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flat steel

ISCOR VANDERBIJLPARK STEEL

ENVIRONMENTAL MASTER PLAN

SPECIALIST REPORT

VISUALS AND AESTHETIC QUALITY

BY

FRANCOIS MARAIS & ASSOCIATES

SERIES IV

DOCUMENT IVS/SR/036

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OCKIE FOURIE TOKSIKOLOë TOXICOLOGISTS (EDMS) BPK (PTY) LTD
TEL: 012 349-9732/7

FRANCOIS MARAIS & ASSOCIATE ASSOCIATES
Consulting Engineers • Raadgewende Ingenieurs
Tel: (012) 998-5886

ENPRO
Omgewingsadviseurs / Environmental Advisors
Tel: (012) 471153

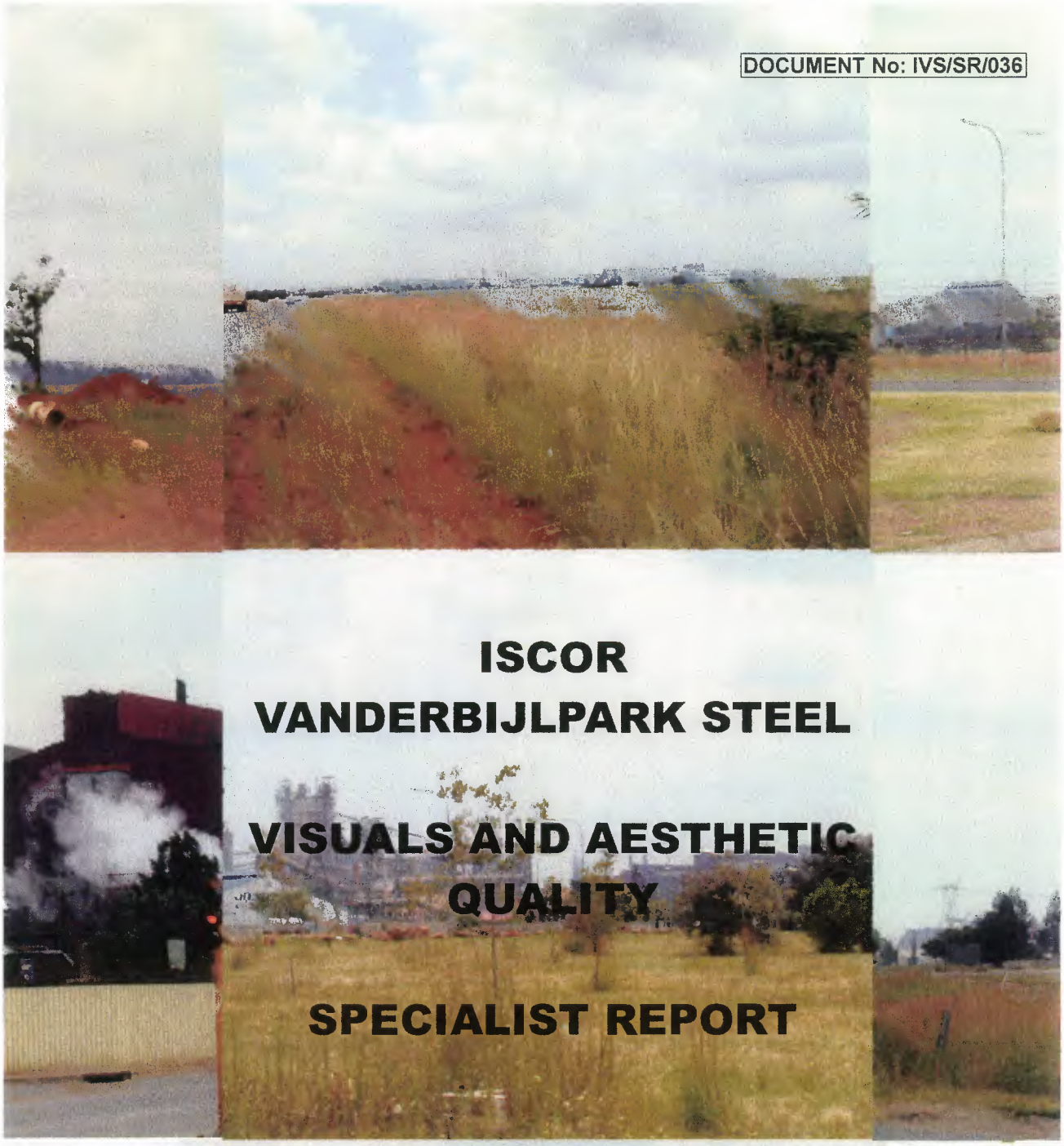
VAN RENSSEN & FORTUIN
Consulting Engineers / Raadgewende Ingenieurs
Tel: (012) 362 0986

