5.5 VLEESBAAI AND BOGGOMSBAAI (population: ± 263 Census 2011)

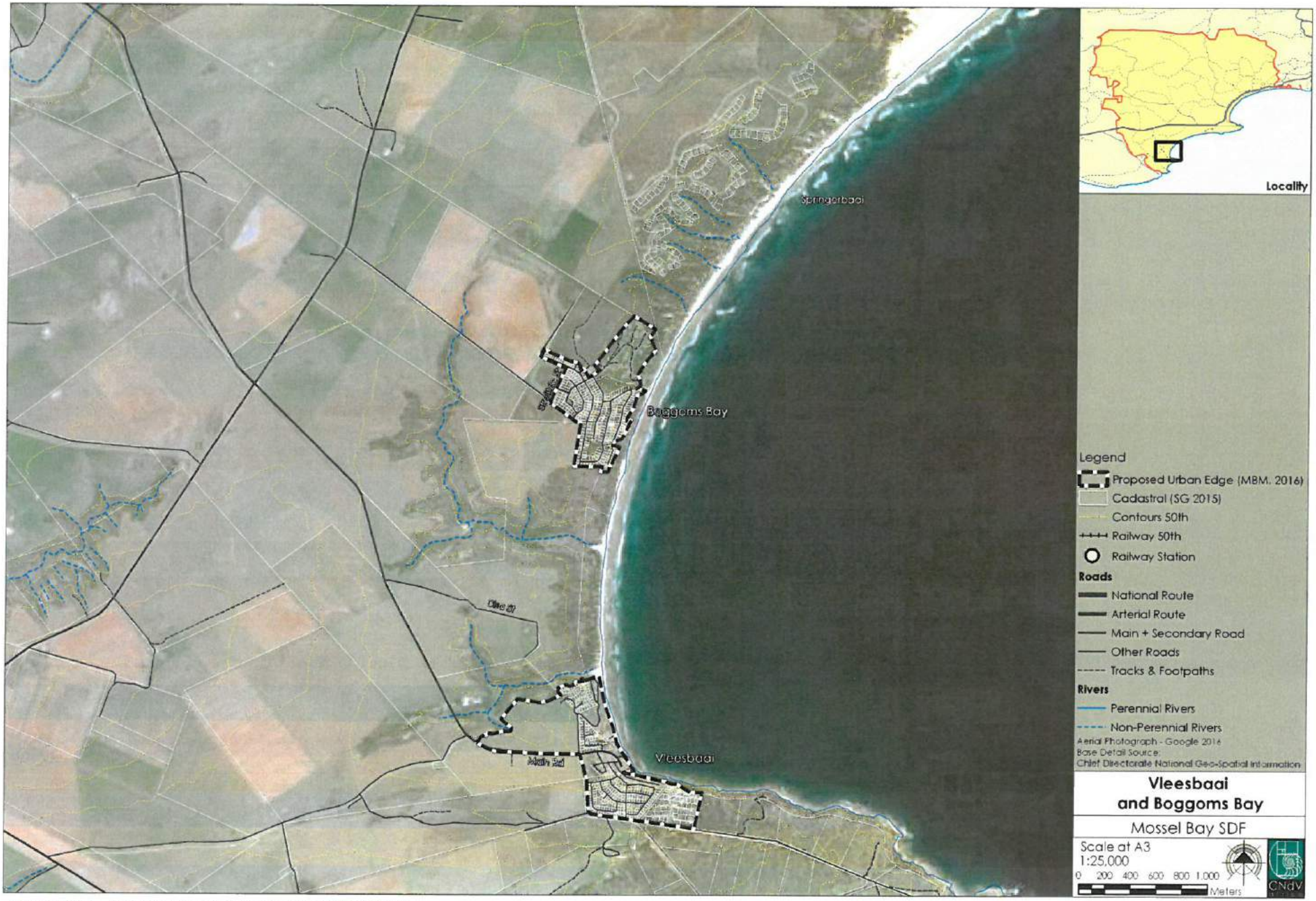


Figure 5.5.1.1 Vleesbaai and Boggomsbaai Aerial photograph

5.5.1 SPATIAL ANALYSIS, see Figures 5.5.1.2

General:
Vleesbaai and Boggomsbaai, as the names suggest, were originally associated with livestock and fish trading. They then became coastal vacation spots for inland farmers and have subsequently developed into the current holiday townships. Permanent occupants are only 25%. They are largely self-contained and Vleesbaai operates as a private township. Springerbaai and Nautilus Bay coastal estates developed as typical large plot resort developments taking advantage of the excellent views and seaside location.

Sub-regional location
- These coastal settlements take access off the road that links Gouritzmond to the N2 near MossGas. They are approximately 30 km from Mossel Bay CBD. There is a small convenience shopping node at Vleesbaai, otherwise residents have to travel to Mossel Bay for most of their needs;
- The sub-regional location makes access for lower and middle income workers extremely difficult and expensive. However, as these settlements function as low occupancy holiday and retiree settlements for most of the year, this is only really an issue during the peak tourist season.

Layout pattern
- Vleesbaai and Boggomsbaai have hybrid layouts comprising a mixture of gridiron and curvilinear street patterns. They respond to the topography and sea views;
- The southern township extension in Vleesbaai has plot sizes of approximately 1200m². The remainder of the properties in Vleesbaai and Boggomsbaai are approximately 600 m²;
- The eco-states/resorts follow different layout design principles comprising short rows of large plots set within an extensive open space network. This layout pattern is extremely low density, far too low to be serviced by conventional reticulated civil services, but enables a high level of biodiversity conservation;
- Depending on the size and appearance of buildings, these estates can still create a suburban impression on the landscape;
- Plots in Springerbaai are between 3000 and 4000 m² (1 acre) and the Nautilus Bay plots are 2000 m². However, these projects are designed as eco-states/resorts with buildings seemingly confined to a smaller building footprint with in the overall erf.

Urban quality
- Vleesbaai and Boggomsbaai comprise relatively low density holiday townships with wide streets and single dwellings setback in the middle of the plots. Vleesbaai functions as a gated private town with controlled access although it appears generally open to the public and day-trippers;
- Their urban quality is essentially suburban with a vegetated streetscape that is more car than pedestrian orientated;
- Buildings comprise a wide range of architectural styles reflecting popular designs of the time as well as people's individual aspirations as to how their holiday houses should look;
- Later schemes in eco-estate settings such as Springerbaai reflect a greater sensitivity to the natural environment with building and urban design guidelines and controls that control height, roof pitch, fenestration, stoeps, verandahs, colours and materials.

Challenges and opportunities
- Nautilus Bay and Springerbaai, as well as later extensions in Boggomsbaai and Vleesbaai, have a number of undeveloped properties, especially on larger stands, see Table 5.5.1, as noticed elsewhere in Mossel Bay municipality, suggesting that this end of the market has little demand.
- Densities are extremely low, see Table 5.5.1, making servicing and business development very challenging.
- This coastline has a strong wilderness character in contrast to the coastline east of Mossel Bay town. However, this character is in danger of being eroded by the large low-density eco-estates/resorts and additional extensions to the original, relatively compact nodal settlements at Boggomsbaai and Vleesbaai.
- Servicing of these coastal settlements will also represent a significant challenge if conventional service technologies are used. These settlements can only be affordable to the municipality if they are responsible for their own services and road access.

Photo 5.5.1(a) **View from Boggomsbaai to Vleesbaai** (source: Panoramio)

Photo 5.5.1(b) **Vleesbaai beach with convenience shopping node** (source: Panoramio)

Vleesbaai and Boggomsbaai	
Total Population (2011)	263
Total No. Households (2011)	156
Average Household Size (2011)	1.7
Cadastral Erven (CE) (SG 2015)	633
Proposed & Approved Units (MBM 2016)	250
Total Erven	633
Urban Area (Ha) (MBM 2016)	138
Person/Ha	1.9
Household/Ha	1.1
CE/Ha (Registered Erven)	4.6
CE/Ha(incl. proposed projects)	4.6
Permanent Households % (assumes all registered erven developed)	24.6

Table 5.5.1 Urban Analysis

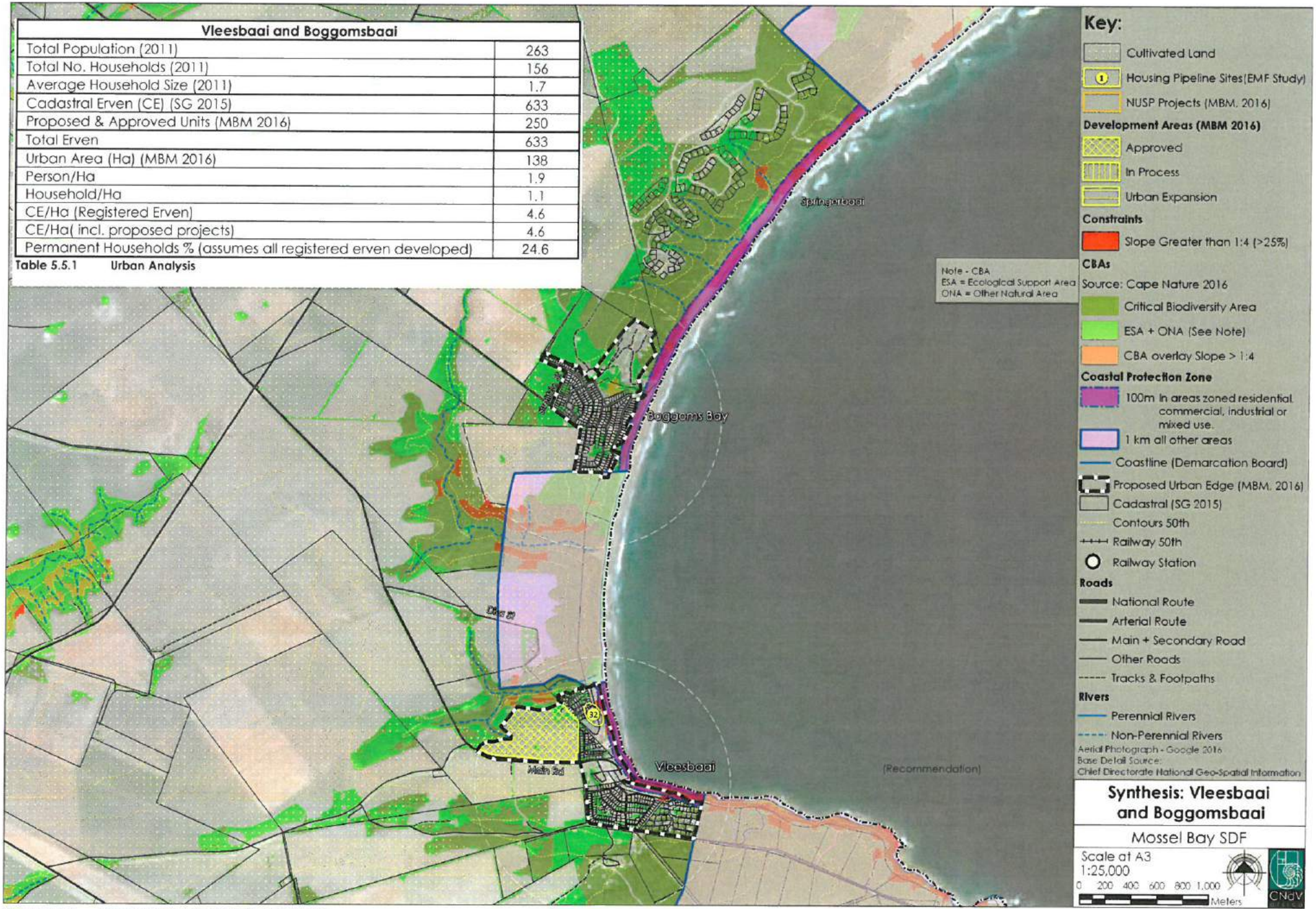


Figure 5.5.1.2 Vleesbaai and Boggomsbaai: Synthesis

5.5.2 VLEESBAAI AND BOGGOMSBAAI: SPATIAL DEVELOPMENT FRAMEWORK AND DESIRED STATE OF THE ENVIRONMENT, see Figure 5.5.2.1

5.5.2.1 Core landscape and agricultural areas

- In general, there should be no further development on the section of coast from Gouritzmond to Moquini eco-estate near Dana Bay; and,
- CBAs and ABAs and extensive and intensive agricultural land should be conserved.

5.5.2.2 Urban Development

- This section of the coast's desired character should be protected by the following:
  - discouraging any development outside of the Urban Edge;
  - strict implementation of architectural and urban design guidelines to inform building and layout design particularly with respect to height, massing, colour and materials so as to minimise the visual impact on the landscape.

5.5.2.3 Heritage Areas

- Not applicable.

5.5.2.4 Urban Restructuring

- Generally not applicable;
- Further intensification of convenience shopping and supportive activities can be considered at Vleesbaai village centre.

