

ANNEXURE C3
ENGINEERING STATUS QUO REPORT

REPORT DETAILS :

Lyners Reference No: C17046
Client: Overstrand Municipality
Report prepared by: H Leng /T Potgieter
Client representative: R Kuchar / B Louw
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1 BACKGROUND AND INTRODUCTION

Neil Lyners & Associates (RF)(Pty) Ltd was appointed by Overstrand Municipality for the investigation into vacant land in and around Kleinmond for current and future housing needs. The investigation also focussed on the upgrading of the Overhills informal settlement.

2 SCOPE OF WORK

The scope of this report is focussing on the current -and future civil and electrical engineering services which includes the following:

- Availability of potable water,
- Capacities of the sewer reticulation,
- Storm water run-off and constraints; and
- Traffic patterns and impact of future developments.
- Availability of electricity and electricity networks

3 STATUS QUO OF WATER

Water sources

The main source of the water for Kleinmond is the Palmiet River. A fountain and a borehole located 300m from each other, are used as additional sources. Raw water from the Palmiet River, the fountain and borehole is treated at the Kleinmond Water Treatment Plant (WTP).

Distribution system

Raw water is pumped via a 0,6km x 200mm diameter pipeline from the Palmiet River diversion weir to the Palmiet Booster pump station. From the Palmiet booster pump station to the Kleinmond WTP raw water is transferred along a 4,0km x 250mm diameter rising pipeline. Maximum transfer capacity is limited by the pump station capacity which at present is in the order of 67 l/s (5 800 kL/day if operated 24 hours per day).

Additionally, raw water is pumped via 482m x 110mm diameter pipeline from a borehole to the Kleinmond WTP. Maximum transfer capacity is in the order of 12 l/s (1 037 kL/day) over 24 hours.

Another source of raw water is pumped via a 0,4km x 110 mm diameter pipeline from the fountain to the Protearand reservoirs in Kleinmond. Maximum transfer capacity of the pump is in the order of 25 l/s (2 160 kL/day), whereas the maximum yield from the source is in the order of 160 kL/day (1.82 l/s) over 24 hours.

The water distribution system in the Kleinmond region is operated as a single pressure zone supplied from the 3,5M³, 2,3 M³ and 2,3 M³ reservoirs.

Master planning

Proposed distribution zones

New distribution zones are proposed to improve pressures in the low lying areas new booster pumping zones are proposed for the higher lying future developments.

Proposed future system and required works

The existing Kleinmond water distribution system has insufficient capacity within the current urban edge to supply the future water demands for the fully occupied scenario and the additional future development areas.

New distribution pipelines are required when future developments are developed with a few distribution pipelines also required to reinforce the water supply within the Kleinmond distribution networks.

Bulk System

The existing bulk water supply system has insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas.

Reservoirs

A new 1,5 M³ reservoir is proposed for the future to augment reservoir storage for Kleinmond when the AADD for Kleinmond exceeds 4 000kL/d.

A schematic layout of the water infrastructure is included in Annexure A.

4 STATUS QUO OF SEWER

Drainage area, demand and sewer flows

The present fully occupied annual average daily demand (AADD), for the existing Kleinmond system that contributes to the domestic sewer flow (excluding areas serviced by septic tanks) is ± 1 818 kL/d, which includes unaccounted-for-water (UAW).

The PDDWF for the Kleinmond system is estimated at ± 1 182 kL/d, or roughly 65% of the AADD. Approximately 78% of this is a direct contribution from connections to the sewerage system, and the other 22% is contributed by groundwater infiltration.

Master planning

The boundaries of the existing drainage areas in Kleinmond are increased to accommodate proposed future developments and existing unserviced erven that fall within these drainage areas.

A few existing outfall sewers require upgrading by replacement with larger sized future sewers.

The upgrading of the Kleinmond PS no. 4 is proposed when the existing pump station reaches capacity and new outfall sewers are proposed to accommodate future development areas and to service the existing unserviced erven in Kleinmond (see Annexure B).

5 STATUS QUO OF STORM WATER

The steep topography to the north of the town makes development difficult and contributes to erosion of properties to the south of the town. The town has limited overland run-off channels and storm water reticulations which deposits in the sea south of the town.

The Overhills informal settlement is located against the steep slope north of the town and further extension of the settlement is limited.

An independent service provider is currently busy with the storm water master planning of the town.

6 STATUS QUO OF TRAFFIC PATTERNS

Overstrand Municipality has done a Transport and Traffic Impact Assessment study of the current infrastructure within the urban edge of the town. The information of the study must be obtained and re-assessed once new developments are identified.

7 STATUS QUO OF ELECTRICAL INFRASTRUCTURE

Bulk Services

The Kleinmond area is fed from an Eskom 66kV overhead line running north of town along the foot of the mountain. (See attached drawing). This line is situated in a 22m servitude registered in favour of Eskom, which must be noted in future development planning.

Although this Eskom line is quite old, the condition thereof is such that there is still sufficient spare capacity available in this 66kV line for at least another 10MVA future growth.

The bulk supply point for Kleinmond town is from a 66/11kV substation situated at the entrance to town on the western side, next to the R44 Main Road. Additional capacity is also available in this step-down substation for future growth, but capacity can also be created by installing an additional transformer and switchgear.

Current Supply

The current Notified Maximum Demand (NMD) registered with Eskom for Kleinmond Town is 7 000kVA.

A steady decline has been experienced over the last few years, mainly due to higher electricity prices, penetration of energy saving equipment and devices, and the effect of solar PV and water heaters.

The current maximum demand used is around 5 000kVA, which means a surplus capacity of 2 000kVA available for normal growth and new development. (To see this in context, the 2 000kVA is adequate to electrify for example around 800 low cost houses).

Future additional load requirements beyond the available 2 000kVA will be based on an application to be submitted to Eskom for increase in the NMD. Current cost for such NMD increase is approximately R2 000/kVA.

Internal 11kV Services

From the intake point at the Eskom 66/11kV substation mentioned above, 2 x 11kV underground cable feeders supply a municipal 11kV switching station, situated next to the Eskom substation. From this municipal switching station four (4) 11kV feeders supply electricity to miniature substations throughout town, from which low voltage networks supply all individual consumers.

These 4 feeders are interconnected at several positions on the network to be able to use them as ring feeds, with the ability then to transfer load in between the different sections of the networks. As such security and quality of supply is kept at an acceptable level.

Most of the 11kV networks consist of underground cables, with only small sections on the northern side of town which are overhead lines.

Depending on the location and size of any new development, these existing 11kV networks can be extended/upgraded/strengthened or replaced to suit the specific requirements. In extreme cases where large new developments might be a reality and, which will mean a significant increase in load, new feeder line(s) might be necessary to install from the municipal switching station, with associated upgrading inside this switching station.

Long term master planning

Master planning on the electricity network in Kleinmond is currently been done by other consultants with completion date thereof due shortly. The outcomes of this masterplan will be used to make informed decisions on the future new developments, i.e. as far as size (kVA) and location is concerned.

8 CONCLUSION

There is sufficient water for the current town within the urban edge with pipeline upgrades, configuration of distribution zones and booster pumping stations required for future high lying developments.

The main sewer pumping station (PS4) must be upgraded when the capacity of the pumping station is reached and further outfall sewers must be upgraded or new outfalls sewers be constructed to deal with the future demand created by new developments.

The traffic assessment of the town together with the storm water master plan must be assessed once new development are identified.

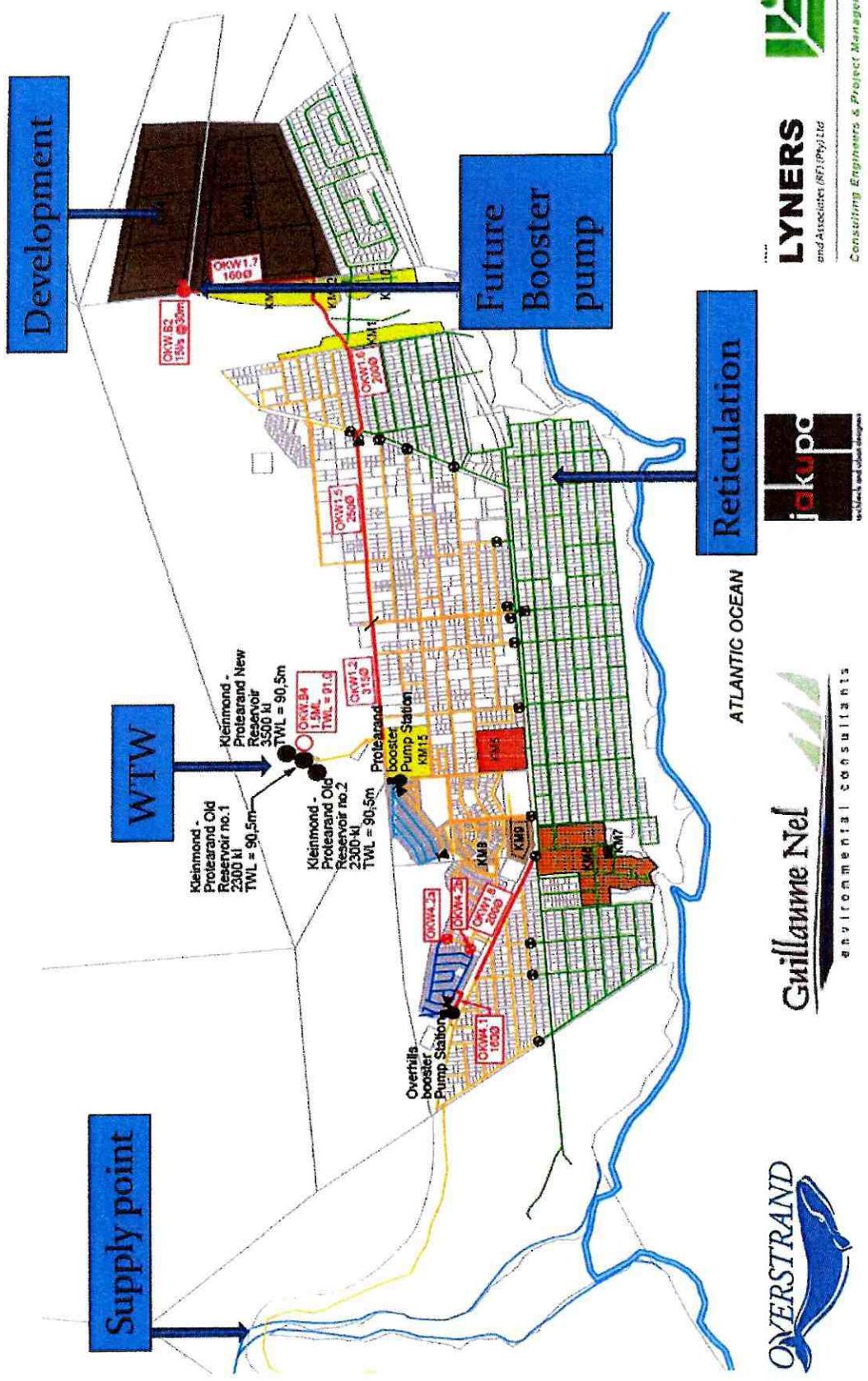
9 RECOMMENDATION

The following is recommended:

- 8.1 That storm water masterplan be completed by other appointed consultant and be made available.
- 8.2 That the Transport and Traffic Impact Assessment of the town be made available to all parties associated with the investigation.
- 8.3 The water -and sewer capacities be confirmed by modelling of the networks once new developments are identified.