Jasper Müller Associates
Consulting Scientists in Geohydrology
Tel: (013) 665 1788

Moolmans
ATTORNEYS
Tel: (011) 483-3704

KEN SMITH
ENVIRONMENTALISTS CC
Tel: (017) 82 61434 / 27

RICHARD PAXTON
ASSOCIATES LIMITED
Tel: 0944-1543 250939



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NOVEMBER 2002

REPORT COMPILED BY:
FRANCOIS MARAIS & ASSOCIATES

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SERIES IV
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FRANCOIS MARAIS & ASSOCIATES
ASSOSIATE

P.O. Box 411
Faerie Glen, 0043

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ISCOR VANDERBIJLPARK STEEL

VISUALS AND AESTHETIC QUALITY SPECIALIST REPORT

1. INTRODUCTION

The Visuals Specialist Report constitutes part of the baseline study investigations, addressing the various environmental aspects in a holistic way.

The IVS plant infrastructure, as man-made features, have significantly altered the natural appearance of the landscape and have also contributed to a conspicuous new skyline, visible from the national and other major roads passing the IVS Works.

Due to the industrial nature of the IVS Works and other industries surrounding the IVS Works, its appearance could potentially impact on neighbouring residential areas in the vicinity.

2. OBJECTIVES OF THE VISUAL AND AESTHETICS SPECIALIST STUDY

The objectives of the study were to:

- Identify zones and areas surrounding the IVS Works which could potentially be visually disturbed by the IVS infrastructure and activities.
- Formulate mitigatory measures by which the visual and aesthetic appearance of the IVS Works would be improved, while simultaneously enhancing the aesthetic quality of the environment.

These objectives are in line with the vision of the founder of Vanderbijlpark – Dr Hendrik van der Bijl who envisaged an industrial city where the visual and aesthetic quality would be enhanced by ongoing improvement and the establishment of natural vegetation and parks.

3. METHODOLOGY:

3.1 Pre-Master plan gap analysis and availability of baseline information:

During the pre-Master Plan phase, a gap analysis was performed to determine whether applicable information regarding this environmental aspect was avaiable and what additional information would be required.

3.2 Methodology followed to obtain baseline information:

3.2.1 A set of baseline maps was compiled and upgraded to a scale of 1:25 000 to accommodate the baseline study work around the visual and aesthetic environmental requirements. The enlarged map displayed the IVS Works within the regional context of industrial surroundings, as well as to determine site-specifically whether the Works and / or associated activities might have a potential visual disturbing influence on the surrounding environment.

Refer to drawing VDB9058 in the Visual Study: Book of Plans

The IVS Works perimeter was outlined on the existing layout drawing and the residential areas and roads in the immediate vicinity of the IVS Works were highlighted, to place the works in context with the viewpoints, lines of sight and general visibility from the surrounding areas.