NDA Site No	Area (Ha)	Project Type	Engineering Services	Comments
1	22.8	Urban development	Water: Location of connection data and new 160mm diameter supply pipeline to Boggomsbaai should be clarified (GLS, 2017). Pipe network required for new development and link to existing pipe network. Waste water: Future sewer system required and connection to existing sewer system for new development. Stormwater: Stormwater drainage infrastructure required. Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: Limited land availability for waste management facilities. Households will require refuse removal by local authority or private company. Refuse Drop-off sites and transfer station required.	Confirmation required whether previous application lapsed. New application to be made.
Total	22.8			

Table 5.5.2 New Development Areas: Vleesbaai/Boggomsbaai/Springerbaai

Photo 5.5.2(a) Springerbaai coastal eco-estate reflecting application of strict building environmental guidelines (source: Panaramio)

Photo 5.5.2(b) Typical back dunes scene along this section of coastline (source: Andrej Pacynsnkij

Photo 5.5.2(c) Wilderness coastline from Nautilus Bay to Dana Bay (source: CNdV Africa, 2017)

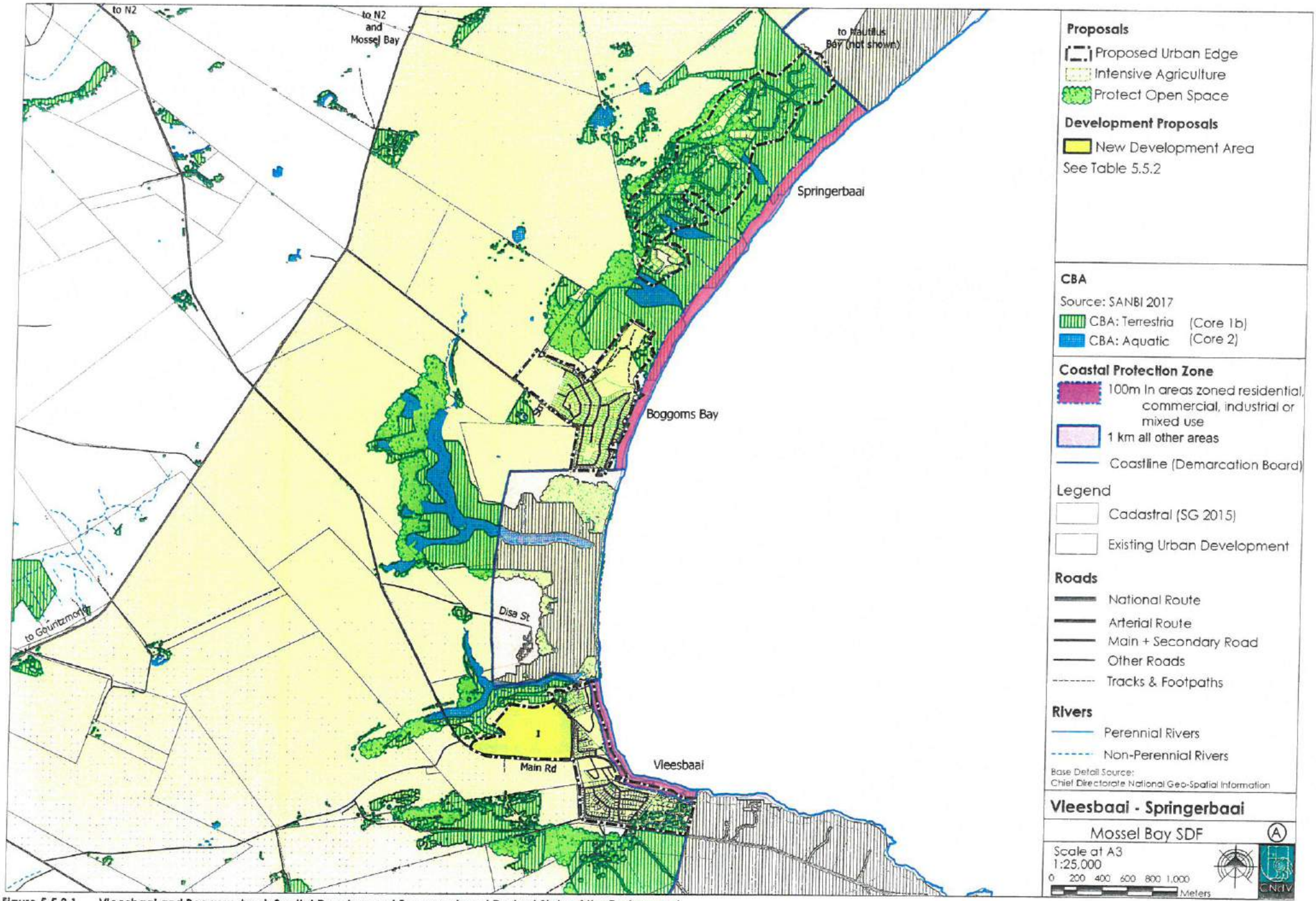


Figure 5.5.2.1 **Vleesbaai and Boggomsbaai: Spatial Development Framework and Desired State of the Environment**

5.5.3 ENGINEERING INFRASTRUCTURE ANALYSIS

- The Boggomsbaai water network requires upgrade in the future.
- Households are part of a rate payers association.
- Thus, road and stormwater upgrades are planned by private developers in Vleesbaai.
- Due to these settlements' low densities, even if permanent occupation levels were significantly increase, innovative off-grid infrastructure technologies should be promoted so as to limit the burden on municipal service provision.

5.5.3.1 Water

- Existing Reservoir capacity:
- Boggomsbaai Reservoir capacity: 2250 kl
- Springerbaai Reservoir capacity: 250 kl
- Actual AADD of present zone: 229 kl/d (Boggomsbaai)

AADD of future zone: 315 kl/d (Boggomsbaai)

The Mossel Bay Water Supply Scheme (Kleinbrak WTW) supplies Boggomsbaai and Vleesbaai with potable water. The Fourth Generation IDP 2017-2022 indicated that the Boggomsbaai water network requires upgrade in the future.

5.5.3.2 Waste water

- The 2017 Sewer Master Plan did not include information on the existing waste water treatment plant capacity and sewer system.

5.5.3.3 Solid Waste

- Solid waste management in the area is done by the Mossel Bay Municipality. The Mossel Bay Municipality transport its general waste to dispose at the Petro SA waste disposal facility.

5.5.3.4 Transport

- Households are part of a home owners association. Thus, road and stormwater upgrades are planned by private developers in Vleesbaai.
- There is a need for non-motorised transport infrastructure in Boggomsbaai.

5.5.3.5 Electricity

- Eskom supplies Vleesbaai and the Mossel Bay Municipality supplies the Boggomsbaai area. New residential development should implement solar water geysers and geyser timers. Off-grid and alternative energy sources should be considered in all new development to reduce the rate and impact of climate change.

5.5.4 SOCIAL FACILITY INFRASTRUCTURE ANALYSIS AND REQUIREMENTS

- Table 5.5.3 indicates the required community facilities. It can be seen that even if all the settlement's erven are fully occupied in the future there will be insufficient demand to warrant more facilities other than a sportsfield. This can be reassessed in the next SDF review.

Category	Facility Description and Areas	Population Threshold: Remote Villages (CSIR, 2012) (people)	Requirements based on Total Erven (2016) (Table 5.5.1, Row 6/Table 5.5.2) + NDA @ gross average 25du/ha (1.7 persons/household) = 1 076 persons*			
			Overall Need	Existing Facilities	Facilities Required (CSIR, 2015)	Total Land needed (ha)
Health	Community Health Centres	N/A	0	0	0	
	Primary Health Clinic	5 000 - 7 000	0	0	0	
Culture	Local Library	5 000 - 20 000	0	0	0	
	Community Hall	10 000 - 15 000	0	0	0	
	Cultural Facilities (Community Performing Arts Centre)	N/A	0	0	0	
Education	Primary School (incl. sportsfield) (@ 2.8 has)	1000	0	0	0	
	Secondary School (incl. sportsfield) (@ 4.8 has)	2500	0	0	0	
	Small Créche / Early Childhood Development Centre (@ 0.2 has)	Variable	0	0	0	
	Skills Training (Adult Education Training Centres / Further Education Training Colleges) (@ 1 ha)	1 per town larger than 5000	0	0	0	
Sport	Sports Complex	N/A	0	0	0	
	Grassed field/ hard surface court	**0.56ha/1 000 people**	**0**	**0**	**1**	**0.56**
	Multipurpose Sports Hall	N/A	0	0	0	
	Community Park	N/A	0	0	0	

Table 5.5.3 **Vleesbaai-Boggomsbaai Social Facilities Requirements for remote villages** (source: CSIR Guidelines for the Provision of Social Facilities in South African Settlements, 2015)

***NOTES**

1. Settlement considered "remote village" ito CSIR definition;
2. Assumes all registered erven permanently occupied;
3. Assumes all NDAs developed and occupied at gross average 25du/ha;
4. There is a strong case for decreasing site areas for certain facilities, e.g. primary and secondary schools; and,
5. Exact location of required social facilities to be identified in new development areas, see Figure 5.5.1 and Table 5.5.3, if and when they are developed.

IMPLICATIONS:

If all existing erven are permanently occupied, household and population numbers are less than the recommended thresholds for all social facilities except two primary schools, one high school, five ECD centres, an FET college and a grassed field / hard surface court.

5.6 DANA BAY (population: + 2 611 Census 2011)

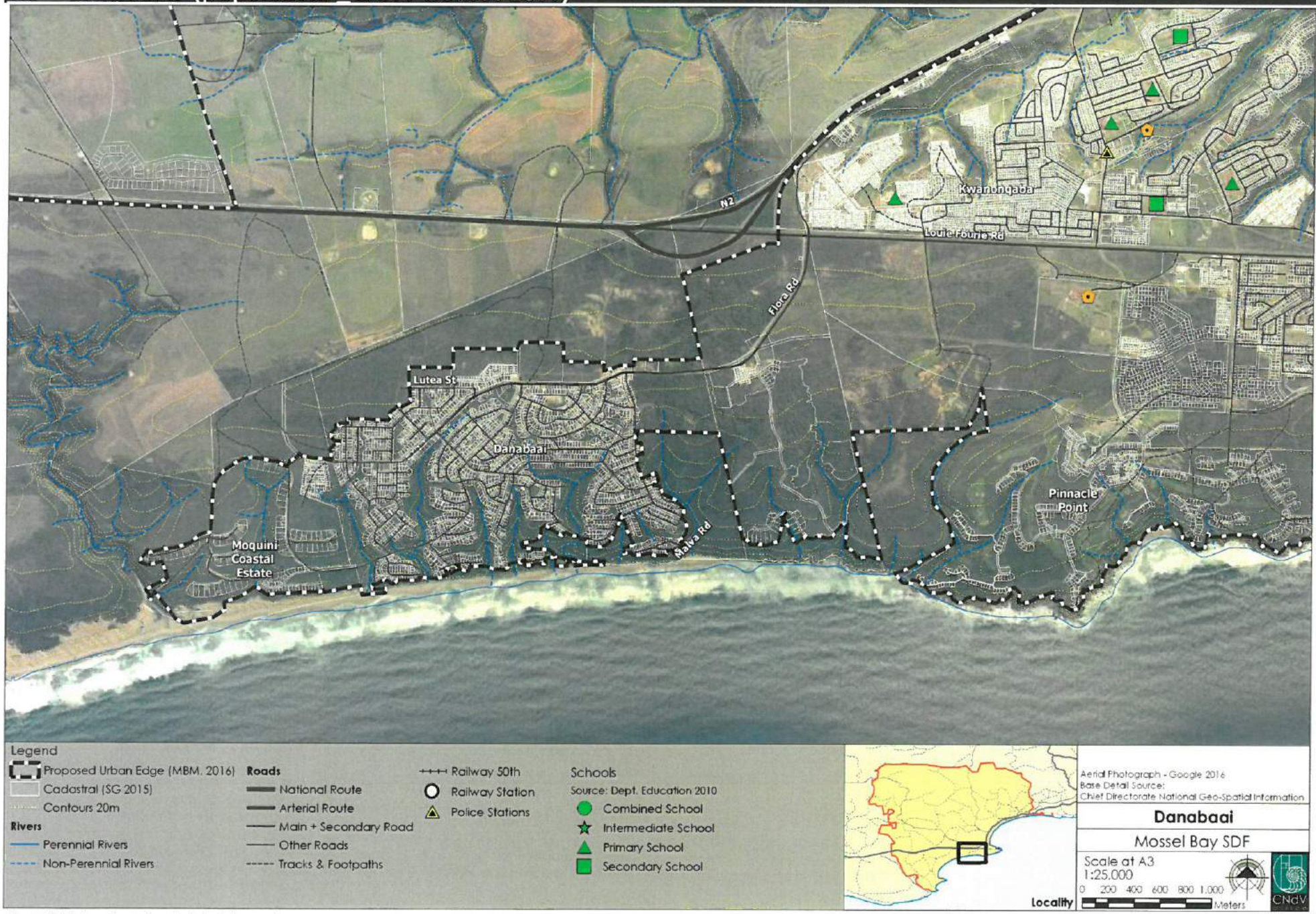


Figure 5.6.1.1 Dana Bay Aerial photograph

5.6.1 SPATIAL ANALYSIS, see Figures 5.6.1.2

General:
Dana Bay sub-area mainly comprises a large plot, low-density suburb developed in the 1970s as a coastal estate separated from the remainder of Mossel Bay town and Kwanonqaba, at that point in time, a relatively small settlement over 5 km away. Subsequently, Moquini coastal estate developed on Dana Bay's western periphery. Interestingly, Ward 11, in which Dana Bay is located, includes a small portion of Kwanonqaba known as ASLA at the end of Flora Road. Recently, another large township, similar in concept to Dana Bay, has been approved to the east (Paradise Coast, ± 930 units).

Sub-regional location
- The main reason for these settlements' location was the good sea views, relative isolation from Mossel Bay town and that the upper-income market at which they were targeted could afford to travel in private motor vehicles from this peripheral location;
- As a consequence of its location and legacy as a largely single use upper-income holiday accommodation suburb Dana Bay is and will continue to be, very difficult to serve with public transport and no allowance has been made for accommodating middle and lower income groups who may work there;
- The current entrance into Dana Bay off the Louis Fourie/Flora Road intersection is intended to be relocated about 500m to the east so as to increase the distance at the first intersection for vehicles entering the road from the N2.

Layout pattern
- Moquini coastal estate comprises an extremely low density with large tracts of open space between the blocks. Some erven in the blocks are between 3000 to 4000 m²;
- Dana Bay is laid out in a conventional curvilinear "bunny ears" street network, designed to minimise congestion from private motor vehicles. Its plot sizes are 1000 to 1250 m² on average. This layout style is not pedestrian friendly;
- A positive development in layout planning in the 1970s was the beginning of a move away from canalising or piping watercourses and to leave them as open space corridors as can be seen in Dana Bay. However, the prevailing preoccupation with minimising the cost of engineering services still saw properties turning their backs on open space corridors. In other socio-economic contexts, this can have a negative effect on public safety and solid waste management. This is not such an issue in Dana Bay;
- There are a few convenience shops and a filling station along Flora Road at the entrance to Dana Bay;
- The school sites along the northern edge have never been developed as there has never been a significant school going population;
- Gross average densities are extremely low at 3.5du/ha and will only increase to 4.5du/ha when the newly approved townships are developed, see Table 5.6.1.

Urban quality
- Dana Bay exhibits a low-density suburban character comprising single dwelling, pavilion residential buildings in a wide variety of architectural styles interspersed with green corridors on its lower slopes. Even the increase in intensity at the small commercial nodes does little to create a pedestrian friendly environment. The urban character is totally dominated by providing for car movement.
- Only 45% of the properties are permanently occupied, see Table 5.6.1, creating a "deserted" impression much of the time.