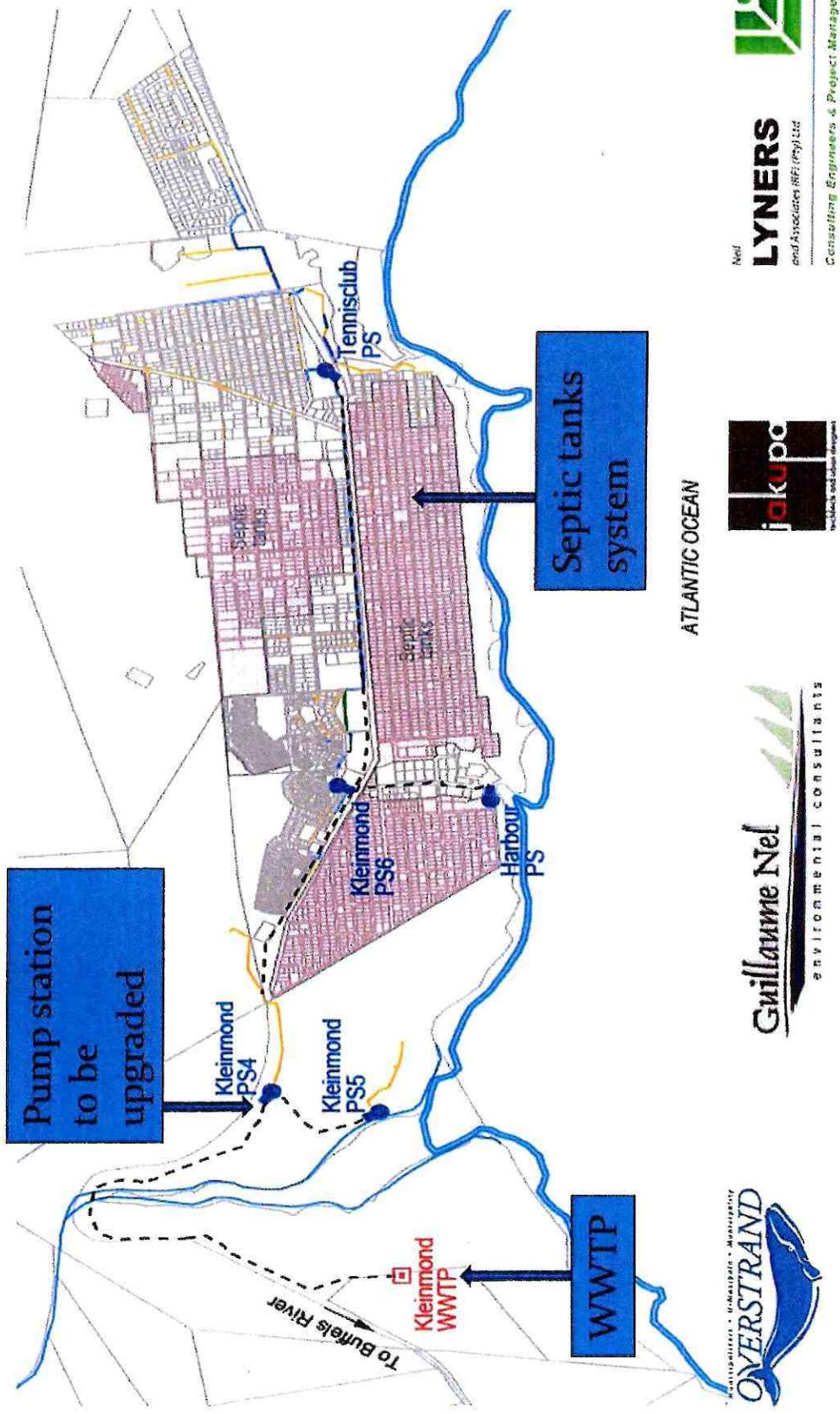
APPENDIX A:
LAYOUT PLAN OF BULK WATER INFRASTRUCTURE

Layout plan of bulk water infrastructure



APPENDIX B :
LAYOUT OF SEWER RETICULATION AND FUTURE UPGRADES

Layout of sewer reticulation and future upgrades



APPENDIX C :
EXISTING 66 KV NETWORK

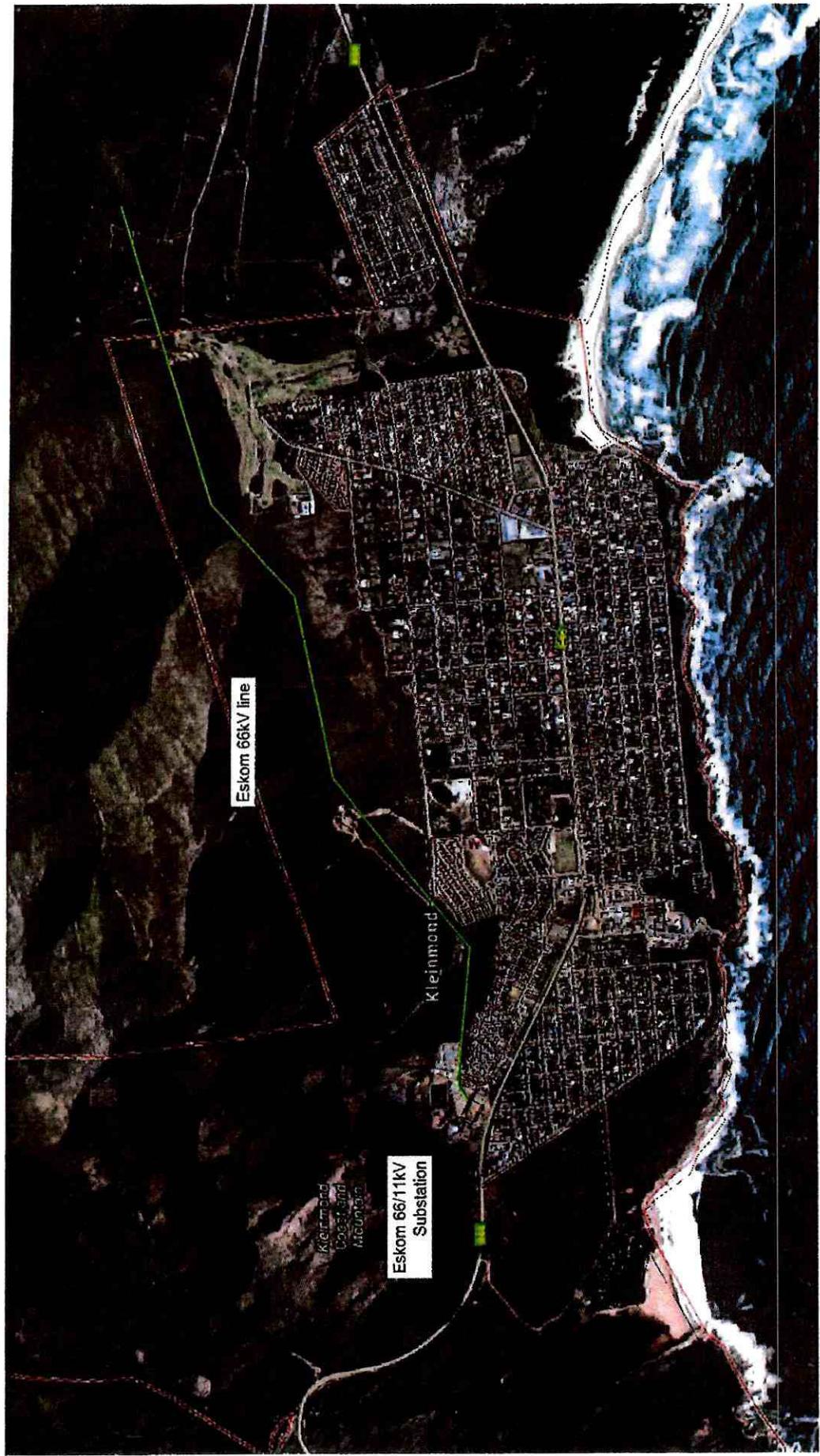
Annexure C: Existing 11kV Network



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APPENDIX D :
ESKOM 66KV SERVITUDE

Annexure D: Eskom 66kV servitude (22m) on northern side of town



ANNEXURE C4

PRESENTATION TO PSC MEETING, 05 DECEMBER 2017

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PRESENTATION TO PSC MEETING, 05 DECEMBER 2017

OVERSTRAND MUNICIPALITY

INVESTIGATION INTO KLEINMOND HOUSING SITES AND OVERHILLS UPGRADE

PROJECT STEERING COMMITTEE MEETING

05 DECEMBER 2017



Welcome and attendance

- Ward representatives
- Western Cape Government: Department Human Settlements representative(s)
- Overstrand Municipality officials
- Professionals



Agenda

- Welcome
- Attendance and introductions
- Purpose of the meeting
- Scope work and work methodology
- Available baseline reports
- Status quo
 - Environmental
 - Urban design, town planning, land ownership and vacant land
 - Civil Engineering infrastructure
 - Electrical Engineering infrastructure
 - Geotechnical
- Future development needs
- Developing criteria for selecting sites
- Public participation process
- Way forward and timelines
- General
- Closure



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Purpose of meeting

- First Project Steering Committee to discuss:
 - Scope of the work
 - Work methodology
 - Current status of development and planning
 - Public participation
 - Way forward



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Scope of Work and Methodology

- Scope:
 - Investigate all vacant land in and around Kleinmond for full spectrum of current and future housing needs.
 - Investigate Overhills upgrading options
- Methodology
 - Holistic approach – Start at town level and work down to specific sites
 - Previous baseline studies and strategic documents inform current status
 - Urban edge not a fixed for current study as SDF planned to be revised in 2018/2019
 - Existing studies reviewed and status quo prepared



Scope of Work and Methodology (continue)

- Methodology (continue):
 - Develop criteria for the selection of sites
 - Refine status quo report
 - Presentation at open house meeting with public to:
 - Inform public on process
 - Get input from public
 - Get buy in to solve the housing needs of Kleinmond
 - Review all constraints and opportunities
 - Screening sites for various uses at hand of criteria, constraints and opportunities, including Overhills
 - Prepare high level report on findings
 - Follow-up PSC meeting to discuss findings



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Scope of Work and Methodology (continue)

- Methodology (continue):
 - Narrow down on number of sites and opportunities for Overhills upgrades
 - Impact analysis and cost estimate for the selected sites and Overhills upgrades
 - Prepare report on final findings
 - PSC meeting to discuss findings
 - Refine report
 - Open house public meeting with exhibits of work and findings
 - Refine report and discuss with PSC
 - Final report
 - Close-out



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Available baseline reports

- All strategic documents made available, amongst others:
 - Spatial Development Framework for Kleinmond
 - Spatial Growth Management Strategy
 - Study into Needs and Demands of Affordable Housing in Overstrand (including socio-economic study)
 - Overstrand Zoning Scheme Report
- Ecology and conservation area maps
- Previous studies of identified housing sites
- Master plans of engineering services
- Existing land ownership



Status quo reports

- Environmental
- Urban Design
- Civil Engineering
- Electrical Engineering
- Geology



Environmental Constraints

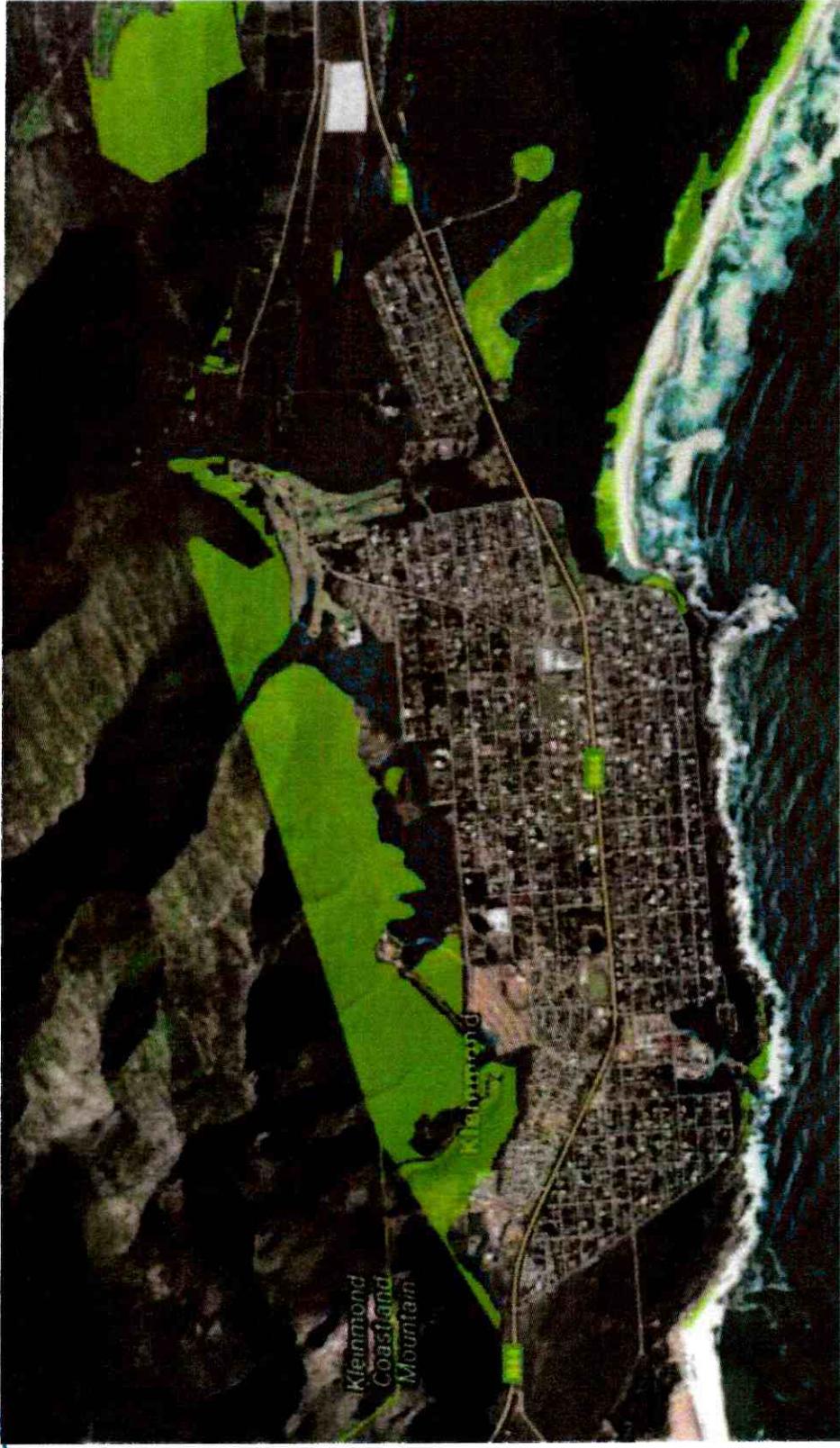
- Meeting with various Environmental Departments, including:
 - CapeNature
 - Kogelberg Biosphere Reserve
 - Overstrand Municipality (Environmental Department)
 - Kleinmond enclosed by Atlantic Ocean to South and Palmiet Mountain Range to North.
 - Majority of Kleinmond is covered by Hangklip Sand Fynbos (Vulnerable vegetation type)
 - Northern reaches are covered by Kogelberg Sandstone Fynbos (Least Threatened vegetation type)
 - Remnants of other vegetation types occur, but it is not expected to be impacted upon



Environmental Constraints (continue)

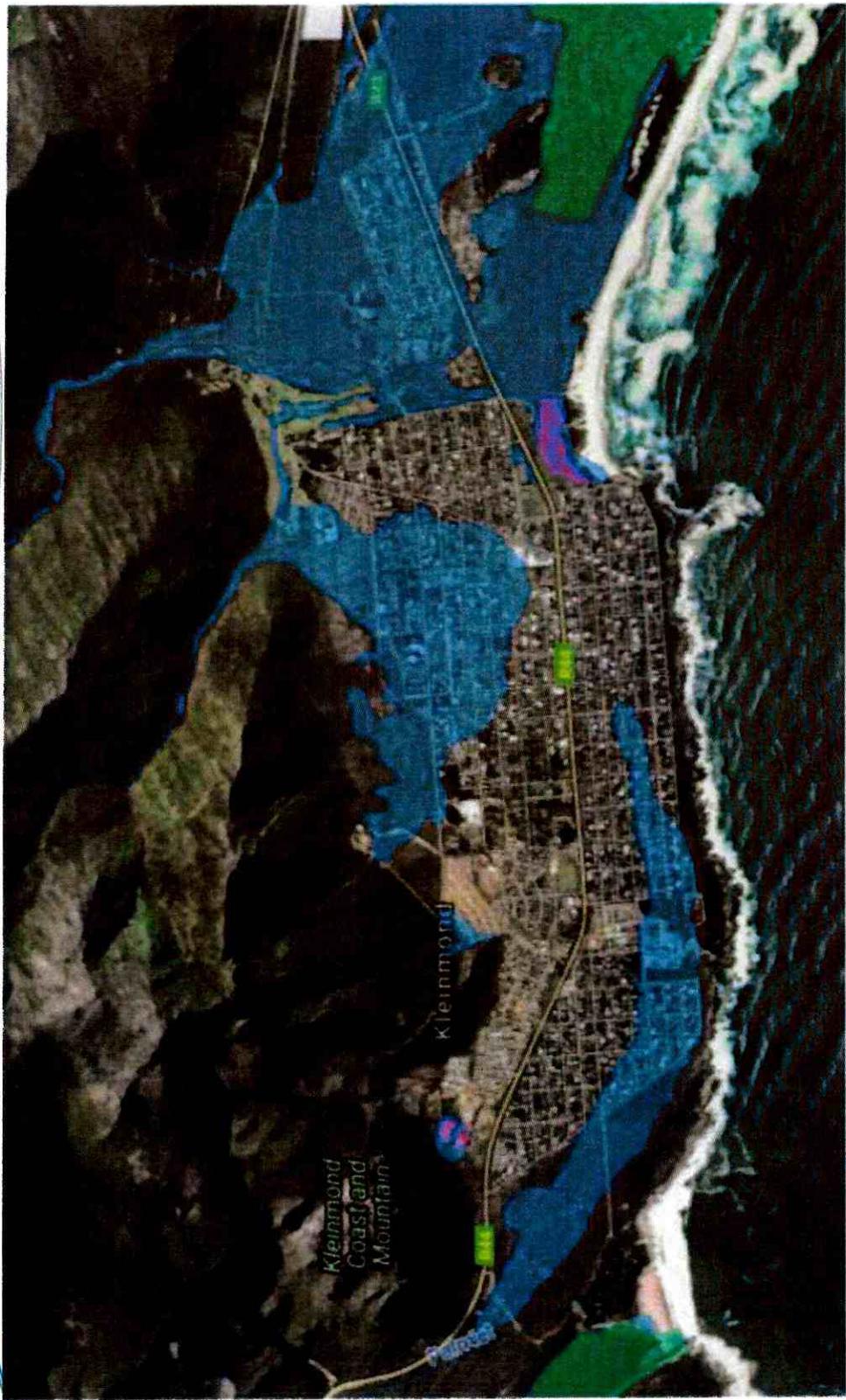
- Numerous freshwater sources surrounding Kleinmond; with Palmiet River located to the West of Kleinmond
- Numerous wetlands mapped across Kleinmond
- Previous study for housing development on Portion 8 of Farm 563 classified extensive areas of property as wetland with two streams also present (CapeNature)
- Environmental impacts can be mitigated, should the need arise
- Kogelberg Biosphere Reserve (KBR) borders the Northern reaches of Kleinmond and should not be encroached on
- EIA process to be followed to be determined when site alternatives have been identified





Critical Biodiversity Areas Map of Kleinmond, Western Cape	Guillaume Nel Environmental Consultants Tel: (021) 870 1874 Fax: 086 6933 802 Cell: 072 1671 321 Source: Cape Farm Mapper
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Water Resources Map of Kleinmond

Source: Cape Farm Mapper
Information provided by the South African National Space Agency (SANSA) and the South African Department of Environment, Forestry and Fisheries (DEFF)

