

INNOVATIVE PPP SAVES CHAPMAN'S PEAK: PPP BRINGS TOGETHER THE PUBLIC AND PRIVATE SECTORS FOR REHABILITATION OF THE FAMOUS ROAD

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ABSTRACT

When the reconstructed Chapman's Peak Drive between Hout Bay and Noordhoek reopened in December 2003, it was a milestone not only in engineering, but also in terms of co-operation between the public and private sectors, between established business and empowerment partners, between lenders and concessionaire, and between project and local community.

The project, which was won via a competitive tender process, is unique in a number of ways:

- it is the first toll road deal concluded directly with a province
- the first toll road deal concluded under the Public Finance Management Act
- it is the first limited recourse deal concluded with the PPP Unit
- the first subsidized toll road with the Provincial Government of the Western Cape putting up a significant portion of the capital cost
- a portion of the value in the project has been put aside for a community trust

This groundbreaking deal has created a new benchmark for PPPs and will provide a template for similar deals in the future. However, the agreement has faced severe test in its first year of operation, lack of an environmental Record of Decision delayed the construction of the permanent toll plazas and severe damage caused by exceptional storms have tested the partnership and provided valuable lessons.

When the reconstructed Chapman's Peak Drive between Hout Bay and Noordhoek reopened in December 2003, it was a milestone not only in engineering, but also in terms of co-operation between the public and private sectors, between established business and empowerment partners, between lenders and concessionaire, and between project and local community.

The R350 million concession, an innovative mix of governmental impetus, contract structuring, engineering know-how and merchant banking expertise, is the latest of a series of groundbreaking PPPs (Public Private Partnerships) facilitated under the Public Finance Management Act (the PFMA).

It is the first toll road in the Western Cape constructed under the Western Cape Toll Road Act and the first subsidised toll road in South Africa. It is the first project in S A to use Swiss engineered catch fences. Innovative engineering is the order of the day with concrete cantilever systems and a half tunnel preventing rocks from falling onto the road. The new Chapman's Peak Drive sets an engineering and construction benchmark.

The original Chapman's Peak Drive was completed in 1922. Today – 80 years on – this road, which was closed in January 2000 after a fatality from a rock fall, re-opened in December 2003 as a PPP toll road.

Since the opening of road, rockfalls occurred regularly. Although the frequency of these incidents increases during the wet winter months, they are by no means limited to periods of rainfall. During the 12 year period preceding the closure of CPD, five fatalities and number of incidents, which resulted in serious injury, have occurred. This represents an average fatality rate of nearly one every second year.

Despite this, no rockfall protection measures of any significance were in place along CPD.

1. PROJECT BACKGROUND

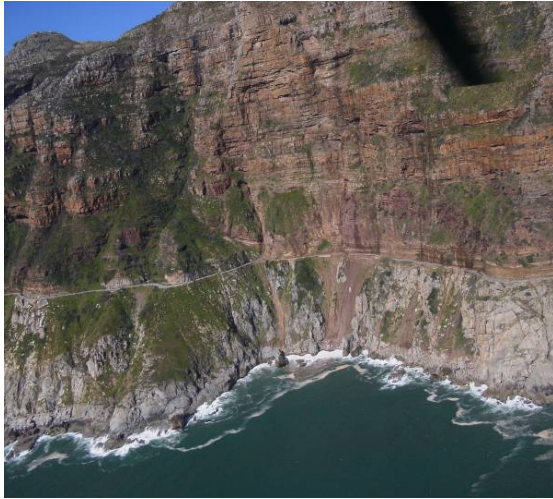
The Provincial Government of the Western Cape (PGOWC) called for proposals in August 2001 to rehabilitate and improve safety on Chapman's Peak Drive (CPD) – an 11 km stretch between Hout Bay and Noordhoek on the Cape Peninsula. Two consortia submitted proposals and the Concor Grouping was chosen as the preferred bidder. The Concession Contract was concluded in May 2002 and Financial Close in August of the same year.

Construction activities were preceded by an extensive design phase that comprised topographical surveys, 3-D rock fall modeling, 2-D profiling for catch fence design, the design of the half tunnel and other safety structures as well as an Environmental Impact Assessment and the development of an Environmental Management Plan.

The design team was tasked with reducing the incidence of rock falls, while preserving the scenic beauty of Chapman's Peak Drive – one of South Africa's premier tourist attractions.

2. SOURCES OF ROCKFALLS AND MODELLING

There are two prime sources of instability, namely those resulting from the natural slopes and cliffs of the mountainous terrain which tower above CPD and those emanating from the man-made cuttings in hard rock for the construction of the road over 80 years ago.