Challenges and opportunities
- Dana Bay's relatively high permanent population for a coastal holiday housing suburb (45%), suggests that its population may be becoming more integrated into the Mossel Bay local economy and that there is an increasing number of retirees making it home;
- In terms of the new spatial planning principles legislated in SPLUMA, Dana Bay needs to become a more balanced settlement, better integrated to the remainder of Mossel Bay town and accommodating a wider socio-economic grouping. However, in promoting such integration the practical constraints of distance and convenience need to be considered. Higher density more socially integrated developments should initially be promoted along the re-aligned Flora Road nearer to the Louis Fourie Road;
- Dana Bay residents are concerned that they only have a single access road into the area off of Louis Fourie road next to Kwanonqaba;
- Proposals have been made for a second access road to the west linking up with the MossGas access road on the N2. Construction as mentioned must be investigated. This may require a road overpass or a very expensive freeway interchange.

Photo 5.6.1(a) **Dana Bay gateway node showing disjointed collection of commercial buildings and little attempt at any civic design and landscaping** (source: Google Earth, 2017)

Photo 5.6.1(b) **Moquini Coastal estate. Even though the estate is largely undeveloped the eventual cumulative visual impact of large conventional double story houses on the landscape can be seen** (source: Google Earth, 2017)

Photo 5.6.1(c) **View down Dana Bay open space corridor lined with buildings on both sides** (source: Google Earth, 2017)

Dana Bay	
Total Population (Census 2011)	2611
Total No. Households	1127
Average Household Size	2.3
Cadastral Erven (CE) (SG 2015)	2490
Proposed & Approved Units (MBM 2016)	930
Total Erven	3420
Urban Edge Area (Ha) (MBM 2016)	760
Person/Ha	3.4
Household/Ha	1.5
CE/Ha (Registered Erven)	3.3
CE/Ha(incl. proposed projects)	4.5
Permanent Households % assumes all registered erven developed)	45.3

Table 5.6.1 Urban Analysis

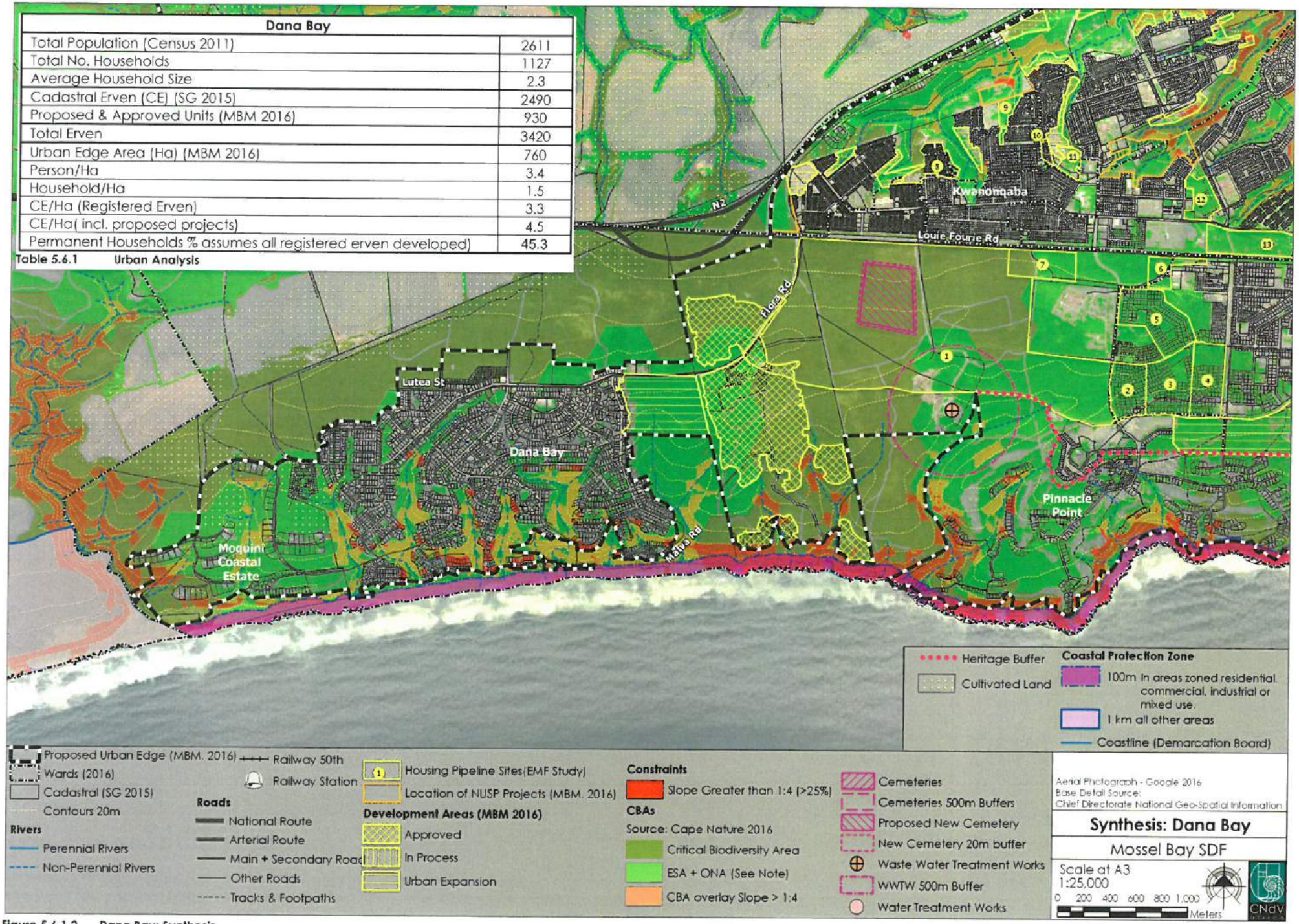


Figure 5.6.1.2 Dana Bay: Synthesis

5.6.2 DANA BAY: SPATIAL DEVELOPMENT FRAMEWORK AND DESIRED STATE OF THE ENVIRONMENT, see Figure 5.6.2.1

In the medium and long term a larger permanent and more social and economically integrated population, including families, should be encouraged in and around Dana Bay starting along the realigned Flora Road.

5.6.2.1 Core landscape and agricultural areas

- All open space and river corridors within the Urban Edge should continue to be protected for the biodiversity conservation and ecosystem services they provide in Dana Bay and Moquini coastal estate;
- The intensive agriculture between Dana Bay and the N2 should be protected for this use particularly due to its close proximity to Mossel Bay and the low transport costs that produce grown here will incur. This land is also suited to an agricultural development project owing to its close proximity to the town;
- Development should be set back behind the 100m coastal setback line in the urban coastal sections and 1000m in the undeveloped properties, subject to the outcome of the forthcoming coastal setback alignment exercise being prepared by Eden District Council.

5.6.2.2 Urban Development

- Small-scale intensification (second dwellings and subdivision according to Council policy) should be encouraged throughout Dana Bay on the large single residential stands, subject to services capacity;
- The large vacant sites in the north of the suburb should be retained as education and health facilities as this need will grow as a permanent population with school growing children, see Table 5.6.3, except for those portions that may be determined as surplus for future schools, see below;
- The overall use of these should be assessed given the new more efficient space standard norms for these facilities. Any surplus land should be used for higher density housing typologies such as group housing and low rise (three-storey) apartments;
- There should be no new urban or resort development between Moquini coastal estate and Boggomsbaai.
- The land unit directly north and east of Danna Bay can be considered (in terms of SPLUMA principles) for development if proven not to be located within a CBA via detail biodiversity and other relevant environmental investigations. (Remainder Farm 245)
- The Urban Edge for the Mossdustria/PetroSA precinct includes all the serviced/constructed industrial development areas and the open land south of the railway line, west of the R342, North of the N2, east and inlcluding Farm 419.
- The area directly adjacent/surrounding the Urban Edge defined for the Mossdustria/Petro SA precint can also be used for industrial development (in terms of SPLUMA principles) via detail biodiversity and other relevant environmental investigations, if the need for the specific industrial use and location can be motivated.

5.6.2.3 Heritage Areas

- Not applicable

5.6.2.4 Urban Restructuring

Dana Bay faces a major challenge in transforming from an isolated, leapfrog, low-density suburb to a well structured integrated component of the larger Mossel Bay settlement system;

- Promote densification along the re-aligned Flora road to assist with achieving this restructuring;
- In this regard, the precedent created by the higher density approved new township between the recently approved cemetery and Dana Bay which has higher density group housing and a mixed use node straddling Flora road should be continued. The development of these components should be encouraged to reinforce Flora Road becoming an activity street;
- The realigned Flora road should be designed as a public and non-motorised transport facility with tree planting to create a high quality pedestrian environment and urban design guidelines for the treatment of buildings alongside;
- New higher density developments along this corridor with easy walking distance of Flora road should be laid out according to the principles of the socio economic gradient, see NDA's 5 and 6, see section 5.3.1.3;
- All new buildings on Flora Road must front towards this road.

Photo 5.6.2(a) Open land north of Flora Road. Revised requirements for social facility sites according to new norms and standards to be assessed and surplus made available for group housing and apartments (source: Google Earth, 2017)

Photo 5.6.2(b) Gateway node requiring urban design and landscaping planning and upgrading (source: Google Earth, 2017)

Photo 5.6.2(c) Location of proposed new node between Dana Bay and Louis Fourie Road. Node should be properly designed as an attractive urban space and Flora Road as a complete street accommodating bus stops, cycling, pedestrian facilities and tree planting (source: Google Earth, 2017)

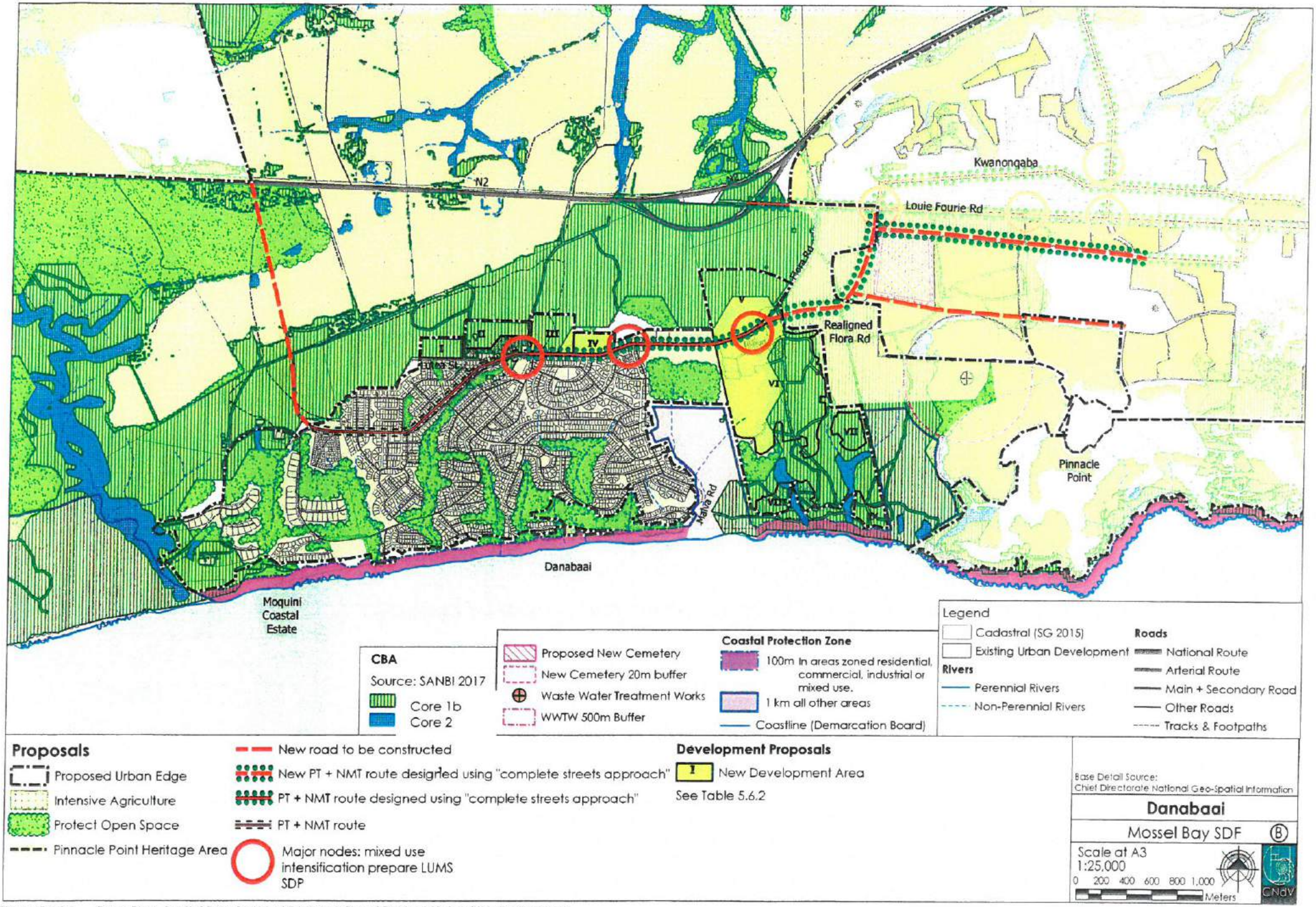


Figure 5.6.2.1 Dana Bay: Spatial Development Framework and Desired State of the Environment

NDA Site No	Area (Ha)	Proposed Use	Engineering Services	Comments
I	4.9	Urban development – social facilities if required	• Water: Future network pipes required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Water Master Plan. • Waste water: Future sewer system required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Sewer Master Plan. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: Limited land availability for waste management facilities. Households will require refuse removal by local authority or private company. Refuse Drop-off sites required.	Assess need for social facilities (CBAs to be ground truthed)
II	8.1	Urban development – social facilities if required	• Water: Future network pipes required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Water Master Plan. • Waste water: Future sewer system required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Sewer Master Plan. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Assess need for social facilities (CBAs to be ground truthed)
III	10.0	Urban development – social facilities if required	• Water: Future network pipes required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Water Master Plan. • Waste water: Future sewer system required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Sewer Master Plan. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Assess need for social facilities (CBAs to be ground truthed)
IV	4.9	Urban development – social facilities if required	• Water: Future network pipes required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Water Master Plan. • Waste water: Future sewer system required. Additional infrastructure information required for future development, as site was not included in the 2017 GLS Sewer Master Plan. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Assess need for social facilities (CBAs to be ground truthed)
V	27.4	• Urban development • Create positive interfaces to Flora Road using frontage roads if required	• Water: Future network pipes required. Distribution main required to supply the low and high lying areas of the future development site. New 5 l/s pumping station required and a 100mm rising main (refer to GLS 2017 Sewer Master Plan). • Waste water: Sanitation link services required for development of future area. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Approved
VI	59.6	• Urban development • Create positive interfaces to Flora Road using frontage roads if required	• Water: Future network pipes required. Distribution main required to supply the low and high lying areas of the future development site. • Waste water: Sanitation link services required for development of future area. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Approved
VII	6.0	Urban development – social facilities if required	• Water: Future network pipes required. Distribution main required to supply the low and high lying areas of the future development site. • Waste water: Sanitation link services required for development of future area. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Approved
VIII	7.4	Urban development – social facilities if required	• Water: Future network pipes required. Distribution main required to supply the low and high lying areas of the future development site. • Waste water: Sanitation link services required for development of future area. Investigate the upgrade to 250mm diameter gravity sewer. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Approved – subdivided properties
IX	5.3	Urban development – social facilities if required	• Water: Future network pipes required. Distribution main required to supply the low and high lying areas of the future development site. • Waste water: Sanitation link services required for development of future area. Investigate the upgrade to 315mm diameter gravity sewer. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1	Approved – sensitive coastal site
Total	**137.6**			

Table 5.6.2 New Development Areas: Dana Bay

5.6.3 ENGINEERING INFRASTRUCTURE ANALYSIS AND PROPOSALS

- A new 6Ml reservoir is proposed at Bartelsfontein to increase the storage capacity in the proposed future zone.
- The Pinnacle Point Sewer Treatment Works is operating at full capacity.
- The capacity of the plant should be increased over the next 3-5 years from 3.7 Ml/day to 6.3 Ml/d to accommodate additional capacities required for new developments. The septic tanks need to be replaced with pump stations at Dana Bay.
- Alternative Access Road into Dana Bay is required as there are no evacuation escape routes out of Dana Bay.

