

BASELINE DOCUMENT

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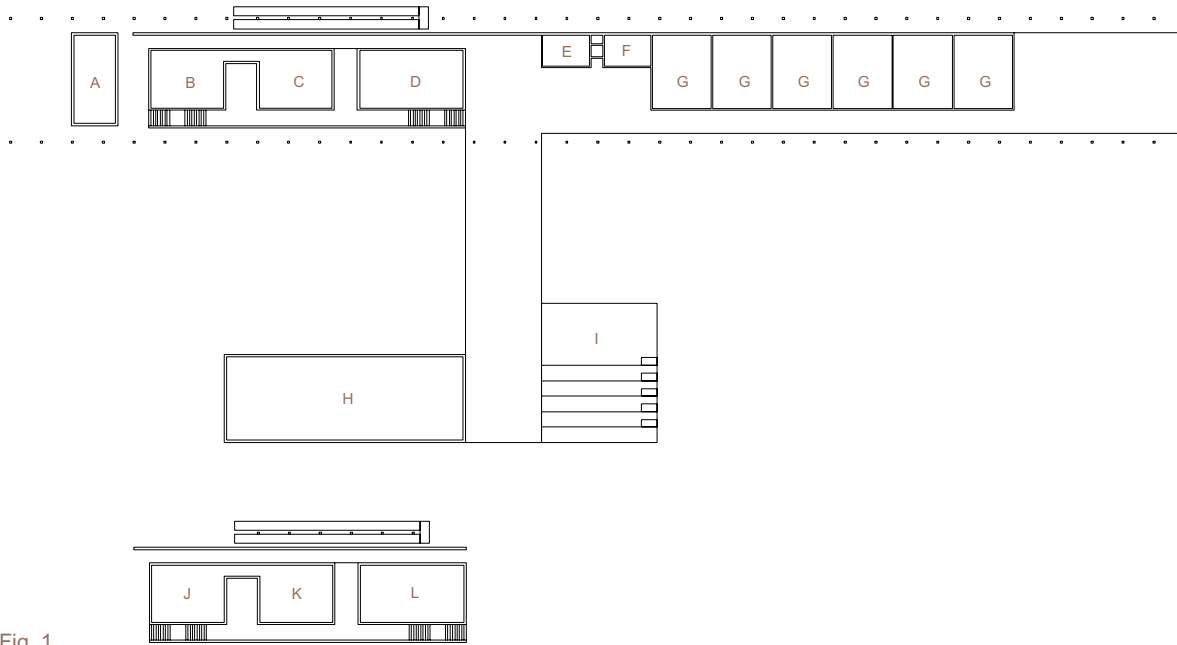


Fig. 1

LEVEL 1

- A - RECEPTION AND RETAIL
- B - COMPUTER LAB
- C - EDUCATION CENTRE LECTURE HALL
- D - STAFF OFFICES AND CONFERENCE FACILITY
- E - MALE ABLUTION
- F - FEMALE ABLUTION
- G - FOOD AND BEVERAGE OUTLETS
- H - SITE SUPPORT FACILITY
- I - OUTDOOR AMPHITHEATRE

LEVEL 2

- J - MULTI-MEDIA AUDITORIUM
- K - EXHIBITION SPACE
- L - EXHIBITION SPACE

- 1 - AERIAL VIEW LOOKING SOUTH
- 2 - ENTRANCE VIEW DOWN PASSAGE
- 3 - NORTH EASTERN AERIAL VIEW
- 4 - PASSAGE VIEW
- 5 - VIEW FROM OUTDOOR AMPHITHEATRE
- 6 - VIEW OF RAMP AT EASTERN EDGE
- 7 - VIEW OF COURTYARD LOOKING NORTH

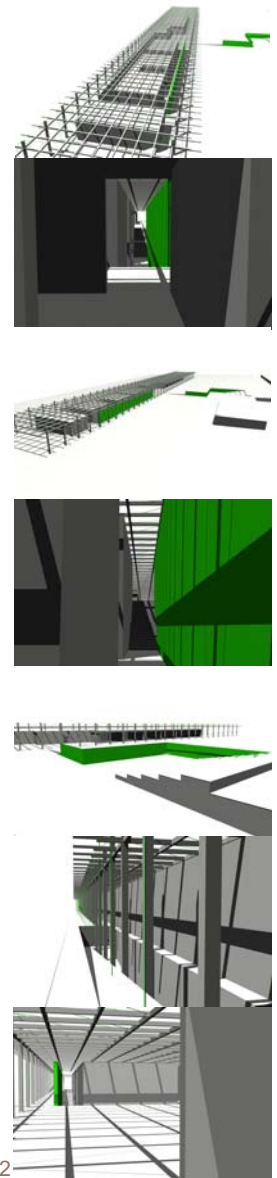


Fig. 2

SO.1 OCCUPANT COMFORT

SO.1.1 Ventilation

The following ventilation rates are required for each of the main functions of the Interpretation Centre:

Function	Air exchange rate required in	Comments
Theatre (Indoors)	3,5	Rate required per person
Education centre	7,5	Rate required per person
Cafeterias	5,0	Rate required per person
Kitchens	17,5	Rate required per person
Retail	7,5	Rate required per person
Conference facility	5,0	Rate required per person
Offices	5,0	Rate required per person
Exhibition space	3,5	Rate required per person
Ablution	20	Rate required per urinal/w c

Fig. 3 Table of required ventilation rates

All ventilation in the Centre will be provided by natural means. The design will incorporate the existing wind patterns on site to facilitate the necessary air volume changes. Wall and opening design will further exploit passive ventilation and the natural convection characteristics of heated and cool air to aid ventilation. Where additional forced ventilation is required such as in kitchen and ablution facilities, mechanical systems powered by renewable energy sources may be utilised. The natural, rural setting of the centre ensures quality fresh air without the need for filtering.

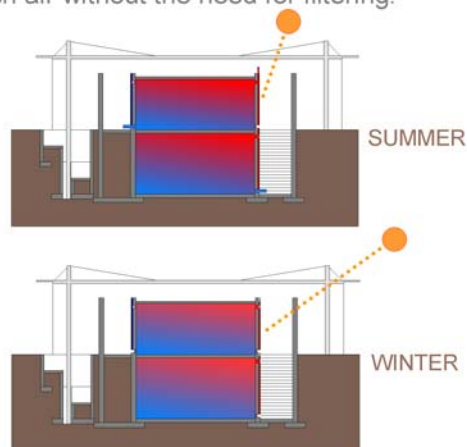


Fig. 4 Sections illustrating function of Trombe Wall during Summer and Winter months

The wall section will function as a trombe wall making use of the convective qualities of air flow to aid ventilation. The construction will use Cor-ten steel panels bolted to a steel channel spacer to form a cavity with the reinforced concrete walls.