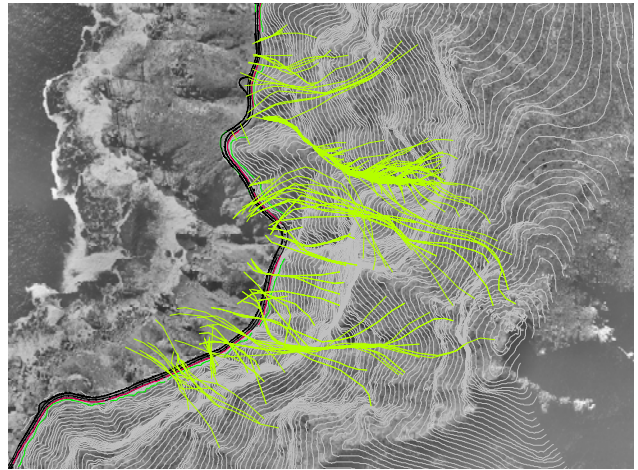
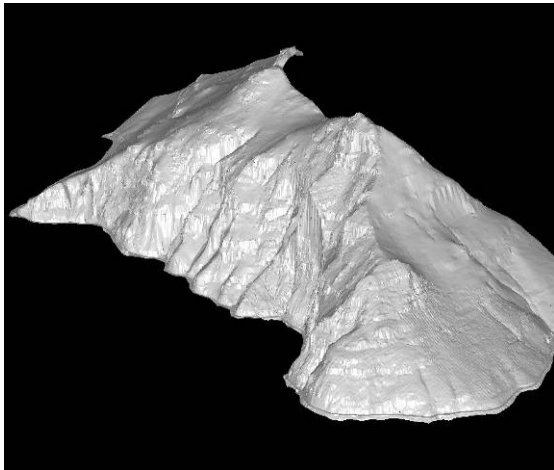


Cliffs and View of Mountain

In order to design rockfall protection measures, extensive rockfall modelling was required.

To this end three dimensional simulations of rockfalls were undertaken in association with Swiss specialists at an intensity and scale never attempted before. The input required for this modelling included a very detailed Digital Terrain Modelling (DTM) and the interpretation of very high resolution aerial photography to undertake an Engineering Geological Classification of the mountainous ground above CPD.

The results of these simulations allowed the distributions of both the relative frequency and the energies of simulated rocks of various sizes to be determined. In this manner a rational approach to selecting, sizing and placing of the required rockfall protection measures as described in the following sections was achieved.



Modelling and 3-D Mapping of Chapman's Peak Drive

3. ROCKFALL PROTECTION MEASURES

The rockfall protection measures being implemented at CPD have been selected on the basis of what is considered to be best international practice and consists of the following components:

3.1 Catch Fences

The primary protection measure adopted is the provision of nearly 1 600 metres of flexible high energy absorbing catch fences. These fences consist of steel posts made of heavy H-beam profiles. The posts are pinned so as to hinge on steel base plates which are anchored to the ground. Top and bottom straining cables are laced between the posts and are tied and tensioned to lateral ground anchors at either end of the fence. Depending of the capacity of the fence, friction brakes, being wire rope loops, are laced into the straining ropes and steel ring nets draped and tied to these straining ropes with a final upside layer of Tecomesh laid over the ring nets to absorb high velocity impacts. The fences vary in height from 4 metres to 9 metres.



Catch Fence and Details

3.2 Concrete Canopy Structures

Being imposing, expensive and time consuming to construct, reinforced concrete protection canopies and chutes have only been provided at two critical locations where very frequent rockfalls occur and where storm water flows result in continuous debris flows.

Two concrete canopy structures have been included as part of the rockfall protection measures for the rehabilitation of CPD. The first 40 metres long curved structure is located in a sharp bend in the road at the confluence of three gullies, where stormwater flow is combined with frequent rockfalls and debris deposits. This structure cantilevers over the full width of the road, giving a clear view to the sea. The second structure is located where the road has been cut back into the cliff face to align it with the northern entrance to the half tunnel. This is in the area with the highest rockfall energy, and where the cliffs extend up to 400 metres above the road. This structure is propped along the front by a series of round sloping columns.