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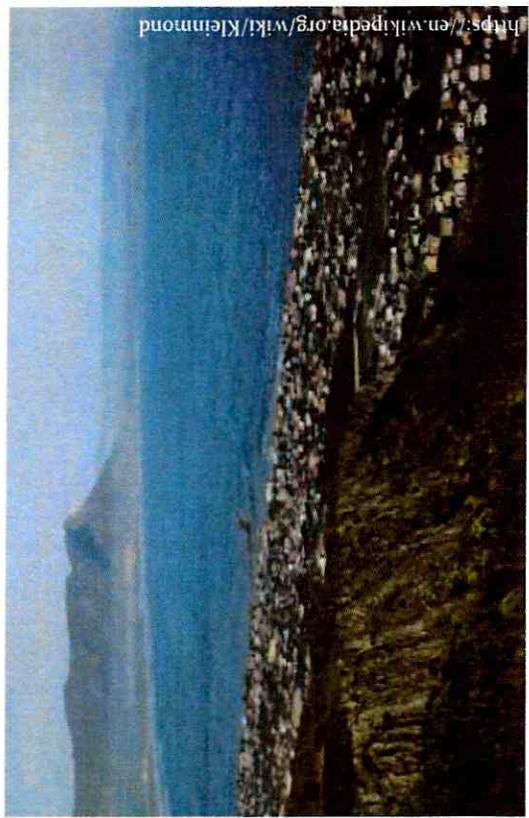
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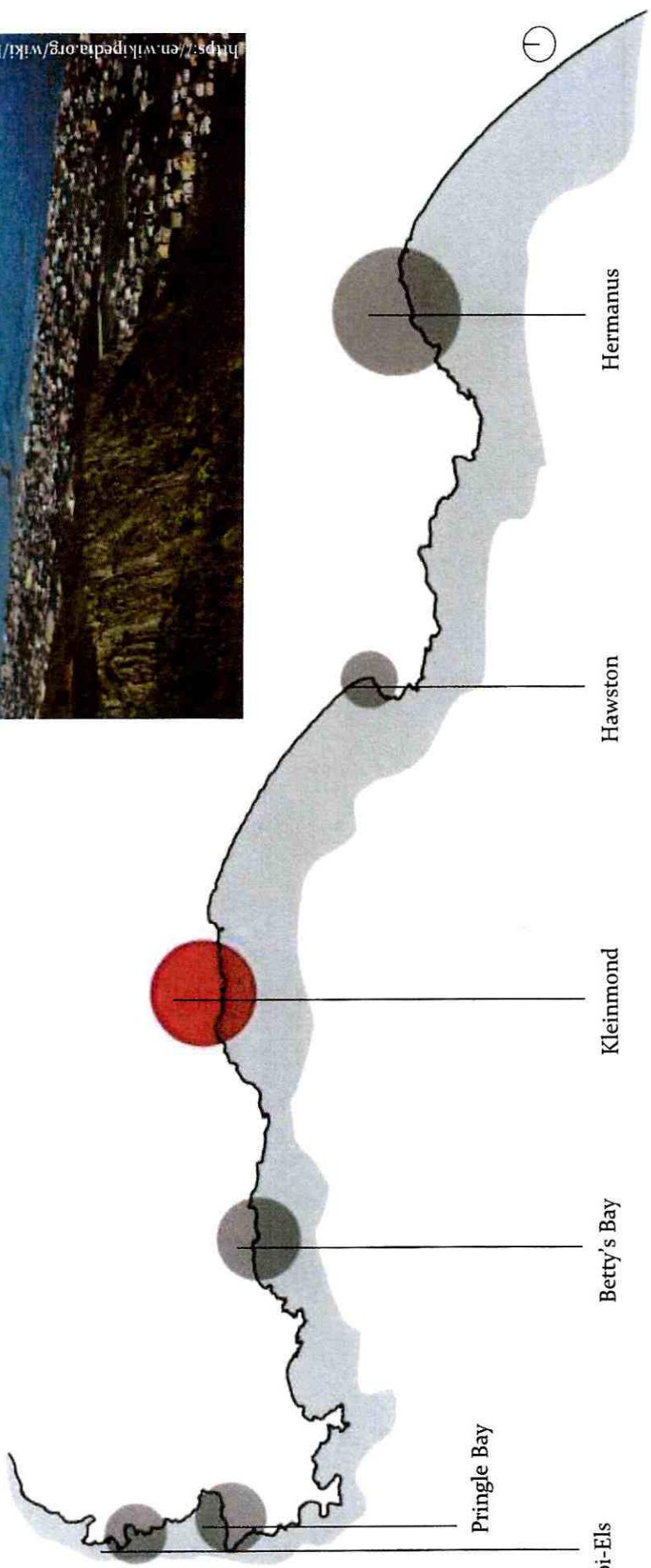


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Urban Design

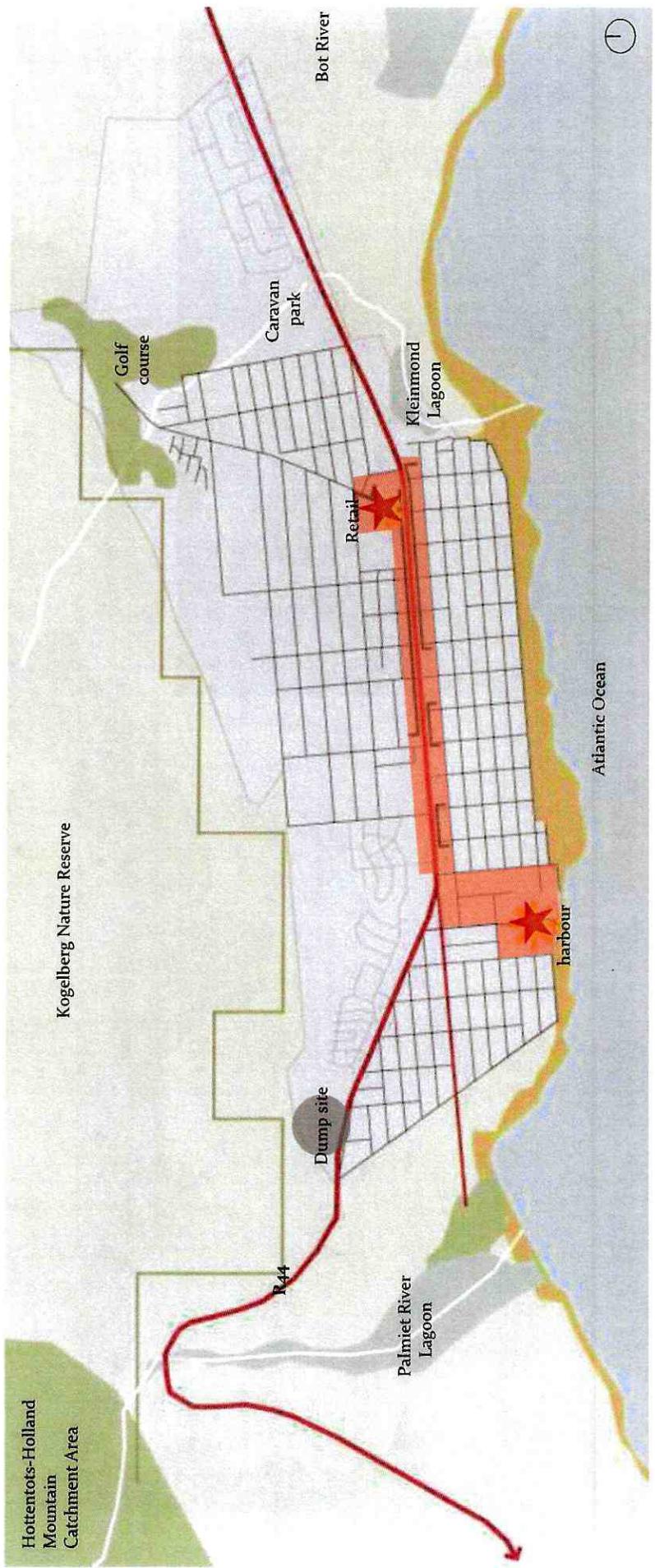


<https://en.wikipedia.org/wiki/Kleinmond>

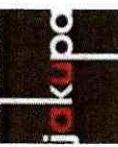


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Town Structure



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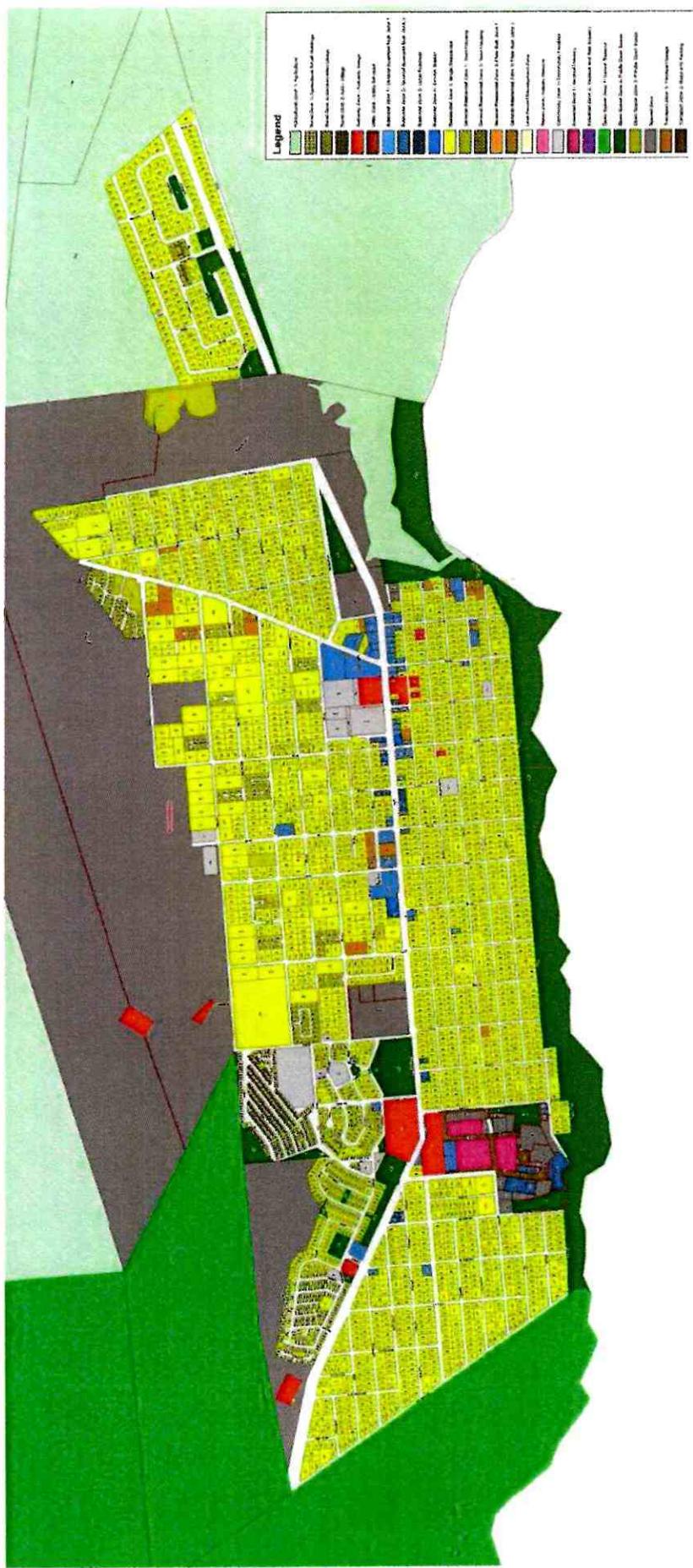


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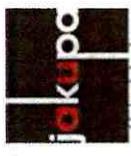


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Land Use



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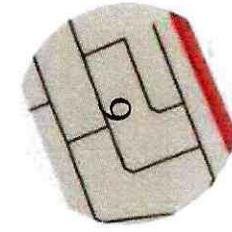
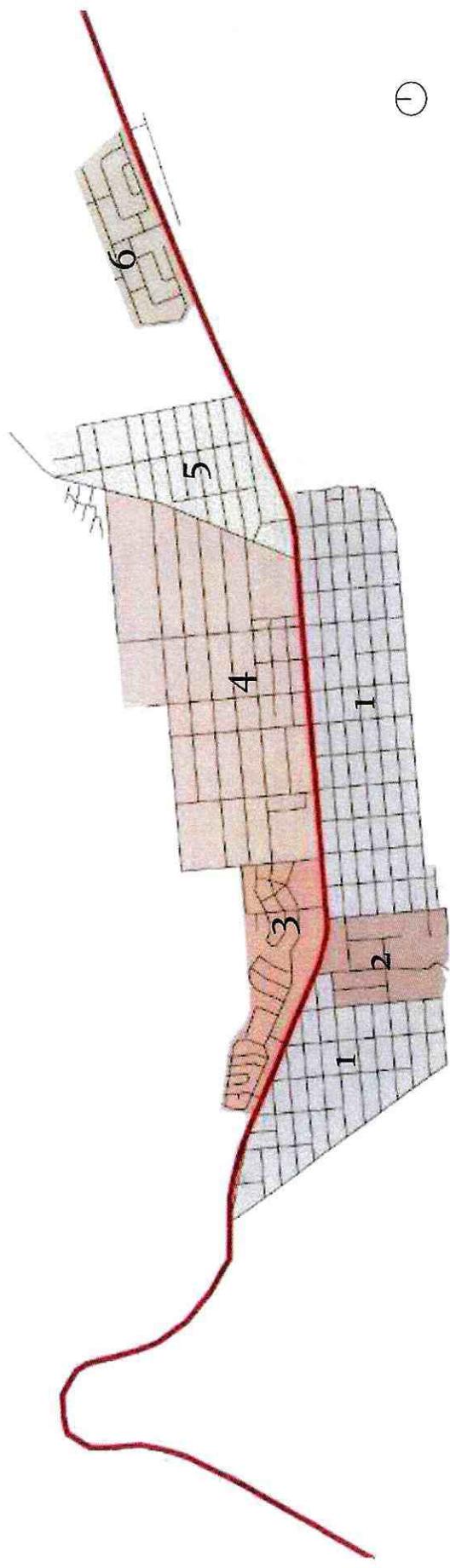


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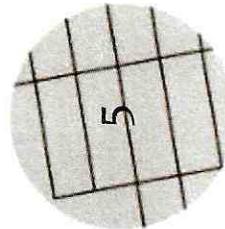


COMMUNAL CHOICE & RESOURCE MANAGEMENT

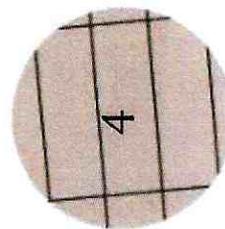
Grids and Convolution



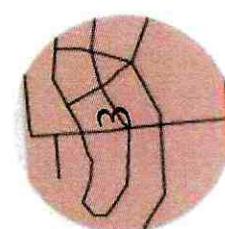
6. Irregular,
labyrinthine street
layout



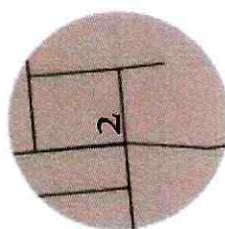
5. Long, narrow
rectangular grid



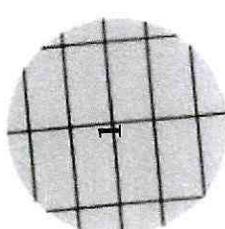
4. Long rectangular
grid



3. Convoluted
irregular street layout



2. Irregular industrial
grid



1. Short rectangular
grid



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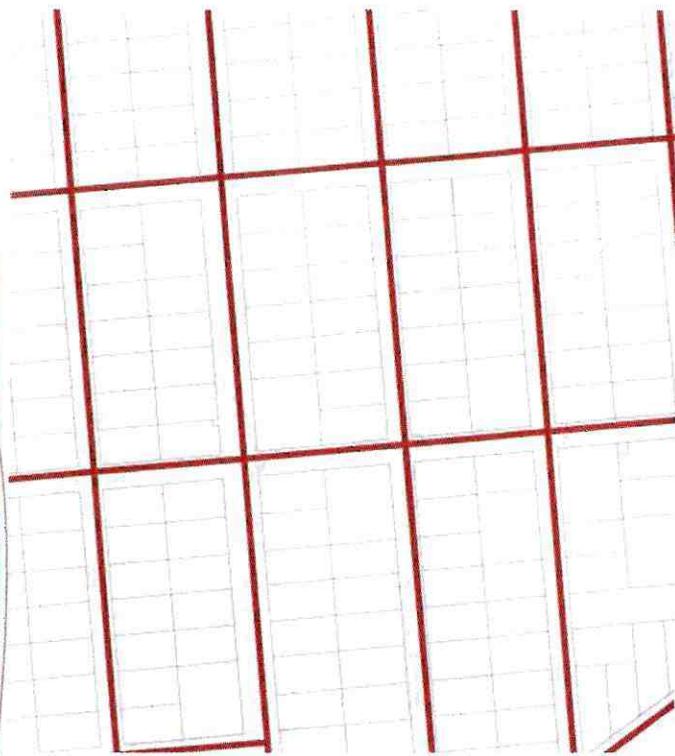


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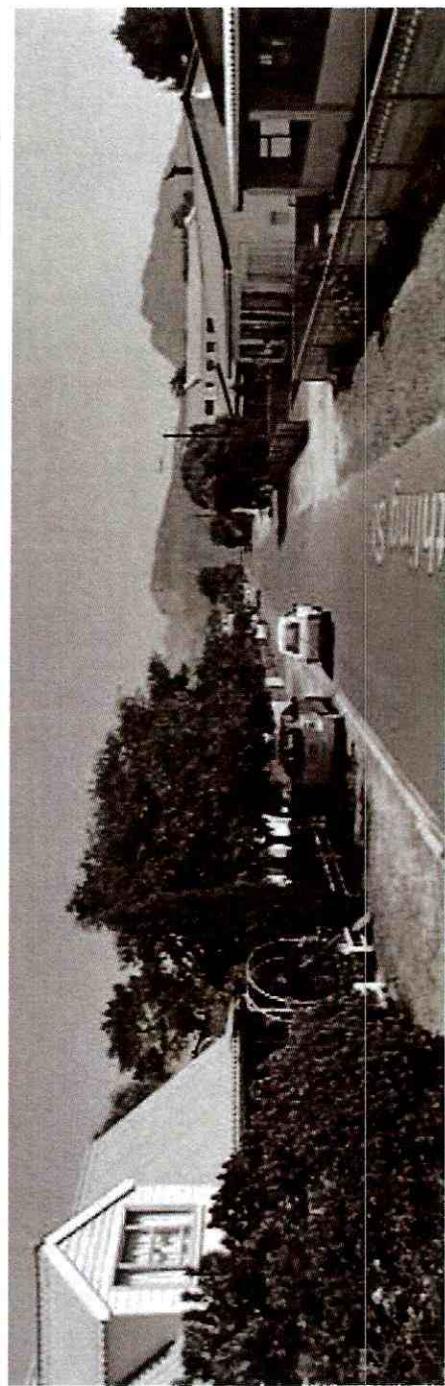
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1. Short rectangular grid