SO.1.2 Thermal comfort

The climate of the site will be tempered with passive design elements and controls that is both energy efficient and operable to suit individual user preferences. The thermal qualities from a range of building materials will be utilised according to properties. In-situ concrete with its thermal storage characteristics is used to construct the main structure. This will ensure a more constant climate in the exhibition spaces forming the core of the facility. Shade structures is used to avoid overheating of this functions.

The existing wind directions in the site area will be directed to further aid ventilation. The main building structure is placed almost parallel to the summer wind direction, this provides protection from low east-west sun positions but allow cooling winds to cool the building structure.

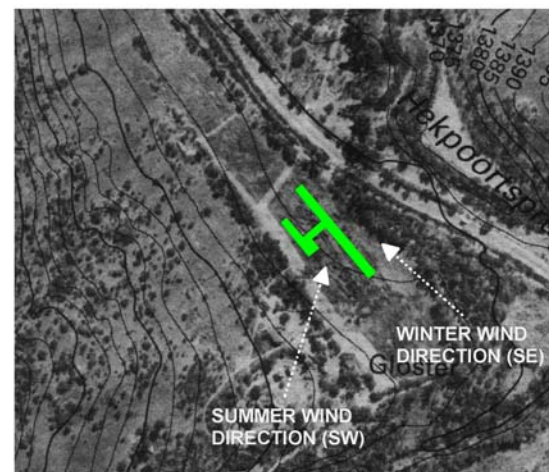


Fig. 5 Site layout plan indicating general wind direction during Summer and Winter.

SO.1.3 Views

Controlled views of the natural surrounding landscape forms an important part of the visitor and staff experience of the centre. Vistas and lines of sight aided the layout and design of the facility. A connection between visitor and landscape formed the basis of the design. Views out of, and into the various functions is controlled and guided by the level of privacy required. Workers in the office space need have a wide field of view to ensure and enforce security. A need for passive security thus also necessitated views through out the facility.

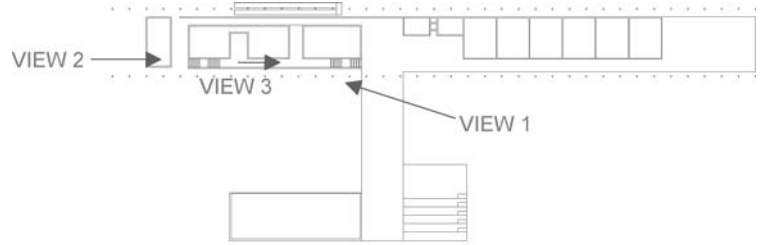


Fig. 7 Building plan indicating view directions

SO.1.4 Noise

The R563 road is the main source of noise pollution. Various solutions can be utilised to curb this problem. Soft landscaping and earth berms is used to attenuate the sound. Speed reductions of the speed limit on the road can also be agreed upon with the local authority. Noise from vehicles of visitors can be attenuated by distance and soft landscaping.

Construction methods and the use of sound absorbing, reflecting, and insulating materials will further reduce unwanted noise. Considering the natural setting, noise plays only a minor role in comparison to other influences.

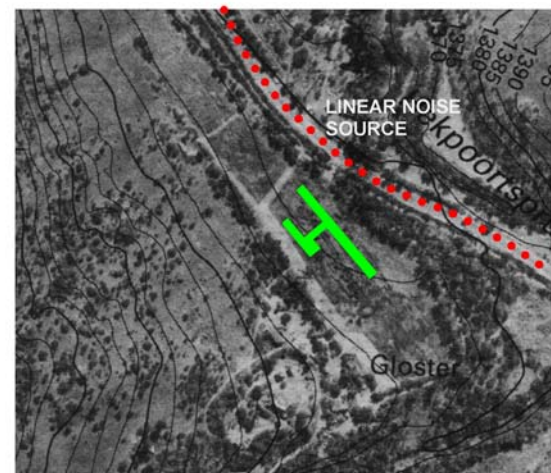


Fig. 8 Site layout indicating road noise source

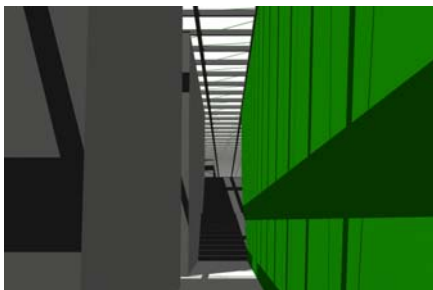
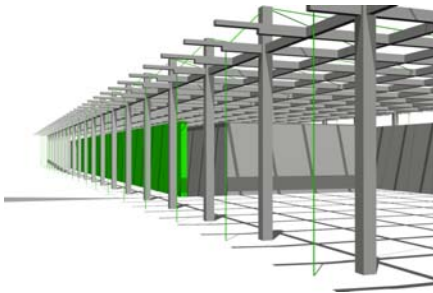


Fig. 6 3D Concept building model. Views, see fig-7

SO.1.5 Indoor/Outdoor connection

As mentioned in the “Views” section, the connection between visitors and staff members with the natural landscape forms a main component of the experience and the interpretive function of the facility. The design and detailing of transitional spaces between indoor and outdoor areas will receive particular attention.

SO.2 INCLUSIVE ENVIRONMENTS

SO.2.1 Transport

The larger part of visitor numbers to the centre will utilise private transport, foreign visitors will mainly make use of tour busses for transport. To make the facility more accessible to local visitors without private transport, scheduled tours can be organised. This will mainly serve the surrounding community. The relative proximity of the centre to the town of Krugersdorp and surrounding towns will ease staff transport to and from the centre. A daily pick up and drop off service of staff members can be organised to ensure worker attendance.

Increased mobility is proposed by means of a themed bus service running on a circuit that links the proposed visitor information points and places of interest. This facility will be available for public use only between those points. The main transport terminus will be at Mohale's Gate.

A COH WHS themed steam train is proposed on the disused SPOORNET rails to the west and north west of the area.

SO.2.2 Entrance

The entrance and approach to the Interpretation centre form part of the whole visitor experience. In view of the function of the centre as Interpretive tool, the entrance and approach must be easily identifiable and transparent. The setting and site layout, where the building can be seen as an object in the landscape, needs to be manipulated to direct new visitors to the entrance. The connection between initial view after arrival on the site, the parking area and approach to the centre needs to be designed in detail.