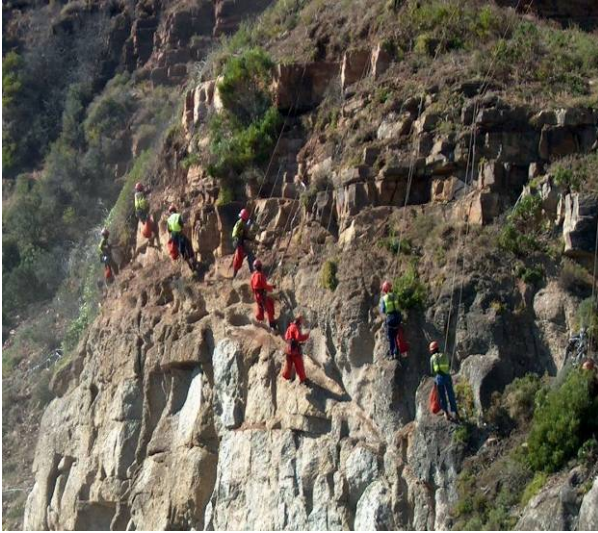
Canopies in Construction and Complete

3.3 Half Tunnel

A 180 metre long section of the CPD traverses an area where sheer cliffs result in some of the highest energies and most frequent rockfalls. Both catch fences and concrete canopies would require frequent maintenance at this location and could even be prone to severe damage from time to time. For this section a 6 metre wide by 6 metre high slot or half tunnel has been excavated into the base of the sandstone cliffs to accommodate a new road alignment. Given the prevailing rock conditions, this structure requires to be supported by way of 95 tonne upwardly inclined rock anchors, up to 18 metres long.

3.4 Barring Down and Slope Stabilisation

- On the natural slopes and cliffs above Chapman's Peak Drive a selected amount of barring down of only the very large blocks of rock, which might otherwise have posed a risk to the rockfall protection structures, was undertaken to eliminate rockfalls from the man-made cuttings below the level of the catch fences.
- Extensive barring down over the full length of the drive of all loose rock, the installation of grouted steel bars to pin back any remaining potentially unstable blocks, and the application of pigmented shotcrete with or without galvanised mesh over friable areas, was done.



Abseilers Barring Down and Shotcreting

4. GEOMETRICS, TRAFFIC AND TOLLING

The rugged terrain along Chapman's Peak Drive presented unusual road drainage demands; however, the major challenge related to road geometrics. The drive has 114 curves along its 9 km length and the road's existing geometry had to be retained while specified clearances between design vehicles (a 65-seater bus travelling southwards and a 16-seater with a trailer travelling northwards) had to be achieved. Twenty-eight sections of road required widening to comply with specifications.

Further challenges were overcome by the team in predicting the traffic. Historical records were few and patterns vary considerably between week day commuters and weekend or holiday travellers. The 'novelty' aspect of the re-opened road to sightseers and the unique scenic nature of the drive also played their part. Setting the entrance gates require special design consideration. These have been the subject of an environmental impact assessment and keen public interest.



Photo of Road Showing Cantilever Canopy Propped Canopy and Half Tunnel

5. PAVEMENT, RETAINING WALLS AND BARRIER WALLS

Trial holes dug showed that the entire pass section of the roadway was underlain by a Telford pack – a layer of packed rocks approximately 300 x 300 x 150 mm thick. The entire road was overlain by a 35 mm premix layer.

Many of the original rock-packed retaining walls along the route showed signs of distress and these had to be reinforced by innovative means to retain their original appearance. Where shotcrete had previously been used to repair the walls, rock anchors and pigmented shotcrete were permitted by the Independent Environmentalist to resemble the adjacent sandstone and granite outcrops.

The reinstatement of the barrier walls along the sea side required input from the Heritage Foundation to ensure that the original appearance was retained. Gabions, using cages with pigmented coatings and local rocks have been used extensively over the length of the road to support unstable cut and fill slopes.



Stone Packed Retaining Walls

6. PROJECT FINANCE

Under the Public Finance Management Act (PFMA), Government Departments at National and Provincial level may procure infrastructure through Public Private Partnerships (PPPs).

