

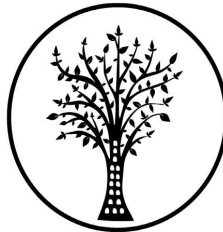
# ARCHAEOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA for a

## **Proposed Square Kilometre Array (SKA) fibre optic cable between Beaufort West and Carnarvon, Northern and Western Cape**

HWC Ref:

**Prepared by**



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In Association with

**CSIR**

October 2020



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## THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Jenna Lavin, as the appointed independent specialists hereby declare that we:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at our disposal regarding the application, whether such information is favourable to the applicant or not; and
- are aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

**Signature of the specialist**

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**Name of company**

October 2020

**Date**



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## EXECUTIVE SUMMARY

The South African Radio Astronomy Observatory (SARAO) spearheads South Africa's activities in the SKA Radio Telescope through engineering, science and construction. SARAO is a National Facility, managed by the National Research Foundation, which incorporates radio astronomy instruments and various programmes across Africa including MeerKAT. Connectivity is required between the SKA core site in the Northern Cape and a data processing facility in Cape Town to transport the science data for the SKA project and its precursor, MeerKAT. Access to dark fibre is required to transport this data due to the expected data throughputs for the SKA project.

Seven heritage resources were identified within the vicinity of the proposed fibre line route including two bridges (BTC01 and BTC07, graded IIIC), the Loxton leiwater (BTC04, BTC05 and BTC06, all graded IIIC), one possible stone artefact (out of context, BTC03, not conservation-worthy), a privately erected monument (BTC02, not conservation-worthy) and a sandstone outcrop (BTC08, not conservation-worthy).

Based on the outcomes of this report, it is not anticipated that the proposed development of the fibre line will negatively impact on significant archaeological heritage. The proposed fibre line route has been previously degraded (heavily disturbed) by the construction of the existing road between Beaufort West and Carnarvon and as such, this explains the lack of conservation worthy archaeological finds. An additional explanation for the lack of stone tools may relate to the lack of rocky outcrops (suitable raw material sources) within the proposed development area.

The heritage resources identified are largely located some distance from the proposed line (BTC02, BTC04, BTC05, BTC06, SAHRIS Site ID 32495) and will not be impacted by the proposed development or are not conservation-worthy (BTC01, BTC03, BTC07 and BTC08).

Due to the fact that some cultural remains along the roadside are likely covered in gravel from road grading/construction, the possibility exists that some artefacts may only be uncovered during the digging of the trenches for the proposed fiber line.

As such, there is no objection to the proposed development in terms of impacts to archaeological heritage however it is recommended that, should any archaeological resources or burial grounds or graves be identified during the course of trenching or excavation activities, work must cease in the area and SAHRA (Northern Cape) or Heritage Western Cape (in the Western Cape) must be contacted regarding an appropriate way forward.



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## 1. INTRODUCTION

### 1.1 Background Information on Project

The South African Radio Astronomy Observatory (SARAO) spearheads South Africa's activities in the SKA Radio Telescope through engineering, science and construction. SARAO is a National Facility, managed by the National Research Foundation, which incorporates radio astronomy instruments and programmes such as the MeerKAT and KAT-7 telescopes in the Karoo, the Hartebeesthoek Radio Astronomy Observatory (HartRAO) in Gauteng, the African Very Long Baseline Interferometry (AVN) programme in nine African countries, as well as the associated human capital development and commercialisation endeavours.

Connectivity is required between the SKA core site in the Northern Cape and a data processing facility in Cape Town to transport the science data for the SKA project and its precursor, MeerKAT. Access to dark fibre is required to transport this data due to the expected data throughputs for the SKA project.

The details of the preferred and selected SKA fibre route (Route A) is as follows:

1. The fibre route starts from Beaufort West Transnet building, to a 3 m x 6 m signal repeater station at Loxton, and then on to the Carnarvon SKA Point of Presence (PoP) site (location where networking equipment may be accessed).
2. The fibre duct and cable will be laid in a 1 m deep and 300 mm wide trench and be buried by backfilling and compacting the trench.
3. The fibre route will predominantly be installed within the road reserves of roads R381 and R63, and 1 m from the fence of the private land.
4. 155 km will be underground and 25 km will be overhead due to it not being technically or financially feasible to trench on the Molteno Pass section. The total pole length is 9 m, buried 1.5 m deep, with a resultant above-ground height of 7.5 m
5. There are several streams / rivers and associated wetlands to cross. Rivers will be crossed using directional drilling 2 m below the riverbed starting 32 m away from river banks.
6. There is only one river with solid bedrock (the Brak River near Loxton) where directional drilling is not technically or financially feasible. Here the fibre cable will be attached to the existing road bridge.

### 1.2 Description of Property and Affected Environment

The area proposed for development is located within a dry rural landscape. The topography of the Karoo region is mainly determined by the geology. The areas that were surveyed directly adjacent to the road (R381) were relatively flat. The land use in the study area is characterised by agriculture which is dominantly sheep and game farming. The soil surface in the surveyed area is very stony, consisting of thick dolerite or sandstone deposits with large boulders. The vegetation is typical of the Karoo Biome and includes knee high shrubs, grasses and Acacias.



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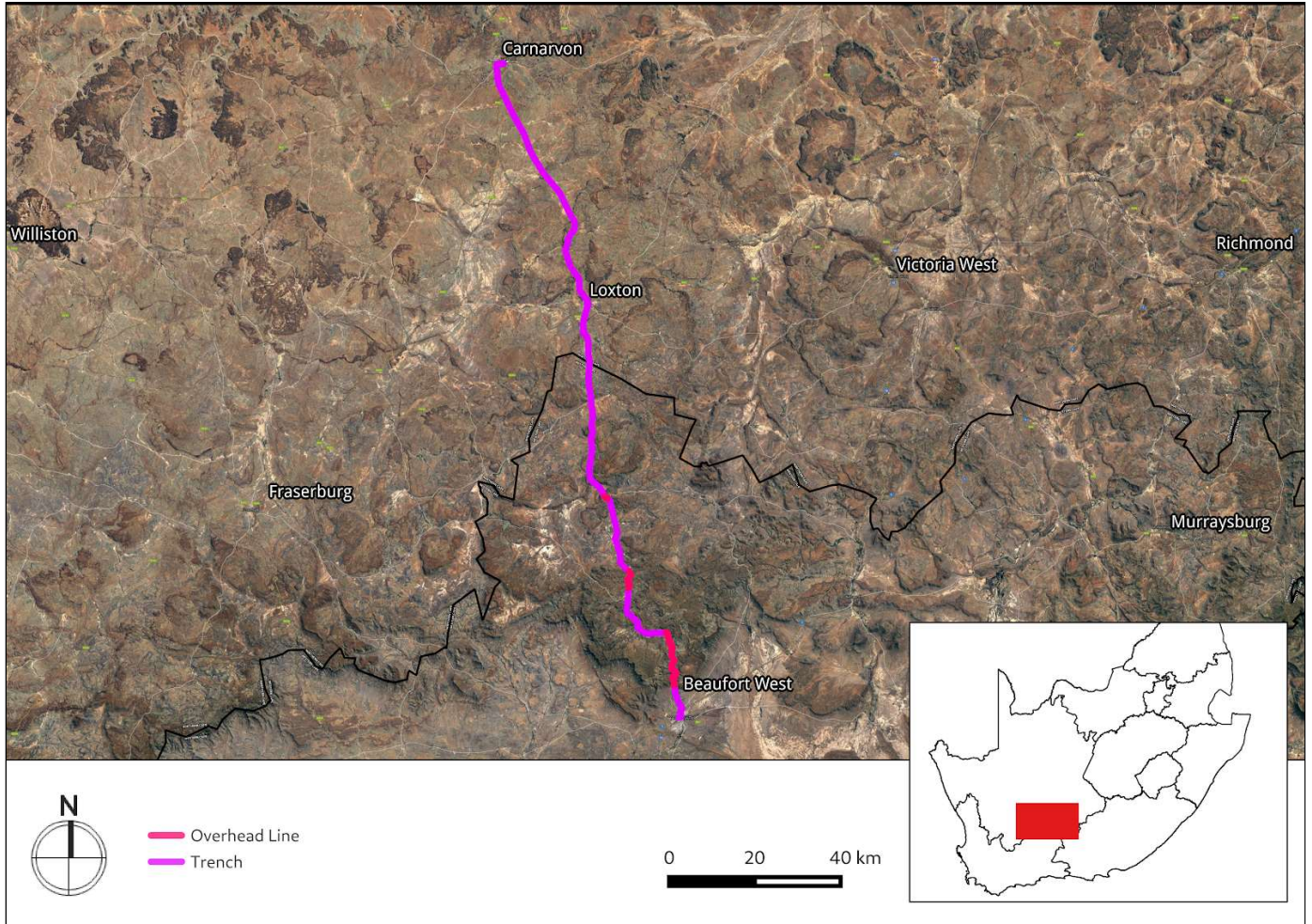