5.6.3.1 Water

- Existing Reservoir capacity:
  - Danabaai Reservoir 1: 2300 kl
  - Danabaai Reservoir 2: 2300 kl
  - Danabaai Tower: 180 kl
- Actual AADD of the present zone: 718 kl/d (Danabaai)
  364 kl/d (Danabaai Tower)
- AADD of the future zone: 1155 kl/d (Danabaai)
  1393 kl/d (Danabaai Tower)
- A new 6Ml reservoir is proposed at Bartelsfontein to increase the storage capacity in the proposed future zone. The Bartelsfontein reservoir will supply the high lying areas of Mossel Bay and Dana Bay (GLS, 2017). High lying areas of Heiderand should be supplied from Bartelsfontein reservoir. There is an extensive network of water pipes through which reticulation of water to households occurs. Proposed works for the future system include 200mm and 250mm diameter distribution mains to supply the high and low lying areas respectively of sites 5 to site 9. (GLS, 2017).

5.6.3.2 Waste water

- The actual PDDWF of existing developments in the Dana Bay Suction Tanks Drainage Area amounts to 74 kl/d. The Potential future PDDWF was estimated to be 80 kl/d. The actual PDDWF of existing developments in the Pinnacle Point WWTP Drainage Area amounts to 2827 kl/d. The Potential future PDDWF was estimated to be 6466 kl/d (GLS, 2017).
- The following pipes in the existing Mossel Bay Municipality system have spare capacities less than 30% and should be kept in mind when planning new sewer systems for the new development sites 1 to 9 (GLS, 2017):
  - Dana Bay main outfall sewer;
  - Main outfall sewer upstream of Pinnacle Point WWTP;
  - The main outfall sewer for Pinnacle Point Pump Station (PS 6);
  - The main outfall sewer for Pinnacle Point PS 1.
- The Pinnacle Point Sewer Treatment Works presently caters for effluent from Mossdustria, Dana Bay and Heiderand and is operating at full capacity. The IDP (2017-2022) propose that the capacity of the plant be increased over the next 3-5years from 3.7 Ml/day to 6.3 Ml/d. The development need is also to replace the septic tanks with pump stations at Dana Bay (IDP, 2017-2022).
- The following items are proposed for the future Dana Bay and Pinnacle point WWTP system:
  - Upgrade the capacity of the existing pipes gravitating towards the Dana Bay Main Outfall PS;
  - Increase the capacity of the collector sewers in Dana Bay and Pinnacle Point which was identified as priority sewer projects in the Sewer Master Plan (GLS, 2017).
  - Sanitation link services for future developments are required (site 5 to site 9).

5.6.3.3 *Stormwater*

- The Fourth Generation IDP 2017-2022 prioritised the rehabilitation of the embankment at E Pinea Street. The stormwater systems in P. Compacta, A Ferox Street, and P Nutans Street have been upgraded and improved in 2017. The Municipality has undertaken to compile a Stormwater Master Plan for Dana Bay (IDP, 2017-2022).

5.6.3.4 *Solid Waste*

- Limited land available for waste management facilities. Landfill site required next to PetroSA to address this challenge.

5.6.3.5 *Transport*

- The Pavement Management System indicated that various patching and slurry work are required on existing road infrastructure (Aurecon, 2015). The following priority projects are recommended in the Fourth Generation IDP 2017-2022:
  - Resealing of roads, Heide, Flora, P Scanra and Lutea required;
  - Upgrade of Flora road, including public transport and non-motorised transport routes using the "complete streets" approach. Paving of sidewalks in Flora Road is also included;
  - Re-align Flora road and link to the existing Crotz Street/ Louie Fourie road intersection and signalise new four-way intersection;
  - Extend Kreupelhout street to Flora Road to provide access to proposed Technikon site (Hatch Goba, 2015);
  - Extend Apiesdoring Street from Spekboom street to Flora Road (Hatch Goba, 2015);

- An alternative Access Road into Dana Bay is investigated as there are no evacuation escape routes out of Dana Bay. Three possible access roads, which could also serve as emergency routes, are considered. The Roads Master Plan recommends the extension of Flora road to the R327, indicated in red on Figure 5.6.2.1. The shorter routes, indicated in blue and orange on Figure 5.6.2.1 has challenges relating to land ownership and are only proposed for use as emergency roads.

5.6.3.6 *Electricity*

- Eskom is the primary bulk provider of electricity to Mossel Bay Municipality. Currently there are sufficient capacity at all major substations to accommodate load growth. Expanding capacity include the moving of certain sub-stations. The main Dana Bay substation building and switchgear requires replacement and a new 11Kv Feeder is planned for Dana Bay in the 2018/19 budget year (IDP, 2017-2022).

5.6.4 SOCIAL FACILITY INFRASTRUCTURE ANALYSIS

Table 5.6.3 indicates the community facilities that would be required should all Dana Bay's properties be permanently occupied. The current population is too small to warrant facilities at this point. This should be reassessed in the next SDF review.

Category	Facility Description	Population Threshold: Small to Medium Towns (CSIR, 2012) (people)	Requirements based on Total Erven (2016) (Table 5.6.1, Row 6/Table 5.6.2) + NDA @ gross average 25du/ha (2.3 persons/household) = 15 542persons			
			Overall Need	Existing Facilities	Facilities Required (CSIR, 2015)	Total Land needed (ha)
Health	Community Health Centres	60 000 - 100 000	0	0	0	
	Primary Health Clinic	24 000 - 70 000	0	1	0	
Culture	Local Library	20 000 - 70 000	0	0	0	
	Community Hall	60 000	0	1	0	
	Cultural Facilities (Community Performing Arts Centre)	50 000	0	0	0	
Education	Primary School (incl. sportsfield) (@ 2.8 has)	**7000**	**2**	**0**	**2**	**5.6**
	Secondary School (incl. sportsfield) (@ 4.8 has)	**12 500**	**1**	**0**	**1**	**4.8**
	Small Créche / Early Childhood Development Centre (@ 0.2 has)	**2 400 - 3 000**	**5**	**2**	**5**	**0.02ha/ 100 children**
	Skills Training (Adult Education Training Centres / Further Education Training Colleges) (@ 1 ha)	**1 per town larger than 5000**	**1**	**0**	**1**	**1**
Sport	Sports Complex	60 000	0	0	0	
	Grassed field/ hard surface court	30 000	0	0	0	
	Multipurpose Sports Hall	100 000	0	0	0	
	Community Park	60 000	0	0	0	

Table 5.6.4 **Dana Bay: Social Facilities Requirements for small to medium towns** (source: CSIR Guidelines for the Provision of Social Facilities in South African Settlements, 2015)

***Notes**

1. Settlement considered "small and medium town" ito CSIR definition;
2. Assumes all registered erven permanently occupied;
3. Assumes all NDAs developed and occupied at gross average 25du/ha;
4. Holiday housing is not included;
5. There is a strong case for decreasing site areas for certain facilities, e.g. primary and secondary schools; and,
6. Exact location of required social facilities to be identified in new development areas, see Figure 5.6.1 and Table 5.6.3, if and when they are developed.

IMPLICATIONS:
If all existing erven are permanently occupied, household and population numbers are less than the recommended thresholds for all social facilities except two primary schools, one high school, five ECD centres, an FET college and a grassed field / hard surface court.

5.7 MOSSEL BAY TOWN (population: ± 55 036 Census 2011)

Figure 5.7.1.1 Mossel Bay Town: Aerial photograph

5.7.1 SPATIAL ANALYSIS, see Figures 5.7.1.2

General:

This sub area includes Kwanonqaba, Heiderand, Da Nova/ D'Álmeida, Mossel Bay historic CBD, and the port.

Sub-regional location

- Mossel Bay CBD owes its location to the safe landing to ships offered by its natural harbor since the late 1400s, now enlarged into the port. The original road between Knysna, George and Cape Town followed the coast and deviated all the way into the CBD around Da Nova before exiting along Louis Fourie Road West to Albertinia and Swellendam. This "dog-leg" was bypassed in the 1980s with the construction of the N2. Mossel Bay CBD is now considerably removed from the N2 with the nearest intersections 7 km away (Louis Fourie) and 5.5 km away (Aalwyndal). Another intersection is proposed off the N2 to link with Mayixhale Street in Kwanonqaba but this will still be approximately 7 km from the CBD;
- Fairview and Kwanonqaba historically followed the classic 1960s apartheid spatial planning pattern being located peripherally from the CBD off Louis Fourie road. Ironically, the subsequent intersection of Louis Fourie Road with the N2 has resulted in Kwanonqaba becoming the gateway to Mossel Bay CBD from the West. This can be turned to good economic development and employment creation advantage if the correct urban design and transport treatment of development along this corridor is implemented, see section 5.12.

Layout pattern

- This sub area displays a wide range of layouts reflecting its topography, incised with steep river valleys particularly in Kwanonqaba, and the prevailing design principles, planning policy, and target market at the time each extension was implemented;
- Mossel Bay CBD is a classic Dutch gridiron layout with long streets along which water would have been lead, similar to Cape Town CBD and Stellenbosch;
- Earlier extensions in DÁlmeida and Da Nova have gridiron layouts. Later layouts became curvilinear and car orientated in the 1960s and 70s. This pattern characterises most of Heiderand. These design principles also found in Kwanonqaba although the smaller plots and blocks are more rectilinear;
- Generally, development is set back well away from Louis Fourie corridor creating a tension whereby current transport planning policy encourages development to turn its back on this route whereas economic and employment creation imperatives create pressure for the opposite;
- Sea facing developments south of the ridge line between the coast and Louis Fourie Road include low-density golf course estates wrapped around fairways (Mossel Bay and Pinnacle Point).

Urban quality

- Not surprisingly, there is a wide range in urban quality in this sub area;
- Mossel Bay CBD comprises a potentially outstanding heritage precinct of historic buildings which is still largely intact. This is probably due to the movement of businesses to new shopping areas in Voorbaai and along Louis Fourie Road after the N2 was built. While the colonial origins of this heritage cannot be ignored, if properly maintained and managed, the entire CBD could become a tourist honeypot. Already, international cruise liners drop anchor in the bay and provide shore side excursions. However, many of these tours appear to bypass Mossel Bay CBD and the historic Diaz Museum and travel further afield to George and the Outeniqua mountains;
- Mossel Bay port offers potential for an attractive seaside waterfront experience within convenient walking distance of the CBD but this is not being realised at present although Transnet has recently produced a plan to upgrade this facility;
- The upper income suburbs, e.g. Heiderand, have a low-density single dwelling, car oriented urban quality with relatively little activity in the streets;
- This pattern changes significantly in Fairview and Kwanonqaba, where densities are far higher and levels of car ownership far lower. There is a lot more street life and formal and informal businesses;
- There are a number of informal settlements in Kwanonqaba generally inappropriately located along the steeper slopes of the river valleys. Isinyoka informal settlement enjoys magnificent sea views over the bay;
- 16 new housing pipeline sites have been identified for an Environmental Management Framework (EMF) review - (301.7ha), see Figure 5.7.2.1 and Table 5.7.2;
- 24 new development areas have been identified for detailed investigation proposals, see Figure 5.7.2.1 and Table 5.7.3 – (138 ha).

