



Western Cape
Government
FOR **YOU**



HESSEQUA
LOCAL MUNICIPALITY



HESSEQUA FIREBREAK MAINTENANCE AND MANAGEMENT PLAN



**PREVENT
WILDFIRES**



**MAINTAIN
FIREBREAKS**



**SUPPORT
COMMUNITIES**



**PROTECT
OUR ENVIRONMENT**

Draft

22 September 2026

I. Report Revision and Tracking Schedule

Document Title:	HESSEQUA FIREBREAK MAINTENANCE AND MANAGEMENT PLAN		
Client Name & Address:	Hessequa Municipality, Van den Berg Street, Riversdale, 6670		
Status:	Draft		
Issue Date:	22 September 2026		
Lead Author:	Initial plan done by Hessequa Municipality	Edit - Hessequa Municipality	
Reviewer:			
Report Distribution	Draft circulated to:	No. of hard copies	No. electronic copies
	Authorities		
Report Version	<i>Date: September 2026</i>		
Draft	Hessequa Municipality		

II. Submission Tracking Table

	Starting Date:	End date:	Platforms and stakeholders
Draft	21 September 2026	22 September 2026	Internal (Environmental Management - Protection Services)
Draft	23 September 2026	23 October 2026	Authorities & Stakeholders

TABLE OF CONTENTS

I.	Report Revision and Tracking Schedule	2
II.	Submission Tracking Table	3
	EXECUTIVE SUMMARY.....	8
	SECTION 1: FIREBREAK MANAGEMENT PLAN	11
1.	Introduction	11
2.	Purpose.....	11
3.	Objectives	11
3.1	Strategic Objectives.....	11
3.2	Operational Objectives.....	12
4.	Scope of the firebreak management plan.....	12
5.	Legislative Framework	25
5.1	Authority of the Fire Chief under the Fire Brigade Services Act, 99 of 1987	25
5.2	National Legislation	25
5.3	Provincial Framework.....	26
5.4	Municipal Framework.....	26
6.	Fire Risk Assessment	27
6.1	Fuel Assessment.....	27
6.2	Topographical Assessment.....	28
6.3	Weather Assessment	28
6.4	Ignition Risk Assessment	29
7.	Fire Risk Classification	29
8.	Firebreak Management Strategy	29
8.1	Firebreak Categories	29
8.1.1	Primary Firebreaks	29
8.1.2	Secondary Firebreaks.....	30
8.1.3	Tactical Firebreaks	30
9.	Firebreak Design Standards	30
10.	Firebreak Construction Methods	31
10.1	Mechanical Methods	31
10.2	Manual Methods.....	31
10.3	Prescribed Burning.....	31
10.4	Grazing	32
10.5	Emergency Firebreak Construction.....	32

11.	Invasive Alien Plant Management	32
12.	Environmental Management Considerations	32
13.	Roles and Responsibilities	33
14.	Annual Firebreak Programme	34
15.	Monitoring and Inspection.....	34
15.1	All firebreaks shall be inspected:.....	34
15.2	Inspection records shall include:.....	35
16.	GIS and Asset Management	35
17.	Stakeholder Engagement.....	35
18.	Emergency Preparedness	36
19.	Key Performance Indicators	36
20.	Budget Requirements	36
21.	Reporting	37
22.	Review and Continuous Improvement.....	37
23.	Conclusion.....	38
SECTION 2: INVASIVE SPECIES MONITORING, CONTROL AND ERADICATION PLAN.....		40
1.	Introduction	39
1.1	Hessequa Municipal Area.....	40
1.2	Purpose of the Invasive Vegetation Management Plan	41
1.3	Objectives of the Invasive Vegetation Management Plan.....	41
2.	Legislative Context	42
2.1	Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA)	42
2.2	National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)	43
2.3	GN No. R.598: National Environmental Management: Biodiversity Act (Act No. 10 of 2004): Alien and Invasive Species Regulations, 2014	44
2.3.1	Categories of Listed Invasive Species	44
2.4	GN No. R.599: National Environmental Management: Biodiversity Act (Act No. 10 of 2004) - Notice 3: National List of Invasive Species in terms of Section 70(1A)	46
2.5	Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947)..	47
2.6	Compliance Table:	47
2.7	Hessequa Municipality: Bylaws	48
2.7.1	Hessequa Local Municipality: Air Pollution Control By-law, 2008.....	48
2.7.2	Hessequa Local Municipality: Fire Safety By-law, 2010	49
3.	Invasive Vegetation Clearing Methods.....	49
3.1	Manual Control (Hand Pulling/Cutting)	49

3.2	Mechanical Control (Machinery / Heavy Equipment)	50
3.3	Chemical Control (Herbicide Application)	50
3.3.1	Hessequa Municipality: Generally used herbicides (Usually on Tender).....	51
3.4	Biological Control	53
3.5	Prescribed Burning (Fire Management)	54
3.6	Clearing Methods for Invasive Vegetation – Recommended Use	54
4.	Common Invasive Vegetation on Municipal Properties	55
4.1	Inland Invasive Plant Species.....	56
4.1.1	Cluster Pine (<i>Pinus pinaster</i>)	56
4.1.2	Radiata Pine (<i>Pinus radiata</i>)	58
4.1.3	Bloekom/Blue gum (<i>Eucalyptus diversicolor</i>)	60
4.1.4	Spanish Reed (<i>Arundo donax</i>)	63
4.2	COASTAL INVASIVE PLANT SPECIES	65
4.2.1	Port Jacksons Willow (<i>Acacia saligna</i>) – inland towns Albertina/Riversdale and Heidelberg ..	65
4.2.2	Manatoka (<i>Myoporum insulare</i> / <i>M. tenuifolium</i>).....	68
4.2.3	Rooikrans (<i>Acacia Cyclops</i>).....	70
4.2.4	Standard Operating Procedure for Managing <i>Acacia cyclops</i> on Municipal Property	72
5.	Densities	75
6.	MUNICIPAL PROPERTIES	76
A.	GOURITSMOND	76
B.	ALBERTINIA.....	85
C.	RIVERSDALE	101
D.	HEIDELBERG	117
E.	WITSAND	129
F.	STILBAAI	135
G.	MELKHOUTFONTEIN	141
H.	JONGENSFONTEIN.....	148
7.	Auditing.....	153
	Annexure: Implementation schedule	155

LIST OF FIGURES

Figure 1: Albertinia	14
Figure 2: Gouritsmond - Doordrift.....	15
Figure 3: GOURITSMOND	16
Figure 4: RIVERSDALE	17
Figure 5: HEIDELBERG	18
Figure 6: SLANGRIVIER	19
Figure 7: WITSAND	20
Figure 8: JONGENSFONTEIN	21
Figure 9: STILBAAI - WEST	22
Figure 10: STILBAAI - EAST.....	23
Figure 11: MELKHOUTFONTEIN.....	24

EXECUTIVE SUMMARY

Hessequa Municipality is situated within a fire-prone environment characterised by diverse fynbos and other indigenous vegetation ecosystems, mountainous and undulating terrain, agricultural landscapes, extensive areas of natural vegetation and dispersed settlements. The Municipality's geographic and environmental characteristics, together with changing climatic conditions and increasing human activity, contribute to a significant risk of veldfires and wildfires across the municipal area.

The Municipality is exposed to a range of fire risks, including:

- Veldfires;
- Mountain fires;
- Agricultural fires;
- Wildland-Urban Interface (WUI) fires;
- Fires associated with roads, infrastructure and human activity; and
- Climate-driven extreme fire-weather events.

The Hessequa region is also recognised for its exceptional floral diversity and the presence of plant species and ecosystems of significant conservation value. The protection of these natural assets is an important responsibility shared by the Municipality, landowners, communities and other relevant stakeholders. Initiatives aimed at conserving and promoting the region's indigenous flora, such as the Tuin-op-die-Brak initiative in Stilbaai, demonstrate the value placed on the protection and appreciation of the area's natural heritage.

At the same time, invasive alien plant species pose a significant threat to the ecological integrity and biodiversity of the Hessequa region. Many invasive alien species were introduced into South Africa historically because of their rapid growth, adaptability and usefulness for purposes such as forestry, windbreaks and ornamental planting. In the absence of effective natural controls, several of these species have subsequently become highly invasive and have established extensive populations across natural and disturbed landscapes.

Invasive alien vegetation has the potential to significantly alter natural ecosystems and ecosystem processes. Dense infestations can:

- Outcompete indigenous vegetation;
- Reduce indigenous plant diversity;
- Alter natural habitat structure and ecological processes;
- Increase water consumption and place additional pressure on water resources;
- Produce substantial quantities of seed and spread rapidly;
- Increase fuel loads and fuel continuity; and
- Increase the intensity, rate of spread and potential severity of wildfires.

The relationship between invasive alien vegetation and wildfire risk is therefore of particular importance to the Municipality. Dense stands of invasive alien trees, shrubs and other species can create continuous and highly combustible fuel loads, particularly where vegetation is old, dense or poorly managed. Following wildfire, invasive species may also rapidly recolonise disturbed areas, potentially creating a cycle of increasing fuel accumulation and recurring fire risk.

Firebreaks consequently form an important component of an integrated wildfire prevention and risk-reduction strategy. Properly planned, constructed and maintained firebreaks can assist in reducing the continuity of combustible vegetation, limiting or slowing the spread of wildfire, improving firefighting access and creating strategic opportunities for fire suppression. However, firebreaks must be designed and implemented in a manner that considers local terrain, vegetation, fire behaviour, biodiversity, soil conditions, erosion potential and environmental sensitivity.

Similarly, invasive vegetation management cannot be considered solely as an ecological management intervention. The systematic identification, prioritisation and control of invasive alien vegetation can contribute significantly to reducing fuel loads and wildfire risk while simultaneously protecting biodiversity, ecological integrity and ecosystem services.

The Municipality therefore recognises the need for an integrated approach in which firebreak management and invasive vegetation control are coordinated as complementary components of municipal fire prevention, environmental management and disaster-risk reduction.

This Plan establishes the framework through which Hessequa Municipality will identify, assess, prioritise, construct, maintain and monitor firebreaks on municipal land, while integrating invasive vegetation management and other fuel-reduction measures where appropriate. It further provides a strategic basis for identifying areas of elevated wildfire risk, protecting life and property, safeguarding municipal infrastructure and environmentally sensitive areas, improving firefighting access and supporting coordinated management between municipal departments, neighbouring landowners, fire protection structures, conservation authorities and other relevant stakeholders.

The Plan also seeks to ensure that firebreak construction, vegetation clearing and invasive alien plant control are undertaken in accordance with applicable legislation, municipal policies, environmental requirements and best-practice principles. Particular consideration will be given to biodiversity priority areas, protected areas, watercourses, wetlands, steep or erosion-prone terrain, coastal environments and other environmentally sensitive areas where inappropriate clearing or firebreak construction may result in secondary environmental impacts.

Through the integration of firebreak management, invasive vegetation control, environmental management, disaster-risk reduction and by recognising contributing phenomenon's such as climate change, the Municipality aims to establish a proactive and sustainable approach to wildfire prevention that protects communities, infrastructure and ecological assets while maintaining the ecological integrity and resilience of the Hessequa landscape.

SECTION 1: FIREBREAK MANAGEMENT PLAN

1. Introduction

This Firebreak Management Plan provides a structured framework for the planning, establishment, maintenance and monitoring of firebreaks on municipal land, particularly areas located along or adjacent to the urban edge and areas where municipal land interfaces with natural, agricultural or developed environments.

The Plan is intended to support a risk-based and environmentally responsible approach to firebreak management.

2. Purpose

The purpose of this Plan is to:

- Reduce the risk of wildfire spread.
- Protect life and property.
- Protect municipal infrastructure.
- Protect ecological and biodiversity assets.
- Improve firefighting access.
- Promote inter-agency cooperation.
- Ensure legislative compliance.
- Support disaster risk reduction objectives.
- Establish clear institutional responsibilities.

3. Objectives

3.1 Strategic Objectives

1. Reduce wildfire risk along the urban edge.
2. Prevent wildfire spread into residential areas.

3. Protect municipal assets and infrastructure.
4. Improve wildfire response effectiveness.
5. Maintain environmentally sustainable firebreaks.
6. Meet all statutory obligations.
7. Promote community preparedness and awareness.

3.2 Operational Objectives

- Complete annual fire risk assessments.
- Inspect all firebreaks before each fire season.
- Maintain GIS-based firebreak inventories.
- Clear invasive alien vegetation within designated firebreak corridors.
- Ensure firefighting vehicle accessibility.
- Monitor compliance and report annually.

4. Scope of the firebreak management plan

This Plan applies to:

- Municipal open spaces
- Greenbelts
- Conservation areas
- Parks
- Mountain slopes
- Road reserves
- Utility servitudes
- Water infrastructure corridors
- Municipal-owned land adjacent to the urban edge

- Land immediately outside the urban edge managed by the Municipality

The Plan applies to both existing and proposed firebreaks as visually illustrations below, for all respective towns within the Hessequa Municipality area:



Figure 1: Albertinia

Town	ALBERTINIA
Total Properties	8
Total Area	283.62 ha (2,836,133.29 m ²)
Total Perimeter	21,941.7 m
Largest Parcel	RE/1 – 171.52 ha
Smallest Parcel	RE/1 – 3.37 ha
Data Note	Several parcels share the cadastral name RE/1; largest/smallest refers to the mapped feature record, not a unique cadastral parcel.

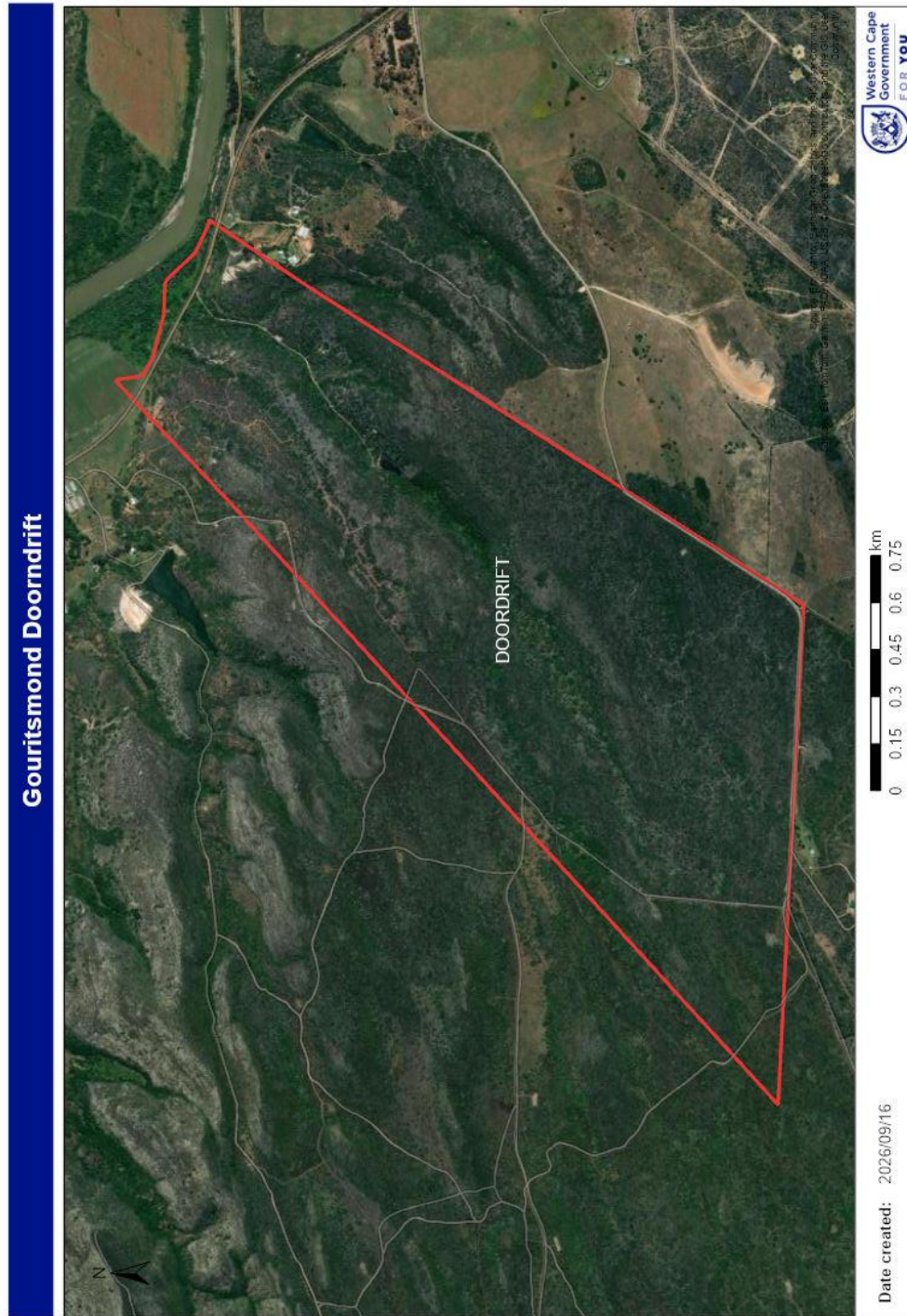


Figure 2: Gouritsmond - Doordrift

Town	GOURITSMOND - DOORNDRIFT
Total Properties	1
Total Area	240.63 ha (2,406,345.53 m ²)
Total Perimeter	7,619.6 m
Parcel	459 – 240.63 ha

Western Cape Government
FOR YOU

Date created: 2026/09/16

0 0.5 1 1.5 2 2.5 km

Riversdale
Kwanokuthula
Mielje se Kraal
Riversdale Golf Club

Source: Esri, Garmin, GeoEye, GeoEye, IGN, NOAA, USGS, and other contributors. Map data by Esri, Garmin, GeoEye, GeoEye, IGN, NOAA, USGS, and other contributors. Map data by Esri, Garmin, GeoEye, GeoEye, IGN, NOAA, USGS, and other contributors.

Figure 4: RIVERSDALE

Town	RIVERSDALE
Total Properties	14
Total Area	1,330.64 ha (13,306,411.69 m²)
Total Perimeter	68,734.4 m
Largest Parcel	2001 – 451.07 ha
Smallest Parcel	2004 – 2.67 ha

[illegible]

Figure 5: HEIDELBERG

Town	HEIDELBERG
Total Properties	18
Total Area	385.49 ha (3,854,940.97 m²)
Total Perimeter	45,318.6 m
Largest Parcel	RE/557 – 128.90 ha
Smallest Parcel	676 – 1.77 ha



Town	SLANGRIVIER
Number of Linear Features	7
Total Length	2,940.2 m
Longest Length	742.3 m
Shortest Length	136.4 m



Figure 7: WITSAND

Town	WITSAND
Polygon Land Parcels	3*
Total Land Extent	8.88 ha
Linear Features	10*
Total Length	2.52 km
Largest Parcel	5.29 ha
GIS Data Note*	The dataset comprises a combination of polygon and linear features. Some features contain duplicate or overlapping records and certain imported features have incomplete area/perimeter information. The figures above therefore represent the available mapped GIS data and should not be interpreted as a definitive cadastral total.

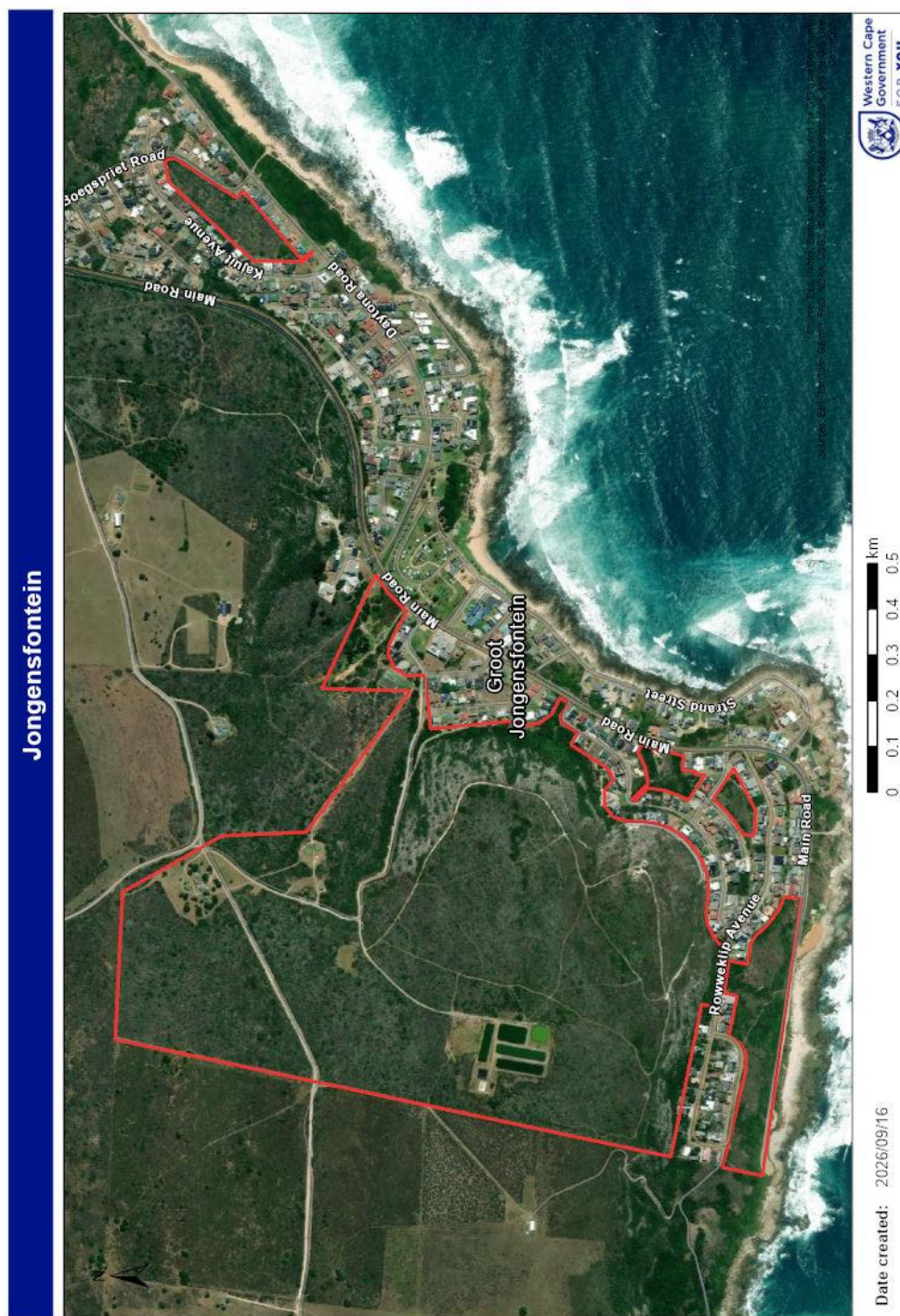


Figure 8: JONGENSFONTEIN

Town	JONGENSFONTEIN
Total Properties	5
Total Area	98.43 ha (984,364.64 m ²)
Total Perimeter	8,089.6 m
Largest Parcel	126 – 88.99 ha
Smallest Parcel	326 – 0.69 ha

[illegible]