Figure 1.1: Close up satellite image indicating proposed location of development



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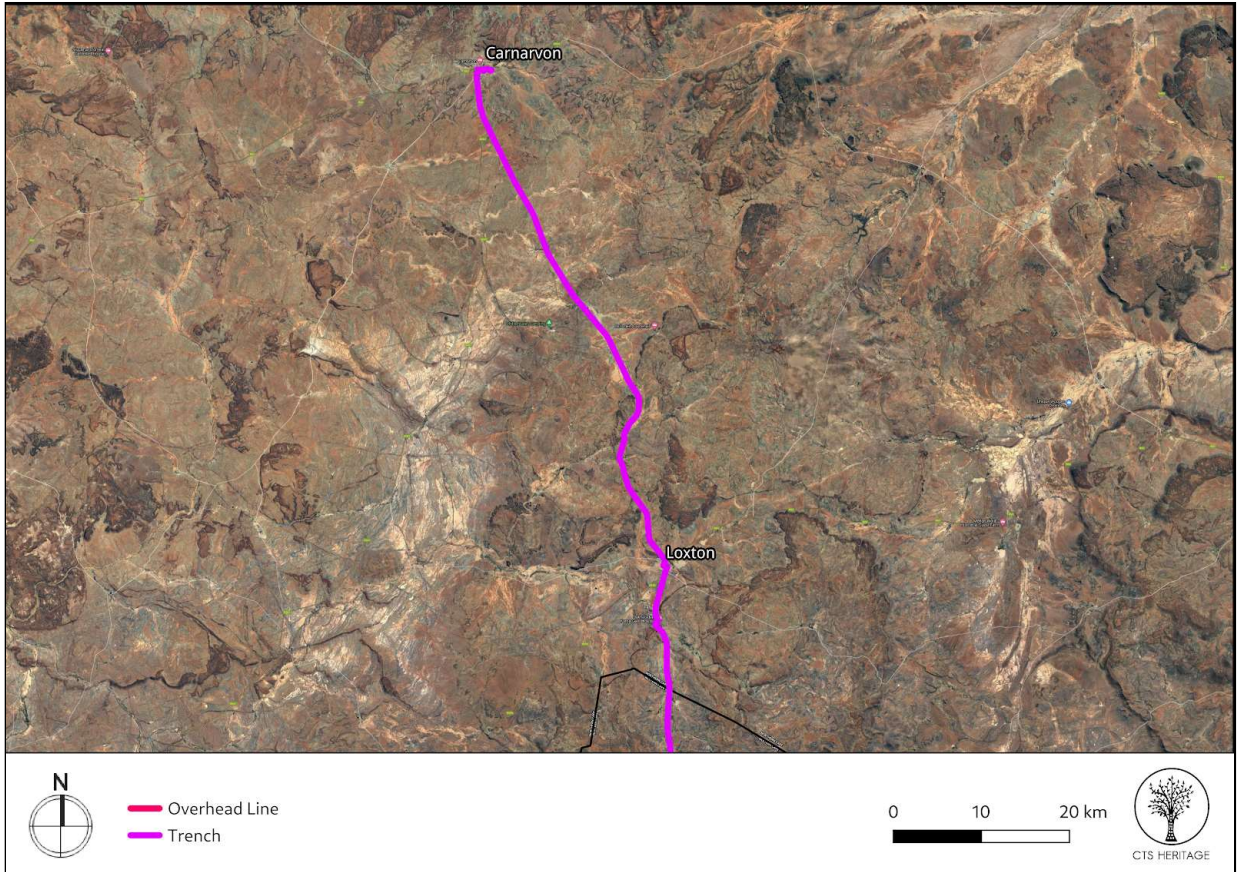


Figure 1.2: Area proposed for development including the proposed layout

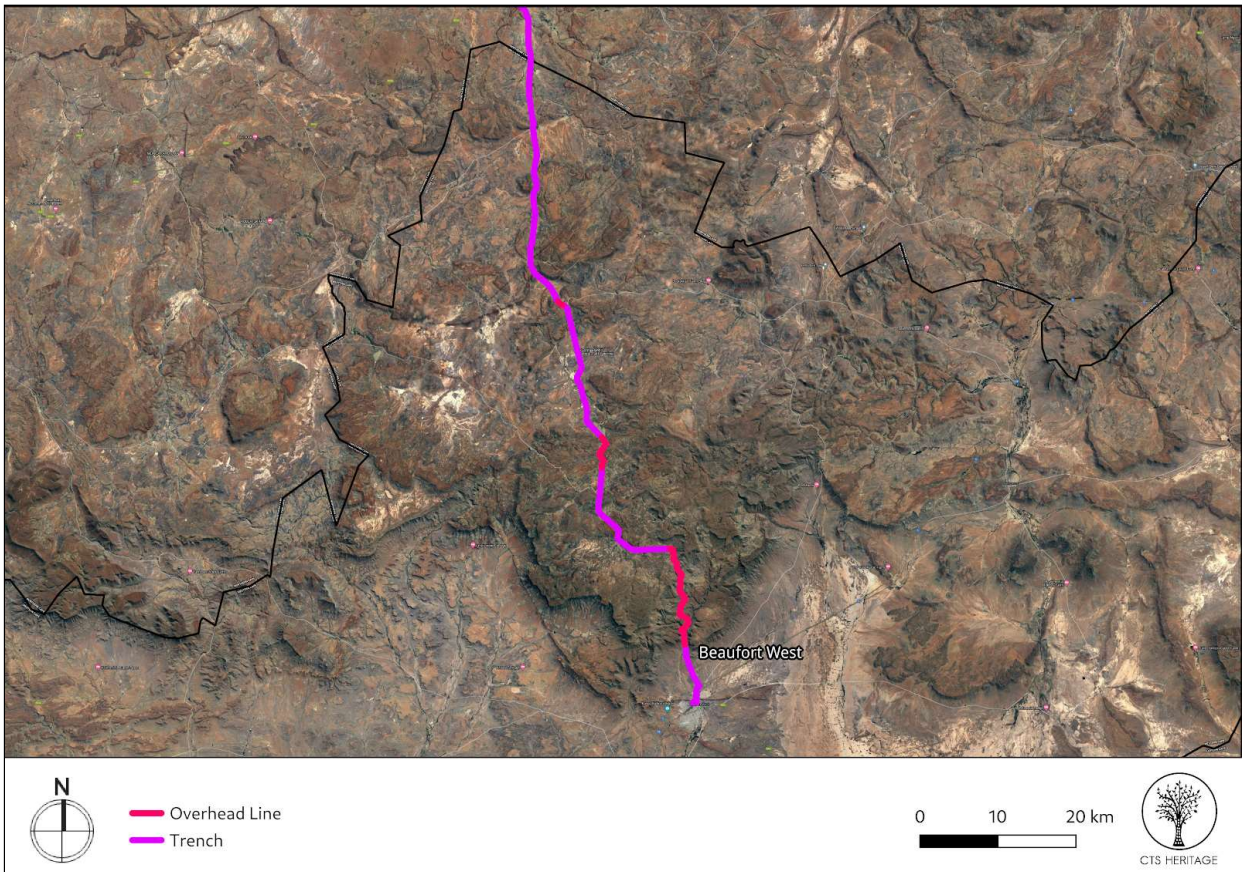


Figure 1.3: Area proposed for development including the proposed layout



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## 2. METHODOLOGY

### 2.1 Purpose of Archaeological Study

The purpose of this archaeological study is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999) in terms of impacts to archaeological resources.

### 2.2 Summary of steps followed

- An archaeologist conducted a survey of the site and its environs on 28 and 29 September 2020 to determine what archaeological resources are likely to be impacted by the proposed development.
- The area proposed for development was assessed on foot, photographs of the context and finds were taken, and tracks (taken at 100m intervals) were recorded using a GPS.
- The identified resources were assessed to evaluate their heritage significance in terms of the grading system outlined in section 3 of the NHRA (Act 25 of 1999).
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner.

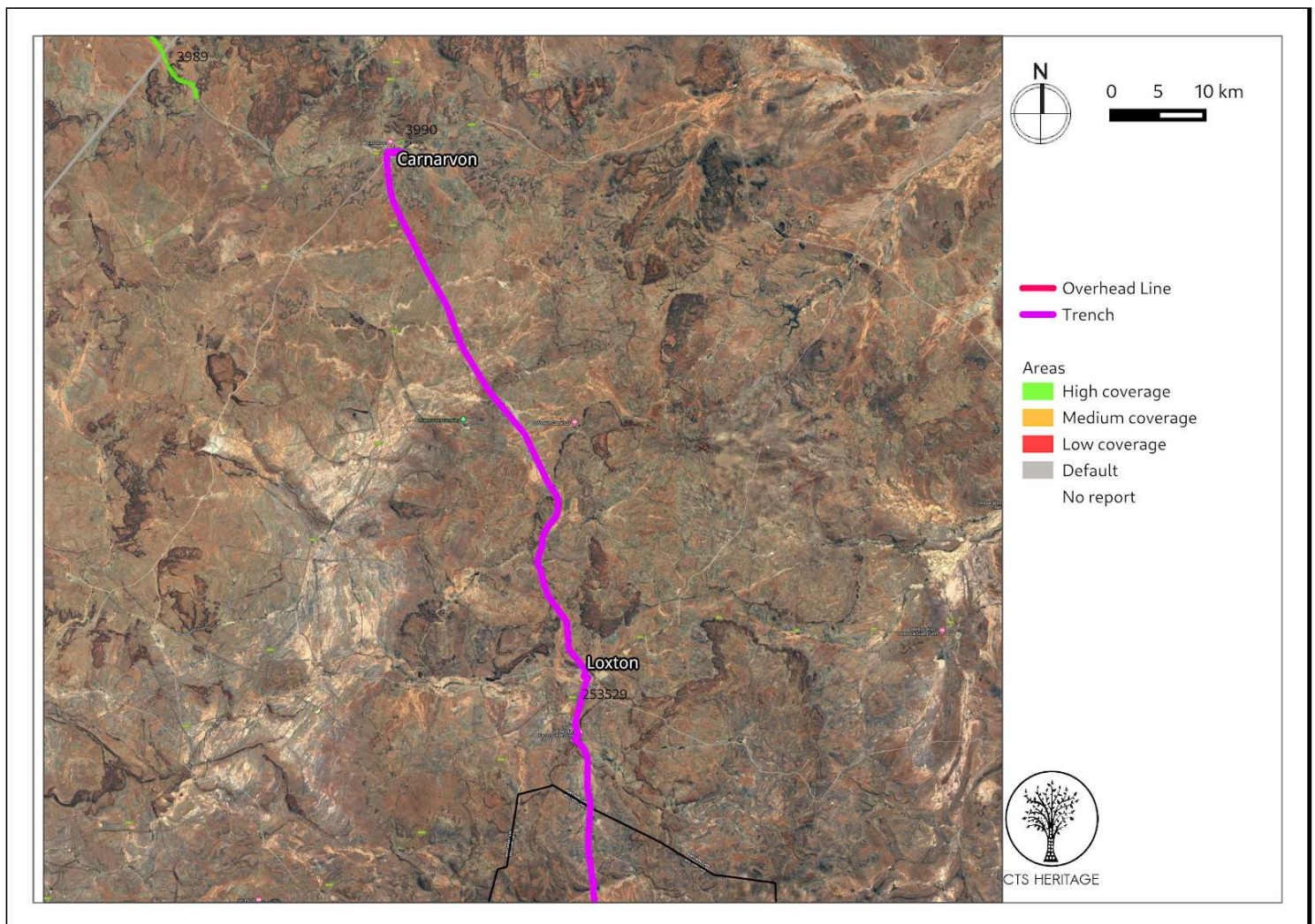


Figure 2.1: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted in the Northern Cape





