DMR 10

mineral resources

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Reference: EC30/5/1/3/3/2/1(0583)EM
Date: 15 November 2011

South African Heritage Resources Agency
P.O. Box 4637
CAPE TOWN case ID: 1693
8000

Sir / Madam

CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002: PROPOSED BORROW PITS: DR604, ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE: DEPARTMENT OF ROADS AND PUBLIC WORKS

1. Please see the attached EMP.

2. Any written comments or requirements your department may have in this regard can be forwarded to this office no later than **9 January 2012.** Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said documents. Comments may be submitted at your earliest convenience in order to reduce the turnaround time for the application process.

3. Consultation in this regard has also been initiated with other relevant State Departments.

4. Please use the reference number as per our correspondence.

Sincerely,

REGIONAL MANAGER

EASTERN CAPE

29 NOV 2011

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED BORROW PITS ASSOCIATED WITH MAINTENANCE OF THE P604 GRAVEL ROAD IN THE ALFRED NZO DISTRICT MUNICIPALITY IN THE EASTERN CAPE

SEPTEMBER 2011

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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED BORROW PITS ASSOCIATED WITH MAINTENANCE OF THE P604 GRAVEL ROAD IN THE ALFRED NZO DISTRICT MUNICIPALITY IN THE EASTERN CAPE

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ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED BORROW PITS ASSOCIATED WITH MAINTENANCE OF THE P604 GRAVEL ROAD IN THE ALFRED NZO DISTRICT MUNICIPALITY IN THE EASTERN CAPE

1 INTRODUCTION

1.1 BACKGROUND

Terratest (Pty) Ltd has been appointed by Controlab CC on behalf of the Eastern Cape Department of Roads and Public Works (DRPW) to undertake the environmental work that forms part of the mining permit authorisation for the utilisation of borrow pits. The material from these borrow pits is to be used on the road rehabilitation projects within the Alfred Nzo District Municipality in the north-eastern part of the Eastern Cape. This report focuses on the borrow pits found on the DR604 roads.

The applicant regarding the mining permit for the borrow pit is the DRPW who are exempt under Section 106(1) of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) from the application process for the mining permits. No application for the mining permits has been lodged with the Eastern Cape Department of Mineral Resources (DMR).

The report constitutes the Environmental Management Plan (EMP), as required by the DMR and according to the regulations promulgated under Section 22 of the MPRDA.

1.2 TERMS OF REFERENCE

The objectives of the EMP are to:

- Provide a description of the proposed activity and the current environment on and around the site;

- Identify Interested and Affected Parties (IAPs), inform them of the proposed development and identify key concerns;
- Identify potential impacts and environmental issues that need further investigation;
- Recommend appropriate mitigation measures and management measures.

1.3 APPROACH

In order to meet the objectives of the EMP, the following activities were undertaken:

- An initial baseline desk survey to determine the nature of the affected environment and to identify potential issues of concern;
- A site investigation;
- Consultation with the client;
- Consultation with key stakeholders;
- The identification and assessment of potential environmental issues;
- The compilation of this EMP.

2 LEGISLATION

2.1 MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 OF 2002)

The Minerals and Petroleum Resources Development Act, (Act 28 of 2002) makes provision for the environmental work requirements and steps to be taken in the application and obtaining of a mining right.

2.2 NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The National Heritage Resources Act, (Act 25 of 1999) makes provisions for any archaeological remains or areas of special concern, such as gravesites, to be protected. South African Heritage Resources Association (SAHRA) is the leading authority at national level. Heritage KwaZulu-Natal (AMAFA) is the leading authority at provincial level.

2.3 NATIONAL WATER ACT (ACT 36 OF 1998)

The National Water Act, (Act 36 of 1998) makes provision for the sustainable management of all water resources in South Africa.

2.4 OTHER APPLICABLE LEGISLATION

The applicant must take cognisance of the provisions of other legislation dealing with matters relating to conservation, and which include, inter alia, the following:

- National Parks Act, (Act 57 of 1976)
- Environmental Conservation Act, (Act 73 of 1989)
- National Environmental Management Act, (Act 107 of 1998)
- Atmospheric Pollution Prevention Act, (Act 45 of 1965)
- Mine Safety and Health Act, (Act 29 of 1996)
- Occupational Health & Safety Act, (Act 85 of 1993)
- The Conservation of Agricultural Resources Act, (Act 43 of 1983).

3 GENERAL SITE LOCATION AND PROJECT DESCRIPTION

The P604 is a gravel road situated approximately 5km east of the town of Matatiele and 19km west of the town of Cedarville within the Eastern Cape Province. Cedarville is situated approximately 46km west of Kokstad and falls within the Matatiele Local Municipality. The P604 is approximately 35km long and runs in a west to east direction. The starting point of the road is at the intersection with the R56 Provincial Road and travels in an easterly direction and ends at the border between the Eastern Cape Province and KwaZulu-Natal.

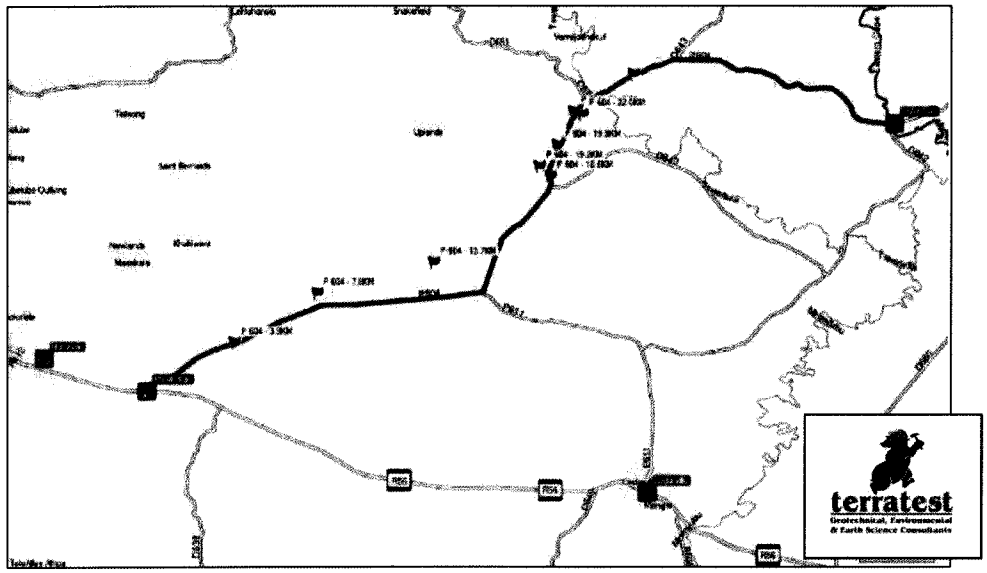


Figure 1: Locality Plan showing the position of the road

The start and end coordinates for the P604 are as follows:

	Southerly	Easterly
Start	S30° 21' 11.2"	E28° 51' 13.1
End	S30° 15' 28.1"	E29° 08' 09.2"

Seven borrow pits have been identified along the alignment of the road and are located at the following coordinates:

Borrow Pit Name	Southerly	Easterly
BP01	S30° 20' 09.5"	E28° 53' 11.9"
BP03	S30° 18' 26.9"	E28° 57' 43.5"
BP04	S30° 16' 36.2"	E29° 00' 21.0"
BP05	S30° 16' 23.7"	E29° 00' 06.2"
BP06	S30° 15' 56.7"	E29° 00' 30.7"
BP07	S30° 15' 13.2"	E29° 00' 52.4"
BP08	S30° 15' 16.8"	E29° 01' 03.7"

The borrow pits are located at various distances along the road alignment. The chainages, measured from the P604 turn-off from the R56 Provincial Road:

Borrow Pit Name	Chainage
BP01	Km3.9
BP03	Km13.7
BP04	Km18.6
BP05	Km19.2
BP06	Km19.9
BP07	Km21.4
BP08	Km22.0

The borrow pits are located within the Matatiele Local Municipality and on private farm land owned by the following individuals:

Borrow Pit Name	Land Owner
BP01	Mr B. Joyner
BP03	Mr B. Joyner
BP04	Mr I. MacDonald
BP05	Mr. F. Van Deventer
BP06	Mr. F. Van Deventer
BP07	Provincial Government
BP08	Provincial Government

The material sourced from these borrow pits will only be used for the maintenance of the P604 roads. The material will primarily be used for road surfacing but might be used in the layer works of the road were feasible or necessary.

Each of the borrow pits show signs of being actively utilised for the sourcing of construction material on an informal basis. As far as can be determined this is not done under any authorisation from the DMR.

According to the Chief Director of Surveys and Mapping Geological Map Number 3028 Kokstad (1979), the geology of the area falls within the Karoo Supergroup which includes the Beaufort Group and Tarkastad Subgroup. The materials in the area generally consist of medium to fine grained sandstone and mudstones.

The intention is that the size of the borrow pit will be in the vicinity of 1.5ha.

The proposed mining method is open cast excavation. No blasting will be required. The topsoil overlying the areas to be excavated will be removed and stockpiled separately from the mineral stockpiles. The mined material will be stockpiled on site and later transported to its point of use along the adjacent P604 roads. A portable chemical toilet will be placed on site. No other structures will be erected.

4 COMMUNITY LIAISON

Letters were written to the different landowners to notify them of the applications associated with each of the borrow pits and providing them with the opportunity to make comments as an input to the process. Copies of the letters sent to the landowners and their feedback has been attached in Appendix B.

The landowners were also contacted before access to their properties were gained to conduct the site visits. None of the landowners had any objection to the use of the pits with the provision that the borrow pits be rehabilitated according to the specifications of this EMP and that the pits all get fenced to protect live stock from falling into them.

An advert notifying the general public of the application process was also been placed in the East Griqualand Fever Newspaper on 29 April 2011. No comments have been received in response to this notice. A copy of this advert is attached in Appendix B.

5 SITE LOCATION AND DESCRIPTION

5.1 BORROW PIT 01

Location

The borrow pit is located approximately 3.9km along the P604 District road from its junction with the R56 Provincial road. Access to the borrow pit directly off the P604. The approximate center point coordinate of the borrow pit site is S30° 20' 09.5", E28° 53' 11.9"

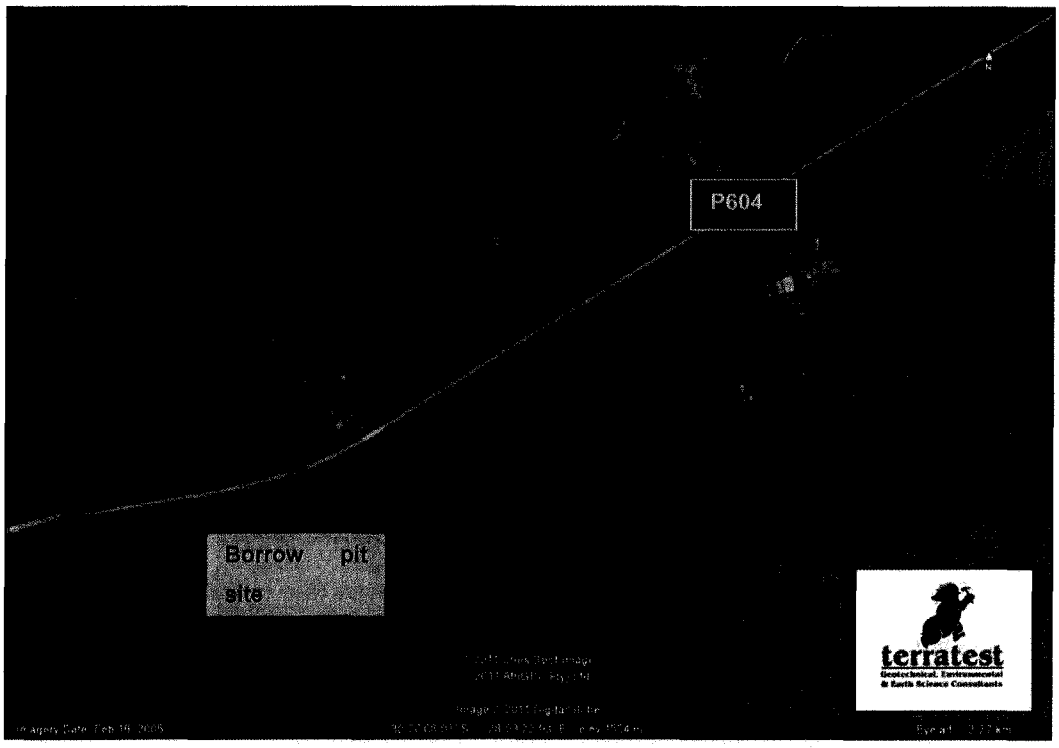


Figure 2: Locality of the Borrow pit along the P604

Extent

The total extent of the mining area will be approximately 1.5ha between the corner points given in the attached table. Detailed surveyor drawings showing the exact layout and operational directions of the borrow pit are attached in Appendix A.

Access

The access road to the site will be constructed by formalizing the existing track that extends from the P604 District road to the borrow pit site. This road will be constructed by blading the current informal track and making provision for temporary stormwater measures in the form of mitre drains along the alignment. Shale gravel from the borrow pit will be used as road surfacing if required.

A detailed surveyor drawing of the layout of the borrow pit is attached in Appendix A.

Material Standards

The material to be mined from the borrow pit is weathered shale. The materials testing results are attached in Appendix C.

Community comments and Land ownership

A meeting on site was conducted with the landowner, Mr Bruce Joyner, who indicated his consent for use of the borrow pit for the surfacing of the P604. He further indicated that there are other sources on his property that could possibly contain more adequate materials. He stressed the requirements for rehabilitation of the borrow pit when workings has ceased.

Biophysical Description

The borrow pit along the P604 is located within the Mabela Sandy Grassland vegetation type (Gs13) according to the classification, *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina and Rutherford, 2006). The areas surrounding the borrow pit site are not typical of this veldtype due to transformation of the vegetation due to the heavy grazing of the area by commercial livestock and the baling of hay during the winter months of the year. The dominant grass species on the areas surrounding the site is *Elionurus muticus* (Wire Grass).

Figure 3: Veldtype Map

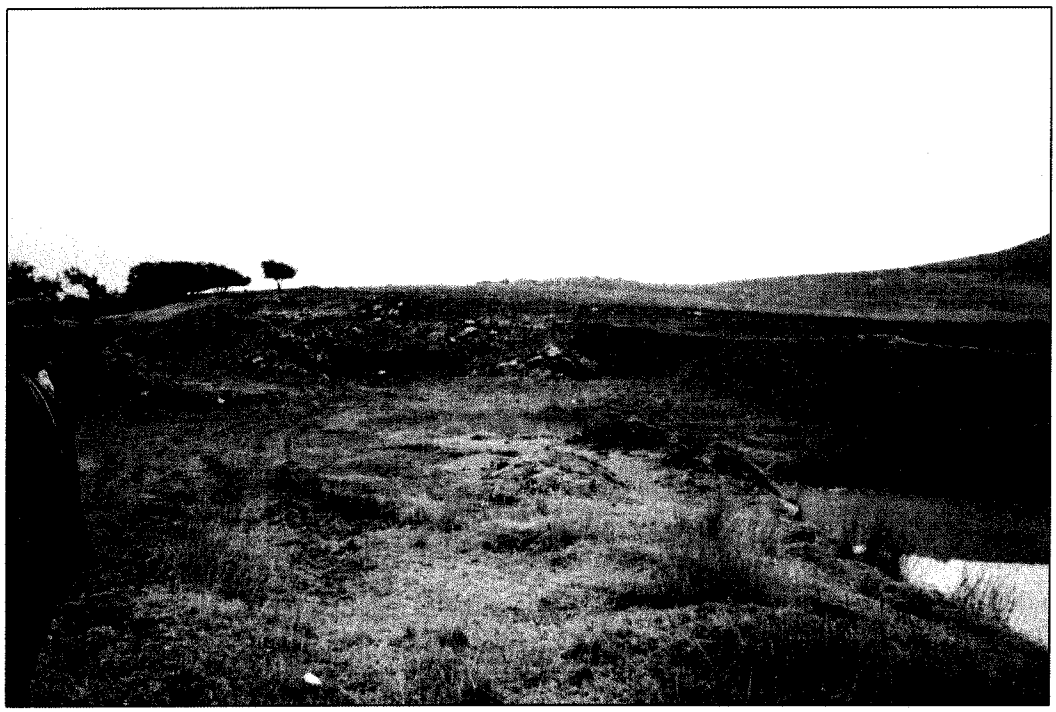


Plate 1: View of the vegetation surrounding the borrow pit

No signs of wildlife were seen during the site visit.

Topography

The topography of the surrounding area is characterized by gentle slope associated with the rim of a low point in the area.

Drainage

There are no natural drainage lines that start on the site or run through the site. Due to the location of the borrow pit on a slope, it should be relatively easy to design the stormwater management of the excavated areas in such a way that the site should be free draining. Water collected in the Borrow pit can be released into the surrounding natural drainage lines after passing through stormwater dissipation ponds.

Social Environment

The borrow pit is located on privately owned commercial agricultural land. The dominant agricultural practice is that of livestock farming.

Heritage Resources

No artifacts of heritage importance were identified during the site visit, nor was any found by the heritage specialists that conducted the Heritage Impact Study that is attached in Appendix C.

Impacts

Visual

The site is located immediately next to the P604 road and will be in clear view of the road users. The nearest homestead is located approximately 520m to the east of the site. This homestead belongs to the landowner who has no objection to the use of the pit.

Recommendations: The limited visual impact of the borrow pit must not detract from the responsibility of the applicant to undertake adequate layout, design and operational planning on the site. This should ensure that successful rehabilitation can be conducted on the borrow pit upon cessation of the operations. The rehabilitation should include the shaping and the rehabilitation of the benches formed by the mining operation. This should take place on an ongoing basis as the mining

operation proceeds through the site. A full surveyor drawing showing the profile and mining plan is attached in Appendix A.

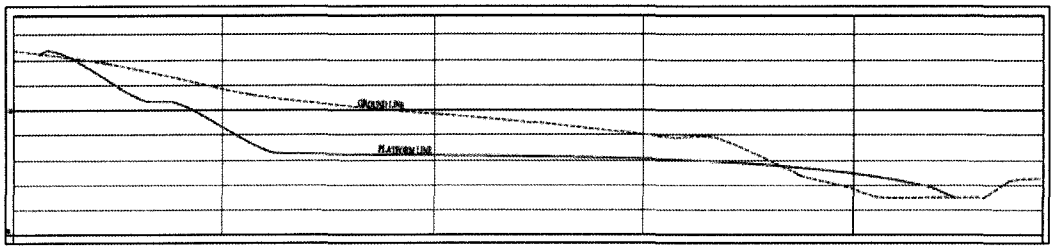


Figure 4: Planned final profile

Overhead Services

There are no overhead services that will be affected by the borrow pit operation.

Fences

There are no fences in the vicinity of the borrow pit that will be affected by the borrow pit operation. The landowner has requested that the borrow pit be fully fenced during operations and that all farm gates that are opened be closed immediately after access has been gained.

Access Road

The short access road to the site will not impact on the surrounding area.

Recommendations: The alignment of the access road will follow the current alignment of the informal track.

The haulage trucks will adhere to the specified speed limit on this access road of 20km/h. The turn-off onto the access road from the P604 District road will be clearly signposted, warning other road users of the presence of construction vehicles on the road.

The road will be sprayed with water or other dust suppression substances to limit the amount of dust generated. All the haulage trucks will be fitted with stock standard noise dampening equipment as specified by their manufactures. This will not only limit the noise generated but will also control the exhaust emissions from these vehicles.

Natural Drainage

There are no drainage lines that originate or run through the site. The rainwater run-off from the site will however need to be managed due to the locality of the borrow pit on a ridge in the landscape.

Recommendations: Earth berms must be put in place along the northern and western boundaries of the borrow pit to limit the rainwater run-off entering the site from the surrounding area. Any water that accumulates within the excavated area must be channeled off site via drainage structures within the borrow pit. These drainage channels should channel the stormwater to be incorporated in the stormwater structures associated with the P604 road. Stormwater management and erosion control measures must be in place along the access road to the borrow pit.

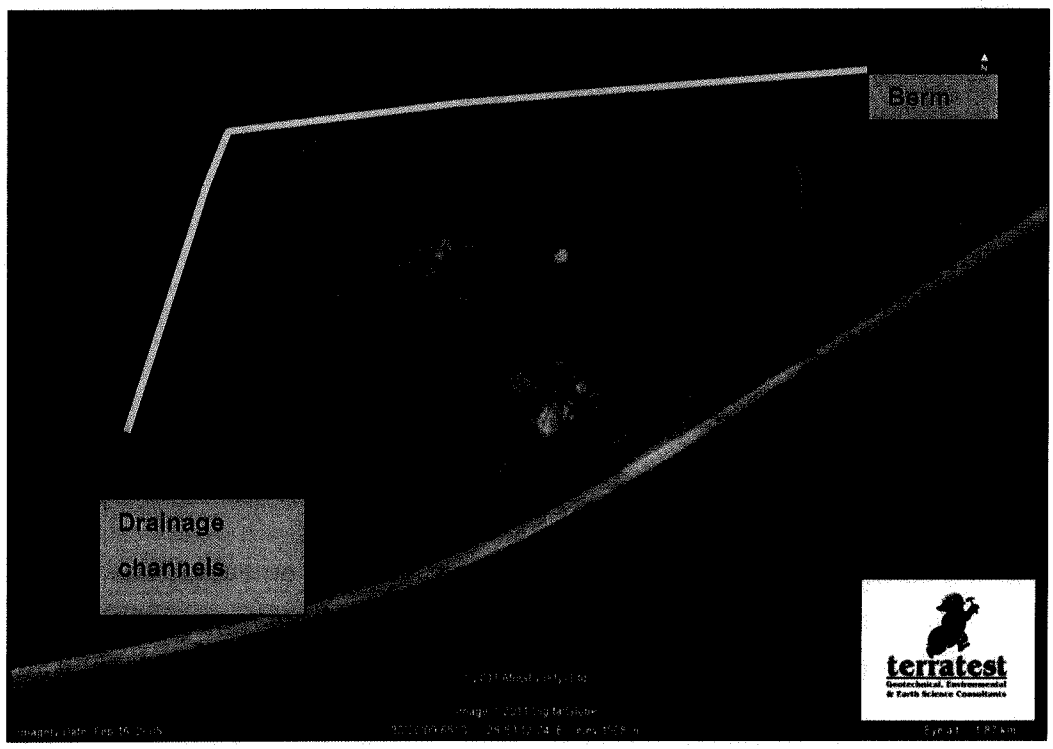


Figure 5: Possible stormwater drainage design

A full survey drawing showing a more detailed stormwater design is attached in Appendix A.

Vegetation

The vegetation that will be disturbed during the mining activity consists primarily of *Elionurus muticus* (Wire Grass).

Recommendations: The grass groundcover that is disturbed will be replanted on the re-sloped, topsoiled areas during the rehabilitation phase. It is suggested that the rehabilitated areas be replanted with *Elionurus muticus* (Wire Grass) seed.

Noise

The noise that is generated during the operational phase of the borrow pit will have a possible impact on the residents in the surrounding homesteads. The noise might also have an impact on the employees on site.

Recommendations: The machinery used for the excavations and the trucks used for transporting must be fitted with the stock-standard noise dampening equipment to limit the noise generated as much as possible. The employees must be supplied with hearing protection equipment for use during the operational phase of the borrow pit.

Other

Due to the shallowness of the material to be mined relative to the surface, very little topsoil is present on the site.

Recommendations: The topsoil that can be salvaged during the first stage of the mining operation must be stockpiled and vegetated with *Panicum maximum* (Guinea Grass) or similar grass species. This will ensure that the collected topsoil's fertility will be sustained during the stockpile period.

Dust will be generated during the mining activity and might have an impact on the surrounding residents and the employees on site.

Recommendations: Dust suppressions measures such as spraying of the operational areas and access roads with water when necessary and/or providing the employees with dust masks if so required must be employed.

5.2 BORROW PIT 03

Location

The borrow pit is located approximately 13.7km along the P604 District road from its junction with the R56 Provincial road. Access to the borrow pit directly off the P604. The approximate center point coordinate of the borrow pit site is S30° 19' 06.4", E28° 55' 04.4"

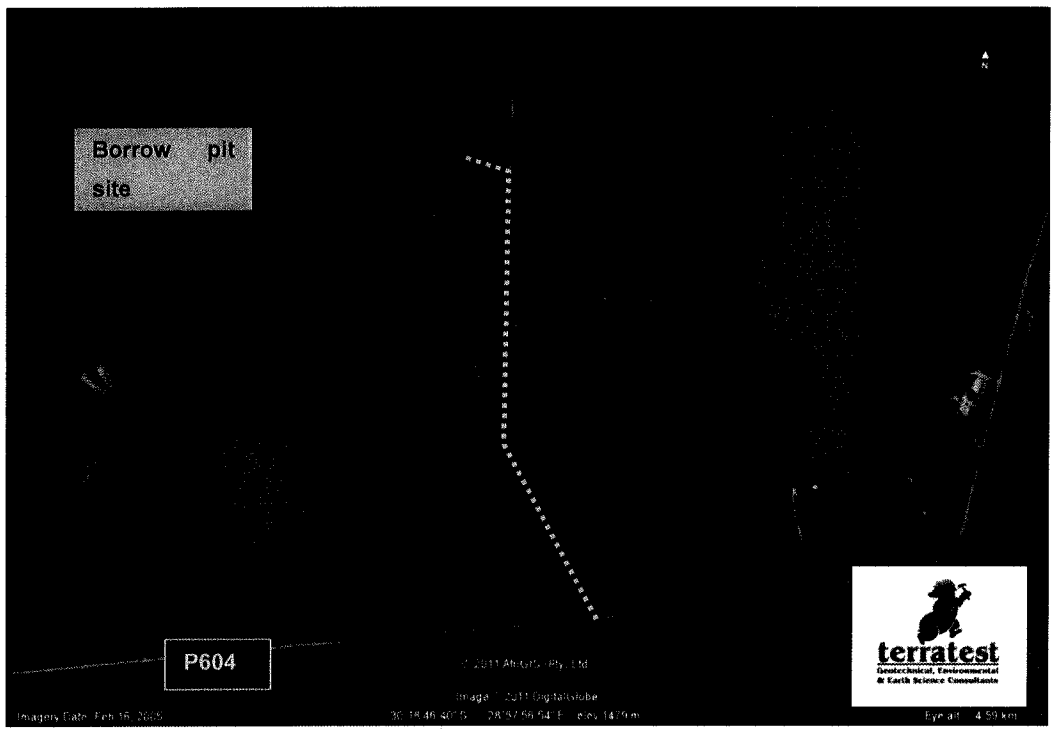


Figure 6: Locality of the Borrow pit along the P604

Extent

The total extent of the mining area will be approximately 1.5ha between the corner points given in the attached table. Detailed surveyor drawings showing the exact layout and operational directions of the borrow pit are attached in Appendix A.

Access

The access road to the site will follow existing farm roads. These farm roads will be maintained by the contractor for the duration of the operation of the borrow pit. Shale gravel from the borrow pit will be used as road surfacing if required.

A detailed surveyor drawing of the layout of the borrow pit is attached in Appendix A.

Material Standards

The material to be mined from the borrow pit is shale and sandstone. The materials testing results are attached in Appendix C.

Community comments and Land ownership

A meeting on site was conducted with the landowner, Mr F. van Deventer, who indicated his consent for use of the borrow pit for the surfacing of the P604. He stressed the requirements for rehabilitation of the borrow pit when workings has ceased and the upkeep and maintenance of the farm access roads to the site.

Biophysical Description

The borrow pit along the P604 is located within the East Griqualand Grassland vegetation type (Gs12) according to the classification, *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina and Rutherford, 2006). The areas surrounding the borrow pit site are not typical of this veldtype due to transformation of the vegetation due to the heavy grazing of the area by commercial livestock and the baling of hay during the winter months of the year. The dominant grass species on the areas surrounding the site is *Elionurus muticus* (Wire Grass).

Figure 7: Veldtype Map

Plate 2: View of the vegetation surrounding the borrow pit

No signs of wildlife were seen during the site visit.

Topography

The topography of the surrounding area is characterized by gentle slope just above the rim of a low point in the area.

Drainage

There are no natural drainage lines that start on the site or run through the site. Due to the location of the borrow pit on a slope, it should be relatively easy to design the stormwater management of the excavated areas in such a way that the site should be free draining. Water collected in the Borrow pit can be released into the surrounding natural drainage lines after passing through stormwater dissipation ponds.

Social Environment

The borrow pit is located on privately owned commercial agricultural land. The dominant agricultural practice is that of livestock farming.

Heritage Resources

No artifacts of heritage importance were identified during the site visit, nor was any found by the heritage specialists that conducted the Heritage Impact Study that is attached in Appendix C.

Impacts

Visual

The site is located approximately 1.4km from the P604 road and the nearest homestead in the area. The visual impact of the site is negligible.

Recommendations: The limited visual impact of the borrow pit must not detract from the responsibility of the applicant to undertake adequate layout, design and operational planning on the site. This should ensure that successful rehabilitation can be conducted on the borrow pit upon cessation of the operations. The rehabilitation should include the shaping and the rehabilitation of the benches formed by the mining operation. This should take place on an ongoing basis as the mining operation proceeds through the site. A full surveyor drawing showing the profile and mining plan is attached in Appendix A.

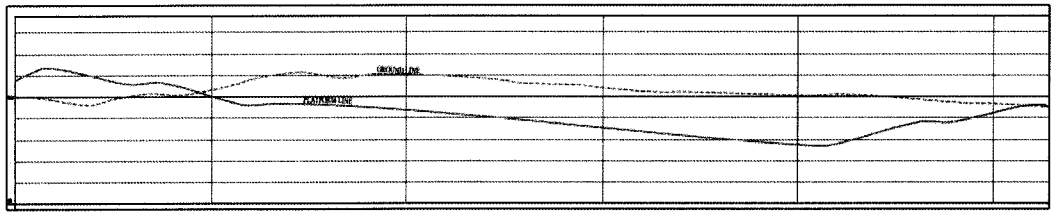


Figure 8: Planned final profile

Overhead Services

There are no overhead services that will be affected by the borrow pit operation.

Fences

There are no fences in the vicinity of the borrow pit that will be affected by the borrow pit operation. The landowner has requested that the borrow pit be fully fenced during operations and that all farm gates that are opened be closed immediately after access has been gained.

Access Road

The access road to the site will not impact on the surrounding area.

Recommendations: The alignment of the access road will follow the current alignment of the informal track.

The haulage trucks will adhere to the specified speed limit on this access road of 20km/h. The turn-off onto the access road from the P604 District road will be clearly signposted, warning other road users of the presence of construction vehicles on the road.

The road will be sprayed with water or other dust suppression substances to limit the amount of dust generated. All the haulage trucks will be fitted with stock standard noise dampening equipment as specified by their manufactures. This will not only limit the noise generated but will also control the exhaust emissions from these vehicles.

Natural Drainage

There are no drainage lines that originate or run through the site. The rainwater run-off from the site will however need to be managed due to the locality of the borrow pit on a ridge in the landscape.

Recommendations: Earth berms must be put in place along the northern and western boundaries of the borrow pit to limit the rainwater run-off entering the site from the surrounding area. Any water that accumulates within the excavated area must be channeled off site via drainage structures within the borrow pit. These drainage channels should channel the stormwater to be released into the surrounding area.

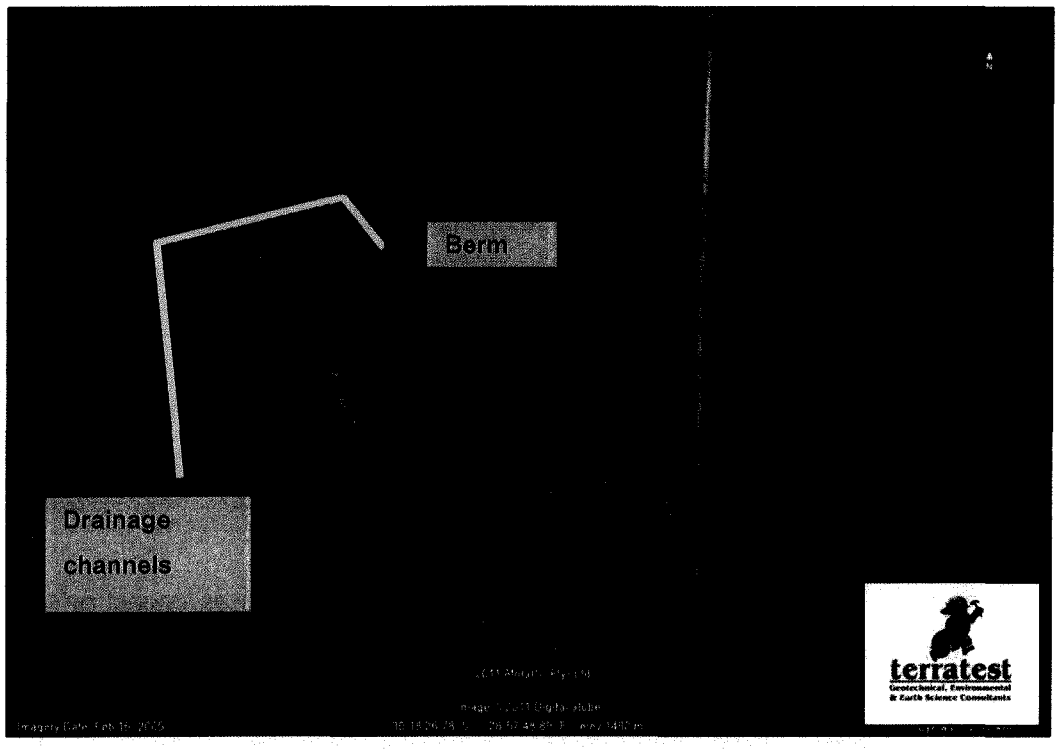


Figure 9: Possible stormwater drainage design

A full survey drawing showing a more detailed stormwater design is attached in Appendix A.

Vegetation

The vegetation that will be disturbed during the mining activity consists primarily of *Elionurus muticus* (Wire Grass).

Recommendations: The grass groundcover that is disturbed will be replanted on the re-sloped, topsoiled areas during the rehabilitation phase. It is suggested that the rehabilitated areas be replanted with *Elionurus muticus* (Wire Grass) seed.

Noise

The noise that is generated during the operational phase of the borrow pit will have a possible impact on the residents in the surrounding homesteads. The noise might also have an impact on the employees on site.

Recommendations: The machinery used for the excavations and the trucks used for transporting must be fitted with the stock-standard noise dampening equipment to limit the noise generated as much as possible. The employees must be supplied with hearing protection equipment for use during the operational phase of the borrow pit.

Other

Due to the shallowness of the material to be mined relative to the surface, very little topsoil is present on the site.

Recommendations: The topsoil that can be salvaged during the first stage of the mining operation must be stockpiled and vegetated with *Panicum maximum* (Guinea Grass) or similar grass species. This will ensure that the collected topsoil's fertility will be sustained during the stockpile period.

Dust will be generated during the mining activity and might have an impact on the surrounding residents and the employees on site.

Recommendations: Dust suppressions measures such as spraying of the operational areas and access roads with water when necessary and/or providing the employees with dust masks if so required must be employed.

5.3 BORROW PIT 04

Location

The borrow pit is located approximately 18.6km along the P604 District road from its junction with the R56 Provincial road. Access to the borrow pit directly off the P604. The approximate center point coordinate of the borrow pit site is S30° 16' 36.2", E29° 00' 21.0".

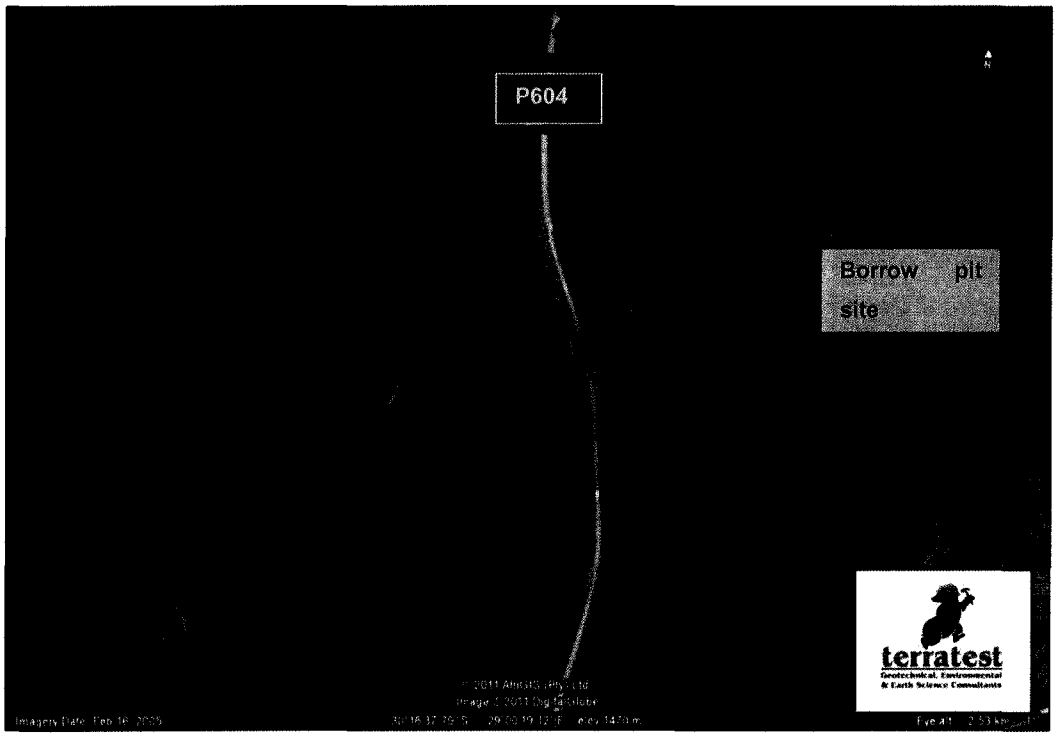


Figure 10: Locality of the Borrow pit along the P604

Extent

The total extent of the mining area will be approximately 1.5ha between the corner points given in the attached table. Detailed surveyor drawings showing the exact layout and operational directions of the borrow pit are attached in Appendix A.

Access

The access road to the site will be constructed by formalizing the existing track that extends from the P604 District road to the borrow pit site. This road will be constructed by blading the current informal track and making provision for temporary

stormwater measures in the form of mitre drains along the alignment. Gravel from the borrow pit will be used as road surfacing if required.

A detailed surveyor drawing of the layout of the borrow pit is attached in Appendix A.

Material Standards

The material to be mined from the borrow pit is decomposed dolerite and shale. The materials testing results are attached in Appendix C.

Community comments and Land ownership

A meeting on site was conducted with the landowner, Mr F. van Deventer, who indicated his consent for use of the borrow pit for the surfacing of the P604. He stressed the requirements for rehabilitation of the borrow pit when workings has ceased and the upkeep and maintenance of the farm access roads to the site.

Biophysical Description

The borrow pit along the P604 is located within the East Griqualand Grassland vegetation type (Gs12) according to the classification, *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina and Rutherford, 2006). The areas surrounding the borrow pit site are not typical of this veldtype due to transformation of the vegetation due to the heavy grazing of the area by commercial livestock.. The dominant grass species on the areas surrounding the site is *Elionurus muticus* (Wire Grass).

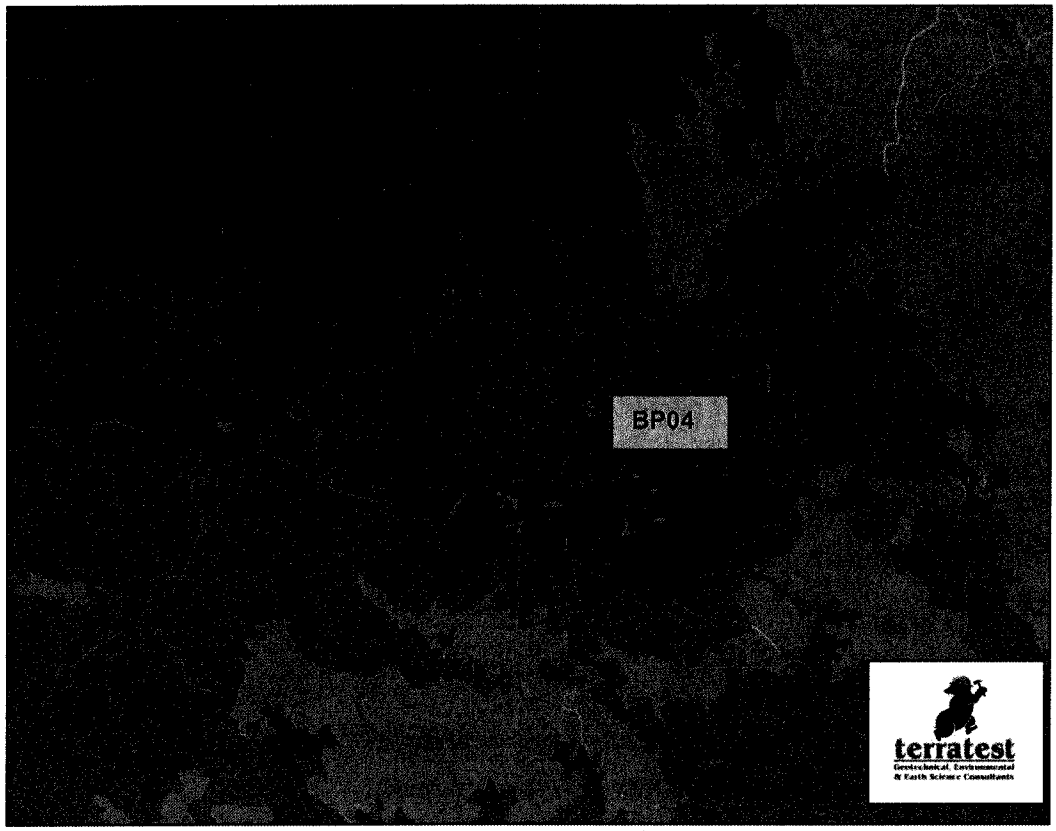


Figure 11: Veldtype Map

Plate 3: View of the vegetation surrounding the borrow pit

No signs of wildlife were seen during the site visit.

Topography

The topography of the surrounding area is characterized by gentle slope associated with the rim of a low point in the area.

Drainage

There are no natural drainage lines that start on the site or run through the site. Due to the location of the borrow pit on top of a hill, it should be relatively easy to design the stormwater management of the excavated areas in such a way that the site should be free draining. Water collected in the Borrow pit can be released into the surrounding natural drainage lines after passing through stormwater dissipation ponds.

Social Environment

The borrow pit is located on privately owned commercial agricultural land. The dominant agricultural practice is that of livestock farming.

Heritage Resources

No artifacts of heritage importance were identified during the site visit, nor was any found by the heritage specialists that conducted the Heritage Impact Study that is attached in Appendix C.

Impacts

Visual

The site is located immediately next to the P604 road and will be in clear view of the road users.

Recommendations: The limited visual impact of the borrow pit must not detract from the responsibility of the applicant to undertake adequate layout, design and operational planning on the site. This should ensure that successful rehabilitation can be conducted on the borrow pit upon cessation of the operations. The rehabilitation should include the shaping and the rehabilitation of the benches formed by the mining operation. This should take place on an ongoing basis as the mining operation proceeds through the site. A full surveyor drawing showing the profile and mining plan is attached in Appendix A.

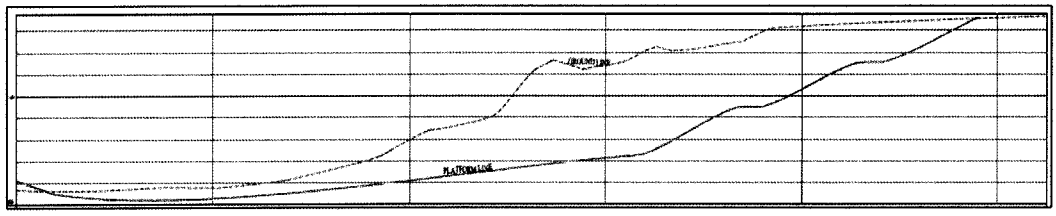


Figure 12: Planned final profile

Overhead Services

There are overhead services that run along the eastern boundary of the site, but if care is taken during operations, these will not be impacted upon.

Fences

There are no fences in the vicinity of the borrow pit that will be affected by the borrow pit operation. The landowner has requested that the borrow pit be fully fenced during operations and that all farm gates that are opened be closed immediately after access has been gained.

Access Road

The short access road to the site will not impact on the surrounding area.

Recommendations: The alignment of the access road will follow the current alignment of the informal track.

The haulage trucks will adhere to the specified speed limit on this access road of 20km/h. The turn-off onto the access road from the P604 District road will be clearly signposted, warning other road users of the presence of construction vehicles on the road.

The road will be sprayed with water or other dust suppression substances to limit the amount of dust generated. All the haulage trucks will be fitted with stock standard noise dampening equipment as specified by their manufactures. This will not only limit the noise generated but will also control the exhaust emissions from these vehicles.

Natural Drainage

There are no drainage lines that originate or run through the site. The rainwater run-off from the site will however need to be managed due to the locality of the borrow pit on a ridge in the landscape.

Recommendations: Earth berms must be put in place along the northern bourndary of the borrow pit to limit the rainwater run-off entering the site from the surrounding area. Any water that accumulates within the excavated area must be channeled off site via drainage structures within the borrow pit. These drainage channels should channel the stormwater to be incorporated in the stormwater structures associated with the P604 road. Stormwater management and erosion control measures must be in place along the access road to the borrow pit.

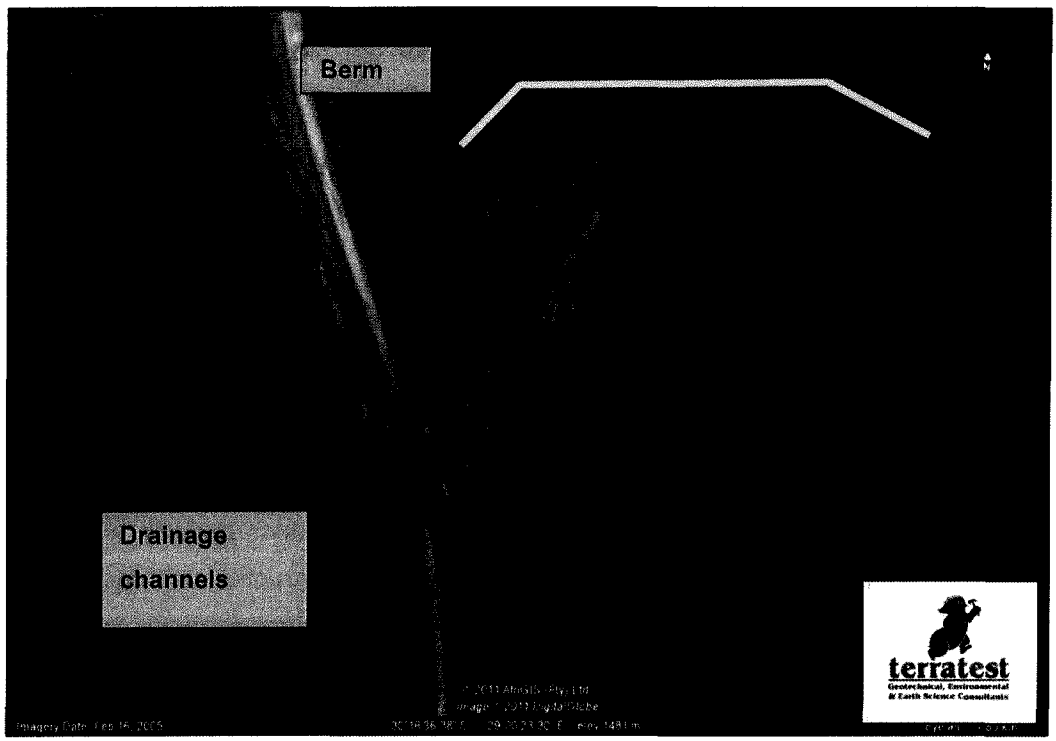


Figure 13: Possible stormwater drainage design

A full survey drawing showing a more detailed stormwater design is attached in Appendix A.

Vegetation

The vegetation that will be disturbed during the mining activity consists primarily of *Elionurus muticus* (Wire Grass).

Recommendations: The grass groundcover that is disturbed will be replanted on the re-sloped, topsoiled areas during the rehabilitation phase. It is suggested that the rehabilitated areas be replanted with *Elionurus muticus* (Wire Grass) seed.

Noise

The noise that is generated during the operational phase of the borrow pit will have a possible impact on the residents in the surrounding homesteads. The noise might also have an impact on the employees on site.

Recommendations: The machinery used for the excavations and the trucks used for transporting must be fitted with the stock-standard noise dampening equipment to limit the noise generated as much as possible. The employees must be supplied with hearing protection equipment for use during the operational phase of the borrow pit.

Other

Due to the shallowness of the material to be mined relative to the surface, very little topsoil is present on the site.

Recommendations: The topsoil that can be salvaged during the first stage of the mining operation must be stockpiled and vegetated with *Panicum maximum* (Guinea Grass) or similar grass species. This will ensure that the collected topsoil's fertility will be sustained during the stockpile period.

Dust will be generated during the mining activity and might have an impact on the surrounding residents and the employees on site.

Recommendations: Dust suppressions measures such as spraying of the operational areas and access roads with water when necessary and/or providing the employees with dust masks if so required must be employed.

5.4 BORROW PIT 05

Location

The borrow pit is located approximately 19.2km along the P604 District road from its junction with the R56 Provincial road. Access to the borrow pit directly off the P604. The approximate center point coordinate of the borrow pit site is S30° 16' 23.7", E29° 00' 06.2"

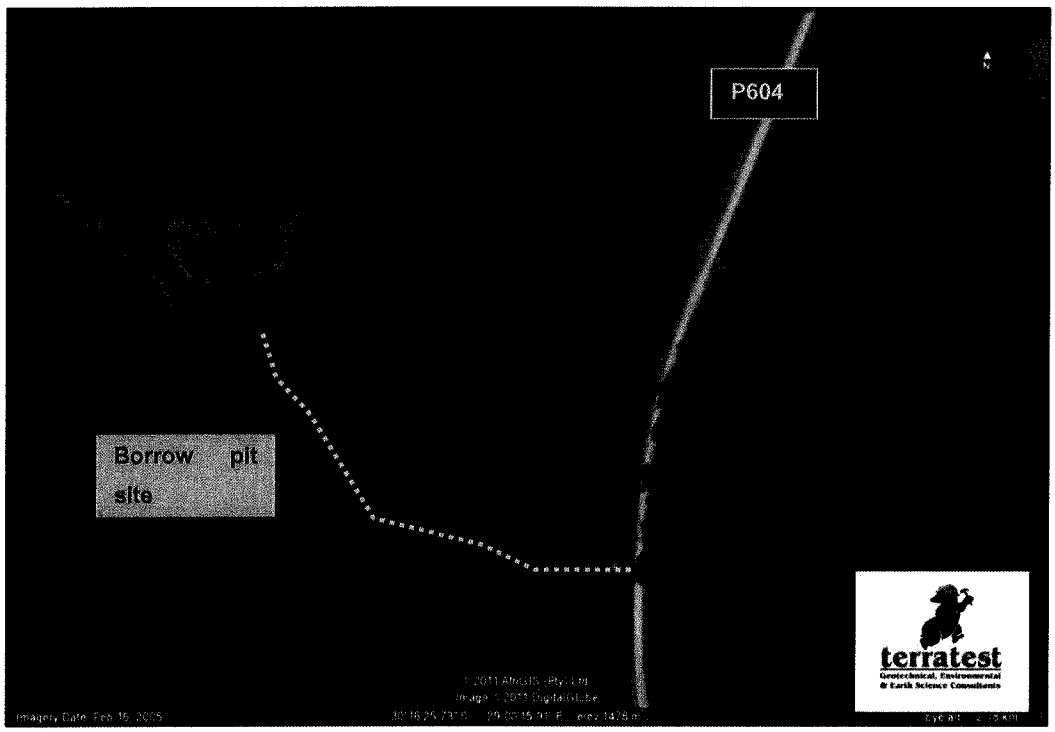


Figure 14: Locality of the Borrow pit along the P604

Extent

The total extent of the mining area will be approximately 1.5ha between the corner points given in the attached table. Detailed surveyor drawings showing the exact layout and operational directions of the borrow pit are attached in Appendix A.

Access

The access road to the site will be constructed by formalizing the existing track that extends from the P604 District road to the borrow pit site. This road will be constructed by blading the current informal track and making provision for temporary

stormwater measures in the form of mitre drains along the alignment. Gravel from the borrow pit will be used as road surfacing if required.

A detailed surveyor drawing of the layout of the borrow pit is attached in Appendix A.

Material Standards

The material to be mined from the borrow pit is shale and sandstone. The materials testing results are attached in Appendix C.

Community comments and Land ownership

The borrow pit is actively being mined by the Department and it is therefore assumed that the land owner, Mr. D. Marx, has provided his consent for this activity. It is understood that emphasis must be placed on the rehabilitation requirements that will lie with the DRPW.

Biophysical Description

The borrow pit along the P604 is located within the East Griqualnd Grassland vegetation type (Gs12) according to the classification, *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina and Rutherford, 2006). The areas surrounding the borrow pit site are not typical of this veldtype due to transformation of the vegetation due to the heavy grazing of the area by commercial livestock and the baling of hay during the winter months of the year. The dominant grass species on the areas surrounding the site is *Elionurus muticus* (Wire Grass).

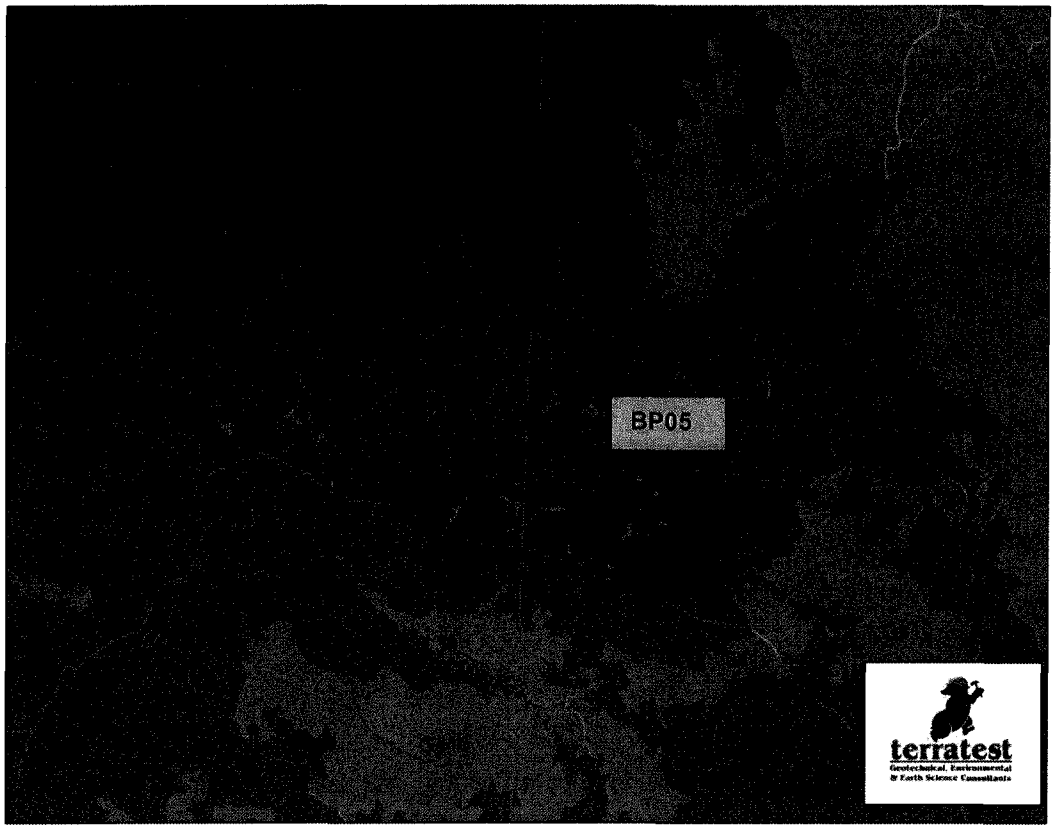


Figure 15: Veldtype Map

Plate 4: View of the vegetation surrounding the borrow pit

No signs of wildlife were seen during the site visit.

Topography

The topography of the surrounding area is characterized by gentle slope associated with the rim of a low point in the area.

Drainage

There are no natural drainage lines that start on the site or run through the site. Due to the location of the borrow pit on a slope, it should be relatively easy to design the stormwater management of the excavated areas in such a way that the site should be free draining. Water collected in the Borrow pit can be released into the surrounding natural drainage lines after passing through stormwater dissipation ponds.

Social Environment

The borrow pit is located on privately owned commercial agricultural land. The dominant agricultural practice is that of livestock farming.

Heritage Resources

No artifacts of heritage importance were identified during the site visit, nor was any found by the heritage specialists that conducted the Heritage Impact Study that is attached in Appendix C.

Impacts

Visual

The site is located in close proximity to the P604 road and will be in clear view of the road users. There are no homesteads that over look the site.

Recommendations: The limited visual impact of the borrow pit must not detract from the responsibility of the applicant to undertake adequate layout, design and operational planning on the site. This should ensure that successful rehabilitation can be conducted on the borrow pit upon cessation of the operations. The rehabilitation should include the shaping and the rehabilitation of the benches formed by the mining operation. This should take place on an ongoing basis as the mining operation proceeds through the site. A full surveyor drawing showing the profile and mining plan is attached in Appendix A.

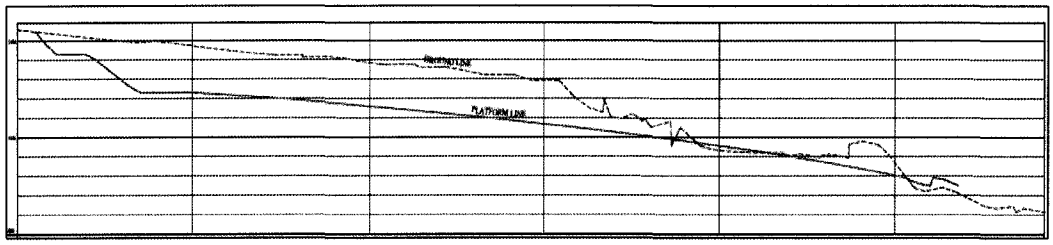


Figure 16: Planned final profile

Overhead Services

There are no overhead services that will be affected by the borrow pit operation.

Fences

There are no fences in the vicinity of the borrow pit that will be affected by the borrow pit operation. The landowner has requested that the borrow pit be fully fenced during operations and that all farm gates that are opened be closed immediately after access has been gained.

Access Road

The short access road to the site will not impact on the surrounding area.

Recommendations: The alignment of the access road will follow the current alignment of the informal track.

The haulage trucks will adhere to the specified speed limit on this access road of 20km/h. The turn-off onto the access road from the P604 District road will be clearly signposted, warning other road users of the presence of construction vehicles on the road.

The road will be sprayed with water or other dust suppression substances to limit the amount of dust generated. All the haulage trucks will be fitted with stock standard noise dampening equipment as specified by their manufactures. This will not only limit the noise generated but will also control the exhaust emissions from these vehicles.

Natural Drainage

There are no drainage lines that originate or run through the site. The rainwater run-off from the site will however need to be managed due to the locality of the borrow pit on a ridge in the landscape.