Figure 9: STILBAAI - WEST

Town	STILBAAI - WEST
Total Properties	14
Total Area	181.29 ha (1,812,720.31 m²)
Total Perimeter	21,728.3 m
Largest Parcel	RE/657 – 69.85 ha
Smallest Parcel	3686 – 0.34 ha



Figure 10: STILBAAI - EAST

Town	STILBAAI - EAST
Total Properties	7
Total Area	259.34 ha (2,593,344.11 m ²)
Total Perimeter	21,767.0 m
Largest Parcel	156.40 ha
Smallest Parcel	4.05 ha

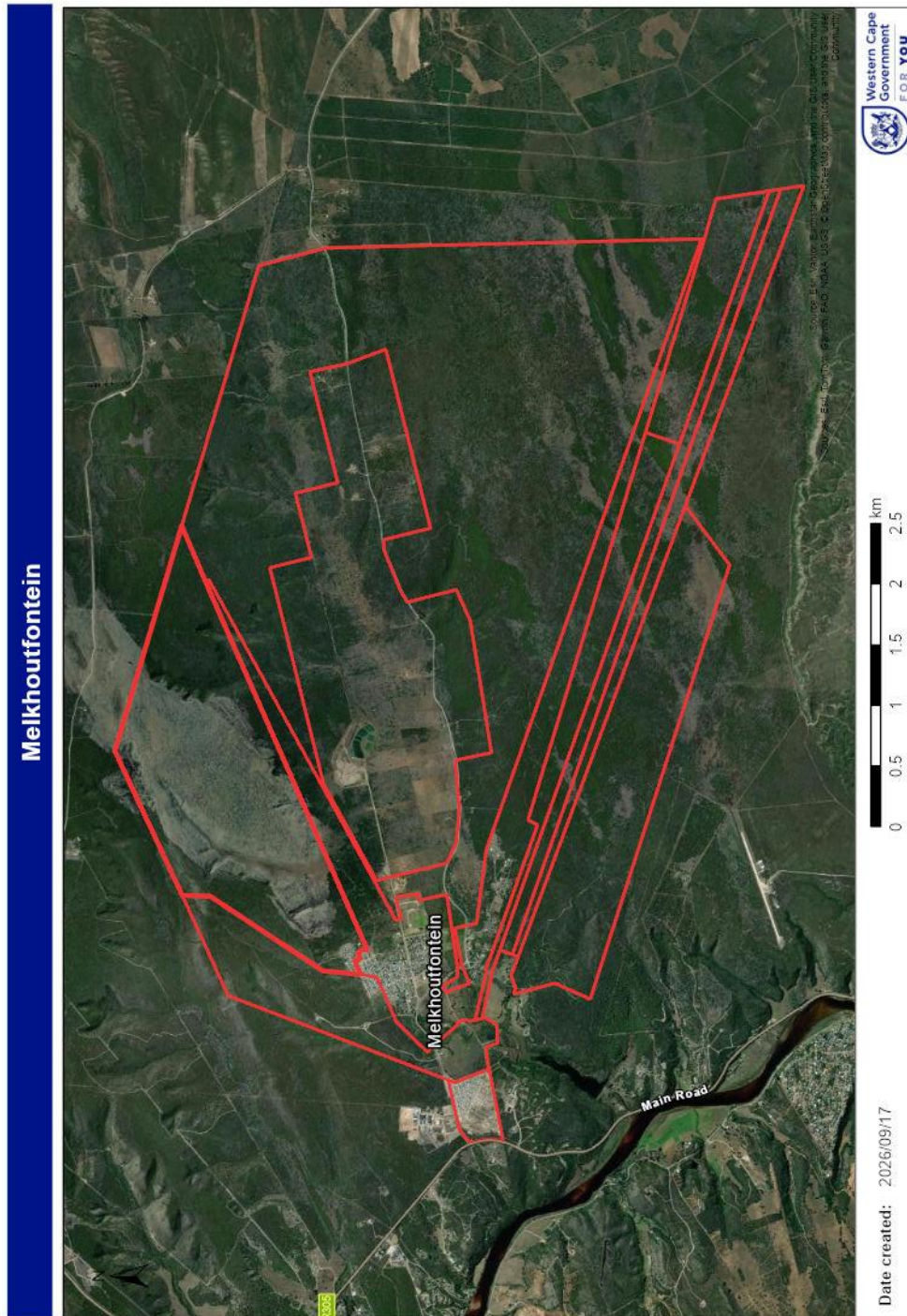


Figure 11: MELKHOUTFONTEIN

Town	MELKHOUTFONTEIN
Total Properties	9
Total Area	2,013.72 ha (20,137,245.11 m ²)
Total Perimeter	99,290.8 m
Largest Parcel	RE/154/480 – 1,018.49 ha
Smallest Parcel	1715 – 17.92 ha

5. Legislative Framework

The Firebreak Management Plan is guided by the following legislation:

5.1 Authority of the Fire Chief under the Fire Brigade Services Act, 99 of 1987

In terms of the Fire Brigade Services Act, 99 of 1987, the Chief Fire Officer is the person in charge of the fire brigade service and is responsible for directing fire brigade operations within the municipal area. The Act provides for fire brigade services to prevent the outbreak or spread of fire, fight and extinguish fires, protect life and property against fire or other threatening danger and perform functions connected with those purposes. Where an actual or imminent fire threat places life, property, municipal infrastructure, or the environment in danger, the Fire Chief may direct the use of appropriate resources, including mechanical machinery, graders, loaders, tractors, brush cutters, mulchers, or other available equipment, to construct, widen, or reinforce a firebreak as an emergency protective measure. Such action must be reasonable, necessary and proportionate to the threat and must be recorded after the incident with due regard to safety, environmental protection, accountability and municipal reporting requirements.

5.2 National Legislation

- Constitution of the Republic of South Africa, 1996 (Act 108 of 1996), as amended by the Constitution Eighteenth Amendment Act, 2023 (Act 3 of 2023)
- National Veld and Forest Fire Act, 101 of 1998
- Disaster Management Act, 57 of 2002
- Fire Brigade Services Act, 99 of 1987
- National Environmental Management Act, 107 of 1998
- National Environmental Management: Biodiversity Act, 10 of 2004
- National Environmental Management: Protected Areas Act, 57 of 2003
- Conservation of Agricultural Resources Act, 43 of 1983
- Municipal Systems Act, 32 of 2000
- Municipal Structures Act, 117 of 1998

- Municipal Finance Management Act, 56 of 2003

5.3 Provincial Framework

- Western Cape Disaster Management Framework
- Western Cape Climate Change Response Strategy
- Provincial Biodiversity Spatial Plans
- CapeNature Fire Management Guidelines
- Western Cape Wildfire Management Strategies

5.4 Municipal Framework

Municipal instruments	Relevance to Firebreak Management Plan
Hessequa Municipality Fire Safety By-law	Fire prevention, fire hazards, access, fire safety requirements and responsibilities.
Hessequa Municipality Integrated Zoning Scheme By-law, 2018	Determines zoning and land-use controls on municipal properties and adjacent properties. Hessequa confirms that the 2018 Zoning Scheme By-law regulates municipal zoning.
Hessequa Municipality Land Use Planning By-law, 2015, as amended	Relevant where firebreaks, clearing, access roads or related works interact with land-use rights or development applications. Hessequa published the 2025 version as a proposed/draft amendment.
Hessequa Municipality Fencing and Fences By-law	Important where firebreaks require fencing removal, relocation, access through fenced properties or maintenance of boundaries.
Hessequa Municipality Roads and Streets By-law	Relevant to firebreaks adjoining municipal roads, road reserves, access routes and maintenance of emergency/fire access.
Hessequa Municipality Storm Water Management By-law	Relevant as mechanical clearing, firebreak construction and erosion control can alter drainage and stormwater runoff.
Hessequa Municipality Air Pollution By-law	Particularly relevant where firebreak management involves controlled burning, smoke or other burning activities.
Hessequa Municipality Disposal of Solid Waste By-law	Relevant to removal/disposal of alien vegetation, cleared biomass and other material generated during firebreak maintenance.

Hessequa Municipality Public Amenities By-law	Relevant where municipal nature areas, parks, recreational areas and public open spaces form part of the firebreak network.
Hessequa Municipality Management and Use of Rivers By-law	Relevant to municipal land adjacent to rivers, wetlands, estuaries and watercourses where firebreaks or vegetation clearing are proposed.
Hessequa Municipality Prevention of Public Nuisance By-law	Potentially relevant to smoke, uncontrolled burning, obstruction of access and activities creating risks to surrounding communities.
Hessequa Municipality Rules for the Conduct of Meetings By-law	Not necessary in the substantive firebreak framework unless the plan requires a specific municipal governance/approval process.
Hessequa Municipality Integrated Development Plan (IDP) 2022–2027 – 2026/27 Review	Policy/strategic instrument rather than legislation. It should be referenced because the firebreak programme must align with municipal priorities, infrastructure, disaster management and environmental objectives. The 2026/27 reviewed IDP was published in May 2026.
Hessequa Municipal Spatial Development Framework (MSDF) 2024/2025	Important for identifying the urban edge, conservation areas, settlement patterns, ecological corridors and areas where firebreaks may be required. The Municipality adopted the MSDF as a core component of its amended IDP in June 2025.
Hessequa Disaster Management Plan	Core policy instrument. The firebreak plan should link directly to municipal disaster-risk reduction, wildfire preparedness, response and recovery. The IDP specifically identifies applicable Disaster Management Plans as part of the municipal planning framework.

6. Fire Risk Assessment

Annual fire risk assessments shall be conducted before each fire season.

6.1 Fuel Assessment

Example of assessment:

Assessment Factor	Low Risk	Moderate Risk	High Risk	Very High / Extreme	Observation / Comments
Vegetation type	☐	☐	☐	☐	

Vegetation age	☐	☐	☐	☐	
Fuel continuity	☐	☐	☐	☐	
Dead biomass	☐	☐	☐	☐	
Fuel moisture	☐	☐	☐	☐	
Invasive alien vegetation	☐	☐	☐	☐	
Accumulated combustible material	☐	☐	☐	☐	

6.2 Topographical Assessment

Example of Assessment:

Assessment Factor	Low Risk	Moderate Risk	High Risk	Very High / Extreme	Observation / Comments
Slope gradient	☐	☐	☐	☐	
Aspect	☐	☐	☐	☐	
Ridges / valleys	☐	☐	☐	☐	
Fire chimneys	☐	☐	☐	☐	
Terrain accessibility	☐	☐	☐	☐	
Natural barriers	☐	☐	☐	☐	

6.3 Weather Assessment

Examples: Factors considered

Factor	Low Risk	Moderate Risk	High Risk	Very High / Extreme	Observation / Source
Prevailing winds	☐	☐	☐	☐	
Seasonal forecast	☐	☐	☐	☐	
Relative humidity	☐	☐	☐	☐	
Temperature	☐	☐	☐	☐	
Drought conditions	☐	☐	☐	☐	

Fire Danger Index	☐	☐	☐	☐	
-------------------	--------------------------	--------------------------	--------------------------	--------------------------	--

6.4 Ignition Risk Assessment

Example of an ignition risk assessment per potential ignition source:

Potential Ignition Source	Present?	Likelihood	Consequence	Overall Risk	Comments
Provincial road	☐ Yes ☐ No				
Municipal road	☐ Yes ☐ No				
Railway line	☐ Yes ☐ No				
Powerline corridor	☐ Yes ☐ No				
Informal access route	☐ Yes ☐ No				
Recreational area	☐ Yes ☐ No				
Agricultural activity	☐ Yes ☐ No				
Illegal fires	☐ Yes ☐ No				
Arson history	☐ Yes ☐ No				
Other	☐ Yes ☐ No				

7. Fire Risk Classification

Risk Category	Description
Low	Low fuel loads and limited exposure
Moderate	Moderate fuel loads and potential for fire spread
High	Significant fuel loading and exposure
Very High	Extreme fuel loading and direct threat to assets

Priority intervention shall be directed toward High and Very High-Risk areas.

8. Firebreak Management Strategy

The Municipality adopts a risk-based firebreak management approach.

8.1 Firebreak Categories

8.1.1 Primary Firebreaks

Located directly adjacent to:

- Residential developments
- Informal settlements
- Industrial areas
- Municipal infrastructure

8.1.2 Secondary Firebreaks

Located within:

- Open spaces
- Greenbelts
- Conservation zones

8.1.3 Tactical Firebreaks

Constructed:

- Along access roads
- On ridgelines
- Strategic firefighting positions

9. Firebreak Design Standards

Firebreak dimensions shall be determined according to:

- Vegetation type
- Historical fire behaviour
- Fuel load
- Topography
- Wind exposure
- Environmental sensitivity

Minimum Requirements

All firebreaks shall:

- Be reasonably free of combustible material.
- Provide effective access for firefighting.
- Minimize erosion.
- Avoid unnecessary environmental damage.
- Be inspected annually.
- Be maintained before fire season.

No fixed firebreak width shall apply universally. Dimensions shall be site-specific based on assessed risk.

10. Firebreak Construction Methods

The Municipality may use one or more of the following methods:

10.1 Mechanical Methods

- Brush cutting
- Slashing
- Mowing
- Mulching
- Grading

10.2 Manual Methods

- Hand clearing
- Chainsaw operations
- Removal of woody fuels

10.3 Prescribed Burning

Where appropriate:

- Subject to permits

- Weather conditions
- Environmental approvals
- FPA coordination

10.4 Grazing

Controlled grazing may be used to reduce fuel load in appropriate areas.

10.5 Emergency Firebreak Construction

Where an actual or imminent fire threat places life, property, municipal infrastructure or the environment at risk, firebreaks shall be constructed, widened or reinforced mechanically where required as an emergency protective measure. Appropriate municipal machinery and equipment, including graders, loaders, tractors, brush cutters, mulchers and similar equipment, shall be deployed as necessary to establish an effective firebreak and support fire suppression and containment operations.

Mechanical construction must be implemented where the identified fire risk requires an immediate and effective firebreak intervention, taking into consideration the prevailing fire conditions, terrain, accessibility and safety requirements. All such emergency works shall be undertaken in a manner that is reasonable and proportionate to the threat, with due regard to environmental protection, public and personnel safety, and applicable municipal reporting and accountability requirements.

11. Invasive Alien Plant Management

Refer to SECTION 2.

12. Environmental Management Considerations

The Municipality shall ensure:

- Protection of biodiversity assets.
- Prevention of soil erosion.
- Protection of watercourses.
- Protection of threatened ecosystems.

- Protection of protected species.

Where firebreaks occur within environmentally sensitive areas, consultation with relevant authorities shall be undertaken prior to implementation.

13. Roles and Responsibilities

Institution / Department	Primary responsibility
Hessequa Municipal Council	Adoption of the Firebreak Management Plan, Governance oversight and allocation of resources
Municipal Manager	Overall municipal administrative responsibility, performance monitoring and interdepartmental coordination
Hessequa Fire Services	Fire prevention, fire-risk assessment, compliance inspections, firebreak requirements/specifications, operational inspections, fire response and technical fire input
Environmental Management Department	Environmental screening, biodiversity, protected areas, environmental compliance and ecological considerations
Disaster Management	Disaster-risk assessment, prevention, mitigation, preparedness, response and recovery
Town Planning / Development Planning	Urban edge, zoning, land-use planning and spatial alignment
Technical Services	Access roads, stormwater, infrastructure interfaces and municipal plant
Community Services / Parks	Vegetation management and routine maintenance
Municipal Law Enforcement	Enforcement of relevant municipal by-laws
Occupational Health and Safety	Worker safety, risk assessments, PPE and safe operating procedures
CapeNature	Biodiversity, protected areas and ecological fire-management input where applicable
Garden Route District Municipality	Regional disaster/fire-management coordination where applicable

Working on Fire	Firebreak construction, fuel management and wildfire-support operations where contracted/assigned
Fire Protection Association	Coordinated veldfire management and firebreak/burning arrangements
DFFE / relevant competent authority	National environmental regulatory oversight where applicable
Department of Forestry, Fisheries and the Environment / Forestry authorities	Protected forests/trees and relevant forestry legislation
Department of Agriculture / provincial agricultural authority	Agricultural land, soil conservation and relevant CARA matters
Landowners / adjoining landowners	Coordination and maintenance of adjoining firebreaks where legally applicable

14. Annual Firebreak Programme

Period	Activity
January-March	Assessments and inspections
April-June	Planning and procurement
June-August	Major clearing operations
August-October	Final inspections
Fire Season	Monitoring and maintenance
Post Season	Rehabilitation and review

15. Monitoring and Inspection

15.1 All firebreaks shall be inspected:

- Prior to maintenance
- Upon completion of maintenance

- Before commencement of the fire season
- Following significant fire events

15.2 Inspection records shall include:

- GPS coordinates
- Photographic evidence
- Firebreak dimensions
- Compliance findings
- Maintenance recommendations

16. GIS and Asset Management

A GIS database shall be maintained containing:

- Firebreak locations
- Length and width
- Maintenance history
- Risk category
- Inspection reports
- Photographic records

The database shall be updated annually.

17. Stakeholder Engagement

The Municipality shall cooperate with:

- Fire Protection Associations
- CapeNature
- Adjacent landowners
- State-owned entities

- Agricultural associations
- Community organizations

Stakeholder meetings shall occur annually before each fire season.

18. Emergency Preparedness

Firebreak management shall support municipal preparedness through:

- Access route maintenance
- Water point accessibility
- Communication planning
- Resource allocation
- Incident response coordination

19. Key Performance Indicators

Performance measurement shall include:

Indicator	Target
Firebreaks inspected	100% annually
Firebreaks maintained	100% annually
Alien vegetation cleared	Annual target achieved
GIS records updated	Annually
Stakeholder engagements	Minimum 2 per year
Compliance inspections	100% completed

20. Budget Requirements

Annual budgets shall provide for:

- Vegetation clearing
- Firebreak construction
- Machinery and equipment

- Contractor services
- Alien vegetation control
- GIS management
- Environmental rehabilitation
- Staff training

21. Reporting

An Annual Firebreak Management Report shall include:

- Risk assessment results
- Firebreak maintenance completed
- Kilometres maintained
- Costs incurred
- Fire incidents recorded
- Compliance status
- Environmental outcomes
- Recommendations for improvement

22. Review and Continuous Improvement

This Plan shall be reviewed annually:

- Prior to each fire season
- Following major wildfire incidents
- Following legislative amendments
- Where significant environmental changes occur

Lessons learned shall be incorporated into future planning cycles.

23. Conclusion

The Hessequa Municipality recognizes that effective firebreak management is a critical component of wildfire prevention, disaster risk reduction, environmental stewardship, and community safety. Through proactive planning, annual maintenance, risk-based decision-making, and collaboration with stakeholders, the Municipality commits to maintaining an effective firebreak system that protects lives, property, municipal infrastructure, agricultural resources, and biodiversity while ensuring full compliance with applicable legislation.



SECTION 2: INVASIVE SPECIES MONITORING, CONTROL AND ERADICATION PLAN

DFFE Reference:14/2/8/2/4/138

1. Introduction

The Hessequa region is home to a remarkable diversity of plant species that are unique to the area. The inhabitants of this region are the custodians of this rich floral kingdom, and the efforts made to preserve it should be applauded. Notable examples include initiatives such as Tuin-op-die-Brak in Stilbaai.

Unfortunately, many people remain unaware of the serious threat posed by highly aggressive invasive alien plant species to our indigenous flora. Many of the most prolific of these species originate from Australia and were introduced over a century ago, primarily because of their rapid growth rates and adaptability.

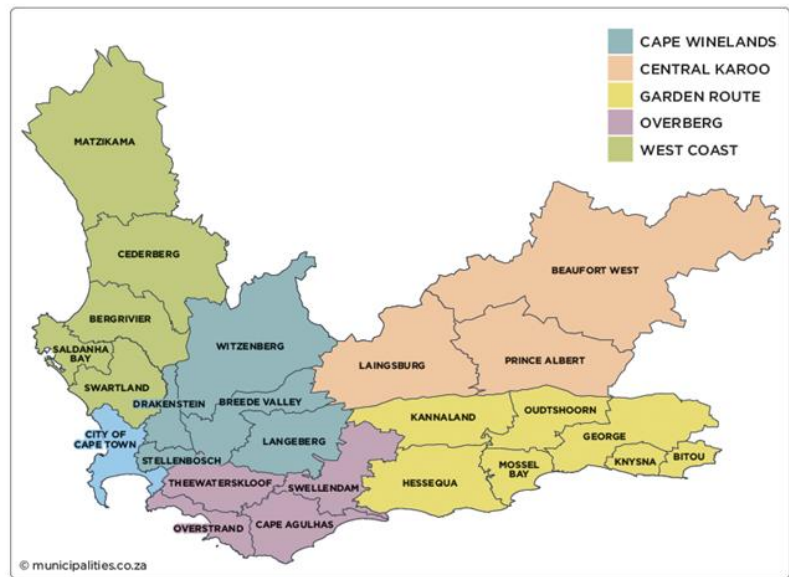
These invasive alien species share four main characteristics:

1. They absorb significantly more water than indigenous plants, often resulting in severely dried-out topsoil.
2. They have no natural enemies to control their spread.
3. They grow rapidly and produce vast quantities of seed.
4. They burn easily and at much higher temperatures than indigenous vegetation, posing a serious threat to local fynbos species.

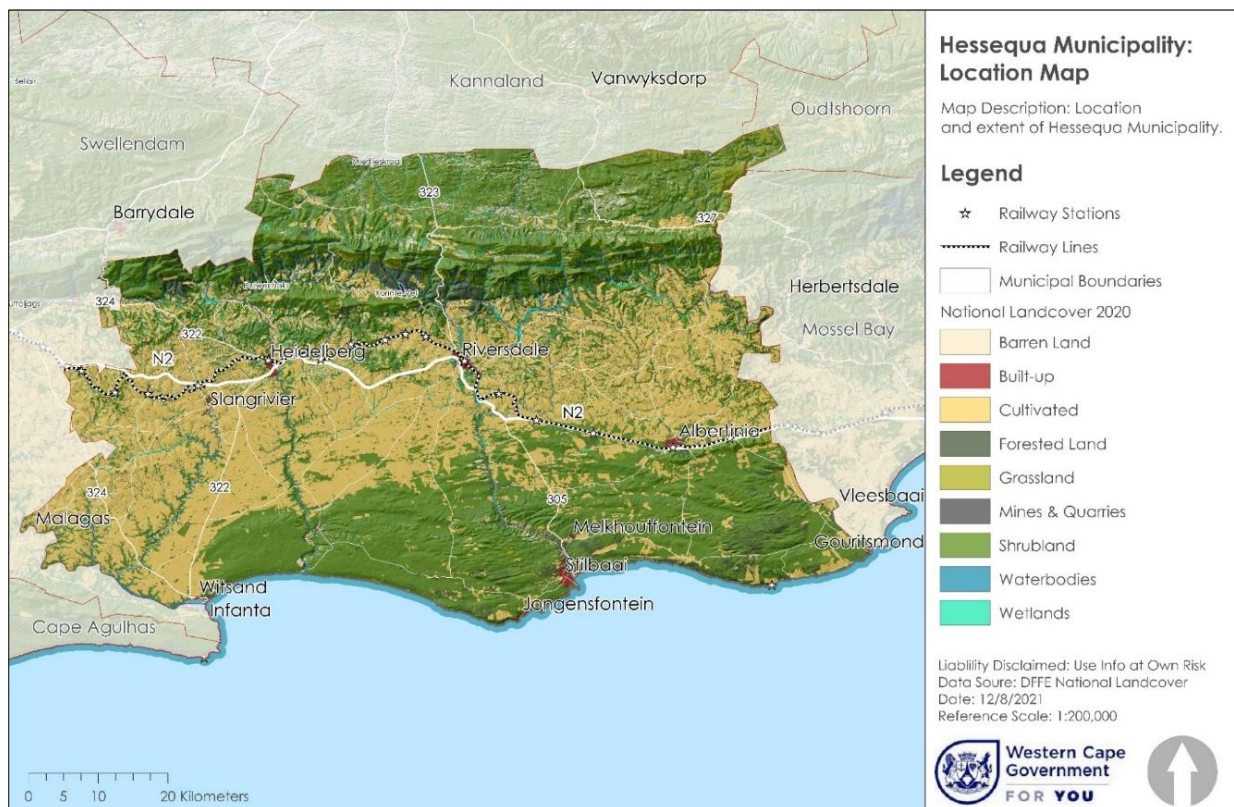
In many cases, available municipal land is overgrown with alien vegetation. According to legislation, landowners are responsible for controlling these invasive species on their properties.