Photo 5.7.1(a) **Kwanonqaba Mall; Mayixhole street** (source: Google Earth, 2017)

Photo 5.7.1(b) **Marsh Street CBD showing vulnerability of quality urban environment to insensitive shopfront renovations and standardised road marking and kerbs** (source: Google Earth, 2017)

Photo 5.7.1(c) **Contrast and integration: Isinyoka informal settlement** (source: Google Earth, 2017)

Figure 5.7.1.2 Mossel Bay Town: Synthesis

Challenges and opportunities

- Opportunities include:
  - Transforming Louis Fourie Road into a hybrid mobility/access route with centre lanes providing higher speed movement for freight and private motor vehicles and well-located business nodes on all sides of intersections and parallel service/frontage roads providing high levels of access and visual exposure from the mobility lanes to small business and employment generating activities along the north and southern reserves;
  - Secondary opportunities along Louis Fourie Corridor include the development of Adriaans Avenue and Seder/Kreupelhout with its future extensions as supporting activity streets.
  - Louis Fourie Road is between 50 and 80 m wide with the latter width prevailing for most of its length from Schoeman Street to the N2;
  - Mayixhale Street linking through to Diaz Industria already integrates Kwanonqaba into the rest of Mossel Bay, although much of it currently passes through vacant land;
  - The port and the historic CBD offer potential as significant new tourism products to extending Mossel Bay's already considerable attractions. These appear to have enabled it to rebound so successfully from the 2008 global financial crisis. The municipality is extremely fortunate to have these two assets, particularly if it is to make serious inroads into maximizing business potential and reducing unemployment;
  - The network of river valleys and open spaces through this sub area, particularly Kwanonqaba, have been acknowledged by the community and others as an important asset that should be managed and maintained for both the ecosystem services that it offers as well as for its recreational and amenity value to the surrounding community;
  - A number of sites for low income and gap housing were identified and have undergone an environmental screening, see Figure 5.7.2.2;
  - These sites comprised three categories: Municipal Housing Pipeline Projects; NUSP projects; and, Informal Settlement Upgrades. These sites underwent a limited environmental management framework scan and were classified as follows: (i) sites excluded from needing an Environmental Authorisation (EA); (ii) sites requiring an EA; and, (iii) sites for which an EA has been completed;
  - Sites (i) and (iii), together with other NDAs identified in this SDF, are shown on Figure 5.7.2.1 and form part of the SDF proposals;
  - These amount to a total of 272.5 hectares of land, see Table 5.7.3. Table 5.7.4 contains three sites totaling 31.3 hectares for which EIAs must be carried out.

- Challenges include:
  - The port vests in National Government creating a challenge in achieving coordination and alignment between these two spheres;
  - Human settlement programs failing to deal effectively with the informal settlements lining some of the river valleys;
  - Addressing the housing backlog which is particularly acute in Kwanonqaba;
  - 16 sites have been identified by the Department of Human Settlements, see Table 5.7.2;
  - The need for strong leadership and guidance to stimulate the urban renewal of the historic CBD in a way that enhances rather than detracts from its potential attractions;
  - The current classification of Louis Fourie Road as a Class II limited access arterial.

Mossel Bay	
Total Population	56016
Total No. Households	16758
Average Household Size	3.3
Cadastral Erven (CE) (SG 2015)	16847
Proposed & Approved Units (MBM 2016)	8308
Total Erven	25155
Urban Edge Area (Ha) (MBM 2016)	2612
Person/Ha	21.4
Household/Ha	6.4
CE/Ha (Registered Erven)	6.5
CE/Ha(incl. proposed projects)	9.6
Permanent Households % assumes all registered erven developed)	99.5

Table 5.7.1 Urban Analysis

Mossel Bay Housing Pipeline (Dept. Human Settlements 2016)					
Id	**Project Name**	**Units**	**Status**	**Project Status**	**Area Ha**
1	Corridor Project (Sites C2-C6) 4274	4274	Red	Pipeline	87.3
2	Spekboom Project Site 5 (451)	451	Red	Pipeline	10.9
3	Spekboom Project Site 4 (557)	557	Red	Pipeline	16.4
4	Spekboom Project Site 3 (286)	286	Red	Pipeline	13.7
5	Spekboom Project Site 2 (628)	628	Red	Pipeline	18.2
6	Spekboom Project Site 1 (776)	776	Red	Pipeline	5.5
7	Future Dev (Corridor Projects C1)BNG 332 & social	332	Red	Pipeline	11.0
8	Asazani/ Izinyoka TRA (UISP, 311)	311	Green	Implementation	6.6
9	Elangeni Completion of PHP (RP, 281)	281	Green	Implementation	2.8
10	Thembelihle Erf 912 45 UISP	45	Red	Pipeline	1.1
11	Thembelihle Project Site M (Erf 1260-61) 151	151	Red	Pipeline	3.1
12	Sampson St Site K (15675, 9234..) 180, BNG 90 &	180	Red	Pipeline	6.3
13	Bill Jeffrey IRDP	-	Orange	Pipeline	16.7
14	Zeta Str Project Site E (228)	228	Red	Pipeline	7.3
15	Joe Slovo Block/ Tarka (Social, 76)	76	Green	Pipeline	10.3
16	Asazani/Izinyoka: 1077 (UISP, 346)	346	Green	Implementation	5.4
	Total				**222.6**

Table 5.7.2 Housing Pipeline (source: Dept of Human Settlements, 2016)

5.7.2 MOSSEL BAY TOWN: SPATIAL DEVELOPMENT FRAMEWORK AND DESIRED STATE OF THE ENVIRONMENT, see Figure 5.7.2.1

5.7.2.1 Core landscape and agricultural areas

- In Kwanonqaba river valleys must be actively managed as part of an open space system with litter removal, relocation or formalisation of informal settlements, and a trail (mountain biking, running, walking) interfacing between urban development and the river valley;
- This trail system should be linked to the Cape St Blaize coastal trail which requires upgrading;
- The river valley open space system in the south is already protected through open space zoning in the coastal estates;
- The intensive agricultural area north of the N2 outside of the urban edge should be retained for the 5 years this SDF is applicable.
- Future development along these valleys should as far as possible face onto single sided roads lining the valley tops, see section 5.4.

5.7.2.2 Urban Development

- Small-scale densification (second dwellings, subdivisions in accordance with approved Council policy) should be encouraged in low-density suburbs, such as Heiderand, subject to service availability;
- Table 5.7.3 lists all the new development areas that either had EAs completed or could be exempted from an EA. It also lists a number of other sites that have been identified as new development areas. This land amounts to 272,5 hectares;
- Table 5.7.4 lists those sites that still require an EA (31.3 hectares);
- Table 5.7.5 lists social facilities requirements to accommodate the forecast population increase, see Section 5.7.2.6 below;
- Redevelopment and small-scale intensification in the CBD heritage area should be promoted and guided by general heritage guidelines and the Central Precinct Plan (final draft 2013);
- The municipality and the Transnet should collaborate on an integrated project that maximises the ports shipping and mixed use waterfront potential and seamlessly integrates with the CBD.

5.7.2.3 Heritage Areas

- The 2013 CBD upgrading plan (final draft Central Precinct Plan local structure plan 2013) should be updated and implemented as a matter of urgency;
- All building renovations and redevelopments and design of roads, sidewalks, colonnades, and tree planting should be carefully assessed to ensure that they contribute to enhancing the historic CBD;
- The conditions of the Pinnacle Point Heritage Area should be adhered to;
- Sustainable repurposing of unutilised heritage buildings must be encouraged.

5.7.2.4 Urban Restructuring

Upgrade Louis Fourie Corridor

- The main urban restructuring action is the upgrading of Louis Fourie road using the "complete streets" design principles, see Section 5.4, so as to ensure that it supports the greatest possible levels of economic development and employment creation, as well as offering safe and convenient access to public transport and non-motorised transport facilities and services;
- Any changes to Louis Fourie road should not compromise mobility. There is currently no formal public transport system in Mossel Bay and therefore mobility is and will be crucial for the next 5 years;
- Mixed use business developments should be promoted along Adriaanse/Bill Jeffery/Kreupelhout/Steger/Mayixhale streets;
- Zonings will be created for properties along these streets make it easy to convert residential to a limited business premises/church/crèche/service industry;
- Consideration should be given to reclassifying this road as a class III road through a CBD and intermediate roadside development environment. Within this access management guidelines policy regime Louis Fourie Road's mobility function should be protected;
- A precinct plan for the Louis Fourie Corridor from the N2 intersection in the west to Sonskynvallei in the east should be prepared, see Section 5.8 and 5.9 as well.

Photo 5.7.2(a) **View over river valley corridor from Bokwe street showing eco-system service and amenity potential of open space system and rubble removal required** (source: google Earth, 2017)

Photo 5.7.2(b) **Louis Fourie road showing wide road verges on either side of double carriageway** (source: google Earth, 2017)

Photo 5.7.2(c) **View down Kerk street to harbour showing restored buildings, upgraded sidewalks, sympathetic street furniture (light standard) and sensitive modern editions – positive example of upgrading to be promoted throughout historic CBD** (source: google Earth, 2017)

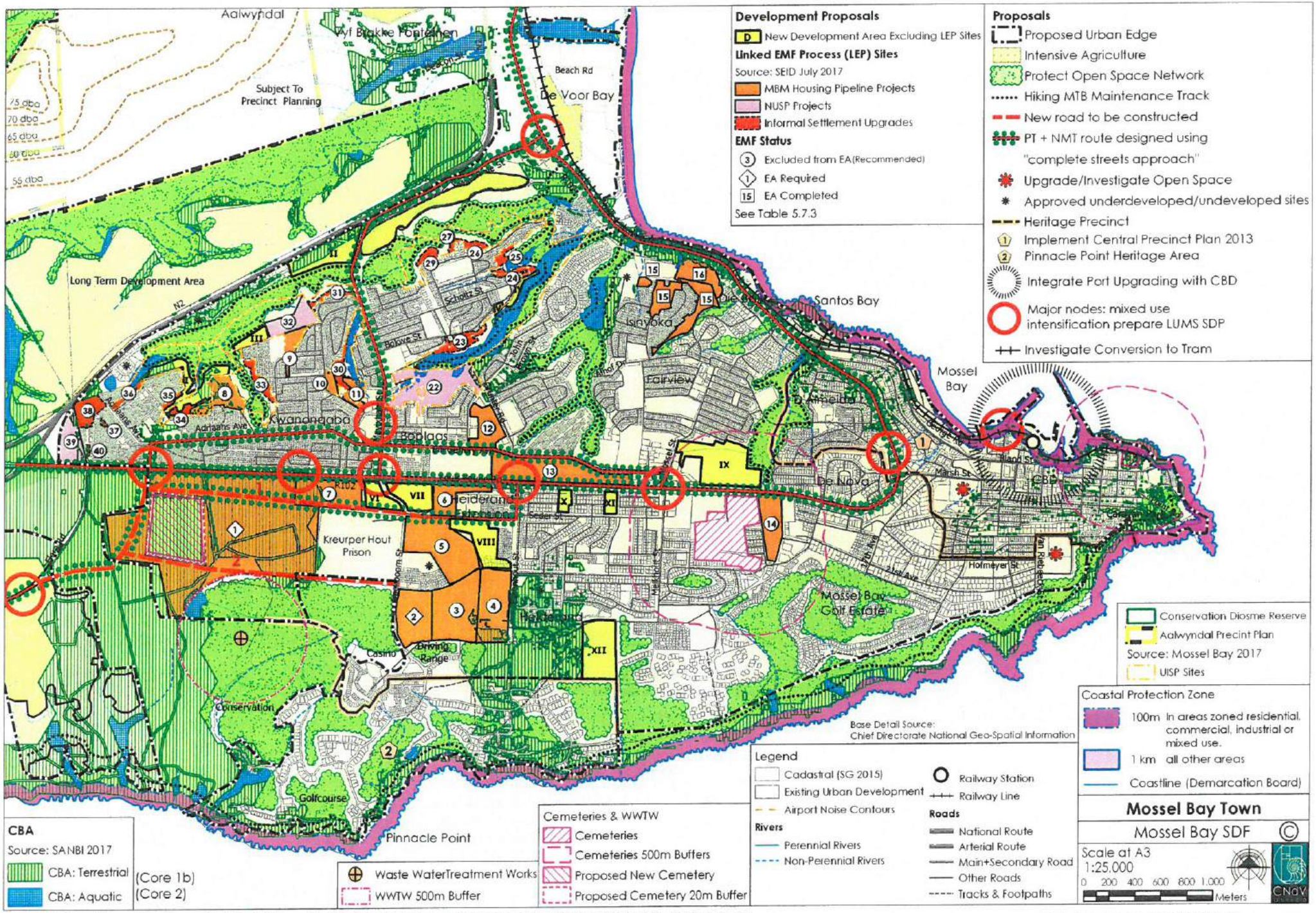


Figure 5.7.2.1 Mossel Bay Town: Final Draft Conceptual Spatial Development Framework and Desired State of the Environment

- Small and large nodes are proposed at the intersections indicated on figure 5.7.2.1 In certain instances, "Checkers" intersection and Da Nova, nodes supporting higher-order commercial and social facilities have already developed;

Kwanonqaba

- Kwanonqaba should not be extended across the N2 at this point in time due to challenges such as public safety, endangering the natural environment and integration will be negatively affected.
- Mayixhale Street should become an important activity link route in the future by upgrading it according to "complete streets" design principles;
- Create road links between Grunter Way and Bokwe Road and Alhof Drive and John Brown Street;

CBD and Port

- Incorporate the rail link from Diaz Dustria to the Port
- The Historic CBD must be repurposed as a tourist node;
- The harbour should be redeveloped with a strong tourist and mixed use waterfront including berthing cruising ships;
- A movement plan that promotes walking, cycling and public transport using the "Complete Streets" approach must be prepared for the CBD;
- Walking/jogging/MTB/ maintenance trails along Cape St Blaize route and along valley tops linking to main routes in Kwanonqaba and D'Almeida should be implemented.

NDA/SEID Site No	Area (Ha)	Project Type	SEID Comment/ Recommendations	Engineering Services	Comments
40	0.2	Informal settlement upgrade – Mossel Bay	Biggest part suitable for development, some part situated on servitude Recommend to exclude from requiring Environmental Authorisation.		Important well located open space to be retained – avoid town cramming, rather promote higher densities around it. Formalise squatter area
39	6.2	NUSP – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. Refurbish new sewerlines in Asla Park and Kwanongaba. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrify informal settlements. Street lighting to be provided. • Solid waste: Limited land availability for waste management facilities. Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Important gateway site for mixed residential development – UISP away from N2 Add possible school site/new open space for area.
38	4.0	Informal settlement upgrade – Mossel Bay	Biggest part suitable for development, some part situated on servitude. Recommend to exclude from requiring Environmental Authorisation.	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 39	Formalise squatter area.
37	0.2	Informal settlement upgrade – Mossel Bay	Suitable for full upgrade, settlement has no formal stands. Recommend to exclude from requiring Environmental Authorisation.		Formalise squatter area.
36	1.6	Informal settlement upgrade – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 39	Area as identified in EMF report – Infill.
35	0.2	Informal settlement upgrade – Mossel Bay	Suitable for full upgrade, slope might be an issue. Recommend to exclude from requiring Environmental Authorisation.	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 39	Area as identified in EMF report - Infill; river bank.
34	1.9	Informal settlement upgrade – Mossel Bay	Suitable for full upgrade, slope might be an issue. Recommend to exclude from requiring Environmental Authorisation.	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • tormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 39	Area as identified in EMF report - Infill; river bank. Recommended to be excluded from EA process.
33	2.1	Informal settlement upgrade – Mossel Bay	Floodlines to be determined (1:50 and 1:100), Suitable for development. Recommend to exclude from requiring Environmental Authorisation.	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 39	Area as identified in EMF report - Infill; river bank.
32	5.7	NUSP – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 39	Area as identified in EMF report - NUSP project.

