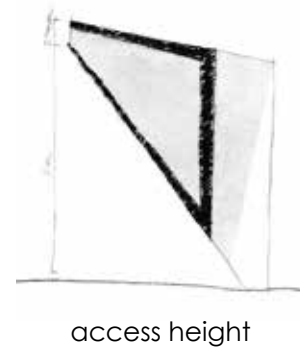
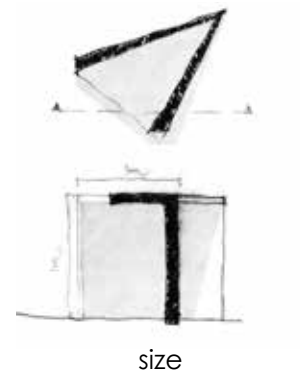
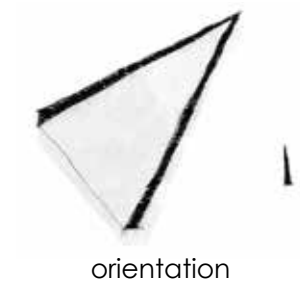
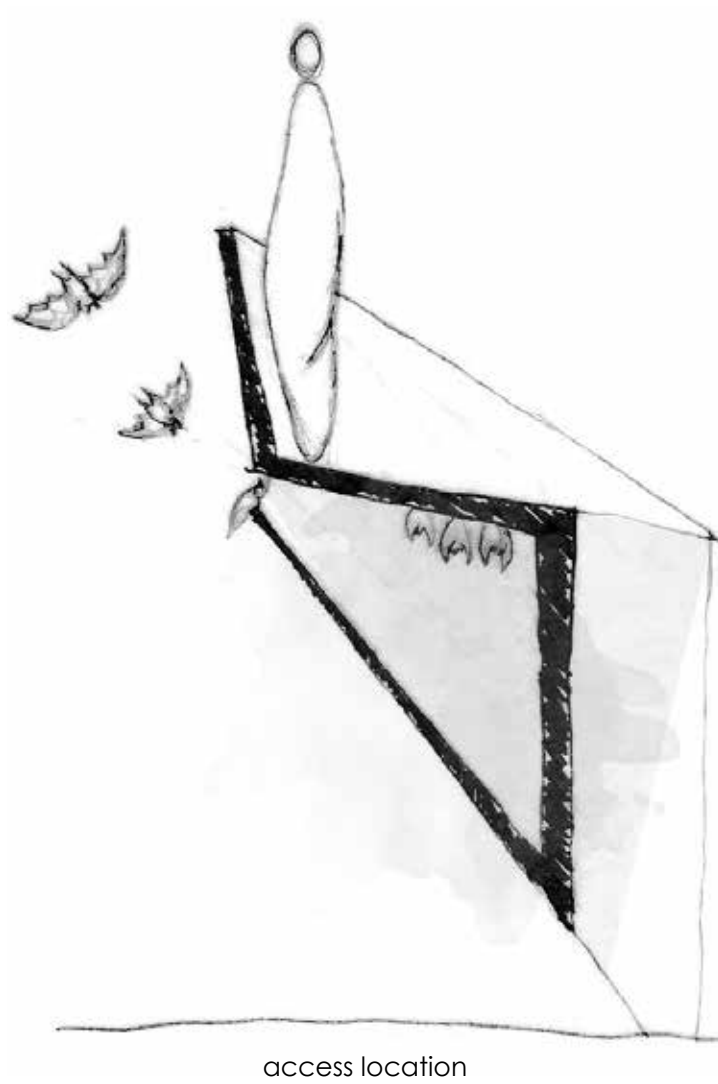
for the bats throughout the seasons. The control of the internal temperature and humidity of a roost are two of the key factors in designing a successful artificial roost (Bat Conservation Trust n.d.). Bats generally roost at temperatures between 30-40°C, taking into consideration that the heat generated by the body mass of the bats increases the internal temperature.

Larger, warm roosts are preferred by bats during the nursing season, and roosts with a consistent, warm microclimate are preferred during the winter months for hibernation (IUCN 2008). To optimise solar gain, the orientation of the opening of the roosts vary according to the season, with a north-facing opening being ideal in winter, and a south or west-facing opening in summer.

The Schreibers' long-fingered bat requires unobstructed flight space, occupying an interior space of no less than 1 meter squared. In roosting sites, the Schreibers' long-fingered bat establishes its colony in a bell-shaped hollow within the roof of the cave, trapping the heat of the bats to raise the internal temperature of the cave (IUCN 2008). Unlike horseshoe bats, Schreibers' long-fingered bat crawls, and does not fly, into roosts through small crevices. The openings range from 15-20mm high, and 20-50mm wide, and should ideally be located at a height of around 2 meters and upwards.

By locating roosts near vegetation and flight lines, bats emerge from the roosts much earlier, leading to a longer foraging time (Bat Conservation Trust n.d.). The vegetation also allows the bats to emerge directly into cover, so as to protect them from predators. Bats are known to use linear features in the landscape, such as hedgerows, tree lines and waterways as

► FIGURE 5.16
CHIROPTERA ROOSTING
REQUIREMENTS
(Author , 2016)



commuting pathways between their roosts and the area in which they forage. The structure that these linear elements provide also assist the bats in acoustic orientation and navigation.

Natural and man-made shelters allow for the gathering of insects, increasing bat foraging. Good foraging areas are seen as the areas with a high density of insects, and more specifically, a high density of nocturnal insects. The Schreibers' long-fingered bat feeds on nocturnal flying insects, including moths, small beetles and the occasional fly (Bat Conservation Trust n.d.). The bat catches the insects by using echolocation, at heights ranging between 10-20 meters, often over large pools of water (IUCN 2008). Other habitats which feature a high density of flying, nocturnal insects are rivers, grassland and areas with endemic vegetation.

The endemic flora of Bolt's farm, not only offers the visitors to the site a picturesque view, but also host a variety of insects, on which the Schreiber's long-fingered bat feeds. Some of the most beautiful flora of the site includes the *Eulophia ovalis*, *Eulophia hians*, and *Eulophia inaequali* orchids. These orchids, along with the other endemic flora support insect life, including the *Phiala constipuncta*, and *Heliothis scutuligera* moths, on which the Schreibers' long-fingered bat feeds, as both the moth and the bat emerge at dusk.

▶
FIGURE 5.17
THE MOTH &
THE ORCHID
(Author , 2016)



Heliiothis scutuligera



Parodoxia graellsii



Loxostege venustalis



Phiala constipuncta



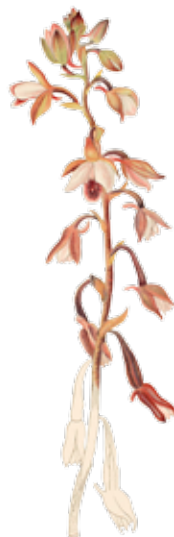
Ctenusa varians



Achaea catocaloides



Eulophia ovalis



Eulophia hians



Eulophia inaequali