1.1 Hessequa Municipal Area

Hessequa Local Municipality (hereafter referred to as HLM) covers an area of approximately 5 700 km² and had an estimated population of 58 533 in 2022. HLM comprises eleven local settlements, which are listed and as illustrated in adjacent image (Hessequa Draft Status Quo Report, 2022). The N2 national route serves as the



primary transportation corridor through the study area. The distance between the western and eastern municipal boundaries, measured along the N2 route, is approximately 130 km. Important connecting roads linking urban settlements to the N2 include the R324 and R322 to Witsand, the R305 to Still Bay, and the R325 to Gouritsmond.



1.2 Purpose of the Invasive Vegetation Management Plan

The main purpose of this Invasive Vegetation Management Plan is to serve as a strategic tool which will guide the prevention, control, and reduction of invasive alien plant species in order to protect ecological integrity, ecosystem services, and biodiversity. The plan supports sustainable land-use planning by identifying environmental sensitivities, managing cumulative impacts, and aligning alien vegetation control with broader environmental and development objectives.

The plan also ensures that alien vegetation management is integrated into municipal planning, land-use decision-making, and environmental authorisation processes, while ensuring compliance with applicable national and provincial environmental legislation.

1.3 Objectives of the Invasive Vegetation Management Plan

The broad objectives of the management plan:

1. Protect biodiversity and ecological functioning

Safeguard indigenous ecosystems, particularly sensitive habitats such as fynbos, wetlands, and riparian zones, from the impacts of invasive alien plant species.

2. Support sustainable land-use planning

Inform spatial planning and development decisions by identifying areas where alien vegetation poses a high environmental risk or where proactive management is required.

3. Reduce environmental risks and cumulative impacts

Minimise the negative impacts of invasive alien vegetation on water resources, soil stability, fire regimes, and ecosystem resilience.

4. Prioritise management areas

Identify and prioritise areas for intervention based on ecological sensitivity, invasion intensity, fire risk, and water catchment importance.

5. Guide appropriate management and control measures

Provide guidance on suitable control methods, including mechanical, chemical, biological, and integrated approaches, in accordance with environmental best practice.

6. Promote ecosystem rehabilitation and restoration

Support the recovery of indigenous vegetation following alien clearing to prevent re-infestation and restore ecosystem functionality.

7. Ensure legislative compliance

Support compliance with relevant environmental legislation, including the National Environmental Management: Biodiversity Act (NEM:BA) and associated regulations.

8. Enable monitoring, reporting, and adaptive management

Establish mechanisms for monitoring the effectiveness of alien vegetation management and for adapting management strategies in response to environmental change or new information.

9. Encourage cooperative governance and stakeholder participation

Promote coordinated action between the municipality, landowners, conservation authorities, and communities to ensure effective and sustained alien vegetation management.

2. Legislative Context

2.1 Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA)

In accordance with the amended regulations issued under the Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA), all listed alien plant species are required to be effectively managed and controlled. The Act places a legal obligation on landowners to control invasive alien plant species occurring on their properties.

Under these regulations, invasive alien plant species are classified into the following categories:

- **Category 1: Prohibited species**

These species are not permitted and must be actively controlled or eradicated.

- **Category 2: Commercially utilised species**

These species may be cultivated only within demarcated areas and subject to a valid permit. Measures must be implemented to prevent their spread beyond authorised areas.

- **Category 3: Ornementally utilised species**

New planting of these species is prohibited. Existing plants may be retained provided that all reasonable measures are taken to prevent their spread, except within the floodlines of watercourses and wetlands, where their presence is not permitted.

2.2 National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEM:BA) provides the primary legislative framework for the regulation of invasive species in South Africa, encompassing a wide range of invasive fauna and flora. In terms of this Act, regulations governing invasive species were promulgated through Government Notices R.506, R.507, R.508, and R.509 of 2013.

In accordance with Section 70 of NEM:BA and the associated regulations, species listed as invasive may not be imported, propagated, cultivated, traded, or otherwise managed without the appropriate permits.

Invasive species regulated under NEM:BA are classified into the following categories:

- **Category 1a: Invasive species requiring compulsory eradication**

All specimens of Category 1a listed species must, by law, be eradicated from the environment. No permits may be issued for the possession, propagation, or trade of these species.

- **Category 1b: Invasive species requiring compulsory control**

These species must be controlled and removed as part of an invasive species management programme. Due to their high invasive potential, infestations may qualify for inclusion in government-sponsored invasive species control initiatives. No permits may be issued for these species.

- **Category 2: Invasive species regulated by area**

A demarcation permit is required to import, possess, grow, breed, move, sell, buy, or accept any Category 2 species. Such permits are subject to strict conditions, and no permits will be issued for the presence of Category 2 species within riparian zones.

- **Category 3: Invasive species regulated by activity**

An individual plant permit is required to undertake any restricted activity involving a

Category 3 species, including importation, possession, cultivation, movement, or trade. No permits will be issued for Category 3 species to occur within riparian zones.

It is important to note that alien plant species regulated as weeds or invader plants under the CARA are exempt from regulation under NEM:BA. In such cases, the provisions of CARA take precedence over those of NEM:BA with respect to the management and control of these listed species.

2.3 GN No. R.598: National Environmental Management: Biodiversity Act (Act No. 10 of 2004): Alien and Invasive Species Regulations, 2014

Government Notice R.598, promulgated under the National Environmental Management: Biodiversity Act (NEM:BA), provides the regulatory framework for the management of alien and invasive species in South Africa. The Regulations establish categories of listed invasive species, define restricted activities, and set out requirements for national framework documents, including Exempted Alien Species Lists and Invasive Species Monitoring, Control and Eradication Plans. The Regulations further provide for a risk assessment process, as well as procedures for the issuing, amendment, and withdrawal of permits.

These Regulations repeal the Alien and Invasive Species Regulations, 2013, published under Government Notice R.506 (Government Gazette No. 33683 of 19 July 2013).

In terms of Section 70 of NEM:BA and the 2014 Regulations, no species listed as invasive may be imported, propagated, cultivated, bought, sold, or otherwise subjected to restricted activities without the appropriate authorisation.

2.3.1 Categories of Listed Invasive Species

a. Regulation 2: Category 1a Listed Invasive Species

Category 1a species are those listed in terms of Section 70(1)(a) of the Act as species that must be combatted or eradicated.

Any person in control of a Category 1a listed invasive species is required to:

- Comply with the provisions of Section 73(2) of the Act;
- Immediately take steps to combat or eradicate the species in accordance with Sections 75(1), (2), and (3) of the Act;

- Allow authorised officials from the competent authority access to land for the purposes of monitoring, assisting with, or implementing eradication measures.

Where an Invasive Species Management Programme has been developed in terms of Section 75(4) of the Act, eradication must be undertaken in accordance with that programme.

b. Regulation 3: Category 1b Listed Invasive Species

Category 1b species are listed in terms of Section 70(1)(a) of the Act as species that must be controlled.

A person in control of a Category 1b listed invasive species must:

- Control the species in compliance with Sections 75(1), (2), and (3) of the Act;
- Implement control measures in accordance with an approved Invasive Species Management Programme, where such a programme exists;
- Permit authorised officials to access land to monitor, assist with, or enforce compliance with control measures and management programmes.

c. Regulation 4: Category 2 Listed Invasive Species

Category 2 species are listed as invasive species that require a permit to carry out restricted activities within a specified area, as defined in the relevant Notice or permit.

The Regulations provide that:

- No restricted activity may be undertaken in respect of a Category 2 listed invasive species without a valid permit, unless otherwise specified in the Notice;
- Landowners or permit holders must ensure that specimens do not spread beyond the land or area specified in the Notice or permit;
- Where an Invasive Species Management Programme exists, control must be undertaken in accordance with that programme;
- Any Category 2 listed invasive species occurring outside the specified permitted area is regarded as a Category 1b listed invasive species and must be managed accordingly;

- Notwithstanding exemptions applicable to existing plantations (as published in Government Gazette No. 37886, Notice 599 of 1 August 2014, as amended), all persons or organs of state must ensure that such listed invasive plant species do not spread beyond the boundaries of land under their control.

d. Regulation 5: Category 3 Listed Invasive Species

Category 3 listed invasive species are regulated in terms of restricted activities and are subject to permit requirements and spatial limitations, as prescribed by the Regulations.

e. Regulation 6: Restricted Activities

In addition to the activities defined as restricted activities in Section 1 of the National Environmental Management: Biodiversity Act, the Alien and Invasive Species Regulations prescribe further actions that are classified as restricted activities.

These include:

- The spreading of, or failure to prevent the spread of, any specimen of a listed invasive species.

The remaining sub-regulations, namely Regulations 6(b) to 6(g), are not applicable to terrestrial plant species.

2.4 GN No. R.599: National Environmental Management: Biodiversity Act (Act No. 10 of 2004) - Notice 3: National List of Invasive Species in terms of Section 70(1A)

This Notice gives effect to Section 70(1A) of the National Environmental Management: Biodiversity Act (NEM:BA) by publishing the national list of invasive terrestrial and freshwater plant species to which the provisions of the Act apply nationally. The listed species are categorised in accordance with the Alien and Invasive Species Regulations, 2014 (GN No. R.598).

Section 70(1A) of NEM:BA requires the Minister, within 24 months of the commencement of this section, to publish a national list of invasive species by notice in the Government Gazette. This list serves as the authoritative reference for the identification and regulation of invasive species subject to compulsory control, permitting requirements, or eradication measures in terms of Chapter 5 of the Act.

2.5 Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947)

In terms of Government Notice No. 13424, dated 26 July 1992, it is an offence to acquire, sell, dispose of, or use an agricultural or stock remedy in any manner other than that specified on the product label or container.

Contractors applying herbicides or other chemical control agents are required to hold a valid Pest Control Operators License (limited to weeds control), as stipulated under the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). Compliance with this Act is regulated and enforced by the Department of Agriculture, Forestry and Fisheries.

This legislation ensures that chemical control of invasive and alien plant species is conducted safely, legally, and in a manner that minimises risks to human health, livestock, and the environment.

2.6 Compliance Table:

LEGISLATION / REGULATION	SPECIES / ACTIVITY	WHERE IT APPLIES	REQUIREMENTS / OBLIGATIONS	PERMIT REQUIRED?	NOTES
CARA (ACT 43 OF 1983)	Declared weeds & invader plants	Agricultural land, municipal land, private land	Control prohibited species; manage ornamental and commercial species per category rules	Yes, for Category 2 (commercial areas)	Categories: 1 – prohibited, 2 – commercial (permit required), 3 – ornamental (manage spread)
NEM:BA (ACT 10 OF 2004)	All invasive species (flora & fauna)	National	No propagation, cultivation, sale, or trade of listed species without permit; control/eradication per category	Yes, for Categories 2 & 3; No for 1a & 1b	Covers all invasive species not regulated by CARA
GN R.598 (ALIEN & INVASIVE SPECIES REGULATIONS, 2014)	Categories 1a, 1b, 2, 3	National	Implement control/eradication; allow authorised officials access; comply with Invasive Species Management Programmes;	Required for Categories 2 & 3 only	Defines restricted activities (Regulation 6)

			restricted activities include spreading listed species		
GN R.599 (NATIONAL LIST OF INVASIVE SPECIES)	Nationally listed terrestrial & freshwater plants	National	Refer to list to determine category; apply control/permit measures as per GN R.598	As per GN R.598 category	Authoritative list for regulatory compliance
FERTILIZER, FARM FEEDS, AGRICULTURAL REMEDIES & STOCK REMEDIES ACT (ACT 36 OF 1947)	Herbicides, chemical control agents	All land where herbicides are applied	Follow label instructions; contractors must hold Pest Control Operators License (limited weeds)	Required for contractors applying herbicides	Ensures legal and safe chemical control

2.7 Hessequa Municipality: Bylaws

2.7.1 Hessequa Local Municipality: Air Pollution Control By-law, 2008

Hessequa has an Air Pollution Control By-law that regulates open burning within the municipal area. Under this by-law:

- “Open burning” (i.e., combustion of material without a chimney) is generally restricted because it can cause air pollution and nuisance smoke.
- Any open burning — including burning vegetation or fuel loads — would typically require prior written authorisation from the Municipality, unless an exemption applies.
- The Municipality may only authorise open burning when it has first considered:
 - Whether all reasonable alternatives (such as reuse or recycling) have been investigated;
 - That no official fire warnings or prohibitions are in place under the National Veld and Forest Fire Act; and
 - That the burning won’t pose a nuisance or hazard to human health, property, or the environment.

Implication: A controlled burn for the purpose of invasive vegetation control (or any other burning of biomass) is not automatically permitted. It requires municipal written approval under the Air Pollution Control By-law before it can be undertaken lawfully.

2.7.2 Hessequa Local Municipality: Fire Safety By-law, 2010

Hessequa Municipality also has a Fire Safety By-law which deals broadly with fire protection and emergency services, but it does not provide detailed provisions on how controlled burns should be conducted for ecological or vegetation-management purposes. It is primarily focused on fire hazards, reporting, and fire brigade services.

3. Invasive Vegetation Clearing Methods

3.1 Manual Control (Hand Pulling/Cutting)

Description:

Physical removal of invasive plants by hand or with handheld tools (e.g., loppers, saws, axes). Best suited for small infestations, seedlings, and sensitive sites.

Seedlings

Seedlings of many invasive plants appear all the time, courtesy to birds. When seedlings appear, they must be pulled out as soon as possible to eliminate costly tree felling at a later stage. It is easier to remove seedlings when the soil is moist.

Shrubs and small trees

Tree Popper must be used to remove shrubs and smaller trees. Alternatively, the top growth must be cut off and then the stem and roots from the soil must be removed. It is vital that the root ball and any taproots are totally removed to prevent re-growth, as invasive plants often have roots capable of regeneration.

Large trees

If the tree is too large to be physically removed, ring-barking must be implemented. Ring-barking entails removing a continuous ring of bark at least 25 cm in width around the full circumference of the tree. The bark must be peeled down to just below ground level and pulled outward to ensure complete removal of the cambium layer.

This method is particularly effective for the control of invasive Acacia species, as it disrupts the tree's vascular system, thereby preventing nutrient and water transport and resulting in gradual dieback and eventual mortality.

Advantages	Disadvantages
✓ No chemicals used — safe for sensitive sites, watercourses, and biodiversity hotspots. ✓ Very targeted — minimal disturbance to surrounding vegetation ✓ Effective for small patches or young plants	✗ Labour-intensive and time-consuming ✗ Not suitable for large infestations ✗ Requires regular follow-up to remove regrowth

3.2 Mechanical Control (Machinery / Heavy Equipment)

Description:

Use of machinery such as brush cutters, tractors with attachments, excavators, mowers, or Bulldozers to clear dense infestations.

Advantages	Disadvantages
✓ Efficient for large areas and dense infestations ✓ Rapid removal of biomass ✓ Reduces fuel load (important for fire management)	✗ Can cause soil compaction, erosion, and disturbance ✗ Can damage desirable vegetation if not carefully operated ✗ Expensive (equipment, operators, fuel)

3.3 Chemical Control (Herbicide Application)

Description:

Use of registered herbicides applied by licensed personnel. Can be foliar spray, cut-stump, basal bark, or stem injection depending on plant size and species.

Note: All herbicide applications must comply with the following regulations and guidelines:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa: Published under the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947), Government Notice R.1120 of 2010.
- South African Bureau of Standards (SANS 10206, 2010): Standards for safe handling and application of pesticides.
- Government Notice No. 13424, 26 July 1992: It is an offence to acquire, dispose of, sell, or use an agricultural or stock remedy in any manner other than that specified on the product label or container.
- Contractors applying herbicides must hold a valid Pest Control Operators License (limited weeds controller) in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This licensing is regulated by the Department of Agriculture, Forestry and Fisheries.
- Compliance with these policies ensures that herbicide use is conducted safely, legally, and with minimal impact on the environment.

Advantages	Disadvantages
✓ Highly effective, especially for woody invasive species ✓ Can reach plants where manual/mechanical methods are difficult ✓ Reduces resprouting when correctly applied	✗ Requires specialist training and licensing (e.g., Pest Control Operators License) ✗ Risk of non-target damage if misapplied ✗ May require multiple applications, increasing cost

3.3.1 Hessequa Municipality: Generally used herbicides (Usually on Tender)

Herbicides commonly used for woody invasive trees & shrubs (Eucalyptus, Port Jackson, Pines):

These are systemic herbicides that move into roots and meristems — recommended for basal bark, cut-stump, frill or foliar treatment.

Triclopyr (Selective systemic for woody plants)

- Used for *Acacia* spp. (incl. Port Jackson) and *Eucalyptus* spp. control.
- Less damaging to grasses when applied selectively (e.g., cut stump).
- Examples include:
 - **Garlon** (triclopyr 480 g/L) — selective woody plant control.
 - **Timbrel** (triclopyr 360 g/L) — good for cut-stump and frill applications.
 - **TRICLON / Lumberjack 360 SL** formulations — strong woody plant control including Bluegum and *Acacia*.

Note: When applied correctly (cut-stump/basal bark), triclopyr has less off-target drift and minimal soil mobility compared with some broad-spectrum products.

Picloram & Picloram combinations

- Used for deep woody weeds such as Port Jackson and some *Eucalyptus*.

Important: Picloram can persist in soil and may affect non-target plants and near sensitive vegetation and water bodies should be avoided.

Herbicides for Spanish reed (*Arundo donax*) and reeds:

Because Spanish reed is a **wetland/perennial grass**, effective control often uses non-selective or specific grass herbicides:

- **Glyphosate (non-selective systemic)**
 - Widely used for *Arundo donax* control, especially as cut-stump or foliar spray on actively growing reed.
 - Commonly available products include Roundup formulations (e.g., Roundup Biactive).

Note: Glyphosate is non-selective and will kill most vegetation it contacts and therefore requires careful application (e.g., spot spray/cut-stump).

- When treating near water, use products labelled for aquatic use and follow buffer restrictions.

➤ Imazapyr (for perennial grasses & tough reeds)

- Used in some regions for long-term control of tough wetland grasses.
- Higher soil persistence can suppress resprouts.

Note: As it persists in soil, avoid application near sensitive vegetation and watercourses unless labelled for such use.

TARGET	COMMON HERBICIDE ACTIVE INGREDIENT	NOTES
EUCALYPTUS SPP.	Triclopyr	Basal bark/cut-stump
PORT JACKSON (<i>ACACIA SALIGNA</i>)	Triclopyr, Picloram combinations	Basal bark / stump
PINES (<i>PINUS</i> SPP.)	Triclopyr (often with cut-stump)	Woody plant
SPANISH REED (<i>ARUNDO DONAX</i>)	Glyphosate, Imazapyr	Spot/foliar/cut-stump

Application & environmental best practice tips:

- Cut-stump or frill application (for trees/shrubs): Cut the tree and immediately apply herbicide to the stump/inner bark — reduces off-target risk.
- Spot spraying dense reed stands rather than broadcast spraying reduces damage to native plants.
- Follow up control (repeat applications in regrowth seasons) is crucial for species with seed banks or resprouting ability, like *Acacia* spp. and *Arundo donax*.
- Wear appropriate PPE and never apply within prohibited buffer zones near water unless the product specifically permits it.

3.4 Biological Control

Description:

The introduction of natural enemies (insects, pathogens) that reduce invasive plant populations. This method is highly regulated and scientifically tested.

Advantages	Disadvantages
✓ Self-sustaining once established ✓ Minimal ongoing cost ✓ Low environmental disruption	⊗ Slow — effects can take years to materialise ⊗ Only available for certain species with approved agents ⊗ Requires rigorous scientific monitoring

3.5 Prescribed Burning (Fire Management)

Description:

Use of controlled fire to reduce invasive plant biomass. Often integrated with other methods and used carefully under strict fire control protocols.

(Refer to 2.7 for relevant bylaws)

Advantages	Disadvantages
✓ Often the most effective long-term strategy ✓ Can reduce reliance on chemicals or heavy equipment alone ✓ Addresses multiple life stages of invasive species	⊗ Requires more planning, expertise, and coordination ⊗ Higher upfront cost (but often better value long term) ⊗ Need to ensure that sufficient resources are available for follow-ups in ensuing years

3.6 Clearing Methods for Invasive Vegetation – Recommended Use

METHOD	DESCRIPTION	BEST USE / SCENARIO	NOTES
MANUAL CONTROL (HAND PULLING / CUTTING)	Physical removal using hands or handheld tools	Small infestations, seedlings, sensitive areas, watercourses, biodiversity hotspots	Minimal environmental impact; labour-intensive; requires follow-up
MECHANICAL CONTROL (MACHINERY / HEAVY EQUIPMENT)	Use of tractors, excavators, brush cutters to remove dense vegetation	Large areas, dense infestations, fire-prone zones	Rapid and efficient; risk of soil disturbance and damage to native vegetation
CHEMICAL CONTROL	Use of licensed herbicides via foliar	Woody invasive species, difficult-to-	Highly effective; requires trained, licensed operators;

(HERBICIDE APPLICATION)	spray, cut-stump, basal bark, or stem injection	access plants, large-scale clearing	repeat application may be necessary
BIOLOGICAL CONTROL	Introduction of natural enemies (insects, pathogens) to re		

4. Common Invasive Vegetation on Municipal Properties

The most common alien invasive plant species occurring on municipal land include:

1. **Cluster Pine** (*Pinus pinaster*)
2. **Radiata Pine** (*Pinus radiata*)
3. **Bloekom / Bluegum** (*Eucalyptus diversicolor*)
4. **Port Jackson** (*Acacia saligna*) – Predominantly found in coastal areas, but may occur as far inland as the foothills of the Langeberg Mountains.
5. **Rooikrans** (*Acacia cyclops*) – Densely concentrated along the coast, with occurrences extending inland to the foothills of the Langeberg Mountains.
6. **Spanish Reed** (*Arundo donax*) – Primarily found in riparian zones and wetland areas along rivers and drainage lines.
7. **Manatoka** (*Myoporum insulare* / *M. tenuifolium*) – Occurring mainly on coastal dunes and dune thicket habitats.