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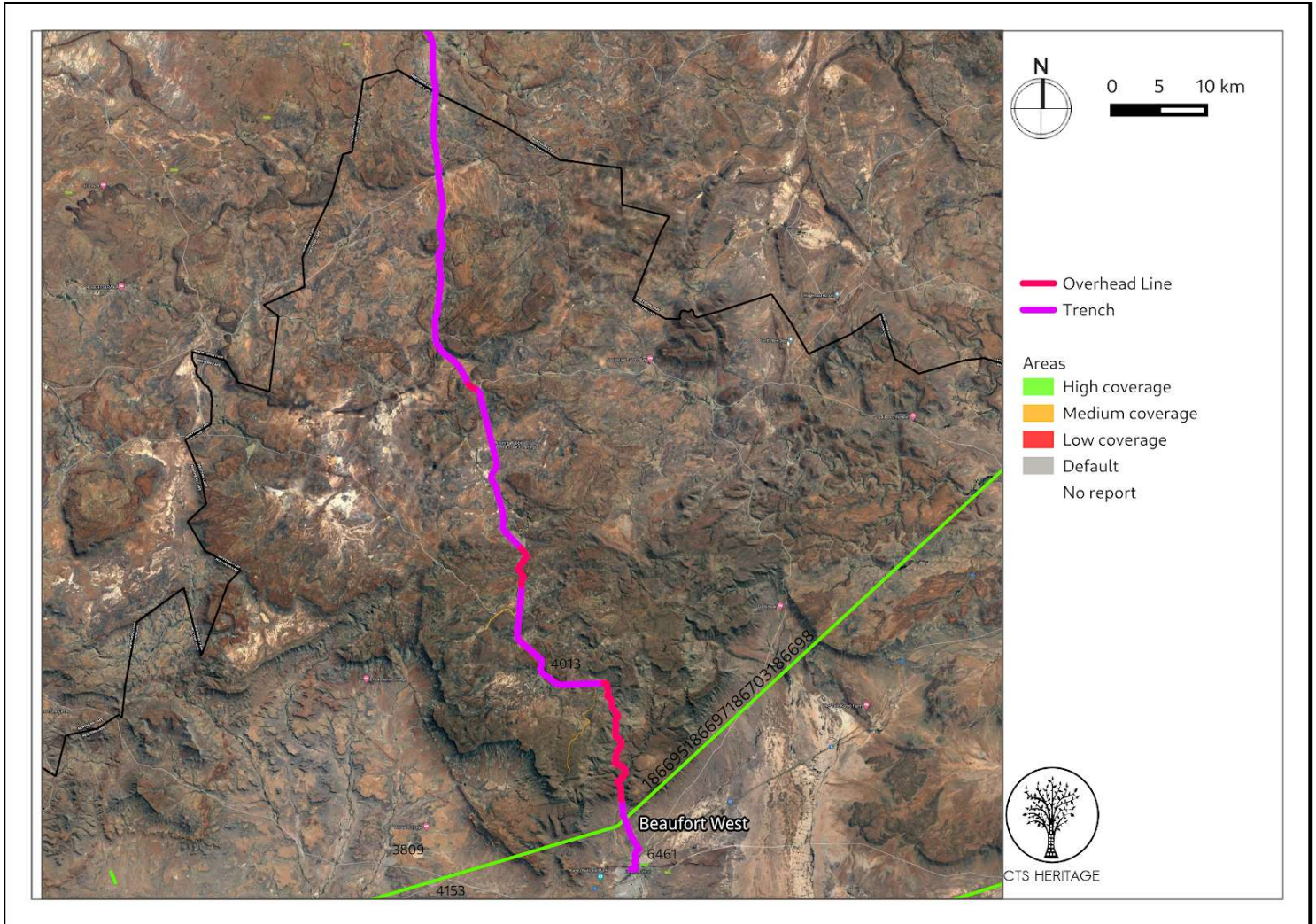


Figure 2.2: Close up satellite image indicating proposed location of development in relation to heritage studies previously conducted in the Western Cape

### 2.3 Constraints & Limitations

A portion of the area proposed for development was inaccessible as it was located along steep hillslopes. There were also a few narrow stretches of road where it was not possible to safely park and walk. As such, the field assessment focussed on areas that were accessible along the road.

The experience of the archaeologist, and observations made during the study, allow us to predict with some accuracy the archaeological sensitivity of the receiving environment.



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### 3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

Carnarvon was established in 1853 on a route between Cape Town and Botswana that was followed by early explorers and traders. It was originally established as a mission station of the Rhenish Missionary Society and named Harmsfontein. Loxton's first church building and schoolhouse was built in 1900. Tree-lined streets and flood irrigation channels that run alongside the town's main roads were completed in the same year. The town became a municipality in 1905 as it developed to serve the region's sheep-farming community. The church that stands in the town's centre was constructed in 1924. Beaufort West was the first town to be established in the central Karoo. The town was founded in 1818 and became the first municipality in South Africa on 3 February 1837 and had the country's first town hall. When the railroad reached the town in 1880 it became a marshalling yard and locomotive depot and today it is the largest town in the Karoo. All of these towns have significant historic town centres with a unique sense of place. It is not anticipated that the proposed trenching for the SKA Fibre Line will negatively impact on any historic fabric or on this unique sense of place. However, care must be taken to ensure that historic features such as leiwater systems are not negatively impacted by the proposed trenches.

According to Tusenius (2012, SAHRIS NID 503050), "with the notable exception of the research done by Sampson in the Seacow Valley (1985), the rich archaeological heritage of the Karoo has not been systematically studied... Sites and scatters of Early, Middle and Late Stone Age (ESA, MSA and LSA) material have been recorded, as well as pastoralist occurrences, historical sites, rock paintings and engravings." According to a concise summary of the heritage of the area provided by Rossouw (2019, SAHRIS NID 521555), Rock engravings located to the southeast of Loxton, suggest the possibility that a giant long-horned buffalo (*Syncerus antiquus*), which became extinct more than 10 000 years ago, previously occurred in the area. Furthermore, "multiple rock engraving sites have been recorded in the region and are mainly attributed to San hunter-gatherers who inhabited the area and had done so for thousands of years, while the pastoralist Khoekhoe had been present in the Karoo for at least 2 000 years. The historical footprint is largely represented by the vernacular architecture of the well-known corbelled houses in the region, which is related to 19th century trekboers who occupied these buildings, and whose cultural history dates back to their 18th century movement onto the VOC ("Verenigde Oostindische Compagnie" / United East India Company) Cape frontier that resulted in ongoing interaction with indigenous people in the Karoo." As the proposed development is anticipated to be restricted to existing road reserve, it is not anticipated that the proposed development will have a negative impact on significant archaeological heritage. However, it is well established that ESA, MSA and LSA archaeological occurrences are prevalent throughout the broader Karoo landscape and these resources may be impacted by the proposed development.



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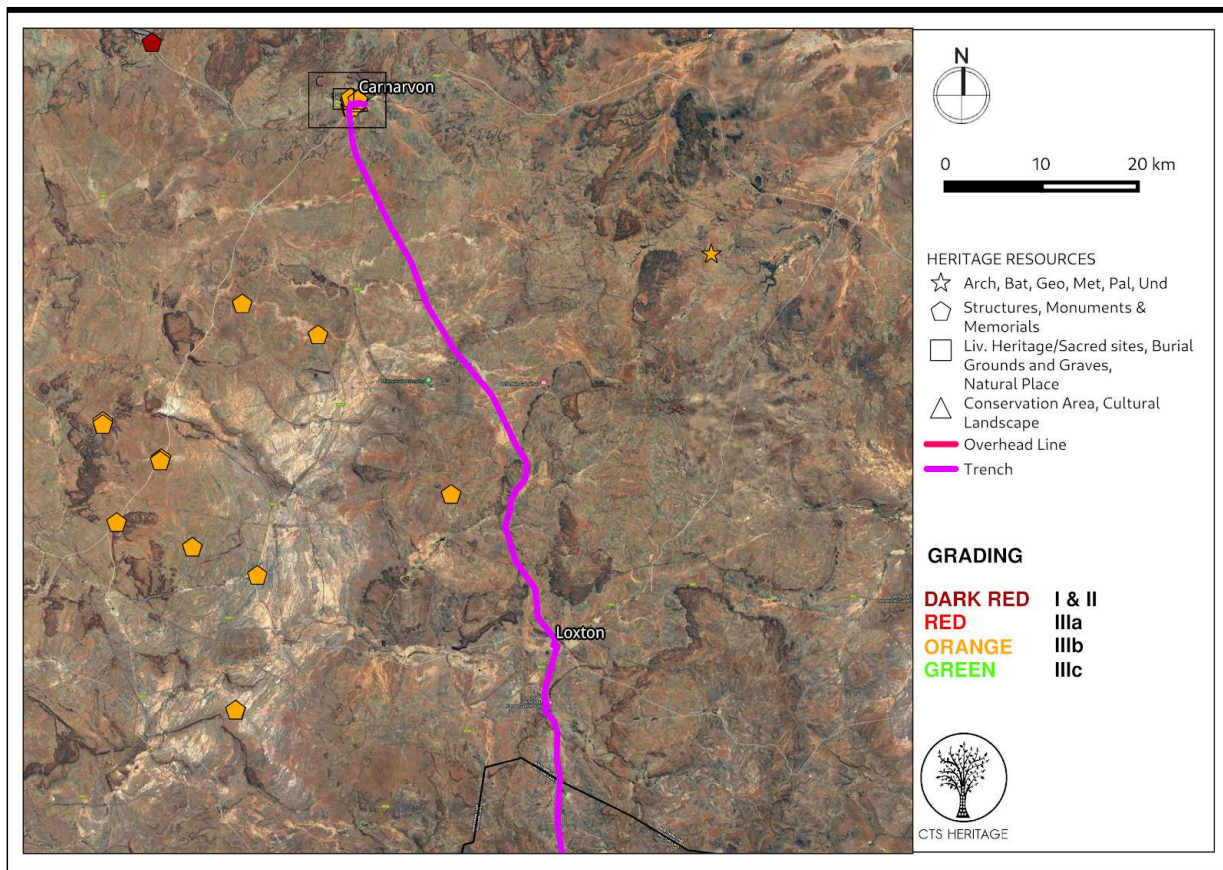