Recommendations: Earth berms must be put in place along the northern and western boundaries of the borrow pit to limit the rainwater run-off entering the site from the surrounding area. Any water that accumulates within the excavated area must be channeled off site via drainage structures within the borrow pit. These drainage channels should channel the stormwater to be incorporated in the stormwater structures associated with the P604 road. Stormwater management and erosion control measures must be in place along the access road to the borrow pit.

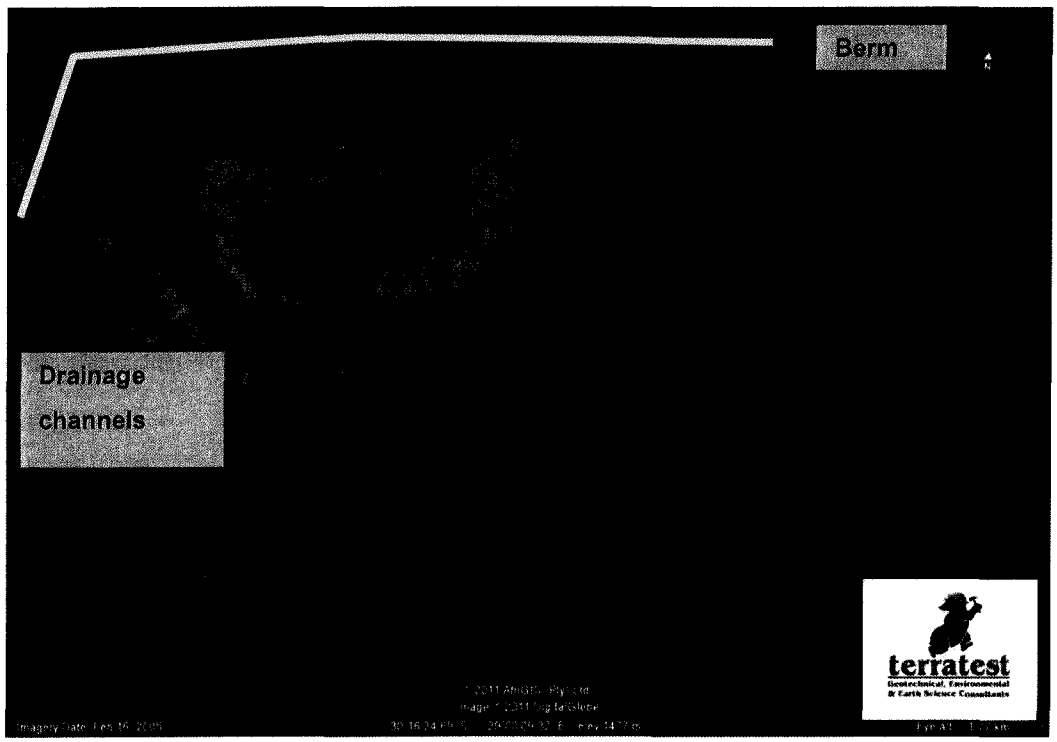


Figure 17: Possible stormwater drainage design

A full survey drawing showing a more detailed stormwater design is attached in Appendix A.

Vegetation

The vegetation that will be disturbed during the mining activity consists primarily of *Elionurus muticus* (Wire Grass).

Recommendations: The grass groundcover that is disturbed will be replanted on the re-sloped, topsoiled areas during the rehabilitation phase. It is suggested that the rehabilitated areas be replanted with *Elionurus muticus* (Wire Grass) seed.

Noise

The noise that is generated during the operational phase of the borrow pit will have a possible impact on the residents in the surrounding homesteads. The noise might also have an impact on the employees on site.

Recommendations: The machinery used for the excavations and the trucks used for transporting must be fitted with the stock-standard noise dampening equipment to limit the noise generated as much as possible. The employees must be supplied with hearing protection equipment for use during the operational phase of the borrow pit.

Other

Due to the shallowness of the material to be mined relative to the surface, very little topsoil is present on the site.

Recommendations: The topsoil that can be salvaged during the first stage of the mining operation must be stockpiled and vegetated with *Panicum maximum* (Guinea Grass) or similar grass species. This will ensure that the collected topsoil's fertility will be sustained during the stockpile period.

Dust will be generated during the mining activity and might have an impact on the surrounding residents and the employees on site.

Recommendations: Dust suppressions measures such as spraying of the operational areas and access roads with water when necessary and/or providing the employees with dust masks if so required must be employed.

5.5 BORROW PIT 06

Location

The borrow pit is located approximately 3.9km along the P604 District road from its junction with the R56 Provincial road. Access to the borrow pit directly off the P604. The approximate center point coordinate of the borrow pit site is S30° 15' 56.7", E29° 00' 30.7"

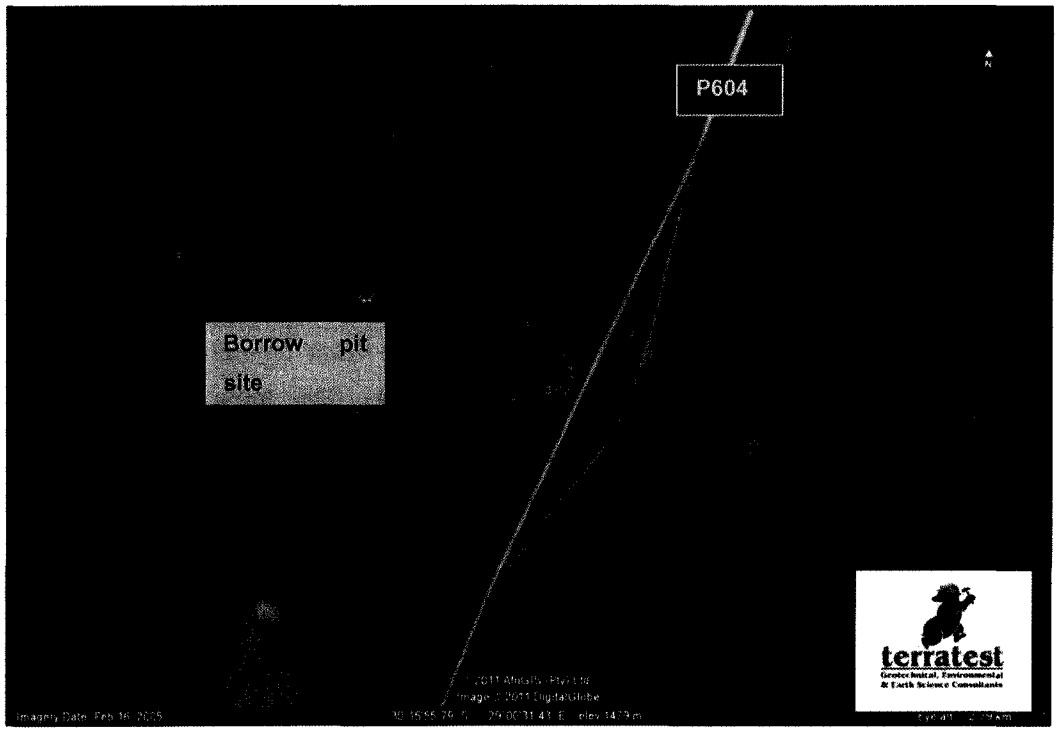


Figure 18: Locality of the Borrow pit along the P604

Extent

The total extent of the mining area will be approximately 1.5ha between the corner points given in the attached table. Detailed surveyor drawings showing the exact layout and operational directions of the borrow pit are attached in Appendix A.

Access

The access road to the site will be constructed by formalizing the existing track that extends from the P604 District road to the borrow pit site. This road will be constructed by blading the current informal track and making provision for temporary

stormwater measures in the form of mitre drains along the alignment. Gravel from the borrow pit will be used as road surfacing if required.

A detailed surveyor drawing of the layout of the borrow pit is attached in Appendix A.

Material Standards

The material to be mined from the borrow pit is shale. The materials testing results are attached in Appendix C.

Community comments and Land ownership

The borrow pit is actively being mined by the Department and it is therefore assumed that the land owner, Mr. D. Marx, has provided his consent for this activity. It is understood that emphasis must be placed on the rehabilitation requirements that will lie with the DRPW.

Biophysical Description

The borrow pit along the P604 is located within the East Griqualand Grassland vegetation type (Gs12) according to the classification, *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina and Rutherford, 2006). The areas surrounding the borrow pit site are not typical of this veldtype due to transformation of the vegetation due to the heavy grazing of the area by commercial livestock and the baling of hay during the winter months of the year. The dominant grass species on the areas surrounding the site is *Elionurus muticus* (Wire Grass).

Figure 19: Veldtype Map

Plate 5: View of the vegetation surrounding the borrow pit

No signs of wildlife were seen during the site visit.

Topography

The topography of the surrounding area is characterized by gentle slope associated with the rim of a low point in the area.

Drainage

There are no natural drainage lines that start on the site or run through the site. There is a small drainage line that runs along the southwestern boundary of the site that can be used for the release of stormwater off the site.

Social Environment

The borrow pit is located on privately owned commercial agricultural land. The dominant agricultural practice is that of livestock farming.

Heritage Resources

No artifacts of heritage importance were identified during the site visit, nor was any found by the heritage specialists that conducted the Heritage Impact Study that is attached in Appendix C.

Impacts

Visual

The site is located immediately next to the P604 road and will be in clear view of the road users. There are no homesteads that over look the site.

Recommendations: The limited visual impact of the borrow pit must not detract from the responsibility of the applicant to undertake adequate layout, design and operational planning on the site. This should ensure that successful rehabilitation can be conducted on the borrow pit upon cessation of the operations. The rehabilitation should include the shaping and the rehabilitation of the benches formed by the mining operation. This should take place on an ongoing basis as the mining operation proceeds through the site. A full surveyor drawing showing the profile and mining plan is attached in Appendix A.

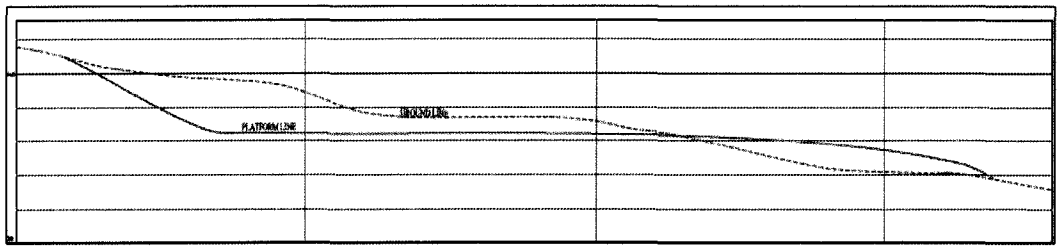


Figure 20: Planned final profile

Overhead Services

There are overhead services that run along the southern boundary of the site, but with careful operations the activities on the site will not impact on these services.

Fences

There are no fences in the vicinity of the borrow pit that will be affected by the borrow pit operation. The landowner has requested that the borrow pit be fully fenced during operations and that all farm gates that are opened be closed immediately after access has been gained.

Access Road

The short access road to the site will not impact on the surrounding area.

Recommendations: The alignment of the access road will follow the current alignment of the informal track.

The haulage trucks will adhere to the specified speed limit on this access road of 20km/h. The turn-off onto the access road from the P604 District road will be clearly signposted, warning other road users of the presence of construction vehicles on the road.

The road will be sprayed with water or other dust suppression substances to limit the amount of dust generated. All the haulage trucks will be fitted with stock standard noise dampening equipment as specified by their manufactures. This will not only limit the noise generated but will also control the exhaust emissions from these vehicles.

Natural Drainage

There are no drainage lines that originate or run through the site. The rainwater run-off from the site will however need to be managed due to the locality of the borrow pit on a ridge in the landscape.

Recommendations: Earth berms must be put in place along the northern and western boundaries of the borrow pit to limit the rainwater run-off entering the site from the surrounding area. Any water that accumulates within the excavated area must be channeled off site via drainage structures within the borrow pit. These drainage channels should channel the stormwater to natural drainage line that runs along the southern boundary of the site.

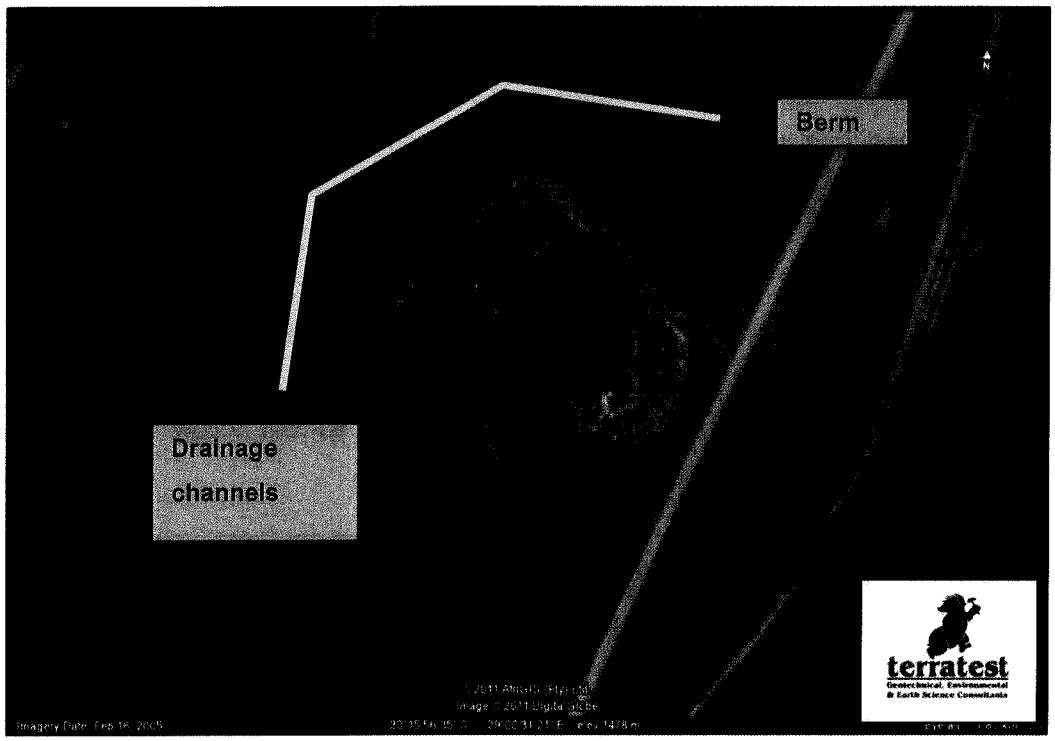


Figure 21: Possible stormwater drainage design

A full survey drawing showing a more detailed stormwater design is attached in Appendix A.

Vegetation

The vegetation that will be disturbed during the mining activity consists primarily of *Elionurus muticus* (Wire Grass).

Recommendations: The grass groundcover that is disturbed will be replanted on the re-sloped, topsoiled areas during the rehabilitation phase. It is suggested that the rehabilitated areas be replanted with *Elionurus muticus* (Wire Grass) seed.

Noise

The noise that is generated during the operational phase of the borrow pit will have a possible impact on the residents in the surrounding homesteads. The noise might also have an impact on the employees on site.

Recommendations: The machinery used for the excavations and the trucks used for transporting must be fitted with the stock-standard noise dampening equipment to limit the noise generated as much as possible. The employees must be supplied with hearing protection equipment for use during the operational phase of the borrow pit.

Other

Due to the shallowness of the material to be mined relative to the surface, very little topsoil is present on the site.

Recommendations: The topsoil that can be salvaged during the first stage of the mining operation must be stockpiled and vegetated with *Panicum maximum* (Guinea Grass) or similar grass species. This will ensure that the collected topsoil's fertility will be sustained during the stockpile period.

Dust will be generated during the mining activity and might have an impact on the surrounding residents and the employees on site.

Recommendations: Dust suppressions measures such as spraying of the operational areas and access roads with water when necessary and/or providing the employees with dust masks if so required must be employed.

5.6 BORROW PIT 08

Location

The borrow pit is located approximately 22km along the P604 District road from its junction with the R56 Provincial road. Access to the borrow pit directly off the P604. The approximate center point coordinate of the borrow pit site is S30° 15' 16.8", E29° 01' 03.7".

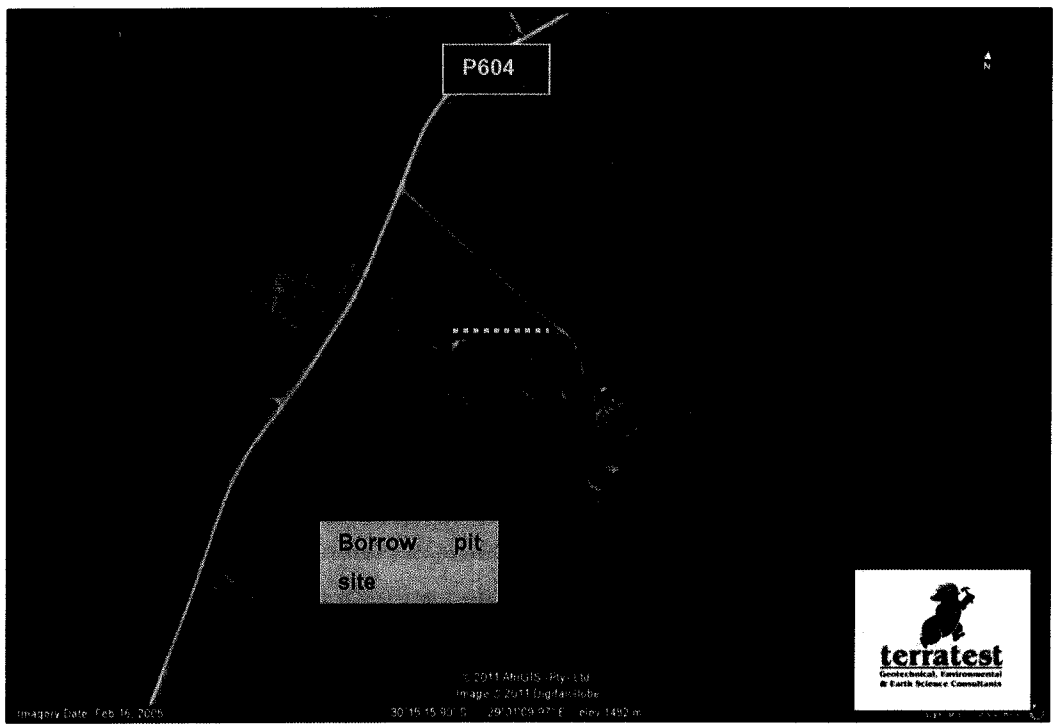


Figure 22: Locality of the Borrow pit along the P604

Extent

The total extent of the mining area will be approximately 1.5ha between the corner points given in the attached table. Detailed surveyor drawings showing the exact layout and operational directions of the borrow pit are attached in Appendix A.

Access

The access road to the site will be constructed by formalizing the existing track that extends from the P604 District road to the borrow pit site. This road will be constructed by blading the current informal track and making provision for temporary

stormwater measures in the form of mitre drains along the alignment. Gravel from the borrow pit will be used as road surfacing if required.

A detailed surveyor drawing of the layout of the borrow pit is attached in Appendix A.

Material Standards

The material to be mined from the borrow pit is sandstone and mudstone. The materials testing results are attached in Appendix C.

Community comments and Land ownership

From the information provided it is evident that the property is under the ownership of the Provincial Government. The property is currently be used by the DPRW and the understanding is therefore that consent is provided by the owner.

Biophysical Description

The borrow pit along the P604 is located within the East Griqualand Grassland vegetation type (Gs12) according to the classification, *The Vegetation of South Africa, Lesotho and Swaziland* (Mucina and Rutherford, 2006). The areas surrounding the borrow pit site are not typical of this veldtype due to transformation of the vegetation due to the heavy grazing of the area by commercial livestock and the baling of hay during the winter months of the year. The dominant grass species on the areas surrounding the site is *Elionurus muticus* (Wire Grass).

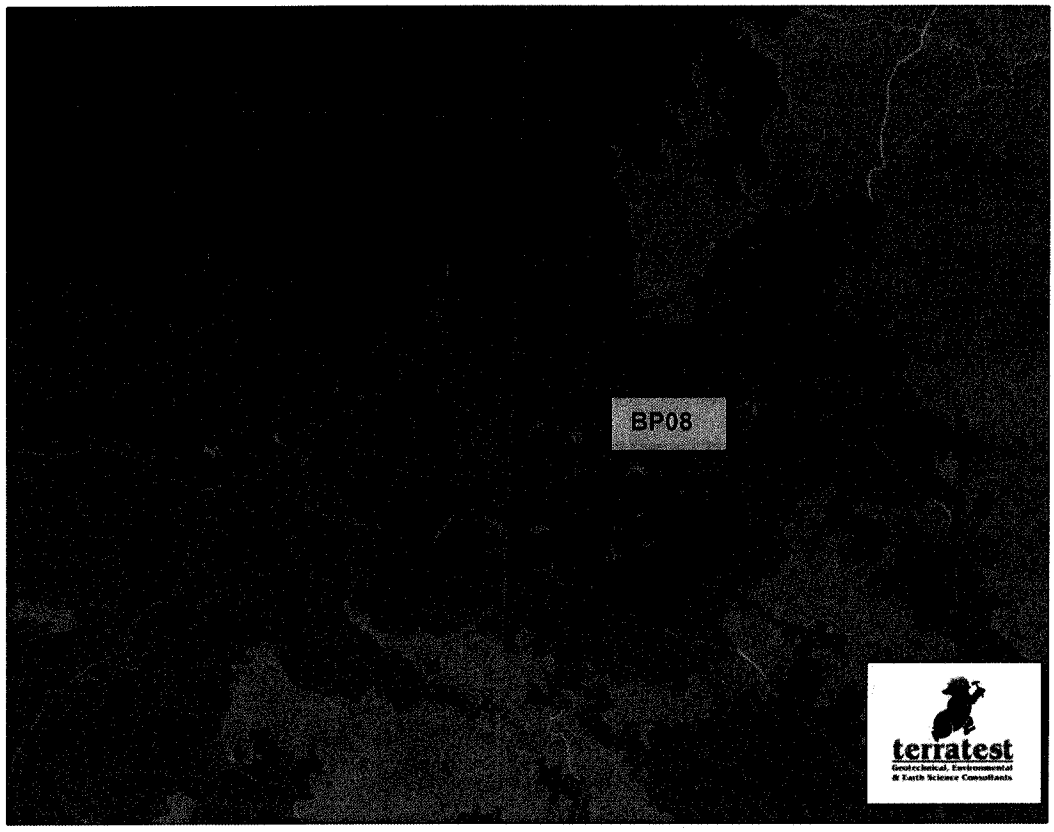


Figure 23: Veldtype Map

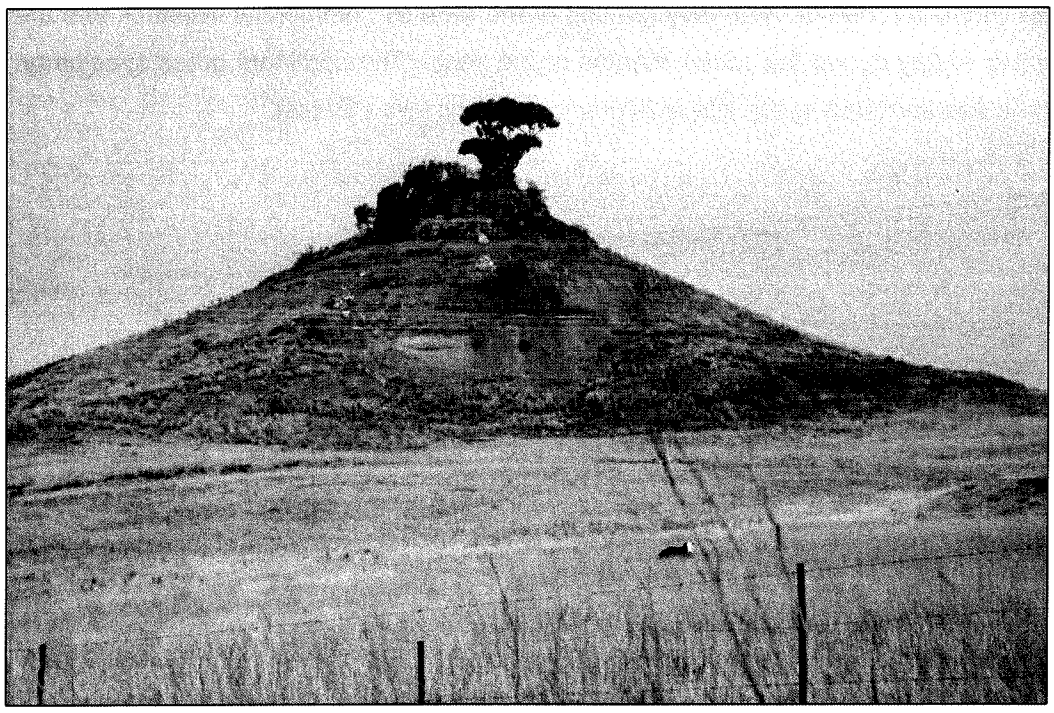


Plate 6: View of the vegetation surrounding the borrow pit

No signs of wildlife were seen during the site visit.

Topography

The topography of the surrounding area is characterized by gentle slope associated with a low hill.

Drainage

There are no natural drainage lines that start on the site or run through the site. Due to the location of the borrow pit on top of a hill, it should be relatively easy to design the stormwater management of the excavated areas in such a way that the site should be free draining. Water collected in the borrow pit can be released into the surrounding natural drainage lines after passing through stormwater dissipation ponds.

Social Environment

The borrow pit is located on land that is owned by the Provincial Government that is currently leased for the grazing of commercial livestock. The dominant agricultural practice is that of livestock farming.

Heritage Resources

No artifacts of heritage importance were identified during the site visit, nor was any found by the heritage specialists that conducted the Heritage Impact Study that is attached in Appendix C.

Impacts

Visual

The site is located immediately next to the P604 road and will be in clear view of the road users. There are no homesteads in the immediate vicinity of the borrow pit.

Recommendations: The limited visual impact of the borrow pit must not detract from the responsibility of the applicant to undertake adequate layout, design and operational planning on the site. This should ensure that successful rehabilitation can be conducted on the borrow pit upon cessation of the operations. The rehabilitation should include the shaping and the rehabilitation of the benches formed by the mining operation. This should take place on an ongoing basis as the mining

operation proceeds through the site. A full surveyor drawing showing the profile and mining plan is attached in Appendix A.

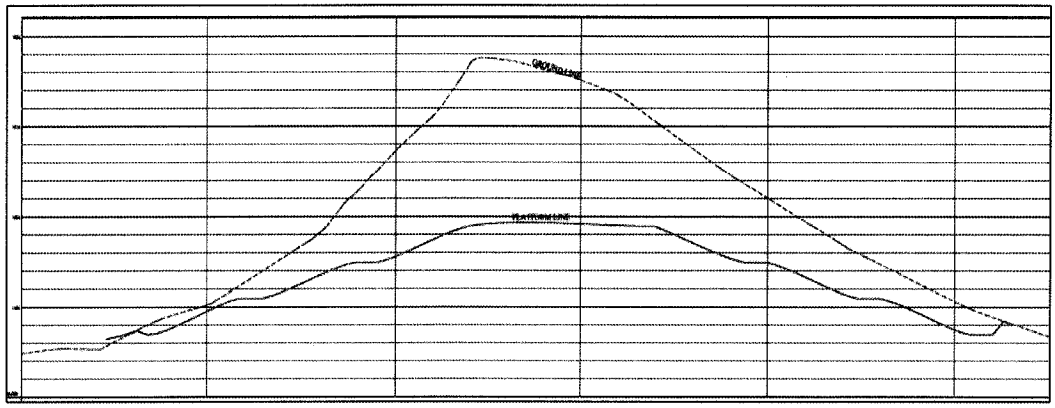


Figure 24: Planned final profile

Overhead Services

There are no overhead services that run across the site.

Fences

There are no fences in the vicinity of the borrow pit that will be affected by the borrow pit operation. The landowner has requested that the borrow pit be fully fenced during operations and that all farm gates that are opened be closed immediately after access has been gained.

Access Road

The short access road to the site will not impact on the surrounding area.

Recommendations: The alignment of the access road will follow the current alignment of the informal track.

The haulage trucks will adhere to the specified speed limit on this access road of 20km/h. The turn-off onto the access road from the P604 District road will be clearly signposted, warning other road users of the presence of construction vehicles on the road.

The road will be sprayed with water or other dust suppression substances to limit the amount of dust generated. All the haulage trucks will be fitted with stock standard noise dampening equipment as specified by their manufactures. This will not only

limit the noise generated but will also control the exhaust emissions from these vehicles.

Natural Drainage

There are no drainage lines that originate or run through the site. The rainwater run-off from the site will however need to be managed due to the locality of the borrow pit on a slope in the landscape.

Recommendations: Earth berms must be put in place along the southern boundary of the borrow pit to limit the rainwater run-off entering the site from the surrounding area. Any water that accumulates within the excavated area must be channeled off site via drainage structures within the borrow pit. These drainage channels should channel the stormwater to a small farm dam used as a livestock watering point.

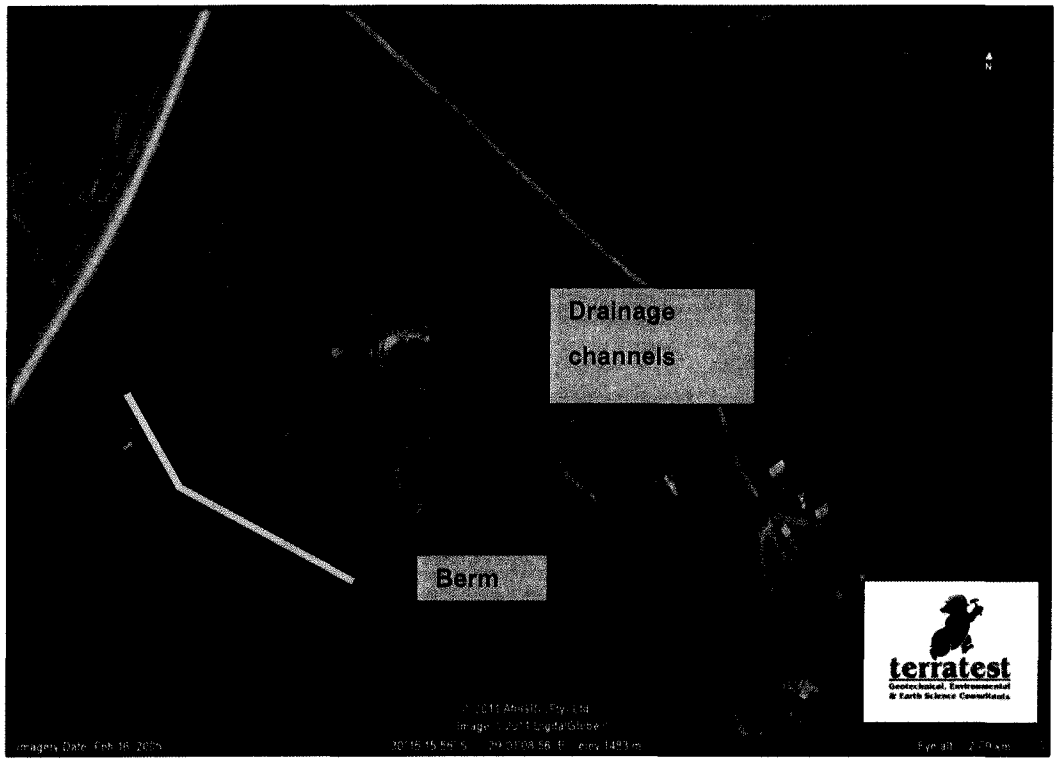


Figure 25: Possible stormwater drainage design

A full survey drawing showing a more detailed stormwater design is attached in Appendix A.

Vegetation

The vegetation that will be disturbed during the mining activity consists primarily of *Elionurus muticus* (Wire Grass).

Recommendations: The grass groundcover that is disturbed will be replanted on the re-sloped, topsoiled areas during the rehabilitation phase. It is suggested that the rehabilitated areas be replanted with *Elionurus muticus* (Wire Grass) seed.

Noise

The noise that is generated during the operational phase of the borrow pit will have a possible impact on the residents in the surrounding homesteads. The noise might also have an impact on the employees on site.

Recommendations: The machinery used for the excavations and the trucks used for transporting must be fitted with the stock-standard noise dampening equipment to limit the noise generated as much as possible. The employees must be supplied with hearing protection equipment for use during the operational phase of the borrow pit.

Other

Due to the shallowness of the material to be mined relative to the surface, very little topsoil is present on the site.

Recommendations: The topsoil that can be salvaged during the first stage of the mining operation must be stockpiled and vegetated with *Panicum maximum* (Guinea Grass) or similar grass species. This will ensure that the collected topsoil's fertility will be sustained during the stockpile period.

Dust will be generated during the mining activity and might have an impact on the surrounding residents and the employees on site.

Recommendations: Dust suppressions measures such as spraying of the operational areas and access roads with water when necessary and/or providing the employees with dust masks if so required must be employed.

6 GENERAL ENVIRONMENTAL MANAGEMENT PLAN

The following management principles are pertinent to all the borrow pit sites included in this document.

This General Environmental Management Plan outlined below has been designed to ameliorate/maintain the existing condition of the environment by working to a plan that will affect rehabilitation after mining.

This Environmental Management Plan contains guidelines, operating procedures and rehabilitation/pollution control requirements, which will be legally binding on the applicant immediately upon approval of the Environmental Management Plan. It is essential that this section be carefully studied, understood, implemented and adhered to at all time.

It is the responsibility of the Applicant to ensure that the manager on the site and the employees are capable of complying with all the statutory requirements which must be met in order to commence mining, which includes the implementation of this EMP.

6.1 CONSTRUCTION PHASE

6.1.1 Access to Site

The borrow pit located in the vicinity of the P604 road requires the formalisation of a temporary access road for the duration of the mining operation. This formalisation of the access road will consist of the blading of existing informal tracks to the borrow pit and the construction of temporary stormwater drainage measures along the road. Shale gravel from the borrow pit will be used as road surfacing if required.

The construction vehicles entering and exiting the borrow pit sites shall adhere to the statutory speed limits in the area. Appropriate signage shall be put in place to warn motorists of vehicles turning in and out of the borrow pit area.
The speed limit on and around the site shall be reduced to 40km/hour to prevent and minimise potential traffic accidents.

6.1.2 Demarcation of the Mining Area

The mining areas must be clearly demarcated by means of beacons at the corners, and along the boundaries, if there is no visibility between the corner beacons.

Permanent beacons must be firmly erected and maintained in their correct position throughout the life of the operation. Mining and resultant operations shall only take place within this demarcated area.

The borrow pits must be fenced for the duration of their operation and provided with gates that can be locked when not in use.

6.1.3 Sanitation

One chemical toilet will be placed at each site in such a way that it does not cause water or other pollution. Due to the relatively small size of the sites the specific positioning of the toilets will be left to the contractor's discretion as it might be required to move as the continuous mining and rehabilitation progresses over the site. The chemical toilet will be kept on site and serviced during the entire life of the mining operation. The chemical toilet will be serviced by a specialised Contractor as per the manufacturer's instructions, during the entire life of the mining operation. Under no circumstances should the effluent from the chemical toilet be disposed off anywhere, except at an approved facility for such effluent disposal.

Weigh bills for servicing shall be kept by the Contractor as proof of servicing and must be available for inspection by the environmental control officer.

The construction of "long drop" toilets is forbidden. Under no circumstances may open areas or the surrounding bush be used as a toilet facility. Penalties/fines will be imposed if these conditions are not upheld.

6.1.4 Topsoil Management

Topsoil shall be removed from all areas where physical disturbance of the surface will occur.

The topsoil will be stripped and stockpiled along the contours at heights restricted to 1.5m. If the topsoil is to be stockpiled for longer than six months it must be grassed to maintain its fertility. The positioning of these stockpiles will be left to the discretion of the contractor since the continuous mining and rehabilitation process might require that they be moved as the process progresses over the site.

In any case the topsoil shall be adequately protected from being blown away or being eroded, by covering it with plastic sheeting or vegetating it. Driving over the topsoil stockpiles by vehicles shall be prohibited, to avoid compaction of the soils.

Topsoil shall be kept separate from overburden and shall not be used for any activity (such as building or berms). Topsoil shall be replaced during rehabilitation over all disturbed areas.

It is strongly recommended that rehabilitation is carried out concurrently with mining. To this end it is recommended that strip mining be engaged. One strip should be mined at any one time and once a strip is completely mined rehabilitation should occur concurrently with the mining of another strip.

6.1.5 Vegetation Management

The vegetation shall be cleared only on the areas that are to be mined, on the stockpiling area and only prior to mining of that section. No un-necessary vegetation clearance shall be carried out.

6.1.6 Alien Invaders Management

The Conservation of Agricultural Resources Act (Act 43/1983) shall be complied with regards to exterminating the alien invaders on the site.

Alien plants shall be prevented from spreading by using a registered herbicide such as "Garlon" or "Chopper". Alien plants were not identified during the site survey. Alien plants are opportunistic and could become established in areas disturbed by human activity.

Spraying in windy conditions must be avoided, as spray drift on to non-target species may occur. Spraying onto drought stressed plants shall also be avoided, as the plants will not absorb a sufficiently lethal dose.

6.2 OPERATIONAL PHASE

6.2.1 Limitations on Mining

The applicant shall ensure that operations take place only in the demarcated areas as marked on the attached site plans.

6.2.2 Neighbours

Where there are residential properties in close proximity to borrow pits, residents shall be informed of all planned activities on the site before they actually commence. An open dialogue with neighbours shall be maintained throughout the mining operation so that there is the least possible disturbance to residents. In this regard the appointed community liaison officer will ensure that all affected parties are kept informed of progress with the borrow pits.

Any neighbours in close proximity to the site shall be informed of all activities to take place on site before these actually commence.

6.2.3 Establishment of Excavation Areas

The following operating procedures shall be adhered to with regards to the excavation of the materials:

Topsoil shall be handled as described in Section 6.1.4 above.

Excavations shall take place only within the approved demarcated mining area.

Overburden shall be placed in the excavations or stored adjacent to the excavation, if practicable, to be used as backfill material once the gravel has been excavated.

6.2.4 Geology

The extraction of gravel is irreversible. The cavity shall be rehabilitated in the manner and method outlined in the following sections.

6.2.5 Topography

The final borrow pit plan shall leave cut faces sloped at a gradient not steeper than 1:3, not steeper than 3m each and separated by benches (see sketch below). The general direction of the slope of the borrow pit will be in the direction of the existing ground contours, as indicated on the site plans.

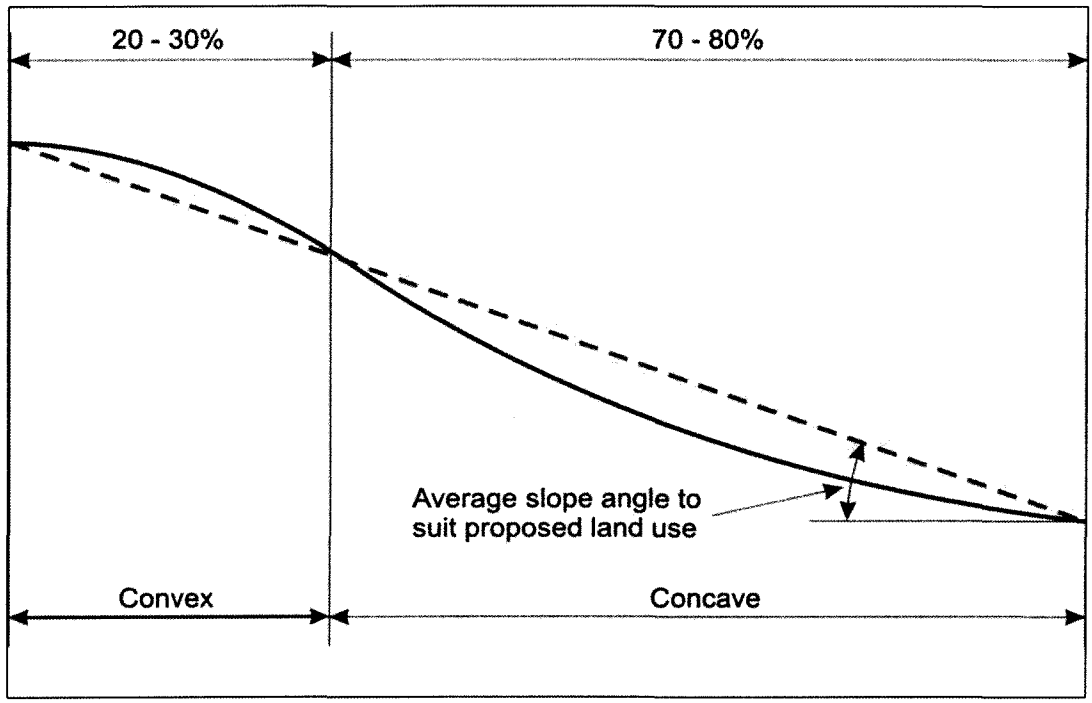


Figure 26: DESIGN OF SLOPE PROFILES (HANNAN, 1984) - (a) Preferred Profile

There will be a definite alteration of the topography/ landscape. Mitigation shall include reshaping (see sketch b below) the mined area to blend in as much as possible with the adjacent ground contour. After topsoiling and revegetation it is expected that the impact will be minimal.

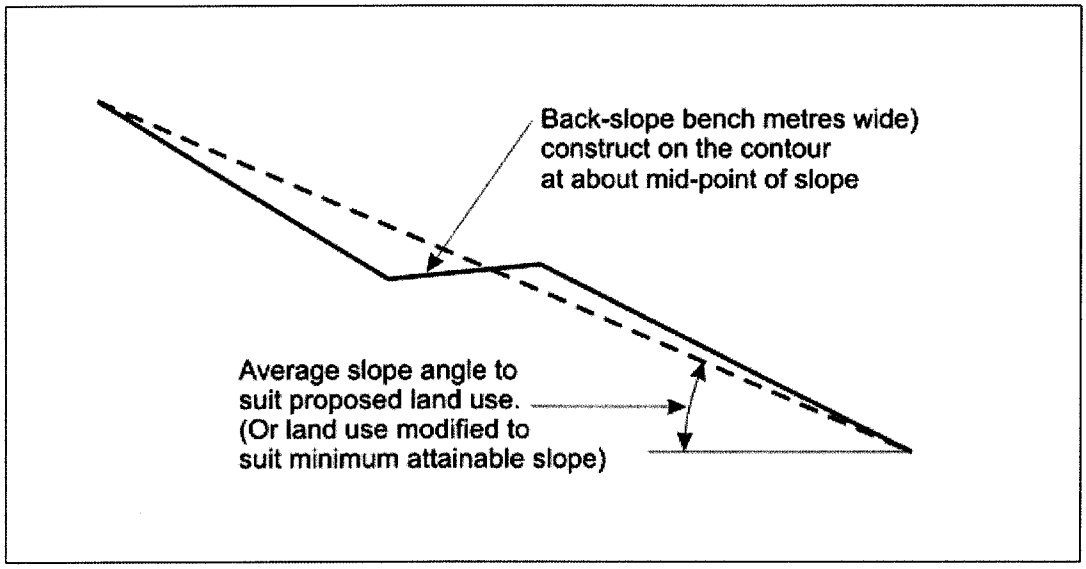


Figure 27: DESIGN OF SLOPE PROFILES (HANNAN, 1984) - (b) Profile design when external features limit spreading distance

The borrow pit floor shall be gently sloped so that water is not left to pond and which will allow for easy drainage.

Cross sections through each borrow pit are presented on the survey drawings of the borrow pits in Appendix A. These cross sections indicate the current ground profile and the ground profile after mining.

6.2.6 Maintenance of Vehicles and Equipment

There will be no maintenance of vehicles and equipment on the site. The contractor appointed for the road rehabilitation will establish its own Contractor's Camp, which is outside the scope of this EMP. This contractors Camp will include a vehicle and equipment maintenance area.

The maintenance of vehicles and equipment used for any purpose during the mining operation will take place at the contractor's camp to be established for the road rehabilitation works or at an appropriate off site garage. Should emergency repairs need to be carried out on site, than a tarpaulin or other suitable plastic sheeting in conjunction with drip trays shall be placed over the ground where the repairs are to be carried out.

The trucks and excavators used in the mining process must be adequately maintained so that no oil, diesel, fuel, hydraulic fluid or other contaminant is spilled during the operations.

The trucks and excavators used on the mining area must not constitute a pollution hazard in respect of the above substances. The Project Engineer shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and / or irreparable.

6.2.7 Waste Disposal

One suitable covered container shall be available at all times and conveniently placed for the disposal of domestic waste. No other waste will be generated.

The domestic waste shall be taken away daily to the contractor's camp to be established for the road rehabilitation. No littering or illegal dumping of any waste material shall take place on site.

All accidental spillages shall be cleaned up immediately, to the satisfaction of the Project Engineer, by removing the spillage together with the polluted soil and by disposing of them at a recognised landfill facility.

6.2.8 Land Capability

The land capability over the area used for the mining activities will be changed to mining for the duration of the mining operation. The land capability of the site will revert to grazing after rehabilitation.

6.2.9 Land-Use

All of the proposed sites have previously been used for mining; hence the land-use will not change. Upon rehabilitation the sites shall revert back to grazing.

6.2.10 Natural Vegetation and Plant Life

The natural vegetation in the borrow pit areas will be disturbed. The overall aim of rehabilitation is to prepare the disturbed terrain to encourage restoration of the

natural vegetation. Rehabilitation will comprise the re-introduction of indigenous plant species.

Seeding should take place during the wet season, preferably at the beginning of summer.

Gathering of firewood, fruit, flowers, 'muthi' plants or any other natural materials from the site or the surrounding areas shall be strictly prohibited.

6.2.11 Alien Vegetation Monitoring

A programme to control alien invader species shall be implemented by the Contractor. This will involve the spraying of the target plants with a selective herbicide strictly in accordance with the manufacturer's instructions. Extra caution is to be taken around drainage lines to ensure that the herbicide is not dangerous to aquatic organisms. A maintenance programme will be drawn up to ensure that re-growth of alien vegetation is controlled until the indigenous grasses and other pioneers have had a chance to establish themselves. Effective control measures are prescribed by the Conservation of Agricultural Resources Act (Act 43/1983) and include the following:

The weeds concerned shall be uprooted, felled or cut off and shall be destroyed by burning or by another suitable method.

The weeds concerned shall be treated with a weed killer that is registered for use in connection therewith, in accordance with the directions for use of such weed killer. Any other recognised method of treatment that has as its' object the destruction of the weeds concerned shall be applied with regard thereto.

The measures referred to above shall be applied with regard to the seed, seedlings or re-growth of the weeds concerned in order to prevent them from running to seed or propagating otherwise.

6.2.12 Animal Life

No hunting will be permitted on the site or surrounds. No wildlife is to be disturbed or interfered with in any way.

No wildlife was observed in any of the site visits. Animal life will be affected by the mining operation. Once the mining operation has ceased it is likely that existing small animals (rodents, snakes, birds) will return to the site.

6.2.13 Surface Water & Erosion Control

The site shall be inspected after occurrences of rainfall that measures more than 30mm in 24 hours. If erosion is found to occur, remedial measures shall be undertaken and berms and drains shall be constructed where necessary. In addition, all erosion control measures shall be visually inspected once a month.

Possible ponding of water might occur in the bottom of some of the borrow pits, which poses a safety risk to children. These ponds must be drained at the start of site work. A rock lined channel can be constructed from the side of the pond to lead the water away and back into the natural drainage line.

To avoid surface water contamination a supply of absorbent material, such as "Peatzorb" or sawdust should be kept at the Contractor's Camp for the treatment of hydrocarbon accidental spillages. Contaminated material must be disposed of at a registered landfill site. Drip trays must always be used to contain and collect lubricants during emergency repairs which may occur in the field.

6.2.14 Air Quality

Air quality is influenced by factors like wind speed, wind direction, temperature and cloud cover and in this case by mining activities on the site. Mining and transporting of material may generate dust pollution.

Water spraying during the dry season or whenever dust pollution occurs shall be practised. Dust suppression can also be also achieved using other dust-allaying agents. Weekly spraying during the dry season and daily spraying during windy conditions shall be carried out. During the rainy season the site shall be sprayed

every 7 consecutive days without rain. No water abstraction shall be undertaken without a valid permit from DWAF.

The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.

Fumes (and black smoke) emitted from vehicles and equipment must be mitigated & monitored and corrective action should be taken to avoid nuisance to the public. All construction vehicles must be regularly serviced so as not to emit excessive smoke.

Burning of domestic waste material shall not be allowed.

6.2.15 Noise

There is a possibility of noise pollution resulting from increased traffic. The noise will be kept within reasonable limits. The combined noise of a maximum of 2 trucks and one excavator is expected at any one time. It is likely that noise levels at peak working hours will be in the region of 40 decibels.

It is not expected that noise level will exceed 85 decibels. Should the noise exceed the noise level of 85 decibels all staff shall be supplied with ear muffs (as per the Occupational Health & Safety Act, Act 85 of 1993).

Working hours shall be restricted to between 07:00 to 17:00. The neighbour's permission must be obtained for work during public holidays and weekends. The Inspector of Mines permission regarding the mine working hours shall also be sought.

6.2.16 Sites of Archaeological and Cultural Interest

No archaeological artefacts or objects or sites of cultural interest were observed during the site visit. None of these aspects were reported during the community liaison meetings.

However, if any objects that are thought to be artefacts are unearthed during the mining of the borrow pits, all operations will cease immediately and the South African Heritage Resources Council (SAHRA) will be contacted to investigate the possible find.

6.2.17 Regional Economic Impact

The materials that are mined from the borrow pits will be used for the upgrading and maintenance of the P604 road which will improve the accessibility to the areas that these roads service.

In addition to this long term importance of the road, temporary opportunities for job creation and skills will be developed during the construction phase of the road and associated mining activities at the borrow pits.

6.2.18 Social Issues

The Contractor must address any concerns / requests that interested and affected parties or the adjacent landowners may have during the mining period.

Access to private property and communal lands shall be undertaken only with permission from the relevant landowners.

The Project Engineer is responsible to ensure that the landowners its representatives or the representatives of any affected communities have been informed before any work is carried out on site. Contractors must ensure that the same people or institutions have been informed before moving onto site.

The Contractor and associated employees may not cause damage to property, crops or animals. Activities that may cause conflict with the local community must be avoided. Should conflict arise it should be immediately reported to the Project Engineer.

Employees must at all times be courteous towards the neighbours, landowners and the local community.

Mining activities must be limited between 07:00 and 17:00 during working days to minimise the noise nuisance to neighbours.

The removal of agricultural products (e.g. fruits, vegetables, stock, and firewood) and equipment from the site will not be permitted.

The Contractor should ensure that access roads and borrow pit entry points are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop.

Main causes of air pollution are dust from vehicle movements and stockpiles, vehicle emissions and fires.

Vehicles travelling to and from the site must adhere to speed limits so as to avoid producing excessive dust. A speed limit of 40km/hr must be adhered to on all dirt roads. Access routes and other cleared surfaces must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust.

All IAPs should be notified in advance of any known potential risks associated with the mining of the borrow pit and the activities on it.

The Contractor is to inform the neighbours in writing of disruptive activities at least 48 hours beforehand. This can take place by way of leaflets placed in public use areas (for example: shops, schools and community halls) giving the Project Engineer's and Contractor's details.

The Engineer and Contractor are responsible for ongoing communication with the people that are interested in and affected by the mining project. A complaints register should be kept at the site office. This should be in carbon copy format, with numbered pages. This register is to be tabled during monthly site meetings. All IAPs need to be made aware of the existence of the complaints book, and the methods in which they can communicate their complaints. Queries and complaints are to be handled by the Project Engineer and or the Contractor by:

- Documenting details of such communications
- Submitting these for inclusion in the complaints register

- Bringing issues to the Project Engineer's attention immediately
- Taking remedial action as per the Project Engineer's instruction

Selected staff is to be made available for formal consultation with IAPs to explain the mining process and to answer questions.

6.3 DECOMMISSIONING PHASE

6.3.1 Removal of Waste and Sanitation Equipment

The chemical toilets and the waste bins shall be removed from site. Waste material (if any) will be removed from the mining areas and disposed of at a recognised landfill facility. These materials shall not be buried or burned on the site. Final rehabilitation shall be completed within the period specified further on in this document.

6.3.2 Machinery/Plant Removal

All machinery and construction plant shall be removed from the site and taken to the Contractor's Camp. This will include any debris and waste material left by personnel.

6.3.3 Stockpile Erasure

On completion of mining, the surface of the stockpile area, especially if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 100mm and graded to an even surface condition. Prior to replacing the topsoil removed from the stockpile area any other materials left on site (gravel, oversized material, etc) will be spread evenly on the borrow pit floor.

The previously stored topsoil shall be returned to its original depth over the disturbed areas.

Following the placing of the topsoil, the area shall then be fertilised if necessary to allow vegetation to establish rapidly. The site shall be seeded with a locally adapted indigenous seed mix.

It is anticipated that the stockpiles at this stage will be minimal, as most of the materials would have been used.

6.3.4 Access Road

Where the construction of access roads are required (DR08473 road borrow pit), this road will not exceed a width of 4m and will be surfaced with material from the borrow pit if necessary. This road will be rehabilitated as part of the rehabilitation phase of the associated borrow pit.

6.3.5 Borrow Pits

All loose material shall be removed and the faces of the excavation and shall be made safe. All overburden and stockpiled mineral (if available) shall be spread over the borrow pit floor and levelled. The floor of the excavation can then be topsoiled and grassed. The borrow pit floor shall be free draining.

6.3.6 Topsoil

Stockpiled topsoil shall be spread across all the areas of the site initially cleared of topsoil on commencement of the contract. Should topsoil not be in sufficient quantity or should the topsoil have lost its fertility then soil ameliorants and / or imported topsoil shall be brought onto the site.

6.3.7 Revegetation

Seed

The topsoiled areas shall be seeded with a suitable, site specific grass mix as shown in the in the discussions of recommendations of every specific borrow pit (Section 5) of this report.

Fertilizer

Standard 2:3:2 (N:P:K) at 0.6t/ha.

Maintenance

25mm of gentle irrigation each week until 70% groundcover has been obtained. Avoid livestock grazing during re-vegetation.

Hydroseeding (a contractor who is conversant with the method must be used). Cellulose pulp at 250kg/ha and compost at 5m³/ha (100 X 50kg bag/ha) should be added to the seed mix.

If seeds are utilised, in order to ensure that seeds have an opportunity to germinate, and to avoid erosion of exposed surfaces, organic mulch should be spread over the surface following seeding.

Grass seed mixes will be planted across the denuded topsoiled areas of the site. Grass sods shall be used on embankments exceeding 1:3 slope.

6.3.8 Rehabilitation Schedule

The following rehabilitation schedule should be followed;

Table 1: Rehabilitation schedule

Activity	Description	Timing
Shape Borrow pit floor	Shape the borrow pit floor to a gradient of a min 2% to ensure that it is free draining	At site establishment, and on-going during borrow pit development
Clear product stockpiles	Ensure that only the quantity of material needed for the road rehabilitation contract is mined, so that no residual stockpiles are left	End of Road construction contract
Scarify access roads	Scarify access road if the borrow pit is not to be used again	At closure
Shape side slopes of borrow pit	The borrow pit side slopes shall be shaped to a maximum slope of 1:3	On going during operation and at closure

Use of overburden	Use any residual overburden material to fill in depressions and to create a smooth slope face	At closure
Place topsoil	Place topsoil from the designated topsoil stockpiles over the mined face at a thickness of min 150mm	At completion of each mined face and at closure
Hydroseed	Hydroseed the completed side slopes and borrow pit floor with the mix as specified above	At closure
Water	Water once per week, until 70% of ground cover has taken	At Closure

6.3.9 Monitoring and Reporting

Regular monitoring of all the environmental management measures and components should be carried out by an appointed independent consultant, in order to ensure that the provisions of this programme are adhered to.

Ongoing and regular reporting on the progress of implementing this programme shall be done.

Inspections and monitoring shall be carried out on both the implementation of the programme and the impact on plant and animal life.

Visual inspections on erosion and physical pollution shall be carried out on a regular basis.

Annual reports confirming compliance with the Environmental Management Plan will be submitted to the Department of Minerals and Energy.

Any emergency or unforeseen impacts must be reported as soon as possible to DME.

Any assessment of environmental impacts that reveals impacts that were not properly addressed, or were unknown when this programme was compiled shall result in the

carrying out of an assessment of the impact and the addition of a corrective action to address the impact.

Erosion control measures shall be inspected after occurrences of rainfall that measured more than 30mm in 24 hours. In addition, all erosion control measures shall be visually inspected once a month. Table on the overleaf presents the proposed monitoring timetable.

Table 2: Proposed Monitoring Timetable

ACTIVITY	MONITORING FREQUENCY	RESPONSIBILITY
PUBLIC PARTICIPATION		
Public participation	Prior to moving onto site	Engineer / Contractor
Notification of I&AP prior to Construction phase	Ongoing during life of the mine at least 48 hours prior to activity	Engineer/ Contractor
Complaints Record	Ongoing (to be tabled during monthly meetings)	Engineer
ROADS AND ASSOCIATED SERVICES		
Routing and haulage	Prior to moving onto site and ongoing during life of mine (weekly)	Engineer / Contractor
Formal drainage (roads and site)	Prior to moving onto site and ongoing during life of mine (weekly)	Engineer / Contractor
Run-off, sheet erosion, scour checks	Prior to moving onto site and ongoing during life of mine (monthly and every time rainfall measures more than 30mm in 24 hours)	Engineer / Contractor
STAFF EDUCATION AND AWARENESS		
Risks associated with materials being stockpiled on site	On staff induction and ongoing (monthly)	Contractor
Environmental education of staff	On staff induction	Contractor

ACTIVITY	MONITORING FREQUENCY	RESPONSIBILITY
Noise control (by staff)	On staff induction and ongoing (monthly)	Contractor
General Housekeeping	On staff induction and ongoing (monthly)	Contractor
Worker conduct	On staff induction and ongoing (monthly)	Contractor
Control of fire arms	On staff induction and ongoing (monthly)	Contractor
Control of alcohol and drugs on site	On staff induction and ongoing (monthly)	Contractor
Control of speed limits	On staff induction and ongoing (monthly)	Contractor / Engineer
CONSTRUCTION PHASE		
Demarcation of the mining area	During site set up	Contractor
Placing of chemical toilet	During site set up	Contractor
Demarcation of sensitive areas (if any; archaeological, biodiversity, etc)	During site set-up	Engineer / Contractor
Emergency procedures	During site set up and ongoing (monthly)	Engineer / Contractor
Appropriate drainage design and monitoring	During site set up and ongoing (monthly and every time rainfall measures more than 30mm in 24 hours)	Contractor
Waste Management	During site set up and ongoing (monthly)	Contractor
Bins/skips should be regularly emptied	On a weekly basis	Contractor
Visual impact of mining areas	During site set up and ongoing during the mine life (monthly)	Engineer / Contractor

ACTIVITY	MONITORING FREQUENCY	RESPONSIBILITY
Run-off sheet erosion and scour check	Ongoing during the life of the mine (monthly and every time rainfall measures more than 30mm in 24 hours)	Engineer / Contractor
Dust Control	Daily/ weekly/ monthly	Contractor
General Housekeeping	On a daily basis	Contractor
Safety of the site at the end of each day	On a daily basis	Contractor
OPERATIONAL PHASE		
Speed level adherence	Ongoing during life of the mine (monthly)	Contractor
Dust Management (dampening of roads and denuded areas)	Ongoing during life of the mine (daily/ weekly/ monthly)	Contractor
Fumes Management (vehicles to be serviced regularly)	Ongoing during life of the mine (monthly)	Contractor
Time that areas are stripped before mining takes place	Ongoing during life of the mine (monthly)	Engineer / Contractor
Erosion control measures to prevent topsoil loss	Ongoing during life of the mine (monthly)	Engineer / Contractor
Conservation of topsoil by revegetation	Ongoing during life of the mine (monthly)	Engineer / Contractor
Fencing of sensitive areas	Ongoing during life of the mine (monthly)	Engineer / Contractor
Hunting, snaring and other forbidden activities	Ongoing during life of the mine (monthly)	Contractor
Prevention of using other types of toilets (Long drops & surrounding vegetation)	Ongoing during the life of the mine (monthly)	Contractor
Noise Management (equipment maintenance)	Ongoing during life of the mine (monthly)	Contractor
Denuded areas must be protected against erosion	Ongoing during life of the mine (monthly and every time	Engineer / Contractor

ACTIVITY	MONITORING FREQUENCY	RESPONSIBILITY
	rainfall measures more than 30mm in 24 hours)	
Ensuring that natural water pathways are maintained	Ongoing during life of the mine (monthly)	Engineer / Contractor
Alien invader management plan	Twice monthly	Engineer / Contractor
DECOMMISSIONING		
Rehabilitation of access/haulage roads	On mine completion	Contractor
Clearing of all materials	On mine completion	Contractor
Disposal of all waste (including general, hazardous, contaminated soils, etc to appropriate facilities)	On mine completion	Contractor
Reshaping of all disturbed areas	On mine completion	Contractor
Scarifying of all disturbed areas	On mine completion	Contractor
Topsoiling of all disturbed areas	On mine completion	Contractor
Revegetation of all the topsoiled areas	On mine completion	Contractor
Alien vegetation control	On mine completion	Contractor
Monitoring vegetation growth until a 70% coverage is achieved	On mine completion	Engineer / Contractor
Inspection by relevant Authority	On mine completion	Engineer

6.4 CLOSURE

When the applicant intends closing down the operation, an environmental risk report shall be compiled. The requirements of such a report are contained in Regulation 60 of the Regulations promulgated in terms of the Minerals & Petroleum Resources Development Act.

