## TABLE OF CONTENTS

## PAGE

1.	INTRODUCTION	1
1.1.	The Need and Justification for the Proposed Project	1
1.2	Overview of the Proposed Project	4
1.3	Environmental Study Requirements	6
2.	DESCRIPTION OF THE PROPOSED PROJECT	7
2.1.	The Proposed CSP Plant	7
2.2.1.	How is Electricity Generated at a CSP Plant	8
2.2.	Project Alternatives	10
2.2.1.	Technology Alternatives	11
2.2.2	The 'Do Nothing Alternative'	12
2.3.	Location Alternatives for the Establishment of a New	13
	Concentrating Solar Power plant within South Africa	
2.4.	Site alternatives Identified within the Northern Cape	14
	Province for the Establishment of a New Concentrating	
	Solar Power Plant	
2.4.1.	Description of Identified Site alternatives	14
2.5.	Associated Infrastructure	18
3.	SCOPE OF ENVIRONMENTAL INVESTIGATIONS	20
3.1.	Approach to Undertaking the Study	20
3.1.1.	Environmental Scoping Process	21
3.2.	Authority Consultation	21
3.2.1.	Consultation with Supervisory Authorities	21
3.2.2.	Consultation with other Relevant Authorities	22
3.3.	Environmental Impact Assessment	23
3.3.1.	Specialist Studies	23
3.3.2.	<b>Overview of the Public Participation Process</b>	24
3.3.3.	Public Review of the Draft Environmental Impact Report	28
3.3.4.	Final Environmental Impact Report	28
4.	LEGAL DISCUSSION	29
4.1.	Content of this report and how it differs from the first	29
	report	
4.1.1.	The general Content of the first report	29
4.1.2	The general content of this report	28
4.2.	Scope and Limitations of this report	28
4.2.1.	The amended NEMA EIA Regime	28
4.2.2.	Applicable convention, legislation and by laws	29
4.3.	Conclusion	32

5.	SITE SELECTION PROCESS UNDERTAKEN DURING THE ENVIRONMENTAL SCOPING STUDY	33	
5.1.	Site Evaluation- Field Studies	33	
5.2.	Specialist Studies	34	
5.3.	Rating Criteria	37	
5.4.	Sensitivity Mapping and Footprint Analysis		
5.5.	Overall Conclusion and Recommendations	44	
6.	APPROACH TO ENVIRONMENTAL IMPACT ASSESSMENT	45	
6.1.	Specialist Studies	45	
6.2.	Significance Ratings	46	
6.2.1.	Temporal Scale		
6.2.2.	Spatial Scale	47	
6.2.3.	Severity / Beneficial Rating Scale	47	
6.2.4.	Significance Scale	48	
6.2.5.	Risk or Likelihood	51	
6.2.6.	Degree of confidence or certainty	51	
6.3.	Assumptions and limitations	52	
7.	GENERAL DESCRIPTION OF THE STUDY AREA ENVIRONMENT	53	
7.1	Locality	53	
7.2.	Climate	53	
7.3.	Topography and Landscape	55	
7.4.	Geology and Soils	55	
7.5.	Land use and agricultural Potential	56	
7.6.	Conservation Areas	56	
7.7.	Water Resources	57	
7.7.1.	Surface Water	57	
7.72.	Ground Water	57	
7.8.	Ecology and Biodiversity	57	
7.8.1.	Olifantshoek Plains Thornveld (Savanna).	57	
7.8.2	Kalahari Karroid shrubland (Nama- Karoo).	58	
7.9.	Social Environment	59	
7.9.1.	Land use	60	
7.9.2	Population	60	
7.9.3	Age and Gender Distribution	60	
7.9.4	Education	61	
7.9.5	Employment	61	
7.9.6	Income		
7.9.7	Housing		
7.9.8.	Services	64	

8.	SURFACE WATER ASSESSMENT	66
8.1	Introduction	66
8.2.	Environmental Description	67
8.2.1.	Site Description	67
8.2.2.	Climate and Landscape	68
8.3.	Methods	69
8.3.1.	Criteria used to Rank Impacts	69
8.4.	Water Requirements of the CSP	69
8.5.	Flow in the Orange River	69
8.6.	Assessment	71
8.7.	Conclusions	73
9.	GROUNDWATER IMPACT ASSESSMENT	74
9.1.	Introduction	74
9.2.	Topography and Geology	75
9.3.	Hydrogeology	76
9.4.	Groundwater Chemistry	77
9.5.	Significance Rating Scales	78
9.6.	Conclusions and Recommendations	84
10.	VEGETATION AND TERRESTRIAL ASSESSMENT	85
10.1.	Introduction	85
10.2.	Scope and Limitations	85
10.2.1.	Vegetation	85
10.2.2.	Terrestrial Fauna	86
10.2.3.	Ecology	86
10.2.4.	Assumptions	86
10.2.5.	Limitations	86
10.3.	Methodology	86
10.3.1.	Information base (sources) for desk study	86
10.3.2.	Survey	87
10.3.3.	Habitat Assessment	87
10.4.	Regional Overview	89
10.4.1.	Major plant communities	89
10.5.	Site Specific Results	90
10.5.1.	Olyvenhouts Drift	90
10.6.	Conclusions	91
10.7.	Recommendations	92
11.	AVIFAUNA	93
11.1.	Introduction	93
11.1.1.	Background to the CSP Project	93
11.1.2.	Review of potential avifaunal issues	93
11.2.	Scope and limitations	97