3.2.2 The use of baseline maps to determine lines of observation with view points, lines of sight and general visibility:

Three lines of observation were established around the Works perimeter, namely:

- IVS perimeter boundary line (Line 1- Primary observation line);
- 0,5 km from boundary line (Line 2 – Secondary observation line);
- 1,0 km from boundary line (Line 3 – Tertiary observation line);

The reasons for determining three lines of observation are the following:

- To establish a baseline data reference framework, which would enable deduction of effective measures to mitigate the potential visual influences IVS might have on the industrial environment, as well as neighbouring residential areas and roads in the vicinity.
- To establish various depth perspectives and images to assist in the development of optimal mitigatory measures;
- The distances between the lines are of significance to properly integrate and accommodate the role the topography would exert on the mitigation measures, and to ensure the recommendation of efficient measures to mitigate the influences. (E.g. – if the viewpoint were lower than the topographical impact height, plants of certain type and height would be effective under the circumstance and vice versa).

3.2.3 Pre-determined viewpoints

Thirty (30) viewpoints along the IVS perimeter (primary, secondary and tertiary lines) and an additional viewpoint on the N1 national road were identified and visited during the field work stage. These viewpoints are indicated on the baseline information drawing numbered VDB9058.

This report should be read in conjunction with the A_2 report - Iscor Vanderbijlpark Works: Visual Impact Assessment, December 2001, which displays the locality of the viewpoints in relation to the Works in true scale and clear images.

3.2.4 Identification process of critical viewpoints:

Photographs were taken from these identified viewpoints using a digital camera, to assist with the identification of **critical** visual zones and eventually critical visual viewpoints.

The ultimate aim in determining critical visual zones was to firstly determine areas where mitigation could feasibly be implemented, and secondly to determine which screening measures would effectively mitigate the visual influences exerted by the industrial nature of the Works.

3.3 Creation of a common level of understanding of the current status:

By presenting the images through the medium of photography, a common level of understanding was created to describe the current status. This baseline information could also assist with future consultation processes, to develop an understanding of perceptions and to seek consensus.

3.3.1 Critical viewpoints located on the primary line:

The following viewpoints are located on the primary line of vision:

- **PV3**: PV3 is situated on the junction between provincial road 553 and the R54 passing the IVS Works on the northern side. From this point, residue deposit heaps are clearly visible in the background.
- **PV6**: The profile of residue deposits can be observed faintly in the distance just above the horizon, separated from the viewpoint by an extended area of veld.
- **PV7**: The industrial profile of the IVS Works features rather prominently in this case due to the topography and sparseness of vegetation in the vicinity.
- **PV8:** Industrial infrastructure can be discerned in the distance.
- **PV15:** Although grass veld is interspersed with some vegetation of medium height in this instance, the industrial buildings of the Works area are in a clear line of sight from this point.
- **PV16**: A reasonable stretch of flat grassland flanked by trees, separates the road from the industrial skyline, which features rather prominently.
- **PV17**: A railway siding, conveyor, stockpile and other industrial infrastructure are pertinent from this viewpoint.
- **PV20**: Huge industrial buildings and accompanying infrastructure are in direct line of sight in this instance. The road is separated from the IVS works by a wall / fence on the boundary which doesn't provide sufficient screening.
- **PV21**: Some shrubs are present in the foreground screening and softening a part of the industrial profile from here. However the eye is not diverted from the very high industrial structures also present.
- **PV24**: The Works infrastructure features very prominently from this viewpoint, although it is separated from the road by grassland and a few trees.
- **PV29**: The industrial influence that IVS exerts on the visual environment is very obvious from this point of view. The topography is flat and the road passes the Works quite closely, with grassland in the foreground.

- **PV30**: This view and the previous rate similarly regarding visual influence. Power line pylons in the foreground together with lower industrial buildings in front of bigger industrial structures are in plain sight from here.

3.3.2 Critical viewpoints located on the secondary line:

The following viewpoints are located on the secondary line (500 m from the IVS Works' boundary):

- **PV2** and **PV4**: A faint profile of dumps is visible in the distance from these viewpoints.

- **PV9 and PV11**: The Works could not be seen from here, as it is screened by trees. Power line pylons are visible in the foreground at **PV9**.

- **PV18**: This photograph displays the road approaching the IVS Works. A boulevard lined with tall trees pleasantly softening the environment, ensures a visually calming approach to IVS.