Table 5.7.3 Mossel Bay Town: Comprehensive List of EMF sites and New Development Areas

NDA/SEID Site No	Area (Ha)	Project Type	SEID Comment/ Recommendations	Engineering Services	Comments
31	2.5	Informal settlement upgrade – Mossel Bay	Suitable for development, Slope analysis should be done. Recommend to exclude from requiring Environmental Authorisation		
30	2.8	Informal settlement upgrade – Mossel Bay	Part of settlement built on floodplain and steep slope. Recommend to exclude from requiring Environmental Authorisation		
12	6.3	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation		
11	3.1	Pipeline – Mossel Bay	Project next to informal settlement / Project to be prioritised. Recommend to exclude from requiring Environmental Authorisation	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: Limited land availability for waste management facilities. Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Infill, river bank
10	1.1	Pipeline – Mossel Bay	Project next to informal settlement / Project to be prioritised. Recommend to exclude from requiring Environmental Authorisation	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: Limited land availability for waste management facilities. Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Infill,
III	3.4	-	N/A	• Water: Distribution main required (160mm diameter) to supply future area. • Waste water: Sanitation link services required for development of future area. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 11	Noisy, infill. Mixed use with light industrial park.
29	0.8	Informal settlement upgrade – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 11	Infill, river bank
27	0.2	Informal settlement upgrade – Mossel Bay	Situated on a steep slope in a recognised floodplain, detailed slope analysis should be done. Powerline servitude runs adjacent to site, no services formal stands. Recommend to exclude from requiring Environmental Authorisation	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 11	Infill, river bank
26	0.7	Informal settlement upgrade – Mossel Bay	Situated on a steep slope in a recognised floodplain, detailed slope analysis should be done. Powerline servitude runs adjacent to site, no services formal stands. Recommend to exclude from requiring Environmental Authorisation	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 11	Infill, river bank
25	0.6	Informal settlement upgrade – Mossel Bay	Suitable for full development. Recommend to exclude from requiring Environmental Authorisation	• Water: Future network pipes required to link to existing bulk supply pipeline. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: See notes at Site No. 11	Infill, river bank

Table 5.7.3 Mossel Bay Town: Comprehensive List of EMF sites and New Development Areas cont.

NDA/SEID Site No	Area (Ha)	Project Type	SEID Comment/ Recommendations	Engineering Services	Comments
24	0.9	Informal settlement upgrade – Mossel Bay	Suitable for full development. Infill, river bank. Recommend to exclude from requiring Environmental Authorisation.	· Water: Future network pipes required to link to existing bulk supply pipeline. · Waste water: Sewer system required for future development. · Stormwater: Stormwater drainage infrastructure required. · Electricity: Electrification of all informal settlements. Street lighting to be provided. · Solid waste: See notes at Site No. 11	Infill, riverbank.
XIV	-	-	N/A	· Water: Future network pipes required to link to existing bulk supply pipeline. · Waste water: Sewer system required for future development. · Stormwater: Stormwater drainage infrastructure required. · Electricity: Electrification of all informal settlements. Street lighting to be provided. · Solid waste: See notes at Site No. 11	Infill, riverbank
23	3.0	Informal settlement upgrade – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.	· Water: Future network pipes required to link to existing bulk supply pipeline. · Waste water: Sewer system required for future development. · Stormwater: Stormwater drainage infrastructure required. · Electricity: Electrification of all informal settlements. Street lighting to be provided. · Solid waste: See notes at Site No. 11	Infill, riverbank
22	15.5	NUSP – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Large mixed use project site
IX	16.3	-	N/A	· Water: Future network pipes required to link to existing bulk supply pipeline. · Waste water: Sewer system required for future development.	Infill, abutting Louis Fourie, possible hospital site Investigate if portions of site closest to Louis Fourie can be developed for mixed use
14	7.3	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Mixed use mixed income site with commercial / business / high density residential.
13	16.7	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Mixed use mixed income site with commercial / business /high density residential.
9	2.8	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Infill development.
8	6.6	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Infill development.

Table 5.7.3 Mossel Bay Town: Comprehensive List of EMF sites and New Development Areas cont.

NDA/SEID Site No	Area (Ha)	Project Type	SEID Comment/ Recommendations	Engineering Services	Comments
7	11.0	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Infill.
6	5.5	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Mixed use mixed income site with commercial / business closest to Louis Fourie allows for frontage road. Well located site abutting Louis Fourie.
5	18.2	Pipeline – Mossel Bay	Primary School 2ha. Recommend to exclude from requiring Environmental Authorisation.		Revise layout.
4	13.7	Pipeline – Mossel Bay	Primary & secondary school. Recommend to exclude from requiring Environmental Authorisation.		Revise layout.
3	16.4	Pipeline – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.		Revise layout.
VII	3.9	-	N/A	• Water: Connection and distribution main required to supply future area. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Electrification of all informal settlements. Street lighting to be provided. • Solid waste: Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Infill development/ South Cape college
VII	5.9	-	N/A	• Water: Connection and distribution main required to supply future area. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Households are to be provided with access to electricity. Street lighting to be provided. Improve the level of lighting along major roads. • Solid waste: Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Well located mixed use, mixed income. Allow for service road parallel to Louis Fourie Infill, Spekboom Street node
VI	6.7	-	N/A	• Water: Area was not included in the Water master plan. Additional information required. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Households are to be provided with access to electricity. Street lighting to be provided. Improve the level of lighting along major roads. • Solid waste: Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Infill

Table 5.7.3 Mossel Bay Town: Comprehensive List of EMF sites and New Development Areas cont.

NDA/SEID Site No	Area (Ha)	Project Type	SEID Comment/ Recommendations	Engineering Services	Comments
IX	2.1	-	N/A	• Water: Area was not included in the Water master plan. Additional information required. • Waste water: Area was not included in the Sewer master plan. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Households are to be provided with access to electricity. Street lighting to be provided. Improve the level of lighting along major roads. • Solid waste: Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Infill: Louis Fourie Road
X	2.1	-	N/A	• Water: Area was not included in the Water master plan. Additional information required. • Waste water: Area was not included in the Sewer master plan. • Stormwater: See notes at site No. T. • Electricity: See notes at site No. T. • Solid waste: See notes at site No. T.	Infill: Louis Fourie Road
XII	40.6	-	N/A	• Water: Connection and distribution main required to supply future development areas. • Waste water: Sewer system required for future development. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Households are to be provided with access to electricity. Street lighting to be provided. Improve the level of lighting along major roads. • Solid waste: Households will require refuse removal by local authority or private company. Refuse Drop-off sites required and the provision of wheel bins.	Large middle income
15			EA completed	• Water • Waste water • Stormwater • Electricity • Solid waste	Slope and river bank setback to be accounted for in design.
16			EA completed	• Water • Waste water • Stormwater • Electricity • Solid waste	Slope and river bank setback to be accounted for in design.
Total	**238.8**				

Table 5.7.3 Mossel Bay Town: Comprehensive List of EMF sites and New Development Areas cont.

SEID Site No	Area (Ha)	Project Type	SEID Comment/ Recommendations	Engineering Services	Comments
3	19.4	NUSP – Mossel Bay	Recommend to exclude from requiring Environmental Authorisation.	· Water: Distribution main required (160mm diameter) to supply future area. · Waste water: Sanitation link services required for development of future area. · Stormwater: Stormwater drainage infrastructure required. · Electricity: Electrification of all informal settlements. Street lighting to be provided. · Solid waste: See notes at Site No. G	EA to be prioritised Large strategic site mixed with residential away from N2 and active edge to Masixhole.
2	10.9	Pipeline – Mossel Bay	Recommended that an Environmental Authorisation is required.		Recommended for exemption.
1	Revise	Pipeline – Mossel Bay	Future project 10 years plus – CNdV WWTW Buffer + OS. Recommended that an Environmental Authorisation is required.		Useable area reduced by WWTW 500m buffer and approved future cemetery.
Total	**30.3**				

Table 5.7.4 Louis Fourie Corridor: Comprehensive List of EMF sites and New Development Areas

5.7.3 ENGINEERING INFRASTRUCTURE ANALYSIS

- Increased demand for services due to growth of informal settlements.
- The size of the Kwanonqaba reservoir zone should be reduced while the Jamieson reservoir zone is enlarged.
- High lying areas west of Kwanonqaba and Heiderand should be supplied from Bartelsfontein reservoir (GLS, 2017).
- Residual pressures in high lying areas of Danabaai Tower, Kwanonqaba Tower and D'Almeida Bottom reservoir zones are below 24m. The low pressures are experienced mainly due to the lack of conveyance in the system, due to insufficient pipe diameter sizes.
- A new 6Ml reservoir is proposed at Bartelsfontein to increase the storage capacity in the proposed future zone.
- Small deficits occur at Cuffs and D'Almeida reservoirs.
- Existing undersized sewer pipe lines in Asla Park and Kwanonqaba.
- A high level of blockages occurred in especially the Asla Park and Kwanonqaba area because of vandalism and the discharge of foreign objects into the system.
- The coastal stormwater outfalls should be regularly maintained.
- Heiderand should be incorporated into the Pinnacle Point WWTP system. The capacity of the Pinnacle Point WWTP should be increased over the next 3-5 years from 3.7 Ml/day to 6.3 Ml/d.
- The stormwater drainage system at Isinyoka Housing pipeline project area should be maintained and extended as future development progress. The Isinyoka housing pipeline project area is surrounded by steep slopes and adequate stormwater drainage is required.
- The importance of a Water Demand Management Programme is emphasised.
- Municipal road upgrades and new four-way signalised intersections are required along the Louis Fourie corridor.
- Spare electricity capacity of 11,9MVA for future growth. Current peak maximum demand is 65.6MVA.
- Limited land available for waste management facilities.

5.7.3.1 Water

- Table 5.7.5 describes the respective reservoir capacities and the actual and future estimated AADD for various water system zones within the study area.

Reservoirs Capacity (kl)	Actual AADD of present zone (kl/d)	AADD of future zone (kl/d)
Cuffs Reservoir: 2250	Cuffs: 1116	Cuffs: 1298
D'Almeida Bottom Reservoir: 2250	D'Almeida Bottom: 1054	D'Almeida Bottom: 1346
D'Almeida Top Reservoir: 140	-	-
Daleys: 2250	Jamieson: 3675	Jamieson: 5428
High Level Reservoir: 1360	High Level: 284	High Level: 261
Hills Reservoir: 1360	Hills: 226	Hills: 202
Jamieson Reservoir: 9000	Jamieson Tower: 365	Jamieson Tower: 1422
Kwanonqaba: 3000	Kwanonquaba: 597	Kwanonquaba: 1098
Very High Reservoir: 8000	Kwanonquaba Tower: 542	Kwanonquaba Tower: 1033

Table 5.7.5 Reservoir capacity and present and future AADD (GLS, 2017)

- The existing bulk water supply system and water distribution system have insufficient capacity to supply the future water demands for the fully occupied scenario and the additional future development areas. The size of the Kwanonqaba zone should be reduced while the Jamieson reservoir zone is enlarged. High lying areas west of Kwanonqaba and Heiderand should be supplied from the Bartelsfontein reservoir (GLS, 2017). A new 6Ml reservoir is proposed at Bartelsfontein to increase the storage capacity in the proposed future zone.
- The spare capacity at Jamieson reservoirs can be utilized to supply the relatively small deficits that could occur at Cuffs and D'Almeida. A third pump set is proposed at the existing Omega and Grunter pumping stations as standby to increase the reliability of supply to the Jamieson reservoir zone (GLS, 2017).

- Proposed work to the future system include (GLS, 2017):
  - New distribution main from Bartelsfontein reservoir to high lying areas of Mossel Bay require upgrading in future;
  - Distribution main required to supply sites H and I;
  - Connection and distribution main to supply sites Q, R, S and V;
  - Network reinforcements to accommodate densification in Kwanonqaba.
- Water meter should be replaced at least every 15 years to minimise losses and to enhance revenue protection.

5.7.3.2 *Waste water*

- The actual PDDWF of existing developments in the Pinnacle Point WWTP Drainage Area amounts to 2827 kl/d. The Potential future PDDWF was estimated to be 6466 kl/d (GLS, 2017). The Pinnacle Point Sewer Treatment Works presently caters for effluent from Mossdustria, Dana Bay and Heiderand and is operating at full capacity. The IDP (2017-2022) propose that the capacity of the plant be increased over the next 3-5years from 3.7 Ml/day to 6.3 Ml/d.
- The Sewer Master Plan (GLS, 2017) proposed the following master plan items for future development areas:
  - Sanitation link services (new 200mm diameter gravity sewer) for development in areas of site I and site H.
  - Verification of pumping station capacity (38l/s required), upgrade of 315mm gravity sewer, diversion and connection to new existing lines near proposed Bill Jeffrey IRDP are required. Investigation required first according to 2017 Sewer Master Plan.
  - Heiderand should be incorporated into the Pinnacle Point WWTP system, due to capacity problems (pipes have less than 30% spare capacity) in the D'Almeida main outfall gravity sewer.
- The Fourth Generation IDP 2017-2022 recommends that existing undersized sewer pipe lines in Asla Park and Kwanonqaba be replaced with bigger diameter pipes by means of pipe cracking technology. The upgrade entails the replacement of the 110-mm diameter main sewerage lines in D'Almeida and Kwanonqaba with 165-mm diameter lines. The upgrading of these lines has already commenced in some areas.
- The main sewerage and sanitation challenges are the following (IDP, 2017-2022):
  - Illegal discharge of foreign objects/material into the municipal sewer network;
  - Septic Tanks;
  - Ageing Infrastructure.

5.7.3.3 *Stormwater*

- The following priority stormwater projects are recommended in the Fourth Generation IDP 2017-2022:
  - Upgrade stormwater drainage system at Kiewit, Cupido, and Sinkfontein to Alhof-D'Almeida;
  - New cut-off channel behind Grunter Street;
  - Upgrade stormwater along Anda, Sneeuberg to Sixaxeni;
  - Upgrade of the CBD stormwater;
  - New stormwater channel at Keerom Cul De Sac – D'Almeida.