For management and control purposes, these invasive plant species can be grouped into the following two spatial categories:

- **Inland Invasive Plant Species**
- **Coastal Invasive Plant Species**

4.1 Inland Invasive Plant Species

4.1.1 Cluster Pine (*Pinus pinaster*)



Common name: Cluster pine

Scientific name: *Pinus pinaster*

Family: Pinaceae

Afrikaans names: Trosden (colloquially also referred to as “Denneboom”)

Origin:

Mediterranean region (southern Europe and North Africa)

Description:

A coniferous evergreen tree typically reaching 15–30 m in height, but often smaller (± 8 –15 m) in invaded fynbos or wind-exposed environments. The tree is conical when young, becoming more cylindrical with a tall, bare trunk as it matures. The bark is reddish-brown and deeply fissured into plates. Leaves consist of dull grey-green needles borne in bundles of two, long (80–240 mm), thick, and rigid.

The species does not produce flowers, but instead forms woody cones that are initially purple and turn light brown as they mature. Cones are 90–180 mm long, shortly stalked, often clustered, persistent, and seed-bearing.

Habitat and distribution in South Africa:

Primarily problematic in the Western Cape, where it invades mountain and lowland fynbos ecosystems, particularly in disturbed areas, along mountain slopes, and within catchment areas.

Mode of spread:

Spreads by seed dispersal, with seeds released from mature cones and dispersed by wind.

Invasive status:

- **CARA (2002):** Category 2 species (permitted only in designated plantations with authorisation)
- **NEMBA:**
 - Category 2 in plantations and windrows (permit required)
 - Category 1b elsewhere (must be controlled)
 - Trees declared as National Heritage or National Monument Trees in terms of the National Heritage Resources Act, 1999, are exempt

Impacts:

Cluster pine competes aggressively with indigenous vegetation and can replace natural plant communities. Dense infestations reduce grazing potential, lower water runoff and stream flow from mountain catchments, and increase fuel loads, thereby intensifying fire risk and threatening indigenous plant and animal species.

Uses:

Used commercially for timber and wood products.

Indigenous alternatives:

Yellowwoods (*Podocarpus henkellii*, *Podocarpus latifolius*, *Podocarpus falcatus*)

4.1.2 Radiata Pine (*Pinus radiata*)



Common name: Radiata pine

Scientific name: *Pinus radiata*

Family: Pinaceae

Afrikaans names: Radiataden (colloquially also referred to as “Denneboom”)

Origin:

South-western North America (primarily coastal California)

Description:

A coniferous evergreen tree, typically 12–25 m tall in invaded areas, but can reach greater heights under optimal plantation conditions. The canopy is sharply conical in plantations but develops a broad, rounded shape when open-grown. The bark is grey-brown, relatively smooth on young trees, becoming more fissured with age.

Leaves (Needles):

Dark green needles, very densely arranged, in bundles of two or usually three, slender, 60–150 mm long.

Reproduction:

Radiata pine does not produce flowers. Seeds are produced in woody, yellowish-brown cones that are obliquely ovoid, strongly asymmetrical, 70–140 mm long, reflexed, persistent, with thick outer scales ending in a fine thorn and smaller, flatter inner scales. Seeds are dispersed primarily by wind.

Habitat and distribution in South Africa:

Invasive in the Western Cape, where it invades fynbos, forest clearings, and grasslands, usually on moist mountain slopes or disturbed areas. Less common in lowland areas compared to *Pinus pinaster*.

Mode of spread:

Spreads by wind-dispersed seeds from mature cones.

Invasive status:

- **CARA (2002):** Category 2 — allowed in plantations with authorisation.
- **NEMBA:**
 - Category 2 in plantations and windrows (permit required).
 - Category 1b elsewhere (must be controlled).
 - Trees declared as National Heritage or National Monument Trees are exempt.
 - Specimens with stem diameter >400 mm at 1 000 mm height in urban areas (City of Cape Town, Overberg, Winelands) are not listed, except in riparian zones, where they remain Category 1b.

Impacts:

- Competes with and replaces indigenous vegetation.
- Dense stands reduce water runoff and stream flow from mountain catchments.
- Reduces grazing potential for livestock.
- Increases fire hazard, threatening the survival of indigenous flora and fauna.

Uses:

- Timber production.
- Shelterbelts and windbreaks.

Indigenous alternatives:

- Yellowwoods (*Podocarpus henkellii*, *Podocarpus latifolius*, *Podocarpus falcatus*)

4.1.3 Bloekom/Blue gum (*Eucalyptus diversicolor*)



Common name: Bloekom / Blue gum / Karri

Scientific name: *Eucalyptus diversicolor* F.Muell.

Family: Myrtaceae

Afrikaans names: Karie / Bloekom

Origin:

Native to south-western Australia, particularly the high rainfall regions of Western Australia.

Description (Morphology)

Growth form:

A very tall evergreen tree, commonly 25–58 m in height in South Africa wherever it has escaped plantations.

Bark:

Smooth bark, typically grey-blue to cream with orange-yellow blotches, shedding annually to reveal fresh bark beneath.

Leaves:

Adult leaves are dark green and glossy above, paler beneath, lance-shaped and typically 100–140 mm long.

Flowers:

Cream-coloured flowers appear primarily from May to December.

Fruit / Seeds:

The tree produces woody, globular brown fruit capsules (about 8–12 mm long).

Habitat and Distribution in South Africa

Eucalyptus diversicolor is invasive in the Western Cape, where it has established outside plantations on forest clearings, fynbos, roadsides and along watercourses.

Mode of Spread

Spreads by wind-dispersed seeds released from mature fruit capsules.

Invasive Status (South Africa)

- **CARA (2002):** Category 2 — permitted in designated plantations with authorisation.
- **NEMBA (National Environmental Management: Biodiversity Act):**
 - **Category 1b** within riparian areas, protected areas, listed ecosystems, and certain sensitive biomes where it must be controlled.
 - Category 1b in many fynbos, grassland, forest, and coastal belt biomes.
 - **Category 2** (permit required) for plantations, woodlots, bee-forage areas, windrows and avenue plantings.
 - Not listed in certain cultivated lands and specific urban contexts (e.g., trees >400 mm diameter at 1 000 mm height in some urban areas), except where in riparian or other sensitive zones.

Ecological & Environmental Impacts

- Acts as an aggressive competitor to indigenous vegetation, often dominating forest gaps and fynbos patches.
- Can alter hydrological regimes by using large volumes of water, potentially reducing stream flow along watercourses where it establishes.
- Dense stands may alter fire behaviour, elevating fire risk due to high oil-rich foliage typical of eucalypts, though *E. diversicolor* itself is killed by severe fire and regenerates only from seed (no lignotuber).

Uses

- **Timber production:** wood is valued commercially.
- **Ornamental:** historically planted for shade, shelter, and landscape purposes.
- **Bee-forage:** flowers provide nectar for honeybees.

Indigenous Alternatives

When removing invasive *Eucalyptus diversicolor* and rehabilitating disturbed sites, consider appropriate indigenous species such as:

- **Forest species** (e.g., *Podocarpus latifolius*, *Ocotea bullata*, *Rapanea melanophloeos*)
- **Fynbos species** for non-forest sites (e.g., *Leucadendron*, *Protea*, *Erica* spp.)

4.1.4 Spanish Reed (*Arundo donax*)



Common name: Spanish reed

Scientific name: *Arundo donax*

Family: Poaceae

Afrikaans names: Spaanse riet

Origin:

Mediterranean region (southern Europe, northern Africa) and western Asia

Description:

A tall, perennial grass that can reach 4–6 m in height, forming dense, bamboo-like stands. Stems are erect, hollow, and rigid, with prominent nodes. Leaves are long, flat, and tapering

(50–100 cm), with rough edges. The species produces feathery flowering plumes (panicles) that are light brown to purplish and appear in late summer. Spanish reed forms extensive clonal colonies through rhizome growth, allowing it to spread vegetatively along rivers, wetlands, and riparian zones.

Habitat and distribution in South Africa:

Primarily occurs in riparian areas, wetlands, and floodplains, particularly in the Western Cape, invades riverbanks, drainage lines, estuaries, and areas subject to periodic flooding.

Mode of spread:

- Vegetative spread via rhizomes (primary mode)
- Water dispersal of stem fragments during floods
- Seed production is generally low, but seeds may also contribute to colonization

Invasive status:

- **CARA (2002):** Category 1b (must be controlled)
- **NEMBA:** Category 1b (invasive species requiring control)

Impacts:

- Forms dense monospecific stands that displace indigenous riparian vegetation, such as *vleitjiesriet* (*Thamnochortus* spp.)
- Alters stream morphology and flow regimes
- Stabilizes banks unnaturally, increasing flood risk upstream and downstream
- Increases fuel loads, creating high fire risk in riparian zones
- Reduces habitat and food availability for native fauna

Uses:

- Occasionally used for fencing, thatching, or erosion control in controlled settings

Indigenous alternatives:

- *Thamnochortus* spp. (*vleitjiesriet*)

- Other indigenous reeds and riparian plants such as *Juncus effusus* or *Schoenoplectus corymbosus*.

4.2 COASTAL INVASIVE PLANT SPECIES

4.2.1 Port Jacksons Willow (*Acacia saligna*) – also found around inland towns such as Albertina/Riversdale and Heidelberg



Common name: Port Jackson

Scientific name: *Acacia saligna* (Fabaceae)

Alternative common names: Port Jackson's willow / Goudwilger (Afrikaans)

Synonyms: *Acacia cyanophylla* (older synonym)

Origin:

Native to south-western Australia.

Description (Morphology)

Growth form:

An evergreen shrub or small tree, typically 3–7 m tall, though it can occasionally reach heights up to 8 m in favourable conditions. The tree often develops a spreading or somewhat weeping habit.

Leaves (Phyllodes):

Instead of true leaves, *A. saligna* has phyllodes (leaf-like flattened stems) that are blue-green turning bright green, usually up to 200 mm long and 10–50 mm wide.

Flowers:

Produces bright yellow, globular flower heads that bloom from August to November in South Africa.

Fruit / Seeds:

The fruit are brown pods with hardened, whitish margins containing numerous hard seeds.

Habitat & Distribution in South Africa

Acacia saligna is invasive in the Western Cape and Eastern Cape, where it has established beyond cultivation, particularly in fynbos, coastal dunes, disturbed areas, roadsides, and watercourses.

Mode of Spread

The species spreads primarily by seed dispersal. Seeds are produced prolifically and can survive for years in the soil seed bank, allowing rapid regeneration after disturbance.

Invasive Status (South Africa)

- **CARA (2002):** Category 2 — permitted in cultivation (e.g., plantations, shelterbelts) with authorisation.
- **NEMBA:** Category 1b — invasive species that must be controlled or removed where declared (outside permitted plantation/shelterbelt contexts).

Impacts

Acacia saligna is a highly invasive alien plant outside its native range. It:

- Competes with and replaces indigenous vegetation through rapid growth and dense canopy formation.
- Alters fire regimes and can affect fuel loads and fire behaviour.
- Reduces water availability in invaded landscapes due to high water use by dense stands.
- Dense stands can limit mobility of animals and alter habitat structure.

Uses:

The species has been used historically for:

- Dune and soil stabilisation (erosion control).
- Shelterbelts and windbreaks.
- Fodder production for livestock in some contexts.

Indigenous Alternatives:

Suitable indigenous alternatives for landscape rehabilitation and ecological restoration include, depending on site conditions:

- **False olive (*Buddleja saligna*)** — a native shrub or small tree suitable for stabilisation and habitat.
- **Weeping Boer-bean (*Peltophorum africanum*)** — a small indigenous tree with ecological value.

4.2.2 Manatoka (*Myoporum insulare* / *M. tenuifolium*)



Common name: Manatoka

Scientific name: *Myoporum insulare* / *Myoporum tenuifolium*

Family: Scrophulariaceae

Afrikaans names: Manatoka, Seekorrel

Origin:

Native to southern Australia, introduced to South African coastal areas as an ornamental and for dune stabilization.

Description:

A small to medium-sized shrub or small tree reaching 2–5 m in height. Leaves are fleshy, lanceolate, and grey-green, often with a slightly succulent texture. Flowers are small, white, and star-shaped, appearing in spring. Fruits are small, fleshy drupes, initially green, turning purple to black when mature. Manatoka forms dense thickets that can outcompete indigenous coastal shrubs and fynbos species.

Habitat and distribution in South Africa:

Occurs predominantly along coastal dunes, dune thickets, and dune-edge habitats in the Western Cape and Eastern Cape. Often invades disturbed areas where it can form dense stands that restrict natural regeneration.

Mode of spread:

- Bird-dispersed seeds (primary mode)
- Vegetative sprouting from roots or cut stems (secondary mode)

Invasive status:

- **CARA (2002):** Category 1b (must be controlled)
- **NEMBA:** Category 1b (invasive species requiring control)

Impacts:

- Competes with indigenous dune thicket and fynbos species
- Forms dense thickets that reduce biodiversity and restrict natural regeneration
- Alters dune dynamics and habitat structure
- Increases fire risk due to dense woody biomass

Uses:

- Ornamental, dune stabilization in coastal gardens (controlled planting only)

Indigenous alternatives:

- Coastal dune shrubs: *Scaevola plumieri*, *Euclea racemosa*, *Carpobrotus edulis* (indigenous alternatives for dune stabilization)

4.2.3 Rooikrans (Acacia Cyclops)



Common name: Red-eye wattle / Rooikrans

Scientific name: *Acacia cyclops* A.Cunn. ex G.Don

Family: Fabaceae

Alternative common names: Coastal wattle, One-eyed wattle

Afrikaans names: Rooikrans, Baaibos, Rooipitjie

Origin:

Native to south-western Australia.

Description (Morphology)

Growth form:

An evergreen shrub or small tree, typically 1.5 – 4 m tall, occasionally reaching up to 8 m in height under favourable conditions. It often forms dense, multi-stemmed stands.

Leaves (Phyllodes):

Rather than true leaves, Rooikrans has phyllodes (flattened leaf-like stems). These are bright green, narrowly oblong, leathery, usually 40 – 90 mm long and 5 – 13 mm wide, with parallel veins and sometimes a small gland near the base.

Flowers:

Bright yellow, globular flower heads appear in clusters, primarily from October to February, but flowering can occur over a broad period.

Fruit / Seeds:

The fruit are brown, flattened, curved or twisted pods (often 40 – 120 mm long), persisting on the plant after seed release. The seeds are dark brown to black and surrounded by a thick, bright red aril (funicle), giving the appearance of a “red eye.”

Habitat & Distribution in South Africa

Rooikrans is a serious invasive species in the Western Cape and Eastern Cape, especially along coastal dunes, fynbos, forest gaps, roadsides and watercourses.

Mode of Spread

The species spreads by seed dispersal. Seeds are produced in large numbers and the conspicuous red arils attract birds and other animals that aid dispersal; wind and water also help spread seeds.

Invasive Status (South Africa)

- **CARA (2002):** Category 2 — permitted in cultivation (e.g., dune stabilisation) with authorisation.
- **NEMBA:** Category 1b — Rooikrans is listed as an invasive alien species that must be controlled or removed where it occurs.

Ecological & Environmental Impacts

Rooikrans has become one of the most widespread and problematic invasive species in the Cape Floristic Region:

- Outcompetes and displaces indigenous vegetation, forming dense thickets that shade out native plants.
- Alters fire behaviour: dense stands can increase fire intensity and the plant regenerates prolifically after fire.
- Consumes significant water resources relative to native vegetation.
- Shades and smothers fynbos and dune ecosystems, reducing biodiversity.

Uses:

- Originally introduced and cultivated for dune stabilisation and soil binding.
- Used locally for firewood due to hard, dense wood.

Indigenous Alternatives

When rehabilitating areas cleared of Rooikrans, consider indigenous species suited to coastal and scrub environments such as:

- Sand olive (*Dodonaea angustifolia*) — a native shrub.
- Other appropriate coastal fynbos species, depending on site conditions.

4.2.4 Standard Operating Procedure for Managing Rooikrans (*Acacia cyclops*) on Municipal Property

Background:

Acacia cyclops (Rooikrans) is the most problematic invasive species on Hessequa municipal land, particularly along coastal dunes and fynbos. As such, herewith a specific 'Standard Operating Procedure' for dealing with this invasive plant.

General Guidelines for Clearing Rooikrans

1. Wood Removal:

- Remove all larger wood where possible and use it as firewood.

- This reduces the remaining fuel load and minimizes fire hazards.

2. Branch Management:

- Lighter branches and foliage should be chipped or brush-packed over cleared areas.
- This technique helps prevent wind and water erosion and provides a natural mulch that protects soil and aids germination of indigenous seeds.

3. Chip Distribution:

- Spread wood chips evenly across the cleared site.
- Avoid piling in one area, as this may smother emerging indigenous plants.

Control Methods:

1. Biological Control

- Release of natural enemies such as insects (e.g., seed-feeding beetles) or pathogens that specifically target *Acacia cyclops*.
- Agents are sourced from the plant's native range (Australia) and monitored for effectiveness.
- Biological control is long-term and should complement manual or mechanical control.

2. Manual Control

- Young plants or seedlings can be removed by hand or with hand tools.
- Ensure roots are removed to prevent regrowth.
- Stack removed plants responsibly to avoid creating new infestations.

3. Mechanical Control

- Mature plants can be felled using axes, pangas, bowsaws, or chainsaws.
- Ring-barking: Remove a 30–40 cm wide strip of bark around the trunk at ground level.
 - This interrupts nutrient transport and gradually kills the tree.

- Suitable for larger specimens where felling is impractical.

Post-Clearing Considerations

- Monitor cleared areas for resprouting seedlings.
- Conduct follow-up removal at least annually for young regrowth.
- Encourage indigenous vegetation to recolonize the site to prevent reinvasion.

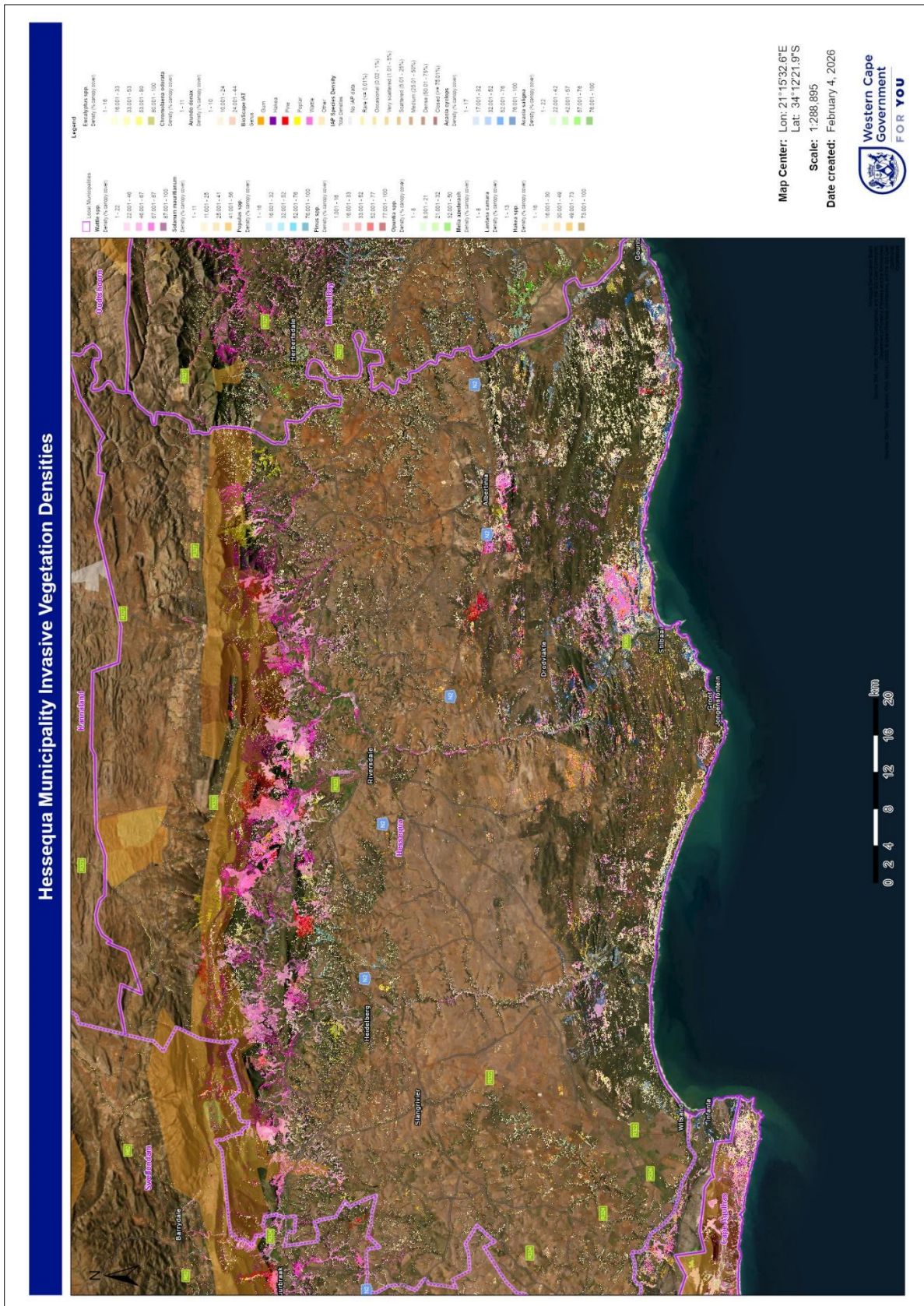
Summary

Effective management of Rooikrans on municipal land requires a combination of methods:

- Biological agents to reduce long-term seed production.
- Manual removal for seedlings and small plants.
- Mechanical or ring-barking methods for mature trees.
- Proper disposal and mulch application to prevent erosion and support native species recovery.



Below is a map of the Hessequa area, depicting invasive vegetation with its densities



6. MUNICIPAL PROPERTIES

A. GOURITSMOND



The municipal property comprises of RE/140 known as the *Gouritsmond Commonage*, is zoned as a protected area. The property is managed by the municipality in collaboration with various local stakeholder groups.

Alien invasive vegetation clearing is undertaken on an annual basis and management activities are therefore aligned with the requirements of the NEM:BA.

The accompanying image illustrates the spatial distribution and density of invasive alien plant species within the study area, with *Acacia cyclops* identified as the dominant invasive species.

Property Details:

	Erf Number	Area	SG Code
1.	RE/140	± 168.97 ha	C06400070000014000000

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±30–37%	±51–63 ha	seedlings, saplings and ±10-year-old trees

Field-ready Work Plan

1. Objectives

- Remove all *Acacia cyclops* individuals across the site.
- Reduce the soil seed bank through structured follow-up operations.
- Prevent reinfestation from boundary and satellite populations.
- Enable recovery of indigenous vegetation.

2. Planning and site preparation

a. Delineation and mapping

Property will be divided into management blocks:

- low density blocks (mostly seedlings and scattered plants),
- medium density blocks (scattered mature trees and saplings),
- high density blocks (near-continuous stands).