Financial Provisions

The determination of the Financial Provisions for the borrow pits were conducted according to the Department of Minerals and Energy's *GUIDELINE DOCUMENT FOR THE EVALUATION OF THE QUANTUM OF CLOSURE-RELATED FINANCIAL PROVISION PROVIDED BY A MINE*. This guideline is the official guideline as contemplated in Regulation 54(1) to the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

The determination was conducted according to the "Quick Method" and is as follows:

- Step 1: Determine the primary mineral
- Step 2: Determine the risk class
    - Class A (High risk)
    - Class B (Medium risk)
    - Class C (Low risk)
- Step 3: Identify the minimum rates per hectare
- Step 4: Determine the overall size of the mine

Table 3: The calculation for each borrow pit is as follows:

Steps	BP01	BP03	BP04	BP05	BP06	BP07	BP08
1	Shale	Shale and sandstone	Dolerite and shale	Shale and sandstone	Shale	Sandstone and mudstone	Shale and sandstone
2	Class C	Class C	Class C	Class C	Class C	Class C	Class C
3	R20 000.00/ha	R20 000.00/ha	R20 000.00/ha	R20 000.00/ha	R20 000.00/ha	R20 000.00/ha	R20 000.00/ha
4	1.5ha	1.5ha	1.5ha	1.5ha	1.5ha	1.5ha	1.5ha
Sub-total (excl. VAT)	R 30 000.00	R 30 000.00	R 30 000.00	R 30 000.00	R 30 000.00	R 30 000.00	R 30 000.00
VAT @ 14%	R 4 200.00	R 4 200.00	R 4 200.00	R 4 200.00	R 4 200.00	R 4 200.00	R 4 200.00
GRAND TOTAL	R 34 200.00	R 34 200.00	R 34 200.00	R 34 200.00	R 34 200.00	R 34 200.00	R 34 200.00

Table 4: Total Financial Provision for all the Borrow pits

Borrow pit no.	Grand Total (incl. VAT)
BP01	R 34 200.00
BP03	R 34 200.00
BP04	R 34 200.00
BP05	R 34 200.00
BP06	R 34 200.00
BP07	R 34 200.00
BP08	R 34 200.00
	R 34 200.00
TOTAL	R 239 400.00

Over and above these costs are the costs to mobilise plant to site on a low-bed truck from the nearest large town, i.e. Mbizana.

7 ENVIRONMENTAL AWARENESS PLAN

The environmental awareness plan has been compiled to inform the Applicant's employees of the environmental risks, which may result from the mining operations and the manner in which the risks must be dealt with in order to avoid pollution and degradation of the environment.

Environmental training must be conducted during induction, before actual mining commencement. Environmental training must be conducted every time new staff is employed and monthly for the duration of the mining period.

The Environmental Management Plan shall be an Item on the monthly construction meetings agenda. Continuous environmental education will be carried out during the monthly staff meetings. The Contractor shall appoint an in-house Environmental Officer which shall inspect the works daily and report back to the Contractor, who in turn needs to report any identified impacts to the Engineers. Monthly external EMP compliance audits are recommended, to ensure adherence to this EMP document.

The following items were included in the Environmental Awareness Plan:

- Definition of the environment
- General housekeeping rules

- How to look after the environment (flora and fauna)
- How to avoid pollution of the air, water
- What to do in an emergency.

The Contractor must submit a proposal for the environmental training to the Project Engineer for approval. **It is the Contractor's responsibility to provide the site foreman with no less that 1 hour's environmental training and to ensure that the foreman** has sufficient understanding to pass this information onto the staff. Translators are to be used where necessary.

The Project Engineer should be on hand to explain more difficult / technical issues and to answer questions. The use of pictures and real-life examples is encouraged as these tend to be more easily remembered. Use should be made of the environmental awareness posters on site.

The need for a "clean site" policy also needs to be explained to the staff.

The Environmental Awareness Plan is attached in Appendix C.

8 CONCLUSION

The environmental impacts associated either of the borrow pits are all manageable with adherence to the attached borrow pit specific and general environmental management and rehabilitation plans.

9 REFERENCE AND SUPPORTING DOCUMENTATION

Bromilow, C., 1995. *Problem Plants of South Africa*, Briza Publications.

Mucina, L. and Rutherford, M.C (eds) 2006. *The Vegetation of South Africa, Lesotho and Swaziland*, Strelitzia Publishers.

Van Wyk, E. and Van Outshoorn, F. 1999. *Grasses of Southern Africa, Briza,* Publications.

www.Google.Earth.com, source of Satellite Imaginary.

UNDERTAKING

I,.....

.....

the undersigned and duly authorised thereto by .....

.....

Company/Close Corporation/Municipality (Delete that which is not applicable) have studied and understand the contents of this document in its entirety and hereby duly undertake to adhere to the conditions as set out therein including the amendment(s) agreed to by the Regional Manager.

Signed at ..... this.....day of.....20.....

.....

Signature of applicant

.....

Designation

Agency declaration: This document was completed by. .....on behalf of.....

APPROVAL

Approved in terms of Section 39(4) of the Mineral and Petroleum Resources Development Act, 2002 (Act 29 of 2002)

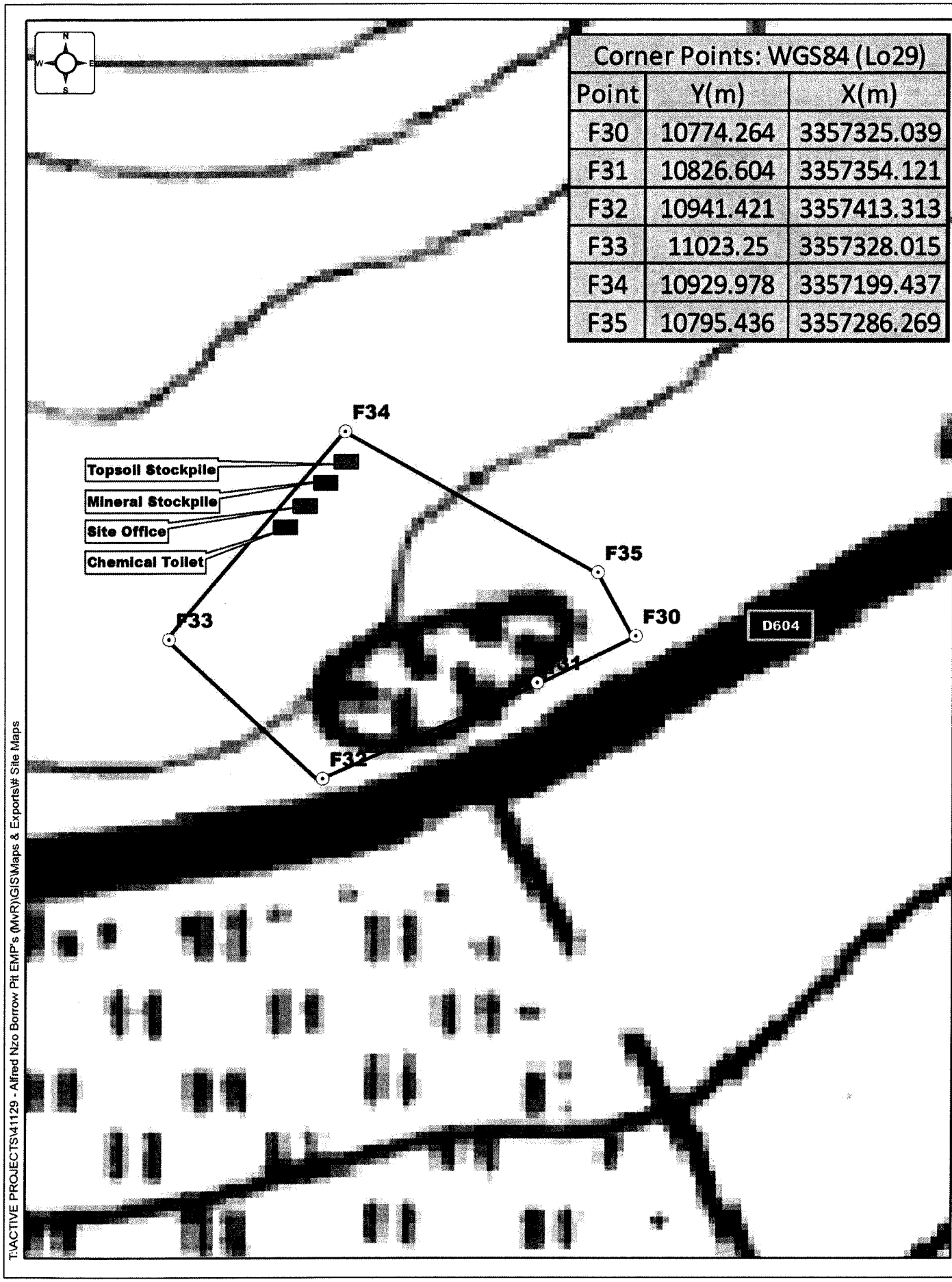
Signed at.....this.....day of.....20.....

.....

REGIONAL MANAGER

REGION:.....

APPENDIX A
AREA WIDE LOCALITY PLAN
SITE PLANS
SURVEY DRAWINGS



Corner Points: WGS84 (Lo29)		
Point	Y(m)	X(m)
F30	10774.264	3357325.039
F31	10826.604	3357354.121
F32	10941.421	3357413.313
F33	11023.25	3357328.015
F34	10929.978	3357199.437
F35	10795.436	3357286.269

T:\ACTIVE PROJECTS\41129 - Alfred Nzo Borrow Pit EMP's (MvR)\GIS\Maps & Exports\# Site Maps

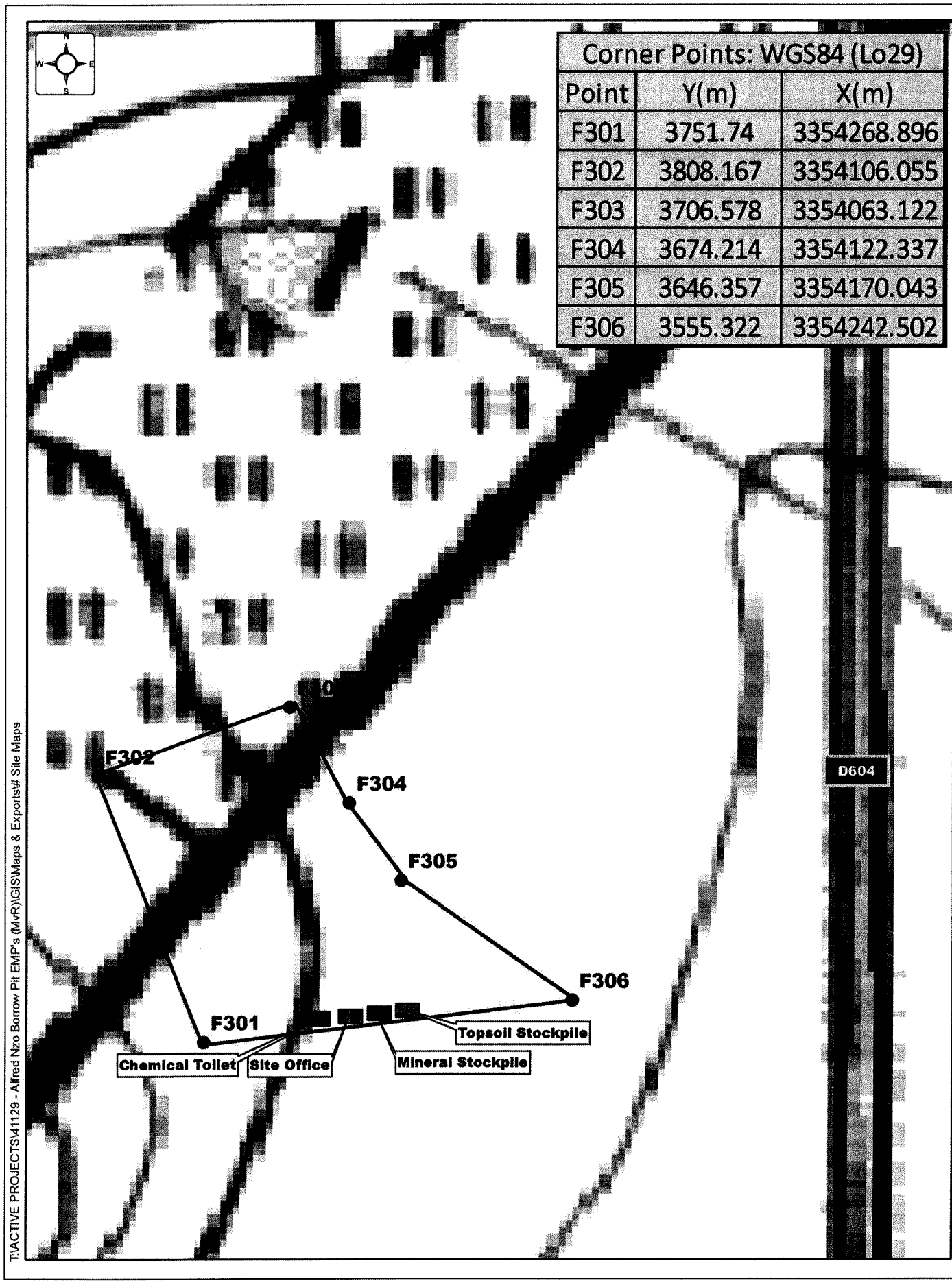
terratest
Geotechnical, Environmental & Earth Science Consultants
P.O. Box 794
HILTON 3245
Tel: (033) 343 6789
Fax: (033) 343 6788

Alfred Nzo Borrow Pit EMP's
Road: D604
Site Layout - BP01

0 30 60 120 180 240 Meters

Fig 2

Scale 1 : 3 000



T:\ACTIVE PROJECTS\41129 - Alfred Nzo Borrow Pit EMP's (MvR)\GIS\Maps & Exports\# Site Maps

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HILTON 3245
Tel: (033) 343 6789
Fax: (033) 343 6788

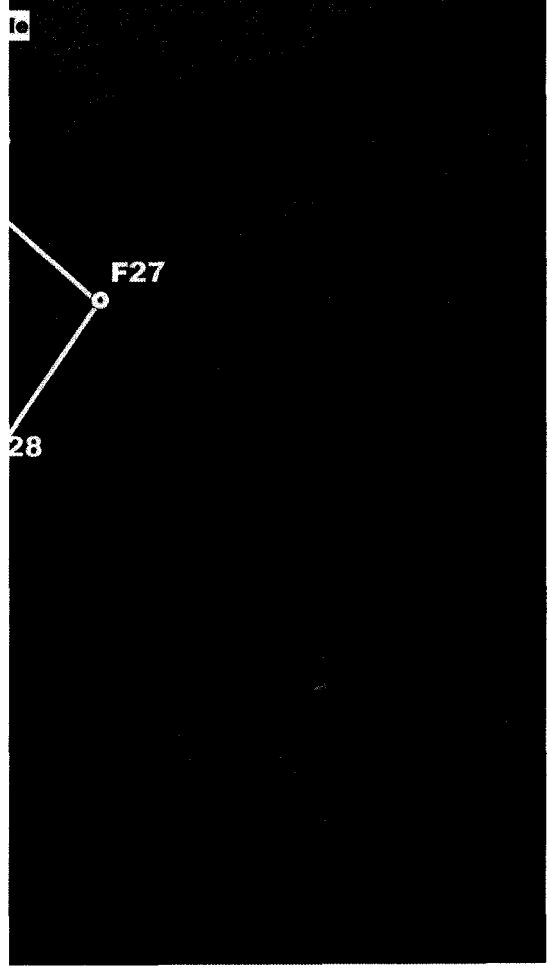
Alfred Nzo Borrow Pit EMP's
Road: D604
Site Layout - BP03

0 20 40 80 120 160 Meters

Fig 2

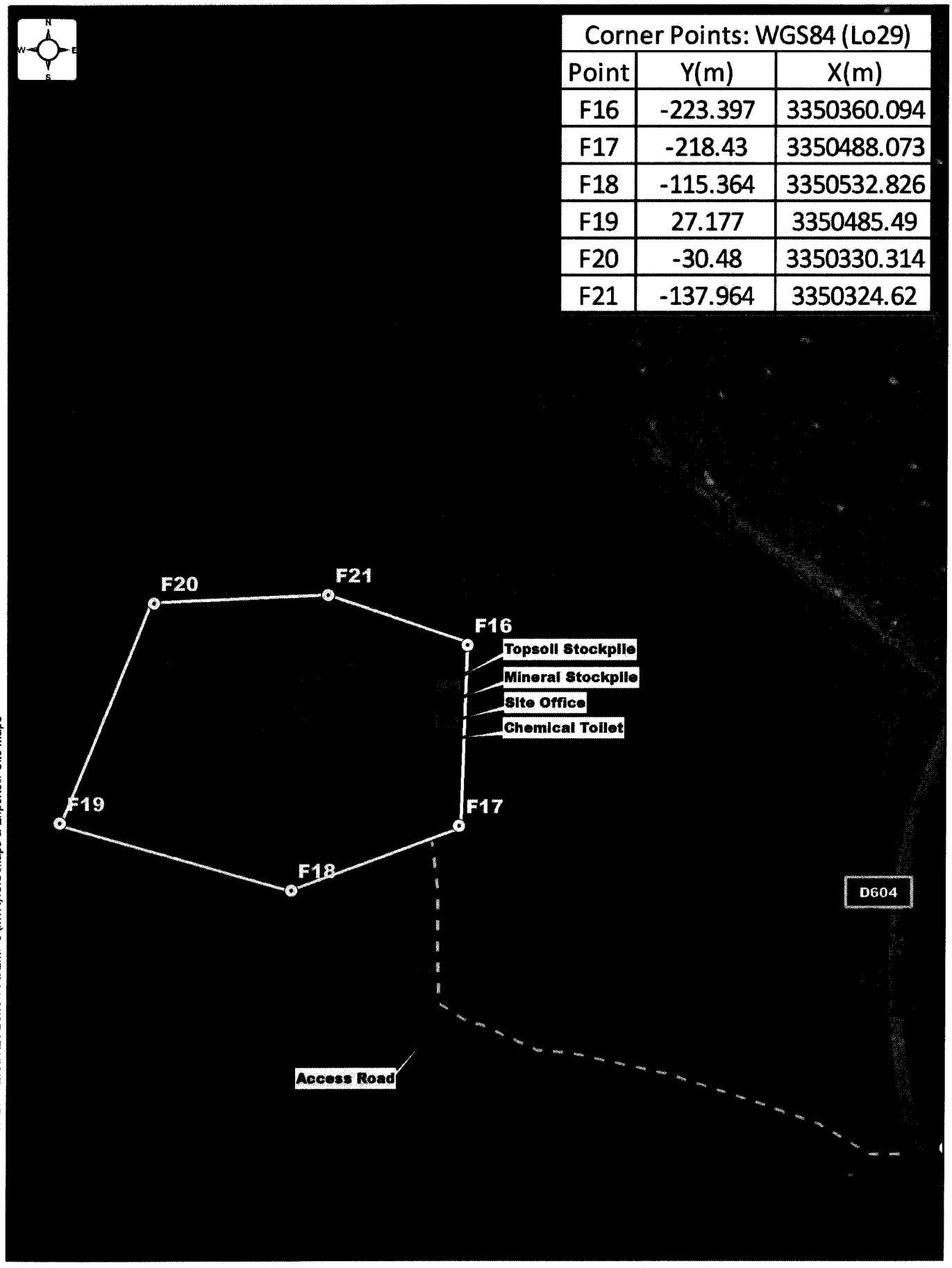
Scale 1 : 3 000

Corner Points: WGS84 (Lo29)		
Point	Y(m)	X(m)
F22	-565.141	3350848.766
F23	-554.465	3350806.193
F24	-517.213	3350714.466
F25	-620.443	3350662.297
F26	-665.689	3350686.628
F27	-721.375	3350743.566
F28	-677.125	3350817.261
F29	-608.592	3350849.183



Pit EMP's	Fig 2
3P04 120 160 Meters	Scale 1 : 3 000

Corner Points: WGS84 (Lo29)		
Point	Y(m)	X(m)
F16	-223.397	3350360.094
F17	-218.43	3350488.073
F18	-115.364	3350532.826
F19	27.177	3350485.49
F20	-30.48	3350330.314
F21	-137.964	3350324.62



T:\ACTIVE PROJECTS\41129 - Alfred Nzo Borrow Pit EMP's (MvR)\GIS\Maps & Exports\# Site Maps

terratest
Geotechnical, Environmental & Earth Science Consultants
P.O. Box 794 Tel: (033) 343 6789
HILTON 3245 Fax: (033) 343 6788

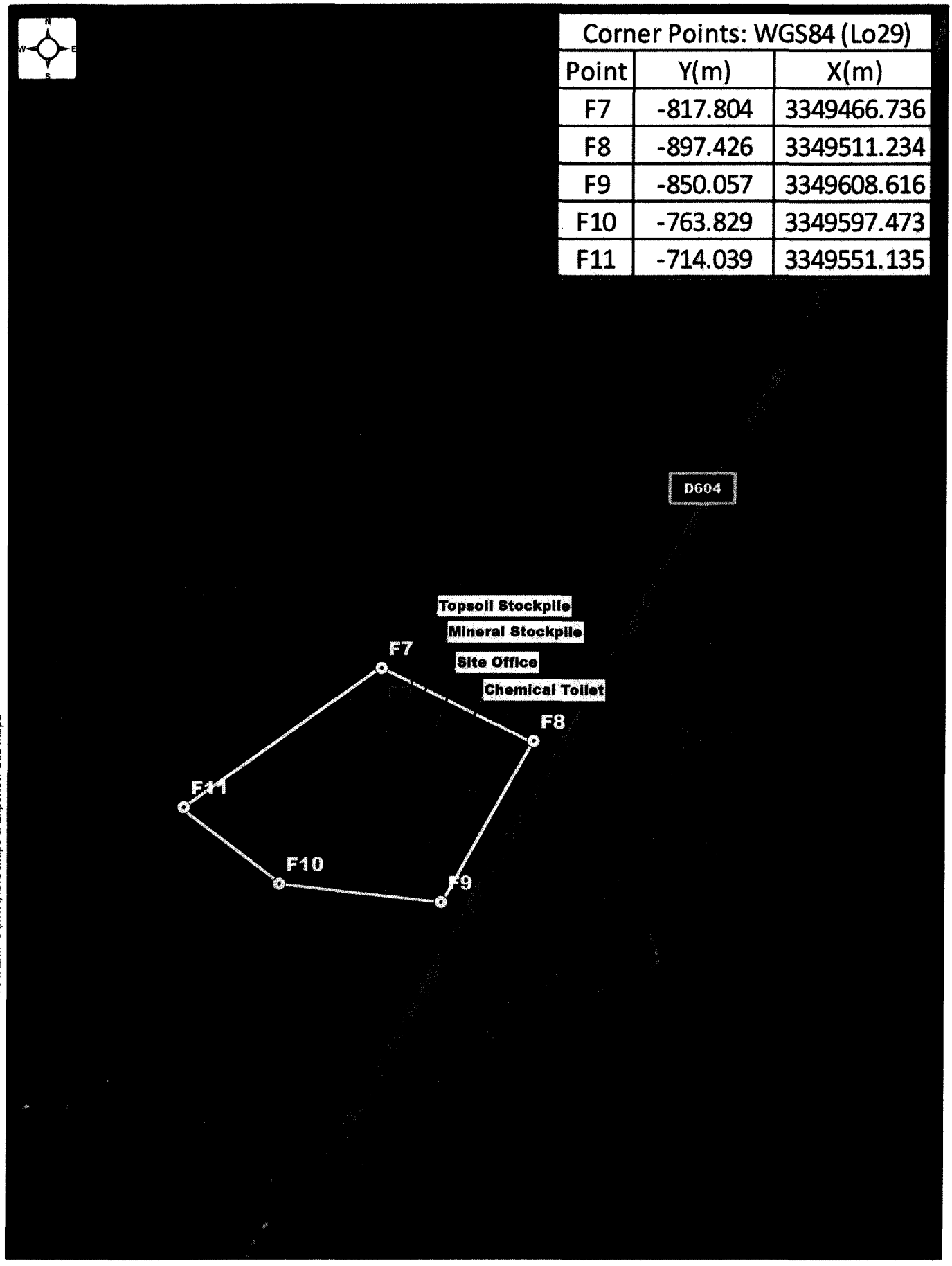
Alfred Nzo Borrow Pit EMP's
Road: D604
Site Layout - BP05

0 25 50 100 150 200 Meters

Fig 2

Scale 1 : 3 500

Corner Points: WGS84 (Lo29)		
Point	Y(m)	X(m)
F7	-817.804	3349466.736
F8	-897.426	3349511.234
F9	-850.057	3349608.616
F10	-763.829	3349597.473
F11	-714.039	3349551.135



T:\ACTIVE PROJECTS\41129 - Alfred Nzo Borrow Pit EMP's (MvR)\GIS\Maps & Exports\# Site Maps

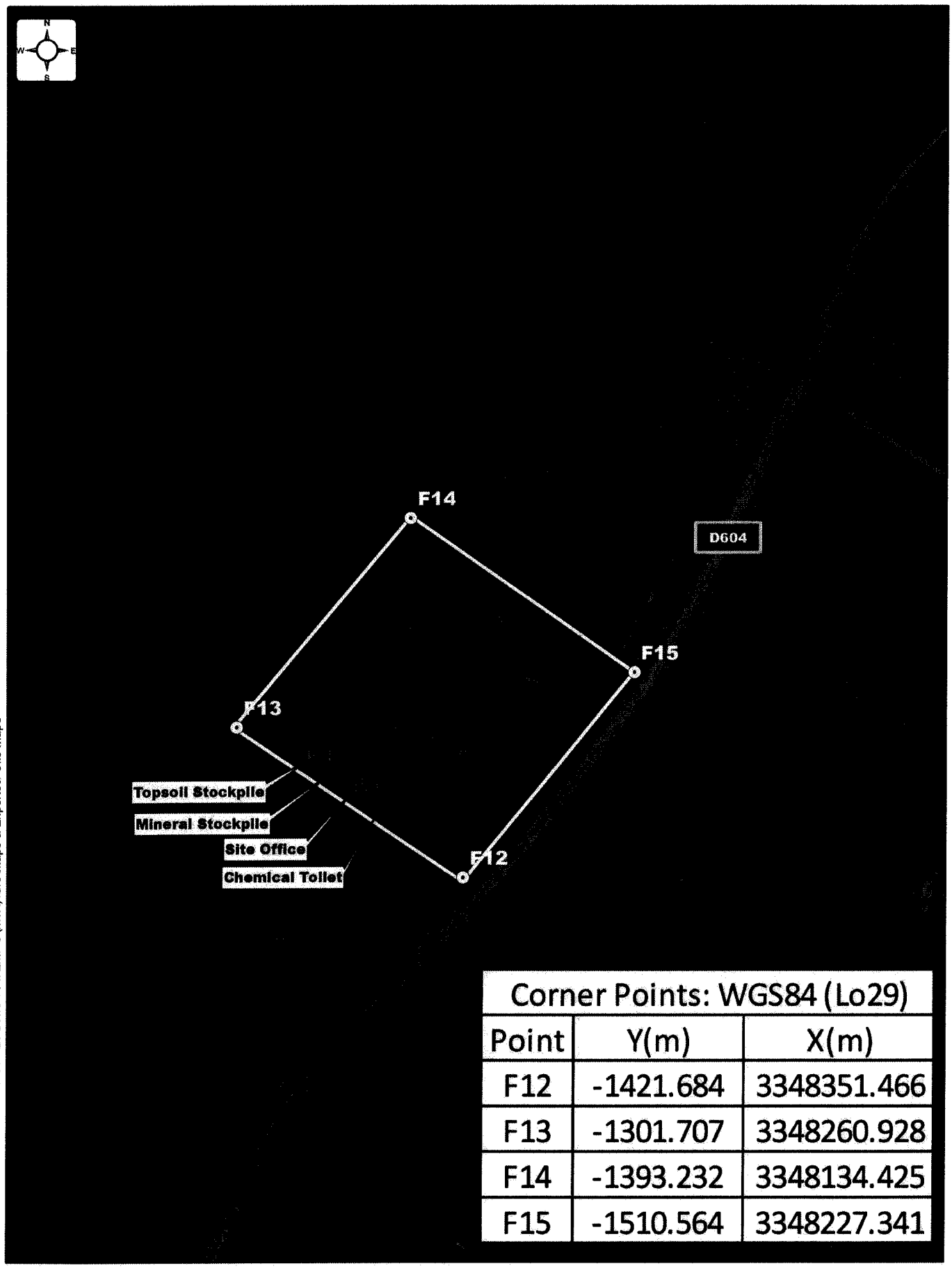
terratest
Geotechnical, Environmental & Earth Science Consultants
P.O. Box 794 Tel: (033) 343 6789
HILTON 3245 Fax: (033) 343 6788

Alfred Nzo Borrow Pit EMP's
Road: D604
Site Layout - BP06

0 20 40 80 120 160 Meters

Fig 2

Scale 1 : 3 000



Corner Points: WGS84 (Lo29)		
Point	Y(m)	X(m)
F12	-1421.684	3348351.466
F13	-1301.707	3348260.928
F14	-1393.232	3348134.425
F15	-1510.564	3348227.341

T:\ACTIVE PROJECTS\41129 - Alfred Nzo Borrow Pit EMP's (MvR)\GIS\Maps & Exports\# Site Maps

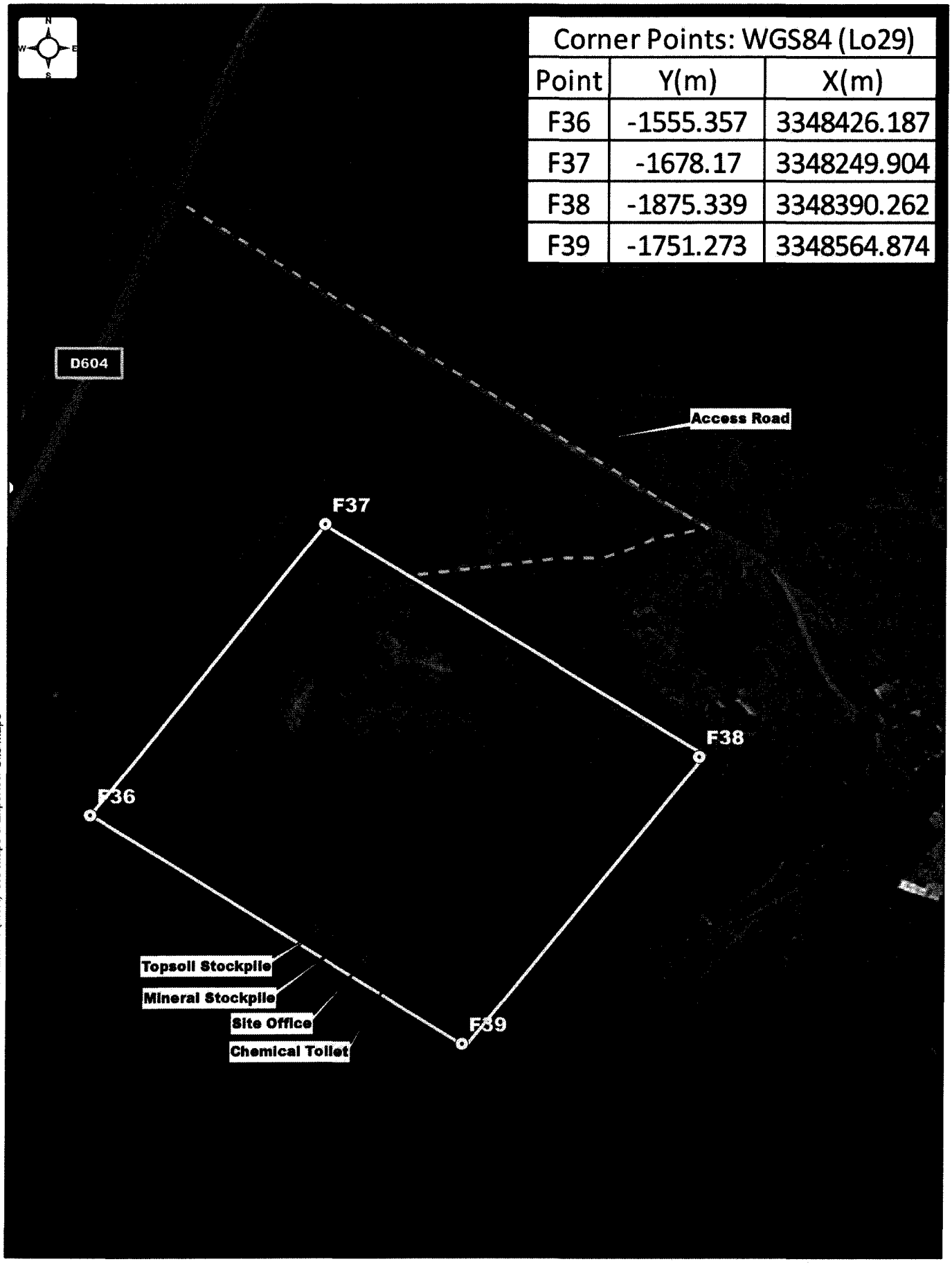
terratest
Geotechnical, Environmental & Earth Science Consultants
P.O. Box 794
HILTON 3245
Tel: (033) 343 6789
Fax: (033) 343 6788

Alfred Nzo Borrow Pit EMP's
Road: D604
Site Layout - BP07

0 20 40 80 120 160 Meters

Fig 2

Scale 1 : 3 000

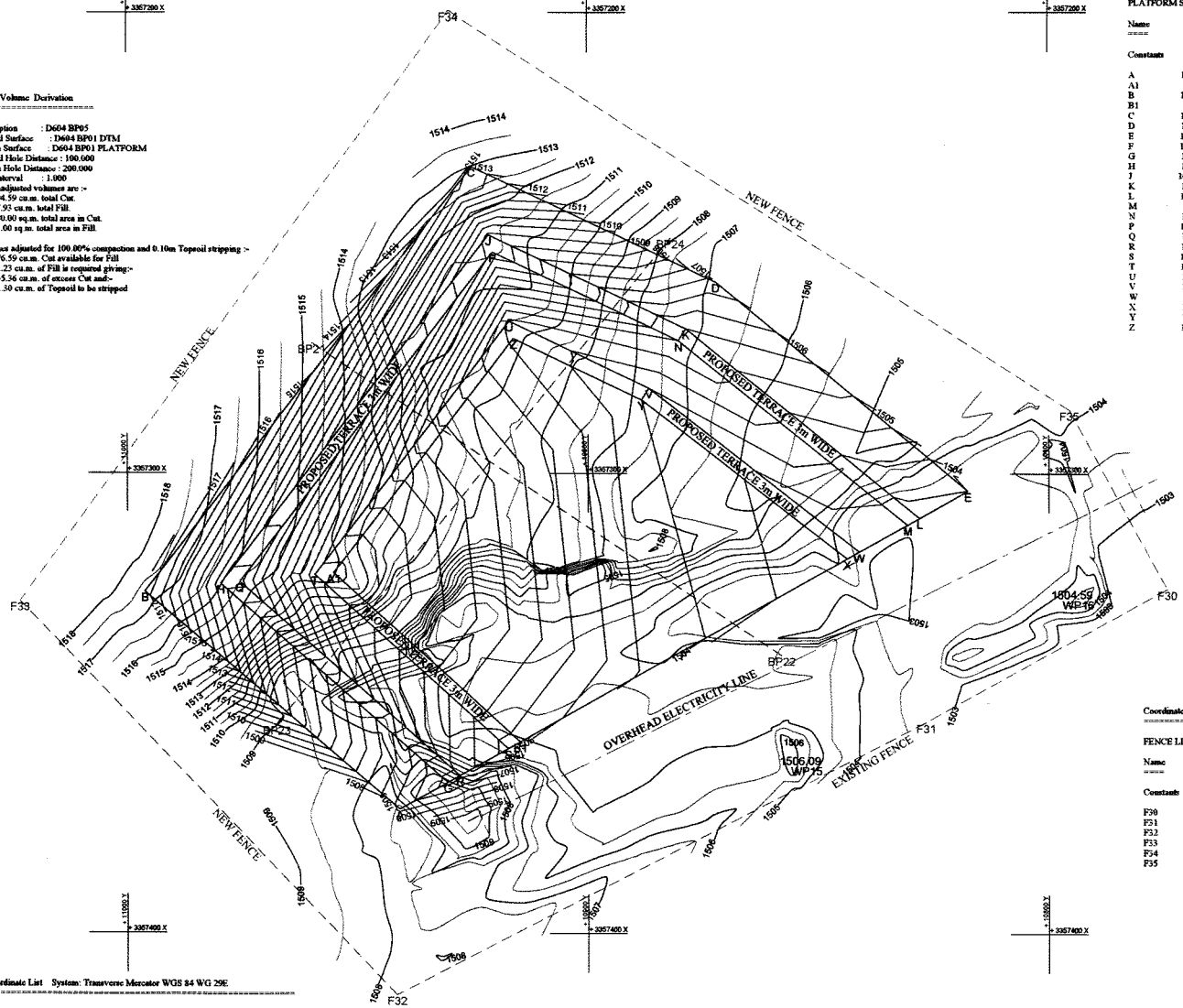


terratest
Geotechnical, Environmental & Earth Science Consultants
P.O. Box 794 HILTON 3245
Tel: (033) 343 6789 Fax: (033) 343 6788

Alfred Nzo Borrow Pit EMP's
Road: D604
Site Layout - BP08
0 20 40 80 120 160 Meters

Fig 2

Scale 1 : 3 000



DTM Volume Derivation

Description : D604 BP05
Ground Surface : D604 BP01 DTM
Design Surface : D604 BP01 PLATFORM
Ground Hole Distance : 100.000
Design Hole Distance : 200.000
Grid Interval : 1.000
The unadjusted volumes are :-
23894.59 cu.m. total Cut.
3397.93 cu.m. total Fill.
10190.00 sq.m. total area in Cut.
3433.00 sq.m. total area in Fill.

Volumes adjusted for 100.00% compaction and 0.10m Topsoil stripping :-
22876.59 cu.m. Cut available for Fill
3741.23 cu.m. of Fill is required giving:-
19135.36 cu.m. of excess Cut and:-
1361.50 cu.m. of Topsoil to be stripped

Coordinate List System: Transverse Mercator WGS 84 WG 29E

PLATFORM SETTING OUT CO-ORDINATES

Name	Y	X	Z
Constants	0.000	0.000	0.000
A	10940.874	3357373.172	1507.300
A1	10955.213	3357321.725	1509.206
B	10996.166	3357325.803	1517.200
B1	10914.755	3357358.450	1505.300
C	10925.113	3357233.257	1512.900
D	10872.181	3357258.543	1506.800
E	10817.563	3357303.720	1503.500
F	10879.219	3357338.446	1504.150
G	10930.418	3357367.285	1506.300
H	10979.722	3357324.090	1513.200
J	10921.514	3357248.275	1508.900
K	10878.689	3357268.733	1505.500
L	10828.019	3357309.609	1503.250
M	10830.633	3357311.081	1503.250
N	10880.299	3357271.288	1505.500
P	10920.614	3357252.029	1508.900
Q	10975.630	3357323.686	1513.200
R	10927.805	3357365.811	1506.300
S	10917.349	3357359.922	1505.300
T	10959.280	3357322.096	1509.200
U	10917.016	3357267.047	1504.900
V	10886.721	3357281.519	1504.000
W	10841.088	3357316.970	1503.000
X	10843.702	3357318.443	1503.000
Y	10888.306	3357284.087	1504.000
Z	10916.116	3357270.802	1504.900

Coordinate List System: Transverse Mercator WGS 84 WG 29E

FENCE LINE CO-ORDINATES

Name	Y	X
Constants	0.000	0.000
F30	10774.264	3357325.039
F31	10826.604	3357354.121
F32	10941.421	3357413.313
F33	11025.250	3357328.015
F34	10929.978	3357199.437
F35	10795.436	3357286.269

Coordinate List System: Transverse Mercator WGS 84 WG 29E

SURVEY CONTROL POINTS

Name	Y	X	Z
Constants	0.000	0.000	0.000
WP15	10852.480	3357363.356	1506.086
WP16	10793.507	3357327.153	1504.589

DRAWING REFERENCE

No	Dwg No	Title

NOTES

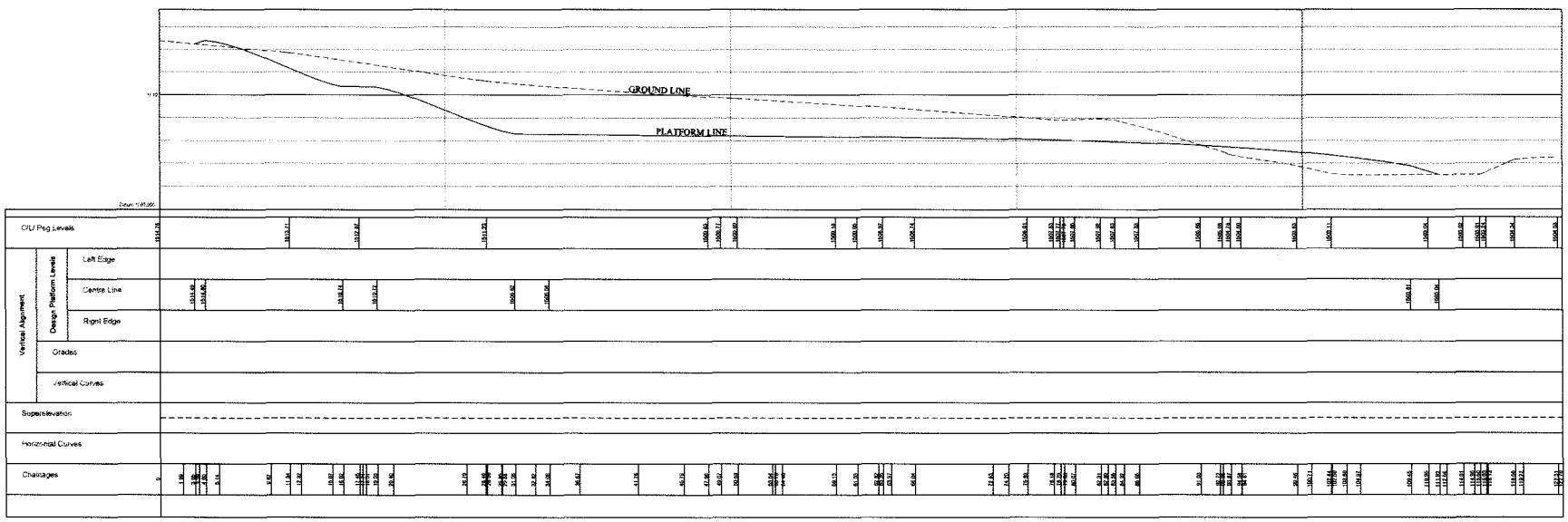
REVISIONS

No	Description	Date	By

Recommended by: Date:
Approved by: Date:
Drawn: GORDON DRAKE
Designed:
Checked:
Engineer:
Client Appr.:
Date: 24 MAY 2011

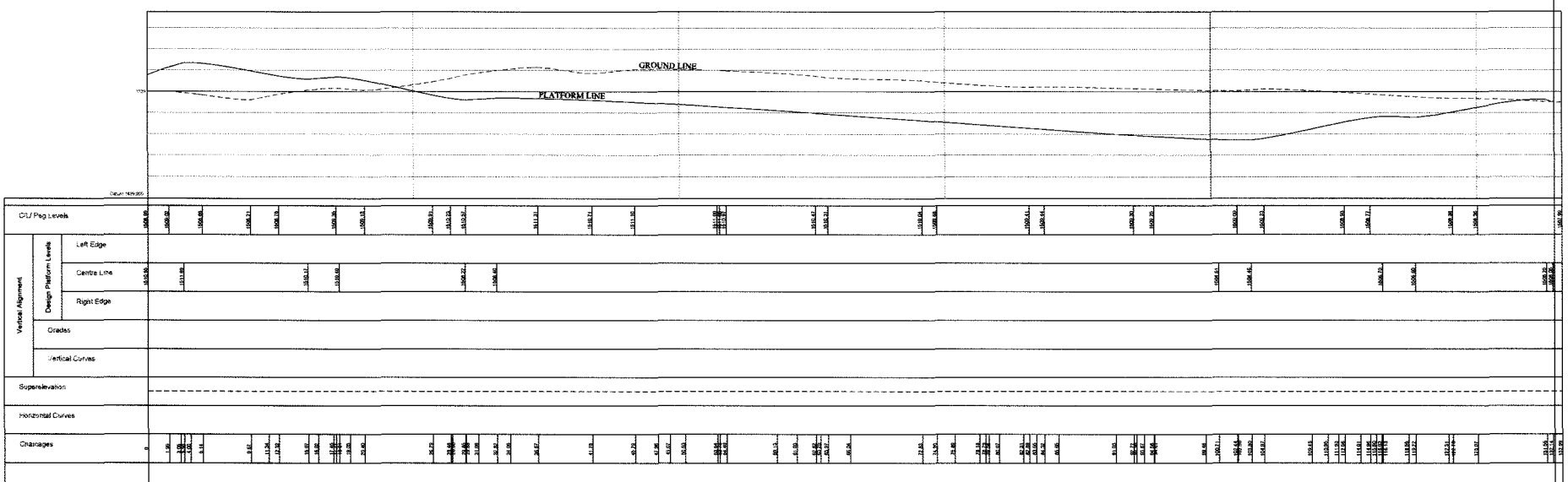
Scale 1:1000

Surveyors: SABLE SURVEYS CC
Coordinate System: WG29
Client: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT
Contract: TERRATEST
Title: P604 BP01 BORROW PIT SURVEY AND PLATFORM DESIGN
Drawing No:
Rev No:



Long Section for 0.00 to 122.70 (BP21 TO BP22)

DATE: 24 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT						SCALES
DRAWN BY GORDON DRAKE							Horizontal Scale: 400 Vertical Scale :400
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 01 SURVEY AND PLATFORM DESIGN				DRAWING No.
SURVEYORS: SABLE SURVEYS CC							



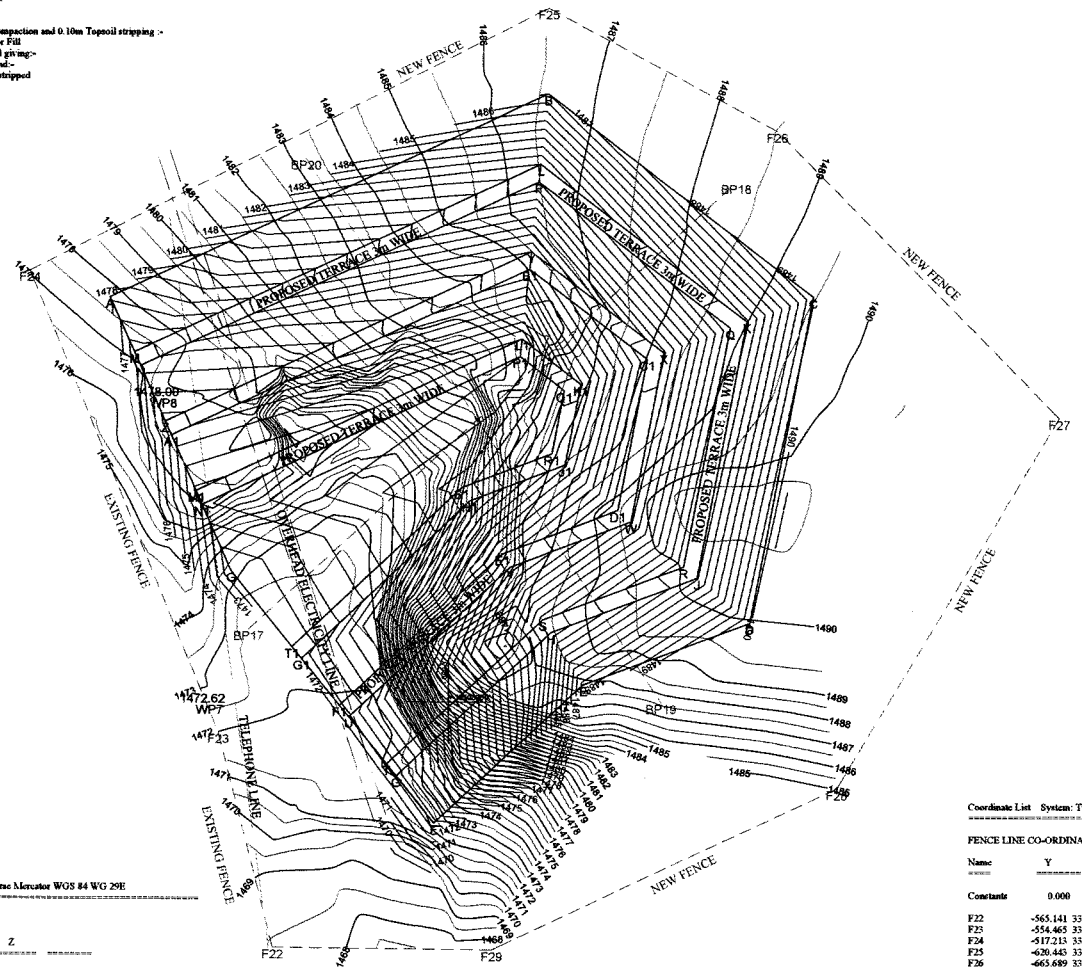
Long Section for 0.00 to 132.99 (BP23 TO BP24)

DATE: 24 MAY 2013	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT			SCALES
DRAWN BY GORDON DRAKE		TITLE: P604 BORROW PIT 01 SURVEY AND PLATFORM DESIGN		Horizontal Scale: 400 Vertical Scale :400
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST			DRAWING No.
SURVEYORS: SABLE SURVEYS CC				

DTM Volume Derivation

Description : D604 BP05
Ground Surface : D604 BP04 DTM
Design Surface : D604 BP04 PLATFORM
Ground Hole Distance : 100.000
Design Hole Distance : 200.000
Grid Interval : 1.000
The unadjusted volumes are :-
45765.50 cu.m. total Cut.
1204.42 cu.m. total Fill.
11545.50 sq.m. total area in Cut.
1564.00 sq.m. total area in Fill

Volumes adjusted for 100.00% compaction and 0.10m Topsoil stripping :-
44610.95 cu.m. Cut available for Fill
1360.82 cu.m. of Fill is required giving:-
43250.13 cu.m. of excess Cut and:-
1310.95 cu.m. of Topsoil to be stripped



Coordinate List System: Transverse Mercator WGS 84 WG 29E

PLATPORM SETTING OUT CO-ORDINATES

Name	Y	X	Z
Constants	0.000	0.000	0.000
A	-533.035	3350719.775	1477.600
A1	-545.168	3350747.212	1474.800
B	-620.207	3350679.233	1486.500
B1	-616.333	3350714.120	1478.500
C	-672.635	3350719.628	1489.400
C1	-639.586	3350732.036	1481.400
D	-659.829	3350784.127	1489.900
D1	-633.657	3350761.899	1481.900
E	-626.836	3350796.495	1487.700
E1	-610.735	3350770.492	1479.700
F	-597.121	3350824.153	1472.800
F1	-578.394	3350800.716	1472.400
G	-556.975	3350773.906	1472.000
G	-580.630	3350814.778	1472.600
G1	-570.903	3350791.341	1472.200
H	-620.399	3350786.092	1483.700
H1	-604.286	3350760.894	1475.700
J	-649.560	3350775.236	1485.900
J1	-623.188	3350753.006	1477.900
K	-659.416	3350724.592	1485.400
K1	-626.566	3350737.000	1477.400
L	-618.658	3350693.188	1482.500
L1	-614.783	3350728.075	1474.500
M	-577.888	3350750.750	1476.200
M1	-550.021	3350758.187	1473.400
N	-539.102	3350733.494	1476.200
N1	-551.235	3350760.931	1473.400
P	-618.270	3350696.677	1482.500
P1	-614.396	3350731.564	1474.500
Q	-656.111	3350725.832	1485.400
Q1	-623.062	3350738.240	1477.400
R	-646.743	3350773.013	1485.900
R1	-620.571	3350750.786	1477.900
S	-618.789	3350785.492	1485.700
S1	-602.673	3350757.495	1475.700
T	-587.757	3350812.434	1472.600
T1	-569.031	3350788.997	1472.200
U	-580.267	3350803.059	1472.400
V	-612.346	3350773.892	1479.700
W	-636.274	3350764.122	1481.900
X	-642.891	3350730.796	1481.400
Y	-616.721	3350730.632	1478.500
Z	-543.955	3350744.469	1474.800

Coordinate List System: Transverse Mercator WGS 84 WG 29E

SURVEY CONTROL POINTS

Name	Y	X	Z
Constants	0.000	0.000	0.000
WP7	-552.777	3350800.322	1472.621
WP8	-543.661	3350739.579	1478.001

Coordinate List System: Transverse Mercator WGS 84 WG 29E

FENCE LINE CO-ORDINATES

Name	Y	X
Constants	0.000	0.000
F22	-565.141	3350848.766
F23	-554.465	3350806.193
F24	-517.213	3350714.466
F25	-620.443	3350662.297
F26	-665.689	3350686.628
F27	-721.375	3350743.566
F28	-677.125	3350817.261
F29	-608.592	3350849.183

DRAWING REFERENCE

No	Drg No.	Title

NOTES

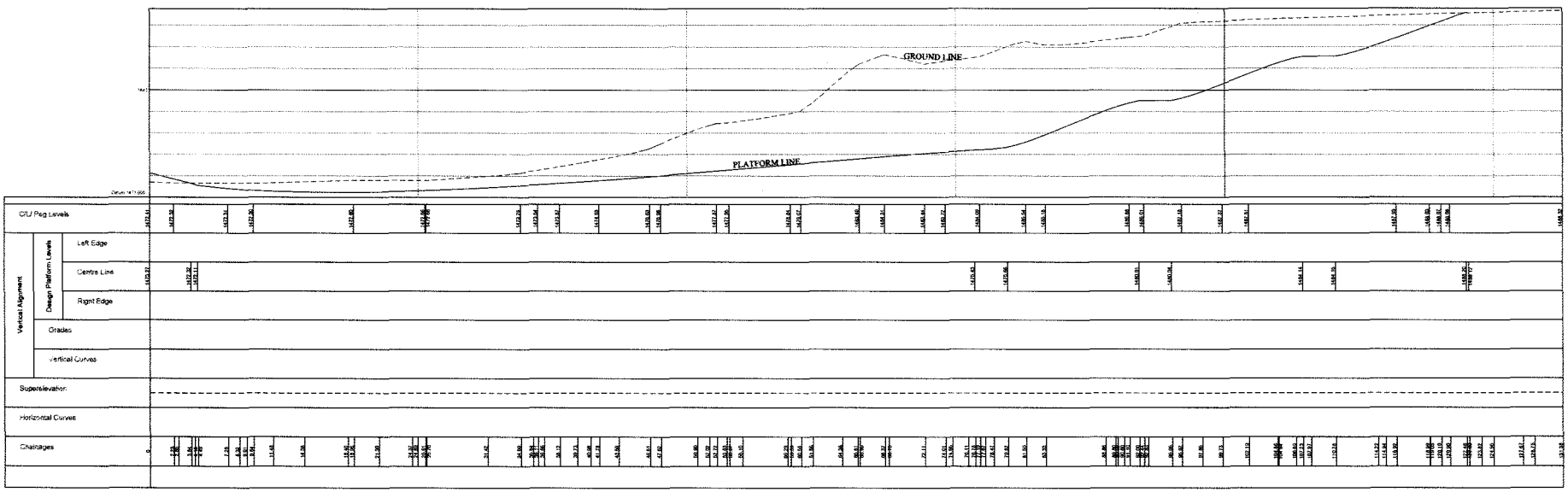
REVISIONS

No	Description	Date	By

Recommended by Date
Approved by Date
Drawn GORDON DRAKE Designed
Checked Engineer
Client App. Date 24 MAY 2011

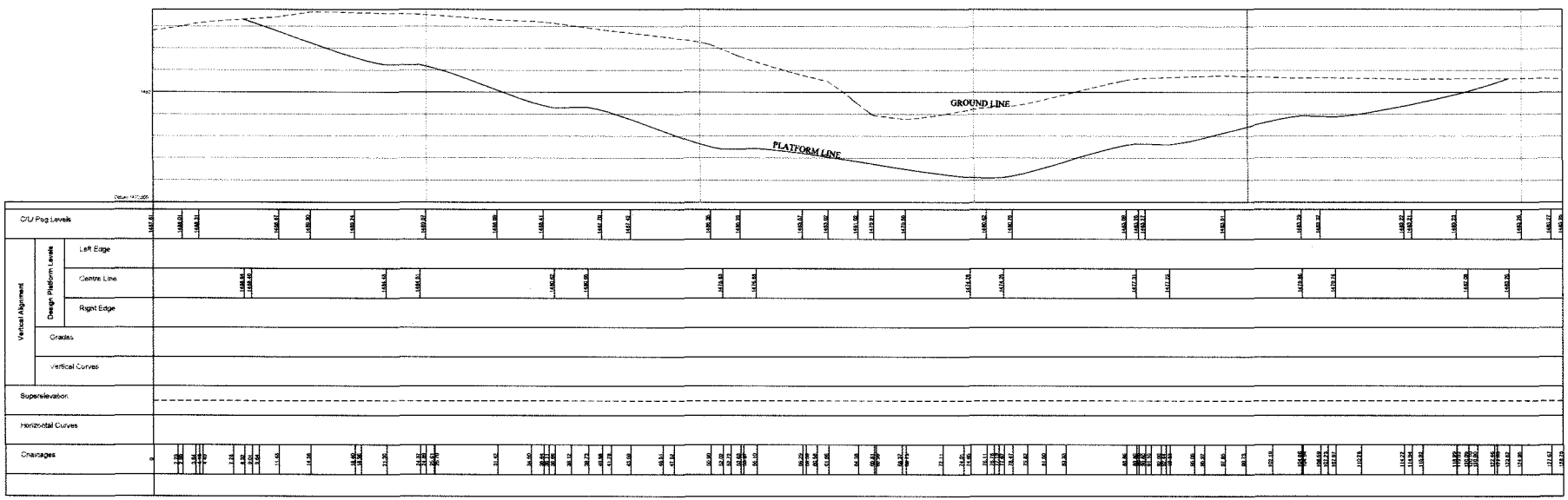
Scale 1:1000

Surveyors SABLE SURVEYS CC
Coordinate System WG29
Client EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT
Contract TERRATEST
Title P604 BP04 BORROW PIT SURVEY AND PLATFORM DESIGN
Drawing No
Rev No



Long Section for 0.00 to 131.38 (BP17 TO BP18)

DATE: 24 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT				SCALES
DRAWN BY GORDON DRAKE					Horizontal Scale :400
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 04 SURVEY AND PLATFORM DESIGN		Vertical Scale :400
SURVEYORS: SABLE SURVEYS CC					DRAWING No.