11.3.	Methodology	98
11.3.1.	Ranking of the three sites during the scoping phase	98
11.3.2.	Site Preference Rating (SPR)	100
11.4.	Regional Overview	100
11.5	Site specific Assessment of the Impacts	103
11.6.	Conclusions	110
12.	VISUAL IMPACT ASSESSMENT	112
12.1.	Introduction	112
12.2.	Scope of Work	112
12.3.	Methodology for the Assessment of the Visual Impact	113
12.3.1.	General	113
12.3.2.	Potential Visual Exposure	113
12.3.3.	Visual Distance / Observer Proximity to the Facility	115
12.3.4.	Viewer Incidence / Viewer Perception	116
12.3.5.	Visual Absorption Capacity of the natural vegetation	117
12.3.6.	Visual Impact Index	117
12.4.	Regional Overview	118
12.4.1.	Description of the Affected Environment	118
12.4.2.	Site Description	119
12.5.	Site Specific Results	119
12.5.1.	Visual Impact Index	119
12.5.2.	Issues related to the visual impact of the CSP Plant	121
12.6.	Conclusions and Recommendations	126
13.	NOISE IMPACT ASSESSMENT	128
13.1	Introduction	128
13.1.1	General	128
13.1.1 13.1.2.	Terms of reference	128
13.1.2. 13.1.3.	Location and Extent of the Study Area	128
13.1.3. 13.2.	Details of the planned CSP Plant	120
13.2	Methodology	130
13.3.1.	Determination of the Existing Conditions	130
13.3.1. 13.3.2.	Assessment of Planning/Design Phase and Construction	132
13.3.2.	Phase Impacts	152
13.3.3	Assessment of Operational Phase impacts	132
13.4.	Details of the Study Area	132
13.4.1	Topography	132
13.4.2.	Land Use	132
13.4.3.	Roads	133
13.4.4	Railway Lines	134
13.4.5.	Factors of Acoustical Significance	134
13.5.	Findings and Assessment of Impact	134
13.5.1.		134

13.5.2.	Noise Sensitive Areas/sites	134
13.5.3.	The Residual (Existing) Noise Climate	135
13.5.4.	The Predicted Noise Climate (Pre-Construction Phase)	135
13.5.5.	The Predicted Noise Climate (Construction Phase)	135
13.5.6.	The Predicted Noise Climate (Operational Phase)	136
13.5.7.	Significance Rating of the Noise Impact	139
13.6.	Conclusions	140
13.7.	Mitigation Measures	140
13.7.1.	Pre-Construction Phase	140
13.7.2.	Construction Phase	140
13.7.3.	Operational Phase	141
13.8.	Recommendations	141
14.	SOCIAL IMPACT ASSESSMENT	143
14.1.	Introduction	143
14.1.1.	Background to the Proposed Project	143
14.1.2.	Definition of a Social Impact Assessment	143
14.1.3.	Purpose of the Report	144
14.1.4.	Scope	144
14.1.5.	Methodology	144
14.1.6.	Assessment Categories	145
14.1.7.	Impact Tables	148
14.2.	Proposed Sites	148
14.2.1.	Alternative Sites	148
14.2.2.	Preferred Site – Olyvenhouts Drift	148
14.3.	Key Demographic Information	151
14.3.1.	Demographics	151
14.3.2.	Key Economic Activities in the Region	152
14.3.3.	Employment and Income	153
14.3.4.	Housing and Services	156
14.3.5.	Land Use Profile	157
14.4.	Social Impact Assessment	160
14.4.1.	Population Impacts	160
14.4.2.	Community/Institutional Arrangements	165
14.4.3.	Individual, Community and Family Level Impacts	169
14.4.4.	Socio-economic Impacts	174
14.4.5.	Intrusion Impacts	180
14.5.	Conclusions and Recommendations	182
14.5.1.	Preliminary Conclusions	182
14.5.2.	Preliminary Recommendations	184
15.	CONCLUSIONS AND RECOMMENDATIONS	185
15.1.	Evaluation of the Proposed Project	185
15.2.	Final Conclusions of the Specialist studies	187

Draft Environmental Impact Assessment for the proposed establishment of a New Concentrating Solar Power (CSP) plant and associated infrastructure in the Northern Cape Province.

15.2.1.	Surface Water	187
15.2.2.	Ground Water	188
15.2.3.	Ecology	188
15.2.4.	Avifauna	188
15.2.5.	Visual	189
15.2.6.	Noise	190
15.2.7.	Social	190
15.3.	Recommendations for Appropriate Mitigation Measures	192
15.3.1.	Ground Water	192
15.3.2.	Fauna and Flora	192
15.3.3.	Avifauna	193
15.3.4.	Visual/Aesthetic Impacts	194
15.3.5.	Noise Impacts	194
15.3.6.	Social Impacts	195
15.4.	Summary of Significance Ratings	197
15.5.	Overall Conclusions	203
15.6.	Overall Recommendations	203

## 16. **REFERENCES**

204

## **APPENDICES:**

Appendix A:	Acceptance of Environmental Scoping Report and Plan
	of Study for EIA
Appendix B:	Advertisements
Appendix C:	Issues Trail and I&AP Database
Appendix D:	Legal Discussion – Table 1A
Appendix E:	Legal Discussion – Table 2
Appendix F:	Legal Discussion – Table 2 A and Annexure
Appendix G:	Visual Maps
Appendix H:	Glossary of Terms
Appendix I:	Details of the Noise Measurement Survey and Existing
	Noise Climate Condition Assessment
Appendix J:	Assessment of Noise Impact