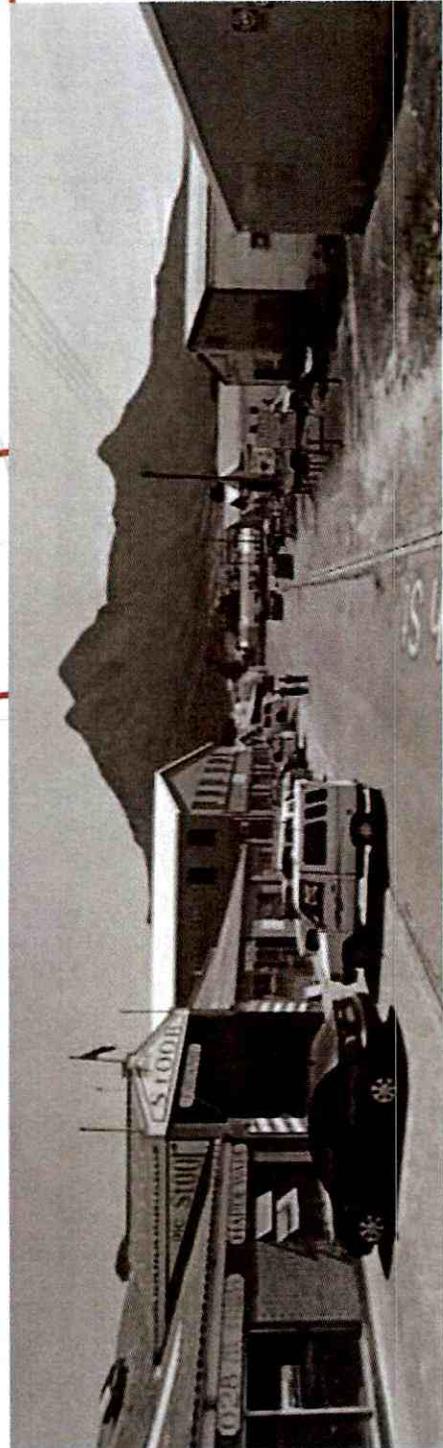
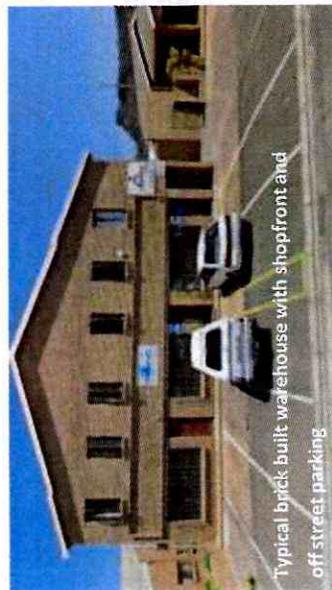
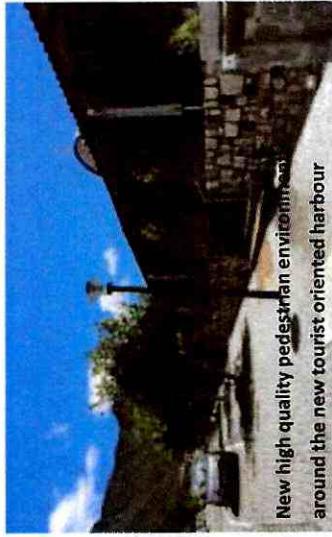


Typical single storey dwelling with large frontgarden and low wall facing the street.



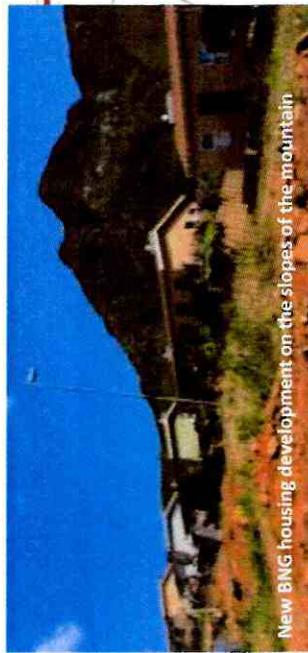
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2. Irregular industrial grid



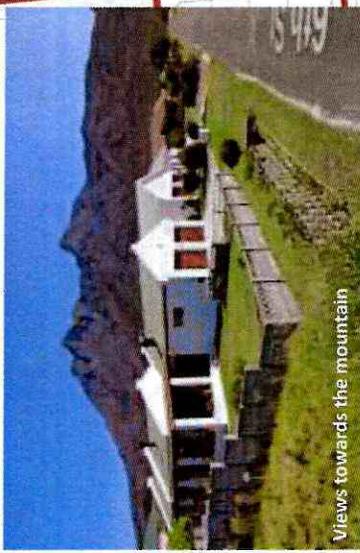
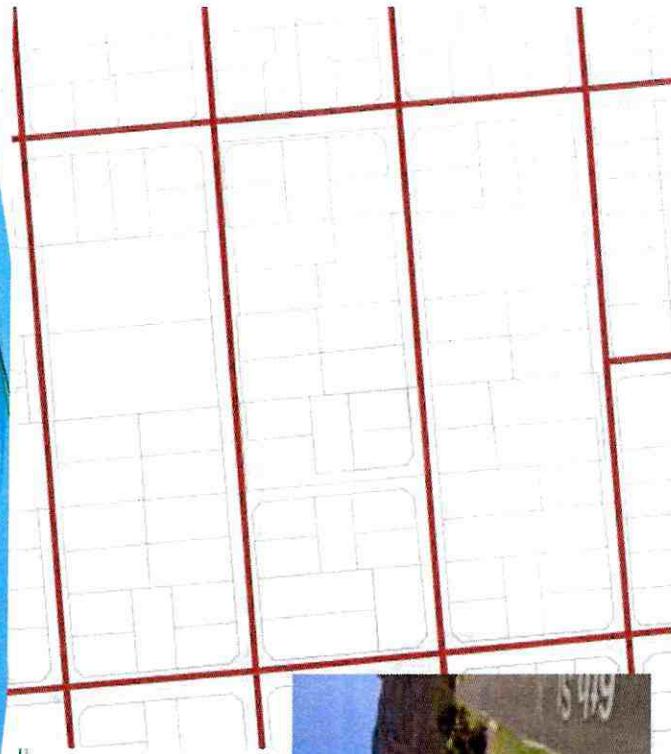
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3. Convolute irregular layout



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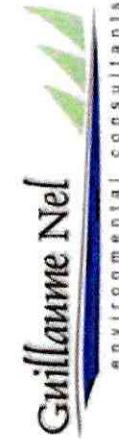
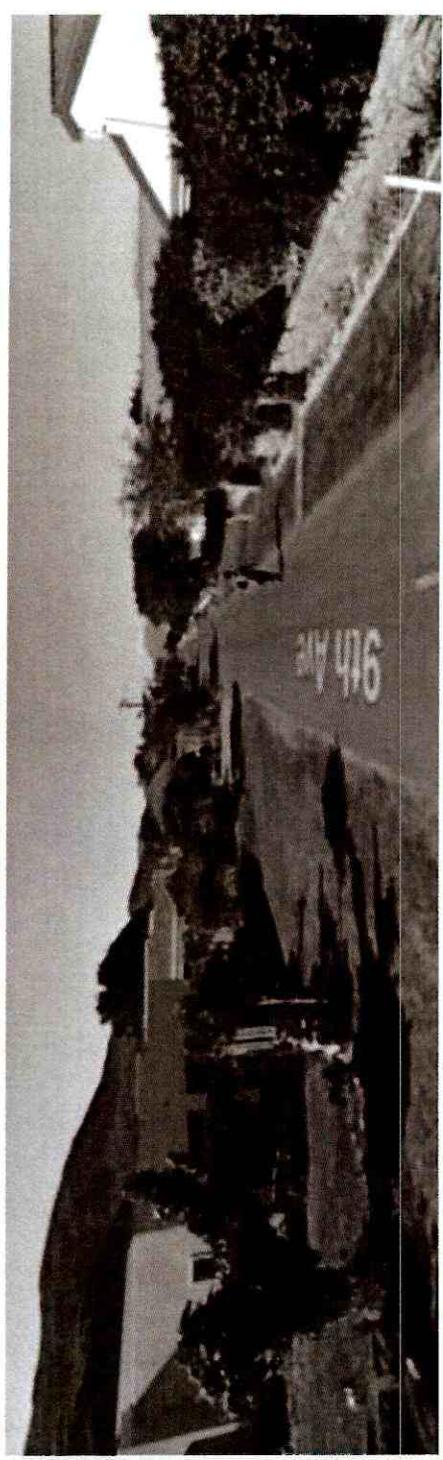
4. Long rectangular grid



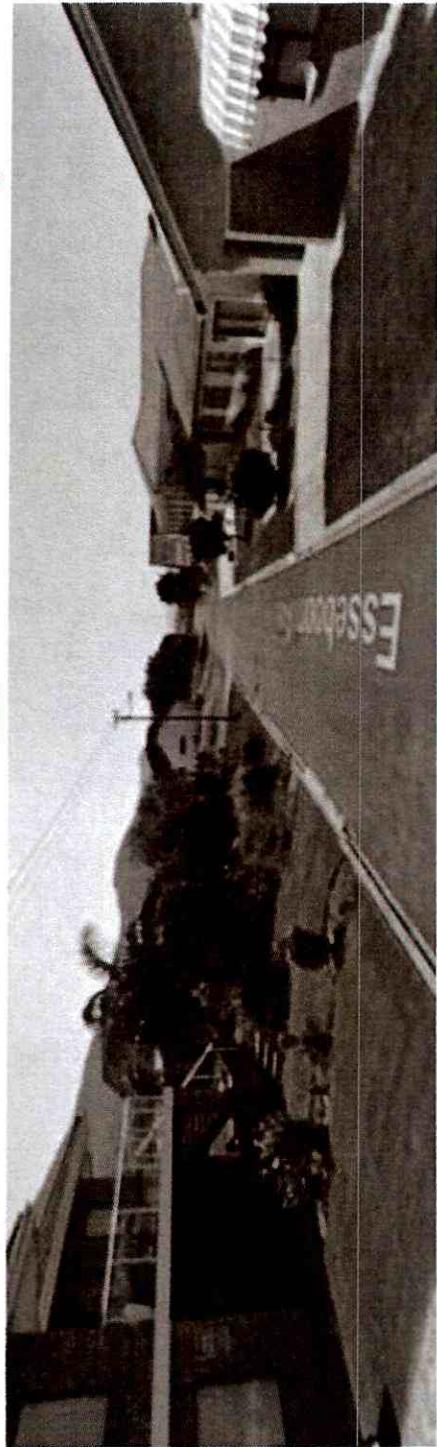
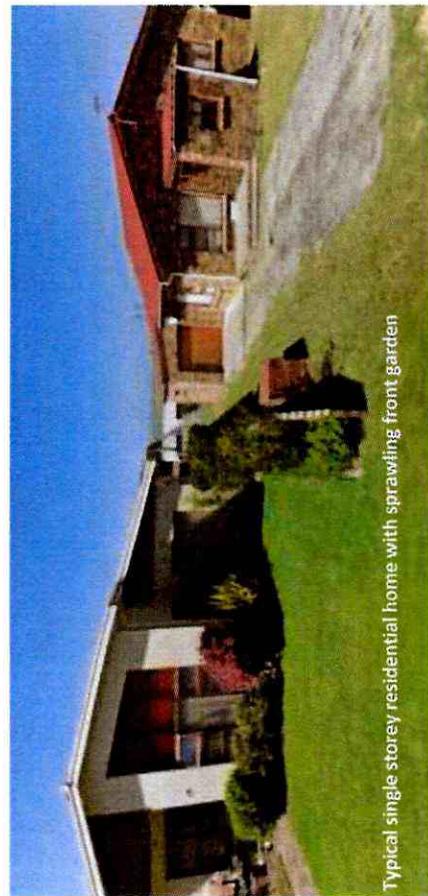
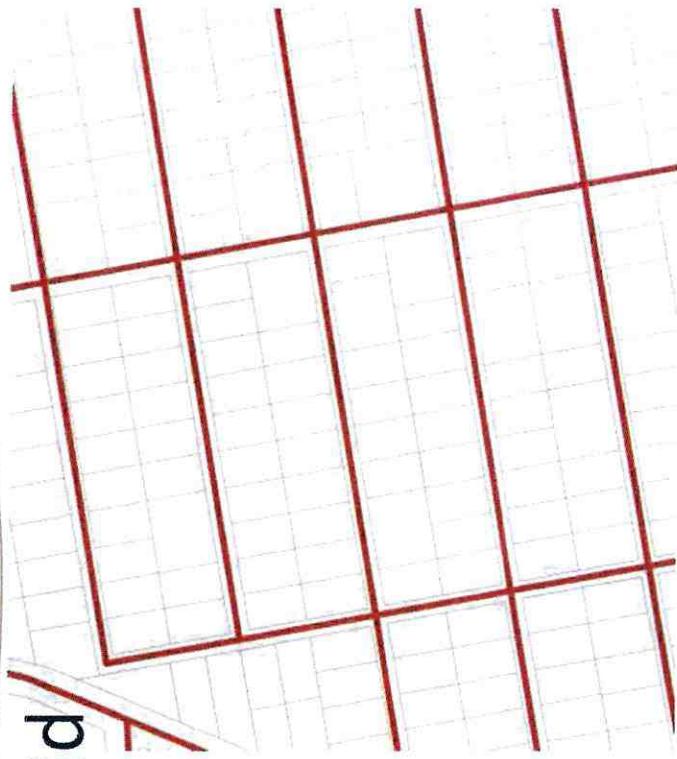
Views towards the mountain



Typical single storey residential home with sprawling front garden



5. Long, narrow rectangular grid



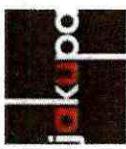
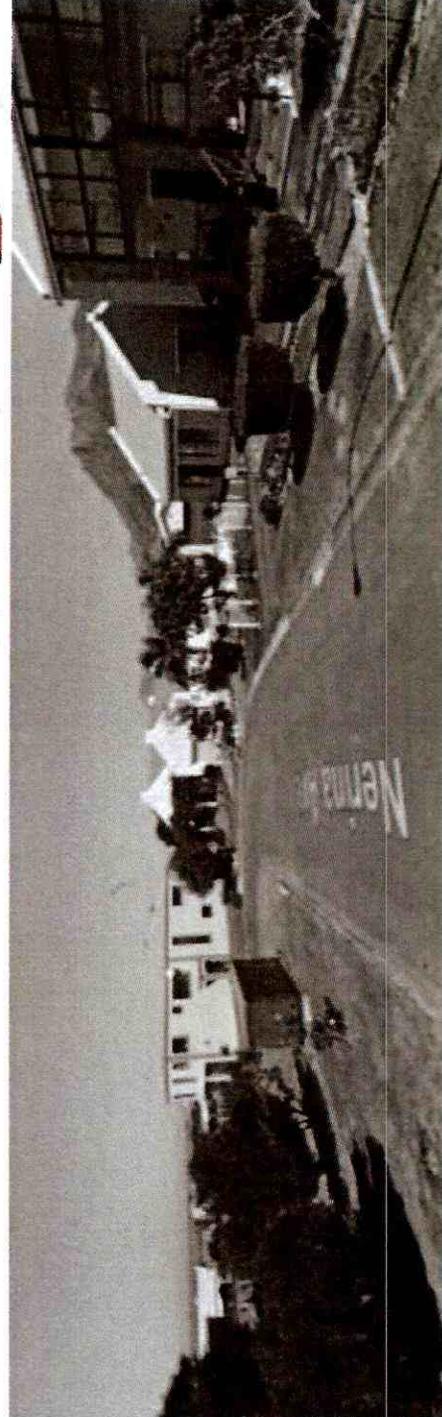
6. Irregular, labyrinthine layout