5.7.3.4 *Solid Waste*

- The Louis Fourie disposal facility receives garden waste and building rubble. To be closed when the regional site is operational. The Kwanonqaba Transfer station is located in Kwanonqaba and accessed via Mayixhale Street from Louis Fourie Road and a short gravel access road from Mayixhale Street. Waste is offloaded here into skips, from where it is hauled to the nearby PetroSA waste disposal facility. Limited land available for waste management facilities. Landfill site required next to PetroSA to address this challenge. New location for Kwanonqaba Transfer station must be investigated. Possible site could be located next to N2 or within the sewerage buffer zone next to the Pinnacle Point sewerage plant.
- Fencing of existing formalised rubbish dumping areas at the following areas are required (IDP, 2017-2022):
  - Zone 7 (P.A Camp)
  - Next to 53 Maqabanqa Street opposite Khanyisa Creche;
  - At the end of John Mapisa Street;
  - At the back of 20 Lingelethu Street Elangeni;
  - At the back of Marikana Informal Settlement Graceland Street.

5.7.3.5 *Transport*

- There is a need for formalisation of informal settlements and future informal settlements layout planning since there is currently limited space for roads and stormwater as unplanned informal houses occurs unstructured and occupy road reserves.
- The following priority projects are recommended in the Fourth Generation IDP 2017-2022:
  - Upgrading of gravel roads and stormwater are required as well as sidewalk;
  - Bus stops/ Taxi embayments are required along major routes;
  - Mapete and Mtonjeni Street require upgrade. Kerbs and sidewalks required at Sixaxeni Street and Asla Park;
  - Fencing Louis Fourie Road Reserve (Highway);
  - Upgrade Pedestrian crossing over Louis Fourie Road (Bridge);
  - Taxi embayments along Louis Fourie Road.
- The access to the solid waste disposal site has no formal vehicle access on Louis Fourie Road. A one vehicle access on the southern side off Louis Fourie road would be sufficient to serve the solid waste disposal and the new cemetery sites. The Roads Master plan recommends a new link road to the east of the new cemetery.
- The following supporting Municipal Road upgrades are in the vicinity of the new proposed development areas (Hatch Goba, 2014):
  - New signalised intersection towards Pinnacle Point;
  - Exclusive right and left turn slip lanes (near Sites Q and R illustrated on Figure 5.7.2.1);
  - Extend Grunter road and change Grunter/Bill Jeffery to a four-way signalised intersection providing a new northern link to Bill Jeffery road;
  - Extend Bill Jeffery road to provide access to new hospital site and link up with Da Gama Street. Review of geometry at Mossel Street and Schoemans street intersection required;
  - Schoeman street intersection upgrade to provide a two lane approach for the northbound traffic along Shoeman Street (completed);
  - Four-way signalised intersection with protected left turn slip lane at Melkhout street and Louis Fourie;
  - Left-in, Left-out operation to Magistrate Court;
  - Extent Adriaans Avenue over the N2 (near sites A and B);
  - Extend Mayixhale Road (diamond Interchange), which are near Sites H and I;
  - Extend Walvis Road to contour the topography parallel with TR33/1 and terminate with a cul-de-sac;
  - Watson Road upgrade to "Seagull Intersection" with partial signalisation.

5.7.3.6 *Electricity*

- Electricity is purchased from Eskom at six intake substations with a notified maximum demand of 77,5MVA and is distributed under a NERSA licence at voltages ranging from 230V to 66000V to various industrial, commercial and domestic customers. The peak maximum demand currently is 65,6MVA and there is spare capacity of 11,9MVA for future growth. The Main intake substation is currently being upgraded by installing additional 66kV switches and three step up transformers. In addition, 6km, 66kV cooper overhead lines are constructed between the Main intake and Saunders substations.
- The following priority projects are recommended in the Fourth Generation IDP 2017-2022:
  - Illegal electricity connections at informal settlements to be controlled;
  - Electricity shortage and electricity connection backlog in areas of Khayelitsha and a portion of Elangeni;
  - Installation of Meter Boxes Electricity (Block 1E and 1 C);
  - High mass lights at all dark areas and at informal settlements required;
  - Saunders 66/11kV Substation planned for 2019/2020.
  - Solar water geysers and geyser timers required for future housing developments.

5.7.4 SOCIAL FACILITY INFRASTRUCTURE ANALYSIS

Table 5.7.6 indicates the community facilities to accommodate the future population. While 4 more primary and 2 high schools will be required by far the biggest need already is and will be for ECDs.

Category	Facility Description	Population Threshold: Small to Medium Towns (CSIR, 2012)	Requirements based on Total Erven (2016) (Table 5.7.1, Row 6/Table 5.7.2) + NDA @ gross average 25du/ha (3.3 persons/household) = 94 396 persons			
			Overall Need	Existing Facilities	Facilities Required (CSIR, 2015)	Total Land needed (ha)
Health	Community Health Centres	60 000 - 100 000	1	2	0	
	Primary Health Clinic	24 000 - 70 000	3	2	1	
Culture	Local Library	20 000 - 70 000	4	3	4	
	Community Hall	60 000	1	4	0	
	Cultural Facilities (Community Performing Arts Centre)	50 000	1	0	1	
Education	Primary School (incl. sportsfield) (@ 2.8 has)	**7000**	**13**	**9**	**4**	**9.2**
	Secondary School (incl. sportsfield) (@ 4.8 has)	**12 500**	**7**	**5**	**2**	**9.6**
	Small Créche / Early Childhood Development Centre (@ 0.2 has/100 children)	**2 400 - 3 000**	**31**	**4 + not formal**	**27**	***(5)**
	Skills Training (Adult Education Training Centres / Further Education Training Colleges) (@ 1 ha)	1 per town larger than 5000	1	2	1	
Sport	Sports Complex	60 000	1	3	0	
	Multipurpose Sports Hall	100 000	0	2	0	
	Community Park	60 000	1	5	0	

Table 5.7.56 **Mossel Bay Town: Social Facilities Requirements for small to medium town** (source: CSIR Guidelines for the Provision of Social Facilities in South African Settlements, 2015)

***ASSUMPTIONS**

1. Settlement considered "small to medium town" ito CSIR definition;
2. All registered erven permanently occupied;
3. All NDAs developed and occupied at gross average 25du/ha;
4. There is a strong case for decreasing site areas for certain facilities, e.g. primary and secondary schools; and,
5. Exact location of required social facilities to be identified in new development areas, see Figure 5.7.1 and Table 5.7.5, if and when they are developed.
6. No areas have been calculated for ECDs as these can be accommodated informally on existing residential properties.

5.8 LOUIS FOURIE CORRIDOR: N2 TO SONSKYNVALLEI

Section 5.7 identified the Louis Fourie Corridor upgrading as the most significant urban restructuring to improve Mossel Bay Municipality's spatial justice, efficiency and sustainability. Upgrading this corridor by increasing urban densities and improving its already existing potential to promote economic development and job creation will achieve the most benefits for the least expenditure.

Louis Fourie Road is currently classified as a Class II road with strict access management guidelines in terms of the new draft policy.

However, Louis Fourie road between the N2 and De Nova with its supporting routes of Adriaanse / Bill Jeffrey streets to the north and Krepelhout/Seder Streets, to the south, some sections of both which north and south routes still need to be completed, has the text book configuration of a successful activity corridor based on a trinary route network. In some instances, such as Bogota in Columbia and Curitba in Brazil, the central route is used as a high capacity public transport spine.

5.8a Applying the Complete Streets Approach to the "Louis Fourie Corridor"

Therefore, it is proposed that the "Complete Streets Approach", see Section 5.4.19 throughout the main spine roads through the municipality including Flora Road, Louis Fourie Road to Sonskynvalllei, Mayixhale/Watson Ave, Aalwyndal Road, Impala/R102 through Klein-Brak to Groot-Brak, Amy Searle street to Wolwedans and Morrison Street through Glentana, should be applied.

This approach entails considering the nature of adjacent urban development, services and facilities for public and non-motorised transport as well as accommodating freight and private motor vehicle traffic.

Figure 5.8.1.2 show an artist's impression of how such a development corridor might look from the N2 to De Novo.

In Mossel Bay town's context Louis Fourie Corridor performs an important mobility function. The Department of Transport and Public Works is completing an upgrading program for Louis Fourie Road from the N2 to Hartenbos, see Figures 5.8.1.4, 5.8.1.11 and 5.8.1.13.

In seeking to improve access and promote economic development and employment creation along Louis Fourie road it is important that its mobility function is not compromised.

5.8b Retain Current Intersection Spacing

This requires that the current intersection spacing along Louis Fourie Road, shown in figures 5.8.1.3, 5.8.1.11 and 5.8.1.13, is not compromised. However, these intersections are far too few to promote and facilitate the necessary direct access and visual exposure to the existing high volumes of traffic along Louis Fourie Road to successfully promote business development, employment creation and support a convenient and efficient linear public transport system. These volumes are likely to increase in the future, further improving the corridor's economic potential.

These proposals were discussed at length with the engineers designing the Louis Fourie Corridor on behalf of the Department of Transport and Public Works. Section 5.8 record the comments as to how the road could be converted into a development corridor including public transport, cycle lanes and pedestrian sidewalks using the complete streets approach.

It was highlighted that this road would experience gridlock particularly as a result of holiday traffic if the current modal split continued.

Informal businesses must be very carefully managed to ensure they do not negatively influence the gateway impression to Mossel Bay.

5.8d Cycling

Shoulders could be used as Class III cycle lanes by placing cycle symbols in them at the required interval according to the road marking hand book, see Figures 5.8.1.6 and 5.8.1.7.

5.8e Convert Rail Line from Santos Beach to Glentana to Tram Service

The rail line is considered a major opportunity in the future due to its convenient alignment and ability to connect far flung low density settlements such as Glentana with shopping and employment nodes such as Voorbaai, and to take pressure off Louis Fourie Corridor's private motor vehicle traffic volumes.

However, there is a concern with the numerous level crossings, see Figure 5.8.1.7.

If the rail line was converted to a tram service this could address both the level crossing issue as well as the traffic congestion issue. It will also be an excellent tourism resource.

The possibility of this strategy to provide public transport was never modelled in the current Provincial Department of Transport and Public Works upgrading project but should be seriously addressed. Some successful examples of urban tram services can be found throughout Australia and Europe, see Photos 5.8.1.1 to 5.8.1.3.

5.8f Proposed Louis Fourie Corridor Precinct Plan

A precinct plan for the Louis Fourie Corridor from the N2 intersection in the west to Sonskynvallei in the east should be prepared, see Section 5.7.2 as well.

Photo 5.8.1.1 Yarra Tram, Australia
(source: www.showbus.co.uk)

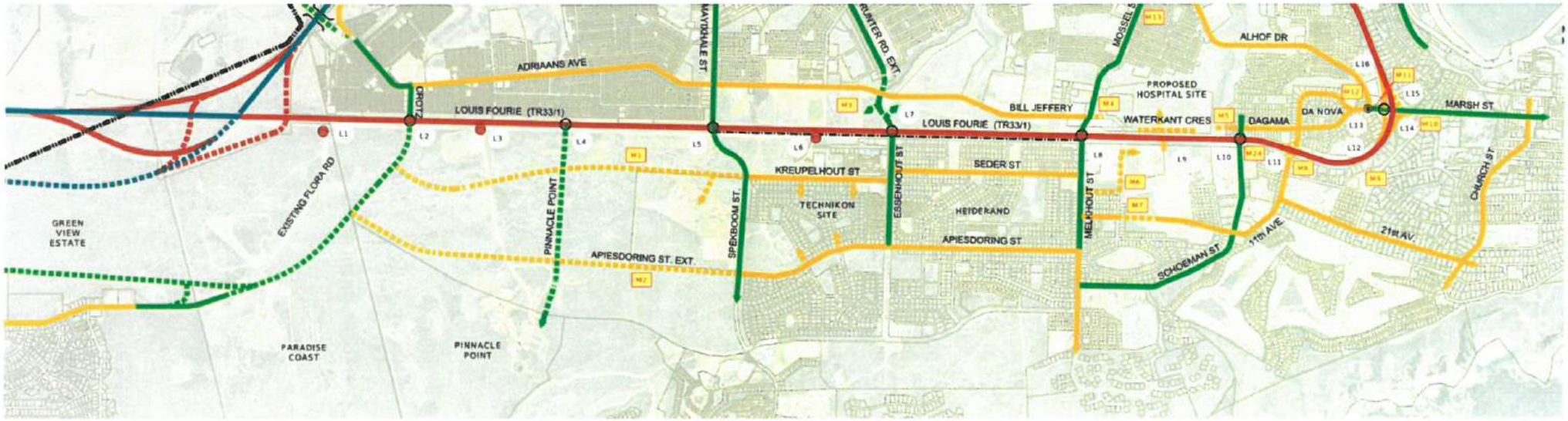
Photo 5.8.1.2 Tram stop at Flemington Racecourse, Australia
(source: www.crudeoil_peak.info)

Photo 5.8.1.3 Tram service in Melbourne, Australia
(source: www.internationalblog.acu.edu.au)

Figure 5.8.1.1 Louis Fourie Corridor Aerial (source: Google Earth, 2017)

Figure 5.8.1.2 Louis Fourie Corridor Re-imagined (N2 – Schoeman Street)

N2 to De Novo



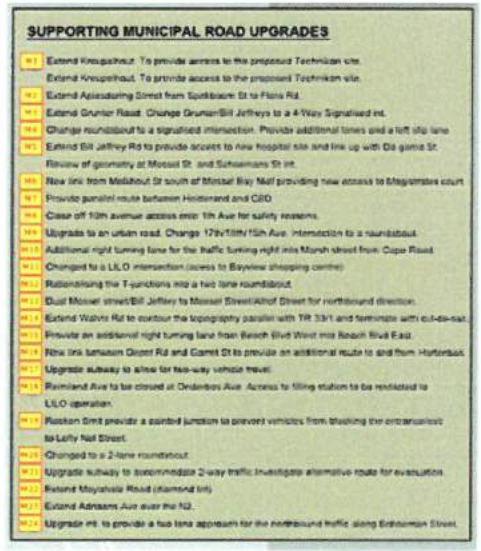


Figure 5.8.1.3 **Louis Fourie Corridor Management Plan** (source: Hatch Goba, 2015)

5.8.1 ROAD SECTION PROPOSALS

Dana Bay: Flora Road to Louis Fourie Road

- The proposed realignment of Flora Road had been included in the SDF proposals to link with Crotz Street, see Figure 5.7.2.1.