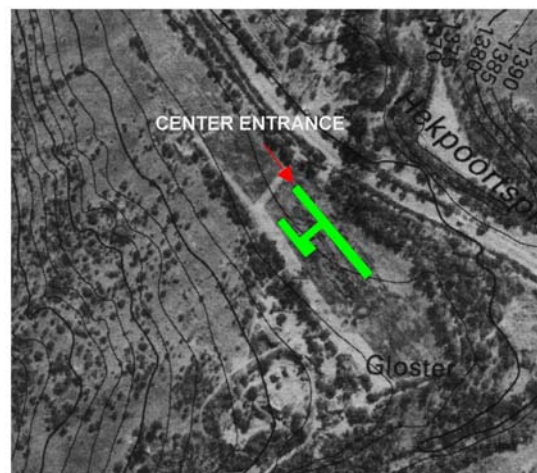


Fig. 9 Centre entrance location

SO.2.3 Circulation

The circulation of visitors in and around the centre was directed and manipulated to fit the hierarchy and order of the functions in the facility. The projected visitor numbers according to time of day and function guided the layout of the circulation route. A further guide to the layout of the circulation routes was the views and vistas to and from the centre. The circulation also had to aid passive security.

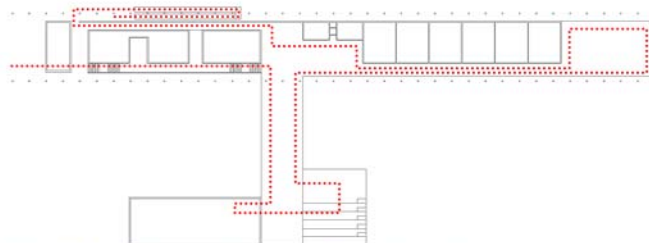


Fig. 10 Possible circulation routes through centre

SO.2.4 Furniture and fittings

The use and type of fittings and furniture varies according to function. The conference facility will be a multi-function space with movable furniture and partitions.

The multi-media theatre leading to the permanent exhibition space will have fixed seating. All area where groups can meet for a presentation or meeting will be equipped with sound and intercom systems. The multi-media theatre will also be equipped with projectors and other presentation technology. This equipment requires a high level of security to avoid theft and misuse. The kiosks and food outlet facilities will be equipped by the independent licence holders. The exhibition areas will also be equipped with specialist lightning and presentation systems.

SO.2.5 Toilets and kitchens

Ablution and restaurant facilities will be outsourced to local private businesses, with employment as aim in the contract.

SO.3 ACCESS TO FACILITIES

SO.3.1 Childcare

Care of children during visits to the centre will be the responsibility of the parents. Educational programs may be presented aimed at various age levels.

SO.3.2 Banking

A ATM machine will be available close to the retail facility.

SO.3.3 Retail

The retail facility will also be outsourced to local private businesses. The facilities will centre mainly on the sale of locally manufactured curio, jewellery and liquor. A percentage of the profits of the retail function and use of local labour will form part of the contract agreement.

SO.3.4 Communications

Wireless telecommunication systems such as cellular phones and microwave dishes are considered to be ideal for preserving the aesthetic quality of the COH WHS environment. However, innovations are required to mitigate the visual impact of towers, as they inevitably are built on ridges. It is therefore recommended that towers be restricted to high intensity use zones. Telkom's DECT towers cannot be easily camouflaged and so it is recommended that they be relocated to ridges outside the COH WHS. Discussions need to be held with Telkom for cost-effective alternatives to the poor service especially at Kromdraai. It is recommended that new line telecommunication infrastructure is constructed on existing poles or else kept in the existing servitudes underground.

A network of communication hubs between the visitor information points is also proposed.

SO.3.5 Work/ Residential

No additional residential facilities will form part of the program of the Interpretation Centre. Staff members will be transported from nearby cities, towns and farms. All work opportunities will be filled by local labour. All outsourced functions will have this requirement stipulated in the contracts.

SO.4 PARTICIPATION AND CONTROL

SO.4.1 Environmental control

To ensure personal satisfaction and comfort, permanent staff will be able to adjust their personal working environment including natural lightning, ventilation and heating. This will promote productivity.

SO.4.2 User manual/training

Staff members will be educated in the sustainable use of the building as well as specialist equipment used in the normal functioning of the centre. The aim is to keep systems as basic and easily operable as possible to ensure proper use and avoid down time and maintenance.

SO.4.3 Social spaces

Spaces for social interaction is provided next to or in close proximity to all meeting areas, both outdoors as well as indoors. Seating spaces will also be designed in addition to seating in the open air amphitheatre.

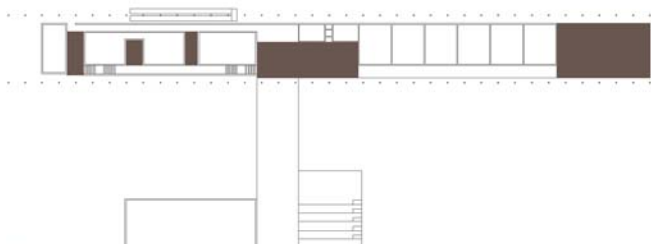


Fig. 11 Location of social spaces interspersed between functions

SO.4.4 Amenity

Ease of access to all supporting function including kiosks, restrooms and waterpoints will be ensured.

SO.4.5 Local community

Potential community benefits

1. Economic benefits

- Formal employment opportunities
- Training for formal employment
- Training for self-employment
- Labour intensive infrastructural interventions
- Capital support for small business
- Access to land for productive and domestic use, including natural resources
- Access to markets
- Access to transport

2. Cultural benefits

- Wider understanding of culture & people in area
- Greater respect for varied cultures in the area
- Greater cultural cohesion in the area

3. Social benefits

- Access to formal housing
- Access to potable water
- Access to transport
- Access to schooling
- Place of safety for abused women and children
- Prevention of HIV/Aids
- Alcohol abuse prevention programmes and abuse interventions
- Violence prevention interventions
- Crime prevention interventions
- Access to electricity
- Health facilities access and improvements
- Recreational areas (including playgrounds)

4. Scientific Community Benefits

- Long term sustainability of the site for scientific processes
- Value of intellectual capital
- Development of capabilities of staff
- Raised scientific profile
- Employment opportunities, including for black, female and disabled scientists

5. Environment and conservation

- Land Care
- Alien plant control
- Road stabilisation
- Quarry rehabilitation
- M&E – training and data collection
- Research projects

- Field guides
- Recycling and waste management
- Water bottling
- Traditional crops
- Waste swapping
- Crafts – training and production
- Signage
- Butterfly farm
- Cultural village
- Community tourism on community land
- Bioprospecting – medicinal and cosmetic
- Indigenous and medicinal nurseries
- Indigenous crops
- IKS
- Resource harvesting

Benefits will occur in three main areas:

- job creation, both temporary and permanent, through environmental initiatives, and the construction and upgrading of housing, the interpretation network facilities and infrastructure;
- small business opportunities in the tourism, hospitality and related service sectors, arising from the development of the interpretation network and increased tourism to the area; and
- community infrastructure and service delivery which will increase the quality of life of all residents of the area. This will include housing development and a programme to upgrade and secure tenure of residents where this is appropriate.