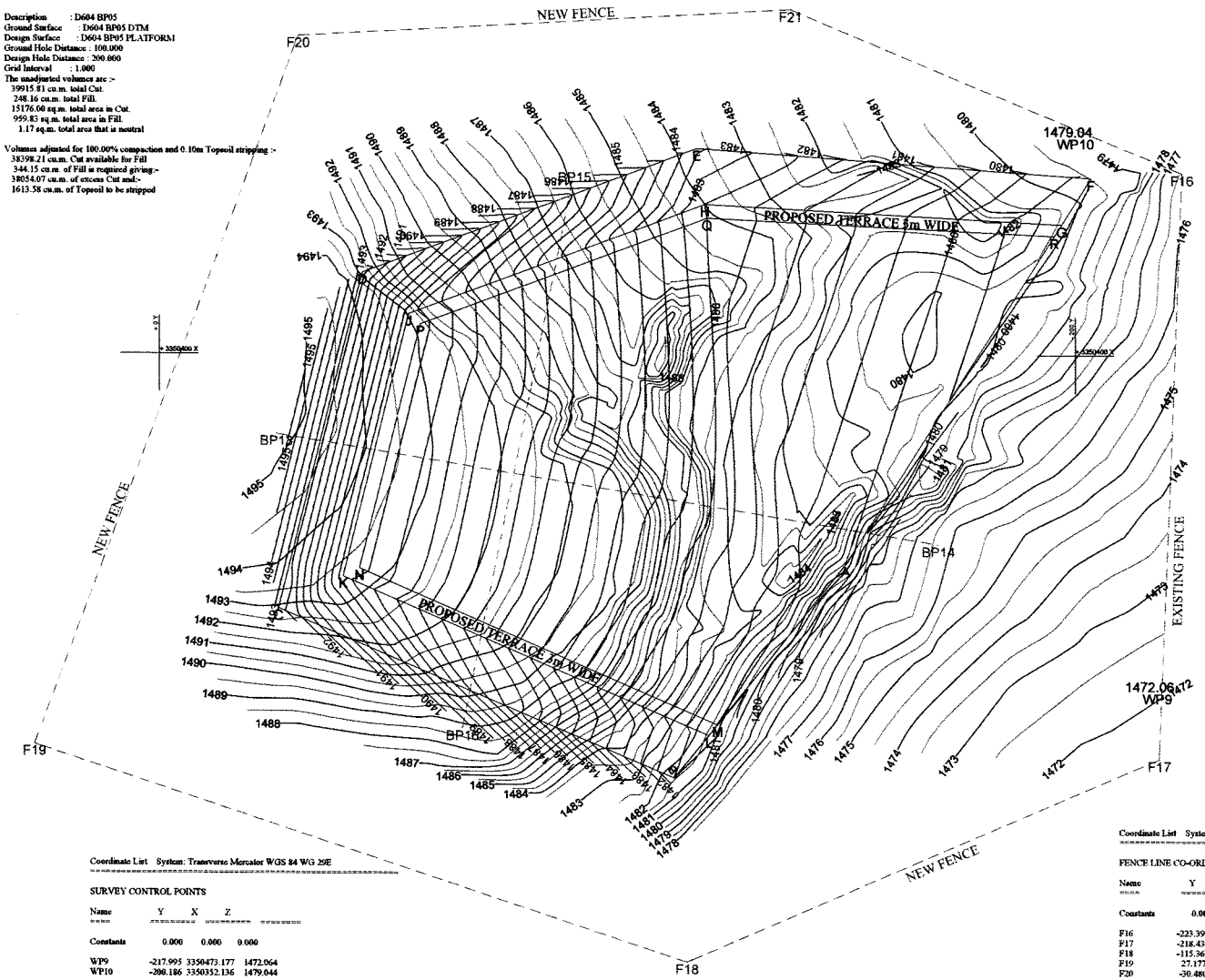
Long Section for 0.00 to 128.75 (BP19 TO BP20)

DATE: 24 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT				SCALES
DRAWN BY GORDON DRAKE					Horizontal Scale: 400
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 04 SURVEY AND PLATFORM DESIGN		Vertical Scale: 400
SURVEYORS: SABLE SURVEYS CC					DRAWING No.

DTM Volume Derivation

Description : D604 BP05
Ground Surface : D604 BP05 DTM
Design Surface : D604 BP05 PLATFORM
Ground Hole Distance : 100.000
Design Hole Distance : 200.000
Grid Interval : 1.000
The unadjusted volumes are :-
39915.81 cu.m. total Cut.
248.16 cu.m. total Fill.
15176.00 sq.m. total area in Cut.
959.83 sq.m. total area in Fill.
1.17 sq.m. total area that is neutral

Volumes adjusted for 100.00% compaction and 0.10m Topsoil stripping :-
38398.21 cu.m. Cut available for Fill
344.15 cu.m. of Fill is required giving :-
38054.07 cu.m. of excess Cut and:-
1613.58 cu.m. of Topsoil to be stripped



Coordinate List System: Transverse Mercator WGS 84 WG 29E

PLATFORM SETTING OUT CO-ORDINATES

Name	Y	X	Z
Constants	0.000	0.000	0.000
A	-149.849	3350445.782	1480.000
B	-112.512	3350492.425	1481.000
C	-26.025	3350455.616	1492.700
D	-44.350	3350381.955	1492.700
E	-117.443	3350354.719	1483.600
F	-203.500	3350361.171	1479.300
G	-197.074	3350371.305	1479.000
H	-119.168	3350366.882	1482.500
J	-54.468	3350390.989	1488.700
K	-40.139	3350448.582	1488.700
L	-120.011	3350483.057	1480.500
M	-121.885	3350480.715	1480.500
N	-43.665	3350446.836	1488.700
P	-56.997	3350393.248	1488.700
Q	-119.626	3350369.913	1482.500
R	-195.467	3350373.839	1479.000

Coordinate List System: Transverse Mercator WGS 84 WG 29E

SURVEY CONTROL POINTS

Name	Y	X	Z
Constants	0.000	0.000	0.000
WP9	-217.995	3350473.177	1472.064
WP10	-200.186	3350352.136	1479.044

Coordinate List System: Transverse Mercator WGS 84 WG 29E

FENCE LINE CO-ORDINATES

Name	Y	X
Constants	0.000	0.000
F16	-223.397	3350360.094
F17	-218.430	3350488.073
F18	-115.364	3350532.826
F19	27.177	3350485.490
F20	-30.000	3350330.314
F21	-137.964	3350324.620

DRAWING REFERENCE

No	Dwg No	Title

NOTES

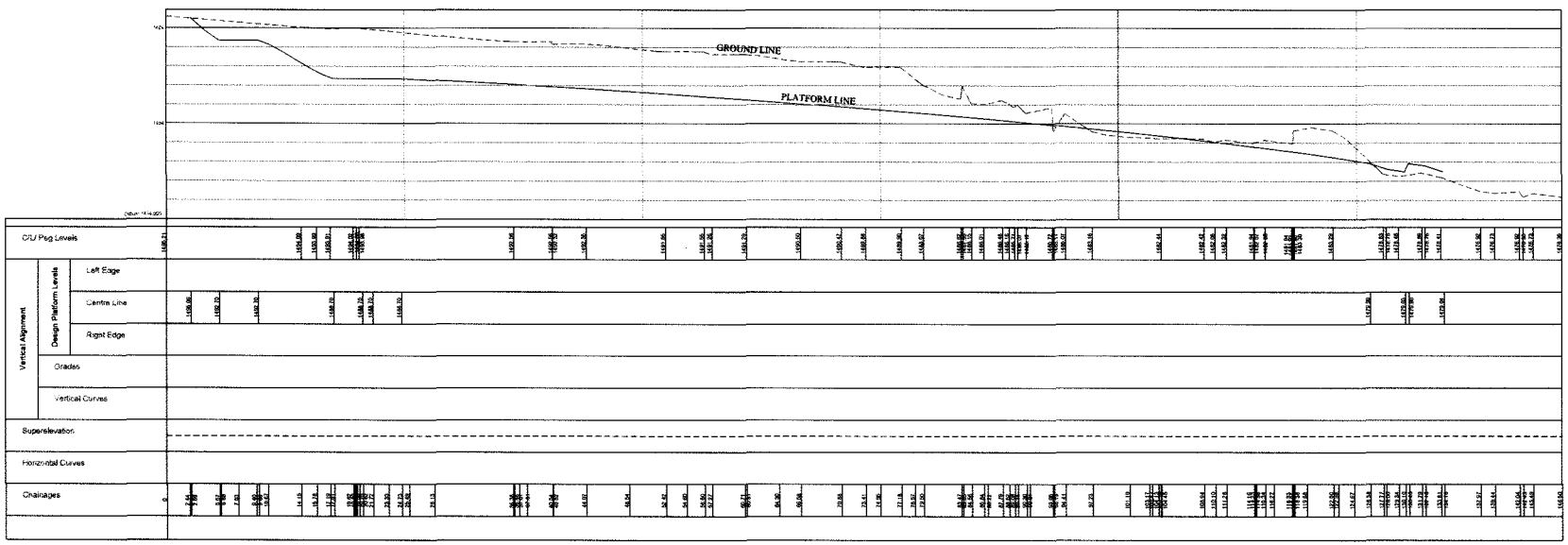
REVISIONS

No	Description	Date	By

Recommended by: Date
Approved by: Date
Drawn: GORDON DRAKE
Designed:
Checked:
Engineer:
Client Appr.:
Date: 25 MAY 2011

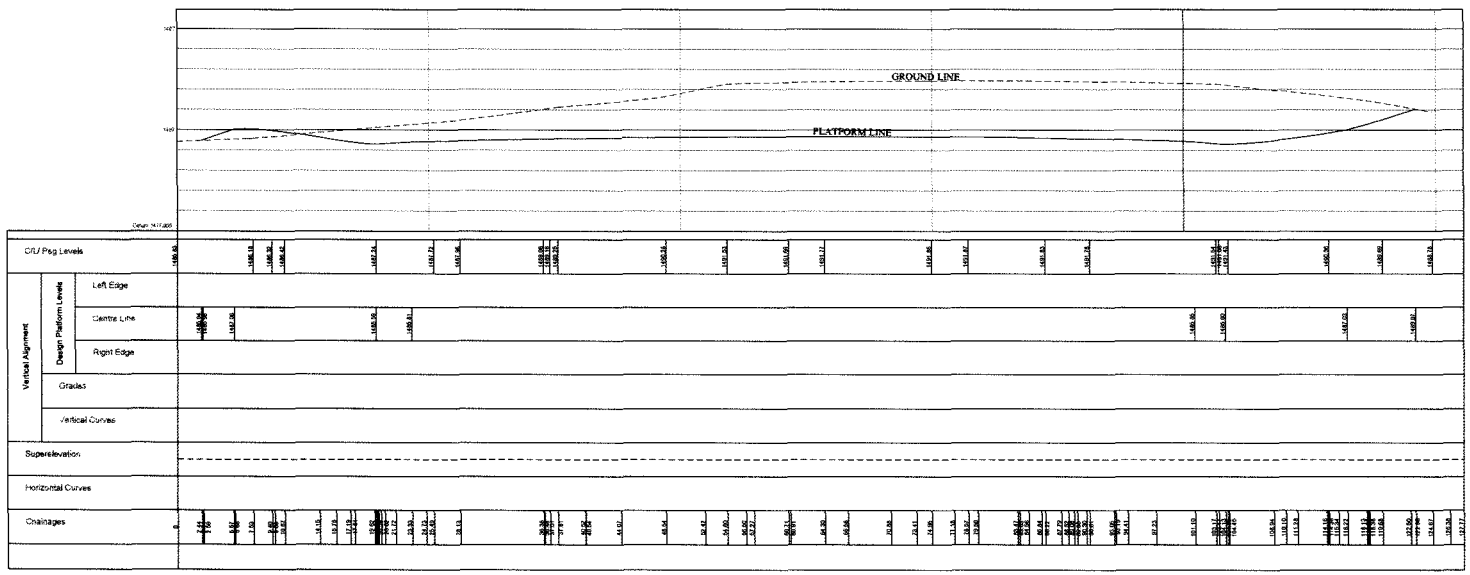
Scale 1:1000

Surveyors: SABLE SURVEYS CC
Coordinate System: WG29
Client: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT
Contract: TERRATEST
Title: P604 BP05 BORROW PIT SURVEY AND PLATFORM DESIGN
Drawing No:
Rev No:



Long Section for 0.00 to 146.50 (BP13 TO BP14)

DATE: 25 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT							SCALES
DRAWN BY GORDON DRAKE								Horizontal Scale: 500
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 05 SURVEY AND PLATFORM DESIGN					Vertical Scale :500
SURVEYORS: SABLE SURVEYS CC								DRAWING No.



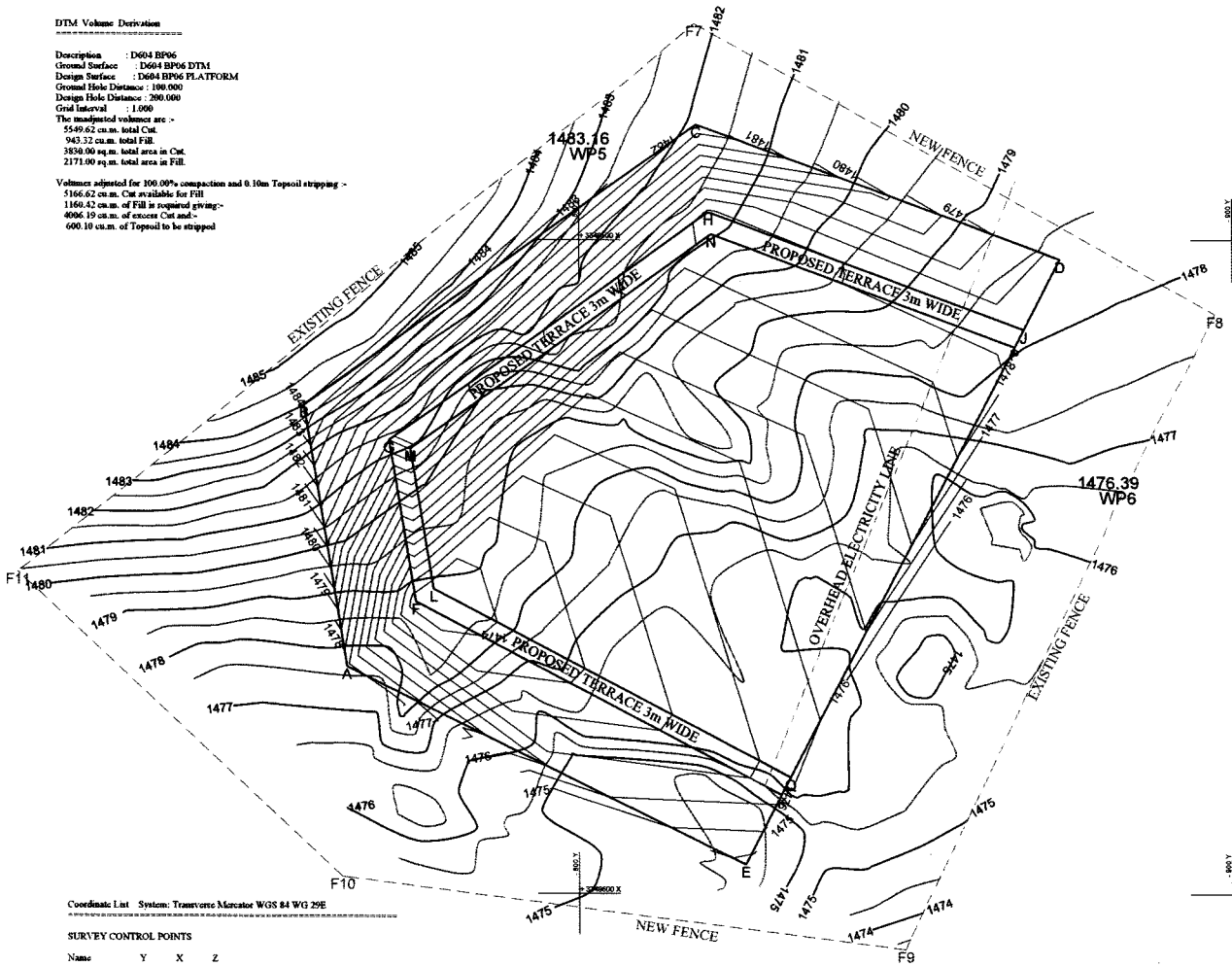
Long Section for 0.00 to 127.77 (BP15 TO BP16)

DATE: 25 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT				SCALES
DRAWN BY GORDON DRAKE					Horizontal Scale :500
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 05 SURVEY AND PLATFORM DESIGN		Vertical Scale :500
SURVEYORS: SABLE SURVEYS CC					DRAWING No.

DTM Volume Derivation

Description : D604 BP06
Ground Surface : D604 BP06 DTM
Design Surface : D604 BP06 PLATFORM
Ground Hole Distance : 100.000
Design Hole Distance : 200.000
Grid Interval : 1.000
The unadjusted volumes are :-
5549.62 cu.m. total Cut.
943.32 cu.m. total Fill.
3830.00 sq.m. total area in Cut.
2171.00 sq.m. total area in Fill.

Volumes adjusted for 100.00% compaction and 0.10m Topsoil stripping :-
5166.62 cu.m. Cut available for Fill
1160.42 cu.m. of Fill is required giving:-
4006.19 cu.m. of excess Cut and:-
600.10 cu.m. of Topsoil to be stripped



Coordinate List System: Transverse Mercator WGS 84 WG 29E

SURVEY CONTROL POINTS

Name	Y	X	Z
Constants	0.000	0.000	0.000
WP5	-801.585	3349485.384	1483.160
WP6	-882.515	3349537.944	1476.387

Coordinate List System: Transverse Mercator WGS 84 WG 29E

PLATFORM SETTING OUT CO-ORDINATES

Name	Y	X	Z
Constants	0.000	0.000	0.000
A	-764.447	3349565.414	1477.637
B	-757.826	3349525.141	1484.033
C	-818.024	3349482.298	1481.901
D	-873.652	3349502.941	1478.351
E	-825.539	3349595.492	1474.390
F	-774.982	3349555.524	1473.637
G	-770.881	3349530.578	1480.033
H	-819.806	3349495.759	1477.901
J	-868.110	3349513.585	1478.132
K	-831.022	3349584.818	1475.678
L	-777.699	3349553.560	1473.637
M	-774.145	3349531.938	1480.033
N	-820.254	3349499.122	1477.901
P	-866.725	3349516.286	1478.150
Q	-832.407	3349582.157	1475.678

Coordinate List System: Transverse Mercator WGS 84 WG 29E

FENCE LINE CO-ORDINATES

Name	Y	X
Constants	0.000	0.000
F7	-817.804	3349466.736
F8	-897.426	3349511.234
F9	-850.057	3349608.616
F10	-763.829	3340597.473
F11	-714.039	3349551.135

DRAWING REFERENCE

No.	Dwg No.	Title

NOTES

REVISIONS

No.	Description	Date	By

Recommended by: Date:

Approved by: Date:

Drawn: GORDON DRAKE | Designed:

Checked: | Engineer:

Client Appr. | Date: 23 MAY 2011

Scale 1:750

Surveyors: SABLE SURVEYS CC

Coordinate System: WG29

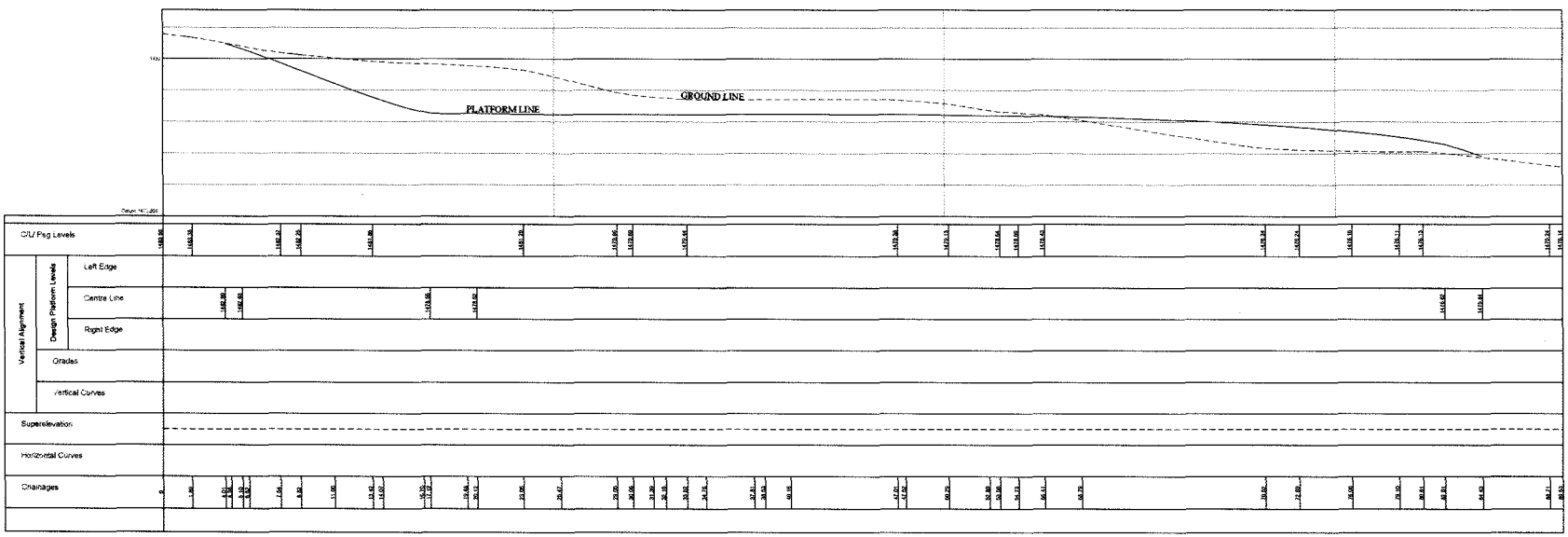
Client: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT

Contract: TERRATEST

Title: P604 BP06 BORROW PIT SURVEY AND PLATFORM DESIGN

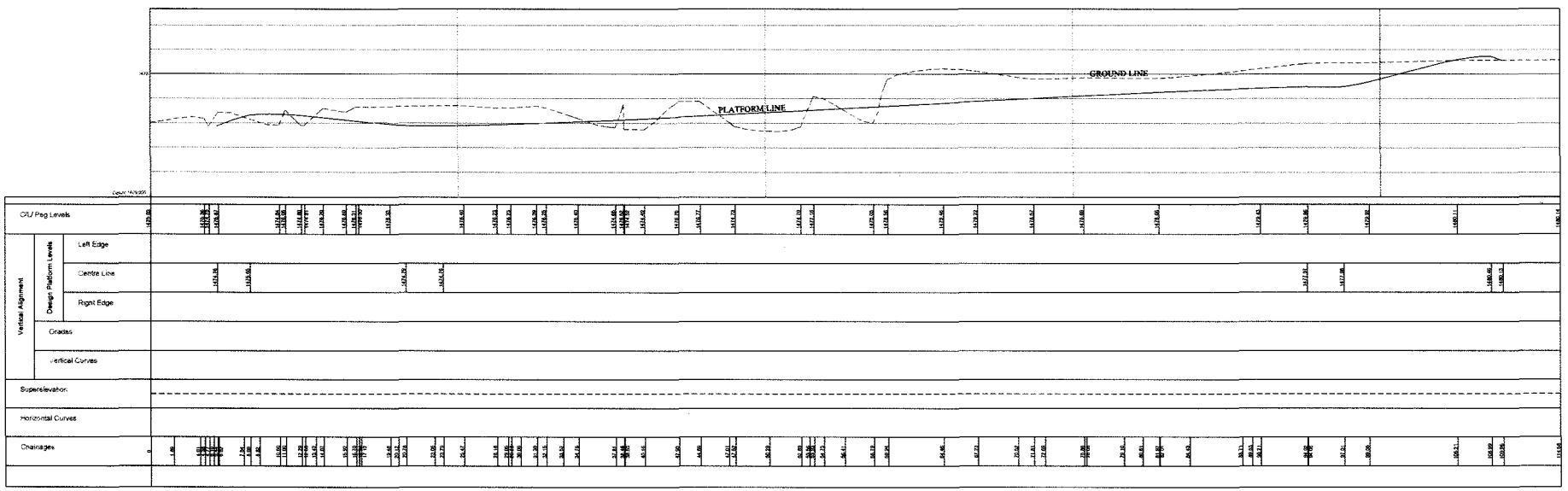
Drawing No:

Rev No:



Long Section for 0.00 to 89.53 (BP5 TO BP6)

DATE: 23 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT						SCALES
DRAWN BY GORDON DRAKE							Horizontal Scale :300
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 06 SURVEY AND PLATFORM DESIGN				Vertical Scale :300
SURVEYORS: SABLE SURVEYS CC							DRAWING No.



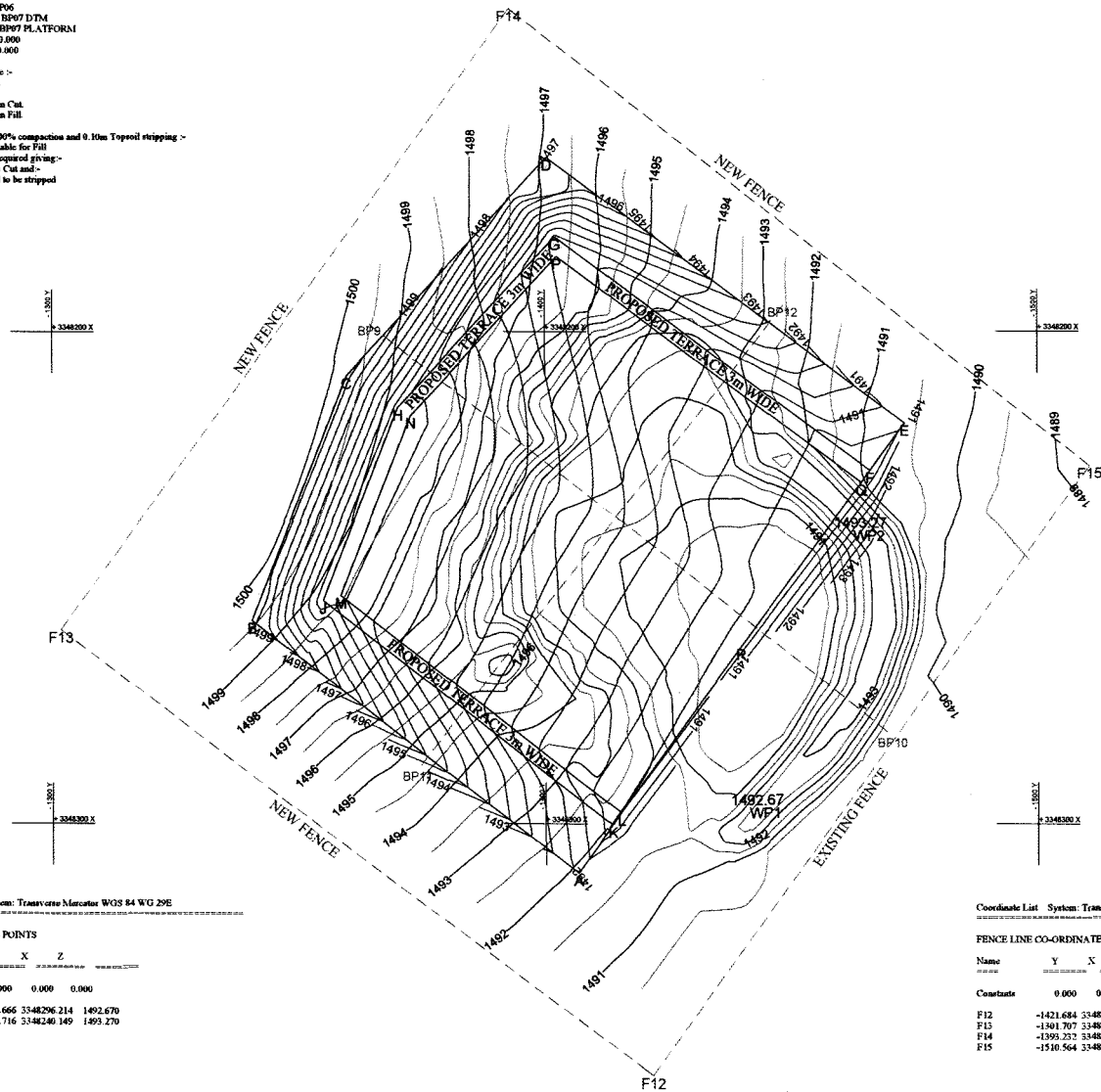
Long Section for 0.00 to 114.58 (BP7 TO BP8)

DATE: 23 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT							SCALES
DRAWN BY GORDON DRAKE								Horizontal Scale :350
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 06 SURVEY AND PLATFORM DESIGN					Vertical Scale :350
SURVEYORS: SABLE SURVEYS CC								DRAWING No.

DTM Volume Derivation

Description : D604 BP06
Ground Surface : D604 BP07 DTM
Design Surface : D604 BP07 PLATFORM
Ground Hole Distance : 100.000
Design Hole Distance : 200.000
Grid Interval : 1.000
The unadjusted volumes are :-
13405.81 cu.m. total Cut.
1354.09 cu.m. total Fill.
8394.17 sq.m. total area in Cut.
2448.83 sq.m. total area in Fill.

Volumes adjusted for 100.00% compaction and 0.10m Topsoil stripping :-
12566.39 cu.m. Cut available for Fill
1598.97 cu.m. of Fill is required giving:-
10967.42 cu.m. of excess Cut and:-
1084.50 cu.m. of Topsoil to be stripped



Coordinate List System: Transverse Mercator WGS 84 WG 29E

PLATFORM SETTING OUT CO-ORDINATES

Name	Y	X	Z
Constants	0.000	0.000	0.000
A	-1406.605	3348309.978	1491.880
B	-1340.462	3348258.990	1499.600
C	-1359.729	3348206.942	1499.770
D	-1400.613	3348164.768	1496.910
E	-1472.983	3348218.576	1490.600
F	-1465.932	3348228.285	1490.000
G	-1402.101	3348180.827	1492.910
H	-1370.180	3348215.402	1495.770
J	-1354.876	3348254.950	1495.600
K	-1413.656	3348300.268	1490.500
L	-1415.359	3348297.798	1490.500
M	-1358.479	3348253.940	1495.600
N	-1372.693	3348217.018	1495.770
P	-1402.473	3348184.842	1492.910
Q	-1464.229	3348230.755	1490.000
R	-1439.794	3348264.277	1490.250

Coordinate List System: Transverse Mercator WGS 84 WG 29E

SURVEY CONTROL POINTS

Name	Y	X	Z
Constants	0.000	0.000	0.000
WP1	-1444.666	3348296.214	1492.670
WP2	-1465.716	3348240.149	1493.270

Coordinate List System: Transverse Mercator WGS 84 WG 29E

FENCE LINE CO-ORDINATES

Name	Y	X
Constants	0.000	0.000
F12	-1421.684	3348351.466
F13	-1301.707	3348260.928
F14	-1399.252	3348134.425
F15	-1510.564	3348227.341

DRAWING REFERENCE

No	Dwg No	Title

NOTES

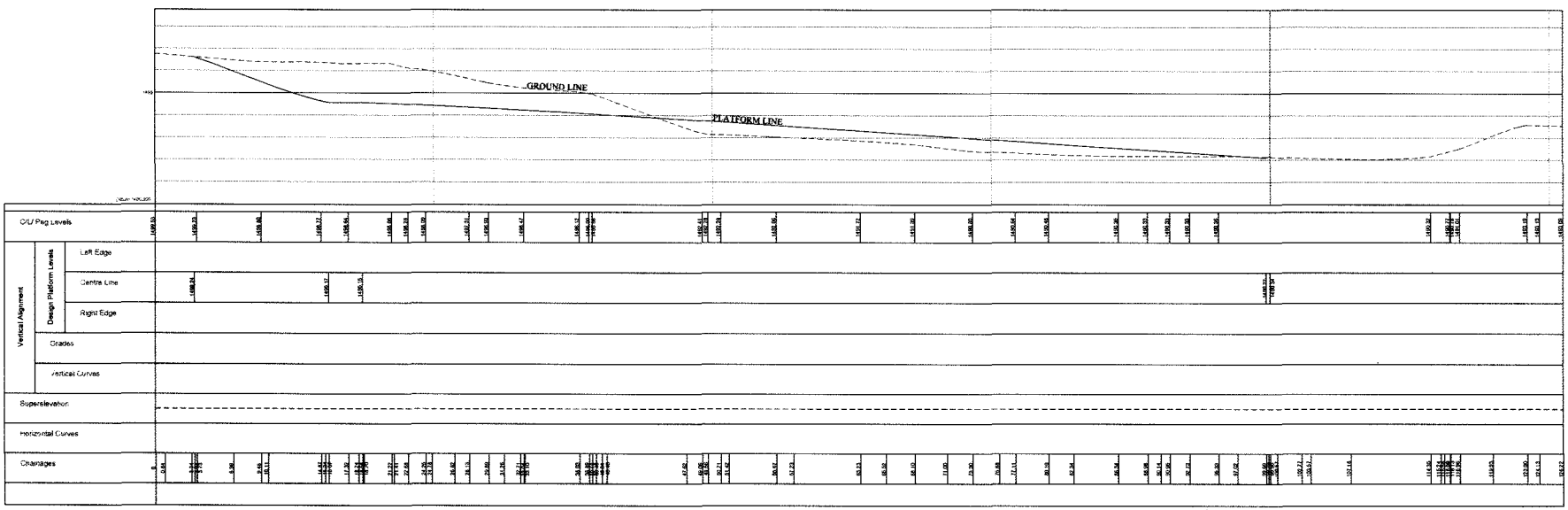
REVISIONS

No	Description	Date	By

Recommended by: Date
Approved by: Date
Drawn: GORDON DRAKE
Designed:
Checked:
Engineer:
Client App.:
Date: 23 MAY 2011

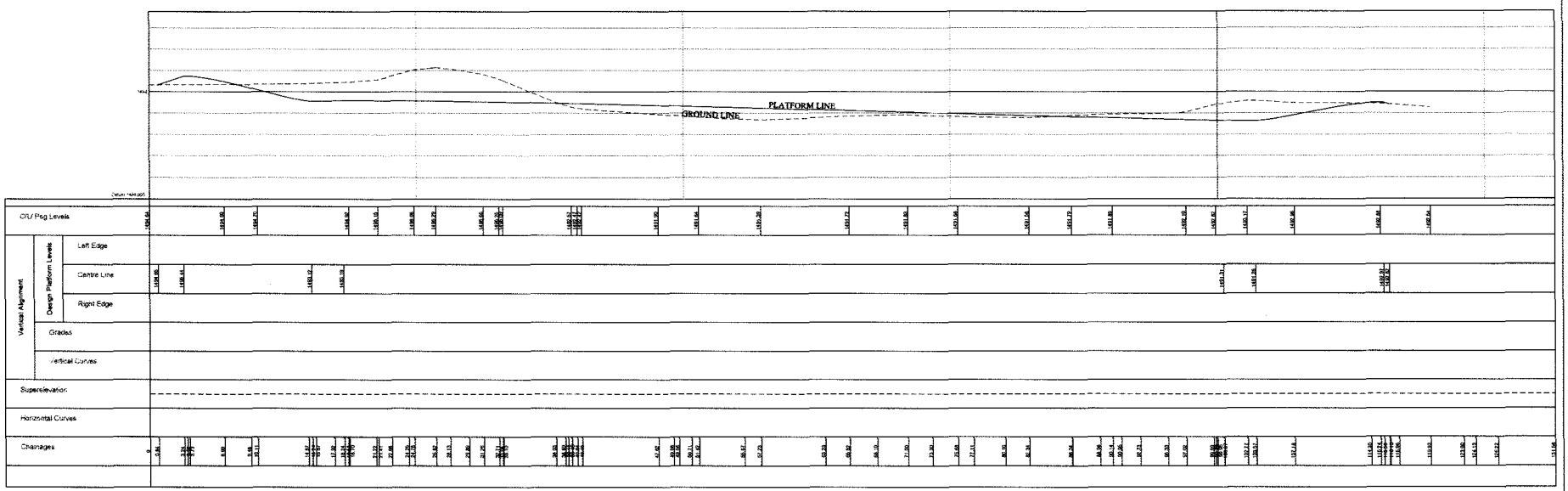
Scale 1:1000

Surveyors: SABLE SURVEYS CC
Coordinate System: WG29
Client: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT
Contract: TERRATEST
Title: P604 BP07 BORROW PIT SURVEY AND PLATFORM DESIGN
Drawing No:
Sheet No:



Long Section for 0.00 to 126.22 (BP9 TO BP10)

DATE: 23 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT								SCALES
DRAWN BY GORDON DRAKE									Horizontal Scale :400
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 07 SURVEY AND PLATFORM DESIGN						Vertical Scale :400
SURVEYORS: SABLE SURVEYS CC									DRAWING No.



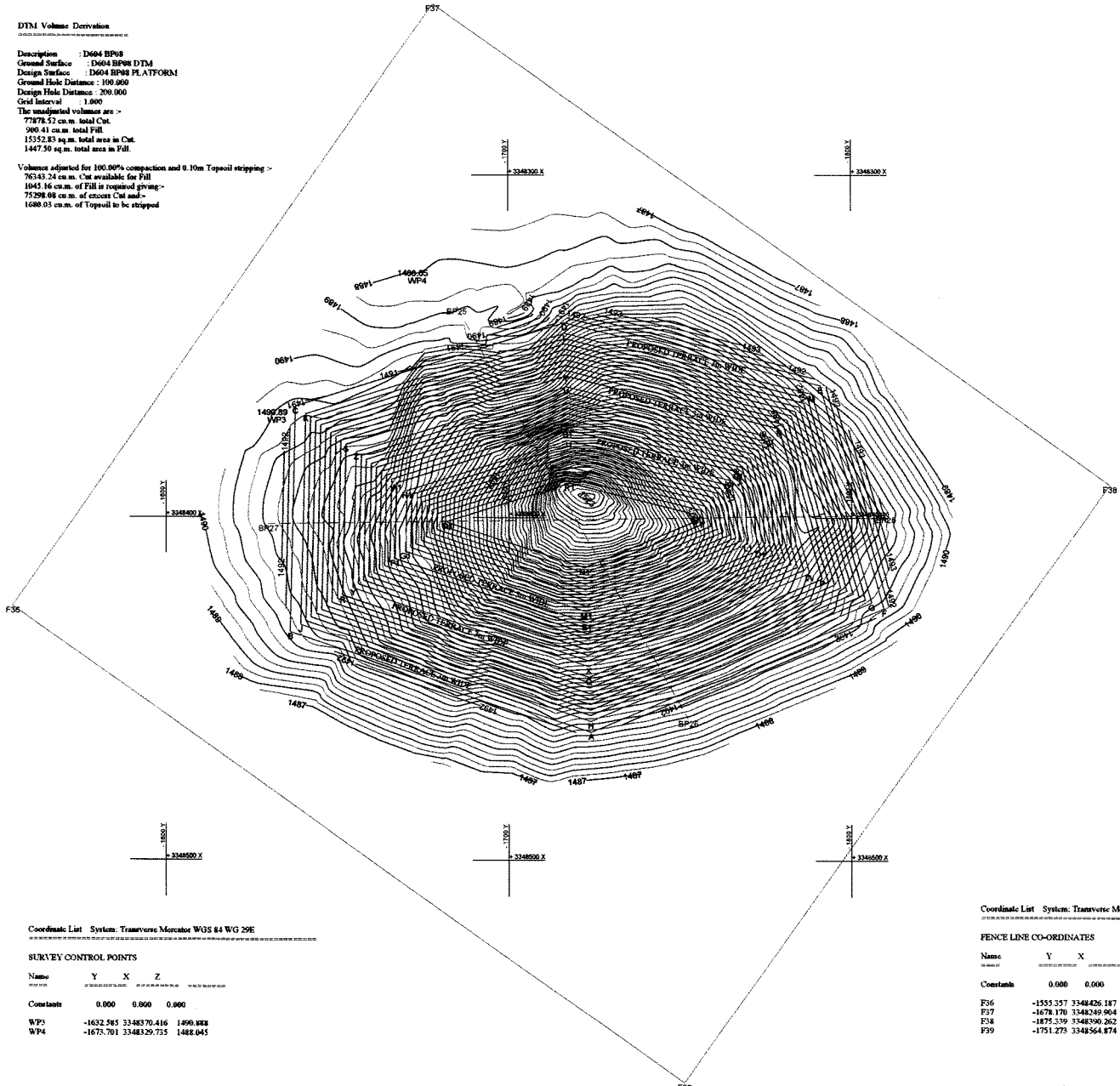
Long Section for 0.00 to 131.56 (BP11 TO BP12)

DATE: 23 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT			SCALES	
DRAWN BY GORDON DRAKE				Horizontal Scale: 400	
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 07 SURVEY AND PLATFORM DESIGN	Vertical Scale: 400	
SURVEYORS: SABLE SURVEYS CC				DRAWING No.	

DTM Volume Derivation

Description : D604 BP08
Ground Surface : D604 BP08 DTM
Design Surface : D604 BP08 PLATFORM
Ground Hole Distance : 100.000
Design Hole Distance : 200.000
Grid Interval : 1.000
The unadjusted volumes are :-
77878.52 cu.m. total Cut.
900.41 cu.m. total Fill.
15352.83 sq.m. total area in Cut.
1447.50 sq.m. total area in Fill.

Volumes adjusted for 100.00% compaction and 0.10m Topsoil stripping :-
76343.24 cu.m. Cut available for Fill
1045.16 cu.m. of Fill is required giving:-
75298.08 cu.m. of excess Cut and:-
1680.03 cu.m. of Topsoil to be stripped



Coordinate List System: Transverse Mercator WGS 84 WG 29E

PLATFORM SETTING OUT CO-ORDINATES

Name	Y	X	Z
Constants	0.000	0.000	0.000
A	-1724.050	3348462.780	1491.000
A1	-1667.402	3348389.946	1499.000
B	-1636.287	3348453.590	1491.000
B1	-1717.280	3348374.410	1499.000
C	-1637.957	3348367.696	1491.000
C1	-1766.863	3348386.528	1499.000
D	-1716.311	3348343.290	1491.000
D1	-1773.333	3348409.263	1499.000
E	-1790.940	3348361.530	1491.000
E1	-1722.760	3348430.756	1499.000
F	-1809.437	3348426.525	1491.000
F1	-1666.840	3348412.136	1499.000
G	-1805.826	3348424.799	1491.000
G1	-1669.895	3348409.991	1499.000
H	-1723.921	3348459.576	1491.000
H1	-1670.347	3348592.171	1499.000
J	-1639.342	3348431.445	1491.000
J1	-1717.377	3348377.522	1499.000
K	-1640.901	3348369.921	1491.000
K1	-1764.455	3348589.028	1499.000
L	-1716.408	3348346.402	1491.000
L1	-1769.723	3348407.537	1499.000
M	-1788.532	3348364.030	1491.500
M1	-1722.632	3348427.551	1499.000
N	-1778.902	3348374.029	1495.000
N1	-1722.116	3348414.713	1503.000
P	-1791.385	3348417.894	1495.000
P1	-1682.117	3348401.410	1503.000
Q	-1723.403	3348446.758	1495.000
Q1	-1682.125	3348401.070	1503.000
R	-1651.563	3348422.863	1495.000
R1	-1717.764	3348389.970	1503.000
S	-1652.680	3348378.821	1495.000
S1	-1754.825	3348399.028	1503.000
T	-1716.795	3348358.850	1495.000
T1	-1755.281	3348400.631	1503.000
U	-1716.892	3348361.962	1495.000
V	-1776.494	3348376.529	1495.000
W	-1781.774	3348416.168	1495.000
X	-1723.276	3348443.554	1495.000
Y	-1654.619	3348420.718	1495.000
Z	-1655.624	3348381.046	1495.000

Coordinate List System: Transverse Mercator WGS 84 WG 29E

SURVEY CONTROL POINTS

Name	Y	X	Z
Constants	0.000	0.000	0.000
WP3	-1632.585	3348370.416	1490.888
WP4	-1673.701	3348329.735	1488.645

Coordinate List System: Transverse Mercator WGS 84 WG 29E

FENCE LINE CO-ORDINATES

Name	Y	X
Constants	0.000	0.000
F36	-1555.357	3348426.187
F37	-1678.170	3348249.904
F38	-1875.339	3348390.262
F39	-1751.273	3348564.874

DRAWING REFERENCE

No	Dwg No.	Title

NOTES

0m 5m 10m 20m

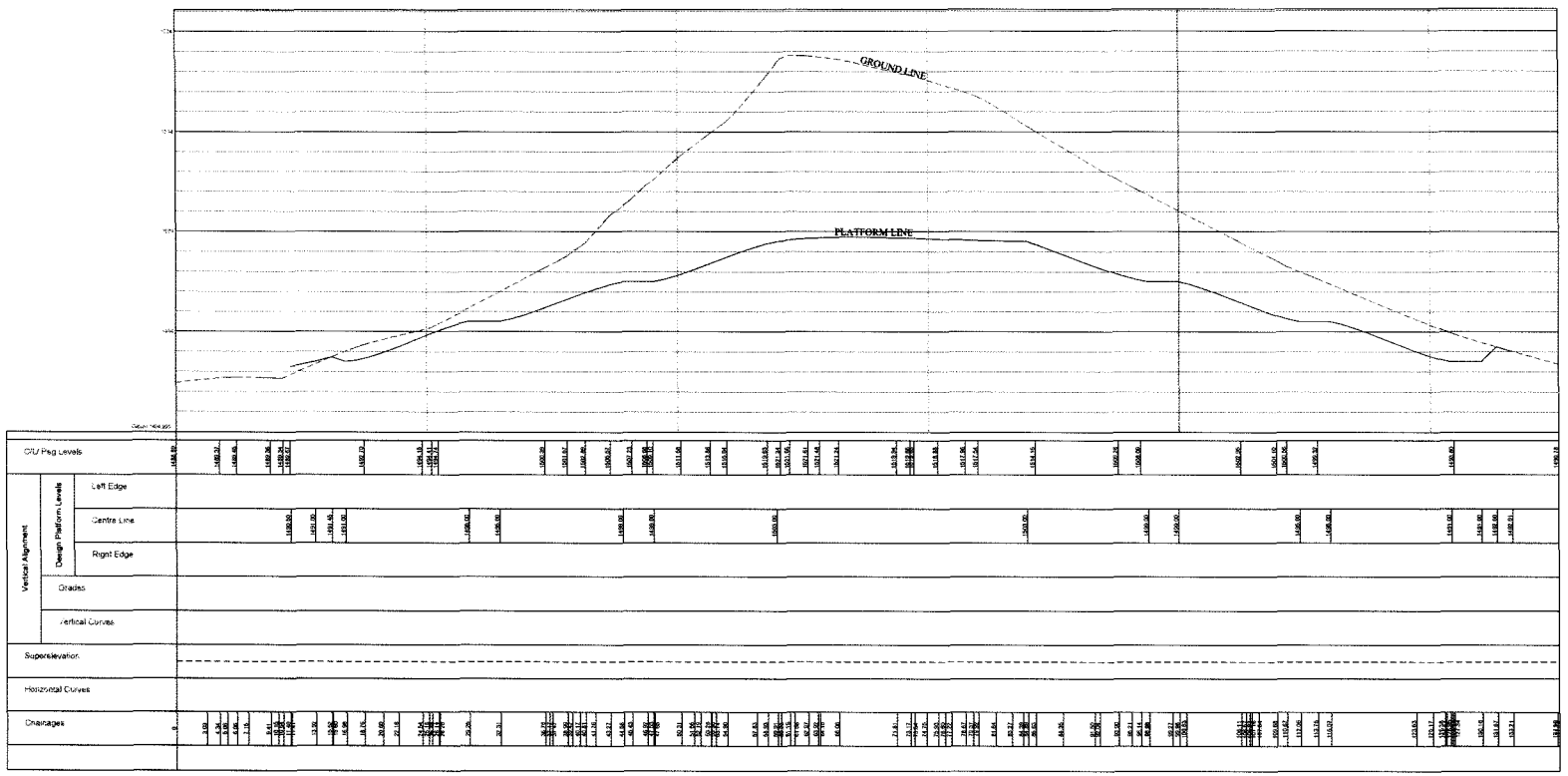
REVISIONS

No	Description	Date	By

Recommended by: Date:
Approved by: Date:
Drawn: GORDON DRAKE Designed:
Checked: Engineer:
Chief Asp. Date: 25 MAY 2011

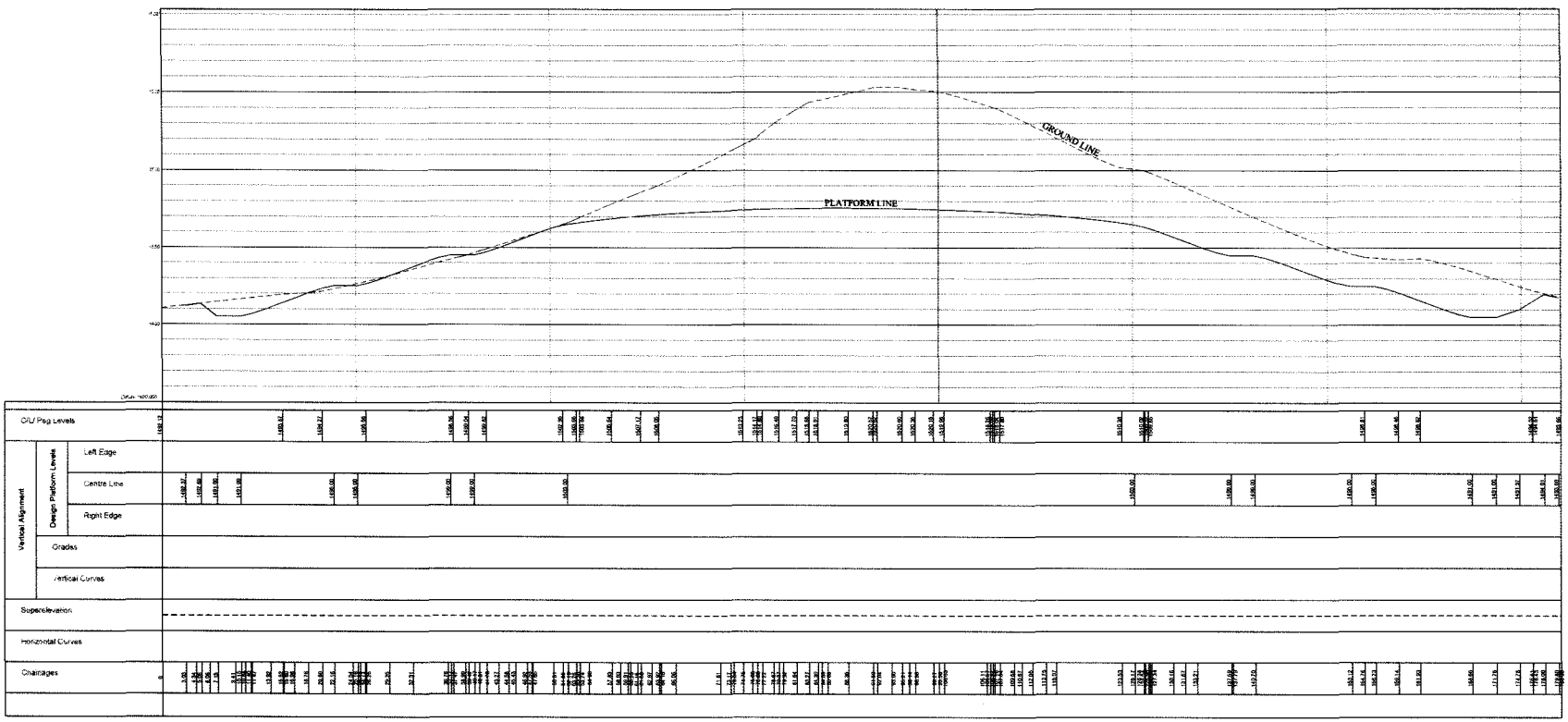
Scale 1:1250

Surveyors: SABLE SURVEYS CC
Coordinate System: WG29
Client: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT
Contract: TERRATEST
Title: P604 BP08 BORROW PIT SURVEY AND PLATFORM DESIGN
Drawing No:
Rev No:



Long Section for 0.00 to 137.79 (BP25 TO BP26)

DATE: 25 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT							SCALES
DRAWN BY GORDON DRAKE								Horizontal Scale :500 Vertical Scale :500
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 08 SURVEY AND PLATFORM DESIGN					DRAWING No.
SURVEYORS: SABLE SURVEYS CC								



Long Section for 0.00 to 180.05 (BP27 TO BP28)

DATE: 25 MAY 2011	CLIENT: EASTERN CAPE DEPARTMENT OF ROADS AND TRANSPORT			SCALES
DRAWN BY GORDON DRAKE				Horizontal Scale :600
DESIGNED BY SABLE SURVEYS CC	ENGINEERS: TERRATEST		TITLE: P604 BORROW PIT 08 SURVEY AND PLATFORM DESIGN	Vertical Scale :600
SURVEYORS: SABLE SURVEYS CC				DRAWING No.

APPENDIX B
PUBLIC PARTICIPATION PROCESS

terratest
Geotechnical, Environmental
& Earth Science Consultants

Our Ref. 41129/IS

5 July 2011

Eastern Cape Parks Board
PO Box 11235
Southernwood
East London
35200

Submitted via post on 05 July 2011.

ATTENTION: EASTERN CAPE PARKS BOARD

Dear Sir/Madam,

BID'S FOR THE APPLICATION FOR BORROW PITS ALONG NINETEEN ROADS WITHIN THE ALFRED NZO DISTRICT MUNICIPALITY

Attached please find nineteen Background Information Documents (BID) for the Borrow Pit Applications for assorted materials, within the Alfred Nzo District Municipality.

Any comments are to be directed to the details provided hereunder or on the BID's. Please note that comments are to be extended before the 26 July 2011.

Yours faithfully,

Imke Summers
FOR: TERRATEST (Pty) Ltd

Email: summersi@terratest.co.za

terratest
Geotechnical, Environmental & Earth Science Consultants

Our Ref. 41129/IS

5 July 2011

South African Heritage Resource Agency
PO Box 759
Southernwood
East London
5200

Submitted via post on 05 July 2011.

ATTENTION: SAHRA

Dear Mr T. Lungile

BID'S FOR THE APPLICATION FOR BORROW PITS ALONG NINETEEN ROADS WITHIN THE ALFRED NZO DISTRICT MUNICIPALITY

Attached please find nineteen Background Information Documents (BID) for the Borrow Pit Applications for assorted materials, within the Alfred Nzo District Municipality.

Any comments are to be directed to the details provided hereunder or on the BID's. Please note that comments are to be extended before the 26 July 2011.

Yours faithfully,

Imke Summers
FOR: TERRATEST (Pty) Ltd

Email: summersi@terratest.co.za

terratest
Geotechnical, Environmental
& Earth Science Consultants

Our Ref. 41129/IS

5 July 2011

WESSA
26 Lawrence Street
Central Hill
Port Elizabeth
6001

Submitted via post on 05 July 2011.

ATTENTION: WESSA

Dear Dr. Jenny Gon

BID'S FOR THE APPLICATION FOR BORROW PITS ALONG NINETEEN ROADS WITHIN THE ALFRED NZO DISTRICT MUNICIPALITY

Attached please find nineteen Background Information Documents (BID) for the Borrow Pit Applications for assorted materials, within the Alfred Nzo District Municipality.

Any comments are to be directed to the details provided hereunder or on the BID's. Please note that comments are to be extended before the 26 July 2011.

Yours faithfully,

Imke Summers
FOR: TERRATEST (Pty) Ltd

Email: summersi@terratest.co.za

Alfred Nzo Borrow Pit Investigation Background Information Document P604

Our Reference: 41129

CONTROLAB

Prepared for:
Eastern Cape Transport
Stellenbosch Park
Flemming Street
Schornville
King William's Town
5601

Prepared for:
Controlab CC.
10 St Pauls Rd
East London,
Eastern Cape
5201
Tel: +27 43 722 5420

terratest
Geotechnical, Environmental & Earth Science Consultants

Prepared by:
Terratest (Pty) Ltd
PO Box 794
Hilton
3201
Tel: +27 33 343 6789

BACKGROUND INFORMATION DOCUMENT FOR THE INVESTIGATION AND PROPOSED APPLICATION OF BORROW PITS IN THE ALFRED NZO DISTRICT OF THE EASTERN CAPE

1. Introduction

Terratest (Pty) Ltd was appointed by Controlab CC. on behalf of the Eastern Cape Department of Roads and Transport, to manage the environmental investigation and permitting process of numerous borrow pits in the Alfred Nzo District Municipality. The borrow pits are to be used as a source of materials for the resurfacing of numerous stretches of road throughout the region.

The objective of this Background Information Document (BID) is:

- To provide information and to notify and inform parties regarding the application procedure;
- To invite parties to register as Interested and Affected Parties (IAPs).

2. Site Locality

The borrow pits are located on the P604, which is a gravel road situated approximately 5 km's east of the town of Matatiele (See Figure 1 below). The road starts at the intersection of the R56 (TR01905), and runs for 3.43 km's before it ends at the border between the Eastern Cape and KwaZulu-Natal.