- **PV14, PV22, PV25** and **PV27:** From these viewpoints, the industrial character of the IVS Works features rather prominently in the line of sight, although less so than on the primary line. This could be due to the difference in distance. However, screening features to soften the profile, are absent.

3.3.3 Critical viewpoints located on the tertiary line:

The following viewpoints are located on the tertiary line (1 000 m from the IVS Works' boundary):

- **PVA, PV10 and PV19**: The IVS Works are faintly visible in the distance from the first two viewpoints. The view from PV19 consists mainly of trees situated in a residential area, with IVS not in the direct line of sight.

- **PV5:** The Works can be observed in the distance. Due to sparse vegetation, the profile is not softened.

- **PV1**: An image similar to that of mountains in the far off distance coupled with a faint industrial profile is discernable from this viewpoint.

- **PV5B**: A residue deposit heap forms a prominent feature on the horizon, albeit in the distance. A small clump of trees in the foreground has a screening effect on the one side of the view.

- **PV12**: In the far away distance, industrial infrastructure visually disturbs the skyline to a degree as it presents a foreign profile to the otherwise flat grassy environment.

- **PV13**: Industrial structures, due to their size, are discernable against the horizon over a distance.

- **PV23, PV26 and PV28:** Industrial buildings are in plain sight from PV23. Industrial buildings as well as accompanying structures can be seen from PV26 and PV28 in the distance.

3.4 Projected views from specific surrounding areas:

The above baseline information assisted in identifying the following areas to be considered for mitigation:

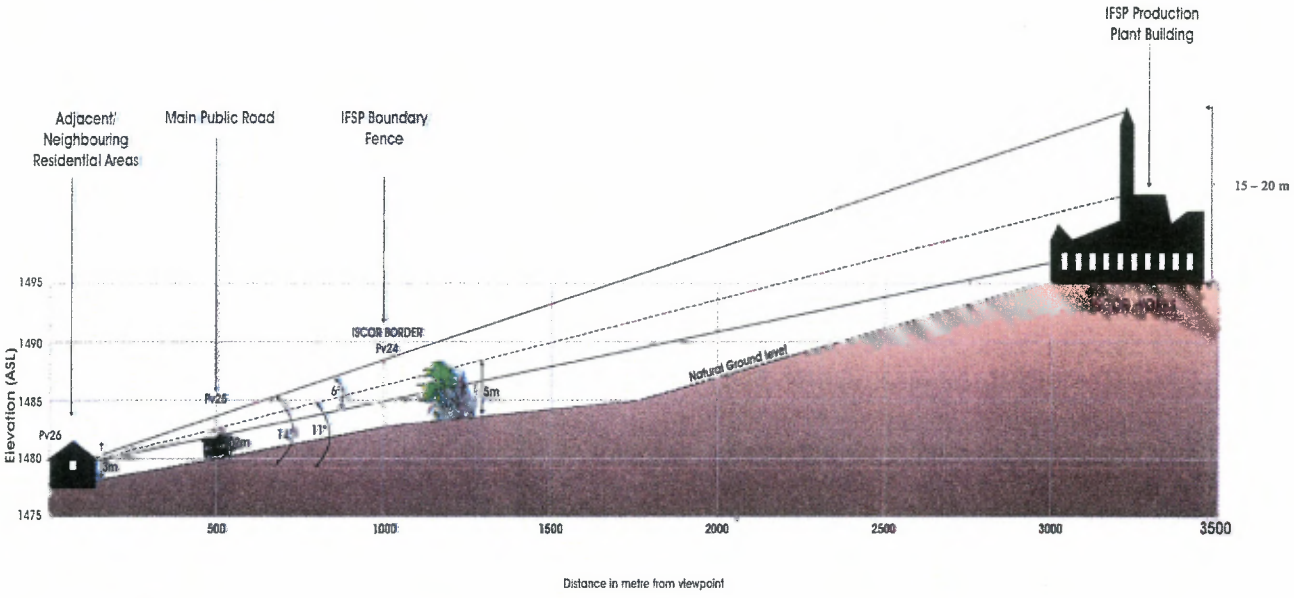
- Along the south-western, southern and south-eastern borders of the Works area, where Vanderbijlpark, Boipatong and Bophelong and informal settlements are situated;
- The western border and north-western corner along which the N1 road 553 and R57 are located;
- The north-eastern corner which might influence the visibility from the R28 and R54.