SO.5 EDUCATION, HEALTH & SAFETY

SO.5.1 Education

Education Resource Centre

While the Education Resource Centre aims to provide resources to all schools visiting the site and to find creative ways to provide resources to-

those who are unable to visit the site, a special focus will be to support the schools within and immediately surrounding the COH WHS. There are almost 50 schools operating in Circuit 5 of the Krugersdorp / Roodepoort district, many of them operating with very scarce resources. Teachers from schools in the area will be invited to training programmes and offered resource packages and access to equipment. Subsidised activities for local schools, along with sharing of resources for teachers to take back into local schools, will make a significant impact on community educational needs, and increase the likelihood of community "buy-in" on all levels. This interaction can be expected to engender a sense of local pride in the COH WHS heritage.

The Education Resource Centre will also function as a place of training for tour guides and others employed in the area to meet the needs of visitors.

The main community benefit deriving from the Education Resource Centre is educational and capacity building, not financial. Nevertheless, a number of jobs will be created as a dedicated staff of educationalists is needed.

S0.5.2 Safety and Security

Security

In addition to the On-Site Security Scheme, security will be needed in the Interpretative Centre, and possibly in other components of the Interpretative Network. There is the possibility of training and re-training people who are already employed in this capacity. In addition, security officials should also be trained in tour guiding skills, where appropriate.

The security of certain of the Interpretative Network components has the potential to be outsourced, although a decision will need to be taken by the Management Authority in association with DACEL as to the appropriateness of outsourcing this function for each component.

Should the function be outsourced, it could be contracted to a company with the condition that after a period of operating independently, it then hands over the function to a locally based company. In the interim it would have the responsibility of facilitating training

SO.5.3 Smoking

No smoking will be allowed indoors and in public spaces. Spaces allocated for smoking outdoors will be provided

SO.5.4 Indoor air quality

The rural, natural setting of the facility ensures fresh air quality without the need of filtering.

SO.5.5 Exercise & recreation

The activities presented in and around the COH WHS includes: Game viewing, bird watching, fishing, horse trials, hiking trials, 4 x 4 trials, mountain bike trials, camping, craft and art viewing, day tripping (Crocodile Ramble), hot air ballooning, spelunking, picnicking, canoeing, river rafting/tubing, Magalies meander, indigenous craft manufacturing and agri-tourism activities.

EC.1 LOCAL ECONOMY

EC.1.1 Local contractors

As part of the process of employing people from the COH WHS area, a set of conditions and criteria should be applied to ensure that the majority of people who benefit from the creation of the jobs are currently resident within the COH WHS and surrounding areas. This will need to be handled carefully, as development will also attract people to the area looking for jobs and opportunities. The Gauteng Provincial Government should seek to prioritise the involvement of local people in the COH WHS and thereby ensure their 'buy-in'. It is important that social organisation in the area is strengthened to be able to deal with this.

The set of criteria to ensure that priority for employment is given to residents of the area would include that to qualify for employment on the project a person must live in the area (local employment). There will also need to be a focus on the employment of women, people with disabilities or youth in particular situations. In addition, to ensure there is a spread of jobs, projects will seek to use labour-intensive building or production processes.

There is a need to ensure that the creation of new job opportunities and employment of local people should not disrupt the existing jobs or dislodge those in employment, or else the programme will quickly lose the critical support of landowners.

It needs to be stressed that this is an artificially created situation. As the COH WHS rollout takes place, it will act as a magnet for employment seekers, as well as people hoping to gain access to the scarce resources and benefits.

The residents of the COH WHS area and the Management Authority will have to deal with this to minimise conflict and division. Leadership and organisation can help to act as gatekeepers, and to stabilise the dynamics that get played out in such a situation and the WHA will need to play a role in facilitating this.

The creation of jobs and employment of people is regarded by respondents to the SES as a priority. Labour-intensive processes for construction of buildings and roads will go a long way towards meeting the immediate pressures. Skills training and capacity building will be necessary for the jobs requiring greater expertise, funds for which can be accessed from a range of local and international agencies.

Construction:

The Proposed Financial Plan for the COH WHS, drawn up in 1999, estimates that 1 172 temporary jobs will be created, either on or off site, during the construction period. While this may be an over-generous estimate and the exact number of jobs will depend on a number of factors,

there is no doubt that the construction of the interpretative facilities will result in a significant amount of temporary employment. The construction will be outsourced and guidelines and conditions, built into tender procedures and contracts, can ensure that local communities receive maximum benefit in terms of these employment opportunities.

EC.1.2 Local building material supply

The proximity of the site location relative to the industrial centres of Krugersdorp, Johannesburg and Pretoria ensures a local building material source. This proximity reduce travel distance and costs.

EC.1.3 Local components

All building materials and components will be sourced locally from the centres mentioned above. Specialist equipment will also be sourced from local suppliers with maintenance services and knowledge.

EC.1.4 Repairs and maintenance

Building components, systems and construction techniques will be designed to ease and reduce maintenance needs. This will also be done with the skill level of local contractors in mind.

EC1.5 SMME support

Households with access to sufficient capital may want to consider using this capital to engage in medium-sized enterprises. Some very poor households are engaged in extremely marginal, easy-to-enter enterprise arenas, and may want to access micro-financing, skills training support, etc.

DACEL needs to consider how to help residents of the COH WHS access varied programmes that provide capital and technical support. This support will need to be co-ordinated preferably through an NGO or private organisation.

There is a strong emphasis in many of the proposals that community benefits will accrue as a result of small business activity, much of it as an outsourced set of income-generating possibilities.

The Interpretative Network and Housing Development are the primary sources of outsourced economic activity, as detailed above.

From a "demand-side" perspective, the SES results indicate that very few of the existing small businesses owned and carried out by historically disadvantaged people are suited to the future market about to be created. In addition, it is anticipated that each of the identified opportunities would be "snapped-up" by entrepreneurs from outside the COH WHS area.

On the supply-side, attention needs to be paid to the extent to which a programme for SMME support should be set up, who is responsible for this and who would manage and fund it.

Alongside this, a systematic process needs to be established within the COH WHS to identify possible SMME opportunities that would require government facilitation to establish. Each of these opportunities will need to be analysed in detail to assess the sustainability of the opportunity.

There is a wide range of support available for small business development in South Africa, however, this support is not easy to access and it can be a complex process. It seems that a support mechanism would need to be introduced to the area designed specifically for the SMME market. Such support needs to consider non-financial support such as mentoring and training.

DACEL needs to consider the establishment of an agency with a defined mandate to oversee, support, project manage and mentor SMMEs for a stipulated time period. This agency would have no part of the running of the COH WHS or any of its components. It could be a non-governmental organisation or even an established SMME itself.