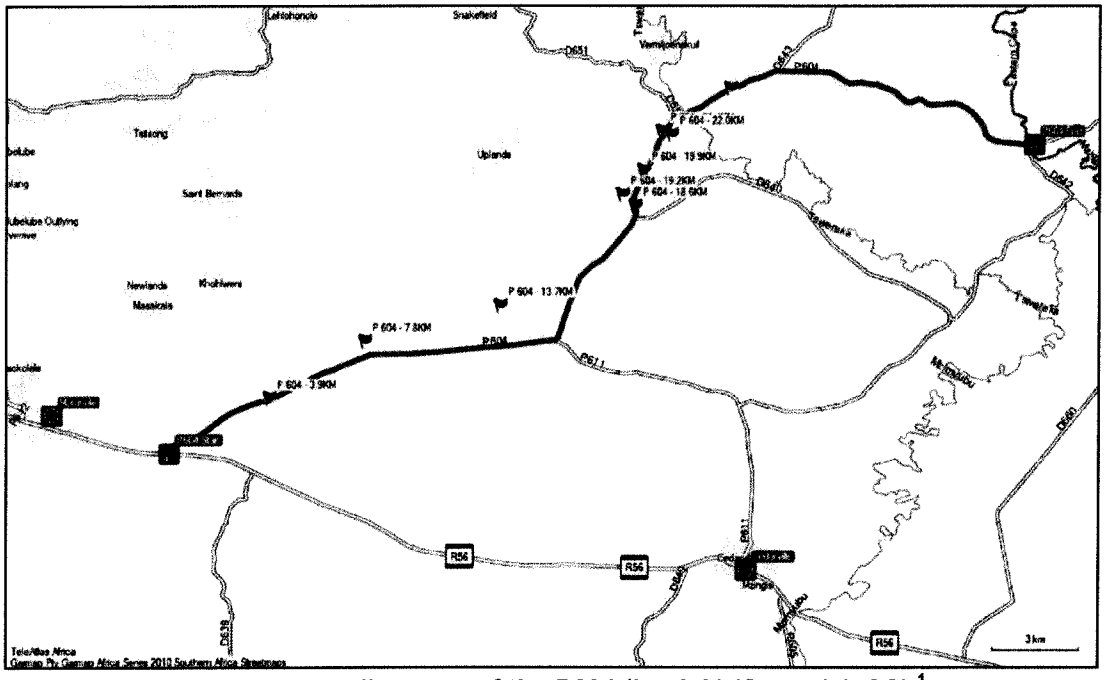


Figure 1. The alignment of the P604 (in pink) (Controlab CC).[1]

[1] Controlab CC., *Geotechnical Borrow Pit Assessment, Initial Assessment Report for the P604*, December 2010.

The key co-ordinate points along the alignment are:

Point	Southerly co-ordinate	Easterly co-ordinate
Borrow Pit 01	S30° 20' 09.5"	E28° 53' 11.9"
Borrow Pit 03	S30° 18' 26.9"	E28° 57' 43.5"
Borrow Pit 04	S30° 16' 36.2"	E29° 00' 21.0"
Borrow Pit 05	S30° 16' 23.7"	E29° 00' 06.2"
Borrow Pit 06	S30° 15' 56.7"	E29° 00' 30.7"
Borrow Pit 07	S30° 15' 13.2"	E29° 00' 52.4"
Borrow Pit 08	S30° 15' 16.8"	E29° 01' 03.7"

3. Description of the Site

Of the eight borrow pits that were sampled, seven were recommended in the Materials Investigation Report (Controlab CC). These borrow pits are established pits that have been mined for materials in the past. Please see the table below for details regarding the location, materials composition and yield of each borrow pit:

Borrow Pit	Km log	Materials composition	Yield
BP 01	3.9km	Shale	High
BP 03	13.7km	Shale and sandstone	High
BP 04	18.6km	Decomposed dolerite and shale	High
BP 05	19.2km	Shale and sandstone	High
BP 06	19.9km	Shale	High
BP 07	21.4km	Sandstone and mudstone	High
BP 08	22.0km	Shale and sandstone	High

4. Project Description

The project entails the formalised permitting of the borrow pits in terms of the Department of Mineral Resources. An area of no more than 1.5ha is to be mined as per the regulations for mining permits. The mined materials are to be used by the Department of Roads and Transport, for the upgrading and rehabilitation of existing surfaces.

The proposed mining method is open cast excavation with a front-end loader and loading onto tipper trucks for transport. The mining operations will be operated in accordance with an approved Environmental Management Programme as per the requirements set out by the Department of Mineral Resources.

5. Heritage Impact Assessment

A Heritage Impact Assessment was conducted for each of the seven borrow pits located along the DR08646. No graves or archaeological artefacts were found on site or in the vicinity of the borrow pits.

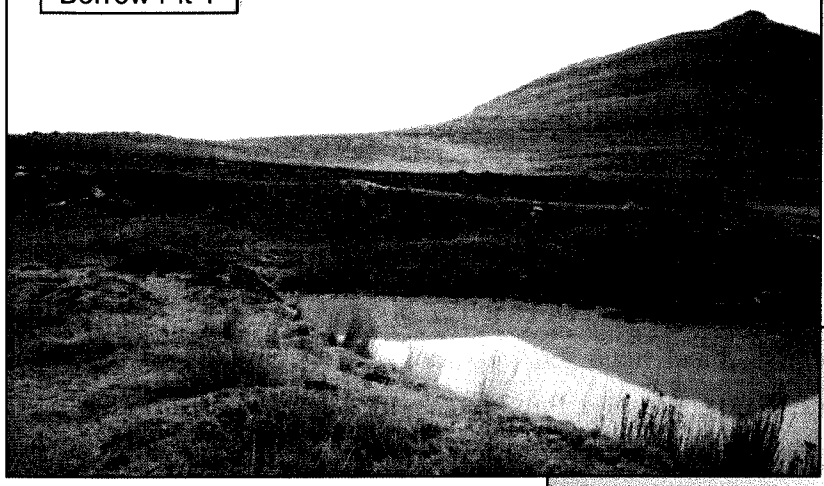
6. How to participate

According to the Environmental Impact Assessment Regulations (2010) promulgated in terms of the National Environmental Management Act (Act 107 of 1998) those who are impacted by a proposed development must have the opportunity to comment and/or raise concerns. These inputs are then addressed through the EIA process. For this reason it is imperative that you as an interested and/or affected party (IAP) comment on the proposed development and highlight issues or concerns that you feel need to be considered during the proposed planning and implementation process. This can be done by contacting the environmental consultant (details given on page 01) who will register you as an IAP. If you intend to register as an IAP please forward the following information to Terratest before **26 July 2011.**

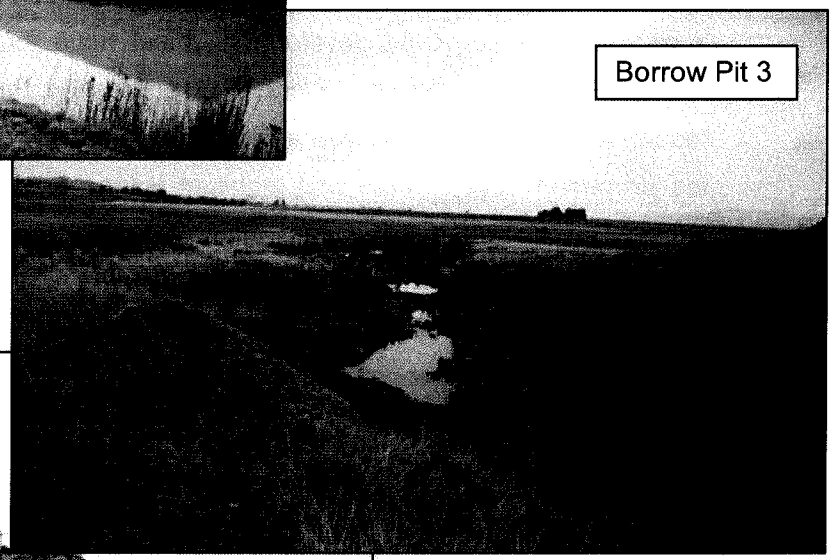
- **Your Name**
- **Your Contact Details**
- **Your Comment**

A comments form is attached in Appendix A.

Borrow Pit 1

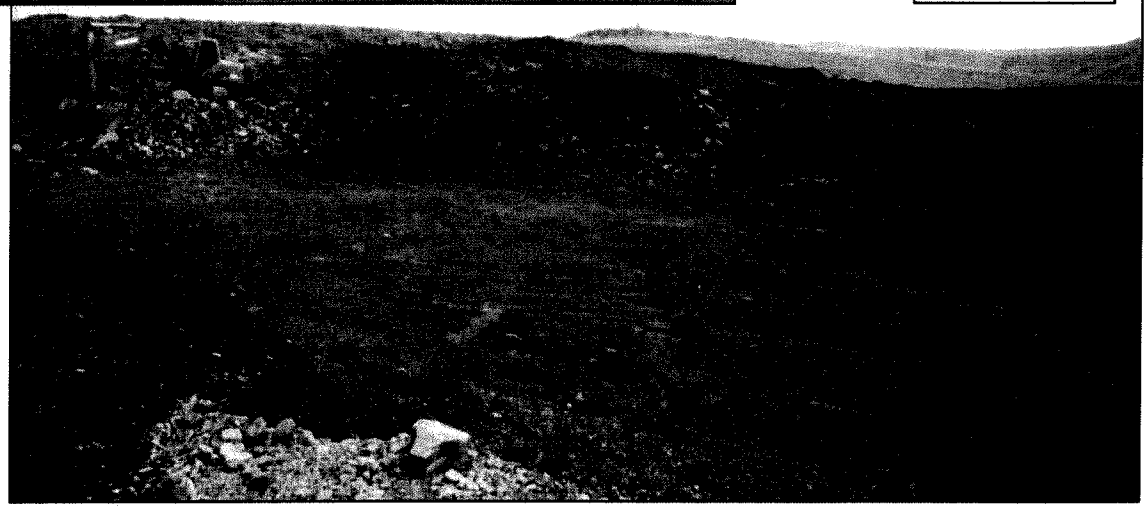


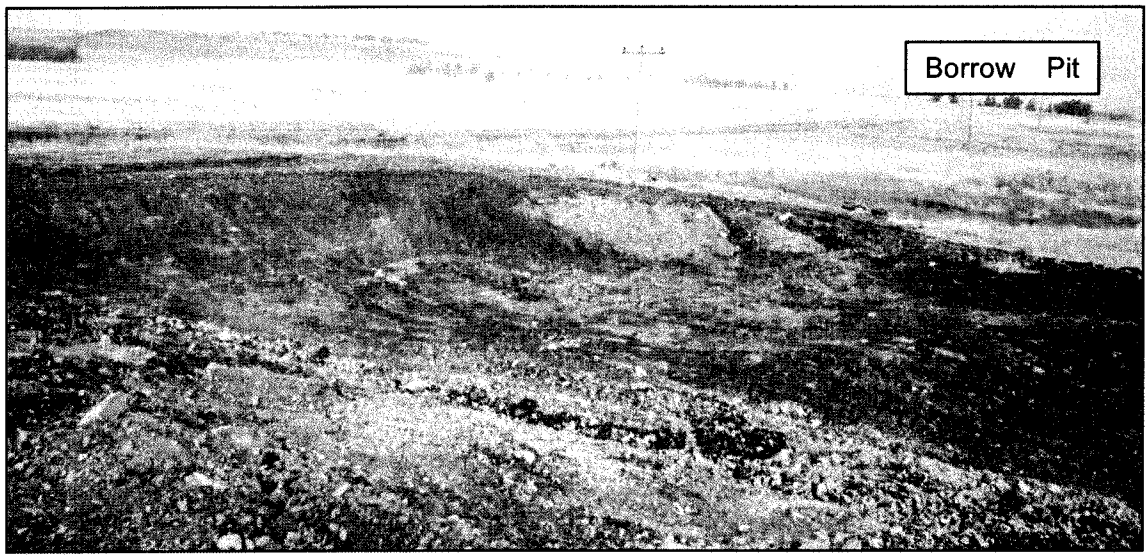
Borrow Pit 3



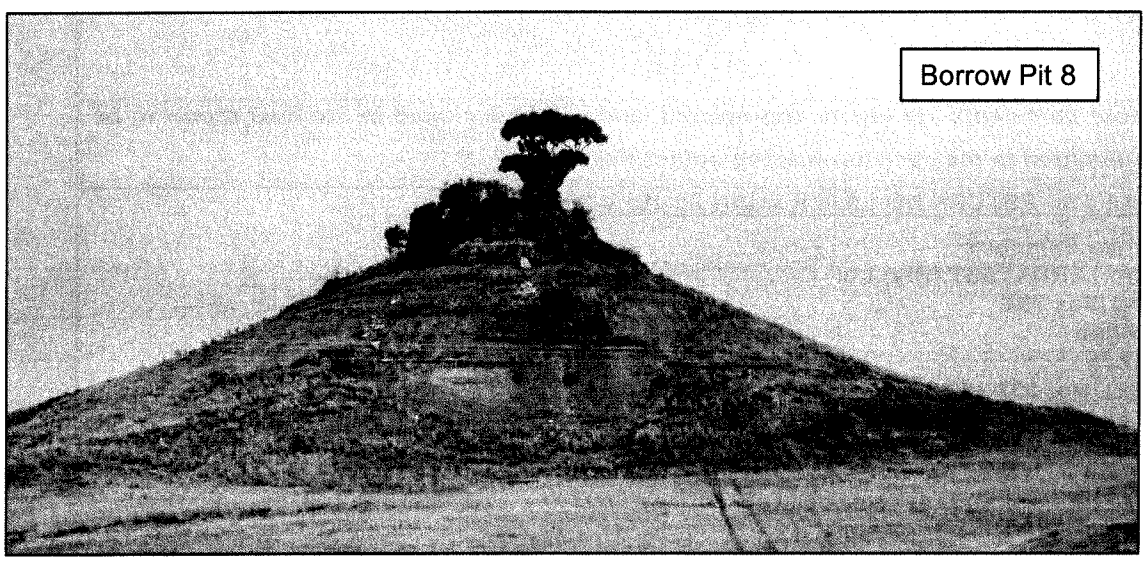
Borrow Pit 4

Borrow Pit 5




Borrow Pit


Borrow Pit 7


Borrow Pit 8

Appendix A – Comments Forms

REGISTRATION FORM – Our Ref - 41129
Name: **Surname** **Address:**   **Postal Code:** **Tel No:** **Fax No:** **Cell No:** **e-mail :**
Comments: (add extra pages should you need)
Do you require any additional information?
Other parties which you think should be included in the process:
Your comments are highly appreciated, and will be included in the final report to be submitted to the decision-making authorities.
PLEASE RETURN NO LATER THAN 26 JULY 2011 TO: **Imke Summers** **c/o TERRATEST (Pty) Ltd** **PO Box 794** **Hilton** **3245** **TEL No: 033 343 6789** **Fax No: 033 343 6788** **e-mail: summersi@terratest.co.za**

Please Detach and Return to Terratest

terratest
Geotechnical, Environmental & Earth Science Consultants

Your Ref.....
Our Ref. 41129

6th July 2011

.....

.....

.....

ATTENTION: .....

Dear Sir/ Madam

ALFRED NZO MASIPALA WENDAWO, ISICELO SE KWARI, INCWADI YESAZISO.

Isebe lezendlela nemisebenzi(Roads and Public Works) kwiphondo lase Mpumakoloni lijongene nohlelo logunyaziso lwekwari kwindawo zonke ezikwi nginqi kaMasipala wase Alfred Nzo. Koluhlelo isebe licele iTerratest (Pty) Ltd (inkampani yenzululwazi) ukuthatha ingxaxheba malunga nokhuseleko lwezendalo ngalomsebenzi.

Esi sicelo sokombiwa kwekwari sifakwa lisebe leZembiwa (Mineral Resources) elikwi Phondo leMpumakoloni (Eastern Cape Province), elonana lingunyazisa ukusetyenziswa kwezombiwa kwindawo zonke ze-Phondo.

Inkosi ithathwe ingu mnikazi mhlaba okanye ummeli wesizwe salondawo kucelwa imvume yekwari. Ukuba umhlali unamava malunga nolomsebenzi ocelwa nguRhulumenti, maka thethe phambi **koLwesihlanu, 5 August 2011** nalomtu ulandelayo:

Imke Summers
Address: PO Box 794
Hilton
3245
Email: summersi@terratest.co.za
Tel: 033 343 6789
Fax: 033 343 6788

Okanye athethe nomgunyazisi weleta.

Ngokuzithoba,

Magnus van Rooyen
(for TERRATEST)

terratest
Geotechnical, Environmental & Earth Science Consultants

Your Ref.
Our Ref. 41129

6th July 2011

.....

.....

.....

ATTENTION:.....

Dear Sir/ Madam

ALFRED NZO, MASEPALA WA SETEREKE, KOPO YA KWARI, LENGOLO LA TSIBISO.

Lefapha la tsa Mmila le Mesebetsi (Roads and Public Works) Eastern Cape le shebane le ho nehana ka tumello ya tshebediso ya sebaka sa majwana / kwari(borrow pit) sebakeng sa Masepala wa Alfred Nzo.

Mosebetsing oo, ho kgethuwe ditsibi tsa mokgatlo waTerratest (PTY) LTD ho shebana le tsa tlhokomelo ya tikoloho (dihlodilweng).
Kopo ya mosebetsi e kengwa ke lefapha la tsa Diepuwa (Mineral Resources) Eastern Cape Province, leo e leng lona le nang le matla a ho fana ka tumello ya ho sebedisa diepuwa Lebatoweng.

Morena o kgethuwe e le monga mobu/sebaka kapa moemedi setjhabeng seo ho kentsweng kopo ya tshebediso ya kwari. Ha e ba ho le teng motho ya nang le tlhahiso mabapi le mosebetsi ona o kupuweng ke Kgoromente , o kopjwa hore a hlahise maikutlo a hae pele ho letsatsi la

Labohlano, 5 Phato (August) 2011, a ka buwa le : Imke Summers

Address: PO Box 794
Hilton
3245
Email: summersi@terratest.co.za
Tel: 033 343 6789
Fax: 033 343 6788

Kapa a buwe le mongodi wa lengolo lena dinomorong tse beilweng.

Ka boikokobetso

Magnus van Rooyen
(for TERRATEST)

terratest
Geotechnical, Environmental & Earth Science Consultants

Your Ref:
Our Ref: 41129

11 July 2011

svandeventer@mtnloaded.co.za

ATTENTION: Mr Faan van Deventer

Dear Sir

ALFRED NZO DISTRICT MUNICIPALITY BORROW PIT APPLICATIONS LETTER OF NOTIFICATION, P604

The Eastern Cape Department of Roads and Public Works has embarked on the borrow pit authorisation process for borrow pits in the whole of the Alfred Nzo District Municipality area. To this end Terratest (Pty) Ltd has been appointed to conduct the environmental services associated with these applications.

The applications for these borrow pits are lodged with the Department of Mineral Resources in the Eastern Cape Province who is the authority for awarding permits for the use of minerals in all properties within the Province.

The reader has been identified as a landowner or community representative for the locality of some of the borrow pits that are being applied for. If the reader has any comment regarding the Department's intention to apply for borrow pits in these areas, please forward them to the contact person indicated below before **Friday 5 August 2011**.

Contact Person:	Imke Summers
Address:	PO Box 794 Hilton 3245
Email:	summersi@terratest.co.za
Tel:	033 343 6789
Fax:	033 343 6788

Should you require any additional information please do not hesitate to contact the undersigned.

Yours sincerely,

Magnus van Rooyen
(for TERRATEST)

terratest
Geotechnical, Environmental
& Earth Science Consultants

Your Ref:
Our Ref: 41129

11 July 2011

maz@futurenet.co.za

ATTENTION: Mr Bruce Joyner

Dear Sir

ALFRED NZO DISTRICT MUNICIPALITY BORROW PIT APPLICATIONS LETTER OF NOTIFICATION, P604

The Eastern Cape Department of Roads and Public Works has embarked on the borrow pit authorisation process for borrow pits in the whole of the Alfred Nzo District Municipality area. To this end Terratest (Pty) Ltd has been appointed to conduct the environmental services associated with these applications.

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Contact Person:	Imke Summers
Address:	PO Box 794
	Hilton
	3245
Email:	summersi@terratest.co.za
Tel:	033 343 6789
Fax:	033 343 6788

Should you require any additional information please do not hesitate to contact the undersigned.

Yours sincerely,

Magnus van Rooyen
(for TERRATEST)

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

L. K. NDLUNGA

BOX 422

MATATIELE 4730 Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie brief is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100.00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering tot R2 000.00 is beskikbaar en is slegs op binnelandse geregisteerde briewe van toepassing.

Postage paid R _____ c
Service fee / Diensgeld R _____ c
Insurance / Versekering R _____ c
Total / Totaal R _____ c

Insured value of contents
Versekerde waarde van inhoud R _____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

REGISTERED LETTER
(with an insurance option)
RD 674 112 045 ZA
CUSTOMER COPY 301027R
klientafskrif

Initial of accepting officer
Paraaf van aanneem-beampte

Date Stamp
Datumstempel

MATATIELE 2 23-07-07

Lebone Litho Printers 011 493 7921 701281

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

V. N GOBOZA

BOX 96

MT FLERE Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Postage paid R _____ c
Service fee / Diensgeld R _____ c
Insurance / Versekering R _____ c
Total / Totaal R _____ c

Insured value of contents
Versekerde waarde van inhoud R _____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

REGISTERED LETTER
(with an insurance option)
RD 674 112 059 ZA
CUSTOMER COPY 301027R
klientafskrif

Initial of accepting officer
Paraaf van aanneem-beampte

Date Stamp
Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

(with an insurance option/met 'n versekeringsopsie)

Post Office

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

D. N MANDELA

BOX 1183

MATATIELE 4730 Postcode / Poskode

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Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Affix Track and Trace

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(with an insurance option)
RD 674 111 645 ZA
CUSTOMER COPY 301027R

Initial of accepting officer

Paraaf van aanneem-beampte

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REGISTERED LETTER
GEREGISTREERDE BRIEF

(with an insurance option/met 'n versekeringsopsie)

Post Office

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

SONWABILE Mngeneli

BOX 33

CEDARVILLE Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Postage paid R ____ c
Service fee / Diensgeld R ____ c
Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
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(with an insurance option)
RD 674 111 654 ZA
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REGISTERED LETTER
GEREGISTREERDE BRIEF

(with an insurance option/met 'n versekeringsopsie)

Post Office

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

COUNCILLOR STUURMAN

BOX 101 47

MATATIELE 4730 Postcode / Poskode

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Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

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RD 674 111 668 ZA
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Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

MR MAZARENI

BAG 139

MALUT

4740 Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

REGISTERED LETTER
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RD 674 112 062 ZA
CUSTOMER COPY 301027R
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Date Stamp
MAATATELE
2
2011-07-07
4730
Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Cllr V. Makaula

Box 68070

MT FRERE Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

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Toll-free number
Tolvry nommer
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RD 674 112 076 ZA
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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Councillor S. CEKESHE

Box 309

MT FRERE Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic regis letters only.

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Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

Affix Track and Trace
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Date Stamp
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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

GWANGWA

Box 11

MOUNT FRERE Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

Affix Track and Trace
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CUSTOMER COPY 301027R

Paraaf van aaneem-beampte

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2011-07-07
4730
Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

PATRICK Zolile BONO

BOX 1687

MATATIELE 4730

Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Insurance / Versekering R ____ c

Total / Totaal R ____ c

Insured value of contents

Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

REGISTERED LETTER
(with an insurance option)

RD 674 111 566 ZA

CUSTOMER COPY 301027R

klientafskrif

Paraaf van aanneem-beampte

MATATIELE Date Stamp 2 2011-07-07 4730

Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Shukumisa Ndleki

BOX 171

MATATIELE 4730

Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Total / Totaal R ____ c

Insured value of contents

Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

REGISTERED LETTER
(with an insurance option)

RD 674 111 570 ZA

CUSTOMER COPY 301027R

Paraaf van aanneem-beampte

MATATIELE Date Stamp 2 2011-07-07 4730

Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Chief Ludidi

BOX 1503

MATATIELE 4730

Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Insured value of contents

Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

REGISTERED LETTER
(with an insurance option)

RD 674 111 583 ZA

CUSTOMER COPY 301027R

Paraaf van aanneem-beampte

MATATIELE Date Stamp 2 2011-07-07 4730

Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Chief Lupindo

Box 894

4730

Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Insured value of contents

Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

REGISTERED LETTER
(with an insurance option)

RD 674 111 597 ZA

CUSTOMER COPY 301027R

klientafskrif

Paraaf van aanneem-beampte

MATATIELE Date Stamp 2 2011-07-07 4730

Datumstempel

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REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan
Chief Phakamy
Box 1604
MTE
Postcode/Poskode 4730

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Postage paid R ____ c
Service fee / Diensgeld R ____ c
Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Affix Track and Trace
REGISTERED LETTER
(with an insurance option)
RD 674 111 606 ZA
CUSTOMER COPY 301027R

Initial of accepting officer
Paraaf van aaneem-beampte

Date Stamp
MATATIELE 2 2011-07-07 4730
Datumstempel

Lebone Litho Printers 011 493 7921 701281

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan
Chief Makaula
Box 50
MT FRERE
Postcode/Poskode 5090

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Postage paid R ____ c
Service fee / Diensgeld R ____ c
Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Affix Track and Trace
REGISTERED LETTER
(with an insurance option)
RD 674 111 610 ZA
CUSTOMER COPY 301027R

Initial of accepting officer
Paraaf van aaneem-beampte

Date Stamp
MATATIELE 2 2011-07-07 4730
Datumstempel

Lebone Litho Printers 011 493 7921 701281

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan
Bazotho Zilo
Box Mandileni
MT FRERE
Postcode/Poskode 5090

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

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Postage paid R ____ c
Service fee / Diensgeld R ____ c
Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

REGISTERED LETTER
(with an insurance option)
RD 674 111 623 ZA
CUSTOMER COPY 301027R
Plak Volg-en-Spoor-klientafskrif

Initial of accepting officer
Paraaf van aaneem-beampte

Date Stamp
MATATIELE 2 2011-07-07 4730
Datumstempel

Lebone Litho Printers 011 493 7921 701281

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan
Tshangie (Chairman)
Box 369
Matatiele
Postcode/Poskode 4730

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Die waarde van die inhoud van hierdie brief is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100.00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering tot R2 000.00 is beskikbaar en is slegs op binnelandse geregisteerde briewe van toepassing.

Postage paid R ____ c
Service fee / Diensgeld R ____ c
Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

REGISTERED LETTER
(with an insurance option)
RD 674 111 637 ZA
CUSTOMER COPY 301027R
klientafskrif

Initial of accepting officer
Paraaf van aaneem-beampte

Date Stamp
MATATIELE 2 2011-07-07 4730
Datumstempel

Lebone Litho Printers 011 493 7921 701281

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR PROPOSED MINING OF GRAVEL FROM BORROW PITS FOR THE MAINTENANCE OF GRAVEL ROADS IN THE ALFRED NZO DISTRICT MUNICIPALITY AREA OF THE EASTERN CAPE

Notice is hereby given in terms of Regulation 49 of the Regulations published in the Government Notice No. 26275, under Section 22 of the Minerals & Petroleum Resources Development Act (Act No 28 of 2002) of intent to carry out the following activity:
Proposed Activity: Mining of gravel at the Borrow Pits located at km3.9; km7.8; km13.7; km18.6; km19.2; km19.9; km21.4 and km22 along the P604.
Proponent: The project proponent is the Eastern Cape Department of Roads and Transport (DoRT)
Consultant: Terratest (Pty) Ltd, P O Box 794, Hilton 3245, Tel: 033 343 6789, Fax: 033 343 6788. Contact Person: Magnus van Rooyen, e-mail: vanrooyenm@terratest.co.za
In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter to the contact person given above within 21 days from the date of this advertisement.

APPENDIX C
GEOTECHNICAL FEASIBILITY REPORT
HERITAGE IMPACT STUDY

GEOTECHNICAL BORROW PIT ASSESSMENT

INITIAL ASSESSMENT REPORT

FOR

P604

Prepared for:
Province of the Eastern Cape
The Head of Department
Department of Roads and Transport
Eastern Cape Government
Private Bag X0023
BHISHO
5605

Prepared by:
Controlab cc
P O Box 346
EAST LONDON
5200

CONTENTS

EXECUTIVE SUMMARY

This report represents the findings of the visual assessment survey performed on the borrow pits in road P604.

The road is within the Alfred Nzo District Municipality and Matatiele Local Municipality with the start and end co-ordinates as follows:

- Start co-ordinate - S30° 21' 11.2" E28° 51' 13.1"
- End co-ordinate - S30° 15' 28.1" E29° 08' 09.2"

Eight (8) borrow pits were identified on the road:

- BP01 3.9km - Left Hand Side S30° 20' 09.5" E28° 53' 11.9"
- BP02 7.8km - Left Hand Side S30° 19' 06.4" E28° 55' 04.4"
- BP03 13.7km - Left Hand Side S30° 18' 26.9" E28° 57' 43.5"
- BP04 18.6km - Right Hand Side S30° 16' 36.2" E29° 00' 21.0"
- BP05 19.2km - Left Hand Side S30° 16' 23.7" E29° 00' 06.2"
- BP06 19.9km - Left Hand Side S30° 15' 56.7" E29° 00' 30.7"
- BP07 21.4km - Left Hand Side S30° 15' 13.2" E29° 00' 52.4"
- BP08 22.0km - Right Hand Side S30° 15' 16.8" E29° 01' 03.7"

It is recommended that the environmental and materials investigation be approved for the following borrow pit:

Borrow Pit	Km Log	Yield	Material Description
BP01	3.9km	High	Shale
BP03	13.7km	High	Shale and sandstone
BP04	18.6km	High	Decomposed dolerite and shale
BP05	19.2km	High	Shale and sandstone
BP06	19.9km	High	Shale
BP07	21.4km	High	Sandstone and mudstone
BP08	22.0km	High	Shale and sandstone

1. INTRODUCTION

Controlab was appointed by the Department of Roads and Transport, Province of the Eastern Cape for geotechnical borrow pit assessments. The contract number was SCMU 10-08/09-0032. The consultants acting on behalf of the Department of Roads and Transport were the RAMS Joint Venture consisting of Aurecon and Vela VKE.

This report summarises the information collected as part of the initial assessment phase investigation on road P604.

1.1 Terms of Reference

The report is compiled based on the information collected during the first phase investigation on P604 and in accordance to the requirements of the contract document (SCMU 10-08/09-0032).

1.2 Available Information

The information provided to Controlab by the RAMS Joint Venture consisted of the following:

- District Municipality - Alfred Nzo
- Local Municipality - Matatiele
- Road Number - P604
- Start co-ordinate - S30° 21' 11.2" E28° 51' 13.1"
- End co-ordinate - S30° 15' 28.1" E29° 08' 09.2"

2. GENERAL DESCRIPTION OF THE PROJECT

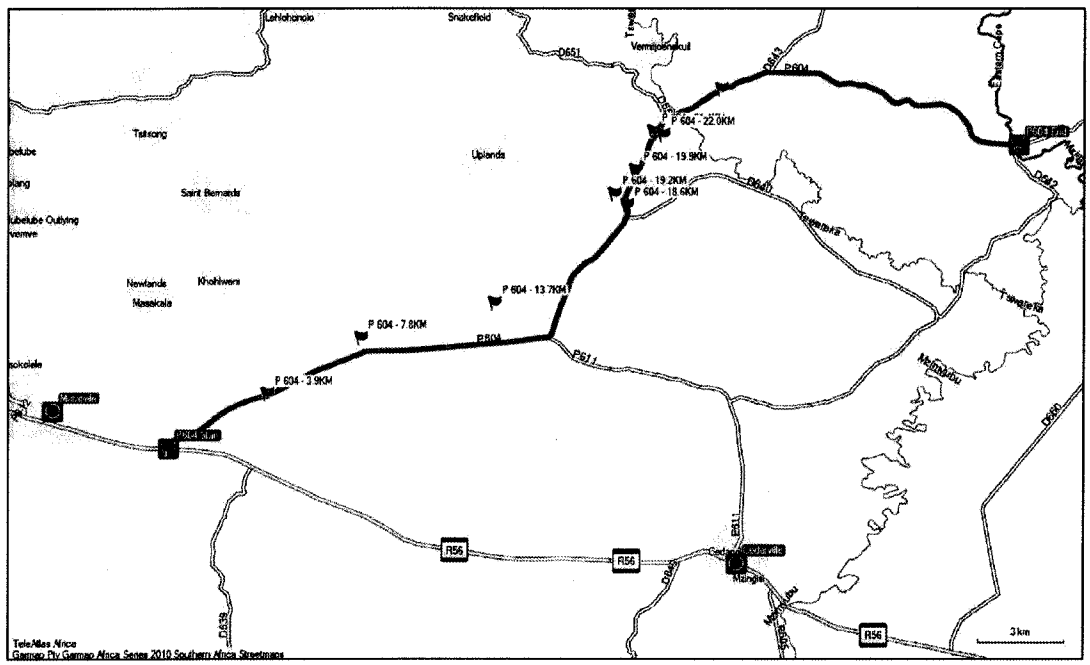
P604 is a gravel road situated approximately 5km east of the town of Matatiele and 19km west of the town of Cedarville within the Province of the Eastern Cape. Cedarville is situated approximately 46km west of Kokstad and falls within the Matatiele Local Municipality. P604 is approximately 3,436km long and runs in a west to east direction. The road starts at the intersection with the R56 (TR01905) and runs in an eastern direction and ends at the border between the Eastern Cape Province and the Province of KwaZulu-Natal.

According to the geological map number 3028 Kokstad published in 1979 by the Chief Director of Surveys and Mapping, the area under investigation falls within the Karoo supergroup, embracing the Beaufort group and Tarkastad subgroup.

The materials in this area would generally consist of medium to fine grained sandstone and mudstones. In the Cedarville area there is dolerite dyke intrusions.

Cedarville normally receives about 598mm of rain per year, with most rainfall occurring mainly during midsummer. It receives the lowest rainfall (3mm) in June and the highest (115mm) in January. The monthly average midday temperatures for Cedarville range from 16.5°C in June to 25.1°C in January. The region is the coldest during July when the mercury drops to 1°C on average during the night.

Wienerts climatic N number for the area is less than 2, which should indicate that the rocks would decompose implying that chemical weathering would dominate over mechanical weathering.



3. OBJECTIVES AND STRATEGIES

The objective with the initial assessment phase investigation is to carry out a visual assessment survey is to identify existing and potential gravel sources prior to performing a detailed environmental study and materials testing. Part of the initial assessment is to identify noticeable constraints at the various borrow pits, identify the material type and identifying whether it would be suitable for expansion.

The strategy followed during the initial assessment can be summarised as follows:

- Getting available information from the RAMS JV
- Contacting the relevant District Municipality
- Programming the project start and end co-ordinates
- Sending the field technician to transverse the road to locate existing borrow pits
- Completing the visual assessment survey form for all identified borrow pits, photographic record of the borrow pit as well as getting co-ordinates of the perimeter of the borrow pit

- Submission of the visual assessment forms to Controlab laboratory for electronic capturing
- Compilation of the initial assessment report.

4. SCOPE OF THE INVESTIGATION

The report deals with eight (8) borrow pits identified on road P604. These borrow pits were situated at the following kilometre references:

➢ BP01	3.9km - Left Hand Side	S30° 20' 09.5"	E28° 53' 11.9"
➢ BP02	7.8km - Left Hand Side	S30° 19' 06.4"	E28° 55' 04.4"
➢ BP03	13.7km - Left Hand Side	S30° 18' 26.9"	E28° 57' 43.5"
➢ BP04	18.6km - Right Hand Side	S30° 16' 36.2"	E29° 00' 21.0"
➢ BP05	19.2km - Left Hand Side	S30° 16' 23.7"	E29° 00' 06.2"
➢ BP06	19.9km - Left Hand Side	S30° 15' 56.7"	E29° 00' 30.7"
➢ BP07	21.4km - Left Hand Side	S30° 15' 13.2"	E29° 00' 52.4"
➢ BP08	22.0km - Right Hand Side	S30° 15' 16.8"	E29° 01' 03.7"

5. VISUAL ASSESSMENT SURVEY

The visual assessment field data sheets are attached in the various appendices.

6. BORROW PIT INFORMATION

The material identified in the various borrows pits were as follows:

- BP01 3.9km Shale
- BP02 7.8km Sandstone
- BP03 13.7km Shale and sandstone
- BP04 18.6km Decomposed dolerite and shale
- BP05 19.2km Shale and sandstone
- BP06 19.9km Shale
- BP07 21.4km Sandstone and mudstone
- BP08 22.0km Shale and sandstone

7. ENVIRONMENTAL CONSIDERATIONS

The environmental constraints noted during the visual assessment were as follows:

- BP01 3.9km - Overhead power lines were noted between the road and the borrow pit
  - Surface water was noted on the floor of the existing borrow pit.
- BP02 7.8km - Hoses are closely situated to the top of the existing face of the borrow pit.
- BP03 13.7km - Surface water was noted on the existing floor of the borrow pit.
- BP04 18.6km - Overhead power lines were noted between the road and the borrow pit.
- BP05 19.2km - No environmental constraints noted.
- BP06 19.9km - Overhead power lines were noted between the road and the borrow pit
  - Surface water was noted on the floor of the existing borrow pit.
- BP07 21.4km - Surface water was noted on the existing floor of the borrow pit.
- BP08 22.0km - Overhead power lines were noted on the side of the borrow pit

8. ASSESSMENT OF SUITABILITY

The suitability for further investigation based on the visual assessment was as follows:

- BP01 3.9km - The borrow pit can be extended in all directions away from the road and into the existing face taking into account the position of the overhead power lines
  - Drainage of surface water must be addressed during expansion
  - Excavators will be required for the extensions.
- BP02 7.8km - Due to the position of the existing houses close to the borrow pit there is no space for expanding the borrow pit.
- BP03 13.7km - The borrow pit can be extended into the existing face
  - Drainage of surface water must be addressed during expansion
  - Excavators will be required for the extensions.
- BP04 18.6km - The borrow pit can be extended in all directions away from the road and into the existing face taking into account the position of the overhead power lines
  - Excavators will be required for the extensions.
- BP05 19.2km - The borrow pit can be extended into the existing face
  - Excavators will be required for the extensions.
- BP06 19.9km - The borrow pit can be extended in all directions away from the

road and into the existing face taking into account the position of the overhead power lines
- Drainage of surface water must be addressed during expansion
- Excavators will be required for the extensions.

- BP07 21.4km - The borrow pit can be extended into the existing face and areas away from the access road and road P604
  - Drainage of surface water must be addressed during expansion
  - Excavators will be required for the extensions.

- BP08 22.0km - The borrow pit can be extended in all directions away from the road taking into account the position of the overhead power lines
  - Excavators will be required for the extensions.

9. ESTIMATED QUANTITIES

An indication of the available quantities based on the visual assessment was as follows:

- BP01 3.9km High
- BP02 7.8km Nil
- BP03 13.7km High
- BP04 18.6km High
- BP05 19.2km High
- BP06 19.9km High
- BP07 21.4km High
- BP08 22.0km High

10. RECOMMENDATIONS

It is recommended that the environmental and material investigation be requested for the following borrow pits:

➢ BP01	3.9km	High	Shale
➢ BP03	13.7km	High	Shale and sandstone
➢ BP04	18.6km	High	Decomposed dolerite and shale
➢ BP05	19.2km	High	Shale and sandstone
➢ BP06	19.9km	High	Shale
➢ BP07	21.4km	High	Sandstone and mudstone
➢ BP08	22.0km	High	Shale and sandstone

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

		Kilometres		South	East
District Municipality	Alfred Nzo				
Local Municipality	Matatiele	Start		30 ° 21 ' 11 "	28 ° 51 ' 13 "
Road Number	P604	End		30 ° 15 ' 28 "	29 ° 08 ' 09.: "

Borrow Pit No. or Source No. :	P604 - 3.9KM - LHS
KM Log from Start co-ord :	3.9KM - Left Hand Side
Estimated Yield :	High
Type of Material :	**Shale**

Borrow Pit Co - ordinates :

S 30 ° 20 ' 9.5 "

E 28 ° 53 ' 11.9 "

Description of Source :	
Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

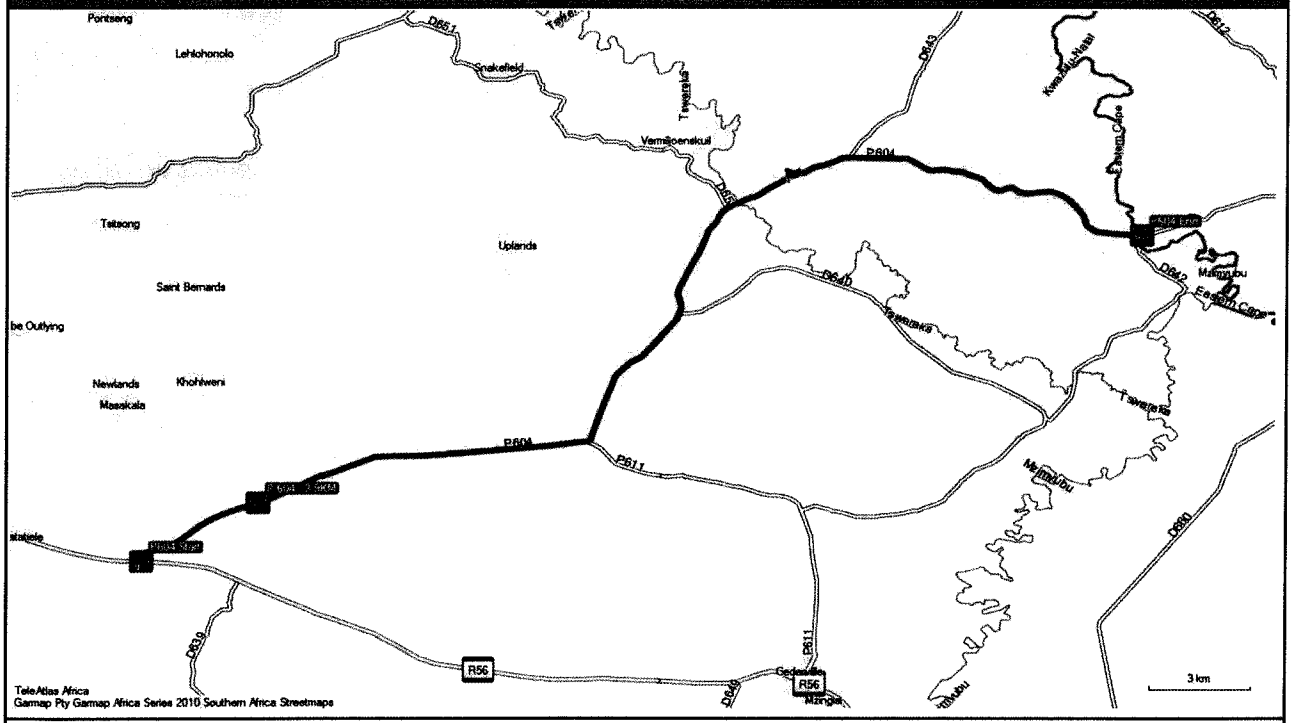
Comments :

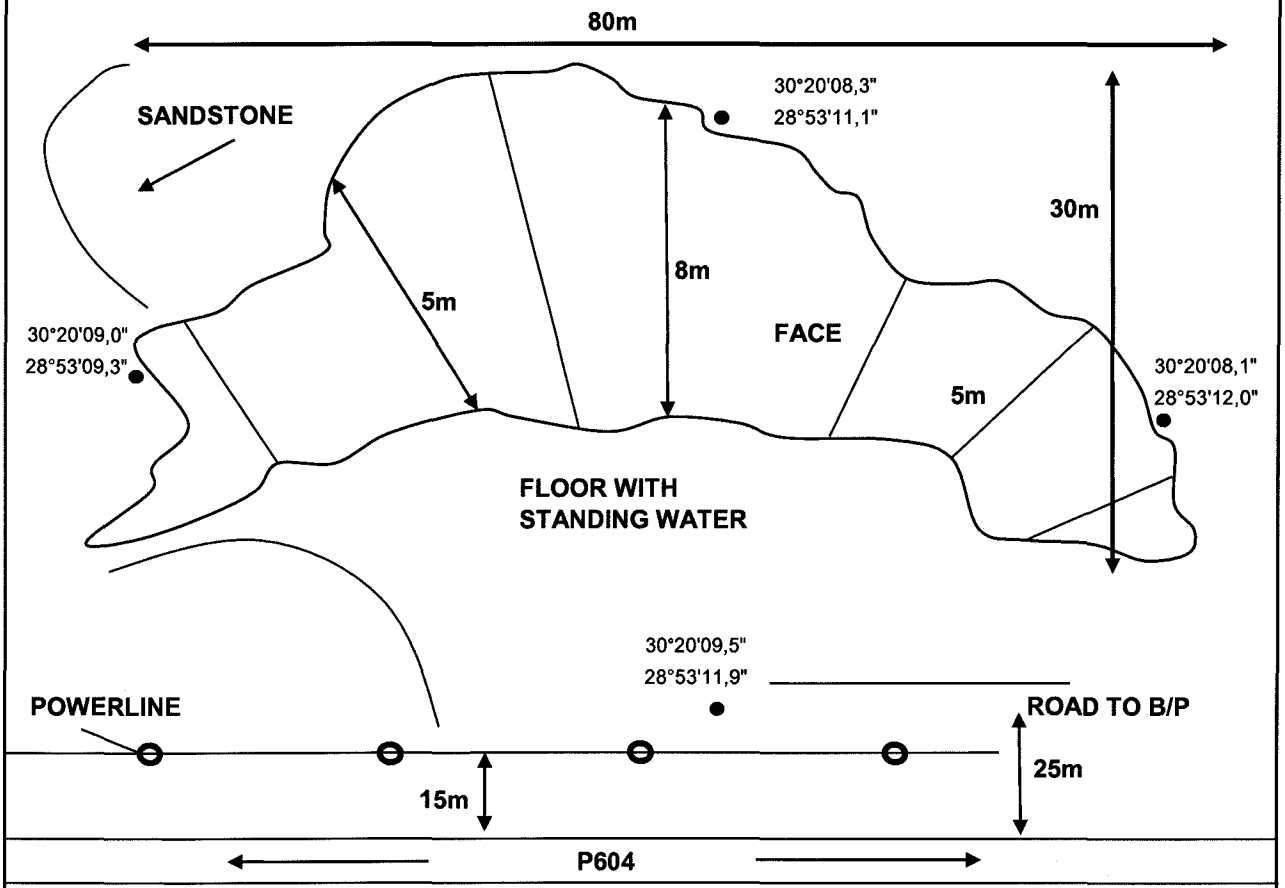
Owner: Bruce Joyner (Tel: 083 501 1611)

Good potential source.

SIGNATURE

DATE:





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : -

b) Depth of Overburden : 300mm

c) Ave Height / Length of Existing Face : 6m

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	
Weathered	X
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	
Weathered	X
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

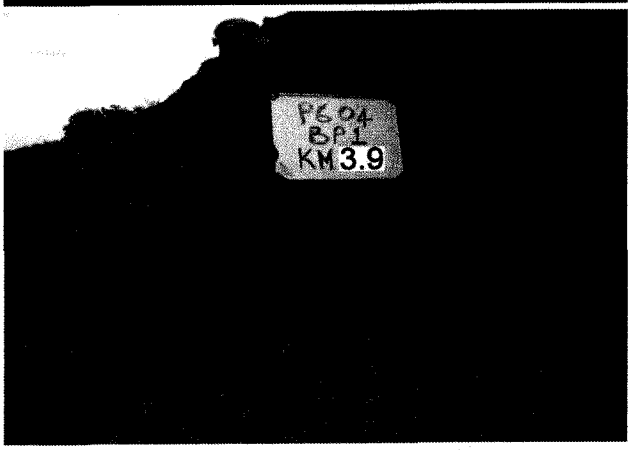
h) Other observations : Can be extended into existing face. Drainage needs attention.

1.3 Possible Constraints

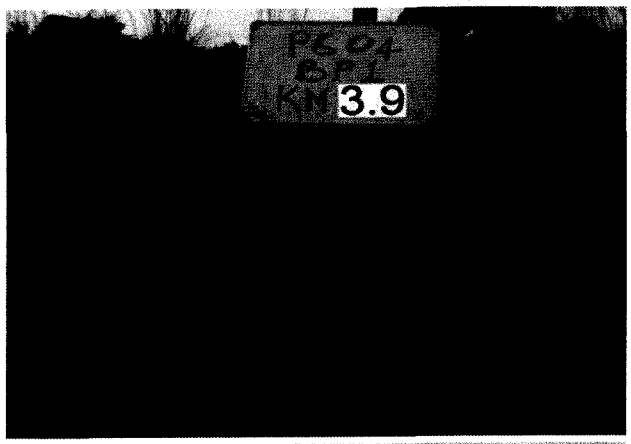
Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance			X
Buildings, structures or human habitation		X	
Power or telephone lines, overhead	X		
Railways		X	
Surface water	X		
Boreholes		X	
Indigenous plant species		X	
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

Comments :

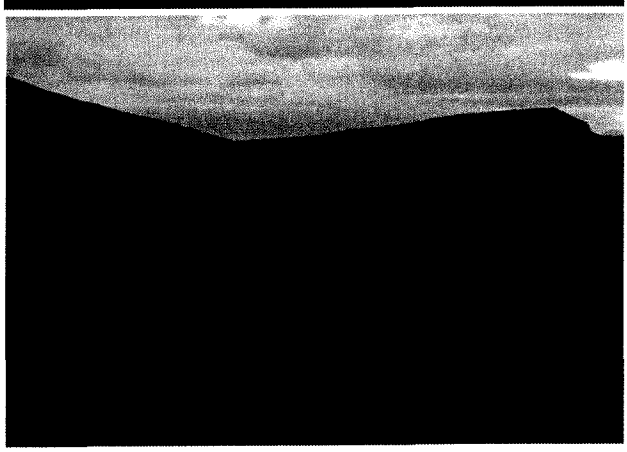
P604
BP1 - 3.9KM
S°20'9.5"
E28°53'11.9"
Face



P604
BP1 - 3.9KM
S°20'9.5"
E28°53'11.9"
Face



P604
BP1 - 3.9KM
S°20'9.5"
E28°53'11.9"
Floor



P604
BP1 - 3.9KM
S°20'9.5"
E28°53'11.9"
General view

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

District Municipality	Alfred Nzo	**Kilometres**		**South**	**East**
Local Municipality	Matatiele	Start		30 ° 21 ' 11 "	28 ° 51 ' 13 "
Road Number	P604	End		30 ° 15 ' 28 "	29 ° 08 ' 09.: "

Borrow Pit No. or Source No. : P604 - 7.8KM - LHS

KM Log from Start co-ord : 7.8KM - Left Hand Side

Estimated Yield : Nil

Type of Material : **Sandstone**

Borrow Pit Co - ordinates :

S 30 ° 19 ' 6.4 "

E 28 ° 55 ' 4.4 "

Description of Source :	
Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

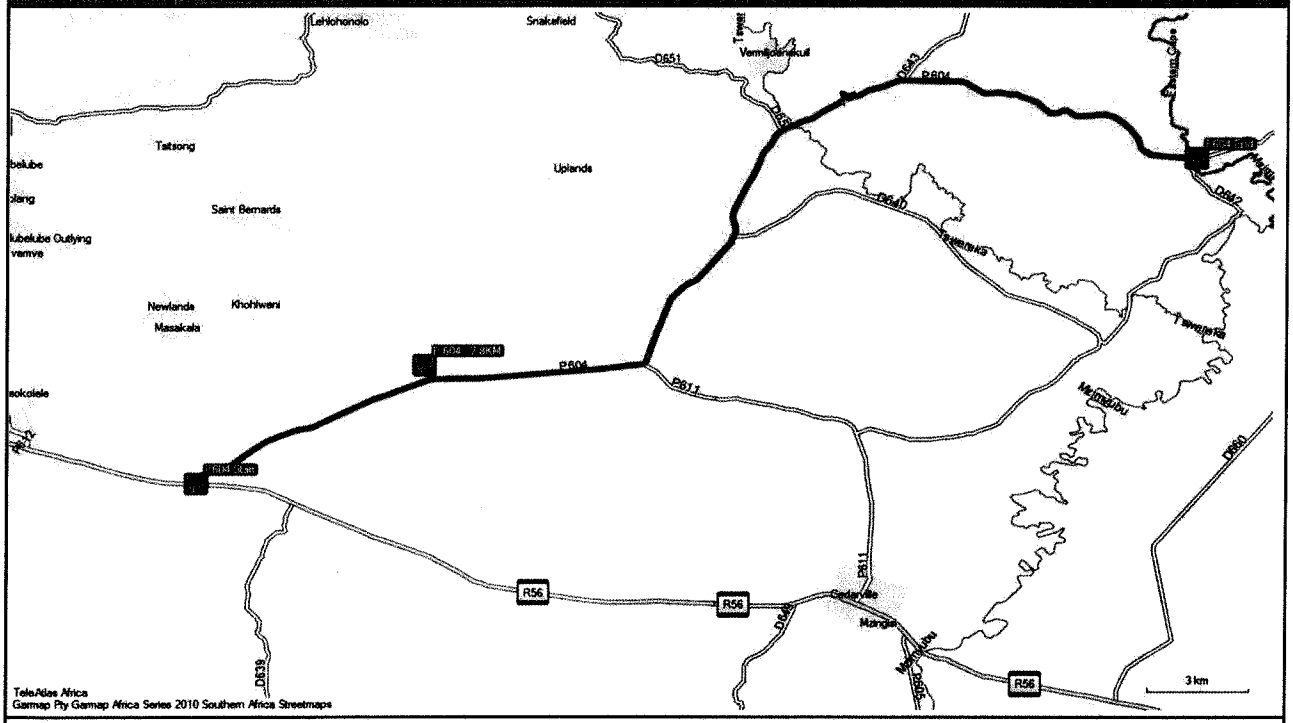
Comments :

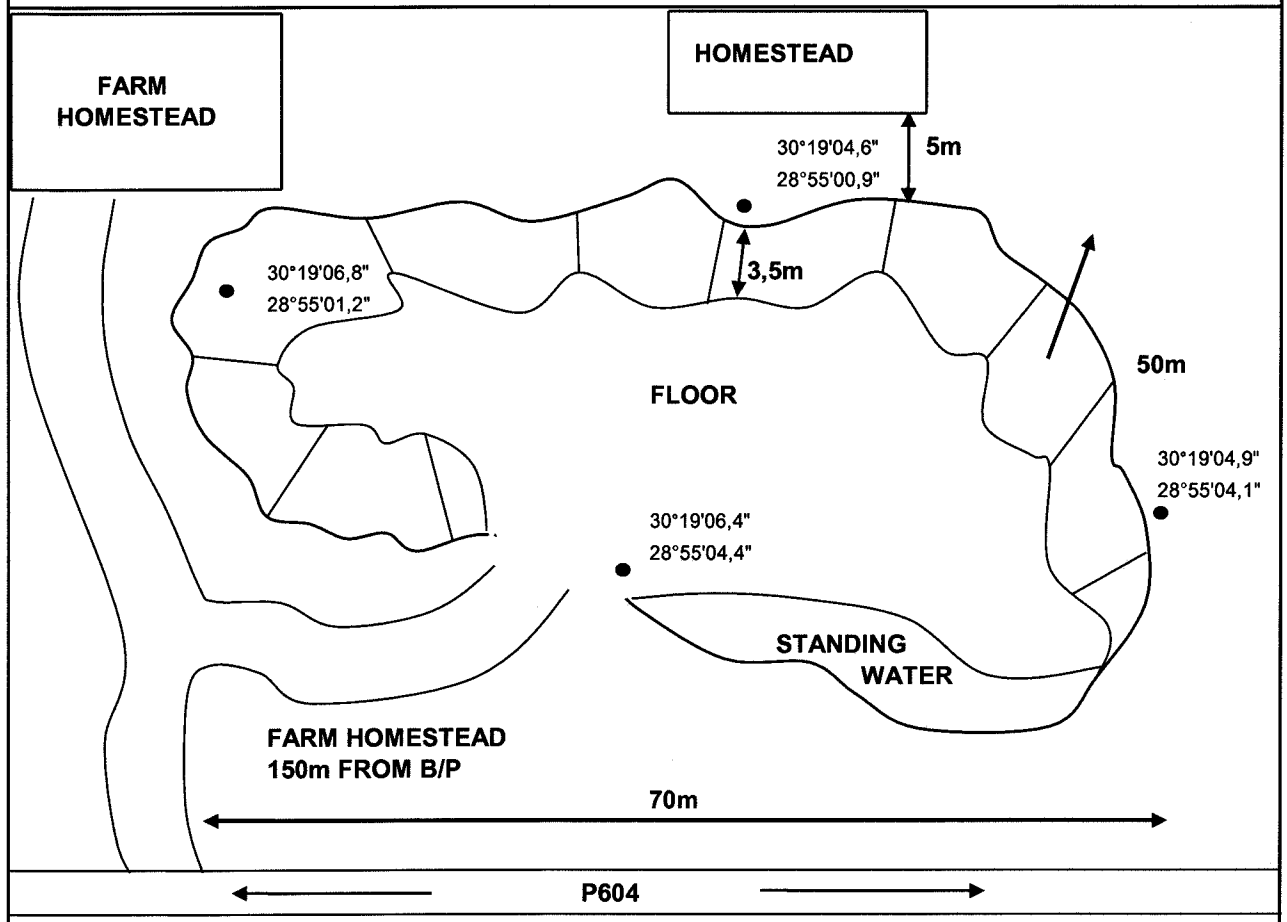
Owner: Ian McDonald (Tel: 083 779 3118)

Cannot be used.

SIGNATURE

DATE:





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : It Br ss

b) Depth of Overburden : 300mm

c) Ave Height / Length of Existing Face : 3.5m

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	
Weathered	X
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	
Weathered	X
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

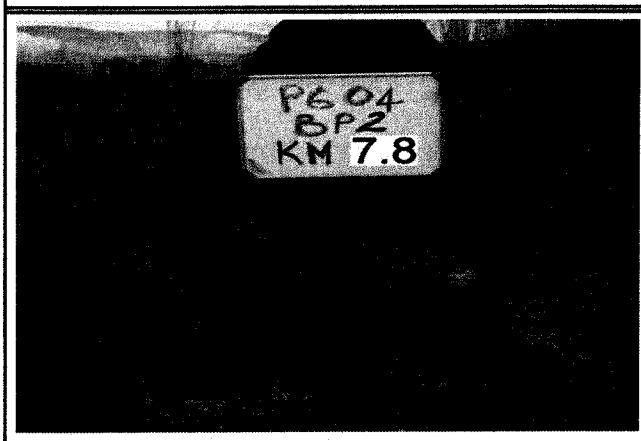
g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

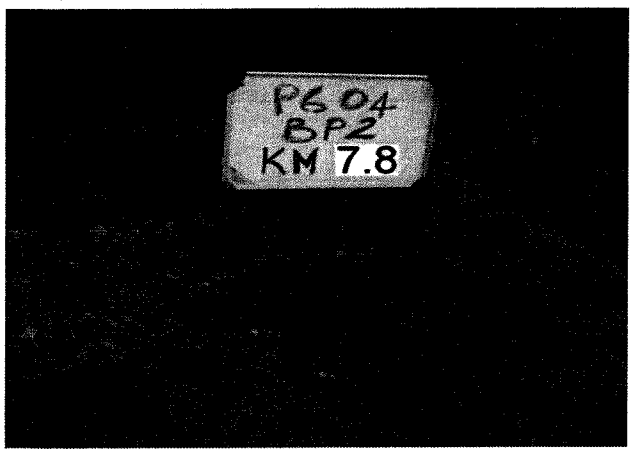
h) Other observations : Too close to existing dwelling.

Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance	X		
Buildings, structures or human habitation	X		
Power or telephone lines, overhead		X	
Railways		X	
Surface water	X		
Boreholes		X	
Indigenous plant species		X	
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

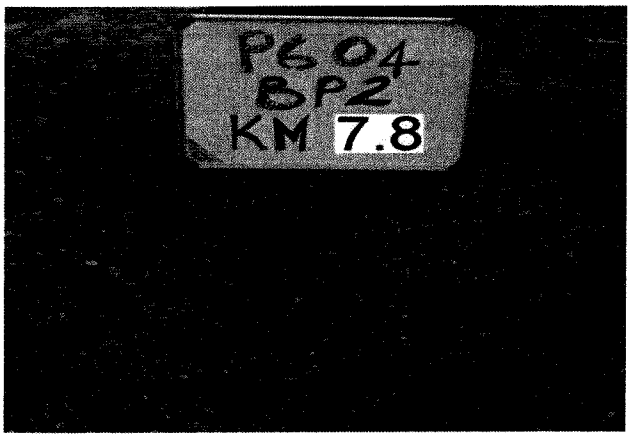
Comments :



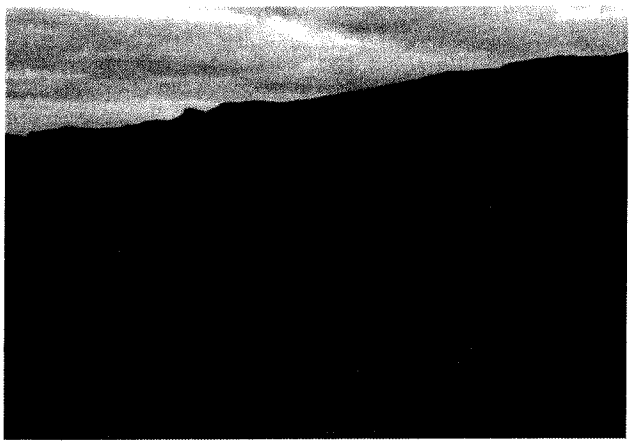
P604
BP2 - 7.8KM
S30°19'6.4"
E28°55'4.4"
Face



P604
BP2 - 7.8KM
S30°19'6.4"
E28°55'4.4"
Face



P604
BP2 - 7.8KM
S30°19'6.4"
E28°55'4.4"
Floor



P604
BP2 - 7.8KM
S30°19'6.4"
E28°55'4.4"
General view

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

		Kilometres		South	East
District Municipality	Alfred Nzo				
Local Municipality	Matatiele	Start		30 ° 21 ' 11 "	28 ° 51 ' 13 "
Road Number	P604	End		30 ° 15 ' 28 "	29 ° 08 ' 09.: "

Borrow Pit No. or Source No. : P604 - 13.7KM - LHS

KM Log from Start co-ord : 13.7KM - Left Hand Side

Estimated Yield : High

Type of Material : **Shale and sandstone**

Borrow Pit Co - ordinates :

S 30 ° 18 ' 26.9 "

E 28 ° 57 ' 43.5 "

Description of Source :	
Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

Comments :

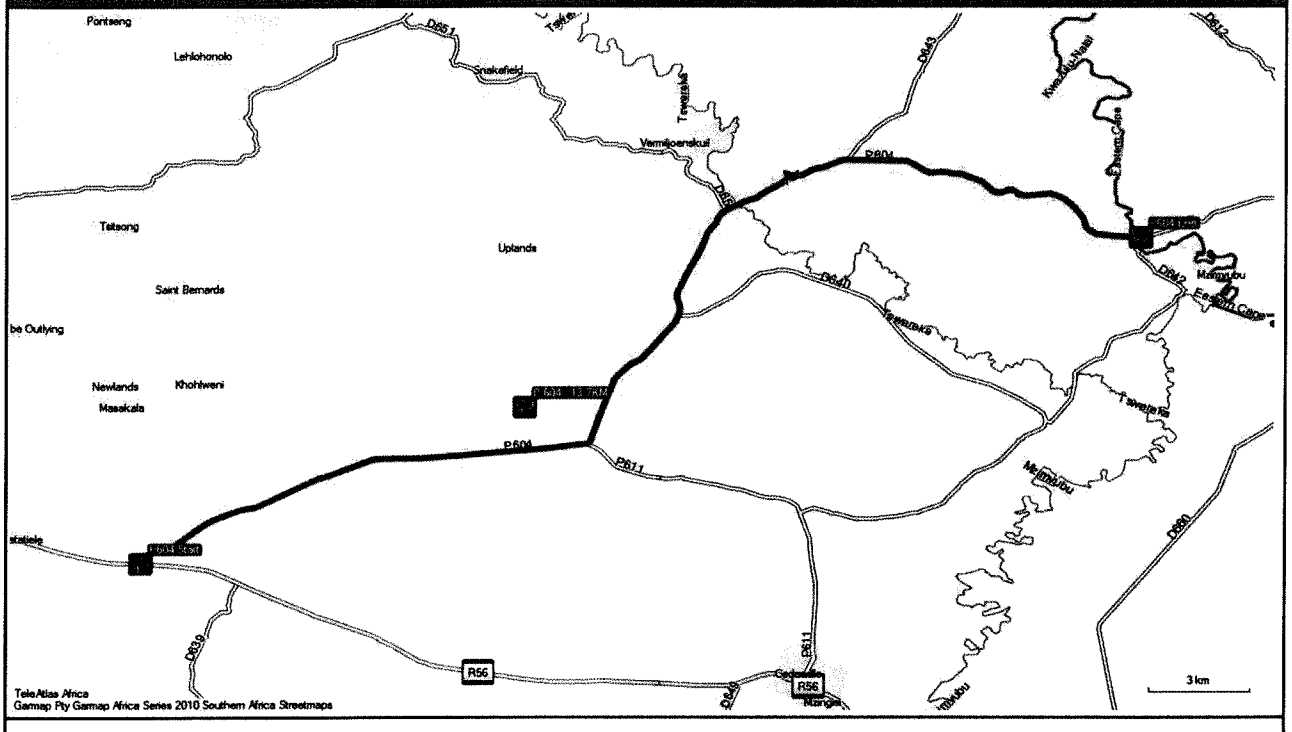
Owner: Faan Van Dewenter (Tel: 083 256 4609)

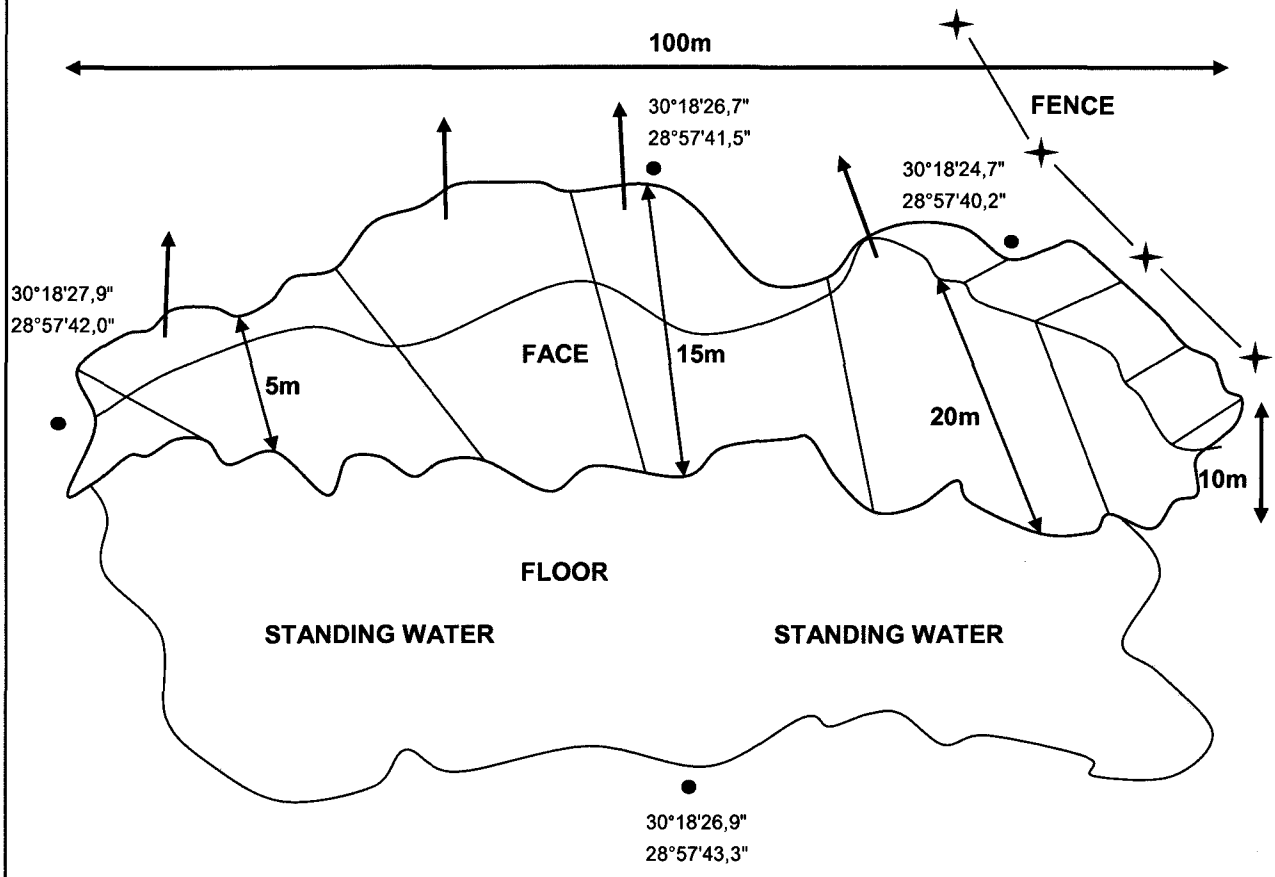
Good potential source.

Owner complains about rehabilitation.

SIGNATURE

DATE:





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : P shale + dk G ss

b) Depth of Overburden : 300mm

c) Ave Height / Length of Existing Face : 15m(H)-100m(H)

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

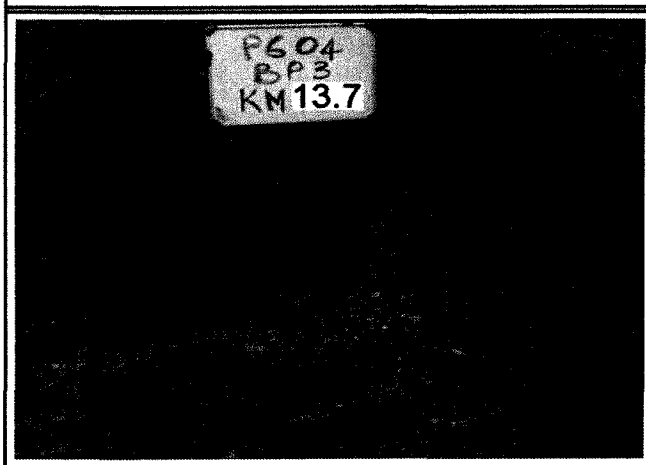
g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

h) Other observations : Can be extended parallel to fence. Fence needs attention. Drainage needs attention.

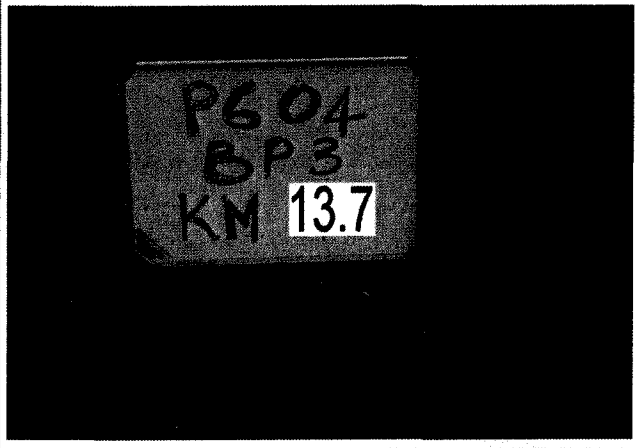
Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance		X	
Buildings, structures or human habitation		X	
Power or telephone lines, overhead		X	
Railways		X	
Surface water	X		
Boreholes		X	
Indigenous plant species			X
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

Comments :

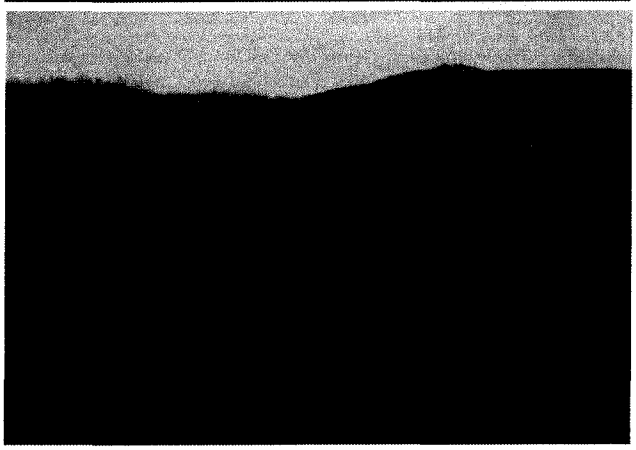


P604
BP3 - 13.7KM
S30°18'26.9"
E28°57'43.5"
Face

P604
BP3 - 13.7KM
S30°18'26.9"
E28°57'43.5"
Face



P604
BP3 - 13.7KM
S30°18'26.9"
E28°57'43.5"
Floor



P604
BP3 - 13.7KM
S30°18'26.9"
E28°57'43.5"
General view

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

District Municipality	Alfred Nzo	**Kilometres**		**South**			**East**	
Local Municipality	Matatiele	Start		**30 ° 21 ' 11 "**			**28 ° 51 ' 13 "**	
Road Number	P604	End		**30 ° 15 ' 28 "**			**29 ° 08 ' 09.: "**	

Borrow Pit No. or Source No. : P604 - 18.6KM - RHS

KM Log from Start co-ord : 18.6KM - Right Hand Side

Estimated Yield : High

Type of Material : **dec Dol and shale**

Borrow Pit Co - ordinates :

S **30 ° 16 ' 36.2 "**

E **29 ° 00 ' 21 "**

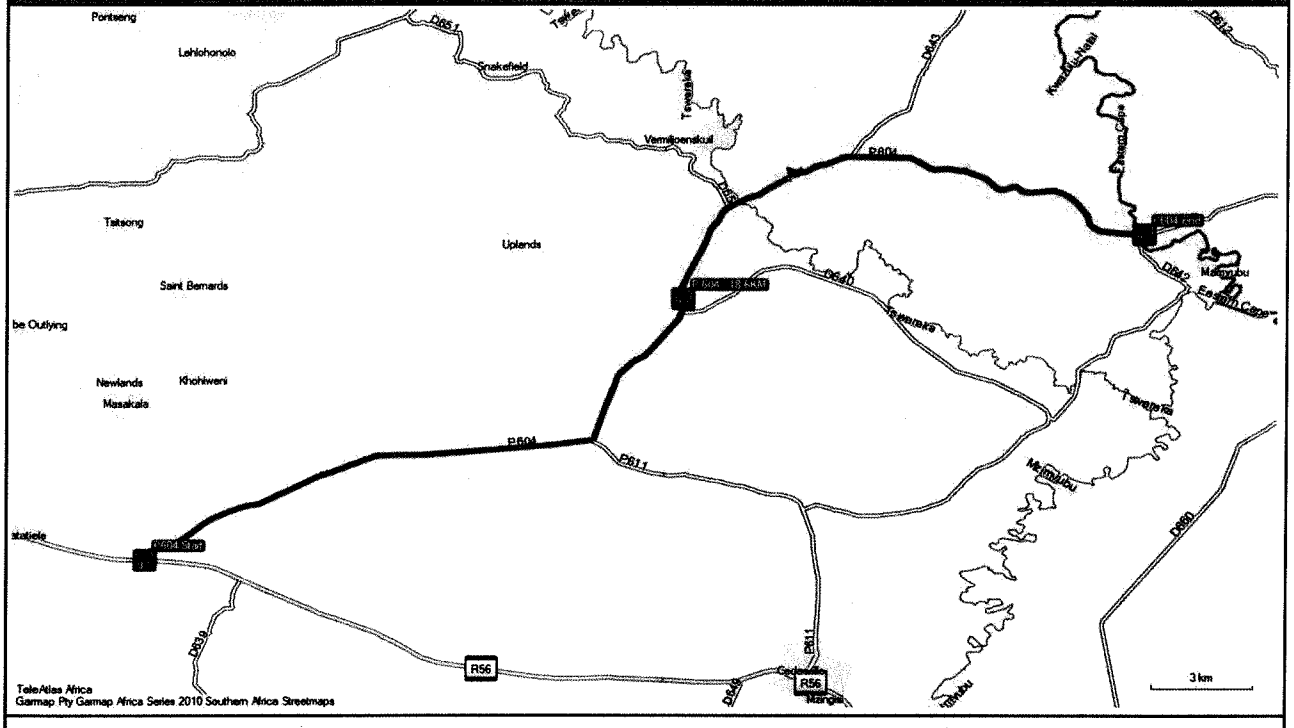
Description of Source :	
Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

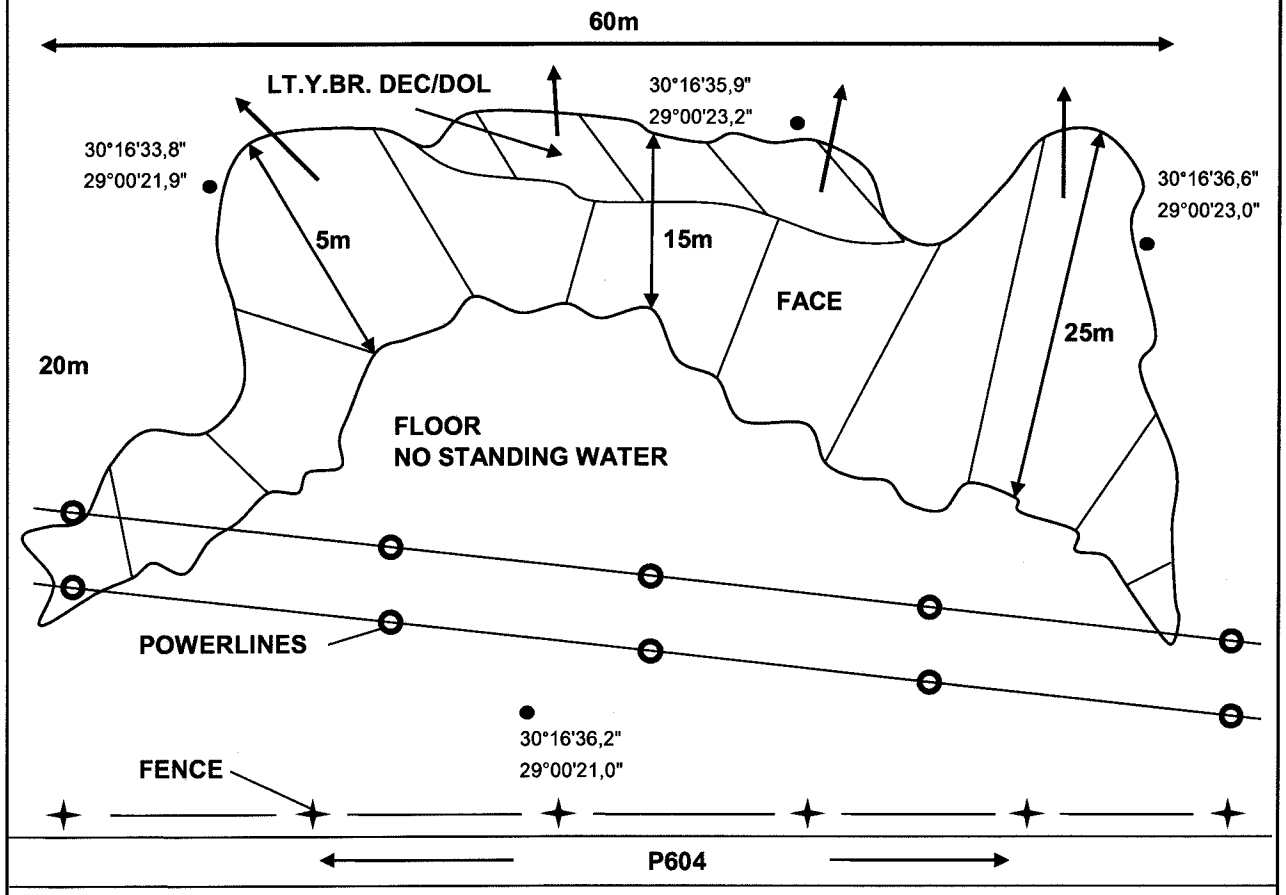
Comments :

Owner: Faan Van Dewenter (Tel: 083 256 4609)

Good potential source.

SIGNATURE **DATE:**





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : Y Br dec Dol + Gr shale

b) Depth of Overburden : 300mm

c) Ave Height / Length of Existing Face : 20m

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

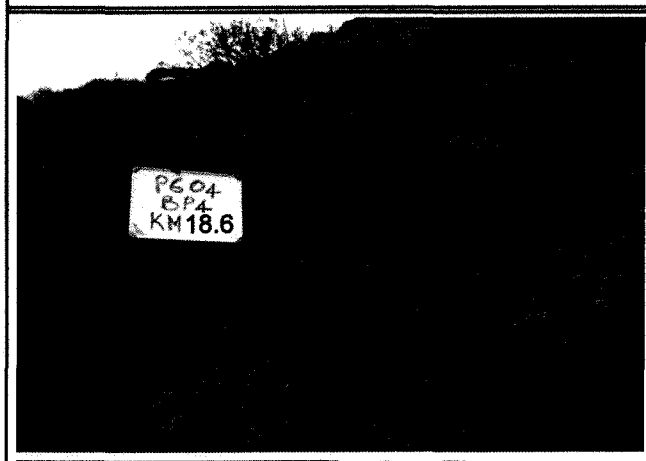
g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

h) Other observations : Could be extended away from road.

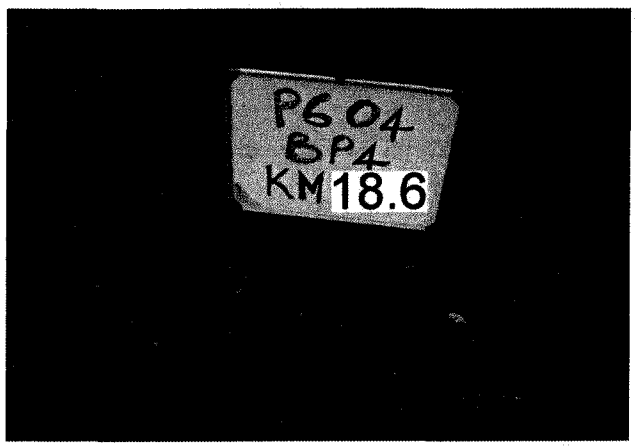
Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance		X	
Buildings, structures or human habitation		X	
Power or telephone lines, overhead	X		
Railways		X	
Surface water		X	
Boreholes		X	
Indigenous plant species		X	
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

Comments :

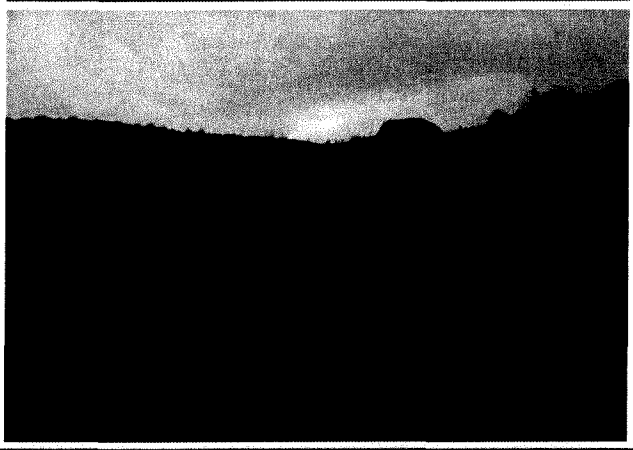


P604
BP4 - 18.6KM
S30°16'36.2"
E29°00'21.0"
Face

P604
BP4 - 18.6KM
S30°16'36.2"
E29°00'21.0"
Face



P604
BP4 - 18.6KM
S30°16'36.2"
E29°00'21.0"
Floor



P604
BP4 - 18.6KM
S30°16'36.2"
E29°00'21.0"
General view

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

		Kilometres		South	East
District Municipality	Alfred Nzo				
Local Municipality	Matatiele	Start		30 ° 21 ' 11 "	28 ° 51 ' 13 "
Road Number	P604	End		30 ° 15 ' 28 "	29 ° 08 ' 09.: "

Borrow Pit No. or Source No. : P604 - 19.2KM - LHS

KM Log from Start co-ord : 19.2KM - Left Hand Side

Estimated Yield : High

Type of Material : **Shale and sandstone**

Borrow Pit Co - ordinates :

S 30 ° 16 ' 23.7 "

E 29 ° 00 ' 6.2 "

Description of Source :

Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

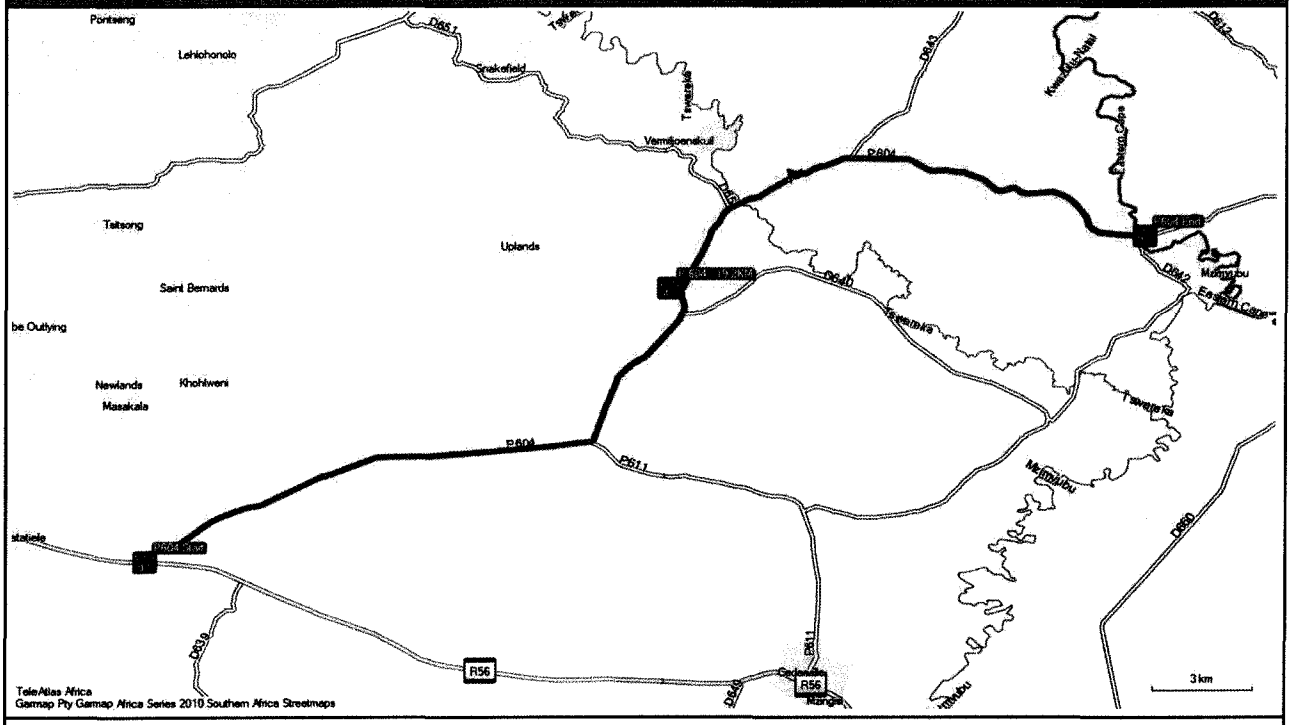
Comments :

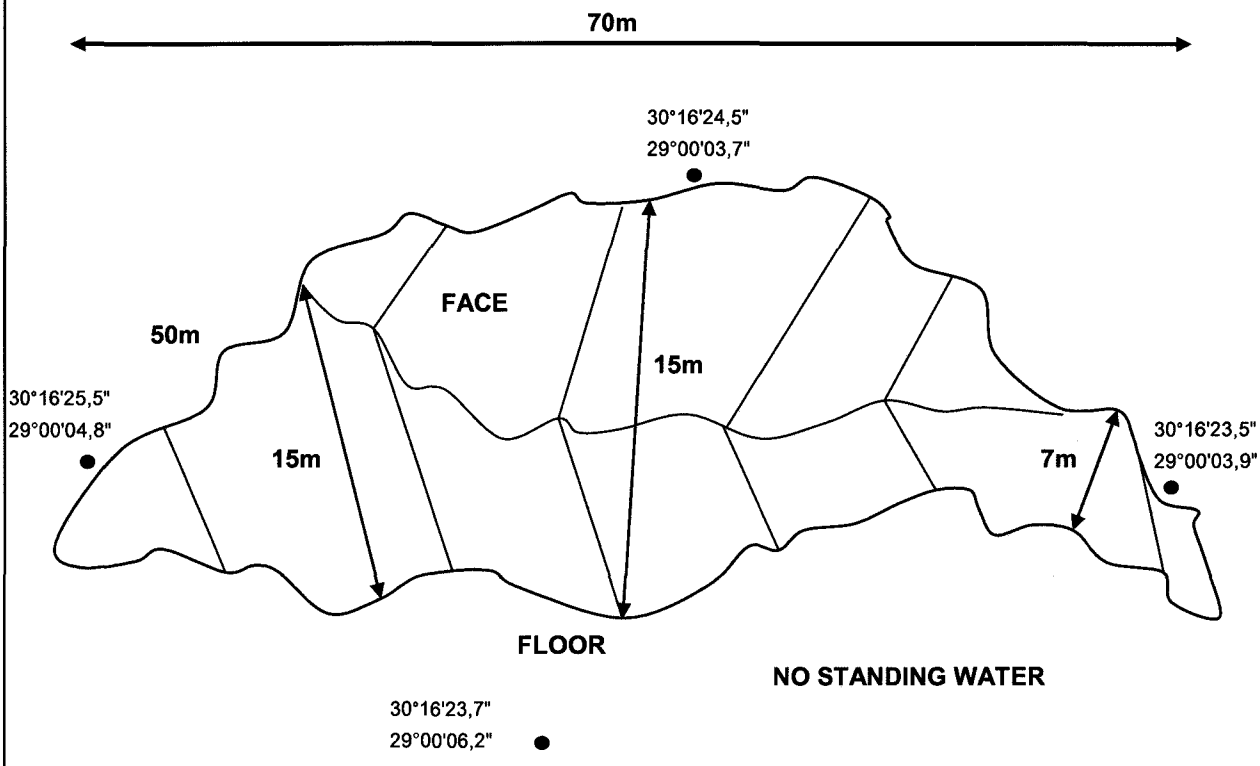
Owner: Ronel & David Marx (Tel: 073 648 5571)

Good potential source.

SIGNATURE

DATE:





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : P shale lt O ss

b) Depth of Overburden : 200mm

c) Ave Height / Length of Existing Face : 15m/70m

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

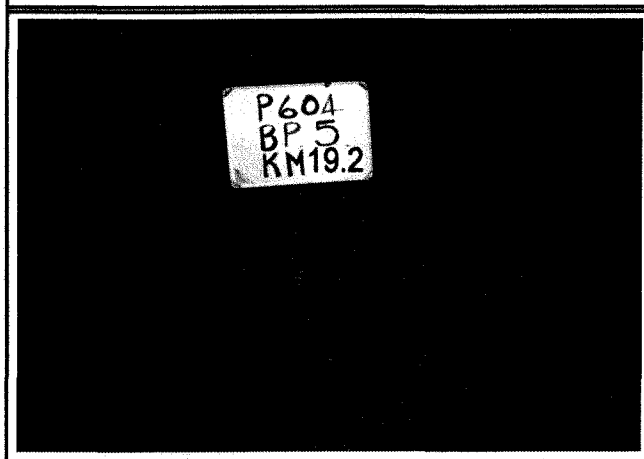
g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

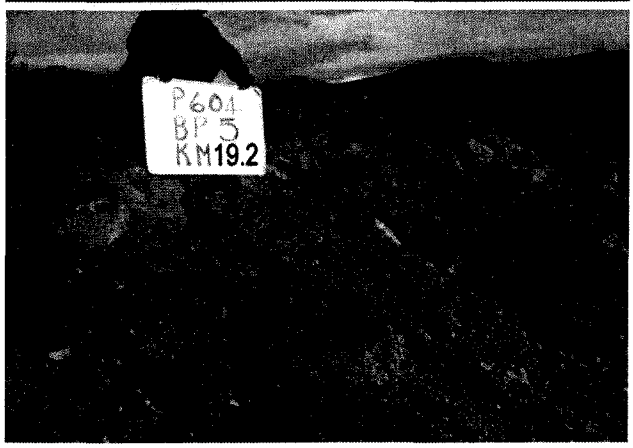
h) Other observations : Can be extended into existing face.

Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance		X	
Buildings, structures or human habitation		X	
Power or telephone lines, overhead		X	
Railways		X	
Surface water		X	
Boreholes		X	
Indigenous plant species		X	
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

Comments :

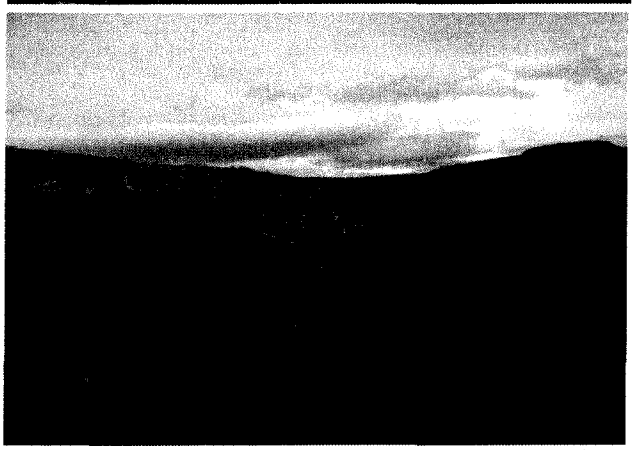


P604
BP5 - 19.2KM
S30°16'23.7"
E29°00'6.2"
Face



P604
BP5 - 19.2KM
S30°16'23.7"
E29°00'6.2"
Face

P604
BP5 - 19.2KM
S30°16'23.7"
E29°00'6.2"
Floor



P604
BP5 - 19.2KM
S30°16'23.7"
E29°00'6.2"
General view

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

				South	East
District Municipality	Alfred Nzo	Kilometres			
Local Municipality	Matatiele	Start		30 ° 21 ' 11 "	28 ° 51 ' 13 "
Road Number	P604	End		30 ° 15 ' 28 "	29 ° 08 ' 09.: "

Borrow Pit No. or Source No. : P604 - 19.9KM - LHS

KM Log from Start co-ord : 19.9KM - Left Hand Side

Estimated Yield : High

Type of Material : **Shale**

Borrow Pit Co - ordinates :

S 30 ° 15 ' 56.7 "

E 29 ° 00 ' 30.7 "

Description of Source :

Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

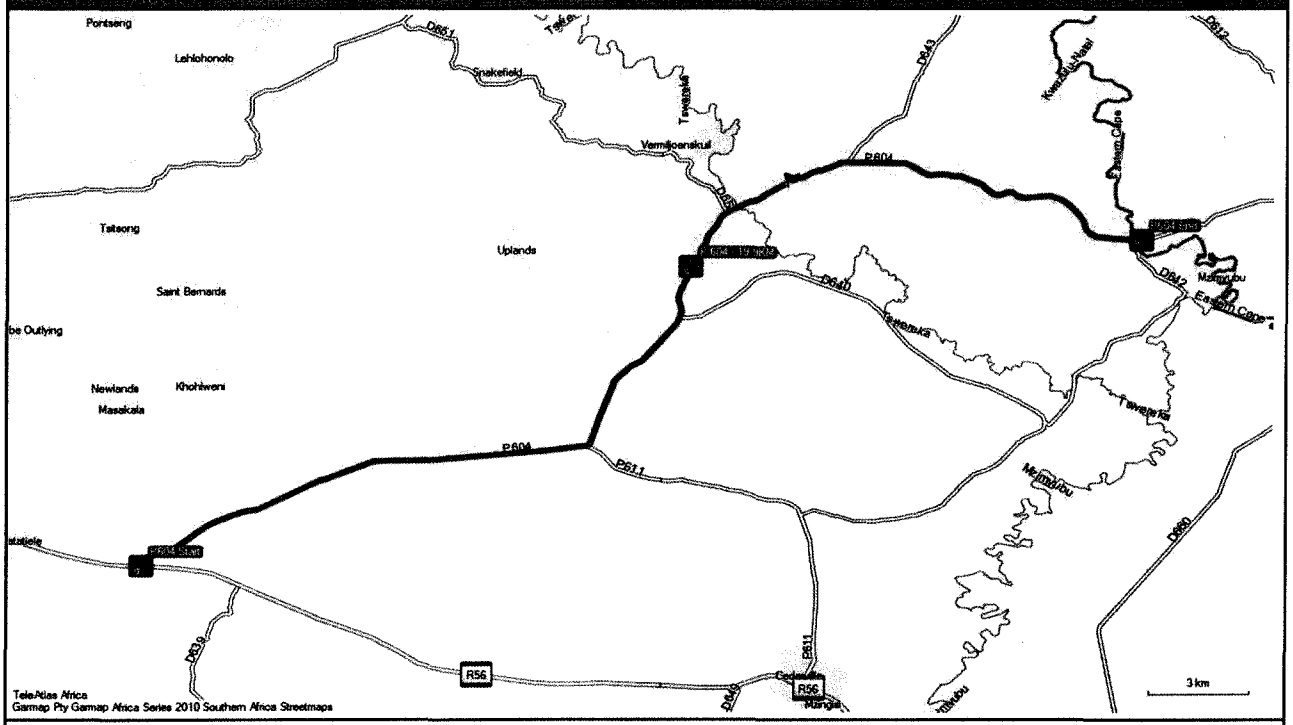
Comments :

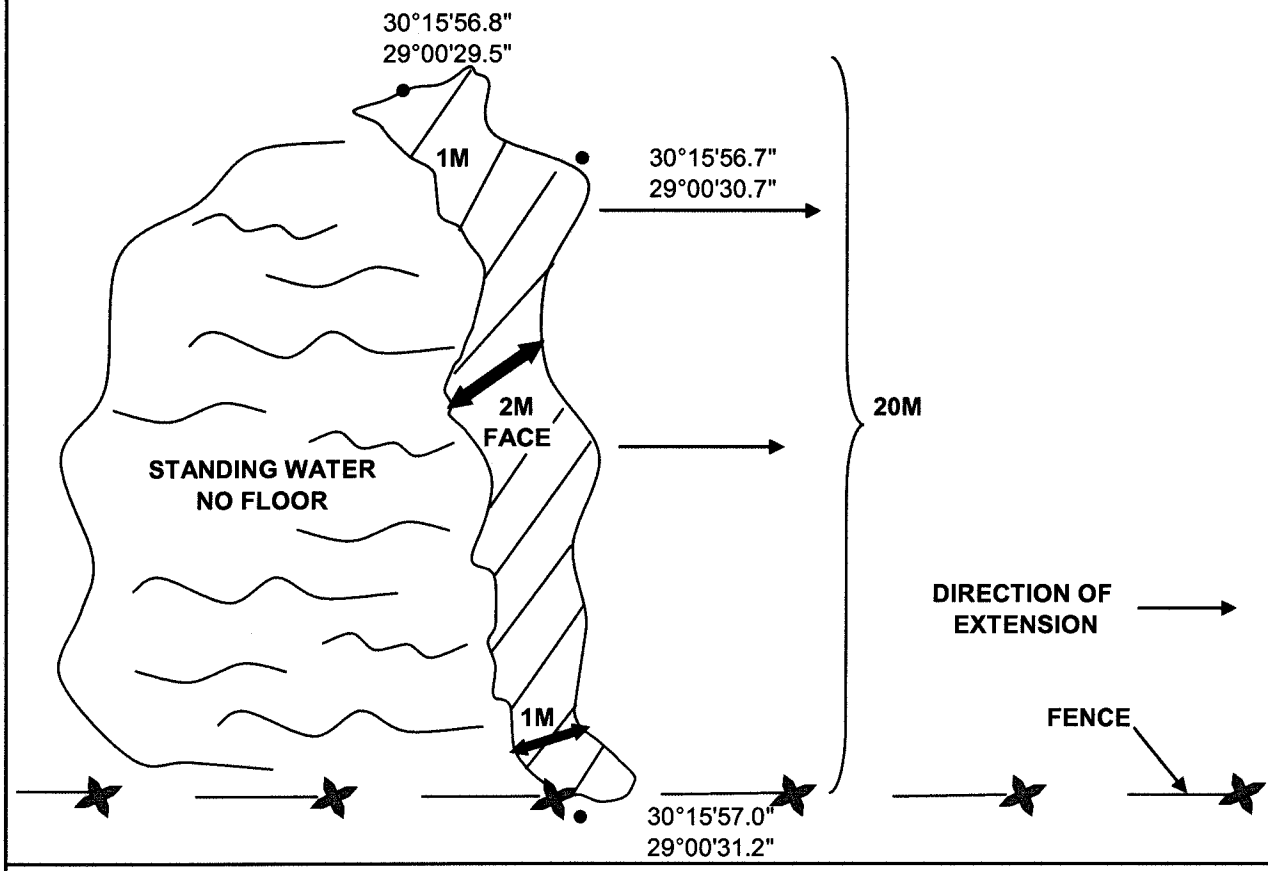
Owner: Ronel & David Marx (Tel: 073 648 5571)

Good potential source.

SIGNATURE

DATE:





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : dk Gr shale

b) Depth of Overburden : 100mm

c) Ave Height / Length of Existing Face : 1m/15m

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

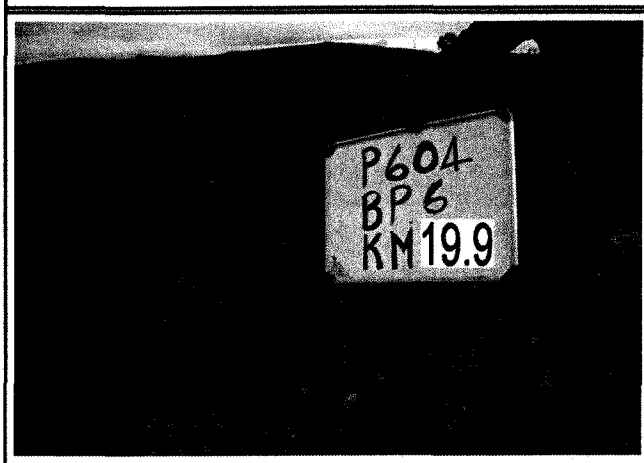
g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

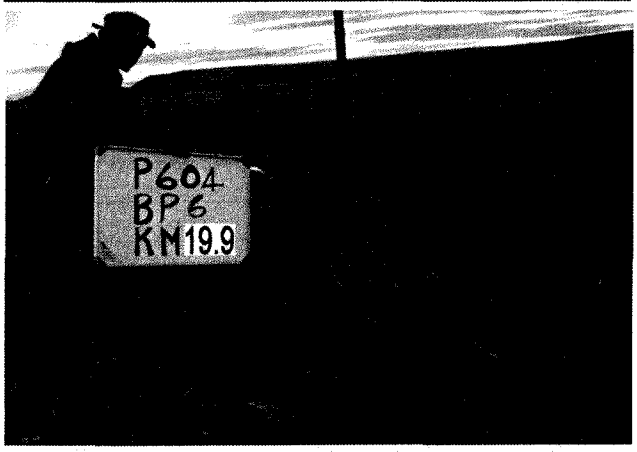
h) Other observations : Can be extended parallel to road. Drainage needs attention.

Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance		X	
Buildings, structures or human habitation		X	
Power or telephone lines, overhead	X		
Railways		X	
Surface water		X	
Boreholes		X	
Indigenous plant species		X	
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

Comments :



P604
BP6 - 19.9KM
S30°15'56.7"
E29°00'30.7"
Face



P604
BP6 - 19.9KM
S30°15'56.7"
E29°00'30.7"
Face

P604
BP6 - 19.9KM
S30°15'56.7"
E29°00'30.7"
Floor

P604
BP6 - 19.9KM
S30°15'56.7"
E29°00'30.7"
General view

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

District Municipality	Alfred Nzo	**Kilometres**		**South**				**East**			
Local Municipality	Matatiele	Start		**30**	°	**21**	'	**11**	"	**28** ° **51** ' **13** "	
Road Number	P604	End		**30**	°	**15**	'	**28**	"	**29** ° **08** ' **09.** "	

Borrow Pit No. or Source No. : P604 - 21.4KM - LHS

KM Log from Start co-ord : 21.4KM - Left Hand Side

Estimated Yield : High

Type of Material : **Sandstone and mudstone**

Borrow Pit Co - ordinates :

S **30** ° **15** ' **13.2** "

E **29** ° **00** ' **52.4** "

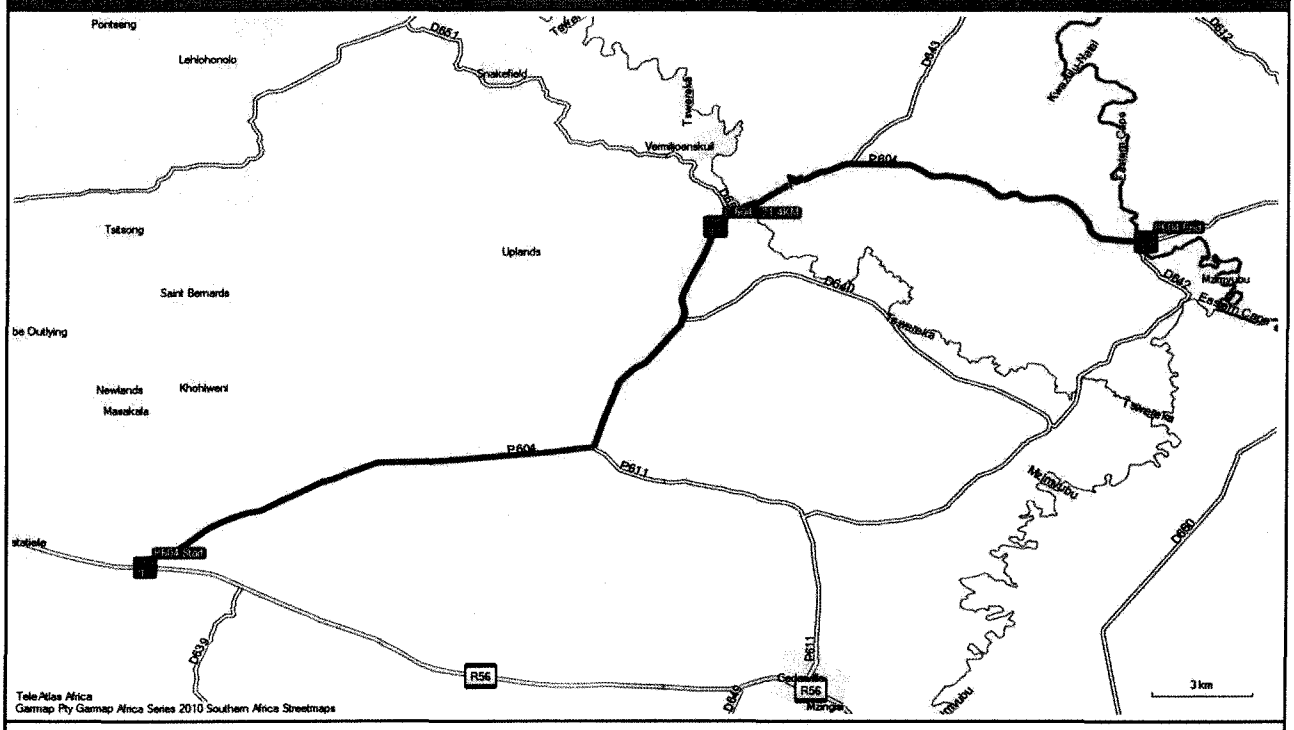
Description of Source :	
Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

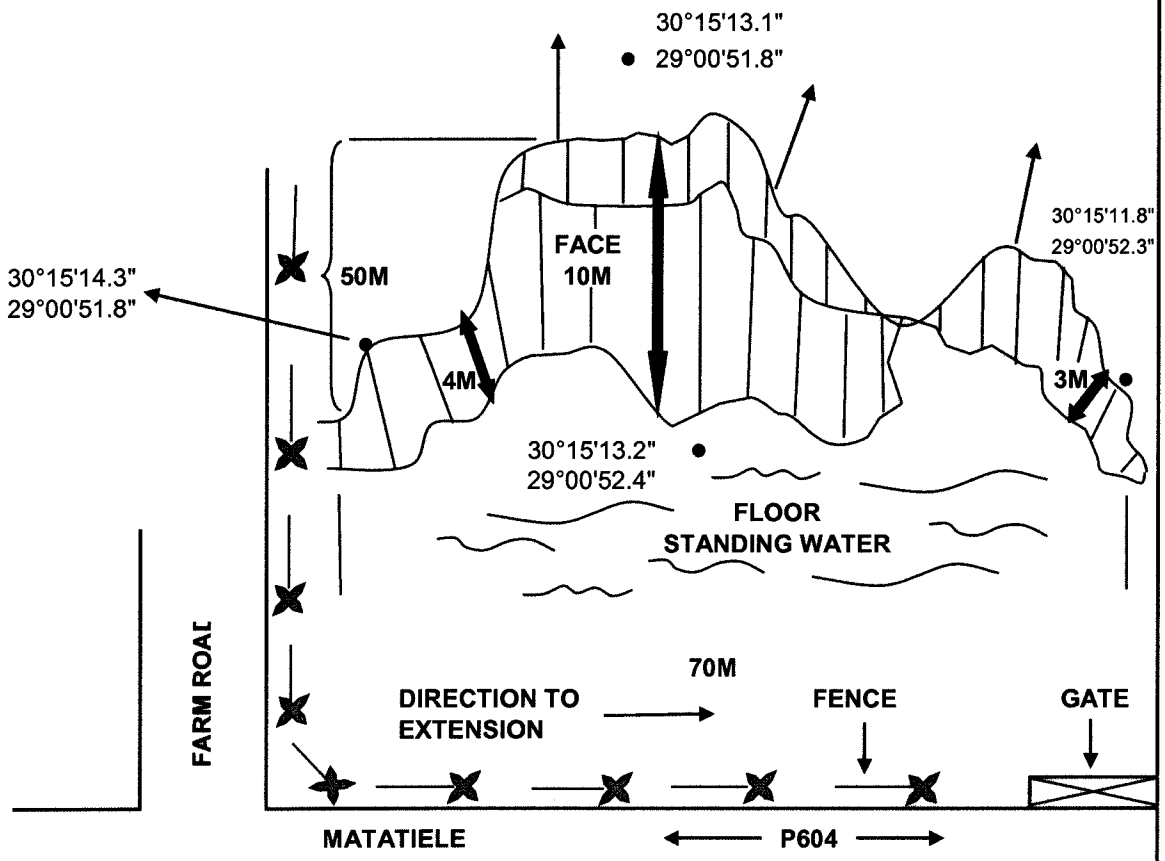
Comments :

Owner: Provincial Government

Good potential source.

SIGNATURE **DATE:**





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : Y O ss + lt Y ms

b) Depth of Overburden : 100mm

c) Ave Height / Length of Existing Face : 10m/10m

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

h) Other observations : Can be extended into existing face.

Drainage needs attention.

Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance		X	
Buildings, structures or human habitation		X	
Power or telephone lines, overhead		X	
Railways		X	
Surface water	X		
Boreholes		X	
Indigenous plant species		X	
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

Comments :

P604
BP7 - 21.4KM
S30°15'13.2"
E29°00'52.4"
Face

P604
BP7 - 21.4KM
S30°15'13.2"
E29°00'52.4"
Face

P604
BP7 - 21.4KM
S30°15'13.2"
E29°00'52.4"
General view

P604
BP7 - 21.4KM
S30°15'13.2"
E29°00'52.4"
General view

PROVINCE OF EASTERN CAPE

BORROW PIT MANAGEMENT SYSTEM FOR THE DEPARTMENT OF ROADS AND TRANSPORT

CONTROLAB

BORROW PIT DATA INPUT SHEET

District Municipality	Alfred Nzo	**Kilometres**		**South**	**East**
Local Municipality	Matatiele	Start		**30 ° 21 ' 11 "**	**28 ° 51 ' 13 "**
Road Number	P604	End		**30 ° 15 ' 28 "**	**29 ° 08 ' 09.: "**

Borrow Pit Information

Borrow Pit No. or Source No. : P604 - 22.0KM - RHS

KM Log from Start co-ord : 22.0KM - Right Hand Side

Estimated Yield : High

Type of Material : **Shale + sandstone**

Borrow Pit Co - ordinates :

S **30** ° **15** ' **16.8** "

E **29** ° **01** ' **3.7** "

Description of Source :	
Existing Borrow Pit	X
Cutting in Road	
Exposed out Crop	
New	

Comments :

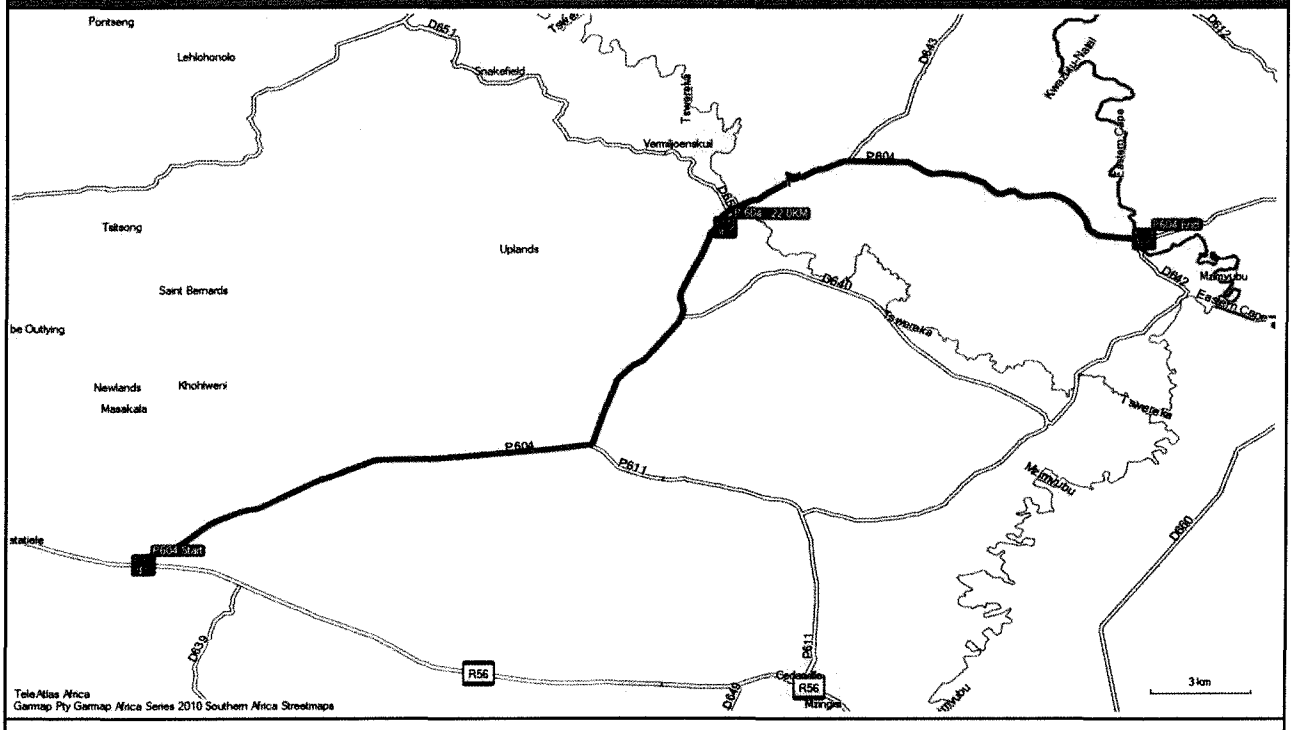
Owner: Provincial Government

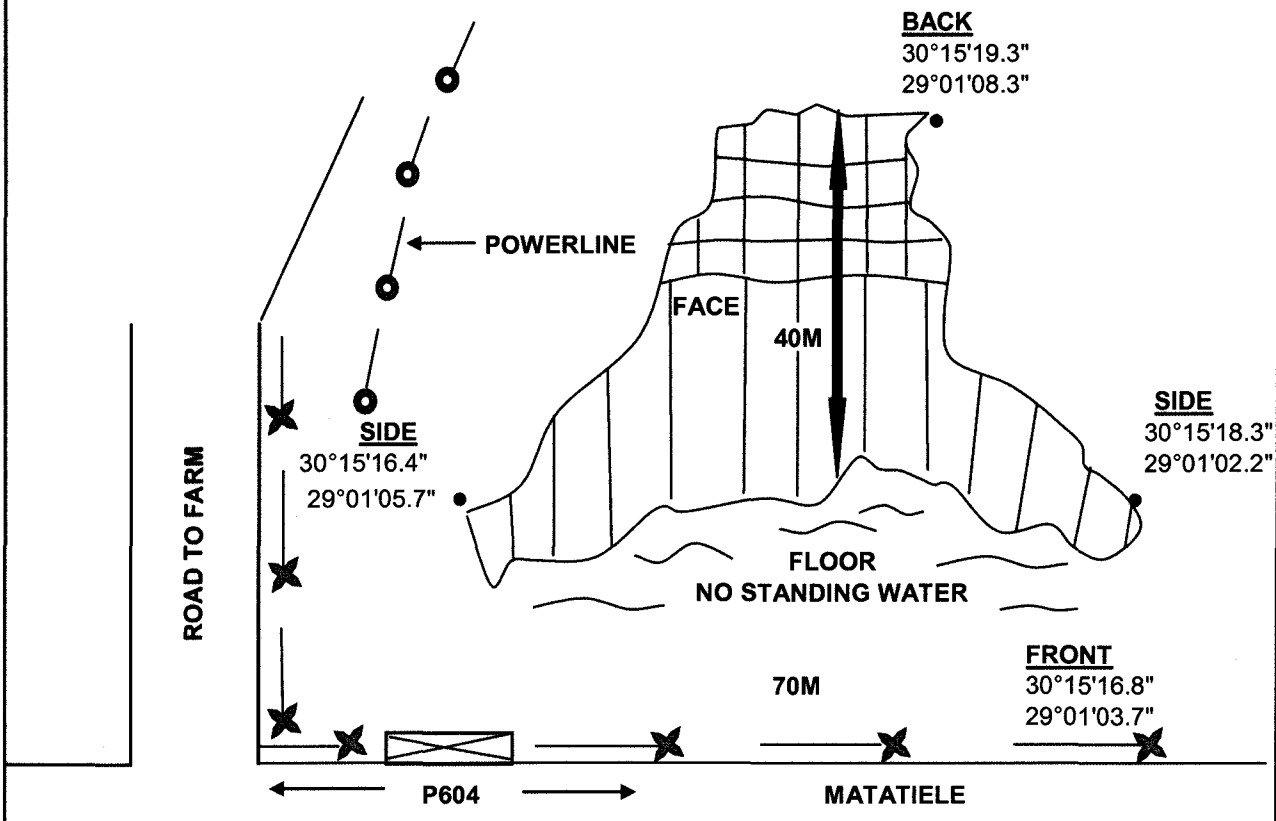
Good potential source.