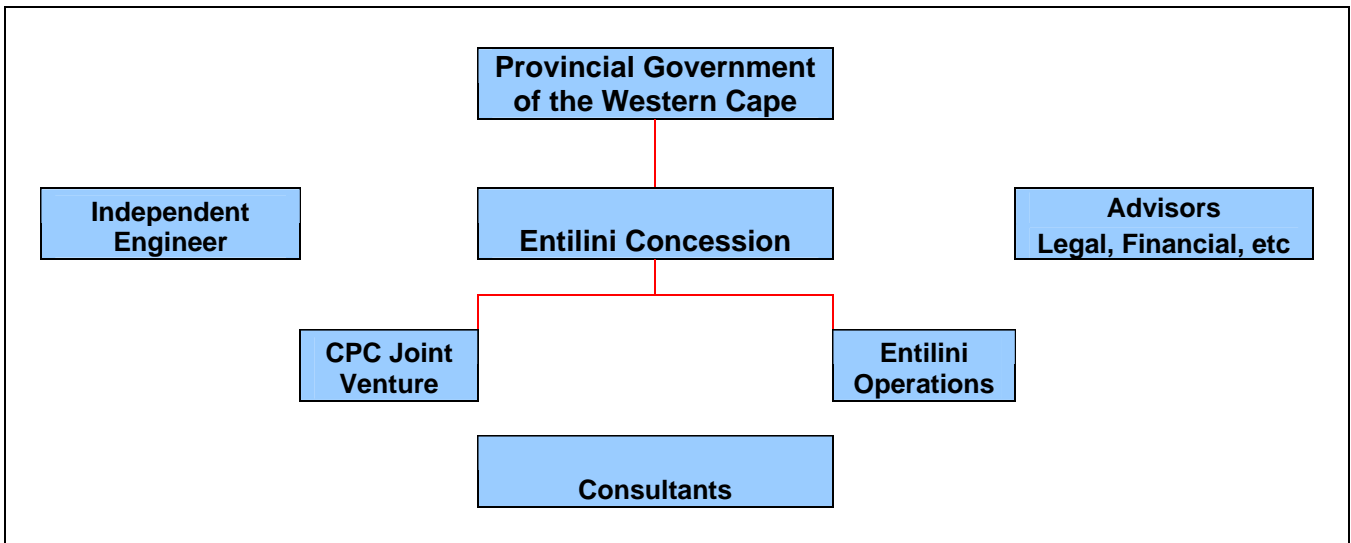
In PPP jargon, the Chapman's Peak project is known as a DBFOT (Design Build Finance Operate Transfer). A private sector consortium designed and has built the sophisticated anti-rockfall infrastructure and toll road, and will operate and maintain them for 30 years. At the end of that period, the project and its infrastructure will be transferred to the Provincial Government of the Western Cape.

The R150 million initial capital for the project was funded in two phases, using a mixture of debt, equity and grant capital.

Chapman's Peak is the first subsidised toll road project in South Africa. The Provincial Government used its contribution of R72 million or nearly half the initial construction cost, to trigger an early start of design and of a Preliminary Works Contract on site prior to conclusion of contract documentation. Apart from the subsidy, the equity is provided by the Sponsors and the debt through a long term 20 year loan linked to CPI. Rand Merchant Bank (RMB) was the arranger, underwriter and lender in this PPP.

7. CONTRACT STRUCTURE

The Concession Contract was built on the suite of documents which have now become quite familiar in the PPP market. The typical Special Purpose Vehicle (SPV) was created in the Entilini Concession Company.



Construction and operation and maintenance risks were transferred down through the respective subcontracts to the Design and Construct (D&C) (CPCJV) and Operation and Maintenance (O&M) (Entilini Operations) contracts.

8. EMPOWERMENT

The successful completion of the rehabilitation of Chapman's Peak Drive has been a model of empowerment with Entilini Concession working hand in hand with a number of stakeholders, including BEE companies, local communities and environmental organisations.

In terms of BEE, the project has embraced empowerment at all levels.

- **Ownership** Currently Entilini Concession and Entilini Operations are 10% owned by Marib Investment Holdings, a local broad-based BEE group who has played an active hands-on role in making the project a reality. An additional 20% of equity has been earmarked for BEE shareholders to take up in the future.
- **Control** Marib Investment Holdings representatives on the Entilini Board of Directors participate in setting direction and making decisions regarding the business of the company.
- **Management** Currently all of Entilini's management staff are black. The management philosophy has been to use seasoned senior managers from the established partners to coach emerging managers and so transfer skills and knowledge without sacrificing safety and performance.
- **Employment** The bulk of the 62 permanent jobs created were filled by candidates from the local disadvantaged communities. Fully 98% of the Entilini employees are previously disadvantaged individuals.

A skills audit was conducted and training programs set up to address deficiencies in the required skill sets.

- **Procurement** Entilini has a comprehensive BEE procurement policy that has resulted in 48% of expenditure being purchased from BEE suppliers.

All stakeholders recognise that the development of partnerships has been the basis of success in empowerment and has provided a template for further engagements.

9. COMMUNITY PARTICIPATION

The project has adopted the following approach to enhance community participation:

- Belief in the self-determination of communities and individuals
- Acceptance that not all communities are organised
- Understanding the need to build organisational infrastructure within a particular community before expecting the active participation of that community in the project

As part of this project, respected community leaders were identified and a forum was established comprising representatives from five neighbouring low-income settlements, namely:

- Imizama Yethu
- Red Hill
- Masiphumele
- Westlake
- Hangberg Harbour Village

This forum has been critical in maintaining good relations with the community by providing a meaningful two-way flow of communication.