A business planning exercise would need to be undertaken within DACEL to determine the viability of this proposal. Critical would be the accessing of funding over a 3 – 5 year period. Funds are available from within Provincial and National Government and a variety of donor agencies.

SMME DEVELOPMENT AGENCY

DACEL should appoint an implementing agent with a defined mandate whose responsibility within the context of the establishment of the COH WHS would be to oversee, support, project manage and mentor SMMEs for a stipulated time period. This agency would have no part of the running of the COH WHS or any of its components. Although the responsibility for the implementation of the SMME support programme should not rest with DACEL or the COH WHS Management Authority, DACEL should undertake to seek sources of funding for so that an Agency can be appointed. DACEL should also seek the involvement of the Department of Trade and Industry as a priority.

EC.2 EFFICIENCY OF USE

EC.2.1 Space use

Occupancy and the use of space will vary according to season and time of day. Certain functions such as the conference centre and the outdoor amphitheatre can be used as multi-functional space that can be hired out to various private/public meetings to increase use.

EC.2.2 Occupancy schedule

A schedule of functions and presentations have to be kept to ensure a smooth flow of proceedings. Multi-media presentations in the indoor theatre will have to be timed according to visitor numbers and the required through flow of numbers.

EC.2.3 Management of space

The use of functions and spaces needs to be monitored for the sake of security. Supervision over space use is necessary due to excessive visitor numbers expected.

EC.2.4 Use of technology

Motion sensors will be installed to ensure optimum use of energy systems. These sensors can also be used for security. Systems controlled by occupancy of spaces includes artificial lighting, ventilation and heating. The economy of infra red sensors in ablution appliances to restrict water usage will also be investigated.

EC.2.5 Disruption & downtime

To eliminate or reduce disruption and downtime ease of access to supporting services must be ensured. Local contractors can be used to reduce travel distances in the case of failure of a system. Back-up systems will be used to enable the continuous use of functions.

EC.3 ADAPTABILITY & FLEXIBILITY

EC.3.1 Vertical dimension

To ensure maximum flexibility of functions, the vertical dimensions can be generous. The height in the exhibition space is a minimum of 3,5 meters. This will allow adaptability according to the requirements of the exhibited medium.

EC.3.2 Internal partitions

The temporary and permanent exhibition spaces will be laid out using partitions according to specialist requirements. This will allow flexibility in the flow of visitors.

EC.3.3 M&E Services

To allow maximum flexibility of spaces, the M&E services will be located in the floor and ceiling spaces. The plant room will also be located in an easily accessible location to enable maintenance work.

EC.3.4 Structure

The exhibition as well as the transport node will be designed to eliminate supporting columns. The main structure consists of a linear fragmented arrangement of functions covered by a light weight steel louver structure.

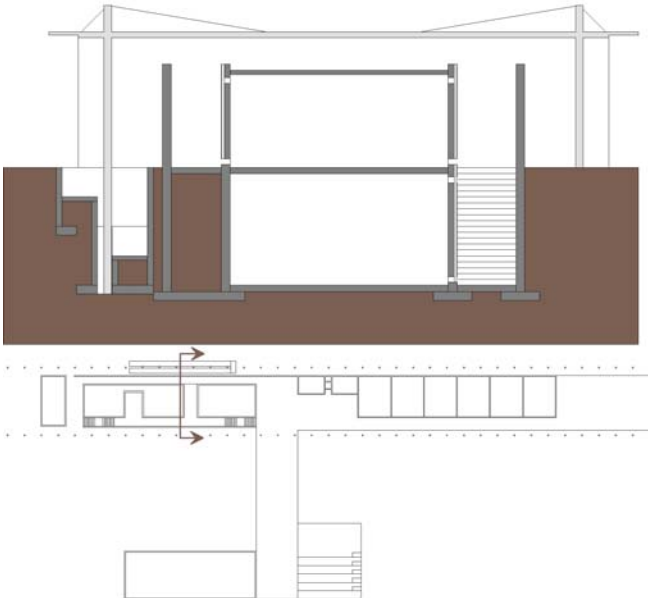


Fig. 12 Section indicating vertical scale

EC.3.5 Circulation & service spaces

The adaptability of circulation and service spaces will depend on the function of the space. The circulation spaces will be laid out to ensure flexibility and adaptability according to the functions they serve.

EC.4 ONGOING COSTS

EC.4.1 Maintenance

Maintenance can be contracted out to local specialist providers to the benefit of the local community.

EC.4.2 Cleaning

Cleaning services will be needed throughout the IC and possibly in other components of the Interpretative Network. It is proposed that this be outsourced to an outside company with conditions stipulating the use of local labour in the contract.

EC.4.3 Security/Care taking

In addition to the On-Site Security Scheme, security will be needed in the Interpretative Centre, and possibly in other components of the Interpretative Network. There is the possibility of training and re-training people who are already employed in this capacity. In addition, security officials should also be trained in tour guiding skills, where appropriate.

The security of certain of the Interpretative Network components has the potential to be outsourced, although a decision will need to be taken by the Management Authority in association with DACEL as to the appropriateness of outsourcing this function for each component. Should the function be outsourced, it could be contracted to a company with the condition that after a period of operating independently, it then hands over the function to a locally based company. In the interim it would have the responsibility of facilitating training.

EC.4.4 Shared costs

THE COH WHS MANAGEMENT AUTHORITY

The Management Authority (MA) has ultimate responsibility to ensure the protection of the unique cultural resources of the site. For all intents and purposes, this responsibility should be concentrated and can reside in, an existing regulatory authority as provided for in Section 8 of the World Heritage Act.

The Authority would have ultimate control over land use and development approvals within the area, through the implementation of standards, zoning appeals, and trading permits. Local authorities would retain initial approval review, but decisions would be subject to final

approval from the Management Authority. As such, the MA and local authorities work as partners to both control and promote certain types of development. Primary responsibilities include the following:

- Planning, Regulatory and Oversight Responsibilities
- Inter-Agency Coordinating Responsibilities

Staffing & Operating Budget

If coordinated as a regulatory agency within DACEL, the operation of the MA will require a total annual budget of R1.498.000 in Years 1 through 5. This budget would be funded through Gauteng Provincial Government and would support a full-time equivalent (FTE) staff of 7,5. The budget would fall to about R571.000 in years 6 through 10, for a total staff compliment of 3 FTE.

In the event of the MA becoming an independent co-ordinating and facilitatory body, then it would need to have its own auxiliary support services. Team members suggest that additional auxiliary staff requirements might include a financial manager & accountant, personnel office manager, administration officer, and legal advisor.