Typical winding streets with single storey residential home and sprawling front

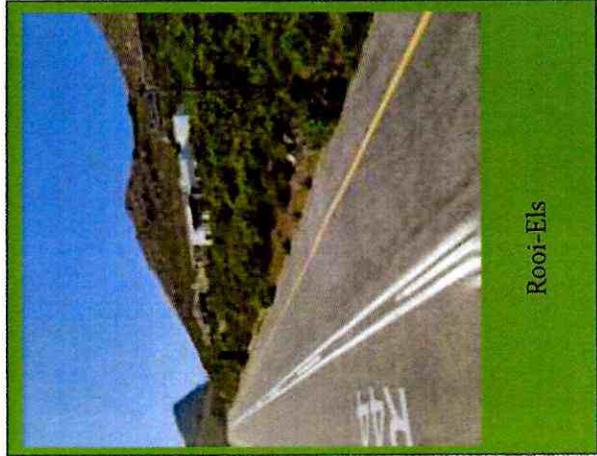


Google maps: <https://goo.gl/VRSNfH>

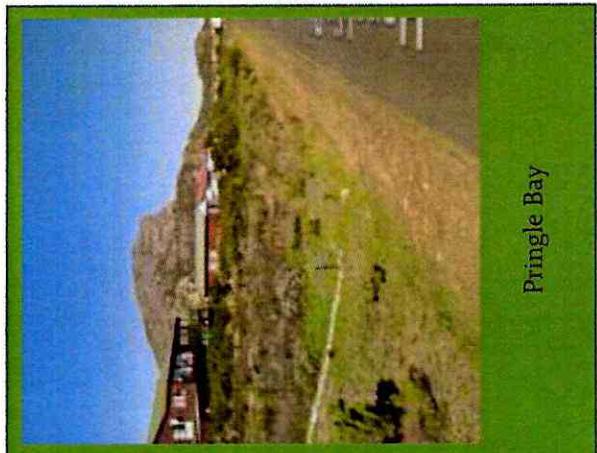


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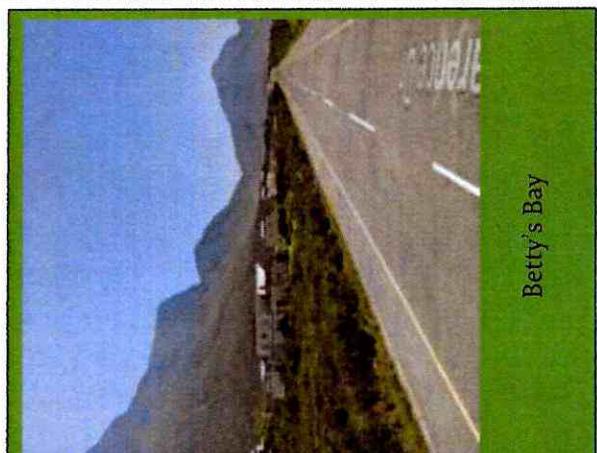
Main Road



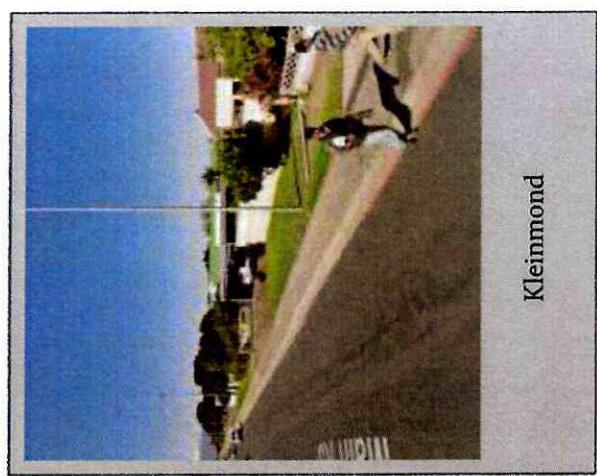
Roi-Els



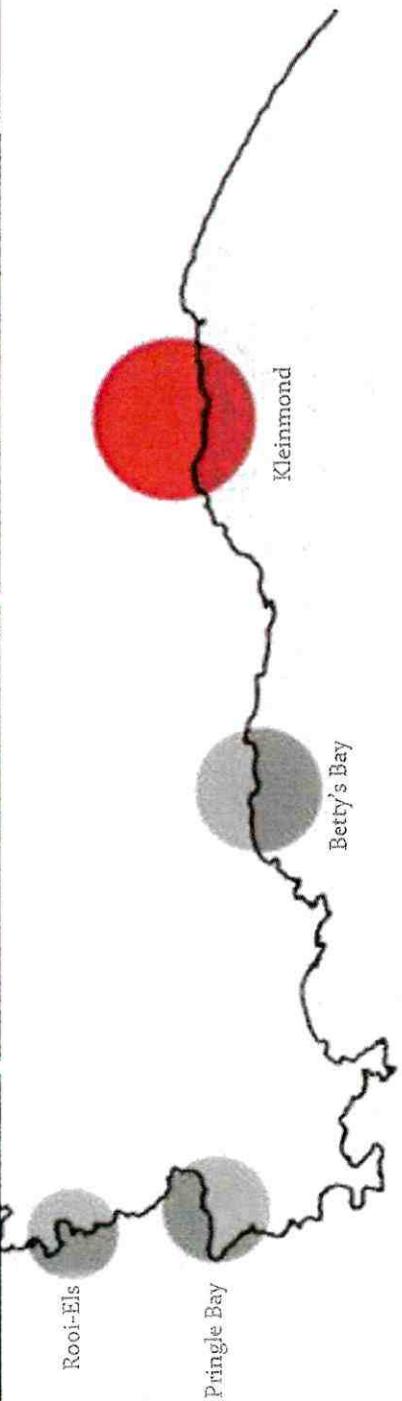
Pringle Bay



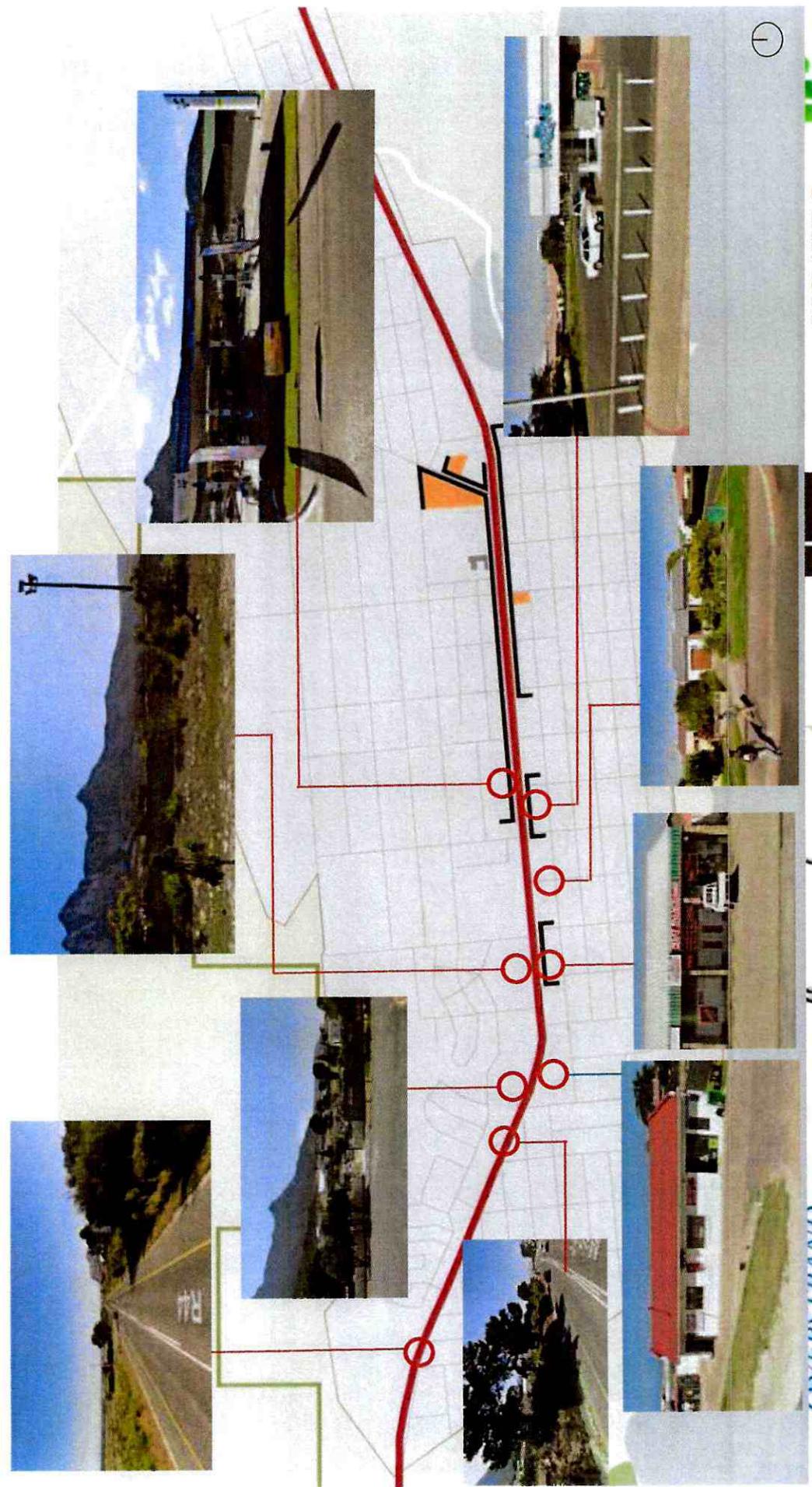
Betty's Bay



Kleinmond



Main Road



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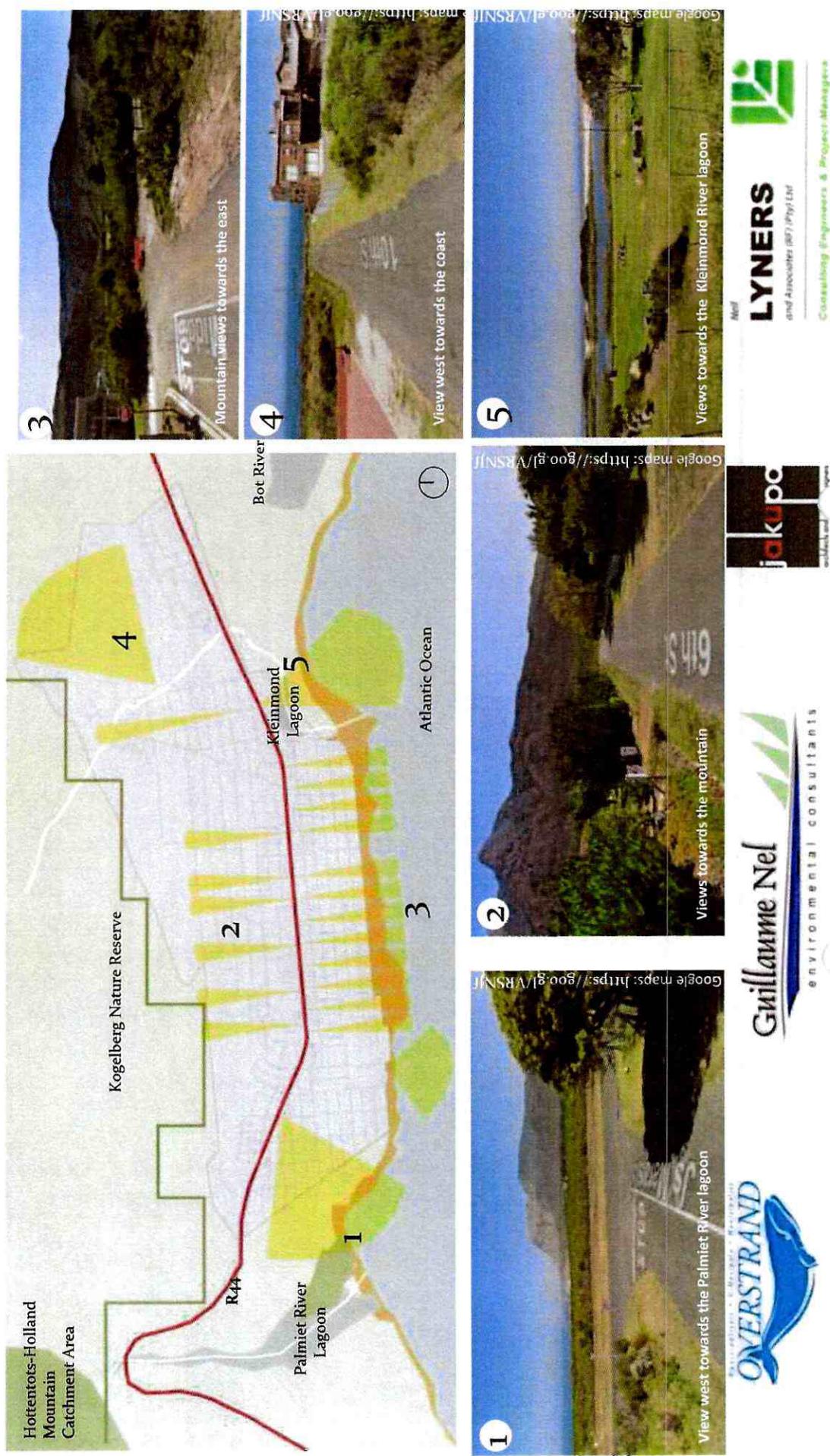
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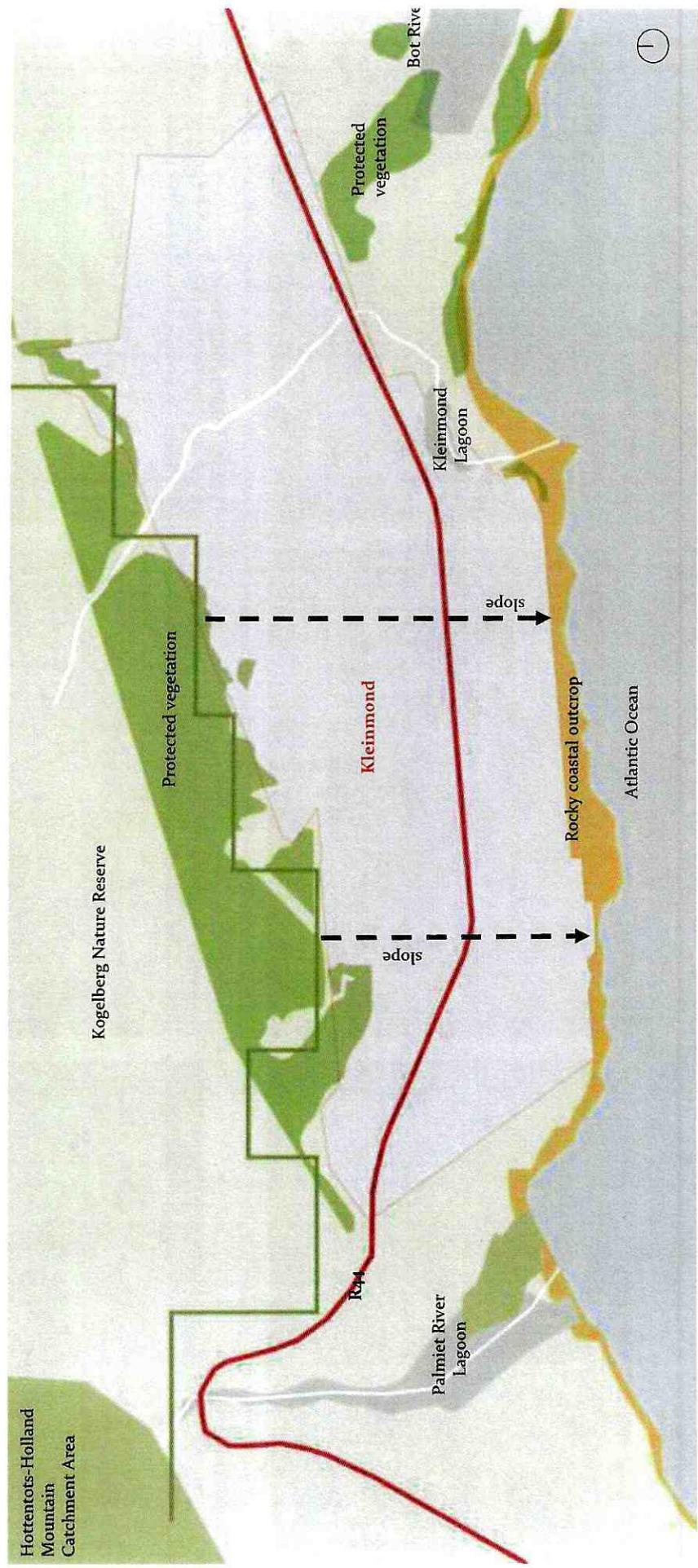
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Views to Nature