These areas require specific attention to enhance their lines of sight by providing mitigatory measures which would assist in blending the industrial image of the Works with the rest of the visual environment

3.5 Assessment and analysis

A more detailed assessment and analysis was performed to assess and analyse the needs for visual mitigation.

A schematic presentation of a cross section through a critical viewpoint was compiled to scale, with the aim of determining optimal placing and height of screening. The available contour data relative to the elevation were used to assist in evaluating the feasibility of screening options.



PV26 was selected as a site-specific locality and point of departure. A horizontal line depicts the distance from the viewpoint in metres, where:

- The viewpoint is situated 3 000 metres from the Works;

- The IVS boundary fence is situated 1 000 m from the viewpoint and 2 000 m from the IVS infrastructure;
- The main public road is situated 500 m from the viewpoint and 2 500 m from the Works;
- The horizontal basis line lies on an elevation of 1 475 m, the residential area on ± 1 477m, the road on ± 1 480 m and the Works on 1 495 m;
- The natural ground line has an elevation of approximately 4° initially (0 to 1 000 m) with a flat stretch in between (1 000 to 1 750 m) and a further steepish incline from 1 750 m to 3 000 m (± 7°).

In real terms this would imply that should a tree with a height of 5 m be planted just inside the IVS boundary (e.g. at PV24) ± 2 250 m from the Works or 1 250 m from the residential area, ± 80% of a typical 15 m to 20 m high production plant building would be screened from view.

This method was implemented to determine the feasibility of the screening options.

Visual influences were evaluated according to the following ratings:

- Significant
- High
- Medium
- Low

The existing residue management facility in the north-western corner of the Works (**CRMF**) accommodating the slag dump with a height of 30 m to 40 m, was rated as significant, as it is highly visible from prominent lines of sight (e.g. N1, road 553, R54) on the northern, north western and western perimeter of the Works.

The consolidated plant area (CPA) situated along the south-eastern, southern and south western perimeters of the Works consists mainly of production infrastructure and was rated to be high. However, the south eastern part of the CPA area is situated much closer to the residential area than the rest of the CPA which would rate this area as high, in comparison with medium for the rest of the CPA, etc.

4. PRIORITY AREAS

By implementing these various techniques a point was reached where certain priority areas were identified from the baseline information, previously discussed.

4.1 Master Plan priorities:

The Master Plan priority areas comprise the following:

- South-eastern corner and eastern boundary (CPA area with industrial production infrastructure visually influencing residential areas and roads);
- North-western corner (CRMF area);
- North-eastern corner (existing slag dump);
- Southern and western boundaries (residential areas situated along the southern boundary and road 553 and N1 running along western boundary of IVS)
- North-eastern corner inside the Works (CPA area with residue deposits).

4.2 Visibility from main routes

IVS is skirted by the following important provincial roads and routes:

ROAD	IVS BOUNDARY	VISUAL INFLUENCE	DIRECTION OF ROAD
N1	Western boundary	CRMF / CPA areas with industrial infrastructure profile	Southwest to North
R57	Western boundary	CRMF / CPA areas with industrial infrastructure profile	South / North
Road 553 – Golden Highway	Western boundary	CRMF / CPA areas with industrial infrastructure profile	South / North
R54	Northern boundary	CRMF / CPA areas with industrial infrastructure profile	East / west

4.3 Requirement for conducting a full impact assessment.

The Regulating Authorities have certain regulatory requirements to which industrial plants have to subscribe, to be legally in compliance. These requirements comprise among others, the permitting of a residue management facility (RMF). The processes are governed by various guidelines to this effect, e.g. the Minimum Requirements (MR – DWAF) and EIA guidelines (GDACEL).