The Management Authority would occasionally recover a portion of this running cost through the distribution of trading permits. Property owners and entrepreneurs will want to take advantage of the market created as a result of investments in infrastructure and visitor facilities. Thus, permits for retail trading sites will have a value that can be used as a basis for permitting fees in support of the Management Authority's activities.

EC.4.5 Cost monitoring

CRADLE OF HUMANKIND CHARITABLE TRUST

The Trust would act as the principle driver for social benefits. A non-profit trust has the ability to leverage contributory funding in support of the COH WHS social objectives with regards to conservation, education, and community benefits.

These objectives would become the mission of the organization.

The Cradle of Humankind WHS Charitable Trust would operate as a non-profit organization subject to the laws and restrictions on charitable contributions. As a charitable organization, the Trust would operate separate and apart from both Government agencies and for-profit corporations. Its functions would include the following:

- Fundraising and generating income from other non-profit organisations and foundations, private contributors, NGOs, domestic and international agencies, and other donors in support of the mission of the WHS.
- Information. The Trust would be the primary source for information about the COH WHS, its mission and activities.
- Oversight. The Trust would have ultimate oversight for the successful operation of the visitor facilities.

However, the Trust and its Board are not responsible for day-to-day operations. That responsibility is given to the Executive Director of the Interpretive Facilities, who is hired by the Board. The Executive Director would hire experienced managers who, in turn, would staff their own departments. These facilities would operate as a "subsidiary" of the Trust that would generate income in support of their own operations

EC.5 CAPITAL COSTS

EC.5.1 Use of existing

Use of existing infrastructure including roads, pipelines and electrical supply lines will be used to minimise construction of new services.

EC.5.2 Shared costsDEVELOP AN INSTITUTIONAL FRAMEWORK THAT WILL SUSTAIN THE INSTITUTION IN THE LONG TERM

The institutional structure outlined below is intended to bring all decision-makers together into an integrated structure to ensure that the potential of the COH WHS for enjoyment, learning, engagement, and scientific and community benefit is maximised.

The COH WHS Management Authority

The COH WHS Management Authority will have ultimate responsibility for planning, regulation and oversight of the COH WHS and for co-ordinating the activities of various government agencies, the community, academic institutions and the charitable trust.

The COH WHS Charitable Trust

The COH WHS Charitable Trust will operate as a non-profit organisation responsible for:

- Fundraising and generating income from other non-profit organisations and foundations, private contributors, NGOs, domestic and international agencies and other donors in support of the conservation, education and community benefit objectives of the COH WHS.
- Reinvestment or re-distribution of net operating revenues generated by the subsidiary units.
- Distribution of funds for community development and scientific research.
- Provision of information about the COH WHS, its mission and activities.
- Oversight of the visitor facilities. Responsibility for the day-to-day management and operation of these will vest in the Executive Director and management of the facilities.

These duties will be carried out under the direction of, and in accordance with, the policies of the COH WHA.

It is proposed that the Trust be divided into four executive/operating components:

- Interpretation Centre: This is the section responsible for the museum/interpretative centre(s);
- Fund Raising: Responsible for seeking funds;
- Marketing and Public Relations: Fulfills a public and media relations function and also co-ordinates the marketing activities of the COH WHS;
- Legal and Contracting: This unit will oversee contracts and concessions associated with subsidiary operations, and could also be involved in defining new development opportunities.

The COH WHS Charitable Trust will be guided and directed by a Board of Trustees representing a broad range of interests, expertise and stakeholders.

EC.5.3 Plate efficiency

The use of floor area and space will be utilized to its maximum potential

EC.5.4 Ratio of capital to ongoing costs

The COH WHS Charitable trust will ensure a balanced approach in expenses and income generation. The phasing of the project according to need will further limit costs.

EC.5.5 Proportions of cost/building size

Economy of materials and construction techniques will be kept in mind during the design phase of the project. This will control expenses and control capital investment.

EN.1 WATER

EN.1.1 Rainwater

Rainwater falling on building roofs will be collected and stored. This water will be used in the growing of produce next to the Centre. A part of the rainwater will also be used to flush toilets and urinals.

Potential annual rainwater harvesting volume

Total roof area	= 1222m ²
Approximate annual rainfall	= 767mm
	= 1222 x 0,767
	= 937.274m ³
	= 937 274l

Highest monthly rainfall (January) harvesting for sizing of storage container

Total roof area	= 1222m ²
Rainfall in January	= 146mm
	= 1222 x 0,146
	= 178.412m ³
	= 178 412l

Possible annual savings by using greywater for flushing of wc's and urinals instead of municipal piped water

Harvested rainwater volume	= 937m ³
Current cost per 1 Kl water	= R3
	= 937 x R3
Possible savings	= R2811

EN.1.2 Water use

The use of water will be rigorously controlled. Water efficient appliances will be used in the ablution and kitchen functions.

PROPOSALS FOR WATER

Tests from boreholes and observations of spring flows suggest that there is a large potential for groundwater extraction water in the karst formations and in the Crocodile Alluvium. The extent of this reservoir, however, is not fully understood and it is believed to be under pollution threat from mining operations and sewage plants adjacent to the World Heritage Site. In the event of reduced water availability, the Rand Water pipelines on the periphery are a potential source of bulk water into the region. Two bulk water sources from the Rand Water bulk main are estimated to cost R7.9 million for Catchment D to the south and R12.9 million for Catchment A to the north. Selling Rand Water is a potential source of revenue for the Management of the COH WHS, but problems in motivating communities to abandon cheaper sources from already installed boreholes and rivers are envisaged. The recommendation to monitor the groundwater and surface water near potential sources of pollution, and from springs is made.

WATER RESOURCES

- The ground water potential for the area was estimated at 34.3Mm³/a in 1986, but is a source that is threatened by pollution from effluent from water treatment works, mine dumps and animal farms.
- 5.5Mm³/a can be obtained from the Danielspruit spring and Kromdraai eye (1986 estimates), but once again its quality depends on the protection of the underground water and the quantities depend on the seasons.
- With respect to surface or river water, the two main sources are the Blaauwbankspruit (23Mm³/a at Zwartkop)/Crocodile (133Mm³/a at Kalkheuvel) system and the Skeerpoort system (12Mm³/a at Hartbeeshoek). This source is unpredictable in terms of quality and quantity.

- Reticulated bulk water supply from the Rand Water Board is from bulk pipelines that go past Mohale's Gate (37Mm³/a) and to Pelindaba in the North, but there is no connectivity to the COH WHS.
- A limited reticulated supply potential from Mogale City Local Council (0.04Mm³ reservoir capacity) exists.

The estimated potential 2013 averaged daily water demand in the COH WHS area is 1.2Ml/day in Gauteng and 0.8Ml/day in North West. At present 78.9% of the population have access to tapped water mostly from boreholes.