Figure 3.1. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with gradings indicated

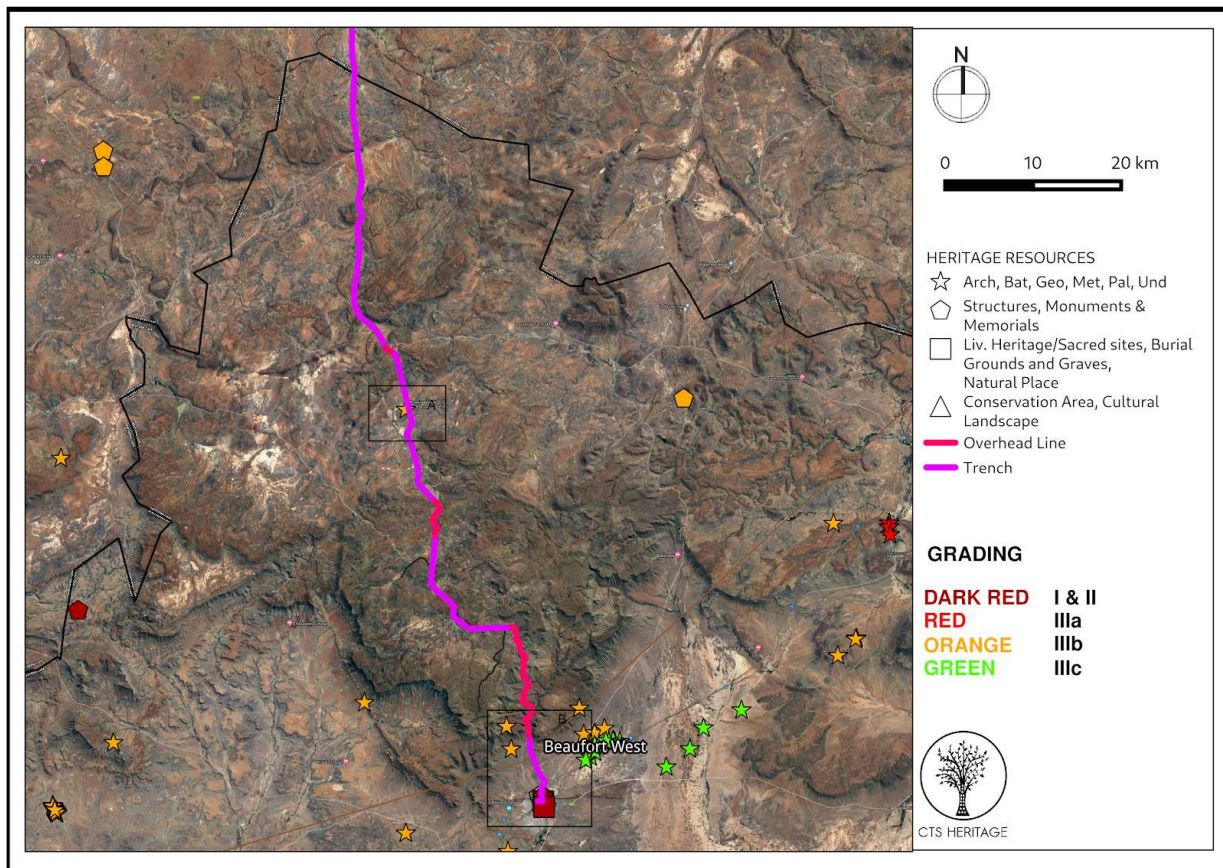


Figure 3.2. Heritage Resources Map. Heritage Resources previously identified in and near the study area, with gradings indicated



#### 4. IDENTIFICATION OF HERITAGE RESOURCES

##### 4.1 Field Assessment

An archaeologist conducted an assessment of the area proposed for development on 28 and 29 September 2020. A portion of the area proposed for development was inaccessible as it was located along steep hillslopes. There were also a few narrow stretches of road where it was not possible to safely park and walk. As such, the field assessment focussed on areas that were accessible along the road. Overall the visibility of archaeological remains on the ground was good as the vegetation was predominantly sparse

The soil surface in the surveyed area is very stony, consisting of brown soils covered by thick dolerite or sandstone deposits with large boulders. The vegetation is typical of the Karoo Biome and includes knee high shrubs, grasses and Acacias. Figure 4.1 to 4.12 provide contextual images of the landscapes in which the fibre optic cable development is proposed.



Figure 4.1: Contextual Image of development area in the south, just outside of Beaufort West



Figure 4.2: Contextual Image of development area facing North (from the south)



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Figure 4.3: Contextual Image of development area facing North towards the Slanghoek Mountains



Figure 4.4: Contextual Images of Development Area indicating Sandstone cross-bedding



Figure 4.5: Contextual Images of Development Area indicating boulders and sheep grazing along the roadside



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Figure 4.6: Contextual Images of Development Area indicating chert source on eastern side of the road



Figure 4.8: Contextual Images of Landscape where road becomes gravel



Figure 4.9: Contextual Images of Development Area indicating interesting geology



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Figure 4.10: Contextual Images of Landscape indicating that the gravel road has been graded up until the fence line



Figure 4.11: Contextual Images of the proposed fibre line route indicating farm structures located outside of alignment



Figure 4.12: Contextual Images indicating the disturbed road surface



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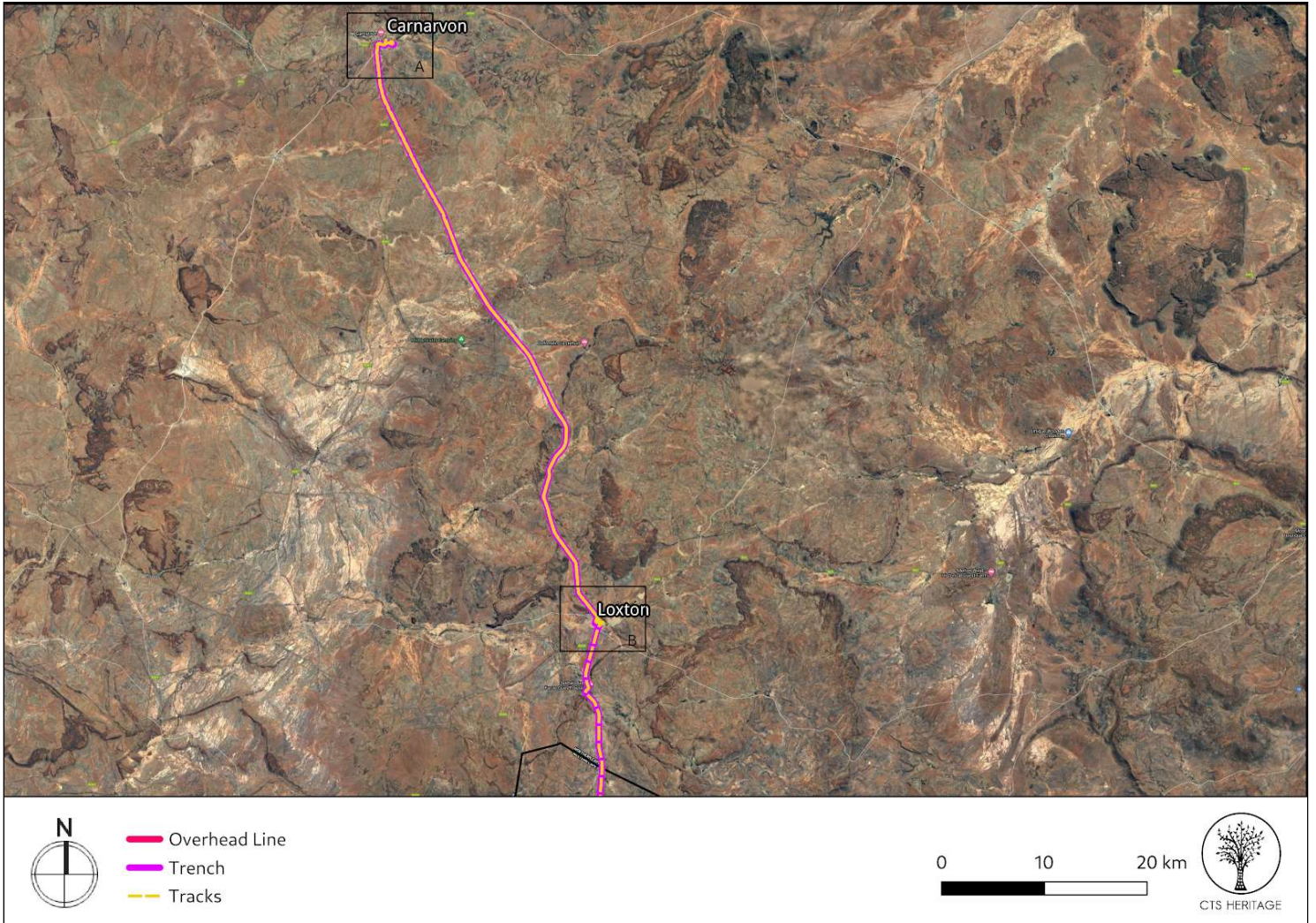