Identify and map:

- access routes,
- steep slopes and erosion-prone areas,
- wetlands and drainage lines,
- stacking / brush-packing areas.

b. Prioritisation sequence

Control must follow the invasion-front principle:

1. Outlying and low-density areas
 2. Medium-density blocks
 3. High-density core infestations
- This reduces rapid re-invasion of cleared areas.

3. Control methods by size class

a. Seedlings (≤ 0.5 m)

Method

- Hand-pulling in soft soils.
- Hoe or grubber removal where roots are firm.

Key requirement

- Entire root system must be removed.
- Lightly firm disturbed soil to prevent erosion.

b. Saplings (± 0.5 – 2 m)

Method

- Cut at ground level.
- Apply herbicide to the cut stump immediately after cutting.

c. Trees (± 2 –10 years)

Method – cut-stump treatment

- Cut as low as possible (within ± 5 –10 cm of ground level).
- Apply registered herbicide to the outer cambium ring.
- Ensure full coverage around the stump circumference.
- This prevents coppicing and re-sprouting.

d. High-density stands

Method

- Progressive block clearing.
- Clear in strips or small blocks on steep or sandy soils to avoid erosion and excessive exposure.

4. Biomass handling

- Stack cleared material in brush-packs away from drainage lines and sensitive areas.
- Do not move seed-bearing branches unnecessarily.
- Do not stockpile on indigenous vegetation.
- Burning may only be used where legally permitted and in accordance with local fire regulations.

5. Seed bank and follow-up strategy (critical)

Acacia cyclops has a long-lived soil seed bank.

Minimum follow-up programme:

Year	Action
1	Initial clearing
2	Follow-up 1 – full property sweep
3	Follow-up 2 – full property sweep
4	Follow-up 3 – full property sweep
5	Audit follow-up

Note: Failure to implement follow-ups will result in rapid reinfestation.

6. Operational implementation

Phase 1 – Initial clearing (Months 2–8)

- Clear all infested areas (± 51 –63 ha).
- Begin with low-density and boundary zones.
- Progress into medium- and high-density blocks.

Record per block:

- area treated,
- method used,
- herbicide quantities,
- team days.

Phase 2 – First follow-up (Months 9–12)

- Walk the entire 168.97 ha.
- Remove:
 - all seedlings,

- coppice re-growth,
- missed plants.

Phase 3 – Second follow-up (Year 2)

- Repeat full-property sweep.
- Expect high seedling emergence after rainfall.

Phase 4 – Third follow-up (Year 3)

- Mop-up operation targeting remaining individuals and edge re-invasion.

7. Rehabilitation and recovery

- Allow natural regeneration where intact indigenous vegetation is present.
- In heavily transformed blocks:
 - stabilise soil using brush-packing,
 - re-introduce locally indigenous species, if required.
- Prevent excessive disturbance during clearing.

8. Monitoring and reporting

For each block:

- date of clearing,
- follow-up dates,
- percentage regrowth observed,
- corrective actions taken.

Note: Key risks specific to this site

- A. High seed production and persistent seed bank.
- B. Rapid reinvasion from surrounding properties if boundaries are not prioritised.

Long-term success will depend far more on consistent follow-up operations than on the initial clearing phase.

Below is Doordrift (Erf 459) which also forms part of the Gouritsmond Section



The subject property comprises an area of approximately 240.63 ha and is characterised by a combination of moderately undulating terrain and extensive steep-sided slopes. Approximately 50% of the property is steep and largely inaccessible to vehicles, requiring access on foot for operational and maintenance activities. These areas present logistical and safety challenges for field operations and will require carefully planned manual clearing methods.

Erf 459 is of high strategic and environmental importance, as the primary water supply infrastructure of Gouritsmond, including a main storage dam and associated natural fountains (springs), is located within the property boundaries. The site therefore forms part of a critical

catchment and source area, and land management activities must prioritise the protection of water quality, slope stability and surrounding natural vegetation.

The property supports varying densities of invasive vegetation, with infestations occurring across both accessible areas and steep, sensitive slopes. The presence of steep terrain, drainage lines, fountains and the main dam requires that all management activities be implemented in a manner that minimises soil disturbance, erosion risk and potential impacts on surface and groundwater resources.

Property Details:

	Farm Number	Area	SG Code
1.	459	± 240.63ha	C06400000000045900000

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±24–50%	±57.8 – 120.3 ha	seedlings, saplings and ±10-year-old trees

1. Objectives

- Eradicate all *Acacia cyclops* individuals on the property.
- Reduce the soil seed bank through structured and repeated follow-up operations.
- Prevent reinvasion from boundary and satellite infestations.
- Promote recovery of indigenous vegetation and ecosystem function.

2. Planning and site preparation

a. Delineation and mapping

Divide the property into operational blocks according to density:

- Low density blocks (±24–30%) – scattered individuals and seedlings.

- Medium density blocks ($\pm 30\text{--}40\%$) – mixed saplings and mature trees.
- High density blocks ($\pm 40\text{--}50\%$) – near-continuous stands.

Map and record:

- access routes,
- steep or erosion-prone slopes,
- drainage lines and wetlands,
- sensitive habitats,
- biomass stacking and brush-packing areas.

Note: The same sequence of events will apply as per RE/140

Albertina - Municipal Properties

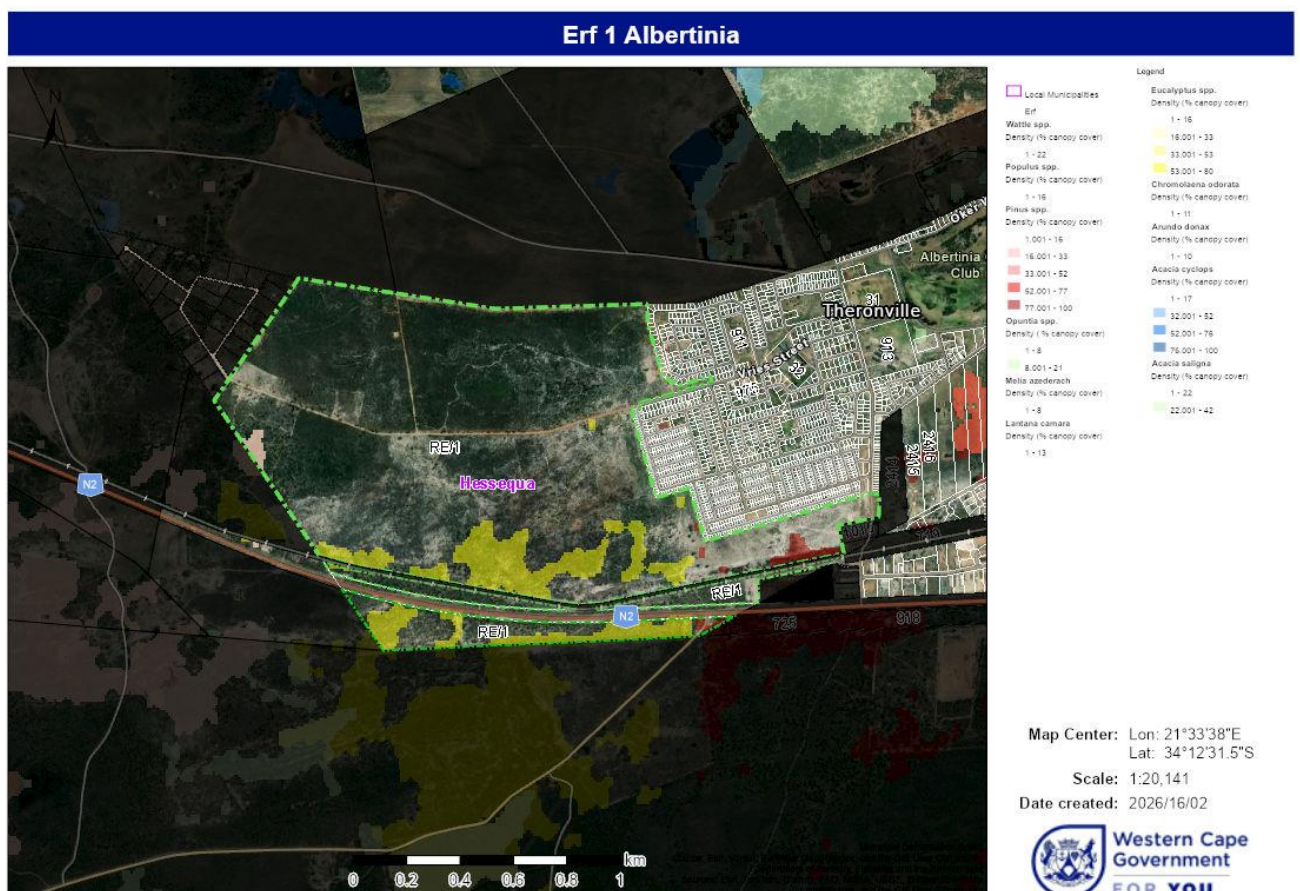


The satellite image above depicts the largest municipal properties in Albertinia, which are extensively invaded by a range of alien invasive plant species, including blue gums (*Eucalyptus* spp.), Port Jackson (*Acacia saligna*) and pine trees (*Pinus* spp.).

These properties require clearing in an ecologically responsible and sustainable manner, particularly as Port Jackson seed banks are known to regenerate rapidly in areas that have already been cleared, and blue gum stumps typically resprout shortly after felling if not treated appropriately.

Effective follow-up control and monitoring are therefore essential to prevent re-infestation and to ensure the long-term success of alien vegetation management on these sites.

The Erf on the left-hand side (Erf1) which also stretches over the N2, shows clusters of pines all over the property with Port Jackson mainly located along the boundary fence adjacent to the N2. Erf 2 and Re/600 are mostly covered by Blue Gums and Port Jackson.



	Farm Number	Area	SG Code
1.	RE/1	± 171,52232ha	C06400010000000100000

Invasive Vegetation Detail: *Acacia Saligna*

	Infestation density	Estimated infested area	Size classes
1.	±40–60%	± 68.6 ha - 102.9 ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±12–20%	±20.6 ha - 34.3 ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Pinus spp.*

	Infestation density	Estimated infested area	Size classes
1.	±6–15%	± 10.3 ha to 25.7 ha	seedlings, saplings and ±15-year-old trees

Conservation and vegetation context

This property falls within a highly sensitive Fynbos dune sandplain system with:

- Low natural resilience to soil disturbance
- High vulnerability to secondary invasion after clearing
- High conservation importance of intact restioid and ericoid shrub layers

All clearing must therefore be staged and selective, not blanket.

Field-ready Work Plan

1. Objectives

- Remove all invasive vegetation across the site.
- Reduce the soil seed bank through structured follow-up operations.
- Prevent reinfestation from boundary and satellite populations.
- Enable recovery of indigenous vegetation.

2. Zonation and operational planning

Before clearing begins:

- Sub-divide the 171.52 ha property into operational blocks (10–20 ha per block).
- Within each block map:
 - Dense *Acacia saligna* stands
 - Mixed *A. cyclops* and *Pinus* infestations
 - Low-density satellite plants
- Mark:
 - Sensitive dune ridges
 - Natural drainage lines
 - Well-intact Fynbos patches

3. Control methods per species

a. *Pinus* spp. (±6–15%)

Seedlings and small saplings (<1.5 m)

Method

- Manual hand-pulling or levering

Procedure

- Remove entire root system.
- Shake soil back into hole.
- Place plants upside down.

Larger saplings and trees

Method

- Cut-stump or drill-and-fill

Procedure

- Cut as low as possible to ground.
- Apply registered herbicide immediately to the cambium ring.
- In rocky or unstable dune areas use drill-and-fill to avoid uprooting.

b. *Acacia cyclops* (±12–20%)

Small plants

Method

- Hand-pull or cut-and-treat

Medium and large plants

Method

- Cut-stump

Procedure

- Cut stem close to ground.
- Apply herbicide to the full stump surface immediately.
- Avoid dragging material through intact Fynbos.

c. *Acacia saligna* ($\pm 40\text{--}60\%$)

This is the dominant invader and must be treated in phases.

Medium and large plants

Method

- Cut-stump (primary method)

Procedure

- Clear in strips or patches (not entire block at once).
- Leave natural vegetation buffers between cleared patches.
- Apply herbicide immediately after cutting.

Dense stands

Method

- Progressive staged clearing

Procedure

- Clear no more than 30–40% of a dense stand within one season.
- Retain scattered indigenous shrubs where possible to maintain shade and soil cover.
- Follow with follow-up seedling control before opening new patches.

4. Biomass and slash management (sandplain specific)

- Do not burn slash unless absolutely required.
- Stack cut material:
 - Along contours
 - Away from drainage lines
- Use slash to:
 - Reduce wind erosion

- Suppress secondary weeds
- Do not stockpile *Pinus* material with cones in untreated areas.

5. Environmental protection measures

Because this is Dune Sandplain Fynbos:

- No heavy machinery is allowed outside of existing tracks.
- All access are restricted to existing roads and tracks.
- Avoid clearing during:
 - High wind events
 - Very dry summer conditions on exposed sands
- Maintain a minimum buffer of intact vegetation around natural drainage features.

6. Follow-up and maintenance clearing

Follow-up is critical due to the persistent soil seedbank of both *Acacia* species.

Minimum follow-up schedule

Time after initial clearing	Action
8–12 weeks	Search and treat new seedlings
6 months	Full block inspection
12 months	Full follow-up
Annually (minimum 5 years)	Maintenance clearing

7. Rehabilitation and recovery support

After clearing of each operational block:

- Assess:
 - Bare soil exposure
 - Natural Fynbos recruitment

- Where necessary:
 - Retain slash cover
 - Lightly brush-pack cleared areas
- No soil ripping or reshaping is permitted.

8. Monitoring and Reporting

Record the following for each block:

- % canopy cover of invaders remaining
- Seedling density per species
- Evidence of Fynbos recruitment
- Areas of erosion or weed secondary invasion

Note: Hygiene and spread prevention

1. Clean all tools and footwear before moving between blocks.
2. Do not move slash from infested to cleared areas.
3. Avoid clearing *Pinus* and *Acacia* during peak seed drop where operationally possible.

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±20–40 %	±16.96 – 33.92ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Pinus spp.*

	Infestation density	Estimated infested area	Size classes
1.	±32–46 %	± 27.14 – 39.01ha	seedlings, saplings and ±15-year-old trees

Invasive Vegetation Detail: *Acacia Saligna*

	Infestation density	Estimated infested area	Size classes
1.	±30–48 %	±25.44 – 40.70 ha	seedlings, saplings and ±15-year-old trees

Conservation and vegetation context

This vegetation type is characterised by:

- A patchy mosaic of thicket clumps, fynbos elements and renosterveld components
- Moderate to high sensitivity to canopy loss and soil exposure
- High risk of secondary invasion after clearing

All operations must therefore be selective, phased and spatially planned.

Field-ready Work Plan

1. Objective

To reduce and progressively eliminate invasive alien trees from a highly sensitive thicket–fynbos–renosterveld mosaic, while maintaining thicket structure, preventing erosion and supporting indigenous recovery.

2. Zonation and operational planning

Subdivide the 84.8 ha property into operational blocks of 5–10 ha.

A. Within each block, map:

- Dense pine stands
- Dense Acacia stands
- Black wattle patches (especially along drainage lines and moist sites)
- Intact thicket and indigenous shrub patches

B. Identify:

- Drainage lines and seep zones
- Areas with steep or erosion-prone soils

3. Clearing priority sequence

The following priority must be applied across all blocks:

- Isolated and outlying Pinus individuals
- Cone-bearing Pinus trees
- Outlying black wattle plants (high seed production and resprouting risk)
- Outlying Acacia cyclops and Acacia saligna
- Progressive reduction of dense mixed stands

4. Control methods by species

a. Pinus spp. (±32–46%)

Seedlings and small saplings

Method

- Manual pulling or levering

Procedure

- Remove entire root system.
- Replace disturbed soil and firm lightly.

Larger saplings and mature trees

Method

- Cut-stump or drill-and-fill

Procedure

- Cut stem as close to ground level as possible.
- Apply registered herbicide immediately to the cambium.
- In rocky or sensitive thicket edges, use drill-and-fill to reduce disturbance.

b. Acacia cyclops (±20–40%)

Small plants

Method

- Hand-pull or cut-and-treat

Medium and large plants

Method

- Cut-stump

Procedure

- Cut close to ground level.
- Apply herbicide immediately over the full stump surface.

c. Acacia saligna ($\pm 30\text{--}48\%$)

This species forms extensive dense stands and must be cleared in phases.

Method

- Cut-stump (primary)

Procedure

- Clear in strips or patches.
- Retain indigenous shrubs where possible.
- Do not clear entire dense stands in one operation.

d. Black wattle – Acacia mearnsii ($\pm 15\text{--}32\%$)

This species poses the highest risk of vigorous resprouting and long-term seedbank persistence.

Method

- Cut-stump or frill-and-fill

Procedure

- Cut stem close to ground.
- Apply herbicide immediately to the cambium.
- In multi-stem plants, treat every stem.
- Where cutting is unsafe or unstable, use frill-and-fill around the full circumference.

5. Biomass and slash management

- Do not burn unless specifically authorised.
- Stack slash:
 - Along contours
 - On previously invaded ground

- Use slash to:
 - Reduce erosion
 - Suppress secondary weeds
- Do not stack slash inside intact thicket patches.

6. Environmental protection measures

- No machinery off existing tracks.
- No uprooting of large stumps in thicket or on slopes.
- Maintain a buffer of intact vegetation along:
 - Drainage lines
 - Moist seep zones
- Avoid clearing during:
 - Very wet soil conditions
 - Strong wind events (seed dispersal risk for Pine and Acacia)

7. Rehabilitation and recovery support

After clearing of each block:

- Inspect for:
 - Bare soil exposure
 - Loss of shade and shelter
- Apply brush-packing using slash in exposed areas.
- Do not disturb existing indigenous seedling recruitment.
- Active re-seeding or planting is only required if:
 - No indigenous recruitment is observed after two winter seasons.

8. Follow-up and maintenance clearing

Due to very high seedbank and resprouting potential:

Timing	Action
6–10 weeks after initial clearing	Remove new seedlings and resprouts
6 months	Full block follow-up
12 months	Full follow-up
Annually for minimum 5–7 years	Maintenance follow-up

*Black wattle and Acacia species must be followed up more frequently than pines.

9. Monitoring and Reporting

- Remaining invasive canopy cover per block
- Density of new seedlings per species
- Presence of resprouting (especially black wattle)
- Indigenous recruitment and ground cover recovery
- Signs of erosion or soil exposure
- Secondary invasive species establishment

10. Key operational notes for these properties

- The combined infestation levels mean that rapid large-scale clearing would severely destabilise this mosaic system.
- Black wattle and Acacia saligna represent the main long-term maintenance risk due to their seedbanks and resprouting.
- Pinus spp., although not resprouting, represent the highest landscape-scale spread risk and must be eliminated early and consistently.
- Long-term success depends on strict follow-up for at least 5–7 years, not on initial clearing intensity.

Note: Clearing intensity limits (site-specific rule)

Within any operational block and within one season:

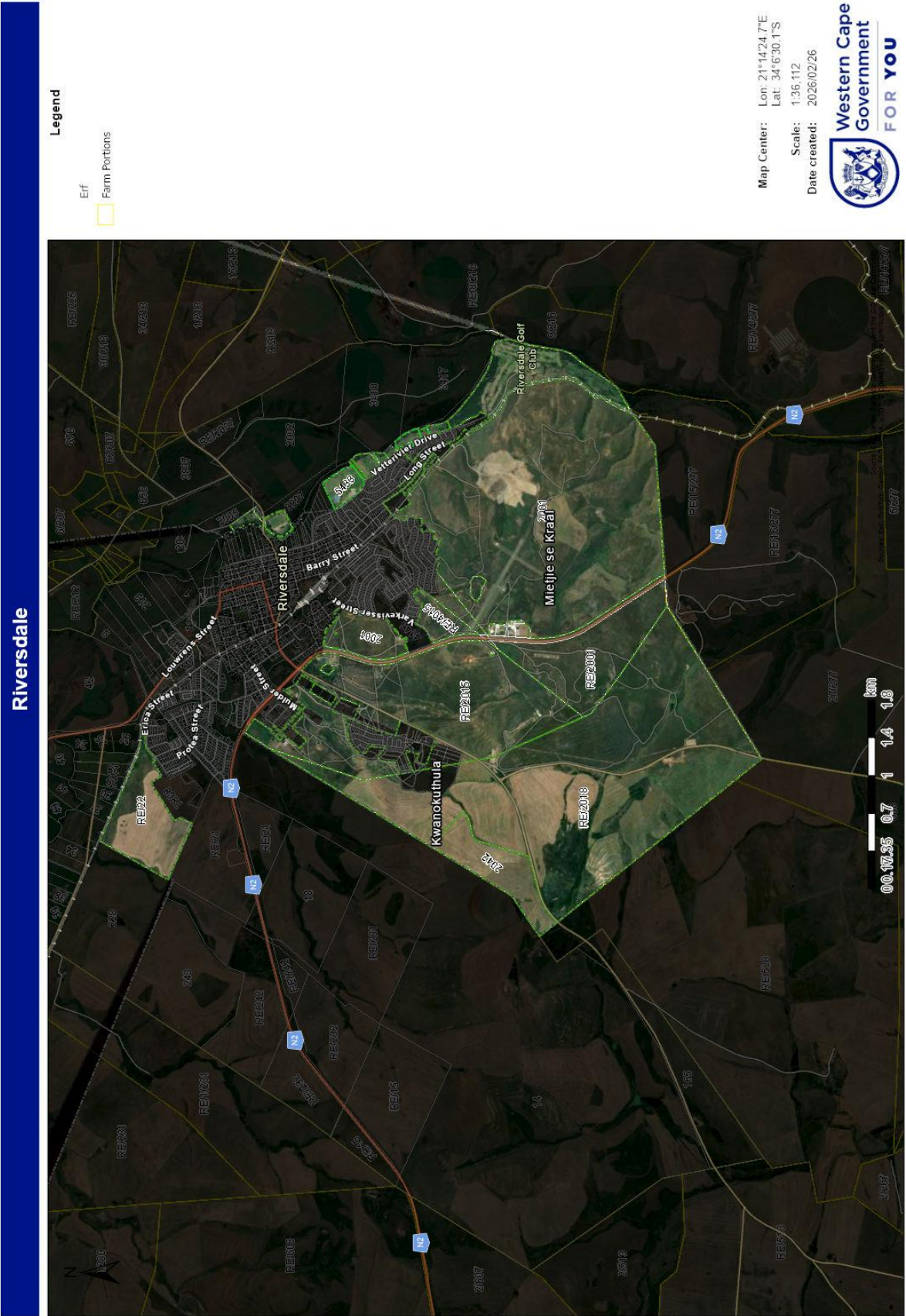
- Do not remove more than 40–50% of total woody canopy cover where thicket elements occur.
- Always retain:
 - Thicket clumps
 - Indigenous shrubs and trees
 - Natural shelter belts

This is critical for microclimate protection and recovery of renosterveld and fynbos species.