SIGNATURE **DATE:**

1. Initial Assessment Stage

1.1 Locality Map





DESCRIPTION OF BORROW PIT MATERIAL

a) Type of Material : -

b) Depth of Overburden : -

c) Ave Height / Length of Existing Face : 50m/100m

d) Consistancy of Face :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

e) Consistancy of Floor :

Loose	
Dense	
Highly Weathered	X
Weathered	
Unweathered	

f) Excavation in Face :

TLB	
Excavator	X
Drill & Blast	

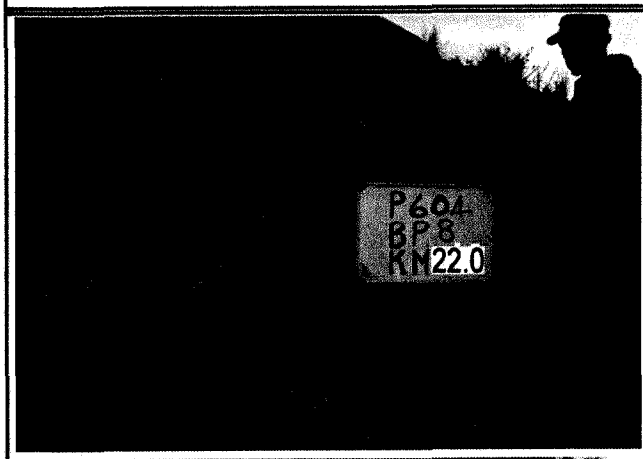
g) Excavation in Floor :

TLB	
Excavator	X
Drill & Blast	

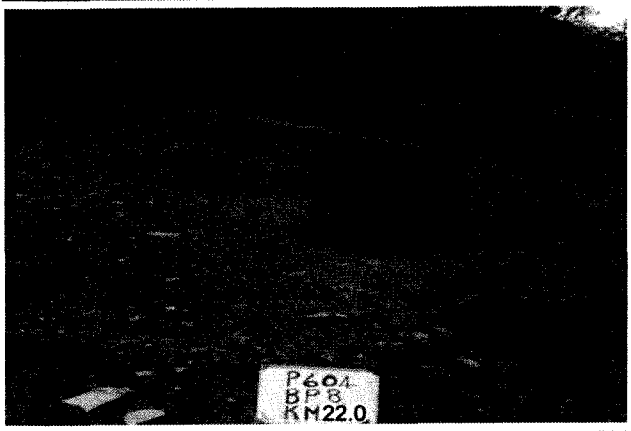
h) Other observations : Can be extended away from the road and power-line.

Item	Problem		
	Yes	No	Don't Know
Grave sites		X	
Fauna		X	
Sites with archaelogical significance		X	
Buildings, structures or human habitation	X		
Power or telephone lines, overhead	X		
Railways		X	
Surface water		X	
Boreholes		X	
Indigenous plant species		X	
Enviromental sensitive locations		X	
Any other restraints such as uncooperative landowners etc		X	

Comments :

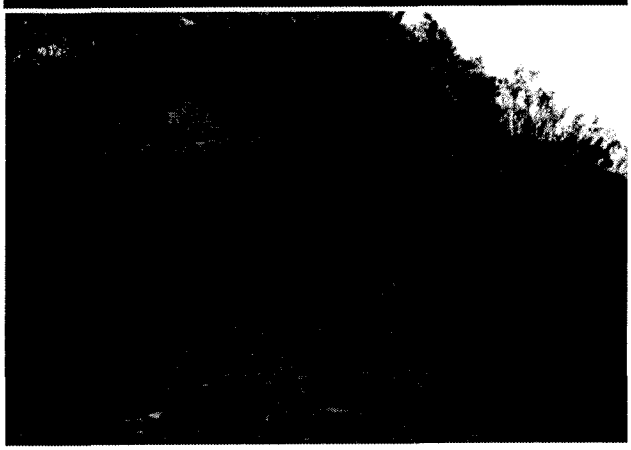


P604
BP8 - 22.0KM
S30°15'16.8"
E29°01'3.7"
Face



P604
BP8 - 22.0KM
S30°15'16.8"
E29°01'3.7"
Floor

P604
BP8 - 22.0KM
S30°15'16.8"
E29°01'3.7"
General view



P604
BP8 - 22.0KM
S30°15'16.8"
E29°01'3.7"
General view

HERITAGE IMPACT ASSESSMENT OF BORROW PITS IN ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE, SOUTH AFRICA

Prepared for

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14 June 2011

Management summary

eThembeni Cultural Heritage was appointed by Terratest (Pty) Ltd to undertake a heritage impact assessment of various borrow pits in the Eastern Cape Province, in terms of the National Environmental Management Act 107 of 1998 as amended, in compliance with Section 38 of the National Heritage Resources Act 25 of 1999. eThembeni staff members inspected the area from 23 to 26 May 2011 and completed controlled-exclusive surface surveys.

Description of heritage resources and significance assessment

- **Landscapes and natural features**

Borrow pit DR8646/BP03 is located within a few hundred metres of the formally proclaimed and protected landscape of Ongeluksnek Nature Reserve. The borrow pit is clearly visible from the reserve entrance and from certain accommodation facilities. The reserve has high heritage significance at local, regional and provincial levels for its aesthetic, scientific and social (including economic) values.

- **Graves and burial grounds**

Ancestral graves occur immediately adjacent to the following borrow pits:

DR8015/BP05	A group of more than 16 stone-packed graves and one grave with a granite headstone is located within 30 metres of the existing southern borrow pit face.
DR8015/BP06	Various family graves are located within a fenced homestead precinct within 5 metres of the existing southern/south-western borrow pit face.
DR8015/BP18	At least three stone-packed graves are located across the road from and directly opposite the borrow pit.

All human remains have high heritage significance at all levels for their spiritual, social and cultural values.

Assessment of impacts

- **Landscapes and natural features**

The impact of the exploitation of DR8646/BP03 on the protected landscape of Ongeluksnek Nature Reserve can be considered of medium consequence and high probability, with MEDIUM significance overall.

- **Graves and burial grounds**

None of the graves near DR8015/BP05 and DR8015/BP06 will be affected directly by borrow pit extensions or rehabilitation. Accordingly, the impact on these graves is LOW. However, it is very likely that the graves near DR8015/BP018 will be altered or destroyed inadvertently by construction activities, since they are not easily noticeable and no next-of-kin reside nearby. Accordingly, the impact on these graves could be HIGH.

Recommended mitigation measures

- **Landscapes and natural features**

Borrow pit DR8646/BP03 should be decommissioned permanently and rehabilitated as soon as possible according to approved environmental standards.

- **Graves and burial grounds**

DR8015/BP05 The existing borrow pit face may extend no further southwards in the direction of the homestead and graves.

DR8015/BP06 The existing borrow pit face adjacent to the homestead may not be extended further and must be stabilized urgently to prevent further erosion and undermining of the graves located within the homestead precinct.

DR8015/BP18 The area between the coordinates
S30 30 58.3; E28 40 35.3
S30 30 57.4; E28 40 35.4
S30 30 57.1; E28 40 35.1
S30 30 58.1; E28 40 34.8
should be fenced permanently in the following manner:

- Preferred fencing materials are metal corner and straining posts and fencing wire, to a minimum height of 1.2 metres.
- The fence must have an access gate.
- No construction may occur within a minimum distance of 10-15 metres from the edge of the fence.
- The developer must obtain a permit from SAHRA to undertake fencing prior to the start of any construction activities. The permit application should include clear photographs of the grave location relative to the proposed development, as well as a letter from the next-of-kin endorsing the fencing.
- The developer must submit a report to SAHRA upon the completion of the fencing, including clear descriptions and photographs of the work undertaken.
- If these management measures are not attainable due to development constraints or due to dissatisfaction on the part of the next-of-kin, a SAHRA staff member or appropriately qualified heritage practitioner should be appointed to negotiate alternatives.

Recommended monitoring

A SAHRA staff member or appropriately qualified heritage practitioner should be appointed to ensure that all mitigation measures are implemented appropriately.

Conclusion

We recommend that the development proceed with the proposed heritage mitigation and have submitted this report to SAHRA in fulfilment of the requirements of the National Heritage Resources Act. Relevant staff members may be contacted at the SAHRA Cape Town head office (Mariagrazia Galimberti telephone 021 462 4502; MGALIMBERTI@sahra.org.za).

If permission is granted for development to proceed, the client is reminded that the Act requires that a developer cease all work immediately and follow the protocol contained in Section 9 of this report should any heritage resources, as defined in the Act, be discovered during the course of development activities.

Contents

List of tables

1. Introduction

eThembeni Cultural Heritage was appointed by Terratest (Pty) Ltd to undertake a heritage impact assessment of various borrow pits in the Eastern Cape Province, in terms of the National Environmental Management Act 107 of 1998 as amended, in compliance with Section 38 of the National Heritage Resources Act 25 of 1999 (refer to Appendix A).

South Africa's heritage resources are both rich and widely diverse, encompassing sites from all periods of human history. Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representivity of a particular time period; their rarity; and their sphere of influence.

The integrity and significance of heritage resources can be jeopardized by natural (e.g. erosion) and human (e.g. development) activities. In the case of human activities, a range of legislation exists to ensure the timeous identification and effective management of heritage resources for present and future generations.

This report represents compliance with a full Heritage Impact Assessment, excluding a specialist palaeontological study, for the proposed development.

2. Terms of reference

A Heritage Impact Assessment must address the following key aspects:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

3. Project description

The Eastern Cape Department of Roads and Public Works wishes to assess and utilise and/or rehabilitate various existing borrow pits in the Alfred Nzo District Municipality in the vicinity of the towns of Matatiele, Mt Ayliff and Mt Fletcher.

4. Receiving environment

4.1 Project location

The borrow pit locations are summarized in Table 1. Available maps are too large to reproduce in this report and SAHRA is referred to the digitized information submitted by the client.

Table 1 Locations of borrow pits in Alfred Nzo Municipality, Eastern Cape Province.

Road No	BP No	Coordinates
D611/D629	BP01A	S30° 26' 53.0" E29° 10' 43.5"
	BP01B	S30° 26' 56.3" E29° 10' 47.3"
	BP03	S30° 30' 10.6" E29° 10' 39.0"
D660	BP01	S30° 23' 38.3" E29° 07' 27.6"
	BP02	S30° 23' 26.4" E29° 07' 31.2"
	BP03	S30° 18' 32.5" E29° 10' 30.9"
D639	BP03	S30° 23' 37.4" E28° 52' 19.6"
DR08015	BP01	S30° 53' 43.1" E28° 59' 00.5"
	BP03	S30° 44' 31.9" E28° 51' 09.4"
	BP04	S30° 43' 49.5" E28° 51' 12.0"
	BP05	S30° 42' 34.3" E28° 51' 11.3"
	BP06	S30° 42' 04.1" E28° 51' 47.1"
	BP07	S30° 41' 00.4" E28° 51' 59.8"
	BP08	S30° 40' 50.4" E28° 51' 41.6"
	BP09	S30° 38' 36.0" E28° 51' 19.4"
	BP10	S30° 31' 51.1" E30° 50' 18.8"
	BP11	S30° 36' 59.0" E28° 48' 56.9"
	BP13	S30° 34' 07.1" E28° 44' 27.6"
	BP14	S30° 34' 07.1" E28° 44' 27.6"
	BP15	S30° 33' 29.9" E28° 43' 37.1"
	BP16	S30° 33' 08.3" E28° 42' 51.8"
	BP17	S30° 32' 12.2" E28° 42' 23.4"
	BP18	S30° 30' 58.7" E28° 40' 35.5"
DR08016	BP01	S30° 39' 41.1" E28° 53' 38.9"
	BP03A	S30° 39' 10.8" E28° 54' 23.2"
	BP03B	S30° 39' 10.2" E28° 54' 26.7"
	BP04	S30° 36' 52.9" E28° 55' 22.3"
	BP05	S30° 35' 25.1" E28° 53' 45.2"
	BP06	S30° 34' 31.2" E28° 52' 27.8"
DR08017	BP02	S30° 47' 58.4" E28° 58' 58.9"
	BP03	S30° 42' 06.8" E29° 02' 23.7"
	BP04	S30° 38' 56.1" E29° 02' 23.0"
	BP05	S30° 38' 03.2" E29° 03' 10.4"
	BP06	S30° 32' 40.8" E29° 04' 16.9"
	BP07	S30° 32' 00.3" E29° 04' 02.4"
DR08077	BP01	S30° 23' 51.0" E28° 30' 55.9"
	BP02	S30° 24' 50.1" E28° 35' 58.6"
	BP03	S30° 25' 10.2" E28° 35' 41.6"
DR08079	BP01	S30° 40' 19.2" E28° 46' 08.8"

DR08084	BP01	S30° 37' 10.6" E28° 33' 24.2"
	BP02	S30° 39' 19.5" E28° 37' 52.6"
DR08086	BP01A	S30 °49' 39.7" E28 °51' 22.9"
	BP01B	S30 °49' 39.5" E28 °51' 19.6"
	BP02	S30 °50' 19.4" E28 °46' 58.8"
DR08094	BP01	S30° 49' 46.4" E29° 07' 35.7"
	BP03	S30° 48' 08.4" E29° 05' 52.3"
	BP04	S30° 48' 01.7" E29° 05' 06.4"
DR08102	BP01	S30° 48' 10.5" E29° 22' 40.1"
	BP02	S30° 48' 14.8" E29° 23' 09.4"
DR08125	BP01	S30° 59' 23.5" E28° 59' 02.1"
	BP02	S31° 00' 04.8" E28° 59' 28.6"
DR08129	BP01	S30° 55' 18.6" E28° 59' 46.0"
	BP02	S30° 55' 26.3" E29° 00' 48.8"
	BP03	S30° 55' 43.1" E29° 01' 15.9"
	BP04	S31° 00' 16.0" E29° 00' 48.6"
DR08412	BP01	S30° 52' 15.3" E28° 51' 04.3"
DR08415	BP01	S30° 22' 18.3" E28° 30' 31.4"
	BP02	S30° 21' 14.8" E28° 24' 54.3"
DR08646	BP01	S30° 18' 19.1" E28° 38' 23.2"
	BP02	S30° 17' 46.6" E28° 36' 01.7"
	BP03	S30° 19' 37.6" E28° 22' 15.5"
P604	BP01	S30° 20' 09.5" E28° 53' 11.9"
	BP03	S30° 18' 26.9" E28° 57' 43.5"
	BP04	S30° 16' 36.2" E29° 00' 21.0"
	BP05	S30° 16' 23.7" E29° 00' 06.2"
	BP06	S30° 15' 56.7" E29° 00' 30.7"
	BP07	S30° 15' 13.2" E29° 00' 52.4"
	BP08	S30° 15' 16.8" E29° 01' 03.7"

4.2 Environmental description

Most of the areas in which the borrow pits occur comprise communally owned land with human settlement in small villages surrounded by extensive rangelands. Services are basic and roads are generally poorly maintained gravel surfaces. Around the towns of Matatiele and Cedarville land use comprises extensive commercial agriculture.

5. Cultural context of the study area

Appendix B summarises the archaeological and historical context of the study area and readers are referred to the bibliography section for primary sources. Heritage resources in such areas of the Eastern Cape that could require the modification and/or relocation of a proposed development project and/or significant mitigation procedures are listed in the following table. The client is advised that subsurface remains of heritage resources might be uncovered during the construction phase of the proposed project, and is referred to the protocol contained in Section 9 below.

Table 2 Typical heritage resources and mitigation measures associated with the project area.

Heritage resource	Typical mitigation measures
Open air scatters of Stone Age stone artefacts and Iron Age archaeological sites with ceramic sherds, probably with low heritage significance, could occur in areas with minimal environmental disturbance.	Test excavations to determine site extent and significance. If necessary, full systematic archaeological excavations requiring permit from heritage authority and significant financial expenditure.
Ancestral graves, typically located within homestead precincts. Often associated with abandoned homesteads; may be difficult to identify if unmarked.	All human remains have high heritage significance and conservation in situ is always preferred. Exhumation and reburial require procedures described in Appendix A and are costly and time-consuming.

6. Observations

Various borrow pits are being utilised at present. The following table summarises the heritage resources assessed, and our observations.

Table 3 Heritage resources and observations: Alfred Nzo Municipality borrow pits, Eastern Cape Province.

Heritage resource type	Observation
Living heritage	Much of the project area is one of living heritage, but no specific places associated with living heritage were identified.
Ecofacts	None were identified within the proposed development area.
Places, buildings, structures and equipment	None were identified within the proposed development area.
Places to which oral traditions are attached or which are associated with living heritage	The entire proposed area is one of living heritage, but no specific places associated with living heritage were identified.
Historical settlements and townscapes	None were identified within the proposed development area.
Landscapes and natural features	See below.
Geological sites of scientific or cultural importance	None were identified within the proposed development area.
Archaeological sites	None were identified within the proposed development area.
Graves and burial grounds	See below.
Movable objects excluding any object made by a living person	None were identified within the proposed development area.
Public monuments and memorials	None were identified within the proposed development area.
Battlefields	None were identified within the proposed development area.
Traditional building techniques	None were identified within the proposed development area.

6.1 Description and significance assessment

– Landscapes and natural features

Borrow pit DR8646/BP03 is located within a few hundred metres of the formally proclaimed and protected landscape of Ongeluksnek Nature Reserve. It is clearly visible from the reserve entrance and from certain accommodation facilities. The degree of government investment in this protected area and the nature of such investment (see Appendix C) suggests that Ongeluksnek Nature Reserve has high heritage significance at local, regional and provincial levels for its aesthetic, scientific and social (including economic) values.

– Graves and burial grounds

Ancestral graves occur immediately adjacent to the following borrow pits:

DR8015/BP05 A group of more than 16 stone-packed graves and one grave with a granite headstone is located within 30 metres of the existing southern borrow pit face, at S30 42 36.0; E28 51 08.5. An occupied homestead is nearby but the graves are not enclosed within the homestead precinct. No-one was home at the time of our visit therefore the family names and ages of most of the burials are unknown. The headstone is inscribed:

MGWATYU
In loving memory of
Our father and grandfather
MZOMKHULU
SKEYI
***26-01-1926**
†21-01-2000
PHUMLA NGOXOLO
TSHEZI

DR8015/BP06 Various family graves are located within a fenced homestead precinct within 5 metres of the existing southern/south-western borrow pit face.

DR8015/BP18 At least three stone-packed graves are located across the road from and directly opposite the borrow pit, within the coordinates given in Section 7 below. The closest grave is situated 7 metres from the road edge. No homesteads are located nearby.

All human remains have high heritage significance at all levels for their spiritual, social and cultural values.

6.2 Assessment of impacts

- **Landscapes and natural features**

The impact of the exploitation of DR8646/BP03 on the protected landscape of Ongeluksnek Nature Reserve would be:

- Of a negative nature (the visual intrusion of a quarry in an otherwise tranquil, rural landscape, with concomitant dust, noise and increased traffic in the form of heavy plant and trucks);
- Local in extent (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius);
- Of low duration (presumably exploitation for current road upgrades may be expected to cease after four years); and
- Of medium intensity, measurably reducing its significance and economic value (associated with tourism) in the short to medium term such that considerable marketing efforts will be required to re-establish its desirability as a tourist destination.

These impacts can therefore be considered of medium consequence and high probability, with MEDIUM significance overall.

- **Graves and burial grounds**

None of the graves near DR8015/BP05 and DR8015/BP06 will be affected directly by borrow pit extensions or rehabilitation. Accordingly, the impact on these graves is LOW.

However, it is very likely that the graves near DR8015/BP018 will be altered or destroyed inadvertently by construction activities, since they are not easily noticeable and no next-of-kin reside nearby. Accordingly, the impact on these graves could be HIGH.

7. Recommended mitigation measures

The purpose of mitigation measures is to reduce impacts on heritage resources to such an extent that their significance is retained at acceptable levels to the communities' concerned. All mitigation measures are for the cost of the developer in terms of extant heritage legislation.

- **Landscapes and natural features**

Borrow pit DR8646/BP03 should be decommissioned permanently and rehabilitated as soon as possible according to approved environmental standards.

- **Graves and burial grounds**

DR8015/BP05 The existing borrow pit face may extend no further southwards in the direction of the homestead and graves.

DR8015/BP06 The existing borrow pit face adjacent to the homestead may not be extended further and must be stabilized urgently to prevent further erosion and undermining of the graves located within the homestead precinct.

DR8015/BP18 The area between the coordinates
S30 30 58.3; E28 40 35.3
S30 30 57.4; E28 40 35.4
S30 30 57.1; E28 40 35.1
S30 30 58.1; E28 40 34.8
should be fenced permanently in the following manner:

- Preferred fencing materials are metal corner and straining posts and fencing wire, to a minimum height of 1.2 metres.
- The fence must have an access gate.
- No construction may occur within a minimum distance of 10-15 metres from the edge of the fence.
- The developer must obtain a permit from SAHRA to undertake fencing prior to the start of any construction activities. The permit application should include clear photographs of the grave location relative to the proposed development, as well as a letter from the next-of-kin endorsing the fencing.
- The developer must submit a report to SAHRA upon the completion of the fencing, including clear descriptions and photographs of the work undertaken.
- If these management measures are not attainable due to development constraints or due to dissatisfaction on the part of the next-of-kin, a SAHRA staff member or appropriately qualified heritage practitioner should be appointed to negotiate alternatives.

8. Recommended monitoring

A SAHRA staff member or appropriately qualified heritage practitioner should be appointed to ensure that all mitigation measures are implemented appropriately.

9. Protocol for the identification, protection and recovery of heritage resources during construction and operation

It is possible that sub-surface heritage resources will be encountered during the construction phase of this project. The Project Engineer, Environmental Control Officer and all other persons responsible for site management and excavation should be aware that indicators of sub-surface sites could include:

- Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate);
- Bone concentrations, either animal or human;
- Ceramic fragments, including potsherds;
- Stone concentrations that appear to be formally arranged (may indicate the presence of an underlying burial); and
- Fossilised remains of fauna and flora, including trees.

In the event that such indicator(s) of heritage resources are identified, the following actions should be taken immediately:

- All construction within a radius of at least 20m of the indicator should cease. This distance should be increased at the discretion of supervisory staff if heavy machinery or explosives could cause further disturbance to the suspected heritage resource.
- This area must be marked using clearly visible means, such as barrier tape, and all personnel should be informed that it is a no-go area.
- A guard should be appointed to enforce this no-go area if there is any possibility that it could be violated, whether intentionally or inadvertently, by construction staff or members of the public.
- No measures should be taken to cover up the suspected heritage resource with soil, or to collect any remains such as bone or stone.
- If a heritage practitioner has been appointed to monitor the project, s/he should be contacted and a site inspection arranged as soon as possible.
- If no heritage practitioner has been appointed to monitor the project, Dr Mariagrazia Galimberti at SAHRA's Cape Town head office should be contacted (telephone 021 462 4502).
- The South African Police Services should be notified by a SAHRA staff member or an independent heritage practitioner if human remains are identified. No SAPS official may disturb or exhume such remains, whether of recent origin or not.
- All parties concerned should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time.
- Any extension of the project beyond its current footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, taking into account all information gathered during this initial heritage impact assessment.

10. Summary of findings in terms of the National Heritage Resources Act 1999 Section 38(3)

- The identification and mapping of all heritage resources in the area affected
  See Section 6.1.

- An assessment of the significance of such resources in terms of the heritage assessment criteria set out in regulations
  See Section 6.1.

- An assessment of the impact of development on such heritage resources
  See Section 6.2.

- An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development
  The proposed development cannot be considered sustainable unless the mitigation measures proposed in Section 7 are implemented.

- The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources
  The client has undertaken such consultation in terms of statutory requirements and retains the relevant documentation.

- If heritage resources will be adversely affected by the proposed development, the consideration of alternatives
  See Section 7.

- Plans for mitigation of any adverse effects during and after completion of the proposed development
  See Section 8.

11. Conclusion

We recommend that the development proceed with the proposed heritage mitigation and have submitted this report to SAHRA in fulfilment of the requirements of the National Heritage Resources Act. According to Section 38(4) of the Act the report shall be considered timeously by the Council which shall, after consultation with the person proposing the development, decide –

- whether or not the development may proceed;
- any limitations or conditions are to be applied to the development;
- what general protections in terms of this Act apply, and what formal protections may be applied to such heritage resources;
- whether compensatory action shall be required in respect of any heritage resources damaged or destroyed as a result of the development; and
- whether the appointment of specialists is required as a condition of approval of the proposal.

Relevant staff members may be contacted at the SAHRA Cape Town head office (Mariagrazia Galimberti telephone 021 462 4502; MGALIMBERTI@sahra.org.za).

If permission is granted for development to proceed, the client is reminded that the Act requires that a developer cease all work immediately and follow the protocol contained in Section 9 of this report should any heritage resources, as defined in the Act, be discovered during the course of development activities.

12. Bibliography

Appendix B

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Appendix C (Methodology)

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APPENDIX A

STATUTORY REQUIREMENTS

GENERAL

The identification, evaluation and management of heritage resources in South Africa is required and governed by the following legislation:

- National Environmental Management Act (NEMA) 107 of 1998
    a. Basic Environmental Assessment – Section (23)(2)(d)
    b. Environmental Scoping Report – Section (29)(1)(d)
    c. Environmental Impacts Assessment – Section (32)(2)(d)
    d. Environmental Management Plan – Section (34)(b)
- KwaZulu-Natal Heritage Act 4 of 2008
    a. Protection of heritage resources – Chapters 8 and 9
    b. Heritage Resources Management – Chapter 10
- National Heritage Resources Act (NHRA) Act 25 of 1999
    a. Definition and management of the national estate – Chapter I
    b. Protection and management of heritage resources – Chapter II
    c. Heritage Resources Management – Section 38
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
    a. Section 39(3)
- Development Facilitation Act (DFA) Act 67 of 1995.
    a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995 Section 31.

KWAZULU-NATAL HERITAGE ACT 4 OF 2008

This Act is implemented by Amafa aKwaZulu-Natali / Heritage KwaZulu-Natal, a statutory organization charged to provide for the conservation, protection and administration of both the physical and the living or intangible heritage resources of the province; along with a statutory Council to administer heritage conservation in the Province.

NATIONAL HERITAGE RESOURCES ACT 25 OF 1999

Heritage Impact Assessments

Section 38(1) of the National Heritage Resources Act of 1999 requires a heritage impact assessment in case of:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity which will change the character of a site—
  (i) exceeding 5 000m² in extent; or
  (ii) involving three or more existing erven or subdivisions thereof; or
  (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the re-zoning of a site exceeding 10 000m² in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

Reports in fulfilment of Section 38(3) of the Act must include the following information:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of the heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on such heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

Definitions of heritage resources

The Act defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes, but is not limited to, the following wide range of places and objects:

- living heritage as defined in the National Heritage Council Act No 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- ecofacts (non-artefactual organic or environmental remains that may reveal aspects of past human activity; definition used in KwaZulu-Natal Heritage Act 2008);
- places, buildings, structures and equipment;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds;
- public monuments and memorials;
- sites of significance relating to the history of slavery in South Africa;
- movable objects, but excluding any object made by a living person;
- battlefields; and
- traditional building techniques.

Furthermore, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; and
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.

'**Archaeological**' means –
- material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'**Palaeontological**' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

A '**place**' is defined as:
- a site, area or region;
- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place.

'**Public monuments and memorials**' means all monuments and memorials—

- erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; or
- which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual;

'**Structures**' means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

MANAGEMENT OF GRAVES AND BURIAL GROUNDS

- **Graves younger than 60 years** are protected in terms of Section 2(1) of the Removal of Graves and Dead Bodies Ordinance 7 of 1925 as well as the Human Tissues Act 65 of 1983. Such graves are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial Member of the Executive Council for Local Government and Planning, or in some cases the MEC for Housing and Welfare.

  Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of the Human Tissues Act 65 of 1983.

- **Graves older than 60 years situated outside a formal cemetery administered by a local authority** are protected in terms of Section 36 of the National Heritage Resources Act 25 of 1999 as well as the Human Tissues Act of 1983. Accordingly, such graves are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of NHRA) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

  If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

The **protocol for the management of graves older than 60 years situated outside a formal cemetery administered by a local authority** is detailed in Section 36 of the NHRA:

(3) *(a)* No person may, without a permit issued by SAHRA or a provincial heritage resources authority—
(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
(c) bring onto or use at a burial ground or grave referred to in paragraph *(a)* or *(b)* any excavation equipment, or any equipment which assists in the detection or recovery of metals.
(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)*(a)* unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.
(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)*(b)* unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority—
(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and
(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.
(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority—
(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and
(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

APPENDIX B

ARCHAEOLOGICAL AND HISTORICAL CONTEXT OF THE STUDY AREA

The Stone Age[1]

No systematic Early and Middle Stone Age research has been undertaken in the proposed development area, hence the general nature of this section. Open air scatters of stone artefacts, probably with low heritage significance, could be expected in areas with minimal environmental disturbance.

South Africa's prehistory has been divided into a series of phases based on broad patterns of technology. The primary distinction is between a reliance on chipped and flaked stone implements (the Stone Age) and the ability to work iron (the Iron Age). Spanning a large proportion of human history, the Stone Age in Southern Africa is further divided into the Early Stone Age, or Paleolithic Period (about 2 500 000–150 000 years ago), the Middle Stone Age, or Mesolithic Period (about 150 000–30 000 years ago), and the Late Stone Age, or Neolithic Period (about 30 000–2 000 years ago). The simple stone tools found with australopithecine fossil bones fall into the earliest part of the Early Stone Age.

- The Early Stone Age

Most Early Stone Age sites in South Africa can probably be connected with the hominin species known as *Homo erectus*. Simply modified stones, hand axes, scraping tools, and other bifacial artifacts had a wide variety of purposes, including butchering animal carcasses, scraping hides, and digging for plant foods. Most South African archaeological sites from this period are the remains of open camps, often by the sides of rivers and lakes, although some are rock shelters, such as Montagu Cave in the Cape region.

- The Middle Stone Age

The long episode of cultural and physical evolution gave way to a period of more rapid change about 200 000 years ago. Hand axes and large bifacial stone tools were replaced by stone flakes and blades that were fashioned into scrapers, spear points, and parts for hafted, composite implements. This technological stage, now known as the Middle Stone Age, is represented by numerous sites in South Africa.

Open camps and rock overhangs were used for shelter. Day-to-day debris has survived to provide some evidence of early ways of life, although plant foods have rarely been preserved. Middle Stone Age bands hunted medium-sized and large prey, including antelope and zebra, although they tended to avoid the largest and most dangerous animals, such as the elephant and the rhinoceros. They also ate seabirds and marine mammals that could be found along the shore and sometimes collected tortoises and ostrich eggs in large quantities.

[1] http://www.britannica.com; article authored by Colin J. Bundy, Julian R. D. Cobbing, Martin Hall and Leonard Monteath Thompson

- The Late Stone Age

Basic toolmaking techniques began to undergo additional change about 40 000 years ago. Small finely worked stone implements known as microliths became more common, while the heavier scrapers and points of the Middle Stone Age appeared less frequently. Archaeologists refer to this technological stage as the Late Stone Age. The numerous collections of stone tools from South African archaeological sites show a great degree of variation through time and across the subcontinent.

The remains of plant foods have been well preserved at such sites as Melkhoutboom Cave, De Hangen, and Diepkloof in the Cape region. Animals were trapped and hunted with spears and arrows on which were mounted well-crafted stone blades. Bands moved with the seasons as they followed game into higher lands in the spring and early summer months, when plant foods could also be found. When available, rock overhangs became shelters; otherwise, windbreaks were built. Shellfish, crayfish, seals, and seabirds were also important sources of food, as were fish caught on lines, with spears, in traps, and possibly with nets.

Dating from this period are numerous engravings on rock surfaces, mostly on the interior plateau, and paintings on the walls of rock shelters in the mountainous regions, such as the Drakensberg and Cederberg ranges. The images were made over a period of at least 25 000 years. Although scholars originally saw the South African rock art as the work of exotic foreigners such as Minoans or Phoenicians or as the product of primitive minds, they now believe that the paintings were closely associated with the work of medicine men, shamans who were involved in the well-being of the band and often worked in a state of trance. Specific representations include depictions of trance dances, metaphors for trance such as death and flight, rainmaking, and control of the movement of antelope herds.

Iron Age[2]

Archaeological evidence shows that Bantu-speaking agriculturists first settled in southern Africa around AD 300. Bantu-speakers originated in the vicinity of modem Cameroon from where they began to move eastwards and southwards, some time after 400 BC, skirting around the equatorial forest. An extremely rapid spread throughout much of sub-equatorial Africa followed: dating shows that the earliest communities in Tanzania and South Africa are separated in time by only 200 years, despite the 3 000 km distance between the two regions. It seems likely that the speed of the spread was a consequence of agriculturists deliberately seeking iron ore sources and particular combinations of soil and climate suitable for the cultivation of their crops.

The earliest agricultural sites in KwaZulu-Natal date to between AD 400 and 550. All are situated close to sources of iron ore, and within 15 km of the coast. Current evidence suggests it may have been too dry further inland at this time for successful cultivation. From 650 onwards, however, climatic conditions improved and agriculturists expanded into the valleys of KwaZulu-Natal, where they settled close to rivers in savanna or bushveld environments. There is a considerable body of information available about these early agriculturists.

Seed remains show that they cultivated finger millet, bulrush millet, sorghum and probably the African melon. It seems likely that they also planted African groundnuts and cowpeas, though

[2] Whitelaw (1997). See also Prins and Granger (1993), Whitelaw (1991, 2009).

direct evidence for these plants is lacking from the earlier periods. Faunal remains indicate that they kept sheep, cattle, goats, chickens and dogs, with cattle and sheep providing most of the meat. Men hunted, perhaps with dogs, but hunted animals made only a limited contribution to the diet in the region.

Metal production was a key activity since it provided the tools of cultivation and hunting. The evidence indicates that people who worked metal lived in almost every village, even those that were considerable distances from ore sources.

Large-scale excavations in recent years have provided data indicating that first-millennium agriculturist society was patrilineal and that men used cattle as bridewealth in exchange for wives. On a political level, society was organised into chiefdoms that, in our region, may have had up to three hierarchical levels. The villages of chiefs tended to be larger than others, with several livestock enclosures, and some were occupied continuously for lengthy periods. Social forces of the time resulted in the concentration of unusual items on these sites. These include artefacts that originated from great distances, ivory items (which as early as AD 700 appear to have been a symbol of chieftainship), and initiation paraphernalia.

This particular way of life came to an end around AD 1000, for reasons that we do not yet fully understand. There was a radical change in the decorative style of agriculturist ceramics at this time, while the preferred village locations of the last four centuries were abandoned in favour of sites along the coastal littoral. In general, sites dating to between 1050 and 1250 are smaller than most earlier agriculturist settlements. It is tempting to see in this change the origin of the Nguni settlement pattern. Indeed, some archaeologists have suggested that the changes were a result of the movement into the region of people who were directly ancestral to the Nguni-speakers of today. Others prefer to see the change as the product of social and cultural restructuring within resident agriculturist communities.

Whatever the case, it seems likely that this new pattern of settlement was in some way influenced by a changing climate, for there is evidence of increasing aridity from about AD 900. A new pattern of economic inter-dependence evolved that is substantially different from that of earlier centuries, and is one that continued into the colonial period nearly 500 years later.

Colonial rule[3]

By the closing decades of the 18th century, South Africa had fallen into two broad regions: west and east. Colonial settlement dominated the west, including the winter rainfall region around the Cape of Good Hope, the coastal hinterland northward toward the present-day border with Namibia, and the dry lands of the interior. Trekboers took increasingly more land from the Khoekhoe and from remnant hunter-gatherer communities, who were killed, were forced into marginal areas, or became labourers tied to the farms of their new overlords. Indigenous farmers controlled both the coastal and valley lowlands and the Highveld of the interior in the east, where summer rainfall and good grazing made mixed farming economies possible.

[3] http://www.britannica.com; article authored by Colin J. Bundy, Julian R. D. Cobbing, Martin Hall and Leonard Monteath Thompson

A large group of British settlers arrived in the eastern Cape in 1820; this, together with a high European birth rate and wasteful land usage, produced an acute land shortage, which was alleviated only when the British acquired more land through massive military intervention against Africans on the eastern frontier. Until the 1840s the British vision of the colony did not include African citizens (referred to pejoratively by the British as "Kaffirs"), so, as Africans lost their land, they were expelled across the Great Fish River, the unilaterally proclaimed eastern border of the colony.

The first step in this process included attacks in 1811–12 by the British army on the Xhosa groups, the Gqunukhwebe and Ndlambe. An attack by the Rharhabe-Xhosa on Graham's Town in 1819 provided the pretext for the annexation of more African territory, to the Keiskamma River. Various Rharhabe-Xhosa groups were driven from their lands throughout the early 1830s. They counterattacked in December 1834, and Governor Benjamin D'Urban ordered a major invasion the following year, during which thousands of Rharhabe-Xhosa died. The British crossed the Great Kei River and ravaged territory of the Gcaleka-Xhosa as well; the Gcaleka chief, Hintsa, invited to hold discussions with British military officials, was held hostage and died trying to escape. The British colonial secretary, Lord Glenelg, who disapproved of D'Urban's policy, halted the seizure of all African land east of the Great Kei. D'Urban's initial attempt to rule conquered Africans with European magistrates and soldiers was overturned by Glenelg; instead, for a time, Africans east of the Keiskamma retained their autonomy and dealt with the colony through diplomatic agents.

However, after further fighting with the Rharhabe-Xhosa on the eastern frontier in 1846, Governor Colonel Harry Smith finally annexed, over the next two years, not only the region between the Great Fish and the Great Kei rivers (establishing British Kaffraria) but also a large area between the Orange and Vaal rivers, thus establishing the Orange River Sovereignty. These moves provoked further warfare in 1851–53 with the Xhosa (joined once more by many Khoe), with a few British politicians ineffectively trying to influence events.

Between 1811 and 1858 colonial aggression deprived Africans of most of their land between the Sundays and Great Kei rivers and produced poverty and despair. From the mid-1850s British magistrates held political power in British Kaffraria, destroying the power of the Xhosa chiefs. Following a severe lung sickness epidemic among their cattle in 1854–56, the Xhosa killed many of their remaining cattle and in 1857–58 grew few crops in response to a millenarian prophecy that this would cause their ancestors to rise from the dead and destroy the whites. Many thousands of Xhosa starved to death, and large numbers of survivors were driven into the Cape Colony to work. British Kaffraria fused with the Cape Colony in 1865, and thousands of Africans newly defined as Fingo resettled east of the Great Kei, thereby creating Fingoland. The Transkei, as this region came to be known, consisted of the hilly country between the Cape and Natal. It became a large African reserve and grew in size when those parts that were still independent were annexed in the 1880s and '90s (Pondoland lost its independence in 1894).

Under apartheid blacks were treated like "tribal" people and were required to live on reserves under hereditary chiefs except when they worked temporarily in white towns or on white farms. The government began to consolidate the scattered reserves into 8 (eventually 10) distinct territories, designating each of them as the "homeland," or Bantustan, of a specific black ethnic community. The government manipulated homeland politics so that compliant chiefs controlled the administrations of most of those territories. Arguing that Bantustans

matched the decolonization process then taking place in tropical Africa, the government devolved powers onto those administrations and eventually encouraged them to become "independent." Between 1976 and 1981 four accepted independence—Transkei, Bophuthatswana, Venda, and Ciskei—though none was ever recognized by a foreign government. Like the other homelands, however, they were economic backwaters, dependent on subsidies from Pretoria.

Conditions in the homelands continued to deteriorate, partly because they had to accommodate vast numbers of people with minimal resources. Many people found their way to the towns; but the government, attempting to reverse this flood, strengthened the pass laws by making it illegal for blacks to be in a town for more than 72 hours at a time without a job in a white home or business. A particularly brutal series of forced removals were conducted from the 1960s to the early '80s, in which more than 3.5 million blacks were taken from towns and white rural areas (including lands they had occupied for generations) and dumped into the reserves, sometimes in the middle of winter and without any facilities.

APPENDIX D

ONGELUKSNEK NATURE RESERVE, EASTERN CAPE PROVINCE

ONGELUKSNEK NATURE RESERVE
GENERAL TOURISM PRODUCT INFORMATION[4]
www.ongeluksnek.com

The 13 000 ha reserve is located in the steep mountain grassland of the southern Drakensberg, on the Lesotho border. It was proclaimed as a protected area in 1976, and forms an important part of the upper catchment of the Kinira River, which feeds the greater Umzimvubu basin. The reserve is drained by the perennial Lebelle and Jordan Rivers. Rainfall is in the region of 750mm per annum, and the area has verdant green summers and snowy winters.

TOPOGRAPHY & CLIMATE

The area lies in rugged mountainous terrain, dropping-off steeply from the Maluti/Drakensberg Escarpment. It is mainly underlain by basaltic lavas of the Drakensberg Group of the Karoo Super group. In the eastern lowlands around 1600m, fingers of fine grained sandstones of the Clarens Formation are exposed, along with Quaternary alluvium, Molteno sandstones and mudstones, with Elliot mudstones extending westwards in to the basalt. (Lechmere-Oertel, 2006).

The steep gradients and shallow soils of the Drakensberg result in almost half of the rainfall leaving the area as run-off (MDTP, 2008). If the soils are bound by intact indigenous vegetation, the surface flow is rapidly absorbed, and controlled gradual water yield will be released throughout the year. Under these ideal conditions, high quality sediment-free water will reach streams. This situation is demonstrated by the presence of alpine wetlands in the upper reaches of the reserve, and the high water quality captured in the Lebelle stream weir which supplies the Thaba Chicha bulk regional water supply to villages adjacent to the reserve.

Average minimum temperatures in summer range between 6 and 12°C. Daytime summer temperatures range between 20 and 28°C. Winters are cold with night temperatures frequently dropping below O°C and a high frequency of frost nights, with occasional snow and ice creating a challenging climatic environment. Maximum winter temperature rarely goes above 18°C. Annual rainfall is in the region of 750mm, occurring mainly in the summer months, with February rainfall levels reaching 125 mm. Some parts of the escarpment have recorded 1800mm per annum (MDTP, 2006), resulting in extreme run-off events. This indicates high run-off capacity during concentrated periods, resulting in increased erosion and topsoil loss where groundcover is insufficient. Precipitation also occurs in the form of mist and snow.

VEGETATION & FAUNA

The topography reflects the area's position on the escarpment with Lesotho, and is mainly covered by grassland defined in Camp's newer veld classification as *Drakensberg foothills moist sourveld*. The Nature Reserve is mainly composed of impressive rolling valleys and spurs running up to the escarpment. The road corridor climbs from East Griqualand grassland (vegetation type Gs12) dominated by tropical and temperate bunch grasses such as *Themeda*, which have been degraded through livestock pressure to become dominated by wire grasses and scattered Karroid shrubs (MDTP, 2008). At higher altitudes, the grasslands shift to become more alpine in nature, underlain by basalts with less grass cover and greater percentage of shrubby fynbos and karroid species, which have been allowed to increase through decreased grass competition from overgrazing. This has reduced soil cover and allowed an increase in erodibility, resulting in increased run-off and erosivity of rainfall.

A good representation of grassland flowering species occurs in the area, and was documented by studies undertaken by the Maloti Drakensberg Transfrontier project (MDTP) in the early 2000s. Biodiversity is however threatened by the annual veld fires which sweep through the area, despite attempts by the Reserve to establish fire breaks and control wildfires.

[4] http://www.dedea.gov.za/Media%20Releases/Ongeluksnek%20Nature%20Reserve%20Fast%20Facts.pdf

The Reserve has a range of raptors and large birds, including the Bearded and Cape Vulture. There is no available bird list for the reserve, but the area provides a habitat for a combination of grassland and alpine species, including Orange throated longclaw, pipits, larks, chats, etc. These seed and insect eaters assist with pollination.
The Reserve has never been stocked with wildlife, but has provided a fairly safe habitat for existing species in the upper catchment, although poaching has been problematic. There is a limited representation of wildlife, however some successful breeding populations include Mountain Reedbuck, Grey Rhebok, duiker, hyrax/dassie, jackals, caracal / rooikat, water and grey mongoose, hares, porcupines, aardvark and baboons have left evidence of their activities. Some good birding opportunities exist – see activities section below.

ACCESS

3 hours from Durban via N2 and R56 to Matatiele. The R56 leading west from Matatiele towards ONR is 12km tar (R56) plus 38km of challenging gravel (DR08646, with signboard to reserve), with fantastic views of the southern berg. Approx 1 hr (Matatiele is the closest town). Road from the Eastern Cape (western) side is via Maclear and Mt Fletcher along the R56, with no signboard for reserve at the gravel road turn-off marked "Farview/Xaxazana". Approx 1hr along gravel to reserve through scenic villages. Approx 5-6 hours from East London. Very scenic drive.
The reserve is bisected by the DR08646, a public gravel road, which leads up the impressive Ongeluksnek Pass between SA and Lesotho. An SA border post is located at the base of the pass (08h00 to 16h00).
The pass has a 1000m rise (equivalent to Table Mountain), and was first driven in an old Land Rover by Matatiele resident Lionel Whittle, via the stock trails in the early 1950s. A simple hand built road was developed as a trading route between Matatiele and Mt Moorosi in the late 1960s by a local trader. The old trading store ruins can still be seen alongside the road half way up the pass on the western side. The road was properly shaped and built in 1991 by the then Transkei Roads Department, and was under renovation in February 2009. The route leads through to Mphaki in southern Lesotho, via the spectacular Lake Letsie wetland area, which is a declared RAMSAR site.

ACCOMMODATION:

GATEWAY LODGE

The sandstone lodge is an old renovated farmhouse, built in the early 1900s, located at the entrance to the reserve. It has 3 rooms, with two doubles, 6 singles, 2 sleeper couches, and can sleep a total of 12. It has solar lighting and plugs, plus gas fridge, stove and geyser. The kitchen is fitted for self-catering guests, and a cook can also be arranged.
The large covered porch with a great view of the mountains is an ideal spot to unwind.
Chopped firewood is supplied for the outside braai area, as well as the lounge's open fireplace.
Also has a conference/dining room for mini meetings of up to 20 people, which can be catered for.
Please note septic tank cannot take any foreign matter, so please respect this.
Gas appliances should be used with care, especially the stove.
Solar lighting and plugs – please follow directions on wall-mounted instructions in kitchen and lounge to prolong the life of the system.
Local village shops have basic supplies if required. Catering can be arranged.

BUSHCAMP

The **Tweespruit bushcamp has** 4 shady well grassed campsites located along the Jordan river. Has a covered open plan boma with potable running water, sink, tables, stone benches, overlooking campsite with great view of the mountains. Has gents and ladies ablutions with flush water and hot showers, with a bath for children. Hot water supplied by donkey boiler
The camp is a good base for hiking or mountain biking up into the catchment where high altitude wetlands are found, and for visiting the interesting and ancient volcanic basalt rock formations.
Has 4x4 or hiking, mountain bike or horseback access (from the main gateway lodge where vehicles can be safely left), with 4 vehicle sites next to the Jordan river, and a capacity of 24 (4 parties) people using own tents.

ACTIVITIES

From the lodge or bushcamp, visitors can explore the beautiful sandstone **Mariazell Mission**, built in 1904, either on a day walk or vehicle accessible, with its self-sufficient hydro electrical

system, high school (which Patrick Mosiua Lekota attended) and farm. Guided tours could be arranged via the reserve staff.
Hiking - lots, for beginners to experienced, guided or self-exploratory with a map. Great swimming pools in Jordan river, at waterfall near reserve HQ (short walk from lodge west along road towards pass), old grave sites, ruins, rock art, etc can be visited. Grassland has wonderful flowers in summer. Some indigenous forests in gorges north of HQ, and Lot's Wife pillar (basalt formation) accessed from bushcamp in the Jordan valley. Drive around to Tweespruit bushcamp site, leave a vehicle and hike along old track leading west towards picnic site at Charles Mills – old homestead ruins and fruit trees, graves sites, swimming upstream of site, etc.
Horse riding - horse can be hired, with a guide, from the local Mabenyeng Horse Association. Arrange via reserve manage. Visitors pay horse owners directly in cash.
Rock paintings - guided walks or on horse back.
Mountain biking - the surrounding villages have a myriad of footpaths which make for excellent single track riding. The reserve has good riding up the pass, with some loops and links for the adventurous and technically skilled rider, allowing exploration of the little known southern berg/Lesotho border area, such as Nene's pass.
Mehloding Hiking Trail - based from a community-operated chalet adjacent to the reserve just beyond the mission. Can do day walks or a 4 day uni-directional trail leading east. Also provide traditional and conventional catering by prior arrangement.
4x4 trails up Ongeluksnek pass or along northern bushcamp track along Jordan river to picnic sites. Can drive through border up into Lesotho to the spectacular Lake Letsie wetland area (24km from lodge).
Birding - The reserve and Matatiele access route along the valley have great birdwatching (Blue and Crowned cranes, Southern ground hornbills, Denham's bustard, Cape vulture, Lammergeier, secretary birds - all of which are endangered) plus Lanner Falcons, Marsh Owls etc. Sighting of a European Roller as well - very rare here!

A trained THETA accredited local guide can also be arranged (via reserve manager), who is very knowledgeable of the area, has a driver's license, and is a birding enthusiast. R100 for half day, R200 for full day, payable directly to the guide.
Five trainee guides are also being supported to gain experience.

LESOTHO / TRANSFRONTIER ACCESS

The pass up into Lesotho has been upgraded (leads from lodge through reserve for 16km up to physical border), and is accessible by vehicles with clearance (4x4 pref but only necessary in wet weather).
Need a passport to go through SA border at base of pass. Lesotho border post still being renovated.
The road leads into Lesotho, through to Mphaki village (fuel, food, rustic lodging) or to Mt Moorosi (fuel, food, lodging, basic shops, historical sites, community chalets).
The A1, main road through Lesotho which passes through Mphaki and Mt Moorosi, is tarred, and leads on towards Maseru in a north westerly direction. The roads to these towns are very scenic, through rural landscape.
Could also make a circular route, via Qachas Nek pass to the east or Rhodes area to west. Check out the Maloti Route www.malotiroute.co.za on the web for more transfrontier travel planning info.

Please notify the reserve manager, duty staff or gate keeper regarding any problems or queries.
Please feel welcome to provide any feedback or comments in the visitors book and attached comment sheets, so that we can improve our service and your experience.
We trust you will enjoy your stay.

Reserve manager contact: Mr Harold Mdhluli 039 256 4888 / 082 345 3709
EC Parks Central Reservations: 043 701 9600 Friends of Ongeluksnek: Nicky McLeod 082 782 6067

DEDEA spends R2, 25M in Ongeluksnek Nature Reserve[5]

9/29/2010 DEDEA Media Release

The Department of Economic Development and Environmental Affairs (DEDEA) has been spent about R2, 25 million to renovate the Ongeluksnek Nature Reserve at Matatiele in Alfred Nzo District Municipality (ADM).

The success of this nature reserve, which is a catalyst for economic development, poverty alleviation and employment creation in the region, has been realised through involvement of the community in the management of parks. The community has been instrumental in the functionality of the reserve through providing horses for guiding, fresh produce supply, and infrastructure and trail maintenance.

The MEC for Finance, Economic Development and Environmental Affairs Mr Mcebisi Jonas visited the Ongeluksnek community as part of the Eastern Cape Executive Council Outreach Programme in the ADM. Addressing the community, MEC Jonas commended the way the community has been proactive in preserving the nature reserve through working with the department.

"The project is very exciting as it brings new perspective whilst setting an encouraging precedence in the overall environmental management of the parks. In most instances the functionality of the nature reserve relies heavily on the external parties rather than the community itself. So we are encouraged by these new and positive developments. This work vindicates the view we have had that key to bringing solutions to the problems facing the parks and the surrounding communities is in the integration of communities in the activities of the nature reserves. Linked to this is the need of identifying other areas of involvement other than the all important economic development, these include areas like the existing culture of surrounding villages, the indigenous knowledge which will contribute in improving lives overall beneficiation by the communities", says Jonas.

Among the key deliverables of the project include the:

- Fencing of 4km to enclose the reserve entrance;
- Renovation of unused sandstone homestead ruins, to provide offices, ablutions, parking, water supply, gatehouse and a controlled entrance to the protected area via a stock grid;
- Renovation of a 3 bedroom self catering guest lodge, with solar lighting, gas supply for geyser and kitchen (fridge and stove), bedding, fully equipped kitchen, fireplace and veranda;
- Construction of a bushcamp in the Jordan valley with covered boma, water supply, comfortable ablutions, hot showers and shaded campsites;
- New reserve entrance gate above Motseng village, providing access to the northern portion of the reserve and controlled access to the bushcamp;
- Trail development, mapping and clearing of over 8km, with signage and markers;
- A website and marketing collateral for marketing;
- Training of over 100 workers and local people in basic Occupational Health and Safety, HIV awareness, , hospitality, hands-on construction skills, horse care, financial literacy, fire fighting, environmental awareness, guiding and tourism basics;
- Rehabilitation of 5km of access road and rebuilding of an extensive stream crossing / bridge to allow access to the bushcamp area for tourists and reserve management.

The Nature Reserve is managed by the Eastern Cape Parks and Tourism Agency – a DEDEA public entity mandated to manage all provincial protected areas and destination marketing with the objective of promoting and developing the tourism industry.

[5] http://www.dedea.gov.za/News/Pages/DEDEAspendsOngeluksnek.aspx

APPENDIX D

METHODOLOGY

Site survey

eThembeni staff members inspected the area from 23 to 26 May 2011. We completed controlled-exclusive surface surveys, where 'sufficient information exists on an area to make solid and defensible assumptions and judgements about where [heritage resource] sites may and may not be' and 'an inspection of the surface of the ground, wherever this surface is visible, is made, with no substantial attempt to clear brush, turf, deadfall, leaves or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures that are observed by accident' (King 1978; see bibliography for other references informing methodological approach).

The site surveys comprised non-systematic or random walks around the existing borrow pits in an area extending approximately 100 metres from the points listed in Table 1. 67 of the 69 borrow pits were inspected; the exceptions were DR8015/BP10 and DR8017/BP02, which could not be accessed due to time constraints. Staff members examined these borrow pits using Google Earth imagery and are confident that the presence of heritage resources in their vicinity is very unlikely. Geographic coordinates were obtained using a handheld Garmin global positioning unit (WPG 84). Photographs were taken with a Nikon Coolpix camera and a representative selection is included in Appendix E.

Database and literature review

No databases were consulted due to the limited footprints of the proposed development areas, and the fact that physical examination of entire footprints was possible. A concise account of the pre and postcolonial history of the broader study area was compiled from sources including those listed in the bibliography and is included as Appendix B. Appendix C contains documents attesting to the significance of Ongeluksnek Nature Reserve.

Assessment of heritage resource value and significance

Heritage resources are significant only to the extent that they have public value, as implicitly demonstrated by the following guidelines for determining site significance developed by the South African Heritage Resources Agency and utilised during this assessment.

Type of Significance

1. Historical Value: It is important in the community, or pattern of history
- Importance in the evolution of cultural landscapes and settlement patterns.
- Importance in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, Province, region or locality.
- Importance for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, Province, region or community.
- Importance as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period
- It has strong or special association with the life or work of a person, group or organisation of importance in history

- Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, Province, region or community.
- Importance for a direct link to the history of slavery in South Africa.

2. Aesthetic Value: It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group
- Importance to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
- Importance for its creative, design or artistic excellence, innovation or achievement.
- Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
- In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

3. Scientific Value: It has potential to yield information that will contribute to an understanding of natural or cultural heritage
- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period.
- Importance for its technical innovation or achievement.

4. Social Value: It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

Degrees of Significance
Rarity: It possesses uncommon, rare or endangered aspects of natural or cultural heritage
- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

Representivity: It is important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects
- Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class.

- Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, Province, region or locality.

Sphere of Significance: High, Medium, Low
- International; National; Provincial; Regional; Local

Assessment of impacts

A heritage resource impact may be defined broadly as the net change, either beneficial or adverse, between the integrity of a heritage site with and without the proposed development. Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource, by minimising natural site erosion or facilitating non-destructive public use, for example. More commonly, development impacts are of an adverse nature and can include:
- destruction or alteration of all or part of a heritage site;
- isolation of a site from its natural setting; and / or
- introduction of physical, chemical or visual elements that are out of character with the heritage resource and its setting.

Beneficial and adverse impacts can be direct or indirect, as well as cumulative, as implied by the aforementioned examples. Although indirect impacts may be more difficult to foresee, assess and quantify, they must form part of the assessment process. The following assessment criteria have been used to assess the impacts of the proposed development on identified heritage resources:

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the type of effect the construction, operation and management of the proposed development would have on the heritage resource.
	Negative	
	Neutral	
Extent	Low	Site-specific, affects only the development footprint.
	Medium	Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius);
	High	Regional (beyond a 10 km radius) to national.
Duration	Low	0-4 years (i.e. duration of construction phase).
	Medium	5-10 years.
	High	More than 10 years to permanent.
Intensity	Low	Where the impact affects the heritage resource in such a way that its significance and value are minimally affected.
	Medium	Where the heritage resource is altered and its significance and value are measurably reduced.
	High	Where the heritage resource is altered or destroyed to the extent that its significance and value cease to exist.
Potential for impact on irreplaceable resources	Low	No irreplaceable resources will be impacted.
	Medium	Resources that will be impacted can be replaced, with effort.
	High	There is no potential for replacing a particular vulnerable resource that will be impacted.

Consequence (a combination of extent, duration, intensity and the potential for impact on irreplaceable resources).	Low	A combination of any of the following: - Intensity, duration, extent and impact on irreplaceable resources are all rated low. - Intensity is low and up to two of the other criteria are rated medium. - Intensity is medium and all three other criteria are rated low.
	Medium	Intensity is medium and at least two of the other criteria are rated medium.
	High	Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration. Intensity is rated high, with all of the other criteria being rated medium or higher.
Probability (the likelihood of the impact occurring)	Low	It is highly unlikely or less than 50 % likely that an impact will occur.
	Medium	It is between 50 and 70 % certain that the impact will occur.
	High	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.
Significance (all impacts including potential cumulative impacts)	Low	Low consequence and low probability. Low consequence and medium probability. Low consequence and high probability.
	Medium	Medium consequence and low probability. Medium consequence and medium probability. Medium consequence and high probability. High consequence and low probability.
	High	High consequence and medium probability. High consequence and high probability.

Assumptions and limitations of this heritage impact assessment

- The description of the proposed project, provided by the client, is accurate.
- The public consultation process undertaken as part of the Environmental Impact Assessment is sufficient and adequate and does not require repetition as part of the heritage impact assessment.
- Soil surface visibility was moderate to good. Heritage resources might be present below the surface or in areas of dense vegetation and we remind the client that the Act requires that a developer cease all work immediately and follow the protocol stipulated in Section 9 of this report should any heritage resources, as defined in the Act, be discovered during the course of development activities.
- No subsurface investigation (including excavations or sampling) were undertaken, since a permit from SAHRA is required to disturb a heritage resource.
- eThembeni is not able to provide a specialist palaeontological assessment for this project and informed the client as much at the time of quotation.
- A key concept in the management of heritage resources is that of non-renewability: damage to or destruction of most resources, including that caused by bona fide research endeavours, cannot be reversed or undone. Accordingly, management recommendations for heritage resources in the context of development are as conservative as possible.
- Human sciences are necessarily both subjective and objective in nature. eThembeni staff members strive to manage heritage resources to the highest standards in accordance with national and international best practice, but recognise that their opinions might differ from those of other heritage practitioners.

- Staff members involved in this project have no vested interest in it; are qualified to undertake the tasks as described in the terms of reference (refer to Appendix F); and comply at all times with the Codes of Ethics and Conduct of the Association of Southern African Professional Archaeologists.
- eThembeni staff members take no personal or professional responsibility for the misuse of the information contained in this report, although they take all reasonable precautions against such misuse.