Figure 5.1: Track paths - Northern Cape





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Figure 5.1a: Track paths - Northern Cape Inset A, Carnarvon



Figure 5.1b: Track paths - Northern Cape Inset B, Loxton



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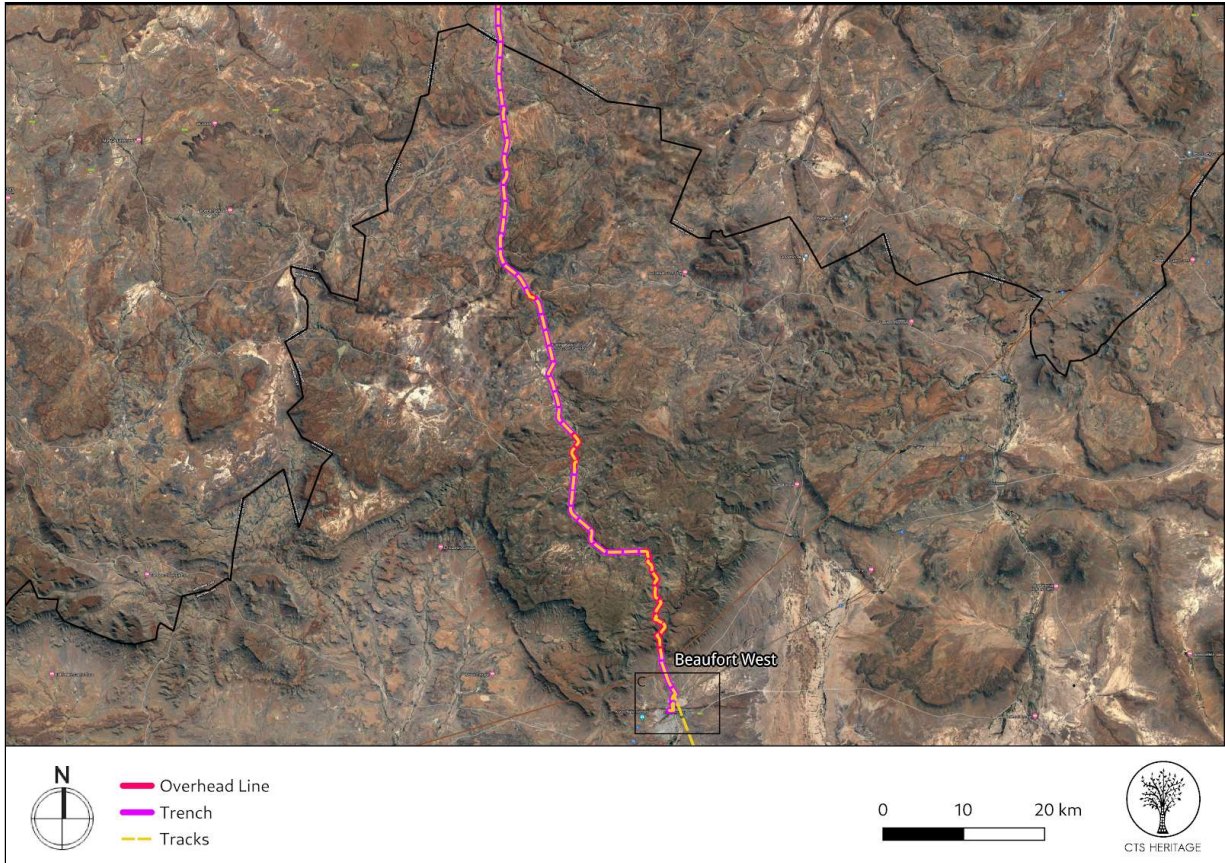


Figure 5.2: Track paths - Westen Cape

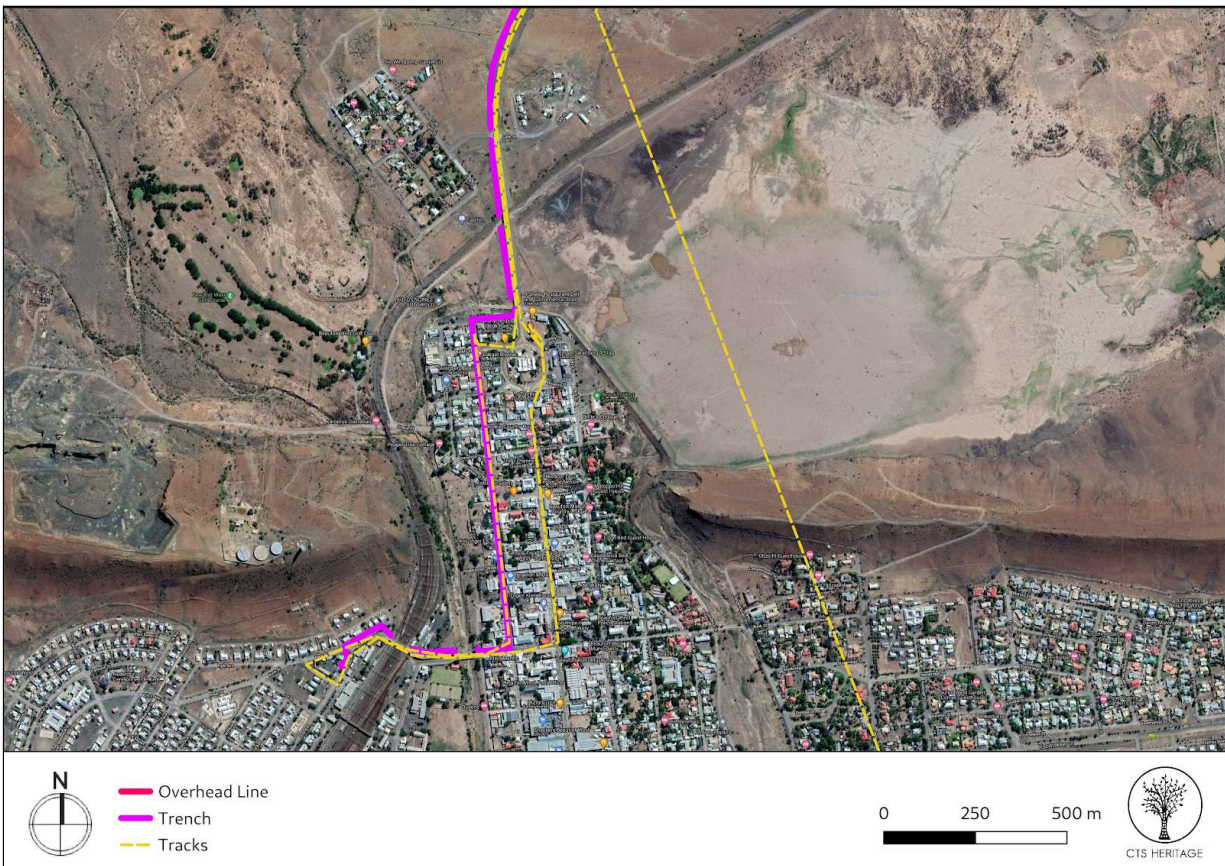


Figure 5.2c: Track paths - Westen Cape Inset C, Beaufort West



#### 4.2 Archaeological Resources identified

Two large bridges (BTC01 and BTC07) were investigated during the field assessment, one of which could be dated to older than 60 years old (BTC07). BTC07 is located at the Soutpoot River near Loxton. An anniversary monument (dedication) was also identified (BTC02), although it is not yet considered to be historical (dated 2014), this monument does form part of the cultural landscape and falls within the definition of Monuments and Memorials in terms of HWC's Guideline. This monument reads:

*"DUISENDE JARE GELEDE HET SALOMO IN SPREUKE 31:10-31 GESKRYF OOR 'N DEURSAME VROU HIERDIE STEEN IS 'N EERBETOON AAN SO 'N DROOM VROU LOUNIE BADENHORST DANKIE VIR ALLES WAT JY VIR MY BETEKEN LIEFDE CHRIS 25STE HUWELIKS HERDENKING 3.8.1994 - 35 JAAR 3 AUG 2004 - 45 JAAR 3 AUG 2014"*

Based on the significance criteria included in the HWC Guide, it is likely that this monument is not conservation-worthy. However, it is recommended that this monument not be negatively impacted by the proposed development (as we are hoping that the Badenhorst's make it to 55 years!).

Although it is well established that ESA, MSA and LSA archaeological finds as well as engraved boulders are prevalent throughout the broader Karoo landscape, only one possible MSA artefact (BTC03) was recorded. The proposed fibre line route has been previously degraded (heavily disturbed) by the construction of the existing road between Beaufort West and Carnarvon and as such, this explains the lack of conservation worthy archaeological finds. An additional explanation for the lack of stone tools may relate to the lack of rocky outcrops (suitable raw material sources) within the proposed development area. With regards to rock engravings, although rocky Karoo dolerite outcrops, consisting of large boulders were observed, no boulders with rock engravings were identified.

There are a few farmhouses situated near the road but no historical farmsteads, dwellings, structures or cemeteries were located within close proximity to the proposed fiber line footprint. The Loxton leiwat system (narrow water canals, examples: BTC04, BT05, BTC06), which are used for irrigation, are set up in a grid system across the Karoo village. These historical features, which are lined with some trees which are older than 100 years, are significant in terms of their contribution to the historical context of Loxton and are therefore graded IIIIC. However these resources were not within the layout of the proposed fiber line and will not be impacted by the proposed development.