Hygiene and spread prevention

1. Clean footwear, tools and vehicles between blocks.
 2. Remove soil and plant material from equipment.
 3. Avoid moving through dense infestations after cutting when seeds and pods are present.
-

C. RIVERSDALE



The properties Re/2001, Erf 2001, Erf 2004, Erf 3928, Erf 22, Erf 5488, Re/4015, Re/2018 and Erf 2042 are of high conservation and restoration priority as they:

- contain remaining fragments of a critically threatened renosterveld vegetation type,
- support a rare and sensitive thicket–fynbos–renosterveld mosaic,
- include an ecologically important river and floodplain corridor linked to the Goukou River.

These properties collectively protect a high-value ecological mosaic consisting of:

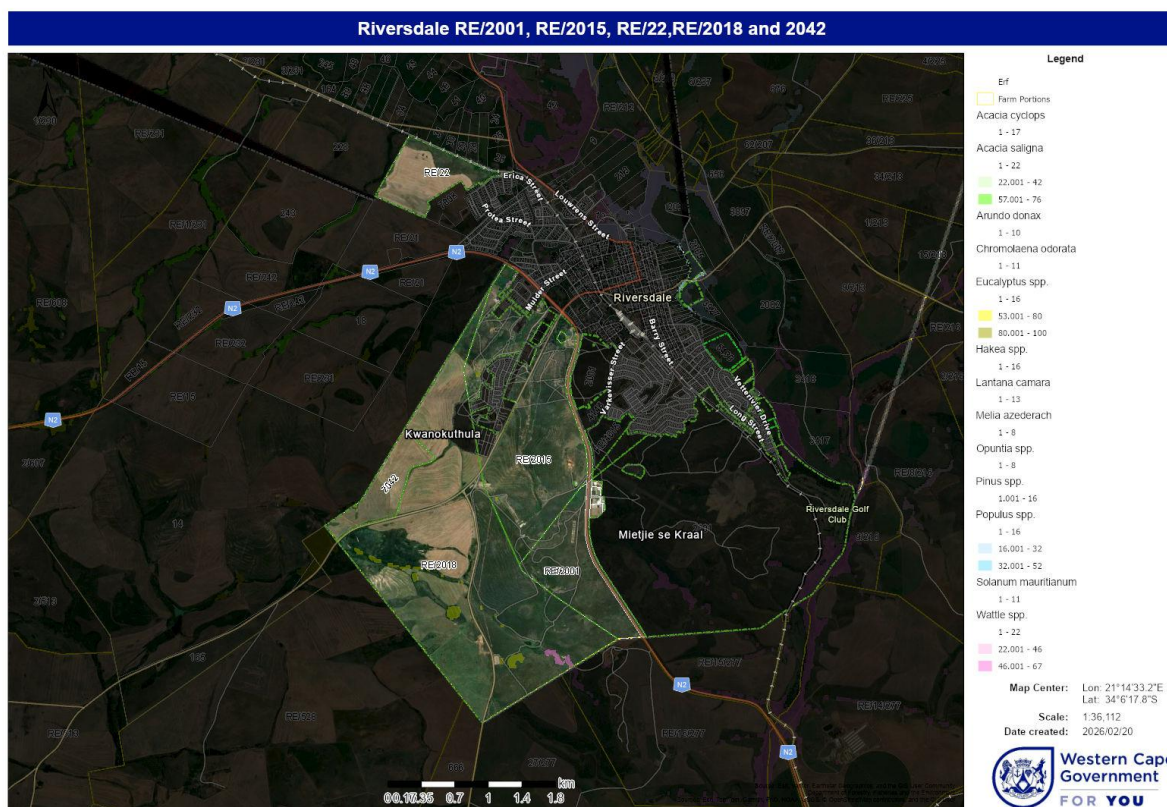
- Eastern Ruens Shale Renosterveld, one of the most threatened vegetation types in South Africa, with very limited remaining natural fragments.
- A mesic thicket–fynbos–renosterveld transition, which supports high plant species turnover over short distances, multiple vegetation structures (open shrubland, closed thicket and fynbos elements), important refugia for fauna and indigenous plant regeneration.
- A functional riparian and floodplain system along the Goukou River, which provides key habitat connectivity across the landscape, supports moisture-dependent plant communities not found in surrounding uplands, plays a critical role in sediment retention, bank stability and water quality.

Together, the terrestrial mosaic and the river corridor form an important biodiversity and ecological connectivity node within the wider Breede–Goukou landscape.

For these reasons, invasive alien plant management on these properties must be:

- carefully phased and selective,
- designed to retain indigenous canopy and ground cover,
- supported by long-term, systematic follow-up clearing to ensure sustainable ecological recovery.

Note: In-order to facilitate a more focused approach the municipal land surrounding the residential areas of Riversdale have been divided into two sections.



Property Details:

	Farm Number	Area	SG Code
1.	Re/2018	± 426.4 ha	C06400030000201800000
2.	Re/2001	± 74.4 ha	C06400030000200100000
3.	Re/22	± 51.1 ha	C06400040000002200000
4.	Erf 2042	± 39.9 ha	C06400030000204200000
5.	Re/2015	± 215.5 ha	C06400030000201500000
	Total	± 808.2 ha	

Note: The various invasive vegetation species are scattered over the 5 properties and percentages overlap spatially, however there are dense patches in certain areas, especially close to water sources.

Invasive Vegetation Detail: *Wattle spp.*

	Infestation density	Estimated infested area	Size classes
1.	± 49 - 62%	± 396.0 – 501.1 ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±17–26%	± 137.4 – 210.1 ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Eucalyptus spp*

	Infestation density	Estimated infested area	Size classes
1.	±32–46 %	± 258.6 – 371.8 ha	seedlings, saplings and ±20-year-old trees

Invasive Vegetation Detail: *Acacia Saligna*

	Infestation density	Estimated infested area	Size classes
1.	±12–21 %	± 242.5 – 387.9 ha	seedlings, saplings and ±15-year-old trees

1. Objective

To progressively reduce and control dense invasive alien tree infestations across a large, ecologically sensitive thicket–fynbos–renosterveld mosaic, while maintaining indigenous canopy structure, preventing erosion, and enabling long-term ecological recovery.

2. Zonation and operational planning

- Subdivide the 808.2 ha property into management blocks of 20–40 ha.
- Within each block, map:
 - dense black wattle stands,
 - Eucalyptus compartments or lines,
 - *Acacia saligna* and *Acacia cyclops* patches,
 - intact thicket and indigenous shrub refuges,
 - drainage lines and moist zones.

3. Clearing priority sequence

Clearing must follow this order across all of the properties:

- Outlying and satellite plants of all species.
- Black wattle infestations in drainage lines and mesic areas.
- Eucalyptus stands that threaten intact thicket or renosterveld remnants.
- Outlying *Acacia cyclops* and *Acacia saligna*.
- Progressive reduction of dense mixed stands.

4. Control methods by species

a. Eucalyptus spp. (±258.6–371.8 ha)

Method

- Cut-stump or frill-and-fill

Procedure

- Cut stems as low as safely possible.
- Apply registered herbicide immediately to the full cambium ring.
- For large stems or where felling is unsafe, use frill-and-fill around the full circumference.

- Treat all coppice regrowth during follow-up.

b. Acacia cyclops (±137.4–210.1 ha)

Method

Procedure

- Cut close to ground.
- Apply herbicide immediately to the entire stump surface.
- Avoid dragging material through intact vegetation.

c. Acacia saligna (±242.5–387.9 ha)

This species forms dense stands and must be cleared in phases.

Method

- Cut-stump

Procedure

- Clear in strips or small patches.
- Retain indigenous shrubs and thicket edge plants where possible.
- Apply herbicide immediately after cutting.

d. Black wattle – *Acacia mearnsii* (±396.0–501.1 ha)

This is the dominant and highest-risk species on this property.

Method

- Cut-stump or frill-and-fill

Procedure

- Cut stems close to ground.
- Apply herbicide immediately to the cambium.
- Treat every stem of multi-stem plants.

- In unstable or steep areas, use frill-and-fill instead of felling.

5. Biomass and slash management

- Do not burn unless authorised and ecologically justified.
- Stack slash:
 - along contours,
 - on already invaded ground.
- Use slash for:
 - erosion control,
 - brush-packing of exposed soils.
- Do not stack slash inside intact indigenous thicket patches.

6. Environmental protection measures

- No heavy machinery outside existing tracks.
- No uprooting of stumps in thicket or on erosion-prone soils.
- Maintain buffers of intact vegetation along:
 - drainage lines,
 - seep zones and moist depressions.
- Avoid clearing during:
 - very wet soil conditions,
 - strong winds.

7. Follow-up and maintenance clearing

Due to extremely high seedbanks and strong resprouting:

Timing	Action
6–10 weeks after initial clearing	Remove seedlings and all coppice/resprouts
6 months	Full block follow-up

12 months	Full follow-up
Annually for at least 7–10 years	Maintenance follow-up

Black wattle and *Acacia saligna* blocks must be prioritised in every follow-up cycle.

8. Rehabilitation and recovery support

After clearing each block:

- Inspect for:
 - exposed soil,
 - loss of shelter and shade.
- Brush-pack exposed areas using on-site slash.
- Do not disturb indigenous seedlings or natural recruitment.
- Active reseeding or planting is only required if:
 - no indigenous recovery is visible after two rainy seasons.

9. Monitoring

- Remaining invasive canopy cover per block
- Density of seedlings per species
- Presence of coppicing and resprouting
- Indigenous regeneration and ground cover recovery
- Erosion or soil exposure
- Secondary invasive species establishment

10. Key operational notes for these properties

- Black wattle is the primary long-term threat due to extreme infestation extent, resprouting and persistent seedbanks.
- Eucalyptus stands pose a high hydrological and shading impact and must be progressively reduced near intact vegetation.

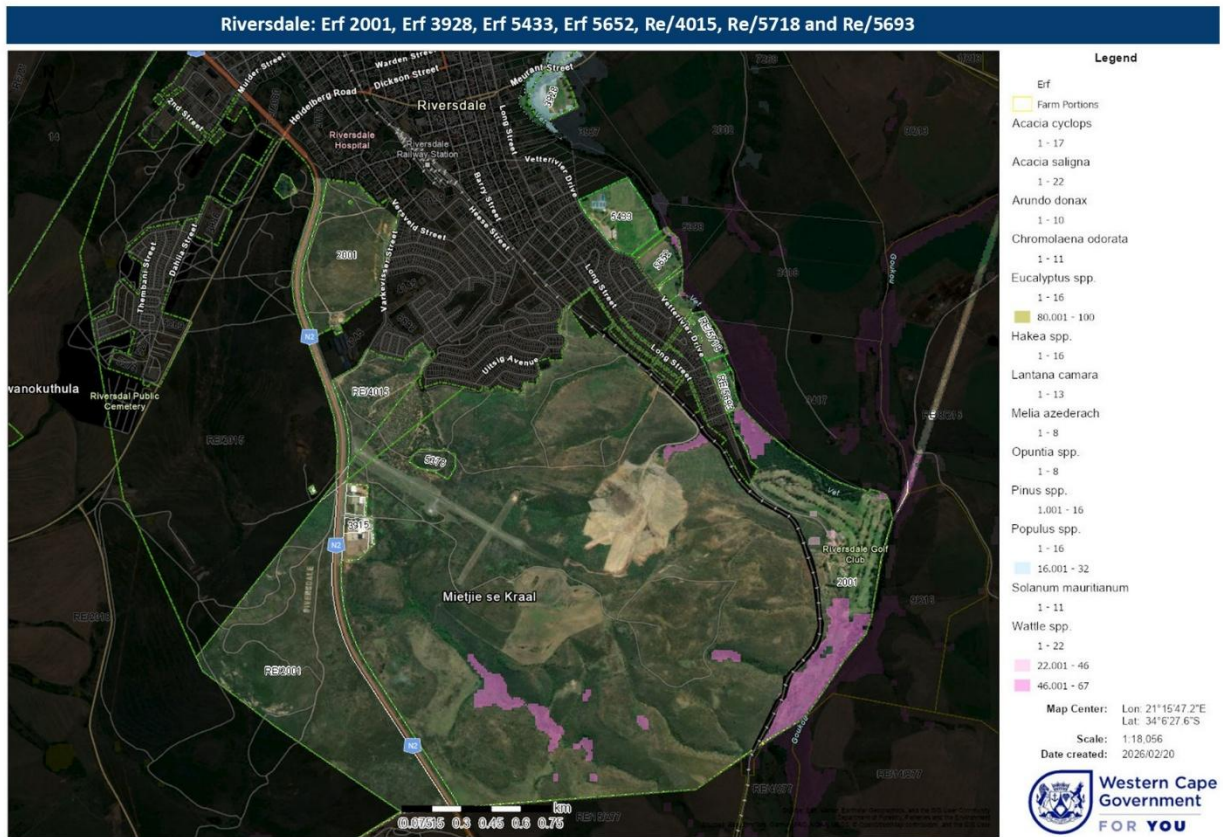
- *Acacia saligna* and *Acacia cyclops* drive rapid reinvasion following disturbance and must be tightly integrated into follow-up planning.
- Because of the size of the property and severity of invasion, success depends on:
 - phased clearing,
 - spatial prioritisation,
 - and long-term, well-funded follow-up programmes, rather than rapid large-scale initial clearing.

Note: Site-specific clearing intensity limits.

Within any block and within one operational season the following need to be adhered to:

- Do not remove more than 40–50% of woody canopy cover in areas where indigenous thicket occurs.
- Always retain:
 - intact thicket clumps,
 - indigenous trees and tall shrubs,
 - natural shelter belts along drainage lines.

This prevents collapse of the thicket–fynbos–renosterveld mosaic.



	Farm Number	Area	SG Code
1.	Erf 2001	± 476.5ha	C06400030000200100000
2.	Re/2001	± 25.4 ha	C06400030000200100000
3.	Erf 5433	± 8.9 ha	C06400030000543300000
4.	Erf 5652	± 3.7 ha	C06400030000565200000
5.	Erf 3928	± 4.2 ha	C06400030000392800000
6.	Re/4015	± 13.1 ha	C06400030000401500000
7.	Re/5693	± 1.6 ha	C06400030000569300000
	Total	533.4 ha	

Note: The various invasive vegetation species are scattered over the 7 properties and percentages overlap spatially, however there are dense patches in certain areas, especially close to water sources.

Invasive Vegetation Detail: *Wattle spp.*

	Infestation density	Estimated infested area	Size classes
1.	± 35 - 42%	± 186.69 – 224.03 ha	seedlings, saplings and ±15-year-old trees

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±09 - 19%	± 48.01 – 101.35 ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Eucalyptus spp*

	Infestation density	Estimated infested area	Size classes
1.	±30 - 45%	± 160.02 – 240.03 ha	seedlings, saplings and ±20-year-old trees

Invasive Vegetation Detail: *Acacia Saligna*

	Infestation density	Estimated infested area	Size classes
1.	±12–21 %	± 64.01 – 112.01 ha	seedlings, saplings and ±10-year-old trees

1. Objective

To remove and control invasive alien trees within a legally and ecologically sensitive Critical Biodiversity Areas (CBA), while maintaining wetland and riparian function, protecting renosterveld remnants on higher ground, and ensuring long-term ecological recovery through structured follow-up.

2. Zonation and operational planning

Before operations:

- Delineate three management zones:
 - Zone A – river and active channel
 - Zone B – riparian buffer (minimum 30 m where feasible)
 - Zone C – higher-lying renosterveld
- Subdivide the 533.4 ha into operational blocks of 10–20 ha.
- Map:
 - dense black wattle and *Acacia saligna* stands in wet and mesic areas,
 - Eucalyptus stands along the channel and terraces,
 - intact indigenous vegetation patches.

3. Clearing priority sequence (CBA-specific)

- Outlying and satellite plants of all invasive species.
- Black wattle and *Acacia saligna* directly adjacent to river and riparian buffers.
- Eucalyptus trees shading channels and floodplain zones.
- Outlying *Acacia cyclops* in upland renosterveld.
- Progressive reduction of dense mixed stands.

4. Control methods by species

a. *Eucalyptus spp.* (±160.02–240.03 ha)

Method

- Cut-stump or frill-and-fill.

Procedure

- Fell only where safe and where access causes minimal disturbance.
- Apply registered herbicide immediately to the cambium.
- In wet or unstable soils, use frill-and-fill instead of felling.

b. *Acacia cyclops* (±48.01–101.35 ha)

Method

- Hand-pull seedlings.
- Cut-stump for saplings and mature plants.

Procedure

- Cut as low as possible.
- Apply herbicide immediately to the full stump surface.

c. *Acacia saligna* (±64.01–112.01 ha)

Method

- Cut-stump.

Procedure

- Clear in small patches or strips.
- Retain indigenous shrubs and ground cover.
- Apply herbicide immediately after cutting.

d. Black wattle – *Acacia mearnsii* (±186.69–224.03 ha)

Method

- Cut-stump or frill-and-fill.

Procedure

- Treat every stem of multi-stem plants.
- Apply herbicide immediately after cutting.
- In wetland soils and seep zones, prefer frill-and-fill to reduce disturbance.

5. Biomass and slash management

- Do not burn within wetland or riparian zones.
- Stack slash:
 - on previously invaded ground,
 - outside the active floodplain.
- Use slash for brush-packing to:
 - stabilise exposed soils,
 - protect regenerating indigenous vegetation.

6. Environmental protection measures

- No heavy machinery outside existing tracks.
- No uprooting of stumps in thicket or on erosion-prone soils.
- Maintain buffers of intact vegetation along:
 - drainage lines,
 - seep zones and moist depressions.
- Avoid clearing during:
 - very wet soil conditions,
 - strong winds.

7. Follow-up and maintenance clearing

Due to extremely high seedbanks and resprouting:

Timing	Action
6–8 weeks after initial clearing	Remove new seedlings and all resprouts
6 months	Full block follow-up
12 months	Full follow-up
Annually for at least 7–10 years	Maintenance follow-up

Note: Wetland and riparian zones must be inspected at every follow-up cycle.

8. Rehabilitation and recovery

- Inspect cleared areas for:
 - bare soil,
 - bank instability,
 - loss of shade and shelter.
- Apply brush-packing where required.
- Do not disturb indigenous seedlings or natural regeneration.
- Active planting is only undertaken where natural recovery fails after two wet seasons.

9. Monitoring

- Remaining invasive canopy cover per block
- Density of seedlings per species
- Resprouting and coppicing (especially black wattle)
- Indigenous vegetation recovery and ground cover
- Bank erosion or sediment movement
- Secondary invasive plant establishment

10. Key operational notes for this CBA

- Black wattle and *Acacia saligna* represent the highest long-term ecological risk due to dense infestations, strong resprouting and persistent seedbanks, particularly in wet areas.
- Eucalyptus poses a major hydrological and shading impact within the riparian system and floodplain.
- The Eastern Ruens Shale Renosterveld on higher ground is highly threatened and must be protected from excessive disturbance.
- Successful restoration of this property depends on:
 - low-impact, phased clearing,
 - strict protection of wetland soils and banks, and
 - long-term, well-resourced follow-up clearing in line with CBA objectives.

Note: Hygiene and spread prevention

- Clean tools, footwear and equipment between blocks.
- Remove soil and plant material before leaving wetland areas.
- Do not move slash or soil from invaded to cleared areas.

11. Riparian protection rules

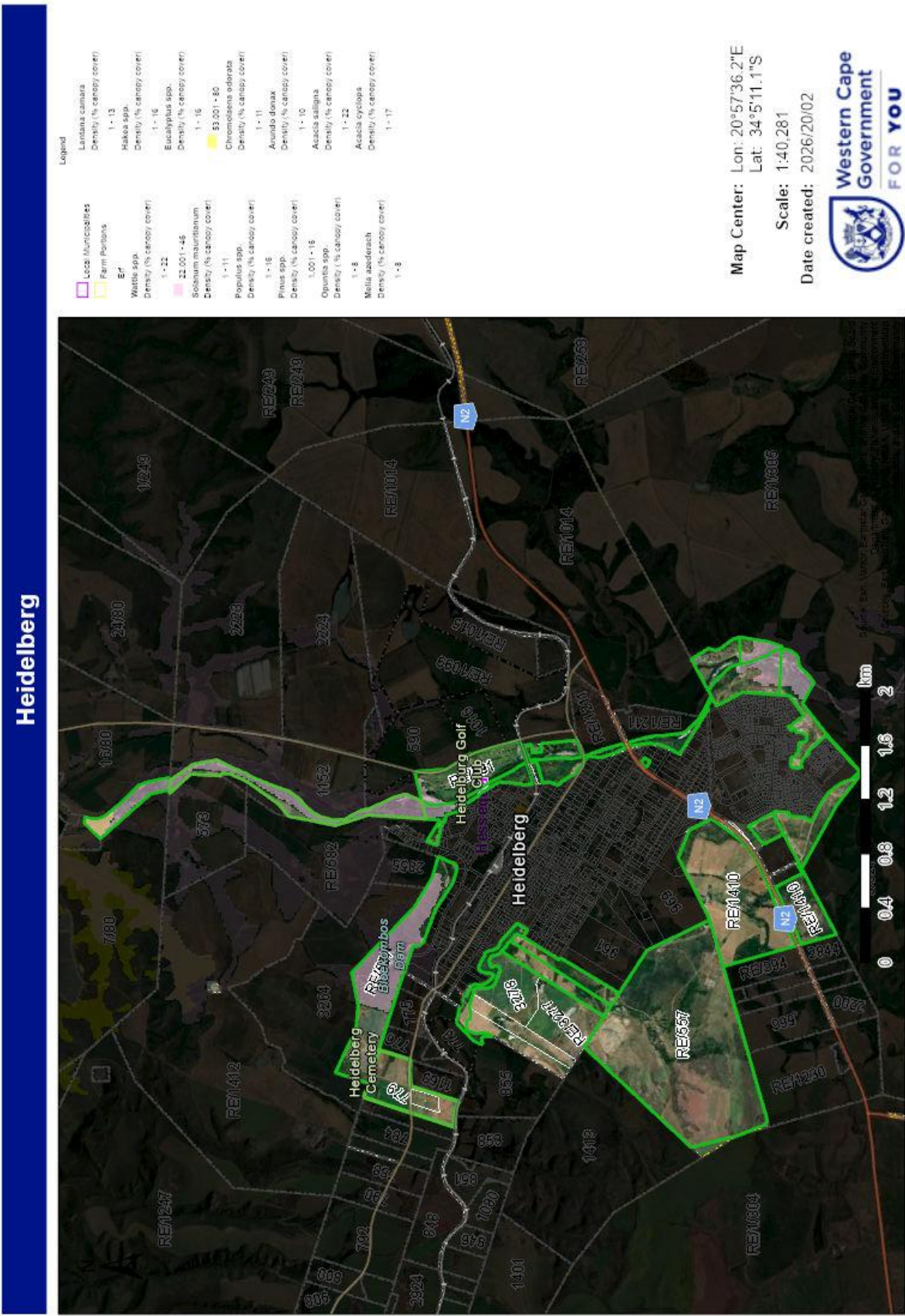
As this is a CBA riparian system:

- No heavy machinery is permitted on riverbanks.
- No uprooting of stumps in wetland or saturated soils.
- All work must be done manually or with lightweight equipment.
- Maintain intact indigenous vegetation buffers along the channel wherever possible.