Fig. 13 Position of produce crop growing

EN.1.3 Grey water

Biodegradable cleaning solutions will be used by cleaning staff and in dishwashing. This will prevent ground water pollution and allow the recycling of water. Grey water will also be collected and used for agricultural as well as toilet flushing uses.

EN.1.4 Runoff

New and existing developments will be required to demonstrate that the adverse effects of uncontrolled storm water such as erosion, pollution and the threat to public health are mitigated. Steep slopes >1:4 and flood lines are to be kept free from development. A more comprehensive regional hydrology study needs to be done to indicate flood lines and check the adequacy of storm water routing structures, such as bridges and culverts, and dams in the area.

The use of hard paving and other impervious surfaces will be kept to a minimum. Parking areas will be constructed using pervious concrete blocks that prevent erosion and aid infiltration of rainwater.

EN.1.5 Planting

Only indigenous plant species will be specified in the construction of the Interpretation centre. Species selection will match existing, natural material. Soft planted terraces and open spaces will be specified for picnic space instead of hard man made surfaces. All plant species specified will also need to have low water requirements.

EN.2 ENERGY

EN.2.1 Transport

Visitors to the Interpretation Centre will be encouraged to leave their vehicles at the centre and travel through the COH WHS on organised tours using busses and open roof safari type vehicles. This will reduce emissions, congestion and noise. These organised tours will depart and return to the Interpretation Centre at regular intervals and according to need.

EN.2.2 Ventilation

Where possible, ventilation of the building will be achieved with passive systems. Other functions where this is not possible, will make use of mechanical ventilation systems using renewable sources of energy, i.e. solar energy.

EN.2.3 Environmental control

Where possible, environmental control systems will be achieved using passive design methods. This will reduce energy consumption. Individual control of systems will also be possible according to preference.

EN.2.4 Appliances & fittings

Energy efficient appliances and fittings will be specified through out the building. This will include fluorescent/low energy consuming light fittings, kitchen appliances and automatic control systems that functions according to need and use of particular functions.

EN 2.5 Energy sources, renewable energy

Just over 60% of the population in the COH WHS do not have access to electricity and depend on alternative fuels, including firewood. The problem for many low-income families usually lies in connection and capital costs. A wide selection of tariff structures is available, that can be customised to the customer's energy requirements. Provision of affordable electricity is seen as a potential generator of substantial social benefit. The projected domestic and visitor energy demand is 25.3MW in 2013. ESKOM is the only supplier of grid power in the region. It has an installed capacity of 210MW in 16 substations all within 5 kilometres of the COH WHS. Capacity problems have been identified in the Broederstroom area because of large tourism developments, and in the Honingklip area south of the COH WHS, below the Krugersdorp Ridge. Upgrades are planned for the Broederstroom area.

Renewable energy sources are attractive for remote sites in the COH WHS because of their modular nature. Solar power in particular is attractive because of its lesser visual impacts compared to wind and because of the solar potential of the area estimated at 1943kWh/m²/a on a horizontal surface compared to Wind 100-250W/m².

Solar and wind energy are more expensive than ESKOM grid power (R12 and R15/kWh respectively for stand alone systems compared to R0.3/kWh, 1998 costs), but technology improvements are reducing the costs year by year. Solar energy is still considered cost effective on remote sites where the cost of constructing a feeder to a site is large.

Solar energy using photovoltaic cells will be highly effective given the amount of cloudless days at the site area as well as the absence of obstructions. The use of gas burning instead of electrical appliances will also be specified. Solar water heaters will also be used for the preheating of water used in the food and beverage outlets.

Approximate annual electricity use of building

Predicted electricity use of centre	= 200kWh.m ² .a
Total building area	= 1943m ²
	= 200 x 1943
	= 388 600kWh.a
Electricity use per day	= 388 600 / 365
	= 1064 kWh

Possible solar power potential in site area

Potential	= 1943 kWh/m ² /a
Daily potential per m ² panel area	= 1943 / 365
	= 5.3 kWh

Solar panel area required

$$= 1064 / 5.3$$

$$= 200\text{m}^2$$

Approximate capital cost for installation of solar panel system

Cost per 0.5m ² panel area (2001)	= R3100
	= 200 / 0.5
	= 400
Cost	= 400 x R3100
	= R1 240 000

Approximate cost of grid electricity

Cost per 1 kWh	= R0.32
Electricity used annually	= 388 600 kWh
	= 388 600 x R0.32
	= R124 352

Time lapse before Solar panel system becomes cost effective

Annual predicted grid electricity cost	= R124 352
Capital cost of solar panel system	= R1 240 000
	= R1 240 000 /
	124 352
Time lapse before system becomes sustainable	= 9,97 years

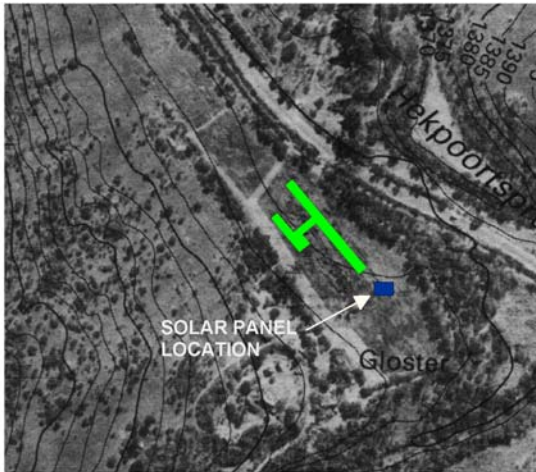


Fig. 14 Position of solar panel plant

EN.3 WASTEEN.3.1 Organic waste

Organic waste produced at the food and beverage outlets will be collected and used as compost in the growing of produce at the centre.

EN.3.2 Inorganic waste

It is recommended that no landfill sites be developed in the COH WHS, but that all non-compostible waste is disposed of outside its boundaries. An efficient collection system is required and hence, four collection and transfer stations have been proposed, at which waste will be separated for recycling and carted away. Residents will be asked to bring their waste to the collection centres. Problems are envisaged motivating the residents to abandon old practices of simply disposing the waste on their farms. The residents' and business community's cooperation is seen to be crucial to the success of any waste collection scheme in the area. Potential community benefits are envisaged by way of new jobs: collecting waste, sorting it, and attending to the centres; improved public health; and opportunities for training in handling waste.

EN.3.3 Toxic waste

The production of toxic waste at the Interpretation Centre will be prohibited. Wastes including used oil used in the preparation of food from kitchens will be collected and disposed of in a efficient manner. Provision of points specifically for the discarding of used batteries and printer toners will be provided.

EN.3.4 Sewerage

Recognising the rural character of the COH WHS, the ventilated improved pit latrine is proposed as a minimum sanitation standard. Furthermore, sealed sanitation systems are to be constructed in dolomite and fissured rock, to protect underground water resources. Upgrades to water borne central collection and disposal units are encouraged.