Part of the EIA process in some instances require the performance of an Environmental Impact Assessment (EIA), which addresses all the environmental aspects which might be impacted upon by an industrial development, such as a residue management facility.

In this instance, the site-specific permitting requirements still need to be determined, and this would spell out whether a full EIA might be required. Should a full EIA be required, this assessment would include a site-specific impact assessment in terms of visual and aesthetic quality

5. MITIGATORY MEASURES

5.1 Objectives:

The objectives of the mitigation measures can be described as, to:

- Visually improve the existing disturbed profile / skyline around the IVS Works area by implementing effective screening measures;
- Determine suitable vegetation by considering the topography of the area and the profile to be screened, as well as the soils and climatic conditions involved;
- Design mitigatory clusters of vegetation to effectively screen the Works area from visually disturbed areas.

5.2 Screening options:

Various screening options were considered, namely:

- Full screening;
- Identification of priority areas suited to clusters of vegetation;
- Size / distribution of screening vegetation / clusters, including consideration of relative distance to critical viewpoints

5.2.1 Full screening along the entire IVS Works perimeter:

This option was not considered, due to the high cost involved.

5.2.2 Identification of priority areas suited to clusters of vegetation:

Please refer to paragraph 4.1 of this report for an in-depth discussion.

5.2.3 Feasibility of clusters:

Advice was obtained from Vesco Eko landscaping experts, on instruction of IVS management, regarding the composition of clusters with regard to height, texture, climate, size of plant, etc.

The following criteria were taken into account in compiling vegetative clusters:

- **Relative distance to critical viewpoints:**

  Please refer to paragraph 3.5 for an in-depth discussion.

- **Environmental suitability:**

The recommendation for vegetative screening plants comprise mainly hardy indigenous trees between the sizes of 1.5 to 15 metres tall, depending on the topography of the area to be vegetated. Indigenous trees were more favourably considered as they are environmentally friendly, promote resettlement of local fauna and flora, require less water than non-indigenous trees and are able to withstand the tough semi-arid climate. The proportion of evergreen to deciduous plants required attention. In the nature of this semi-arid region, deciduous plants always represent the larger portion of the vegetation and if this balance should be altered, it would impact negatively on the natural environment concerning local fauna and flora.

- **Security considerations:**

As many of the identified areas to be screened fall on the boundary line, shrub type plants are not recommended as these might impede security measures.

- **List of suggested plants:**

Lists containing suitable plants / trees were obtained from a botanical specialist Ms E. Vermooten and landscaping contractors Vesco Eko.

The lists indicated tree height, colour, profile, whether flowering / not (and when), growth tempo, whether bird user-friendly and in what way (fruit / nectar / insects), whether frost resistant, deciduous or evergreen.

Please refer to Visual Study: Book of Plans for a comprehensive list of recommended trees and shrubs.

- **Soils**

Soils in this instance is important as the successful establishment of trees is directly dependent on soil quality. This in turn directly impacts on costs, as unsuccessful establishment of trees as a result of poor soil conditions would represent a loss to the establishment of large scale cluster developments.

Soils were independently addressed as part of the Master Plan process and will not be explored further in this baseline study.

6. ESTIMATED COSTS

The feasibility in terms of costs and practical considerations, were taken into account. A cost estimate was obtained from Vesco Eko during August 2001, where plant size, unit costs as well as planting costs were given. The following was recommended for the priority areas:

Bag size (l)	Height (m) of trees / shrubs	Number of trees	% of total of quantity	Unit cost (R)	Total cost (R)
20	1,5	3 840	30	110	422 400
50	2,0	3 840	30	255	979 200
100	3,0	3 840	30	470	1 808 800
800	4,0	640	5	3 975	2 544 000
OG	5,0	640	5	4 495	2 876 800
TOTAL		**12 800**			**8 627 200**

The planting costs, including slow release fertiliser and water system, compost, support, etc., amounted to a further R 981 120.