Within any block and season:

- Do not remove more than 30–40% of woody canopy cover inside riparian and wetland buffers.
- In renosterveld areas, retain indigenous shrub and grass cover to prevent soil exposure.

D.HEIDELBERG



The properties below comprise a ±363.3 ha landscape located in and around Heidelberg area. Most of the covered area is formally designated as CBA and includes extensive Eastern Ruens Shale Renosterveld (a threatened ecosystem), together with Cape Lowland Alluvial Vegetation and a large riparian and floodplain system associated with the Duiwenhoks River.

The properties are of high ecological importance as they support rare and highly threatened renosterveld and alluvial vegetation, maintain key ecological and hydrological processes along the river corridor, and provide essential habitat connectivity between terrestrial and riparian ecosystems. Invasive alien plant clearing and long-term follow-up on these properties is therefore critical to prevent further habitat loss, protect river and wetland function, and ensure that these CBAs are maintained in a natural or near-natural condition, in line with biodiversity conservation objectives.

Property Details:

	Farm Number	Area	SG Code
1.	RE/557	± 209.1 ha	C07300030000055700000
2.	Erf 779	± 17.7 ha	C07300030000077900000
3.	Erf 865	± 7.9 ha	C07300030000086500000
4.	Erf 864	± 8.6 ha	C07300030000086400000
5.	Farm 19/80	± 7.2 ha	C0730000000008000019
6.	RE/591	± 4.3 ha	C06400030000401500000
7.	RE/1410	± 62.5 ha	C07300030000141000000
8.	RE/2/521	± 23.2 ha	C07300000000052100002
9.	RE/2/305	± 12.2 ha	C07300000000030500002
10.	Farm 5/305	± 3.7 ha	C07300000000030500005
11.	Farm 6/305	± 6.9 ha	C07300000000030500006
	<u>Total</u>	<u>363.3 ha</u>	

Invasive Vegetation Detail: *Wattle spp.*

	Infestation density	Estimated infested area	Size classes
1.	± 35 - 42%	± 127.16 – 152.59 ha	seedlings, saplings and ±15-year-old trees

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±09 - 19%	± 18.17 – 39.96 ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Eucalyptus spp*

	Infestation density	Estimated infested area	Size classes
1.	±30 - 45%	± 108.99 – 163.49 ha	seedlings, saplings and ±20-year-old trees

Invasive Vegetation Detail: *Acacia Saligna*

	Infestation density	Estimated infested area	Size classes
1.	±12–21 %	± 21.80 – 47.23 ha	seedlings, saplings and ±10-year-old trees

Invasive Vegetation Detail: *Arundo donax (riparian areas)*

	Infestation density	Estimated infested area	Size classes

1.	±59–81% of riparian zone	± 214.35 – 294.27 ha*	seedlings, saplings and ±10-year-old trees
----	--------------------------	-----------------------	--

Note: The *Arundo donax* range reflects the large proportion of the property occurring within the riparian and floodplain system.

1. Objective

To control and progressively remove invasive alien plant species within CBAs classified as both terrestrial and threatened ecosystems, while maintaining the area in a natural or near-natural state, protecting riparian and floodplain ecological processes, and ensuring long-term recovery through structured follow-up.

2. Zonation and planning

Before clearing:

- Delineate two management zones:
 - **Zone A** – riparian and floodplain CBA (Duivenhoks River and associated floodplains).
 - **Zone B** – upland terrestrial CBA (Eastern Ruens Shale Renosterveld and Cape Lowland Alluvial Vegetation).
- Subdivide the property into operational blocks of 5–15 ha.
- Map:
 - dense *Arundo donax* stands,
 - black wattle and *Acacia saligna* in moist areas,
 - *Eucalyptus* stands near channels and floodplain terraces,
 - intact indigenous vegetation cores.

3. Clearing priority sequence

- Outlying and satellite plants of all invasive species.
- Dense *Arundo donax* infestations along the river and floodplain.

- Black wattle and *Acacia saligna* in riparian and floodplain margins.
- *Eucalyptus* trees directly affecting channel structure and indigenous vegetation.
- Outlying *Acacia cyclops* in upland renosterveld.
- Progressive reduction of dense mixed stands.

4. Control methods by species

a. *Eucalyptus* spp. (± 108.99 – 163.49 ha)

Method

- Cut-stump or frill-and-fill.

Procedure

- Fell only where safe and where disturbance is minimal.
- Apply registered herbicide immediately to the cambium ring.
- In wet or unstable soils, use frill-and-fill to avoid uprooting.
- Treat all coppice during follow-up.

b. *Acacia cyclops* (± 18.17 – 39.96 ha)

Method

- Hand-pull seedlings.
- Cut-stump for saplings and mature plants.

Procedure

- Cut close to ground.
- Apply herbicide immediately to the entire stump surface.

c. *Acacia saligna* (± 21.80 – 47.23 ha)

Method

- Cut-stump.

Procedure

- Clear in small patches or strips.
- Retain indigenous shrubs and ground cover.
- Apply herbicide immediately after cutting.

d. Black wattle – *Acacia mearnsii* (±127.16–152.59 ha)

Method

- Cut-stump or frill-and-fill.

Procedure

- Treat every stem of multi-stem plants.
- Apply herbicide immediately after cutting.
- In wet or saturated soils, prefer frill-and-fill.

e. *Arundo donax* (giant reed) – riparian focus (±214.35–294.27 ha)

*Due to the impact of this specific invasive species on the Duivenhoks river, the *Arundo donax* will be dealt with in more detail.*

i. Purpose

To rapidly suppress and progressively eradicate dense *Arundo donax* stands in riparian areas around Heidelberg while protecting riverbanks, wetland soils and indigenous riparian vegetation. This species is highly invasive in the local riparian environment and is a very aggressive competitor of the indigenous *vleitjiesriet* (*Thamnochortus* spp.). It is particularly well adapted to the natural disturbance dynamics of river systems, as it spreads vegetatively, with flood events breaking up clumps and transporting fragments downstream. In contrast, indigenous *vleitjiesriet* bends with flowing water and does not obstruct or redirect river flow.

Once established, this species forms large, dense, interconnected root and rhizome mats that progressively displace natural riparian vegetation that cannot compete under these conditions. These extensive root systems can unnaturally stabilise stream banks and alter natural flow patterns. The species is also highly flammable for most of the year and is well adapted to survive and rapidly recover after intense fire events, further increasing its ecological impact.

ii. **Where this SOP applies**

- Dense, near-continuous reed beds along channels, banks and floodplains.
- Saturated or erosion-prone soils.
- Areas where machinery access is restricted or prohibited.

iii. **Core principles (non-negotiable)**

- No excavation of rhizomes in riparian soils.
- Low-disturbance methods only.
- Follow-up is compulsory (primary treatment alone is ineffective).
- Maintain indigenous bank vegetation wherever present.

iv. **Approved control method (dense stands)**

Method: Cut-and-treat with follow-up regrowth treatment

Step 1 – Access preparation (only if required)

- Create narrow hand-cleared access lines.
- Avoid trampling indigenous plants.

Step 2 – Primary cut

- Cut all stems as close to ground level as possible.
- Do not pull, lever or disturb rhizomes.

Step 3 – Immediate herbicide treatment

- Apply a registered aquatic-approved herbicide (refer to 3.3.1) to:
 - the freshly cut stems or
 - young exposed shoots where cut-stump treatment is impractical.
- Ensure full wetting of cut surfaces or green tissue.
- Treat on the same day as cutting.

Step 4 – Biomass placement

- Stack cut material above the active channel and floodline.
- Do not leave cut stems lying across live regrowth points.
- Do not stockpile in flowing or ponded water.

v. Follow-up treatment (critical phase)

Timing

- First follow-up: 6–8 weeks after initial treatment.
- Thereafter: every 2–4 months in the first year.

Procedure

- Treat all resprouting stems and new shoots with foliar or stem treatment.
- Do not re-cut unless stems have matured beyond effective foliar uptake.

Rule

- No regrowth may be allowed to reach flowering or tall cane stage.

vi. Clearing intensity and staging

- In very dense, bank-stabilising stands:
 - clear in progressive strips or patches (not the entire bank at once).
- Retain:
 - indigenous reeds, sedges and shrubs between treated strips where present.
- Never open long, continuous bare banks in a single operation.

vii. Riparian protection measures

- No machinery in:
 - saturated soils,

- active channel,
- steep or undercut banks.
- Work only during:
 - low-flow conditions,
 - dry or firm ground.
- Maintain a vegetated buffer immediately adjacent to the water edge where possible.

viii. Erosion and rehabilitation actions

Immediately after clearing:

- Brush-pack treated areas with cut material where soil is exposed.
- Stabilise any disturbed bank edges by placing slash parallel to contours.
- Protect natural indigenous recruitment.

Active planting is only considered if:

- no indigenous recovery occurs after two growing seasons.

ix. Monitoring and follow-up schedule

<u>Time after initial clearing</u>	<u>Action</u>
6–8 weeks	Treat all resprouts and new shoots
3–4 months	Full re-inspection and treatment
6 months	Full follow-up
12 months	Full follow-up
Annually (minimum 5–7 years)	Maintenance control

x. Success indicators

- Progressive reduction in reed shoot density.
- No continuous reed canopy along treated banks.
- Increasing indigenous riparian plant cover.

- No new erosion scars along treated sections.

xi. **Key operational warning**

Dense *Arundo donax* infestations cannot be controlled in one season. Failure to complete at least two intensive follow-ups in the first year will result in rapid full reinfestation.

5. Riparian and floodplain protection rules

Within Zone A:

- No heavy machinery.
- No stump removal or soil disturbance.
- No stacking of slash inside the active floodplain.
- Retain indigenous riverbank vegetation wherever possible.
- Work only during dry soil conditions.

6. Biomass and slash management

- Do not burn within CBAs or riparian areas.
- Stack slash only on previously invaded ground.
- Use brush-packing to:
 - stabilise exposed soil,
 - protect indigenous seedlings.
- Keep slash out of the active channel and floodplain.

7. Follow-up and maintenance clearing

Because of extreme reinvasion risk:

Timing	Action
6–8 weeks after clearing	Treat all resprouts and seedlings
6 months	Full block inspection and clearing

12 months	Full follow-up
Annually for at least 7–10 years	Maintenance follow-ups

Note: *Arundo donax* and black wattle areas must be inspected at every follow-up cycle.

8. Rehabilitation and recovery

- Inspect cleared areas for:
 - exposed soil,
 - bank instability,
 - loss of shade and habitat structure.
- Apply brush-packing where required.
- Protect natural regeneration.
- Active planting or re-seeding is only undertaken if no recovery occurs after two rainy seasons.

9. Monitoring

- Remaining invasive canopy cover per block
- Density of seedlings and regrowth per species
- Extent of *Arundo donax* regrowth
- Indigenous vegetation recovery
- Riverbank stability and erosion
- Secondary invasive species establishment

10. Key operational notes for this property

- This property is of very high conservation importance because it contains:
 - a threatened renosterveld ecosystem,
 - threatened alluvial vegetation,
 - and a major riparian and floodplain corridor.

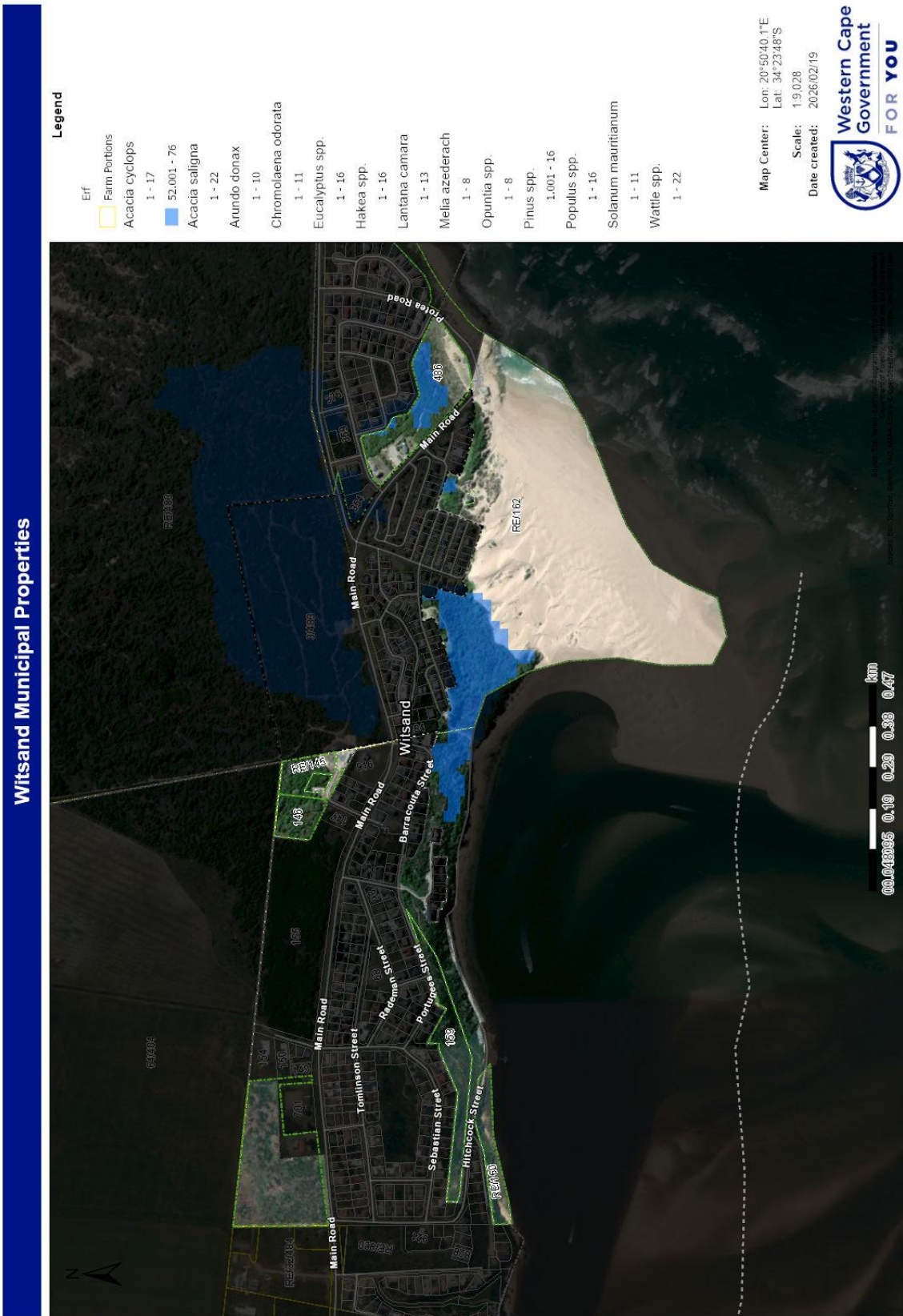
- *Arundo donax* and black wattle represent the highest ecological risk, particularly to river function and wetland processes.
- *Eucalyptus* significantly affects hydrology and shading of floodplain habitats.
- Long-term success depends on:
 - strictly phased clearing,
 - protection of riparian soils and indigenous vegetation,
 - and well-resourced, long-term follow-up programmes consistent with CBA objectives.

Note: Clearing intensity limits

Within any block and season:

- In riparian and floodplain areas:
 - do not remove more than 30–40 % of total woody cover at one time.
 - In terrestrial renosterveld:
 - retain indigenous shrub and grass cover to prevent soil exposure and erosion.
-

E. WITSAND



The municipal properties in and around Witsasnd are adjacent to the Breede Estuary and encompasses approximately 56.64 ha of sensitive primary dune habitat. This area falls within the Canca Limestone Fynbos (FFI3) of the South Coast Fynbos Bioregion and is mapped as an Ecological Support Area (ESA 1 – Coastal Corridor). The properties supports critically important indigenous vegetation, including dune-binding fynbos species, and contributes to the ecological functioning of the Breede Estuary by stabilising sand dunes and maintaining natural hydrological and sediment processes.

Currently, the sites are heavily infested with *Acacia cyclops* (Rooikrans), with infestation levels estimated at $\pm 60\text{--}80\%$, which poses significant threats to dune integrity, indigenous vegetation, and the ecological functioning of the adjacent estuarine and coastal corridor. Effective management and follow-up clearing are therefore critical to restore the natural structure, biodiversity, and stability of this ESA while preventing further invasion and erosion.

Property Details:

	Farm number	Area	SG Code
1.	RE/162	± 38.3 ha	C07300090000016200000
2.	RE/160	± 1.87 ha	C07300090000016000000
3.	RE/4/483	± 7.26 ha	C07300000000048300004
4.	Erf 486	± 3.74 ha	C07300090000048600000
5.	RE/145	± 1.00 ha	C07300090000014500000
6.	Erf 146	± 0.96 ha	C07300090000014600000
7.	Erf 159	± 2.27 ha	C07300090000015900000
8.	RE/160	± 1.27 ha	C07300090000016000000
	Total	± 56.64 ha	

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±60 - 80%	± 33.98 – 45.31 ha	seedlings, saplings and ±15-year-old trees

1. Objective

To reduce and progressively eliminate dense *Acacia cyclops* infestations within a sensitive primary dune and coastal corridor system, while maintaining dune stability, indigenous vegetation recovery and coastal ecological functioning.

2. Ecological and operational sensitivity

This site forms part of a coastal corridor and dune stabilisation system. Clearing must:

- avoid destabilising mobile and semi-mobile dunes,
- maintain indigenous pioneer and dune-binding vegetation,
- prevent secondary invasion and erosion.

3. Target species

Acacia Cyclops (Rooipitjie)

Estimated infestation: ±33.98 – 45.31 ha of the 56.64 ha site

4. Zonation and operational procedure (primary dunes – dense infestations)

Method:

- Manual cut-stump treatment only
- Mechanical clearing is not permitted in primary dune habitat unless approved by the relevant authority.

5. Clearing procedure

a. Site preparation

- Delineate clearing blocks (≤ 1 ha working units).
- Identify and mark:
 - indigenous dune shrubs and pioneers,
 - unstable dune crests and slip faces.

b. Felling

- Cut stems as close to ground level as possible.
- Minimise trampling and surface disturbance.

c. Immediate stump treatment

- Apply a registered herbicide directly to the freshly cut stump surface.
- Treatment must occur immediately after cutting.

6. Biomass handling (critical in dune systems)

- Do not remove biomass off site unless absolutely required.
- Stack brushwood:
 - in low, loose brush-packs,
 - parallel to the dune contours,
 - away from active wind corridors.
- Use brush-packing to:
 - reduce wind erosion,
 - trap sand (only with an approved Maintenance Management Plan),
 - promote natural revegetation.

Brush must not smother existing indigenous plants.

7. Clearing phasing and dune protection

- Clearing must be phased and patch-based.

- Do not clear entire continuous dune faces in one operation.
- Retain:
 - indigenous shrub clumps and grass/reed patches between cleared areas to maintain dune binding.

8. Follow-up control (non-negotiable)

Schedule	Action
1st follow-up: 6–8 weeks after initial clearing	Hand-pull seedlings where sand is firm and roots are shallow.
Thereafter: ◦ every 3–4 months in Year 1, ◦ twice in Year 2, ◦ annually thereafter.	Cut-stump or foliar treat resprouting plants and saplings
Annually for at least 7–10 years	

9. Seed bank and re-invasion management

Acacia cyclops has a persistent soil seed bank.

- Expect continuous germination after disturbance and rain.
- All new shoots must be removed before flowering.
- No cleared block may be left unattended for more than one growing season.

10. Rehabilitation and recovery

- Rely on natural regeneration of indigenous dune species as the primary recovery mechanism.
- Actively protect:
 - indigenous pioneers and shrubs establishing in cleared areas.
- Additional planting is only required where:
 - no natural recovery is evident after two growing seasons, or

- erosion persists despite brush-packing.

11. Erosion prevention measures

- No vehicle access on dunes.
- No dragging of cut material over open sand.
- All exposed sand surfaces created during clearing must be brush-packed before the team leaves the block.

12. Monitoring

Indicators of success

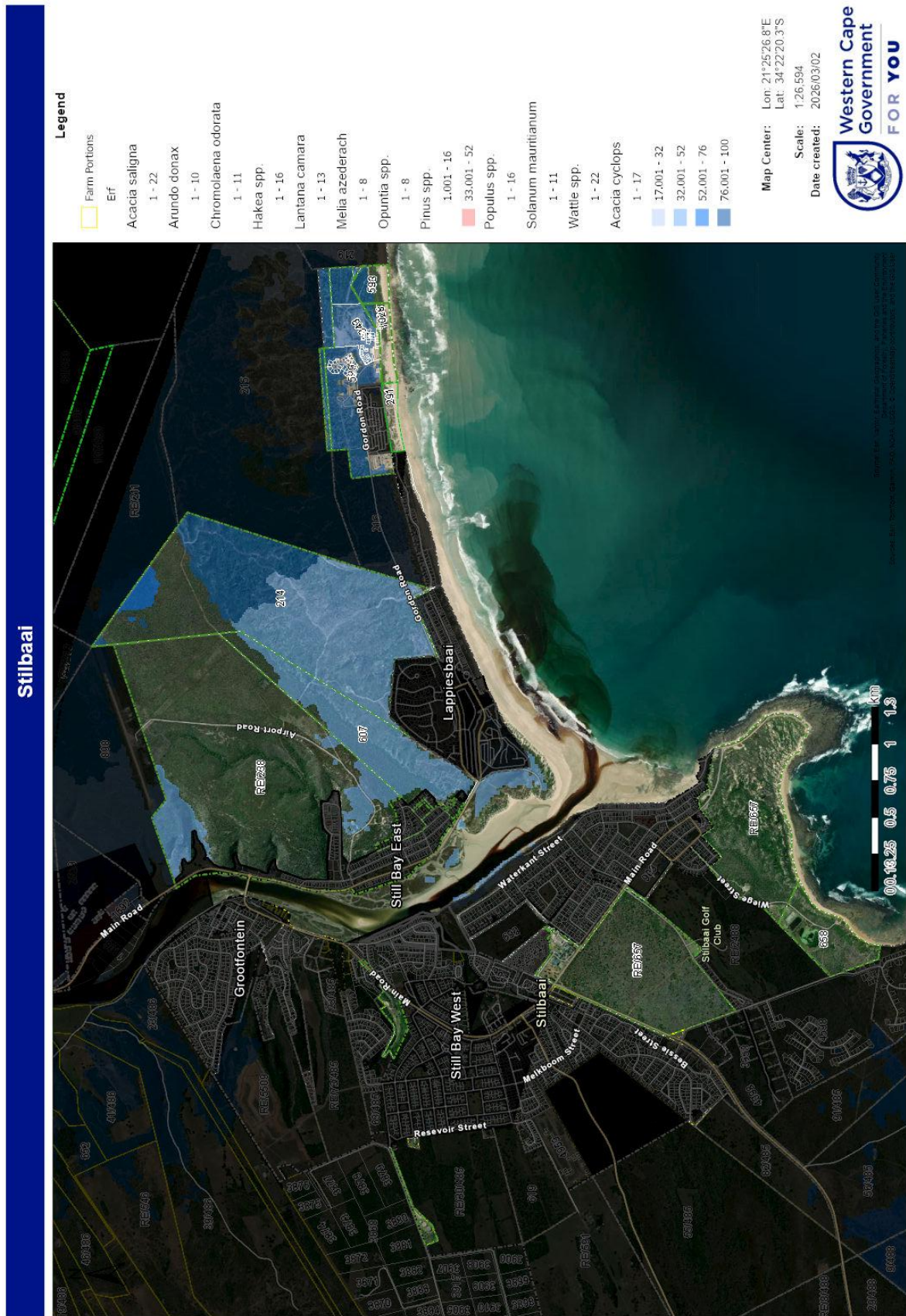
- Declining *Acacia cyclops* seedling and resprout density.
- Increasing indigenous dune vegetation cover.
- No new erosion scars or blow-outs forming in cleared areas.