APPENDIX E

PHOTOGRAPHS

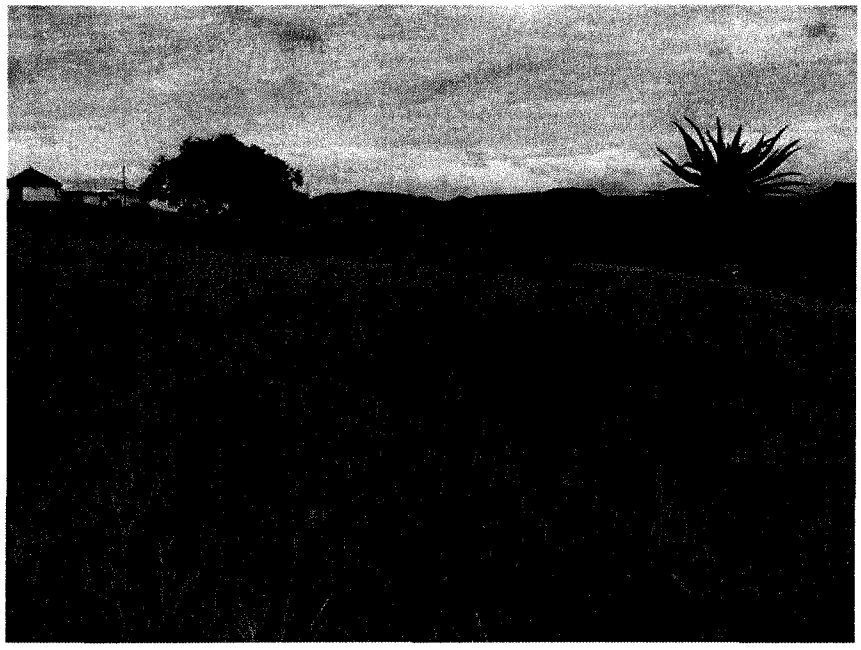


Plate 1 Ancestral graves close to DR8015/BP05.

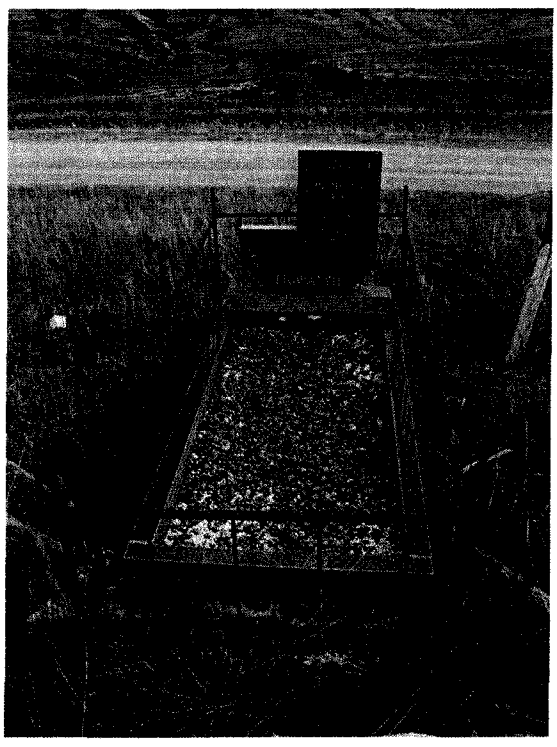


Plate 2 Ancestral grave close to DR8015/BP05.

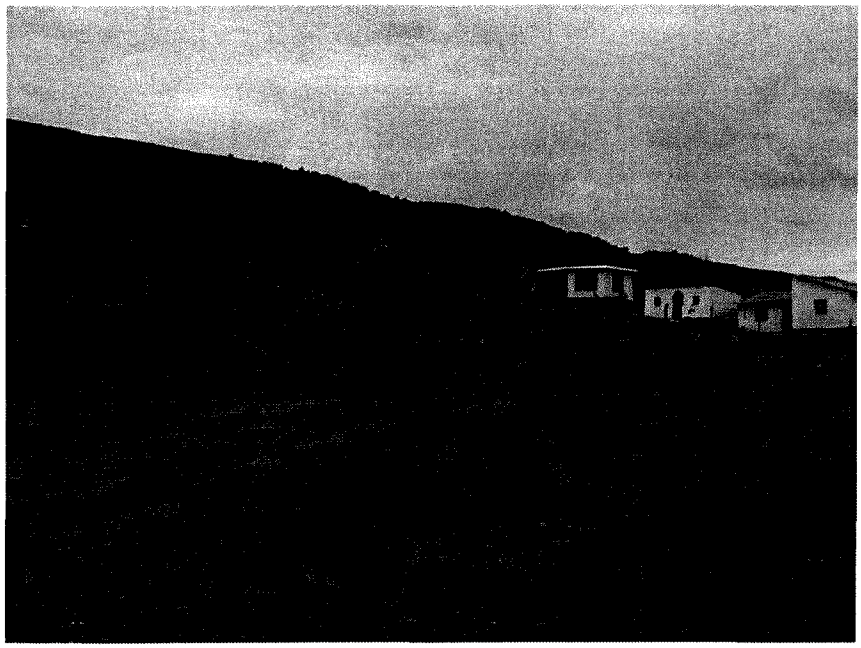


Plate 3 Face of DR8015/BP06 requiring stabilisation to prevent undermining of ancestral graves.

Plate 4 Location of ancestral graves opposite DR8015/BP18 (beyond vehicle across the road).

Plate 5 View from DR8646/BP03 towards Ongeluksnek Nature Reserve.

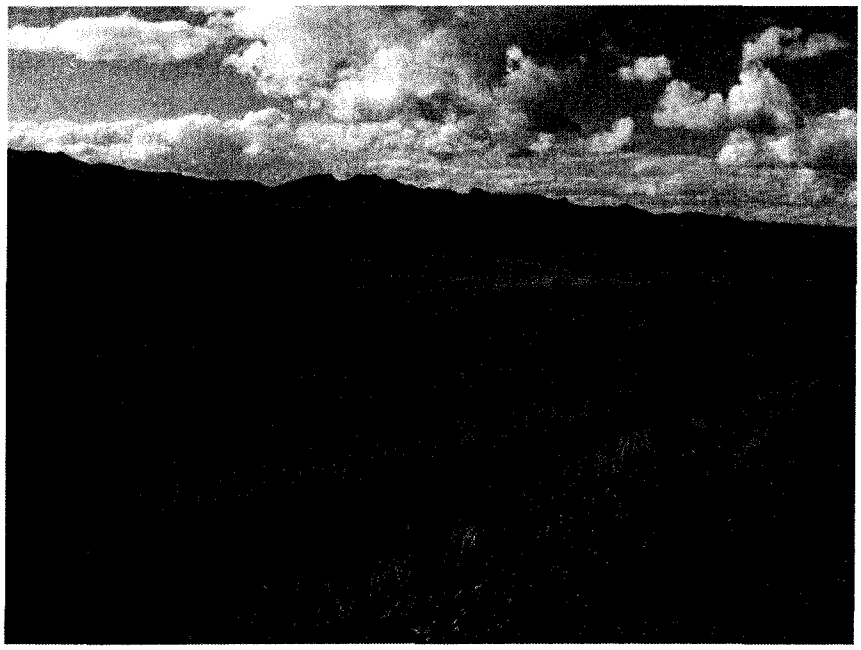


Plate 6 Ongeluksnek Nature Reserve entrance indicated on left, with DR8646/BP03 on right.

APPENDIX F

SPECIALIST COMPETENCY AND DECLARATION OF INDEPENDENCE

Specialist competency

Len van Schalkwyk is accredited by the Cultural Resources Management section of the Association of South African Professional Archaeologists to undertake heritage impact assessments in South Africa. Mr van Schalkwyk has a master's degree in archaeology (specialising in the history of early farmers in southern Africa) from the University of Cape Town and 25 years' experience in heritage management. He has worked on projects as diverse as the establishment of the Ondini Cultural Museum in Ulundi, the cultural management of Chobe National Park in Botswana and various archaeological excavations and oral history recording projects. He was part of the writing team that produced the KwaZulu-Natal Heritage Act 1997. He has worked with many rural communities to establish integrated heritage and land use plans and speaks good Zulu.

Mr van Schalkwyk left his position as assistant director of Amafa aKwaZulu-Natali, the provincial heritage management authority, to start eThembeni in partnership with Beth Wahl, who was head of archaeology at Amafa at the time. Over the past decade they have undertaken almost 1000 heritage impact assessments throughout South Africa, as well as in Mozambique.

Beth Wahl has a BA Honours in African Studies from the University of Cape Town and has completed various Masters courses in Heritage and Tourism at the University of KwaZulu-Natal. She is currently studying for an MPhil in the Conservation of the Built Environment at UCT. She is a member of the Association of Southern African Professional Archaeologists.

Ms Wahl was an excavator and logistical coordinator for Glasgow University Archaeological Research Division's heritage programme at Isandlwana Battlefield; has undertaken numerous rock painting surveys in the uKhahlamba/Drakensberg Mountains, northern KwaZulu-Natal, the Cederberg and the Koue Bokkeveld in the Cape Province; and was the principal excavator of Scorpion Shelter in the Cape Province, and Lenjane and Crystal Shelters in KwaZulu-Natal. Ms Wahl compiled the first cultural landscape management plan for the Mnweni Valley, northern uKhahlamba/Drakensberg, and undertook an assessment of and made recommendations for cultural heritage databases and organisational capacity in parts of Lesotho and South Africa for the Global Environment Facility of the World Bank for the Maloti Drakensberg Transfrontier Conservation and Development Area. She developed the first cultural heritage management plan for the uKhahlamba Drakensberg Park World Heritage Site, following UNESCO recommendations for rock art management in southern Africa.

Declaration of independence

We declare that Len van Schalkwyk, Beth Wahl and eThembeni Cultural Heritage have no financial or personal interest in the proposed development, nor its developers or any of its subsidiaries, apart from in the provision of heritage impact assessment and management consulting services.

APPENDIX D
ENVIRONMENTAL AWARENESS PLAN

ENVIRONMENTAL AWARENESS COURSE

P604

WHAT IS THE ENVIRONMENT?

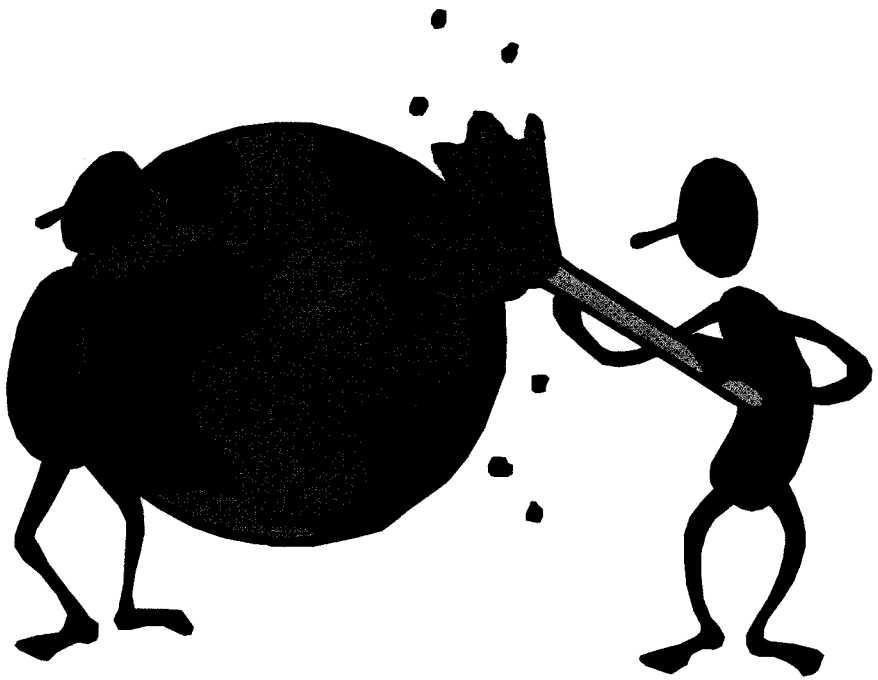
- Soil
- Water
- Plants
- People
- Animals
- Air we breathe
- Buildings, cars and houses

WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A contract has been signed
- Disciplinary action (e.g. construction could stop or fines issued)

HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP



WORKING AREAS

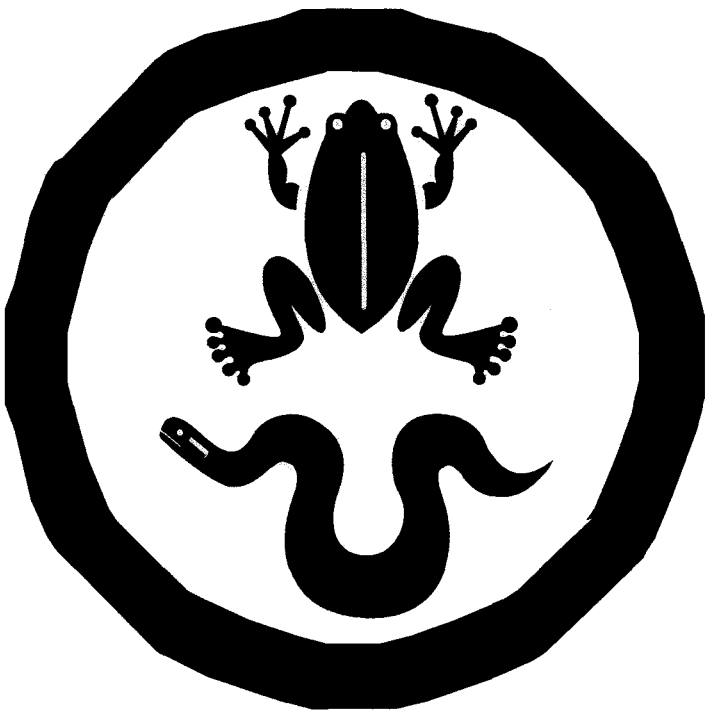
Workers & equipment must stay inside the site boundaries at all times

RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream

ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site



TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers

SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission

PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray, bunded area or plastic sheeting under vehicles, machinery & under all oil, diesel or petrol drums
- Empty drip trays after rain & throw away where instructed

DUST

Try to avoid producing dust -

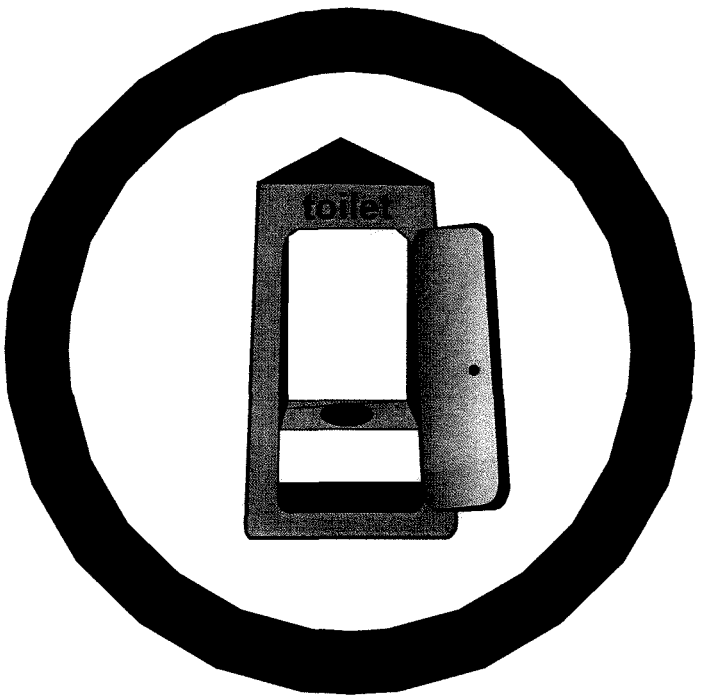
Use water to make ground & soil wet

NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles

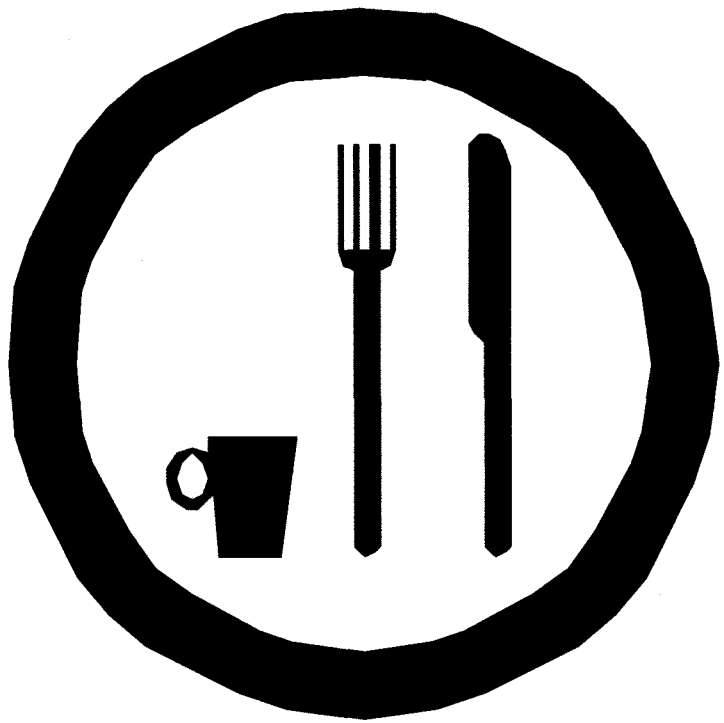
TOILETS

- Use the toilets provided
- Report full or leaking toilets



EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins



RUBBISH

- Do not litter – put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly

TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers - check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill

EMERGENCY PHONE NUMBERS

Know all the emergency phone numbers:

- Ambulance: [10111]
- Fire: [10111]
- Police: 10111
- CMC: 107

FINES AND PENALTIES

- Spot fines of between R20 and R2000
- Your company may be fined
- Removal from site
- Construction may be stopped

PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!

APPENDIX E
GOOD PRACTICE GUIDE FOR STRIPPING SOILS
GOOD PRACTICE GUIDE FOR HANDLING SOILS

GOOD PRACTICE GUIDE FOR HANDLING SOILS

Sheet 13:

Soil Stripping with Bulldozers and Dump Trucks

Issued by the Farming and Rural Conservation Agency, Cambridge

April 2000

v04/00

MAFF FOREWORD

Standards of restoration of minerals and waste sites have steadily improved in recent years, with operators increasingly aware of their environmental responsibilities. The industry is putting forward more imaginative restoration concepts to a variety of afteruses, and is more aware than ever that it will be judged on the standard of that restoration, and the sustainability of the development.

Sustainable mineral development means balancing economic, environmental and social needs, whilst using resources wisely. The UK Strategy for Sustainable Development recognises the importance of safeguarding agricultural land to meet the needs of future generations, and minimising the loss of soils to new development*.

Improved restoration standards have sometimes enabled planning permission to be given for best and most versatile agricultural land to be worked for minerals, on the basis that it can be restored in a way that safeguards its long-term agricultural potential**. Inherent in these high standards of restoration is the requirement to handle soils in such a way that damage to their structure is minimised. It is the aim of this Guide to provide comprehensive advice on soil handling "Good Practice" to operators, soil moving contractors, consultants and planning authorities.

The Guide is in the form of 15 Sheets giving advice on soil stripping, the forming and taking down of soil storage mounds, and soil replacement operations using excavators, earth scrapers or bulldozers. There are also four Guidance Sheets on remedial works involving the removal of stones and damaging materials, and decompaction during the replacement operations.

This document should be cited as MAFF (2000), Good Practice Guide for Handling Soils (version 04/00). FRCA, Cambridge.

Any views expressed in the guidance are those of the consultant and do not necessarily represent the view of the Ministry of Agriculture, Fisheries and Food.

*(DETR, A Better Quality of Life, May 1999, paragraphs 6.66 and 8.50)

**MPG7 (November 1996, paragraph 3).

Acknowledgements

The Guide was written and prepared by Dr R N Humphries of Humphries Rowell Associates, Charnwood House, Loughborough, LE11 3NP, UK. The art work was by R Shenton of H J Banks & Co.

SHEET 13 SOIL STRIPPING WITH BULLDOZERS & DUMP TRUCKS

The purpose of this Guidance Sheet is to provide a model method for best practice where bulldozers, excavators and dump trucks are used to strip soils. This Guidance Sheet comprises 6 pages of text, 4 figures and a user response form.

The model may need to be modified according to site conditions or requirements of the Planning Authority. Where this is the case, deviation from the model should be recorded with reasons. The guidance does not specify the type, size or model of equipment, but this should have been agreed as part of the planning conditions or as a reserved matter. The machines should be of a kind which will cause the minimum compaction whilst being operationally efficient (eg wide tracked), and must be well maintained at all times.

Persons involved in the handling of soils, overburden etc., and in the construction or removal of mounds or tips, must comply with the Health and Safety at Work Etc. Act 1974 and its relevant statutory provisions, and in particular those aspects which relate to the construction and removal of tips, mounds and similar structures. This requirement takes preference over any suggested practice in the Sheets.

The user of these guidelines is solely responsible for all liabilities that might arise. No liabilities are accepted for any losses of any kind arising from the use of this guidance.

This soil handling method uses a bulldozer to strip the soils, an excavator to load the soil into dump trucks, and the trucks transport it to storage or to the replacement area.

The bulldozer soil handling method can significantly affect the agricultural quality of the restoration through severe soil deformation (compression and smearing). This is primarily caused through unavoidable repeated trafficking over the soils during stripping, the building of soil mounds, and on replacement; the effects of which increases with increasing soil wetness. Consequently, for satisfactory restoration

there is a need for effective decompaction treatment during the replacement operation (see Sheets 15 & 19). Decompaction treatment is an obligate requirement when soils are handled by bulldozers.

There are a number of key operational points during stripping to minimise the degree and extent of severe soil deformation, and to aid the effective treatment of the compaction on replacement:

(i) To minimise compaction:

- the dump trucks must only operate on the 'basal'/non-soil layer, and their wheels must not in any circumstances run on to the soil layer(s).
- the adoption of a bed/strip system minimises the need for the trucks to travel on the soil layers.
- the machines are to only work when ground conditions enable their maximum operating efficiency.
- the soils are to be stripped by the bulldozer in as thick layer as possible whilst maintaining their operational efficiency.
- effective decompaction on soil replacement is a requisite of the bulldozer handling method (see Sheet 19).

(ii) To minimise the wetness of the soil and re-wetting of the soil:

- the soil layers should have a moisture content of 5% or greater below their lower plastic limit*. Moisture content should be assessed by oven drying* of samples taken from representative locations and mid/lower points of each soil horizon. [*Or as required in the planning conditions.]

- the bed/strip system provides a basis to regulate the exposure of lower soil layers to periods of rain and a means of maintaining soil moisture contents. The soil profile within the active strip should be stripped to the basal layer before rainfall occurs and before stripping is suspended.

- measures are required to protect the face of the soil layer from ponding of water and maintain the basal layer in a condition capable of supporting dump trucks.

- the area to be stripped is to be protected from in-flow of water, ponding etc. Wet sites should be drained in advance.

- the maintenance of a transpiring crop is important, and an appropriate cropping regime should be established for the year of soil stripping. Before stripping, excess vegetation should be removed; in the case of grassland it should be cut or grazed short and arable crops should have been harvested.

The Stripping Operation

13.1 The area to be stripped is to be protected from in-flow of water, ponding etc. Wet sites should be drained in advance.

13.2 Soil stripping operations should not start until the required soil moisture levels are reached (as determined by the agreed method), and should be suspended as soon as the water content returns to these levels. Prior to work commencing a Meteorological Office forecast should be obtained which gives reasonable confidence of soil stripping proceeding without interruptions from rainfall events. If significant rainfall is forecast or occurs during operations, the stripping must be suspended, and where the soil profile has been disturbed it

should be removed to base level. Stripping must not restart unless the weather is expected to be dry for at least a full day.

13.3 All machines must be in a safe and efficient working condition at all times. The machines are to only work when ground conditions enable their maximum operating efficiency. The operation is to be suspended before traction becomes a problem or the integrity of the basal layer and haul routes fails.

13.4 The operation should follow a detailed stripping plan showing soil units to be stripped, haul routes and the phasing of vehicle movements. The soil units should be defined on the site with information to distinguish types and layers, and ranges of thickness. Detailed daily records should be kept of operations undertaken, and site and soil conditions.

13.5 Within each soil unit the soil layers above the base/formation layer are to be stripped in sequential strips with the topsoil layer stripped first, followed by the subsoil layers; each layer stripped to its natural thickness without incorporating material from the lower layer. The next strip should not be started until the current strip is completely stripped to the basal layer. This is often referred to as the 'bed or strip system'. The system involves the progressive sequential stripping of the materials in strips (Figure 13.1). Where there is a gradient to the site, the main axis of the soil strips should be along the main axis of the slope.

13.6 The haul routes and storage areas must be defined, and should be stripped first in a similar manner.

13.7 The bulldozer is only to stand and work on the soil layer when stripping soils, otherwise it is to travel only on the basal/formation layer. The dump trucks are only to operate on the basal/formation layer. The excavator is only to stand and work on the mounded soil when loading the dump truck, otherwise it is to travel on the basal layer (Figure 13.1).

13.8 Demarcate an initial strip width of about 20m and divide the strip into 20m long segments.

13.9 The topsoil layer is to be pushed up in the thickest layer possible (eg 150-200mm thick), whilst maintaining operational efficiency of the bulldozer, to form a low mound (1-2m high) along the edge of the exposed soil profile (face). The soil nearest the exposed face should be pushed up first, progressively working to the back of the strip (Figure 13.2). The procedure is repeated in each successive segment until the strip is completed.

13.10 Topsoil should be recovered to the full width of the segment without contamination with subsoil (not more than 20% of the lower horizon should be exposed at the layer junction within the strip). This will necessitate some trafficking of the bulldozer on the adjacent strip to be able to mound the entire topsoil within the segment. The thickness and identification of the horizon junction must be verified before and during stripping. The full thickness of the topsoil horizon should normally be stripped progressively along the segments in the active strip before subsoil horizons are started (Figure 13.2). The full topsoil horizon should be stripped along the length of the active strip before the subsoil horizons are started.

13.11 The upper subsoil in the current strip is to be stripped and monitored in the same manner. The final 50cm of the subsoil layer should be left as a step to protect the adjacent topsoil horizon from local collapses. The process is to be repeated for the lower subsoil and any other lower layer to be recovered as a soil material (Figure 13.3).

13.12 With each successive lower layer taken the bulldozer must only work within the segment and not operate across the boundary of the next strip. This will initially result in a 'stand-off' (shelf) at the back of the strip to accommodate the bulldozer. Before the next layer is stripped, the soil layer in this shelf is to

be mounded at the exposed side of the next segment for loading by the excavator into the trucks (Figure 13.4).

13.13 On completion of the strip, the procedures are repeated sequentially for each subsequent strip until the area is completely stripped.

13.14 Where the soils are to be directly replaced without storage in mounds, the initial strip of the upper horizons will have to be stored temporarily to release the lowest layer and enable the sequential movement of materials. The stored initial soil material would be placed on the lower layer removed from the final strip at the end of the programme or on partially completed profiles if rain was forecast.

13.15 Where the stripping operation is likely to be interrupted by rain or there is likely to be over-night rain remove any exposed subsoil down to the basal layer before suspending operations. Make provisions to protect base of current or next strip from ponding/runoff by sumps and grips, and also clean and level the basal layer. At the start of each day ensure there is no ponding in the current strip or operating areas, and the basal layer is to level with no ruts.

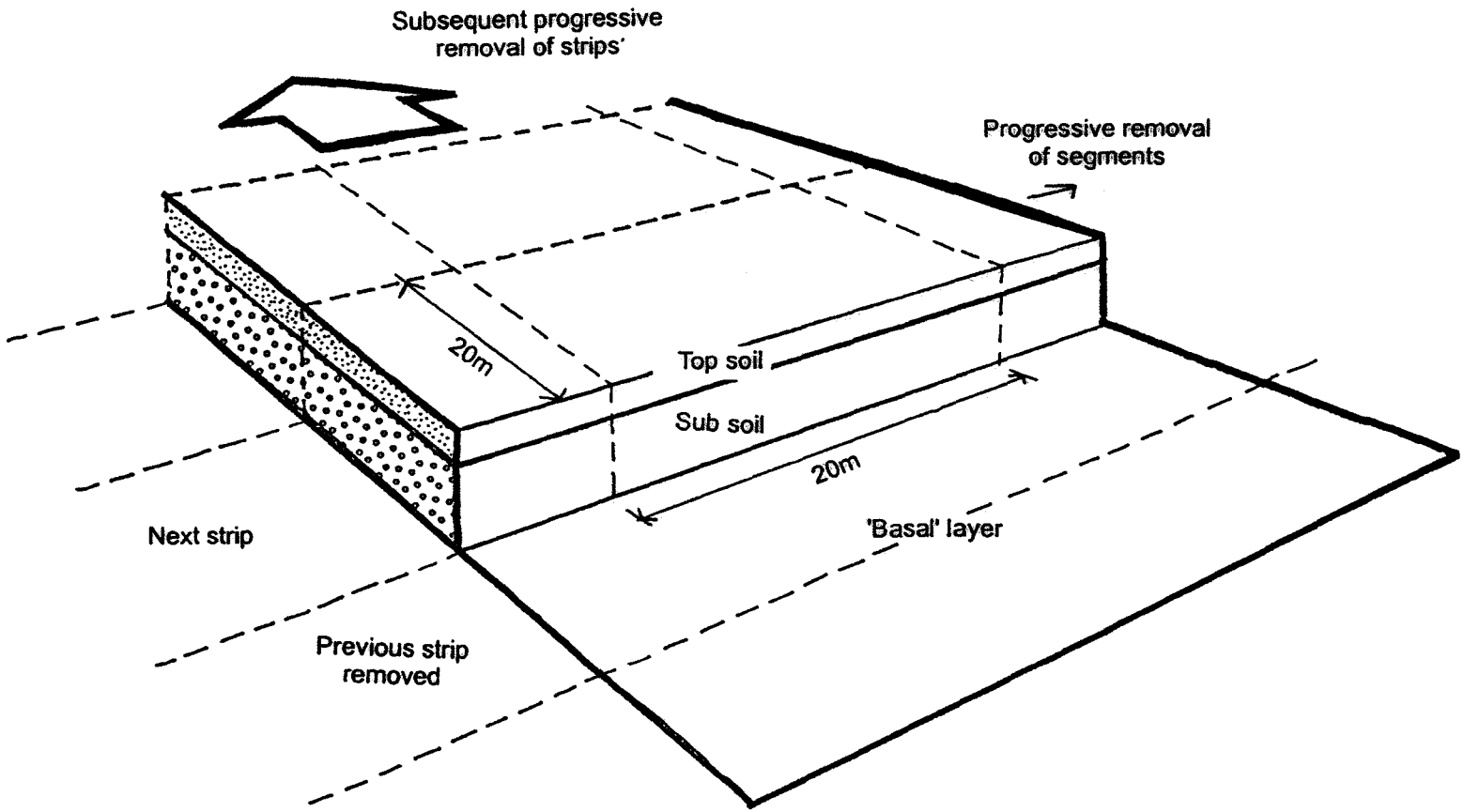


Figure 13.1 Soil stripping with bulldozers and dump trucks: The bed and segment system

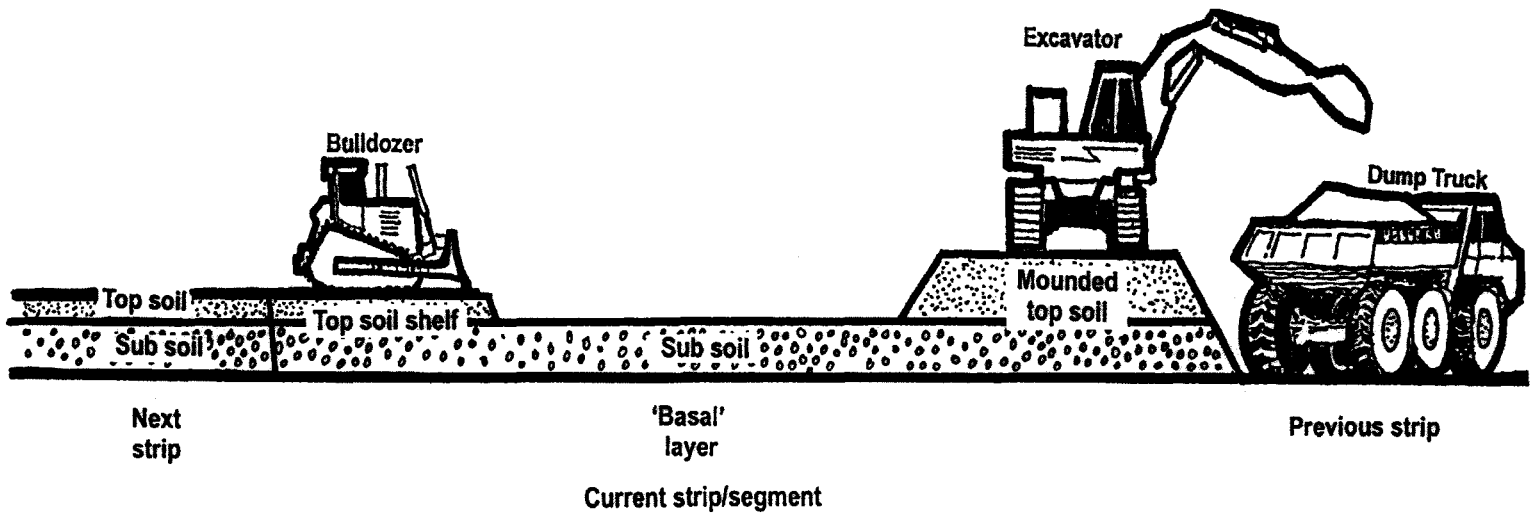


Figure 13.2 Soil stripping with bulldozers and dump trucks: Top soil

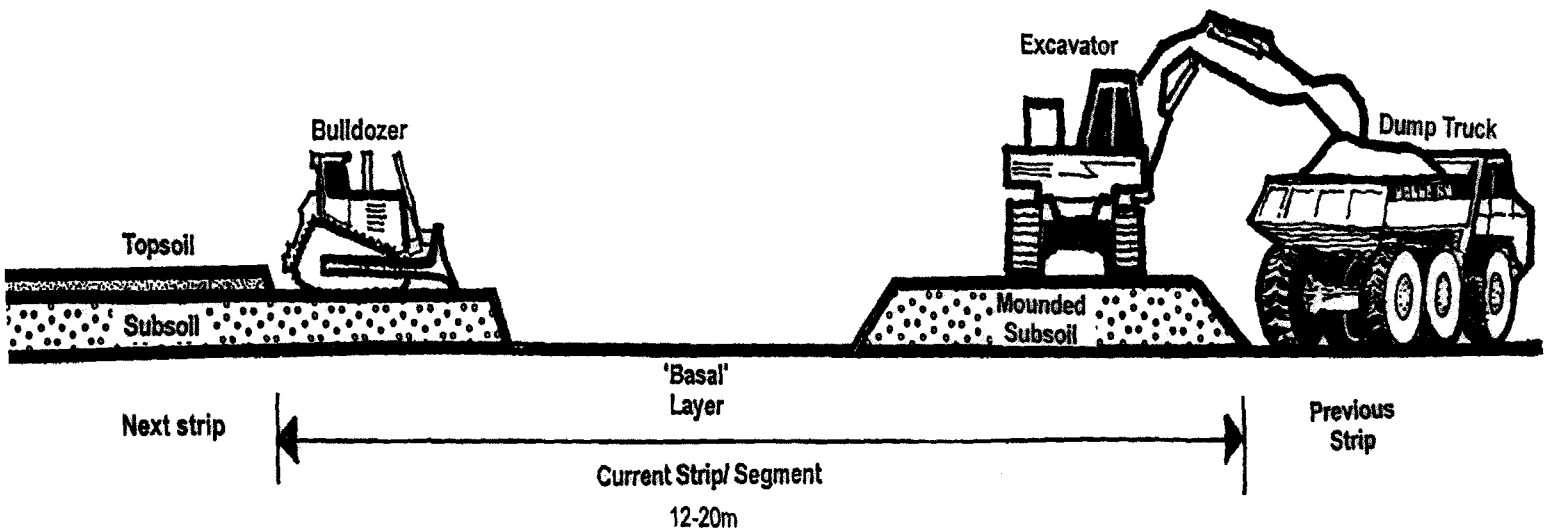


Figure 13.3 Soil stripping with bulldozers-dump trucks: Subsoil

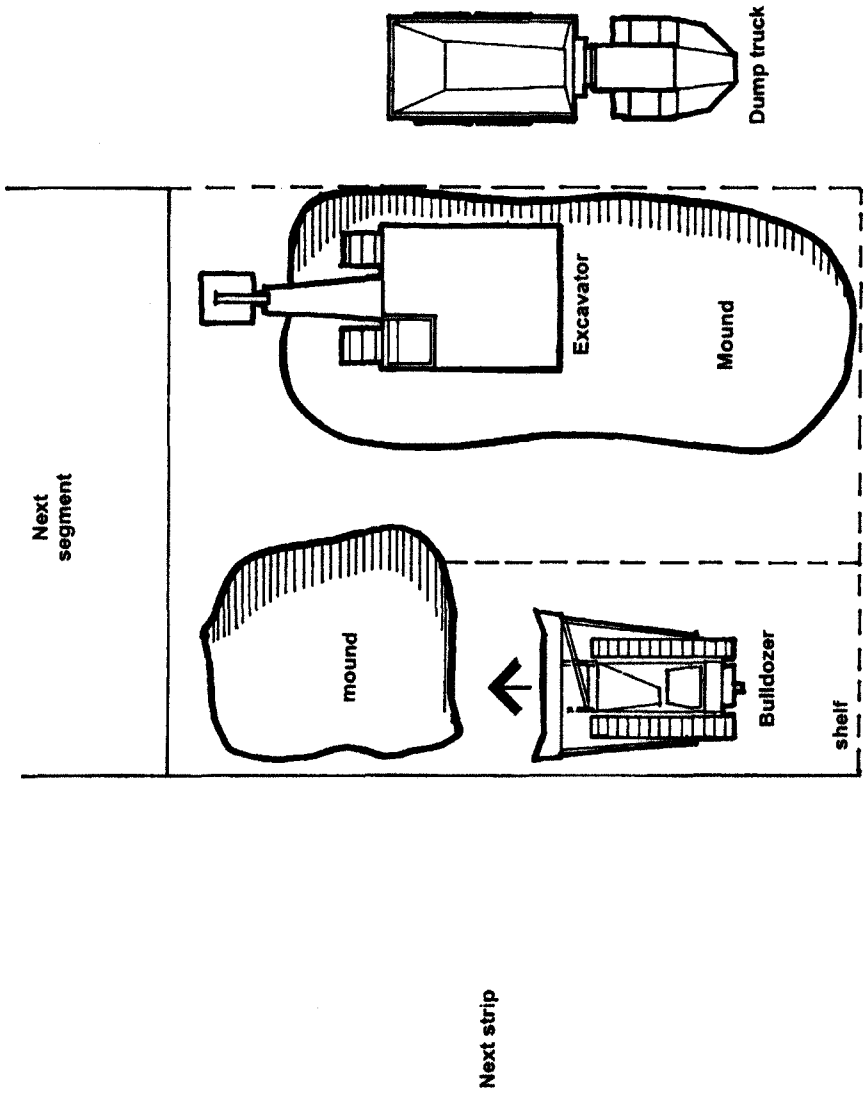


Figure 13.4 Soil stripping with bulldozers and dump trucks: The removal of soil along top soil and sub soil shelves

GOOD PRACTICE GUIDE FOR HANDLING SOILS

Sheet 15:

Soil Replacement with Bulldozers and Dump Trucks

Issued by the Farming and Rural Conservation Agency, Cambridge

April 2000

MAFF FOREWORD

Standards of restoration of minerals and waste sites have steadily improved in recent years, with operators increasingly aware of their environmental responsibilities. The industry is putting forward more imaginative restoration concepts to a variety of afteruses, and is more aware than ever that it will be judged on the standard of that restoration, and the sustainability of the development.

Sustainable mineral development means balancing economic, environmental and social needs, whilst using resources wisely. The UK Strategy for Sustainable Development recognises the importance of safeguarding agricultural land to meet the needs of future generations, and minimising the loss of soils to new development*.

Improved restoration standards have sometimes enabled planning permission to be given for best and most versatile agricultural land to be worked for minerals, on the basis that it can be restored in a way that safeguards its long-term agricultural potential**. Inherent in these high standards of restoration is the requirement to handle soils in such a way that damage to their structure is minimised. It is the aim of this Guide to provide comprehensive advice on soil handling "Good Practice" to operators, soil moving contractors, consultants and planning authorities.

The Guide is in the form of 15 Sheets giving advice on soil stripping, the forming and taking down of soil storage mounds, and soil replacement operations using excavators, earth scrapers or bulldozers. There are also four Guidance Sheets on remedial works involving the removal of stones and damaging materials, and decompaction during the replacement operations.

This document should be cited as MAFF (2000), Good Practice Guide for Handling Soils (version 04/00). FRCA, Cambridge.

Any views expressed in the guidance are those of the consultant and do not necessarily represent the view of the Ministry of Agriculture, Fisheries and Food.

*(DETR, A Better Quality of Life, May 1999, paragraphs 6.66 and 8.50)

**MPG7 (November 1996, paragraph 3).

Acknowledgements

The Guide was written and prepared by Dr R N Humphries of Humphries Rowell Associates, Charnwood House, Loughborough, LE11 3NP, UK. The art work was by R Shenton of H J Banks & Co.

SHEET 15 SOIL REPLACEMENT WITH BULLDOZER & DUMP TRUCKS

The purpose of this Guidance Sheet is to provide a model method for best practice where the soils are replaced using bulldozers and dump trucks. This Guidance Sheet comprises 6 pages of text, 3 figures and a user response form.

The model may need to be modified according to site conditions or requirements of the Planning Authority. Where this is the case, deviation from the model should be recorded with reasons. The guidance does not specify the type, size or model of equipment, but this should have been agreed as part of the planning conditions or as a reserved matter. The machines should be of a kind which will cause the minimum compaction whilst being operationally efficient (eg wide tracked), and must be well maintained at all times.

Persons involved in the handling of soils, overburden etc., and in the construction or removal of mounds or tips, must comply with the Health and Safety at Work Etc. Act 1974 and its relevant statutory provisions, and in particular those aspects which relate to the construction and removal of tips, mounds and similar structures. This requirement takes preference over any suggested practice in the Sheets.

The user of these guidelines is solely responsible for all liabilities that might arise. No liabilities are accepted for any losses of any kind arising from the use of this guidance.

This soil handling method uses a bulldozer to replace the soils and dump trucks transport it to the replacement area. If the soil is from store an excavator will be required to load the trucks.

The bulldozer soil handling method can significantly affect the agricultural quality of the restoration through severe soil deformation (compression and smearing). This is primarily caused through unavoidable repeated trafficking over the soils during the lifting and the building and excavating mounds, and on replacement; the effects of

which increases with increasing soil wetness. Consequently, for satisfactory restoration there is a need for effective decompaction treatment during the replacement operation (see Sheet 19). Decompaction treatment is an obligate requirement when soils are handled by bulldozers and dump trucks.

The early installation of under drainage is strongly recommended. Where required this should either be undertaken sequentially during the replacement of the soils or in the early aftercare period. Until drains are installed it is recommended that the restored land is sown and managed as grassland.

There are a number of key operational points to minimise the degree and extent of severe soil deformation and for the effective treatment of the compaction:

(i) To minimise compaction and optimise decompaction:

- the dump trucks must only operate on the 'basal'/non-soil layer, and their wheels must not in any circumstances run on to the soil layer(s).
- the adoption of a bed/strip system minimises the need for the trucks to travel on the soil layers.
- the machines are to only work when ground conditions enable their maximum operating efficiency.
- the soils are to be stripped by the bulldozer in as thick layer as possible whilst maintaining their operational efficiency.
- effective decompaction on soil replacement is a requisite of the bulldozer handling method (see Sheet 19).
- the soil layers should have a moisture content of 5% or greater below their lower plastic limit*. Moisture content should be assessed by oven

drying* of samples taken from representative locations and mid/lower points of each soil horizon. [*Or as required in the planning conditions.]

(ii) To minimise the re-wetting of the soil and maximising decompaction effectiveness:

- the bed/strip system provides a basis to regulate the exposure of lower soil layers to periods of rain and a means of maintaining soil moisture contents. The soil profile within the active strip should be replaced to the topsoil layer before rainfall occurs and before replacement is suspended.

- measures are required to protect the face of the soil layer from ponding of water and maintain the basal layer in a condition capable of supporting dump trucks.

- the area to receive soil is to be protected from in-flow of water, ponding etc. Wet sites should be drained in advance.

The Replacement Operation

15.1 The area to be restored is to be protected from in-flow of water, ponding etc. Wet sites must be drained in advance. Before the operation starts the basal layer should be to level and clean.

15.2 Prior to commencing operations a Meteorological Office forecast should be obtained which gives reasonable confidence of soil replacement proceeding without interruptions from rainfall events. If significant rainfall is forecast or occurs during operations, the replacement must be suspended, and where the soil profile has been started it should be replaced to topsoil level.

Replacement must not restart unless the weather is expected to be dry for at least a full day.

15.3 All machines must be in a safe and efficient working condition at all times. The machines are to only work when ground conditions enable their maximum operating efficiency. The operation should only be carried out when the basal layer supports the machinery without ruts or is capable of repair/maintenance. The operation is to be suspended before traction becomes a problem or the integrity of the basal layer and haul routes fails. All haul routes should be maintained.

15.4 The operation should follow a detailed replacement plan showing soil units to be replaced, haul routes and the phasing of vehicle movements. The soil units should be defined on the site with information to distinguish types and layers, and thickness. Detailed daily records should be kept of operations undertaken (including the removal of stones and damaging materials, and the results of any assessment of the need for additional decompaction and the effectiveness of decompaction work undertaken), and site and soil conditions.

15.5 The dump trucks are only to stand, work and travel on the basal/formation layer. Only the bulldozer is to operate on the soil layers to spread the soil.

15.6 The soil layers above the base/formation layer are to be replaced in sequential strips with the subsoil layer(s) to be replaced first, followed by the topsoil layer; each layer being replaced to the specified thickness. The next strip is not to be started until the current strip is completed. This is often referred to as the 'bed or strip system'. The system involves the progressive sequential laying of the materials in strips across the area to be restored (Figure 15.1).

15.7 Demarcate the initial strip width (15-20m) and axis, divide strip into 20m long segments. The haul routes should be clearly defined.

15.8 Reverse the dump truck to the edge of the current strip and tip the lowest layer (subsoil) soil at the edge of the strip. The bulldozer is used to spread the lower subsoil to full thickness, and in the thickest layers as possible from front to back of strip (Figure 15.2). This is undertaken progressively until the whole segment is complete, and then repeated in each segment until the strip is complete with the full depth of subsoil.

15.9 Level boards and soil pits should be used to verify soil thickness in each strip and overall levels. Allowance (ie. bulking factor) should be made for any 'heave' that may take place when the soil is decompacted.

15.10 The ripping strategy needs to be determined at the planning of operations and must take into account the thickness of soil layers, depth of recompaction and the effective depth of the ripping tool (Sheet 19), and the need for the removal of stones and other damaging materials (Sheet 17). These should be specified in the soil replacement plan. Decompaction and removal of materials should only take place when each specified soil layer is completed along the strip, and the work must be completed before the next layer of soil is placed.

15.11 On completion of the lowest layer (subsoil) across the whole strip, repeat the process sequentially spreading the next layers (subsoil/topsoil) (Figure 15.3). If the dump trucks have to rise on the already placed lower layers, this must be limited to the rear wheels only. The above decompaction operations must be arranged to treat the compacted strip margins.

15.12 On completion of the topsoil layer the above processes should be repeated for the next strips until the area to be restored is completed. Before the operation starts the basal layer should be to level and clean.

15.13 At the end of each day the current strip/segment must be completed if rain is forecast. If during a day it is evident that a full strip cannot be completed, then ensure the current segment is completed.

15.14 At the end of each day, or during the day if interrupted by rain, make provisions to protect the base of the restored strip from ponding/run-off by sumps and grips, and also clean and level the basal layer. At the start of each day ensure there is no ponding in the current strip or operating areas, and the basal layer is to level with no ruts.

Operational Variation

15.15 If the basal/formation layer is to be decompacted, before any soil material is placed, each strip is to be firstly decompacted before the subsoil layer is replaced. Decompaction is dealt with in Sheet 19, which covers strategies, equipment and methods of operation. The basal layer must only be decompacted in the strip required for soil replacement, and must be prepared on the day of soil placement. During this process it may be necessary to use Sheet 17 for the removal of stones or damaging materials from the basal layer.

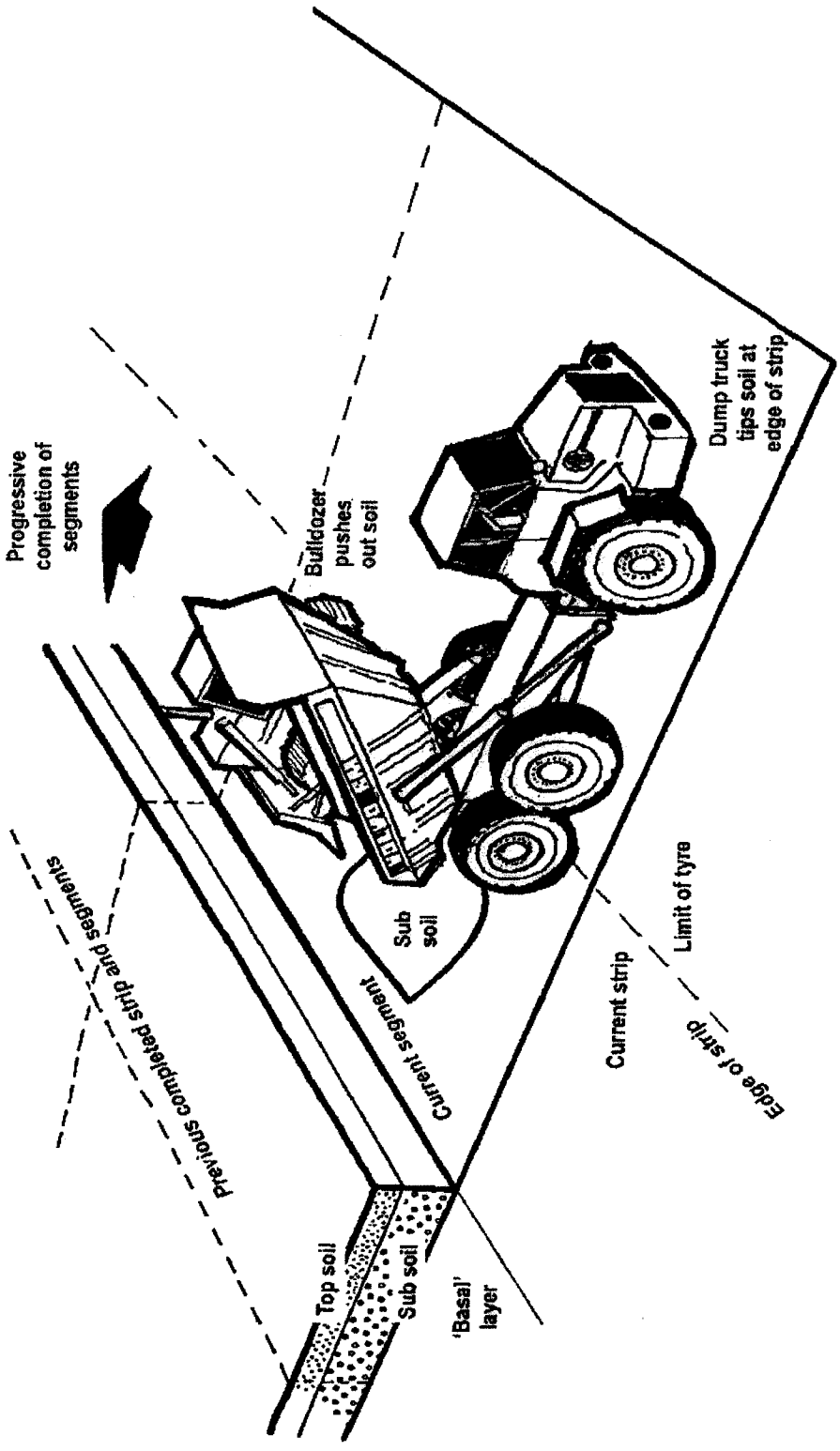
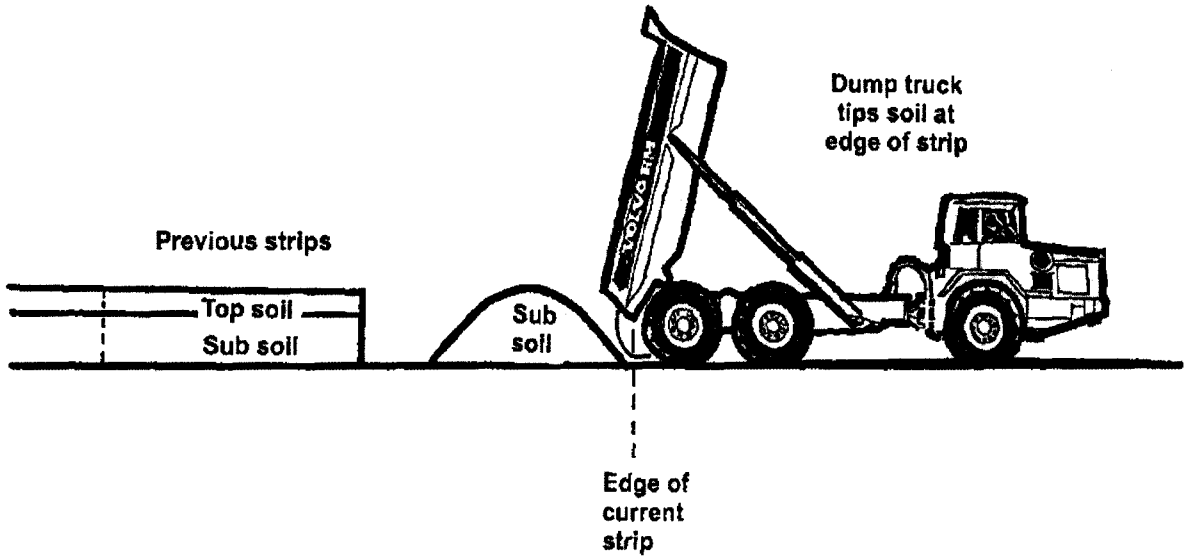


Figure 15.1 Soil replacement by bulldozers and dump trucks: Sub soil layer



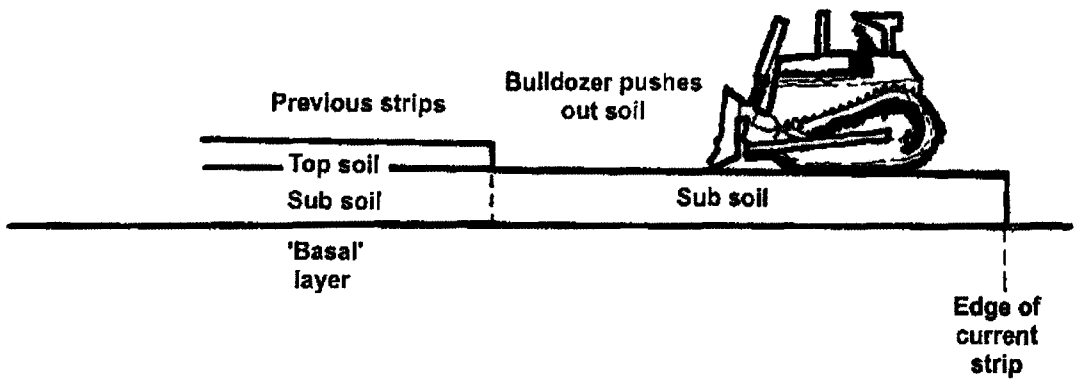
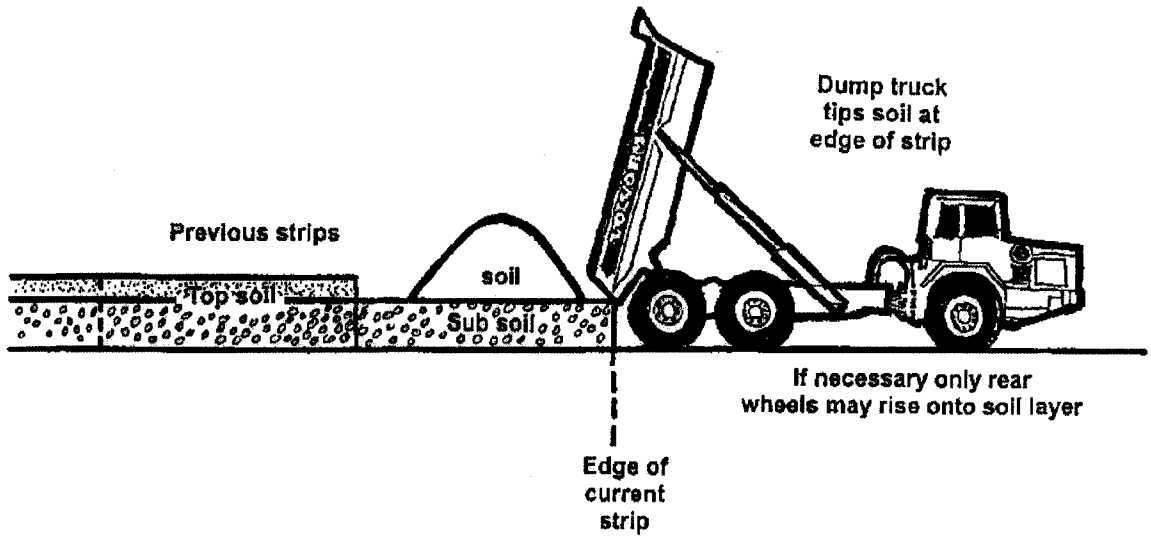


Figure 15.2 Soil replacement by bulldozers and dump trucks: Sub soil layer



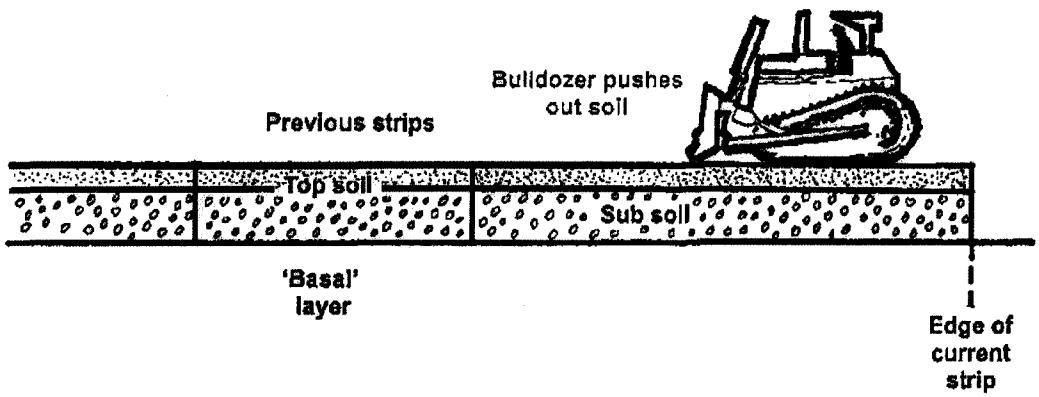


Figure 15.3 Soil replacement by bulldozers and dump trucks: Top soil layer

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