From the outset the concessionaire agreed to transfer 3% of the shareholding to a trust representing these local disadvantaged communities. As soon as the project is generating free cash flow in order to pay dividends, the trust will receive a regular income that will be managed by the community trustees.

In addition, the project has facilitated the set up of the Hout Bay Business Opportunities Forum. This forum assists in identifying opportunities for local BEE companies and facilitates entrepreneurship through mentoring and coaching of local people.

As part of the process, project sponsors have assisted with the reestablishment of the Hangberg Civic Organisation in order to deal with socio economic issues (e.g. drug abuse, crime, etc) in the community.

10. PROJECT PROGRESS

As the Concession Contract was signed, it was predicted that two issues, representing significant risks to the project, could occur.

Firstly, heritage permits and the environmental permit (the RoD) for the construction of the toll plaza had not been issued, and secondly, as a result of the insurance market hardening following 9/11, cover for assets installed along the road with the corresponding loss of income cover, could not be obtained.

Special conditions were written into the contract setting out responsibilities should the RoD not be issued in time (a Designated Event), or should large rockfalls occur which resulted in significant damage to the road and the rockfall protection measures (a Damage Event), and result in loss of revenue due to closure of the road (a Closure Event).

Of course, as things would happen, both events did occur in the first year of operation.

10.1 Designated Event

The Environmental scoping study showed important issues for further study, including location and impact of the toll plaza and the strategy for collecting toll. Studies were completed by Ninham Shand as Independent Environmental Consultants (the EIA), including an intense public participation process, and submitted to the Department of Environmental Affairs and Tourism (DEAT) as an Environmental Impact Report (EIR) in December 2003. Further analysis was required on preferred options and mitigations were presented and exhaustively considered and debated with Table Mountain National Parks (TMNP) management, the Cape Town Unicity and Heritage and Environmental Authorities in the Province.

As this paper goes to press, DEAT has still not issued the RoD.

In the meantime permission was received to build a temporary toll plaza in the road prism and adjacent parking area. Using fibre glass booths and containers for offices, Entilini Operations have managed to open the road and function. Though capacity of the staggered plaza, with only two lanes in each direction, is insufficient for peak periods which occur in holiday periods and over weekends, revenue has been close to projections. The mix of the traffic is being favorable due to the increase in tourist groups using mini and midi busses.

In terms of the Designated Event conditions, the Province pays compensation for the revenue short-fall in order to maintain the financial model.

10.2 Damage Event

Running into the first winter of the operation, two hundred year rainfall events, in late July early August 2004, triggered massive debris flows and rockfalls damaging several catch fences, which were stressed beyond their limits, and dumped hundreds of tonnes of material across the road. Fortunately our operators took note of the intensity of the rainfall and initiated the closure of the road before the rockfall started. Damage was severe and closure continued for 55 days while repairs were effected.

The views of the Province and the concessionaire differed on whether these events constitute Damage Events and, hence, whether compensation is payable for the damage or not.



Photos of Rockfall and Damaged Fences

10.3 Settlement

These events led to protracted exchanges between the partners and eventually to an accelerated dispute resolution process, provided for in the contract. Happily, agreement has been reached on the sharing of the costs and the flow of compensation.

11. CONCLUSION

The Rehabilitation of Chapman's Peak Drive under the PPP Contract has been a spectacular success from an engineering perspective. The project has been showered with awards and acknowledgement.

The operation is coping under restricted conditions and the users of the destination are finding it a rewarding experience. It is very satisfying to note that this icon in South African tourism has been re-opened through the medium of the PPP.

Points of difference between the partners to the PPP have brought home important lessons. These show that even more effort is needed prior to contract signing, to ensure uniform interpretation and buy-in to the contract principles. There is perhaps a case to be made for Central Treasury to assist by extending the over-sight role of the PPP unit through construction into the operational phase.

12. ACKNOWLEDGEMENTS

The authors thank and acknowledge the contributions from the following:-

Chapman's Peak Construction Joint Venture consisting of:

Concor Civils

Haw & Inglis

Jolinde / JPK JV

Chapman's Peak Engineering Group consisting of:

Vela VKE

Melis and Du Plessis

Stewart Scott

Zietsman Lloyd and Hemsted

The shareholders of Entilini Concession (Pty) Ltd consisting of:

Concor Holdings

Haw & Inglis

Marib Investment Holdings

The Chapman's Peak Community Trust

The shareholders of Entilini Operations (Pty) Ltd consisting of:

Concor Facility Management

Marib Investment Holdings