**Table 1: Observations noted during the field assessment**

Site No.	Site Name	Description	Co-ordinates		Grading	Province	Mitigation
BTC01	SKA Fibre_01	Bridge (dated: 1970)	-32.28339	22.56525	NA	Western Cape	None Required
BTC02	SKA Fibre_02	Anniversary Monument/Dedication (dated: 3 August 2014 )	-32.25241	22.56853	NA	Western Cape	Not to be disturbed - 10m buffer recommended
BTC03	SKA Fibre_03	Possible MSA chert artefact	-32.17230	22.48989	NCW	Western Cape	None Required
BTC04	SKA Fibre_04	Loxton Leiwater System	-31.47537	22.34922	IIIC	Northern Cape	No impact anticipated
BTC05	SKA Fibre_05	Loxton Leiwater System	-31.47604	22.35136	IIIC	Northern Cape	No impact anticipated
BTC06	SKA Fibre_06	Loxton Leiwater System	-31.47761	22.35630	IIIC	Northern Cape	No impact anticipated
BTC07	SKA Fibre_07	Bridge (dated: 1958)	-31.34858	22.30103	IIIC	Northern Cape	No impact anticipated
BTC08	SKA Fibre_08	Sandstone outcrop	-31.22497	22.26206	NA	Northern Cape	None Required

### 4.3 Selected photographic record

(a full photographic record is available upon request)



**Figure 6.1: BTC01 - Bridge (1970)**



Figure 6.2: BTC02 - Anniversary Monument/Dedication

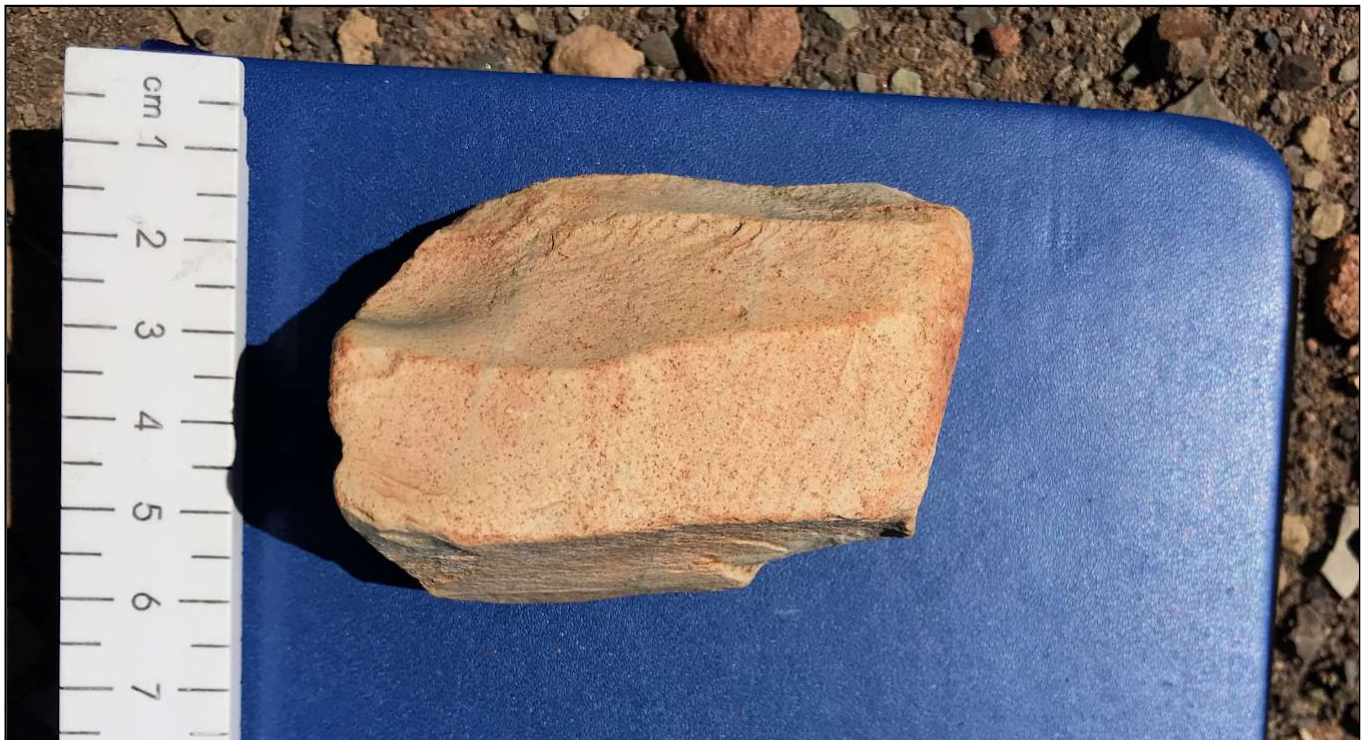


Figure 6.3: BTC03 - Possible MSA Chert Artefact



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Figure 6.4: BTC04, 05 and 06 - Loxton Leiwater System



Figure 6.5 BTC07 - Bridge over the Soutpoot River (1958)



Figure 6.6 BTC07 - Bridge over the Soutpoot River (1958), northern side with basic structure evident



Figure 6.7 BTC08 - Sandstone outcrop

## 5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

### 5.1 Assessment of impact to Archaeological Resources

Based on the assessment completed, the area proposed for development has a low archaeological sensitivity. No evidence was found of *in situ* archaeological material, rock engraving sites, or graves. Historical buildings or structures older than 60 years were not observed within the footprint of the proposed fibre line.

Due to the fact that some cultural remains along the roadside are likely covered in gravel from road grading/construction, the possibility exists that some artefacts may only be uncovered during the digging of the trenches for the proposed fiber line.



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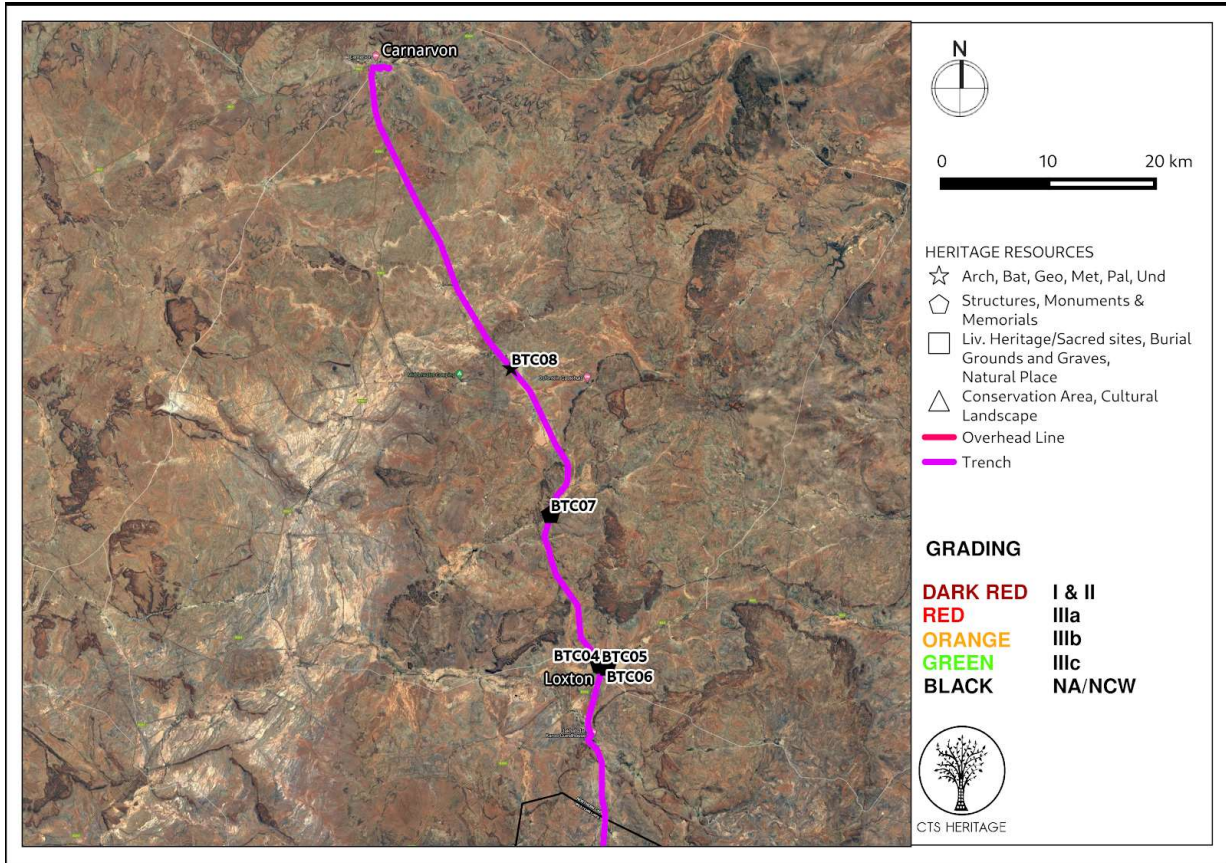


Figure 7.1: Map of heritage resources identified relative to the proposed development footprint in the Northern Cape