6.1 Phased approach

Due to the high costs involved, a further proposal was submitted, suggesting a phased implementation over a period of 5 years as follows:

- **Phase 1** - Year 1 - commencing with the south-eastern corner and eastern boundary.

  Cost quoted: R 2 281 976

- **Phase 2** – year 2 - North-eastern corner.

  Cost quoted: R 2 221 924.

- **Phase 3** – year 3 - North-western corner.

  Cost quoted: R 1 921 664. (7,4 ha, 2 960 trees)

- **Phase 4** – year 4 - Southern perimeter and south-western corner.

  Cost quoted: R 2 161 872

- **Phase 5** – year 5 - Western perimeter

  Cost quoted: R 1 020 884

- N1 off-ramp – Golden Highway – western corner – cost spread over three years between years 2 to 4 in even amounts of R 1 201 040 / annum.

6.2 Alternative approach:

An alternative approach was also investigated, should IVS elect to do the planting themselves to create a more suitable cost profile. It was pointed out that the cost of the plant varies according to the size of the plant as well as the type, and although larger trees would sooner present the screening effect sought, and might withstand the environment better due to stronger trunk and root systems, they represent a larger capital investment.

It was recommended that the suggested priority areas be addressed in a phased manner.

6.3 Clusters for priority areas

The following macro cluster recommendations were made for the priority areas:

Area	ha	No. of trees
South-eastern corner and eastern borders	7,6	3 040
North-western corner	7,4	2 960
North-eastern corner	6,4	2 560
Southern and western boundaries	7,2	2 880
North-east, inside border	3,4	1 360
Total	**32**	**12 800**

6.4 Areas of concern regarding establishment of vegetative screening measures

The following areas of concern were identified and addressed by this study to enable a sustainable way forward:

- High costs related to full boundary screening (large trees);

  Such an idealistic approach would not be economically feasible.

- **Potential impacts of contaminated soils on plant growth in cluster areas**;

  It is recommended that a detailed soil investigation be performed at the proposed cluster areas, prior to implementation.

- **Importance of starting off with large trees to ensure sustainability. This option is however subject to high costs;**

  The plant list recommendations specifically mentioned that larger trees have stronger root and trunk systems and would therefore ensure more sustainable growth than smaller trees.

  Plant sizes are indicated by the volume of the bag in which they are planted which in turn is directly related to the price. For instance – a tree in a 20 litre bag at a cost of R 110 would be 1,5 m high, while a tree in a 50 litre bag would cost R 255 and would be 2 m high.

- **Would a few clusters add real value to screening?**

  The visual baseline information confirms that by implementing cluster vegetation at the identified priority areas, the visual environment could be greatly enhanced.

- **Would cluster screening significantly reduce impacts, if large infrastructure and buildings remain partially visible?**

  Please refer to paragraph 3.5, where the visibility is analysed should certain vegetative measures be implemented. According to this schematic presentation, 80% of the image could be successfully screened from the line of sight, thereby diverting the eye and attention away from the disturbing images of an industrial environment. As plants are perceived to create a softer, more interesting environment, the cluster image could be implemented with a high rate of success

7. CONCLUSIONS AND RECOMMENDATIONS

Although the environmental aspect of visual and aesthetic quality does not carry the same weight as for instance ground water or surface water, which could literally impact on human health, it contributes to perceptions which may exist or which could be positively influenced by successfully addressing this aspect.

This Master Plan priority should however be prioritised along with the other Master Plan priorities to ensure sustainability.

7.1 The following conclusions may be drawn from the baseline studies:

- Key areas of potential visual impact were identified;
- The feasibility of full screening, cluster screening, plant sizes and costs were effectively analysed;

7.2 Recommendations:

The following recommendations could be deduced from the baseline study:

- Should an full scale visual and aesthetic quality assessment be required in future, it is recommended that the assessment be focused on the CRMF slag dump area;
- An experimental cluster implementation is recommended, to monitor the success rate for future phased implementation;
- The impact assessment performed on the CRMF slag dump area, should be aligned with the associated regulatory process requirements.

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F.J. MARAIS Pr. Eng.

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