Minimum monitoring period: 5 years.

13. Key operational risks

- Rapid reinvasion from seed bank if follow-ups lapse.
 - Wind erosion and dune destabilisation if clearing is too extensive or poorly phased.
 - Secondary invasion if indigenous recovery is suppressed by poor biomass placement.
-

F. STILBAAI



There are 13 properties scattered in and around Stilbaai, several of which are heavily infested with Rooikrans (*Acacia cyclops*) and are therefore priority sites for alien vegetation clearing. The area is currently affected by illegal wood harvesting activities, which further impacts the ecological integrity of these properties.

Although various partners and stakeholders are actively clearing some of the most densely infested sections, a large proportion of the invaded areas remains untreated. Despite this progress, the remaining invaded properties presently represent a significant fire risk, posing a direct threat to the residential areas located on the seaward side.

The affected properties occur within a sensitive vegetation mosaic comprising Fynbos and Albany Thicket, specifically within Dune Limestone Mosaic Thicket and Hartenbos Dune Thicket (AT40) of the Albany Thicket Bioregion, in the Gouritz Region, Hectorskraal Sector (Hectorskraal Thicket–Limestone Fynbos variant; from Riversdale Vegetation mapping). These vegetation units are ecologically important for coastal biodiversity and landscape connectivity.

Property Details:

	Farm number	Area	SG Code
1.	214	±156.40 ha	C06400050000021400000
2.	607	±48.49 ha	C06400050000060700000
3.	RE/238	±230.04 ha	C06400050000023800000
4.	599	±37.24 ha	C06400050000059900000
5.	598	±2.12 ha	C06400050000059800000
6.	593	±5.66 ha	C06400050000059300000
7.	291	±4.27 ha	C06400050000029100000
8.	1028	±5.82 ha	C06400050000102800000
9.	RE/657	±140.19 ha	C06400060000065700000
10.	658	±19.59 ha	C06400060000065800000
11.	85/485	±2.25 ha	C06400000000048500085
12.	89/485	±0.13 ha	C06400000000048500089
13.	RE/2896	±5.28 ha	C06400060000289600000
	Total	±657.48 Ha	

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±37 - 80%	± 243.27 – 525.98 ha	seedlings, saplings and ±15-year-old trees

Invasive Vegetation Detail: *Manatoka tree Manatoka tree (Myoporum spp)*

	Infestation density	Estimated infested area	Size classes
1.	±5 - 15%	± 32.87 – 98.62 ha	seedlings, saplings and ±20-year-old trees

1. Objective

To reduce and progressively eliminate invasive woody alien plants, specifically *Acacia cyclops* and Manatoka tree (*Myoporum* spp.), while maintaining the ecological structure, soil stability and natural regeneration capacity of dune limestone thicket and associated fynbos–thicket mosaics.

2. Ecological and operational sensitivity

Some of the sites forms part of a coastal corridor and dune stabilisation system. As such clearing must:

- avoid destabilising mobile and semi-mobile dunes,
- maintain indigenous pioneer and dune-binding vegetation,
- prevent secondary invasion and erosion.

3. Zonation and operational procedures

- Clearing blocks must be demarcated (5–15 ha).
- Priority must be given to:
 - dense invasion nodes,

- invasion edges adjacent to intact thicket,
- Manatoka stands occurring within indigenous thicket patches.

Work must proceed from low-density edges towards dense stands.

Indigenous shrubs and thicket species must be clearly identified and protected.

4. Control methods per specie

a. Rooikrans (*Acacia cyclops*)

Method

- Hand-pull seedlings.
- Cut-stump for saplings and mature plants.

Procedure

- Cut close to ground.
- Apply herbicide immediately to the entire stump surface.

b. Manatoka tree (*Myoporum* spp.)

Method:

Manual cut-stump or stem-injection treatment.

- All stems must be treated chemically.
- Stumps must be treated immediately after cutting.
- For large multi-stemmed individuals, each stem must be treated separately.

Pulling or uprooting of Manatoka trees is not permitted due to severe soil disturbance in dune limestone substrates.

5. Biomass handling (both species)

- Biomass must be stacked in low, stable brush-packs.
- Brush-packs must:
 - follow natural contours,

- remain outside drainage lines and depressions,
- not smother indigenous vegetation.

Brush-packing must be used to protect exposed soil and promote natural recruitment.

6. Clearing intensity and phasing

Due to the very large infestation footprint and the threatened status of the ecosystem:

- clearing must be progressive and phased,
- no large, continuous thicket areas may be cleared in a single operation,
- structural vegetation “islands” must be retained within each block.

At least partial indigenous canopy cover should remain within each operational block during the first clearing phase wherever feasible.

7. Follow-up control (non-negotiable)

Schedule	Action
1st follow-up: 6–8 weeks after initial clearing	All <i>Acacia cyclops</i> seedlings and resprouts must be removed or treated.
Year 2: Bi-annual	All Manatoka regrowth must be re-treated immediately. No individual may be allowed to reach flowering or fruiting stage.
Annually for at least 7–10 years	

8. Seed regeneration and reinvasion management

- *Acacia cyclops* has a long-lived soil seed bank and mass recruitment is expected after clearing and fire.
- Manatoka trees produce bird-dispersed seed and will re-establish rapidly if follow-ups lapse.
- All new Manatoka recruits must be removed while still small

Follow-up inspections must specifically target:

- under shrub canopies,
- along access lines,
- at block edges.

9. Rehabilitation

- Natural regeneration is the preferred recovery mechanism.
- Indigenous shrubs, restios and thicket species must be protected at all times.
- Active planting may only be considered where:
 - no recovery is evident after two growing seasons, or
 - erosion persists despite brush-packing.

10. Monitoring

For each block record:

- remaining *Acacia cyclops* cover,
- Manatoka tree presence and recruitment,
- indigenous canopy recovery,
- erosion and secondary invasion.

11. Key operational risks

- Rapid re-invasion from the *Acacia cyclops* seed bank.
- Continued Manatoka re-establishment via bird-dispersed seed if follow-ups lapse.
- Thicket structural collapse if clearing is too extensive in a single phase.

Note: Minimum commitment from municipality

Given the combined invasion footprint (± 276 – 624 ha across both species), a minimum 5-year clearing and follow-up programme is required to secure long-term recovery of the Hartenbos Dune Thicket and associated dune limestone mosaic system.

G. MELKHOUTFONTEIN



The properties are currently used by local community members for firewood collection and informal wood sales. The Municipality may either retain the current access arrangements or implement alien vegetation clearing through a formal tender process. Where clearing is placed on tender, either the Municipal Technical Department or the appointed contractor must be responsible for removing excess cleared material from site and transporting it to the designated municipal landfill for chipping, where required.

The properties have experienced repeated wildfires in recent years, which have burned extensive *Acacia cyclops* infestations. Burnt areas must therefore be prioritised for follow-up control to prevent rapid reinfestation from post-fire recruitment.

Community access must be managed to prevent damage to indigenous vegetation and to avoid disturbance of treated and recovering areas. Where small-scale farmers are leasing any of the identified properties, their operations must be formally considered and coordinated during planning and implementation of clearing activities.

Property Details:

	Farm number	Area	SG Code
1.	142/480	± 13.98 ha	C06400000000048000142
2.	RE/154/480	± 1018.39 ha	C06400000000048000154
3.	RE/65/480	± 330.85 ha	C06400000000048000065
4.	15/480	± 121.72 ha	C06400000000048000015
5.	66/480	± 72.31 ha	C06400000000048000066
6.	12/480	± 81.36 ha	C06400000000048000012
7.	RE/69/480	± 9.78 ha	C06400000000048000069
8.	RE/57/480	± 63.82 ha	C06400000000048000057
9.	RE/56/480	± 74.11 ha	C06400000000048000056
10.	81/480	± 233.08 ha	C06400000000048000081
11.	147/480	± 10.20 ha	C06400000000048000147
12.	152/480	± 5.59 ha	C06400000000048000152
13.	RE/566	± 8.08 ha	C06400050000056600000
14.	Erf 570	± 9.83 ha	C06400050000057000000

15.	RE/389	± 4.42 ha	C06400050000038900000
	TOTAL	± 2057.52 ha	

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±37 - 80%	± 761.28 – 1 646.02 ha	seedlings, saplings and ±15-year-old trees

Invasive Vegetation Detail: *Manatoka tree (Myoporum spp)*

	Infestation density	Estimated infested area	Size classes
1.	±5 - 15%	± 102.88 – 308.63 ha	seedlings, saplings and ±20-year-old trees

1. Objective

To systematically reduce and control invasive *Acacia cyclops* and *Myoporum* spp. trees while safeguarding the structural integrity, soil stability and ecological functioning of intact Hartenbos Dune Thicket within a threatened Critical Biodiversity Area.

2. Zonation and operational procedures

- Divide the site into operational blocks (10–20 ha).
- Prioritise:
 - dense invasion nodes,
 - invasion edges into intact thicket,
 - Manatoka stands embedded within indigenous vegetation.
- Clearing must proceed from lower-density margins into dense stands.

Indigenous thicket species must be identified and protected before operations commence.

3. Control methods

a. *Acacia cyclops*

Method:

Manual cut-stump treatment.

- Cut stems as close to ground level as possible.
- Apply a registered herbicide immediately to the freshly cut stump.
- Seedlings:
 - hand-pull only where soil disturbance is minimal, or
 - foliar treat where appropriate.

Procedure

- Cut close to ground.
- Apply herbicide immediately to the entire stump surface.

b. Manatoka tree (*Myoporum spp.*)

Method:

Manual cut-stump or stem-injection treatment.

- All stems must be treated chemically.
- Stumps must be treated immediately after cutting.
- For large multi-stemmed individuals, each stem must be treated separately.

Pulling or uprooting of Manatoka trees is not permitted due to severe soil disturbance in dune limestone substrates.

4. Clearing intensity and phasing

Due to the very large infestation footprint and the threatened status of the ecosystem:

- clearing must be progressive and phased,
- no large, continuous thicket areas may be cleared in a single operation,

- structural vegetation “islands” must be retained within each block.

At least partial indigenous canopy cover should remain within each operational block during the first clearing phase wherever feasible.

5. Biomass handling

- Biomass must be stacked as low brush-packs:
 - following natural contours,
 - outside drainage lines,
 - without smothering indigenous plants.
- Brush-packing must be used to:
 - protect exposed soil,
 - reduce trampling impacts,
 - promote natural recruitment.

Dragging of material across exposed soil is not permitted.

6. Follow-up control (non-negotiable)

<u>Schedule</u>	<u>Action</u>
1st follow-up: 6–8 weeks after initial clearing	All <i>Acacia cyclops</i> seedlings and resprouts must be removed or treated.
Year 2: Bi-annual	All Manatoka regrowth must be re-treated immediately.
Annually	No individual may be allowed to reach flowering or fruiting stage.

7. Seed regeneration and reinvasion management

- *Acacia cyclops* has a long-lived soil seed bank and mass recruitment is expected after clearing and fire.
- Manatoka trees produce bird-dispersed seed and will re-establish rapidly if follow-ups lapse.

- All new Manatoka recruits must be removed while still small

Follow-up inspections must specifically target:

- under shrub canopies,
- along access lines,
- at block edges.

8. Rehabilitation

- Natural regeneration is the primary recovery mechanism.
- Indigenous thicket and dune shrub species must be protected at all times.
- Active planting is only permitted if:
 - no natural recovery is evident after two growing seasons, or
 - erosion persists despite brush-packing.

9. Monitoring

For each block record:

- remaining cover of *Acacia cyclops*,
- Manatoka tree density and recruitment,
- indigenous vegetation recovery,
- erosion and secondary invasion.

10. Key operational risks

- Rapid reinvasion from the *Acacia cyclops* seed bank if follow-ups are delayed.
- Continued Manatoka establishment via bird-dispersed seed.
- Structural collapse of thicket and biodiversity loss if clearing is too extensive or poorly phased.

Note: Minimum management commitment

Given the scale of invasion (approximately 864 – 1 955 ha combined footprint) within a threatened Critical Biodiversity Area, a minimum 5–7 year clearing and follow-up programme is required to secure long-term ecological recovery of the Hartenbos Dune Thicket.

H. JONGENSFONTEIN



The site is presently managed by the Hessequa Municipality in partnership with the Jongensfontein Residents Association as an external stakeholder group. A significant proportion of the invasive alien trees occurs on steep dune and limestone slopes, which are highly sensitive to disturbance and prone to erosion. Alien vegetation clearing in this area therefore requires carefully phased, low-impact methods to ensure that slope stability, indigenous vegetation structure and the ecological functioning of this threatened dune thicket system are not compromised.

The Gouritz Dune Thicket, classified as Hartenbos Dune Thicket, is a Critical Biodiversity Area (CBA – Terrestrial) and a threatened ecosystem that is currently in a largely natural condition. The property covers approximately 100.2 ha and represents an ecologically important remnant of intact coastal dune thicket within the Gouritz region.

Property Details:

	Farm number	Area	SG Code
1.	Erf 126	± 88.9 ha	C06400020000012600000
2.	111/489	± 3.6 ha	C06400000000048900111
3.	Erf 253	± 7.7 ha	C06400020000025300000
	TOTAL	± 100.2 ha	

Invasive Vegetation Detail: *Acacia cyclops*

	Infestation density	Estimated infested area	Size classes
1.	±37 - 80%	± 7.01 – 21.04 ha	seedlings, saplings and ±15-year-old trees

Invasive Vegetation Detail: *Manatoka tree (Myoporum spp)*

	Infestation density	Estimated infested area	Size classes
1.	±5 - 15%	± 1.00 – 5.01 ha	seedlings, saplings and ±20-year-old trees

1. Objective

To systematically reduce and control invasive *Acacia cyclops* and *Myoporum* spp. trees while safeguarding the structural integrity, soil stability and ecological functioning of intact Hartenbos Dune Thicket within a threatened Critical Biodiversity Area.

2. Zonation and operational procedures

- Divide the site into small operational blocks (2–5 ha).
- Prioritise:
 - invasion edges,
 - plants occurring within intact indigenous thicket,
 - seed-producing *Myoporum* trees.
- Indigenous thicket species must be identified and protected before clearing.

3. Control methods

c. *Acacia cyclops*

Method:

Manual cut-stump treatment.

- Cut stems as close to ground level as possible.
- Apply a registered herbicide immediately to the freshly cut stump.
- Seedlings:
 - hand-pull only where soil disturbance is minimal, or
 - foliar treat where appropriate.

Procedure

- Cut close to ground.
- Apply herbicide immediately to the entire stump surface.

d. Manatoka tree (*Myoporum* spp.)

Method:

Manual cut-stump or stem-injection treatment.

- All stems must be treated chemically.
- Stumps must be treated immediately after cutting.
- For large multi-stemmed individuals, each stem must be treated separately.

Pulling or uprooting of Manatoka trees is not permitted due to severe soil disturbance in dune limestone substrates.

4. Clearing intensity and phasing

Due to the very large infestation footprint and the threatened status of the ecosystem:

- clearing must be progressive and phased,
- no large, continuous thicket areas may be cleared in a single operation,
- structural vegetation “islands” must be retained within each block.

At least partial indigenous canopy cover should remain within each operational block during the first clearing phase wherever feasible.

5. Biomass handling

- Biomass must be stacked as low brush-packs:
 - following natural contours,
 - outside drainage lines,
 - without smothering indigenous plants.
- Brush-packing must be used to:
 - protect exposed soil,
 - reduce trampling impacts,
 - promote natural recruitment.

Dragging of material across exposed soil is not permitted.

6. Follow-up control (non-negotiable)

<u>Schedule</u>	<u>Action</u>
1st follow-up: 6–8 weeks after initial clearing	All <i>Acacia cyclops</i> seedlings and resprouts must be removed or treated.
Year 2: Bi-annual	All Manatoka regrowth must be re-treated immediately. No individual may be allowed to reach flowering or fruiting stage.
Annually	

7. Seed regeneration and reinvasion management

- *Acacia cyclops* has a long-lived soil seed bank and mass recruitment is expected after clearing and fire.
- Manatoka trees produce bird-dispersed seed and will re-establish rapidly if follow-ups lapse.
- All new Manatoka recruits must be removed while still small

Follow-up inspections must specifically target:

- under shrub canopies,
- along access lines,
- at block edges.

8. Rehabilitation

- Natural regeneration is the primary recovery mechanism.
- Indigenous thicket and dune shrub species must be protected at all times.
- Active planting is only permitted if:
 - no natural recovery is evident after two growing seasons, or
 - erosion persists despite brush-packing.

9. Monitoring

For each block record:

- remaining cover of *Acacia cyclops*,
- Manatoka tree density and recruitment,
- indigenous vegetation recovery,
- erosion and secondary invasion.

10. Key operational risks

- Rapid reinvasion from the *Acacia cyclops* seed bank if follow-ups are delayed.
- Continued Manatoka establishment via bird-dispersed seed.
- Structural collapse of thicket and biodiversity loss if clearing is too extensive or poorly phased.

Note: Minimum management commitment

A minimum 5-year clearing and follow-up programme is required to secure long-term recovery and maintain the natural condition of the Gouritz Dune Thicket within this Critical Biodiversity Area.

7. Auditing

All control and eradication actions implemented in terms of this plan must be audited as resources becomes available, which ideally will be on an annual basis. The environmental audit must comprise a systematic and objective assessment of each site to determine the extent of invasive alien plant infestations and to evaluate the effectiveness and ecological outcomes of the control and eradication measures that have been implemented.

The environmental audit must be undertaken in three phases, namely a pre-audit phase, an on-site audit phase and a post-audit phase.

The pre-audit phase includes all administrative and planning activities required to prepare for the audit. This includes the appointment of a suitably qualified department, the compilation of

an audit protocol and the development of a detailed audit plan. The audit plan must be informed by the most recent site information and the findings of the previous year's audit. The plan must clearly define the audit objectives and scope, the sites to be audited, the audit methods to be applied and the timing of the audit. Particular attention must be given to ensuring that data collection methods remain consistent with previous audits so that results are directly comparable over time.

The on-site audit phase entails the systematic collection and verification of information at each site. The audit team must gather data through direct observation, photographic records, field measurements and any additional assessments or tests identified during the pre-audit phase. During this phase, the effectiveness and limitations of the data collection methods must also be reviewed to determine whether the auditing process is achieving its intended objectives. In accordance with an adaptive management approach, the audit must actively identify opportunities for improving both management practices and monitoring procedures. All observations and measurements must be accurately recorded, and a comprehensive record of the site condition and management outcomes must be compiled.

The post-audit phase involves the preparation of a formal audit report. The report must present and compare current findings with previous audit results, evaluate progress towards management objectives, and identify any shortcomings or non-conformances. The report must further include clear recommendations for corrective actions and practical improvement targets to guide future invasive alien plant management and follow-up operations

+++++

Annexure: Implementation schedule

Phase	Timeframe	Key activities	Main outputs
1. Programme initiation and planning	Month 1 of each financial year	• Confirm priority sites and operational blocks (2–5 ha units). • Review previous year's audit findings and monitoring results. • Update annual work plan and budget. • Appoint internal teams and/or external contractors. • Finalise herbicide procurement and safety plans.	• Annual implementation plan and site priority list. • Approved operational and safety plans.
2. Pre-clearing site preparation	Month 1–2	• Delineate and map operational blocks and access routes. • Identify sensitive areas (wetlands, drainage lines, steep slopes and erosion-prone zones). • Mark indigenous vegetation to be protected. • Establish biomass stacking and brush-packing areas.	• Site maps and block layouts. • Marked protection zones and operational boundaries.

3. Initial clearing phase	Month 2–8	• Progressive and phased clearing of priority blocks, starting at low-density edges and invasion fronts and moving toward denser stands. • Application of approved control methods for each species and size class. • Immediate herbicide treatment of cut stumps. • Biomass handling and brush-packing in accordance with site sensitivity requirements. • Recording of treated area, methods used, herbicide quantities and labour inputs per block.	• Cleared and stabilised operational blocks. • Block-level clearing records.
4. First follow-up control	6–8 weeks after completion of each block	• Treatment of all resprouting plants and new recruits. • Immediate retreatment of all Manatoka regrowth. • Removal of all seedlings before flowering or seed set.	• Follow-up treatment records per block.
5. Second and third follow-ups (Year 1)	Months 3–4 and Month 6 after clearing	• Full block re-inspection. • Removal of missed plants, coppice regrowth and seedlings.	• Updated regrowth and reinvasion records.

		• Targeted inspections under shrub canopies, along access lines and at block edges.	
6. Ongoing follow-up programme	Year 2: bi-annual Year 3 onwards: annual (minimum 5–7 years)	• Systematic follow-up clearing across all previously treated blocks. • Early removal of all new recruits from seed banks and dispersal. • Boundary and invasion-edge inspections to prevent reinvasion.	• Sustained reduction in invasive plant cover. • Annual follow-up logs.
7. Rehabilitation and recovery management	Concurrent with clearing and follow-ups	• Brush-packing of exposed soil immediately after clearing. • Protection of natural indigenous regeneration. • Targeted erosion control measures where required. • Active planting only where no recovery occurs after two growing seasons or where erosion persists.	• Stabilised cleared areas. • Rehabilitation and erosion-control records.
8. Monitoring and data collection	After each clearing and follow-up cycle	• Record remaining invasive cover, recruitment and regrowth per block. • Assess indigenous vegetation recovery. • Record erosion and secondary invasion.	• Updated monitoring database. • Annual site condition summaries.

		• Update GIS and site databases.	
9. Annual environmental audit – pre-audit phase	Month 10–11 (annually)	• Appointment of an independent or suitably qualified internal audit team. • Compilation of audit protocol. • Development of site-specific audit plan informed by previous audits and latest monitoring data.	• Approved audit plan and protocol.
10. Annual environmental audit – on-site phase	Month 11–12 (annually)	• Field verification of infestation levels and treatment effectiveness. • Photographic records and measurements. • Assessment of monitoring and data-collection methods. • Identification of strengths, weaknesses and improvement opportunities.	• On-site audit records and photographic database.
11. Annual environmental audit – post-audit phase	Within one month after on-site audit	• Compilation of audit report. • Comparison with previous audit results. • Identification of failures, gaps and corrective actions. • Setting of improvement targets for the next implementation cycle.	• Annual environmental audit report. • Corrective action plan.

12. Adaptive management and annual programme update	Start of the following annual cycle	• Integrate audit findings into the next year's operational plan. • Adjust priorities, clearing sequences and follow-up intensity where required. • Update budgets and procurement plans.	• Revised annual implementation schedule and budget.
--	-------------------------------------	---	--