Possible locations for bulk sewers are recommended along the Blaauwbankspruit in Catchment D to the south for R2.5 million, and in Catchment A to the north for R0.45 million before cost of treatment. Bulk reticulation is considered as a long-term proposal.

A septic tank connected to a soak away system is proposed. The layout of this system will be constructed following the study of the site topography. Contamination of food crops will be avoided.



Fig. 15 Location of soak-away drain

EN.3.5 Construction waste

The production and disposal of construction waste will be strictly managed. Waste will be reduced using modular construction techniques as well as prefabricated components. Where possible, construction material will be recycled.

EN.4 SITE

EN.4.1 Brownfield site

The Interpretation facility will be constructed on a Greenfield site, but the impact on the environment will be controlled in a manner that allows returning the site to its previous natural condition. The size of the building and its footprint will be limited to form a compact whole. To further limit impact, existing roads will be utilised.

EN.4.2 Neighbouring buildings

The existing buildings near the site will have no major influence on the centre. Views to these buildings will be limited.

EN.4.3 Ecosystems

Impact on the natural existing ecosystems is reduced by the considered site position and layout of buildings and functions. Construction on sensitive areas such as slopes and ridges are avoided. The existing ecosystems play an important role in the quality of the visitor experience and strict measures will be taken to ensure its present state.

EN.4.4 Landscape inputs

The planned agriculture of produce for use at the centre will make use of organic waste as source of fertilizer. This will allow a decreased dependence on fertilizer from other distant sources and enables recycling of nutrients.

EN.4.5 Construction processes

Prefabricated and modular construction systems will be used to limit impact of construction processes on the site. These systems will also reduce construction time. Access to the site for vehicles transporting construction materials are with ease and unhindered.

EN.5 MATERIALS & COMPONENTS

EN.5.1 Material/Component sources

The proximity of the site location relative to the industrial centres of Krugersdorp, Johannesburg and Pretoria ensures a local building material source. This proximity reduce travel distance and costs. The recyclability of materials will also be considered.

EN.5.2 Embodied energy

All aspects of possible building materials will be studied to inform design decisions. Material with high embodied energy might have a low maintenance need that balances the equation.

The following table gives an indication of the main materials that will be used in the construction of the centre and the respective embodied energies of each:

MATERIAL	EMBODIED ENERGY kWh/(kg/m ² /l)
Sand and gravel	0.02
Cement materials	2.3
Paint	106.6
Water	0.0022
Timber	70
Plaster	0.3
Glass	80
Finished steel	13.2

Fig. 16 Table indicating embodied energy of construction materials

EN.5.3 Manufacturing processes

Prefabricated components will be used to minimise site impact and speed up construction time. Standard components will also be specified.

Fig. 17 Shade structure assembled of modular units

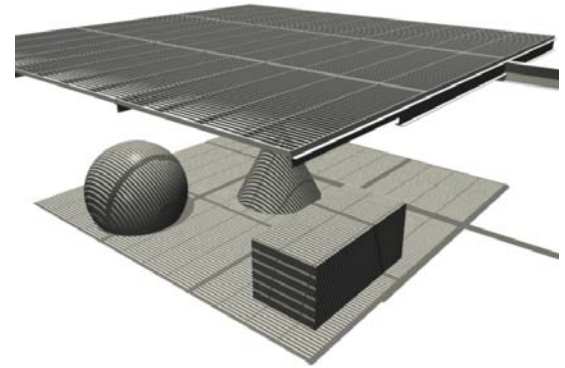
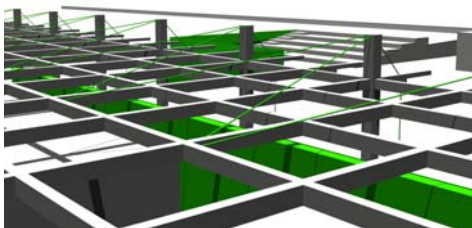


Fig. 18 Example of shadow patterns using louvre structure

EN.5.4 Recycled & reuse of materials & components

A percentage of building materials could be sourced from recycled or reuse sources to promote energy efficiency.

EN.5.5 Modular coordination

Modular components can be used to limit construction waste and speed up construction.

	Area m ²	Quantity	Function of space	Finishes	Special equipment	Light levels-	Norms & standards SABS 0400
Visitor info point	12	1	Point providing visitors with info concerning facility	Tiles, brick walls, timber counter	Signage, computer system, intercom system	150	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Transport hub	306.4	1	Vehicular pick-up, drop-off point	Hard paving	Signage	150	Part B, C, D3, DD2, DD3, H, J, K, O, SS1-SS4, SS7, T, U, W
Orientation & exhibition	175.2	1	Permanent and temporary exhibition space	Tiles, stone walls, timber-steel exhibition equipment	Audio-visual equipment, intercom system, special lightning effects	500	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Education centre	139	(100 p) 1	Facility presenting educational activity programmes for school children, computer room, lecture room	Tiles, stone walls, timber-steel computer stand equipment	Computer network point, audio-visual equipment	500	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Field & site support facility	24	1	Recreational site activities centre, e.g hiking, mountain biking, 4x4 trails, horse riding, rock climbing, caving,	Tiles, stone walls,	timber-steel equipment shelving-stands	500	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Conference centre	50	(25 p) 1	Conference function	Carpet, acoustic wall-ceiling finish	Audio-visual equipment, intercom system, special lightning effects	750	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Restaurant & food outlets	433.2	6	Sit down and take away food outlets	Tiles, stone walls, timber-steel computer stand equipment	Computerised till point	300	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Outdoor amphitheatre	270	(min 300 p) 1	Multi-function gathering space	Hard paving-seating-stage area	Audio-visual system	100	H, J, K, M, R1, RR2, RR4-RR6, SS1-SS4, SS7, T, U, W
Retail outlet	49.5	1	Curio's, Gifts, Branded merchandise	Tiles, brick walls, timber-steel counter-shelving	Computerised till point	500	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Admin Offices	49.16	(4+2) 6	Office space for various trust members	Tiles, brick walls, timber-steel office furniture	Computer network point	500	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, SS1-SS4, SS7, T, U, W
Ablution	50.65	(max 300 p) 2	Male, female, disabled ablution facilities	Tiles, brick walls, timber-steel partitioning	Water saving equipment	100	Part B, C, D3, DD2, DD3, H, J, K, L, M, N, O, P, SS1-SS4, SS7, T, U, W
Parking	2100	Cars-148, Buses-6	Parking	Hard paving	Signage, lightning	150	Part B, C, D3, DD2, DD3, H, J, K, O, SS1-SS4, SS7, T, U, W

Fig. 19 Accommodation schedule table

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