Landscape: City + Nature



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environmental consultants

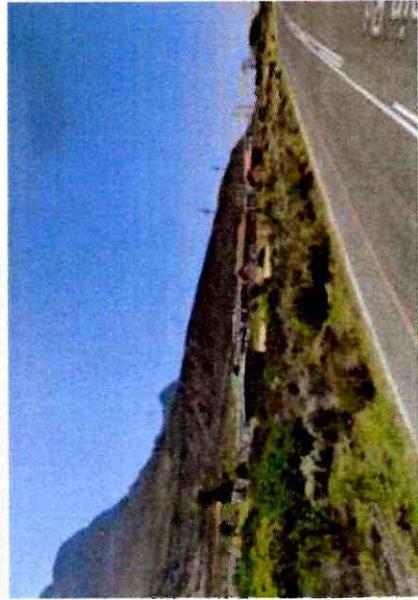


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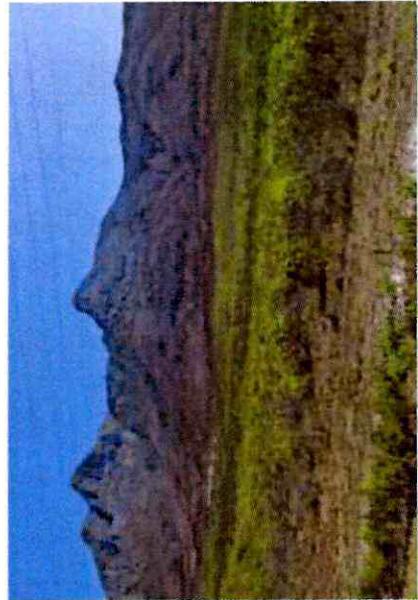
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Landscape: City + Nature

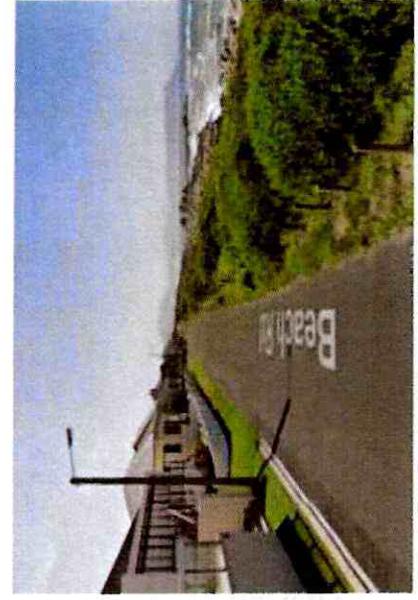
Entrance from R44 to town



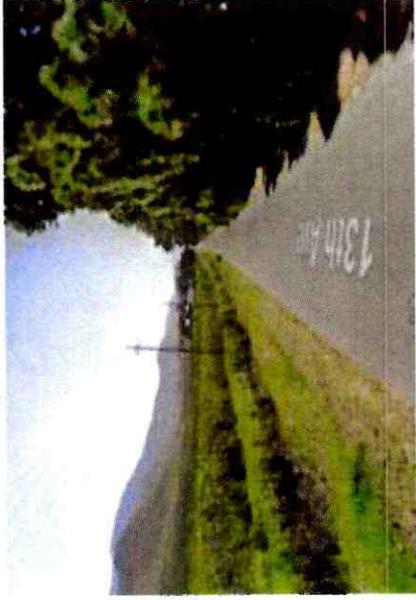
Protected Nature



Built coastline



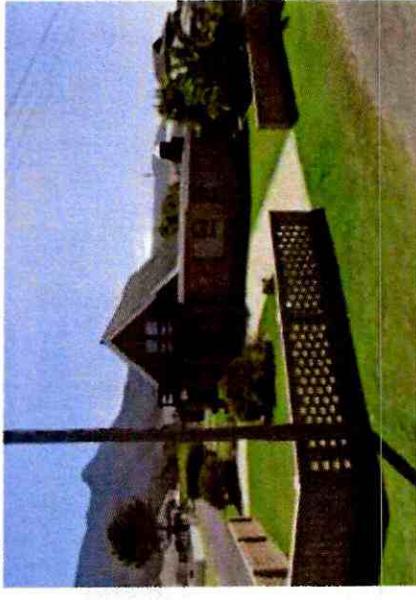
North built edge



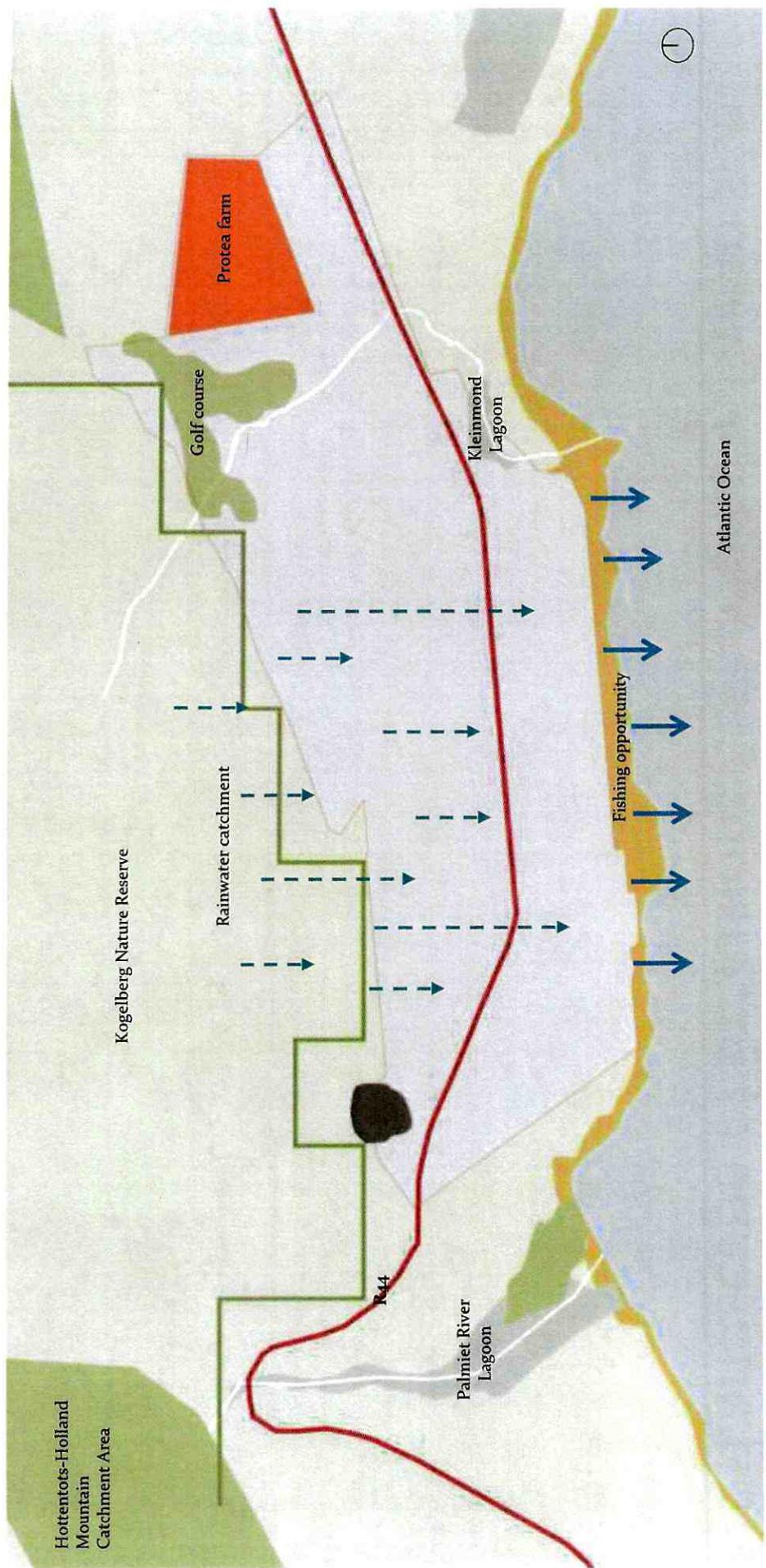
Golf Course



Typical built landscape



Working Landscape: Proteas + Fishing

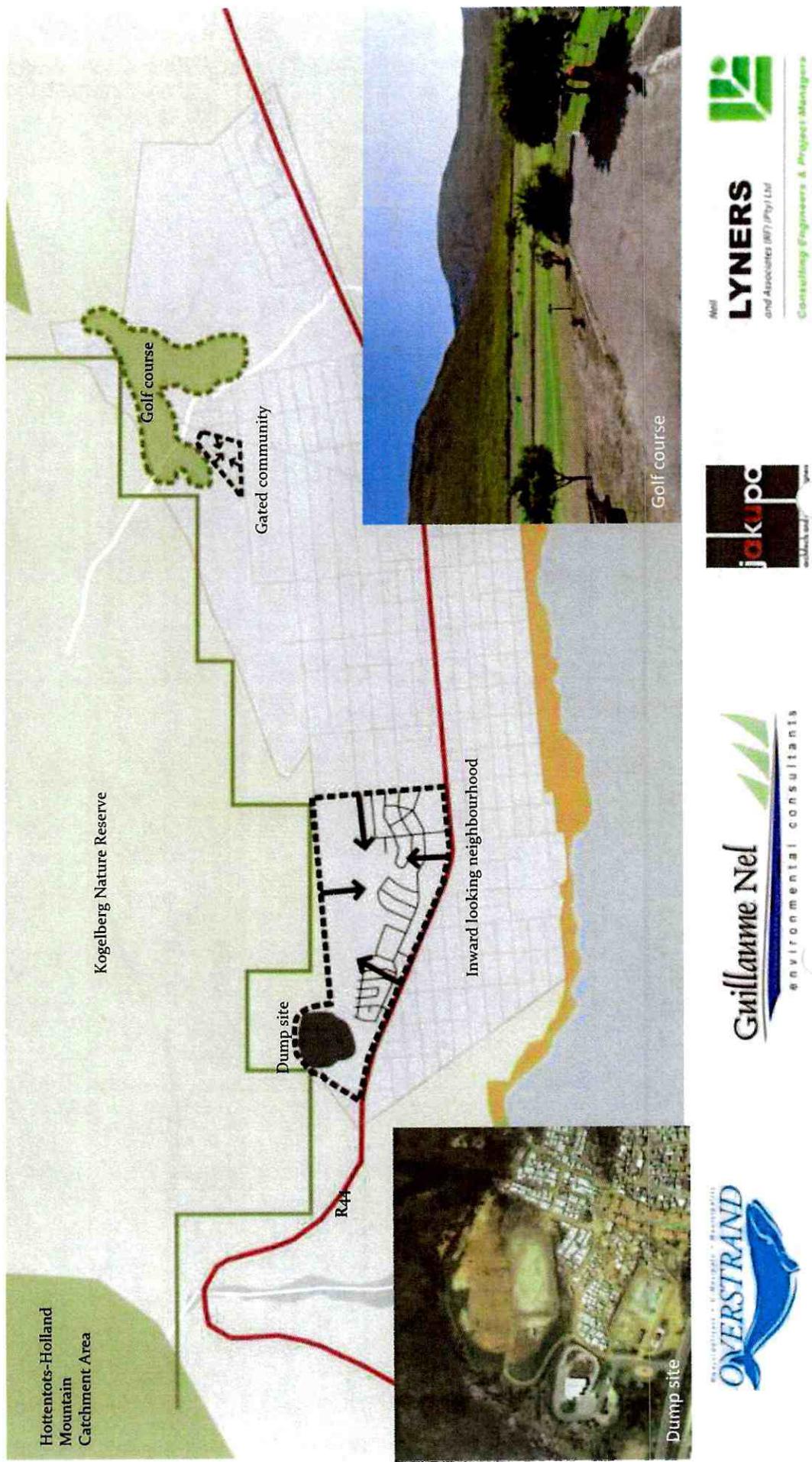


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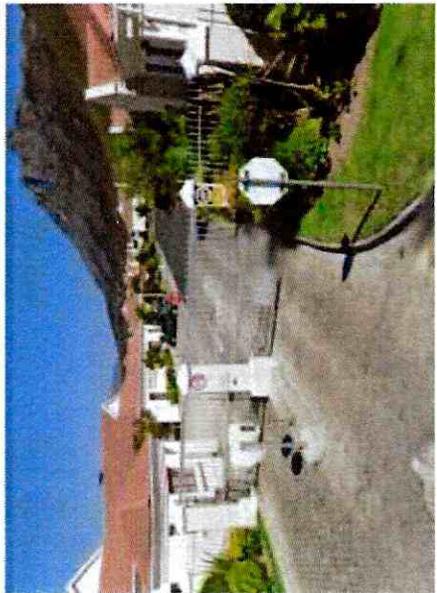
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Landscape of Exclusion: Golf course + Dump site