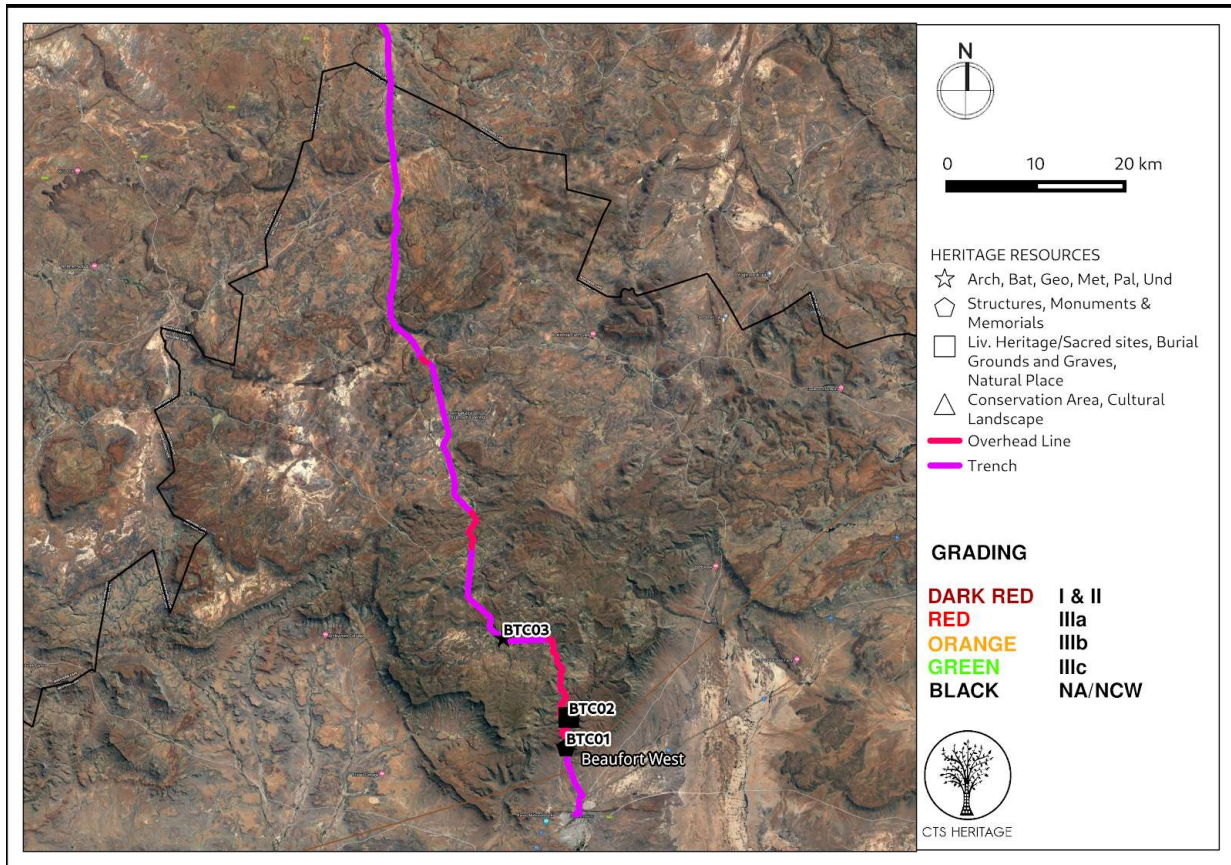


Figure 7.2: Map of heritage resources identified relative to the proposed development footprint in the Western Cape





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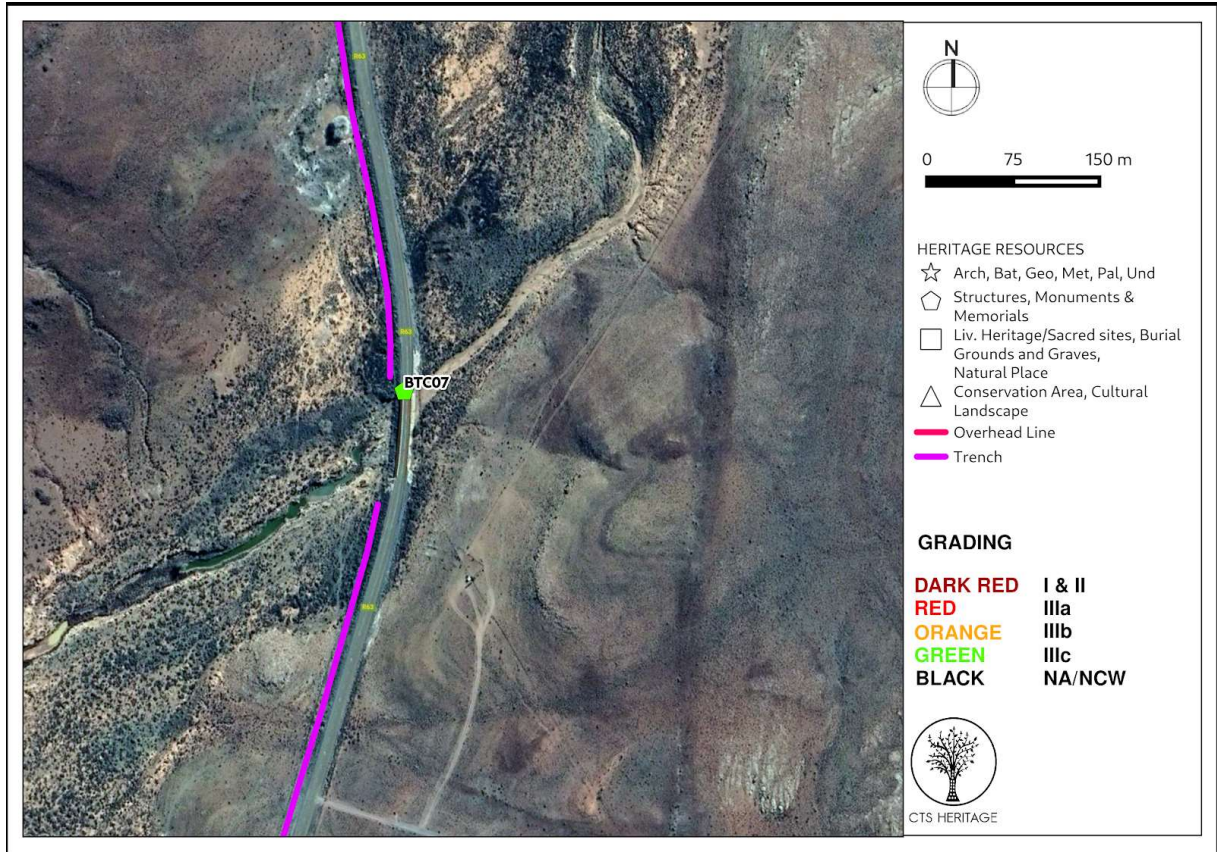