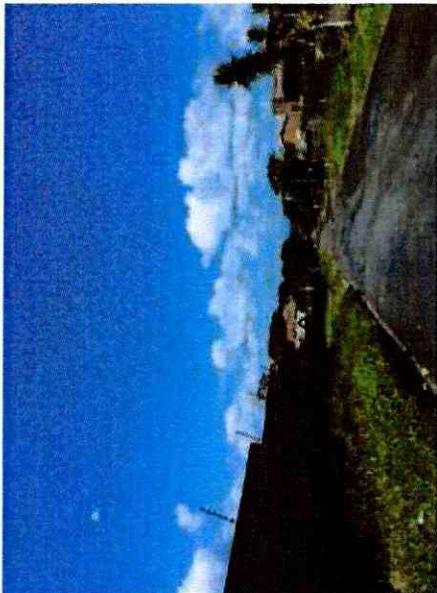


Landscape of Fear: Shift to Introversion

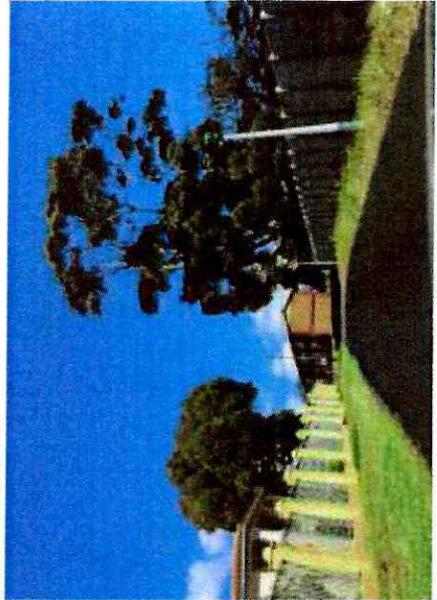
Gated Estates



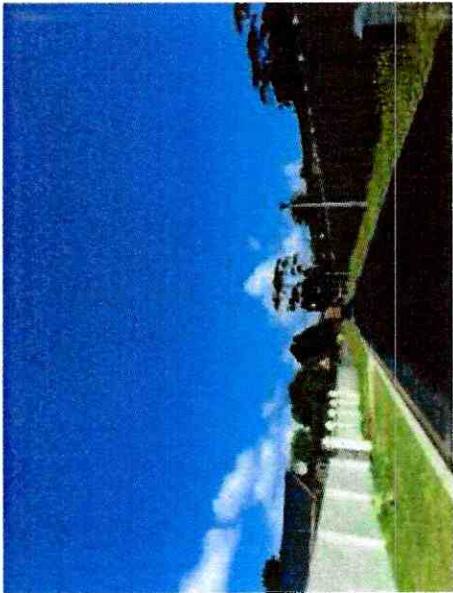
High walls with electric fencing



Palisade fencing



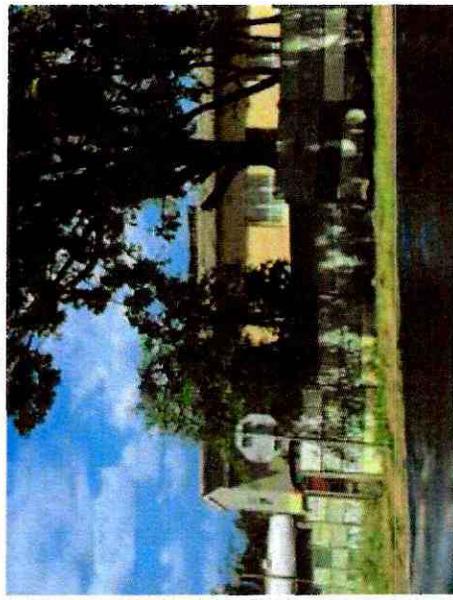
Vibrecrete fencing



High with fencing and greenery



Vibrecrete fencing



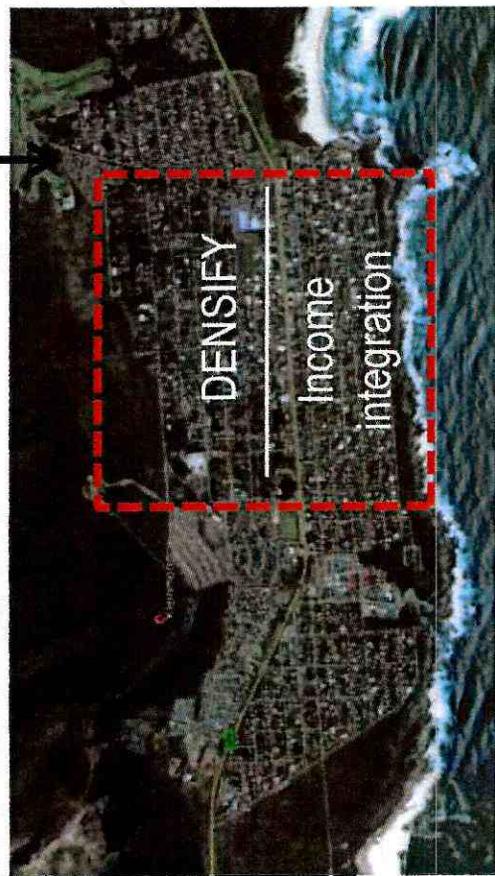
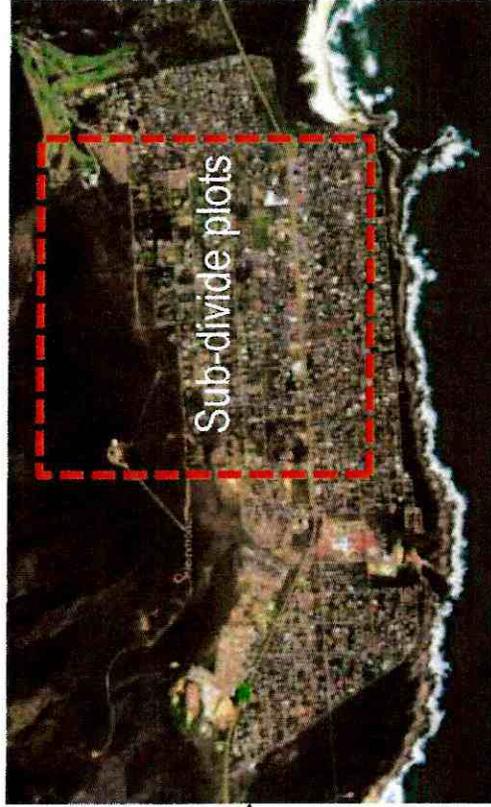
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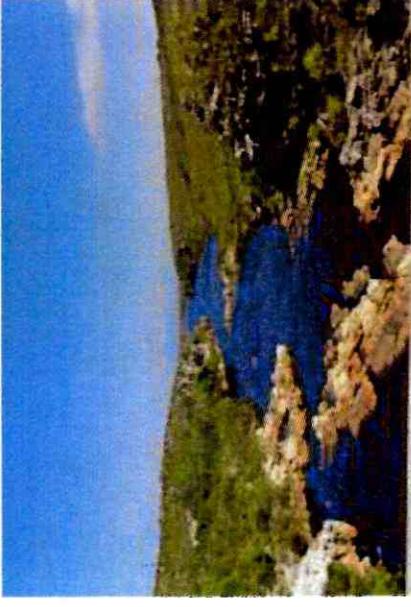
Transition



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Great places

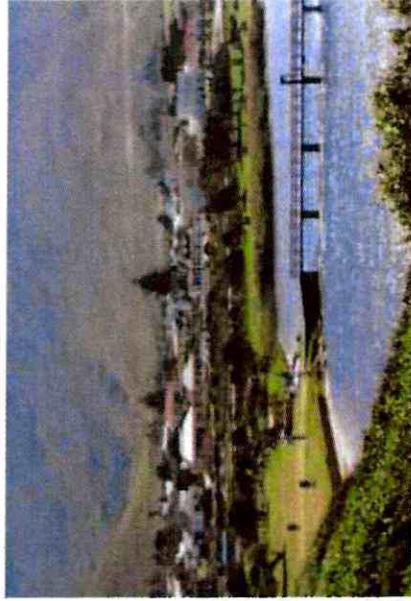
Palmiet River lagoon



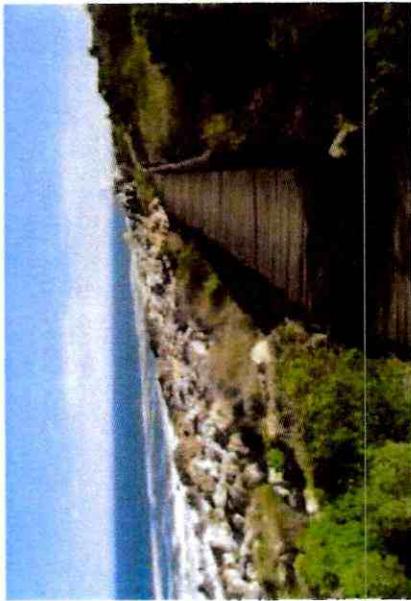
Protected Nature



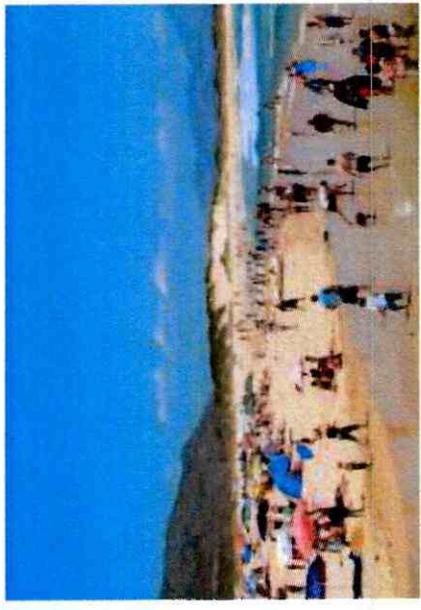
Kleinmond Lagoon



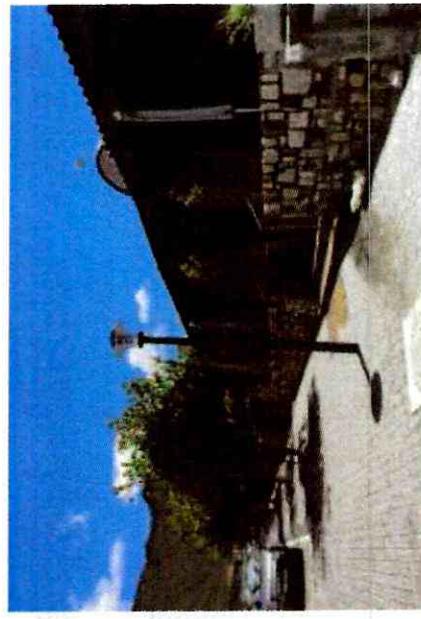
Coastal Walkway



Kleinmond Beach



New harbour



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Civil Engineering

- Water (Current):
 - Main supply from Palmiet River diversion weir, pumped to Kleinmond Water Treatment Works (WTW)
 - Single pressure zone supply from 3 reservoirs located at the WTW with a combined storage capacity of 8,1Mℓ
 - Current system has sufficient capacity



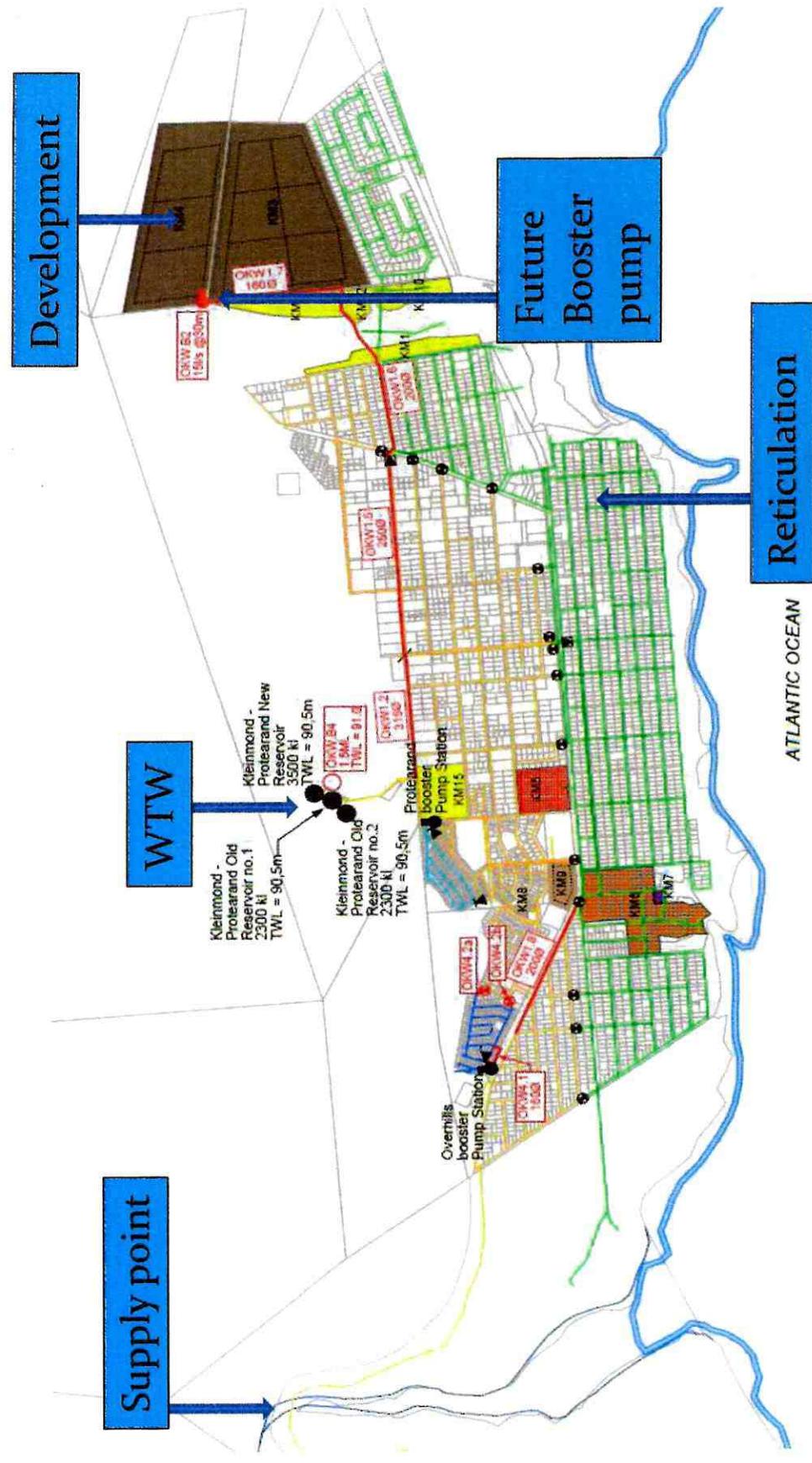
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Civil Engineering (continue)

- Water (Future):
 - Distribution zones to be implemented
 - New booster pumping station for high lying developments
 - New 1,5Mℓ reservoir
 - Upgrading of certain network pipelines depending on developments densities and locations



Civil Engineering (continue)



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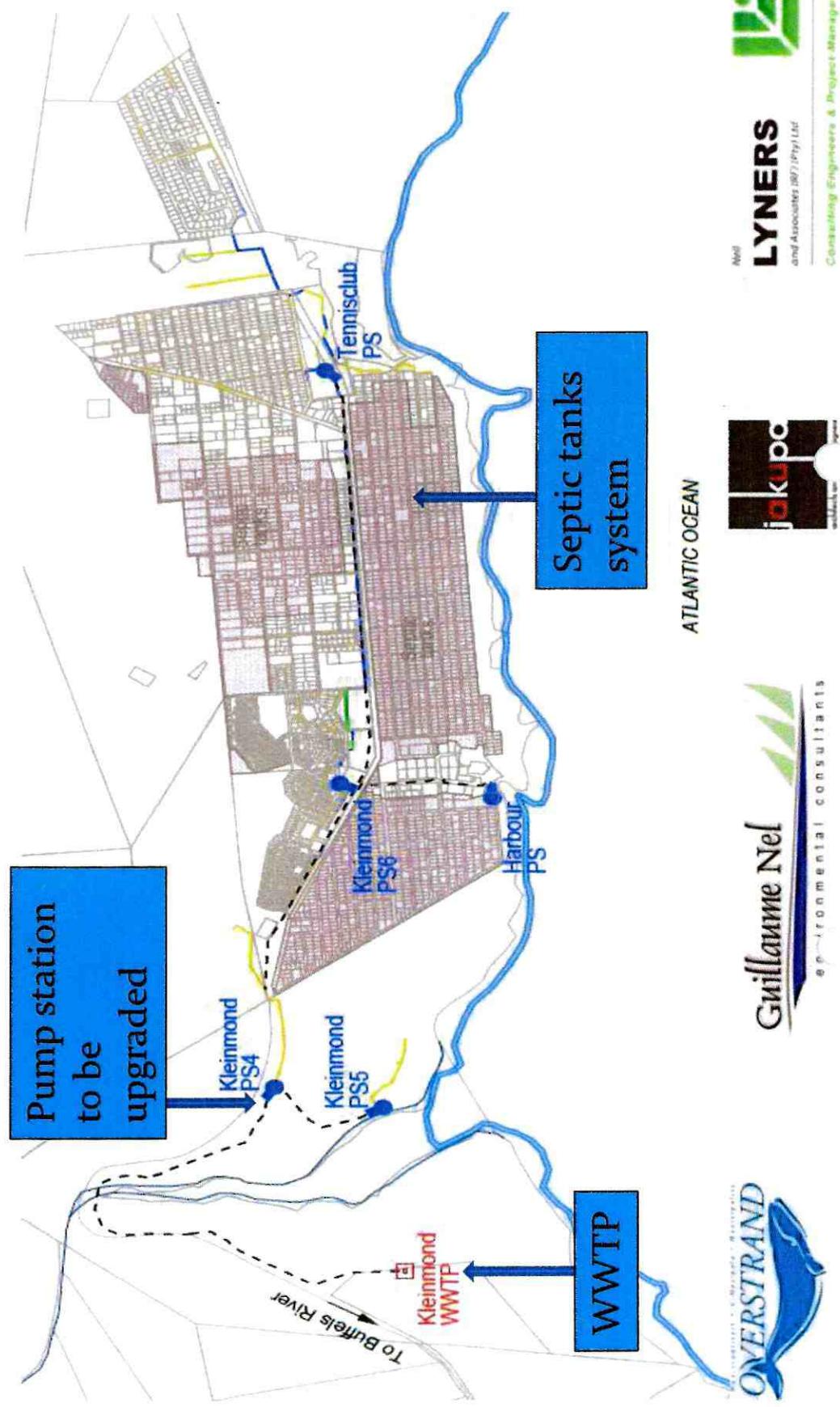


Civil Engineering (continue)

- Sewer:
 - Existing 2Mℓ/day Waste Water Treatment Works (WWTW)
 - Current network has sufficient capacity to deal with current inflow
 - Southern part of town has septic tanks
 - Main pumping station (PS4) to be upgraded when capacity has been reached
 - Certain outfall sewer sizes to be increased
 - New outfall sewers to be constructed for future developments



Civil Engineering (continue)