Figure 7.1a: Map of bridge at BTC07 crossing the Soutpoot river south of Loxton

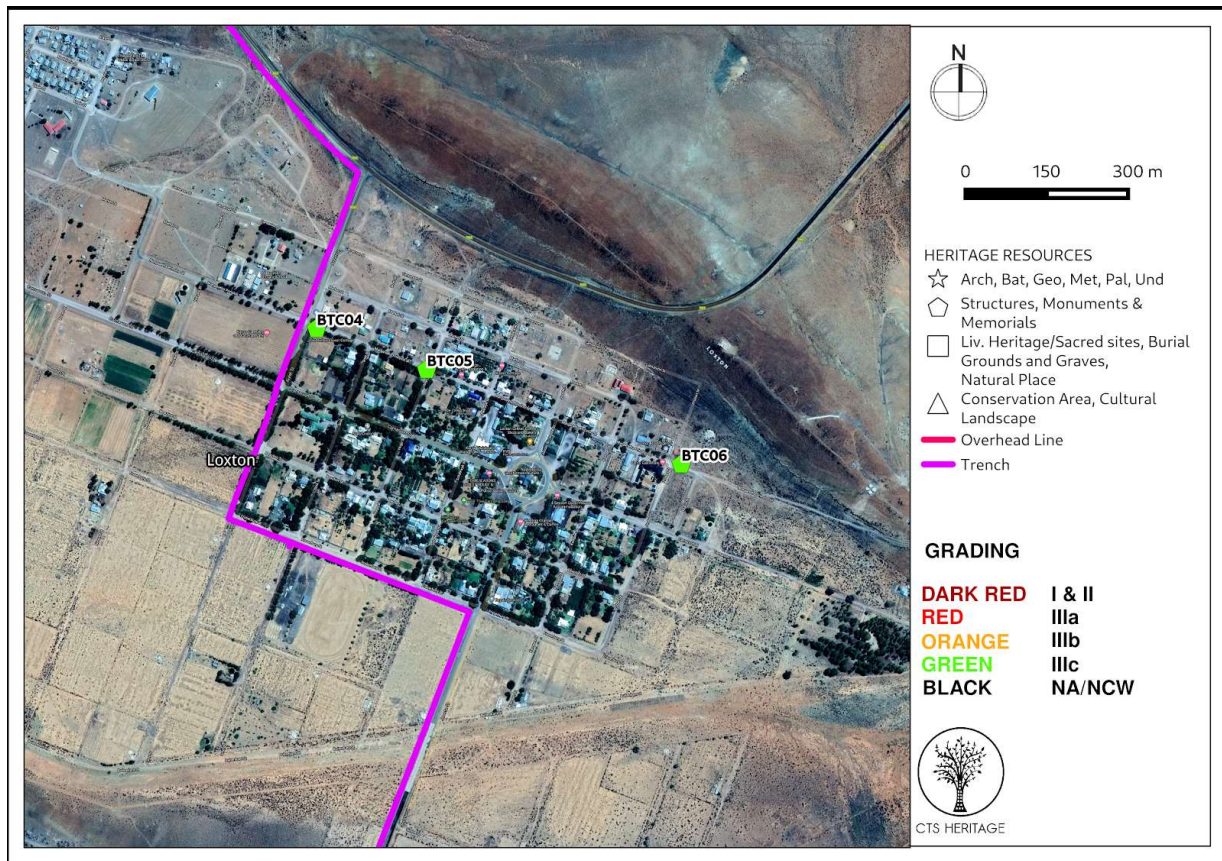


Figure 7.1b: Map of Loxton Leiwat System at BTC04, 05 and 06



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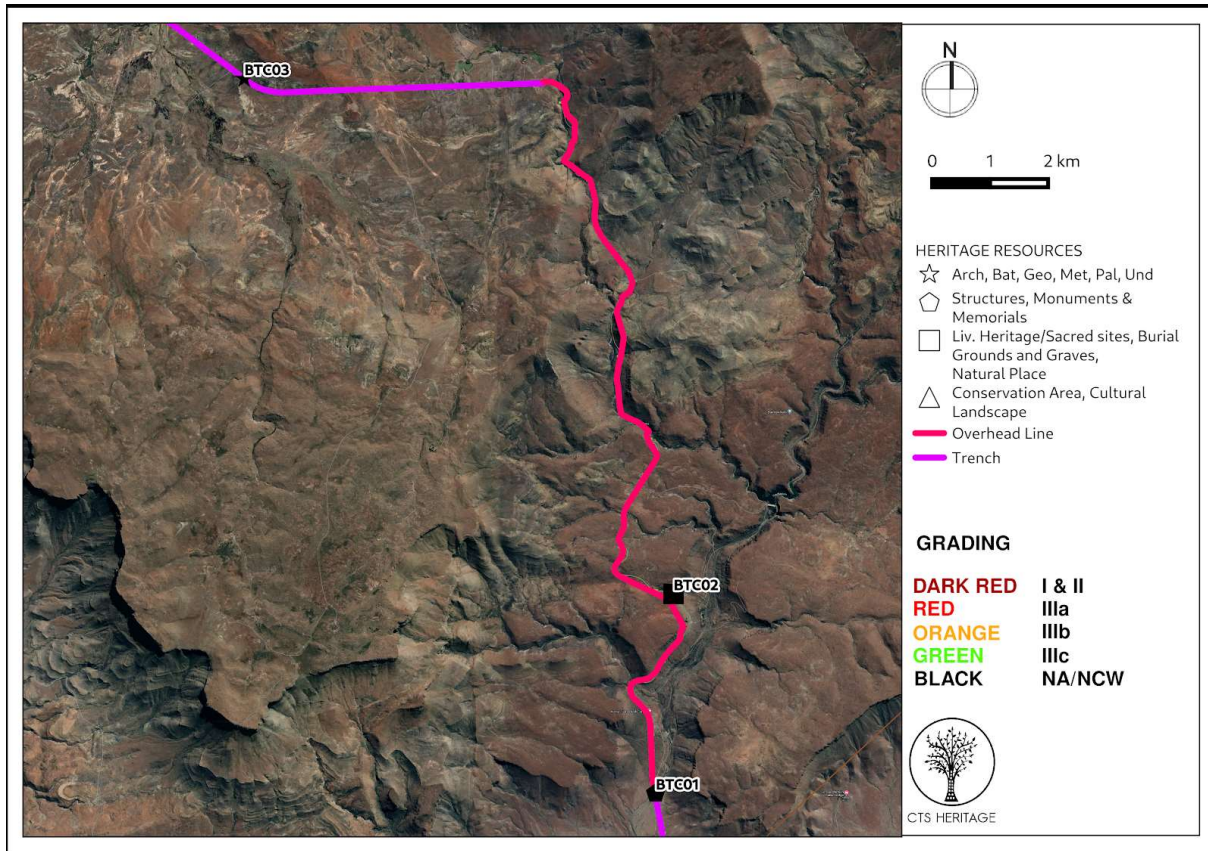


Figure 7.2c: Map of heritage resources identified at BTC01 (1970 bridge), 02 (monument) and 03 (possible MSA chert artifact)

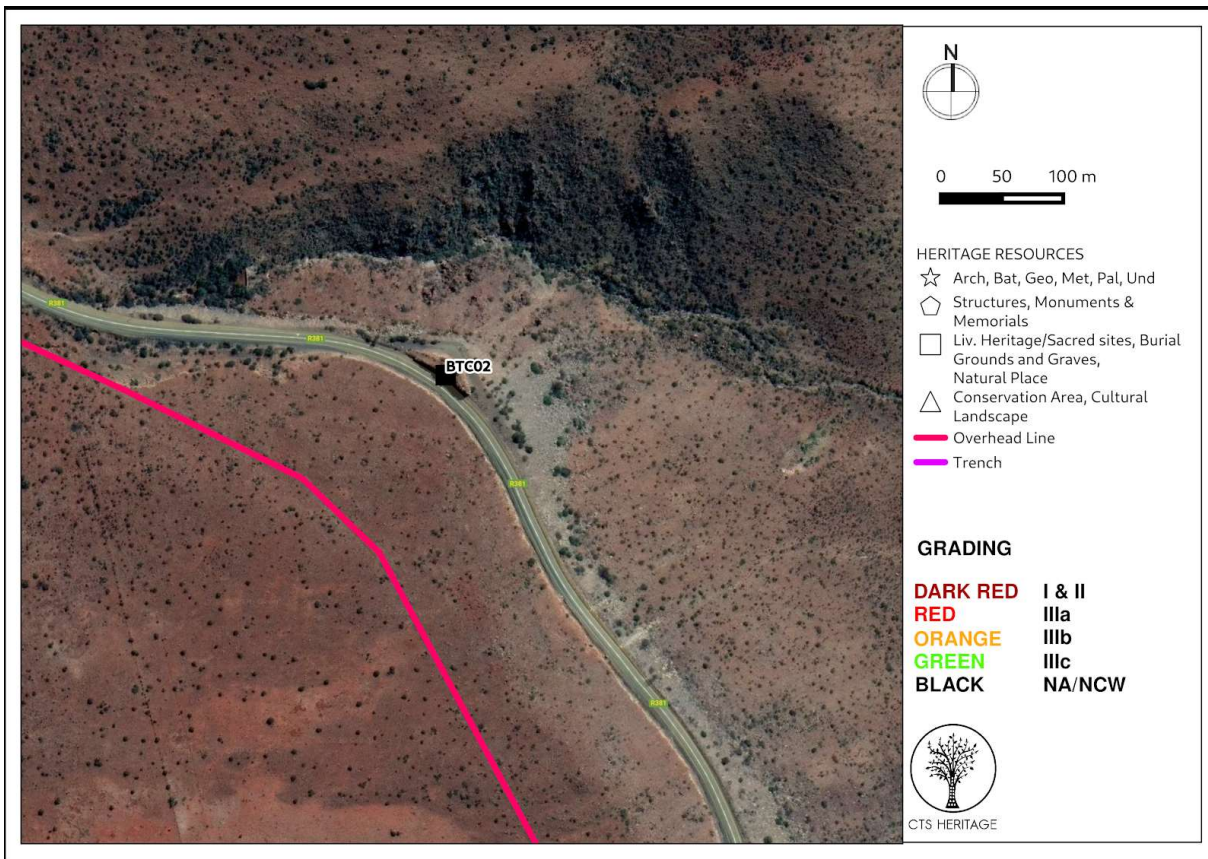


Figure 7.2d: Map of heritage resources identified at BTC02 - the Monument



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## 6. CONCLUSION AND RECOMMENDATIONS

Based on the outcomes of this report, it is not anticipated that the proposed development of the fibre line will negatively impact on significant archaeological heritage. The proposed fibre line route has been previously degraded (heavily disturbed) by the construction of the existing road between Beaufort West and Carnarvon and as such, this explains the lack of conservation worthy archaeological finds. An additional explanation for the lack of stone tools may relate to the lack of rocky outcrops (suitable raw material sources) within the proposed development area.

The heritage resources identified are largely located some distance from the proposed line (BTC02, BTC04, BTC05, BTC06, SAHRIS Site ID 32495) and will not be impacted by the proposed development or are not conservation-worthy (BTC01, BTC03 and BTC07).

Due to the fact that some cultural remains along the roadside are likely covered in gravel from road grading/construction, the possibility exists that some artefacts may only be uncovered during the digging of the trenches for the proposed fiber line.

As such, there is no objection to the proposed development in terms of impacts to archaeological heritage. However it is recommended that, should any archaeological resources or burial grounds or graves be identified during the course of trenching or excavation activities, work must cease in the area and SAHRA (Northern Cape) or Heritage Western Cape (in the Western Cape) must be contacted regarding an appropriate way forward.



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## 7. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
3989	AIA Phase 1	Cobus Dreyer	19/04/2007	First Phase Archaeological and Cultural Heritage Assessment of the Proposed Borrow Pit Sites Along the P02996 Road Between Carnarvon & the Ska Site, Northern Cape
3990	AIA Phase 1	Cobus Dreyer	17/09/2007	First Phase Archaeological and Cultural Heritage Investigation of the Proposed Upgrading of the Oxidation Pond System at Carnarvon, Northern Cape
4013	AIA Phase 1	Jonathan Kaplan	01/02/2006	Phase 1 Archaeological Impact Assessment Proposed Klavervlei Powerline Karoo National Park
6461	AIA Phase 1	Jonathan Kaplan	01/02/2008	Phase 1 Archaeological Impact Assessment: Proposed Development Remainder of Farm 185 (Now Called Plot 8419) Beaufort West, Western Cape Province
253529	HIA Phase 1	Cobus Dreyer	20/12/2014	First phase archaeological and heritage assessment of the proposed solid waste disposal site at Loxton, Northern Cape
186695	HIA Phase 1	McEdward Murimbika	01/08/2014	Proposed Gamma-Kappa 2nd 765kV Eskom Transmission Powerline and Substations Upgrade Development in Western Cape PHASE 1 HERITAGE IMPACT ASSESSMENT STUDY REPORT
186697	AIA Desktop	Foreman Bandama, Shadreck Chirikure	01/08/2014	An Archaeological Scoping and Assessment report for the proposed Gamma (Victoria West, Northern Cape) - Kappa (Ceres &€" Western Cape) 765Kv (2) Eskom power transmission line
186698	PIA Desktop	JF Durand	09/06/2013	GAMMA-KAPPA 765kV Transmission Line, Western Cape Province SCOPING REPORT PALAEOLOGY
186703	Visual Impact Assessment		01/01/2014	THE PROPOSED GAMMA KAPPA 2ND 765KV TRANSMISSION POWERLINE AND SUBSTATIONS UPGRADE, NORTHERN AND WESTERN CAPE (NEAS REFERENCE DEA/EIA/0001267/2012 DEA REFERENCE14/12/16/3/3/2/353) VISUAL IMPACT ASSESSMENT
503050	AIA Phase 1	Madelon Tusenius	01/03/2012	ARCHAEOLOGICAL IMPACT ASSESSMENT OF A PROPOSED BORROW PIT AT RIETKUIL 307, BEAUFORT WEST, CENTRAL KAROO DISTRICT, WESTERN CAPE
521555	Letter of Exemption	Lloyd Rossouw	13/02/2019	Exemption from further Heritage Impact Assessment: Rectification in terms of Section 24G for Residential Development in Loxton, Northern Cape Province.