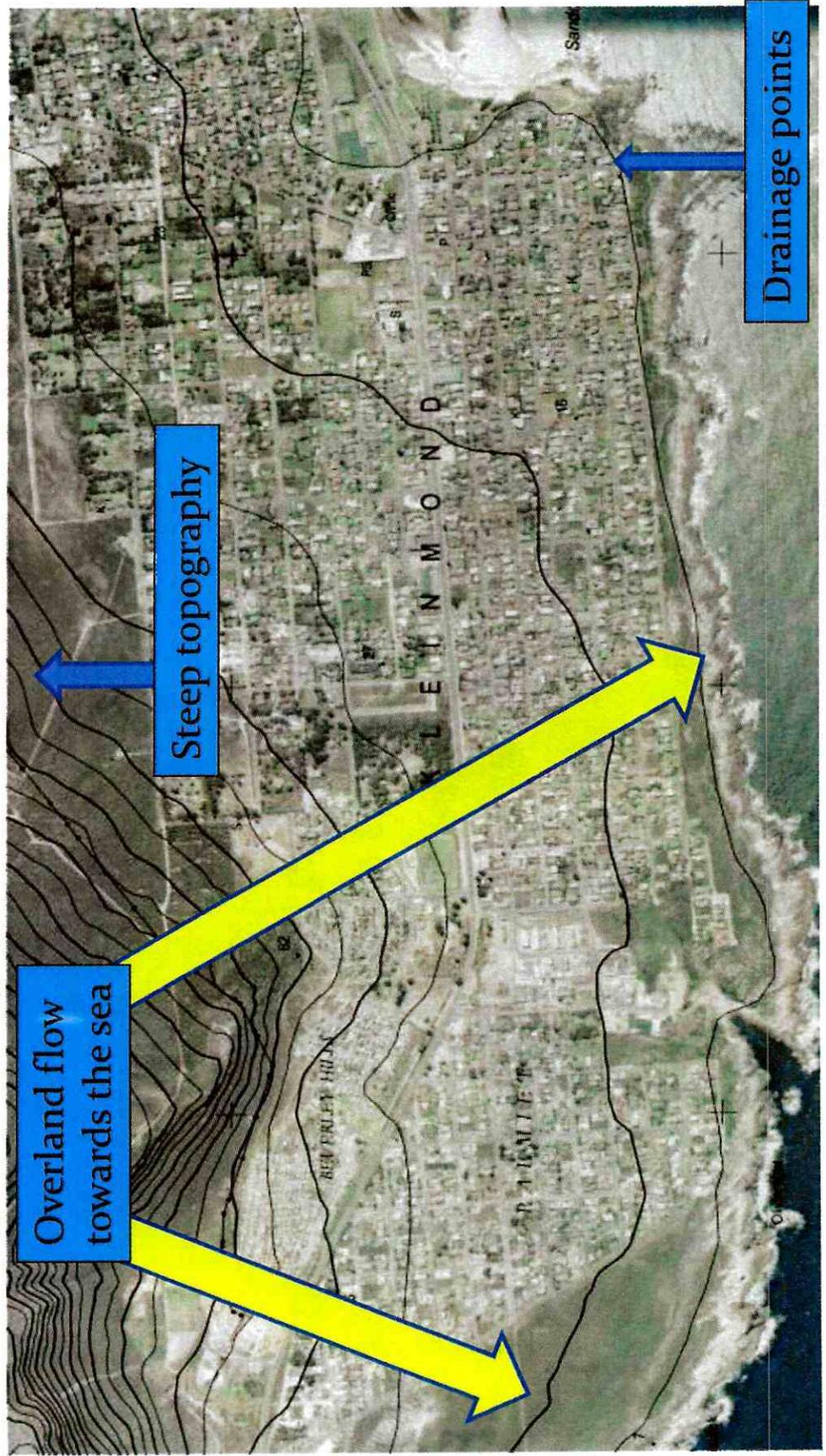


Civil Engineering (continue)

- Storm water:
 - Steep topography to the north of the town causes erosion of land/properties to the south
 - Predominantly north to south overland flow
 - Dedicated run-offs in road reserves which drains to the sea



Civil Engineering (continue)



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Electrical Engineering

- Kleinmond is fed from Eskom 66/11kV Substation
- Intake point situated on Eastern side of town next to the R44 Main Road
- Current Notified Maximum Demand (NMD) registered with Eskom: 7 000kVA
- Maximum Demand : 5 000kVA
- Adequate capacity in the Eskom 66kV Network and step-down substation to increase NMD if needed.



Electrical Engineering(continue)

- Existing bulk electricity network consisting of four (4) interconnected 11kV feeder, mainly underground, with only small section on northern side of town that is overhead.
- Internal networks can be upgraded/strengthened as necessary, depending on locality and size of new development.
- All internal 11kV networks can be relocated/replaced as necessary.



Electrical Engineering(continue)

Existing 11kV Network



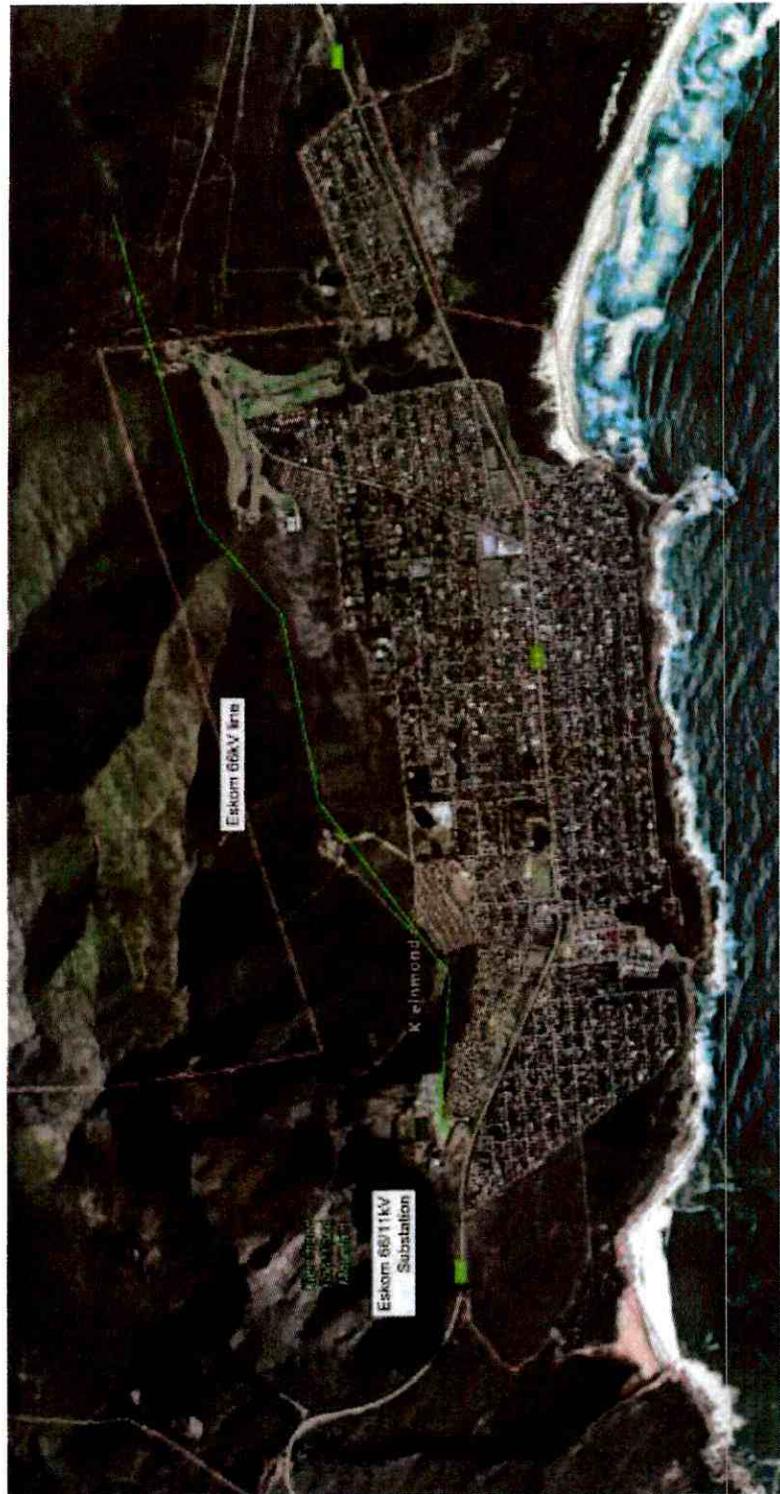
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Electrical Engineering(continue)

- Eskom 66kV servitude (22m) on northern side of town, must be accommodated.



Geotechnical

- Soils along the **northern reaches** of Kleinmond, along the Palmiet Mountain Range, are characterised as Ic85 land type
- Characterised by miscellaneous land classes, very rocky with little or no soils
- The geology is quartzitic sandstone of the Peninsula Formation and of the Goudini and Skurweberg Formation, separated by shale of the Cedarberg Formation, Table Mountain Group.
- Talus gravel occur on the southern slopes
- Majority of **Kleinmond** is characterised by the Gb4 land type
- The geology is colluvial and alluvial sand



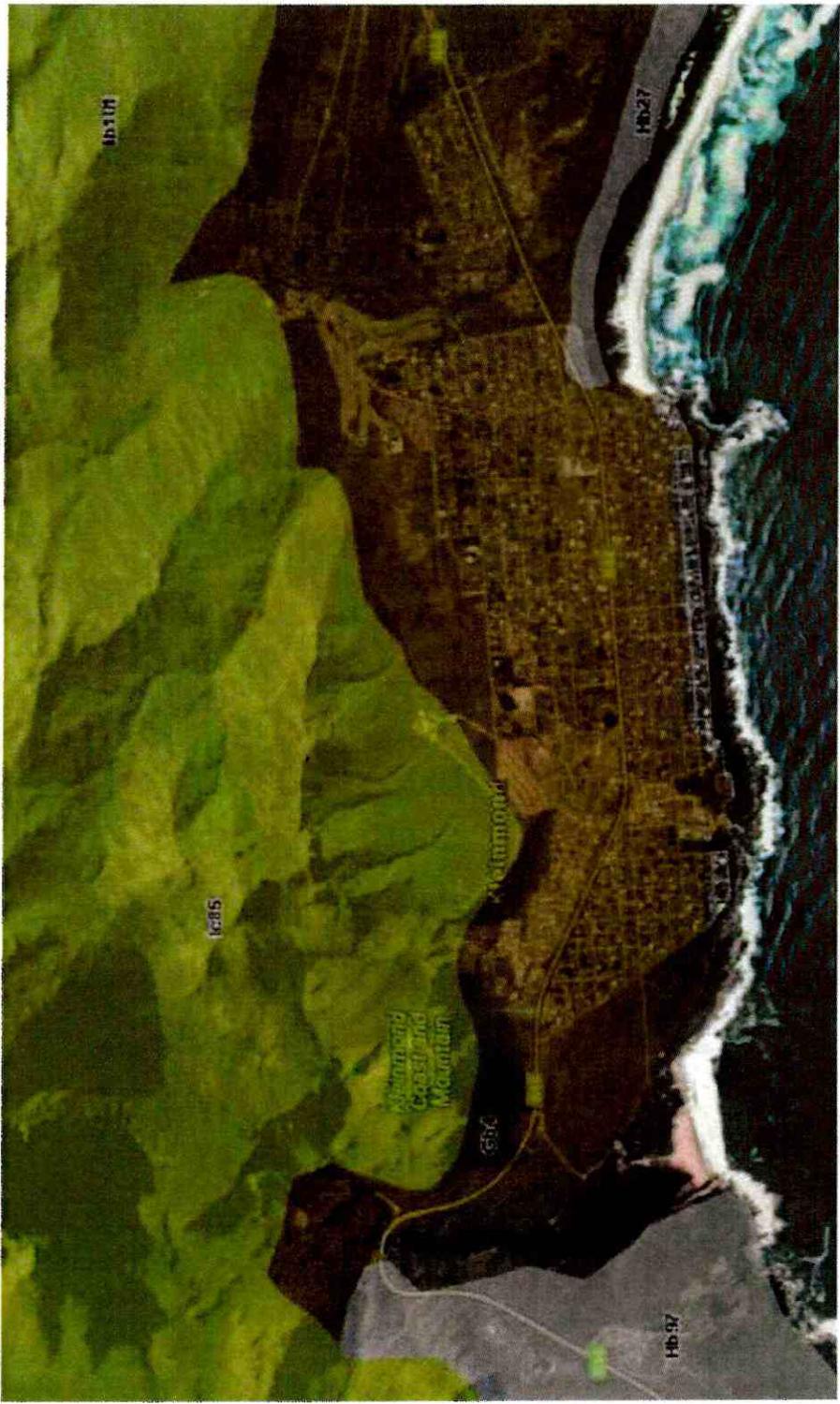
Geotechnical (continue)

- Small portion to the West of Kleinmond is characterised by the Hb 27 land type
- Soils are predominantly grey regic sands
- Geology consists of recent coastal sand and dunes with slight occurrence along the coast of shale of the Bokkeveld Group and sandstone of the Peninsula Formation, Table Mountain Group

(Reference: Cape Farm Mapper, 2016)



Geotechnical (continue)



Soils & Geology (ENPAT) Map of Kleinmond, Western Cape	<u>Guillaume Nel</u> Environmental Consultant Tel: (021) 870 1874 Fax: 086 6933 802 Cell: 072 1571 321
Source: Cape Farm Mapper	 Well and Associates (Pty) Ltd Consulting Engineers & Project Managers



Future development needs

- Industrial
- Residential which includes GAP housing and affordable housing
 - Retail
 - Community facilities
 - Recreation
- Improving main corridors in Kleinmond



Developing criteria for selecting sites

Some criteria, not in specific order:

- Natural features
- Scenic routes in, through and around Kleinmond
- Environmental constraints and opportunities
- Infrastructure capacities and costs
- Geology
- Integrating communities
- Quick wins
- To be expanded and weighted



Public participation process

- Ward Councils
 - Represented on PSC
 - Feedback to Ward Council members and residents in ward
 - Provide input for PSC meetings
- General Public Meetings
 - First public meeting to inform and to get initial input
 - Second public meeting to exhibit and answer questions on one-to-one basis
- PSC
 - Mandate of PSC to be clarified
 - Professional team reports to PSC
 - PSC workshop proposals with professional team
 - PSC decisions to progress to next level of study
 - PSC signs off on final report



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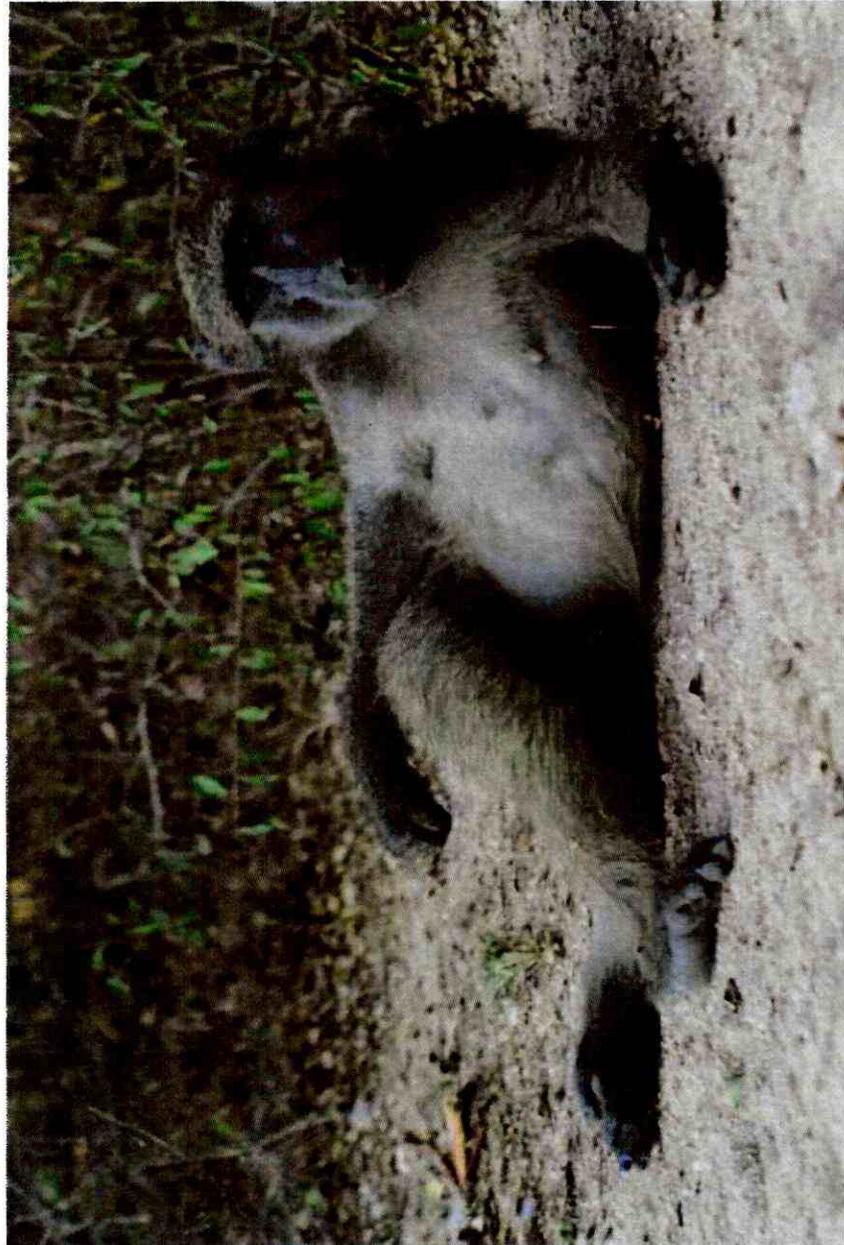
Way forward and timelines

- Prof team to refine the status quo reports
- Advertise for public meeting early Jan 2018
- Public meeting evening of 24 or 25 Jan 2018
- Next PSC meeting end-Feb 2018



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Thank You



We are observing what you are doing!