Mossel Bay/Kwanonqaba: Flora Road to Schoeman Street/Marsh Street

- It is proposed that, where possible, there should be frontage roads along both sides of Louis Fourie. These frontage roads would only take access off Louis Fourie at strategically proposed intersections, see Figure 5.8.1.1 and 5.8.1.2.
- Bill Jeffrey Road on the north and extensions of Seder Road in the south could operate as activity streets but would not have the business and employment generation potential of the Louis Fourie frontage roads.
- Mayixhale Street between Louis Fourie west and Louis Fourie east (Voorbaai) should have generous treed pedestrian sidewalks and cycle lanes retrofitted, notwithstanding the steep gradients onto the headland.

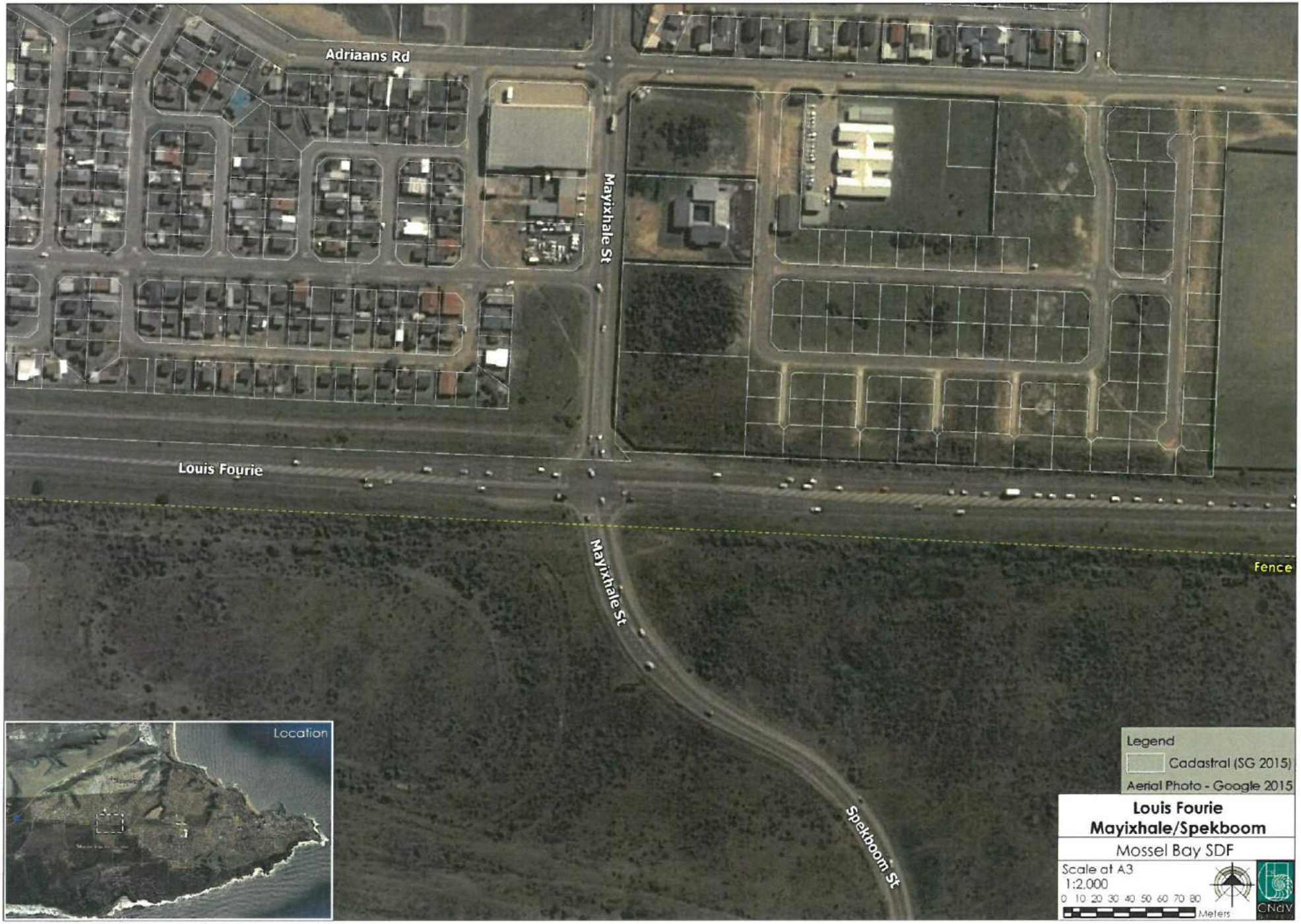


Figure 5.8.1.4 **Mayixhale/Louis Fourie intersection: Existing situation**

Da Nova/Marsh Street

- The grade separated interchange between Louis Fourie and Marsh street at this point is not required because of traffic volumes and high operating speeds but because of the difficult level changes in this vicinity. Therefore, it would be acceptable to continue cycle lanes in the shoulder and pedestrian sidewalks through this intersection.
- Ninth Avenue in Da Nova should be permitted to function as a frontage road and rezoning permitted accordingly.

Da Nova to Voorbaai

- This section is problematic due to the very narrow reserve along Santos Beach and it would be necessary to encroach into the rail reserve to accommodate the required cross-section. It was doubtful whether cycle lanes could be accommodated as there was little possibility of a shoulder. The use of the main carriageways as "sharrows" requires further discussion.

Figure 5.8.1.8 Louis Fourie/Marsh Street intersection

Diaz Beach to Sonskynvallei, see Figure 5.8.1.9

Voorbaai

- This is the most congested section of Mossel Bay. It was proposed to realign the N2 off ramp to line up with Gericke Street. It is unacceptable to have a high way off ramp terminating in a shopping centre car park. This realignment could have the effect of eliminating one of the level crossings.
- Further parking areas were being sought in front of and behind the shopping centre.
- Two sets of freight vehicles have to be accommodated, fuel tankers from the oil terminal and milk tankers from the dairy, in addition to all of the private motor vehicle traffic.
- It will be possible to have generous pedestrian sidewalks and cycle lanes along this section of Louis Fourie corridor. In some cases there are already frontage roads functioning as such, e.g. Sioux and Lofty Nel streets.
- The proposals for lower Aalwyndal to become a new growth node in Mossel Bay could have implications for the N2/Gericke/Aalwyndal intersection.

Figure 5.8.1.9 Louis Fourie Corridor: Aerial (Diaz Beach to Sonskynvallei) (source: Google Earth, 2017)

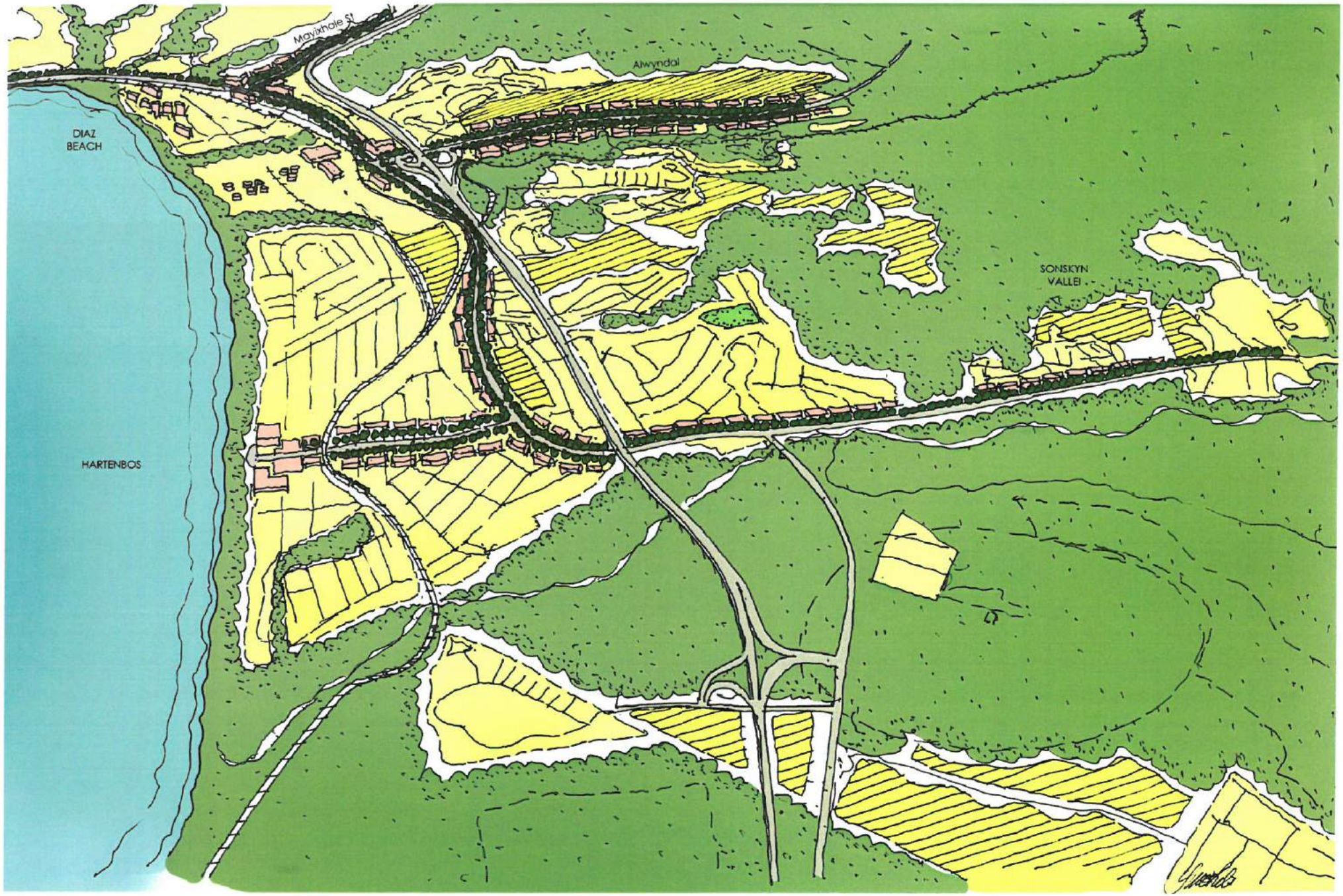


Figure 5.8.1.10 Louis Fourie Corridor: Re-imagined (Diaz Beach to Sonskynvallei)

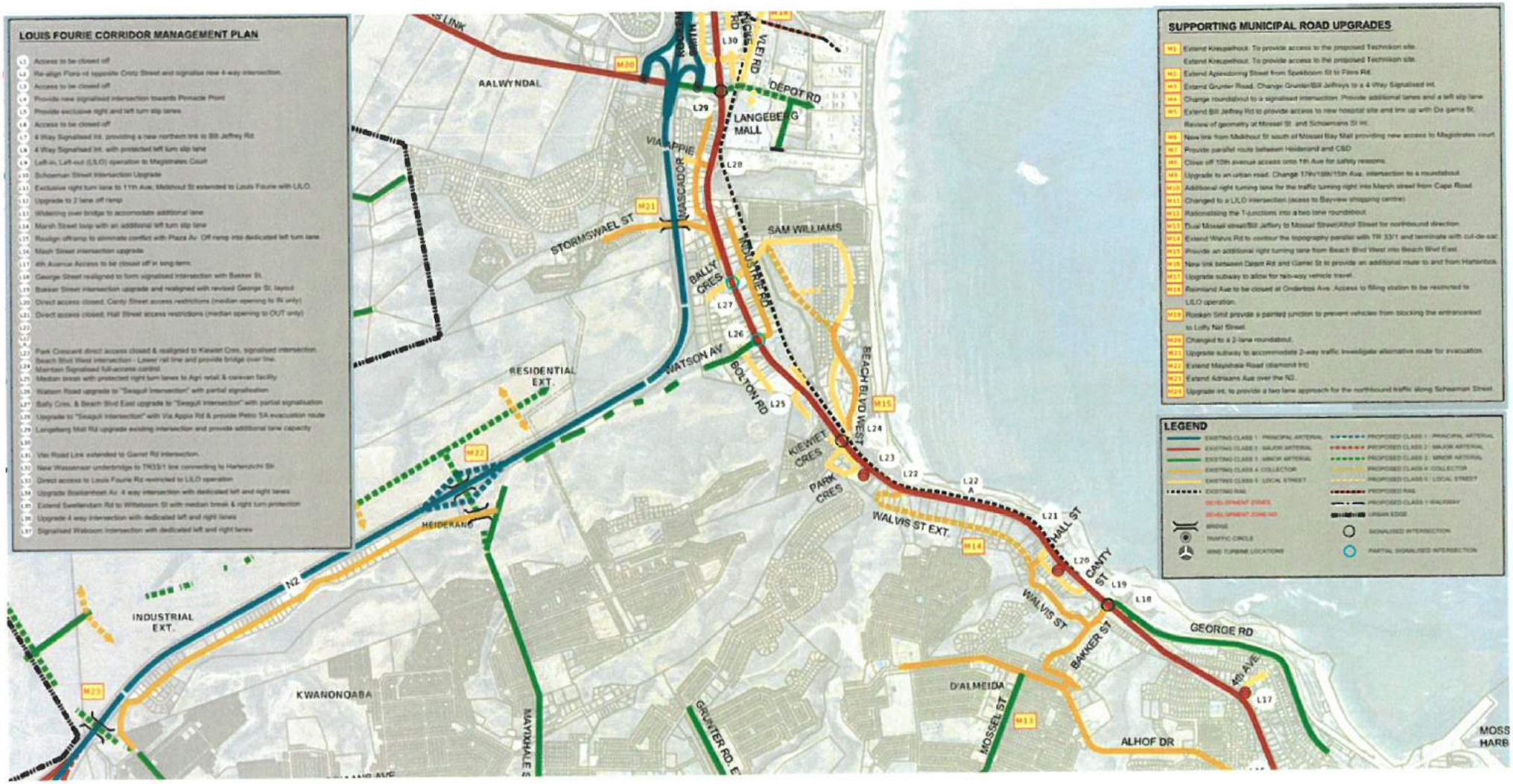


Figure 5.8.1.11 **Louis Fourie Corridor Management Plan** (source: Hatch Goba, 2015)

Figure 5.8.1.12 N2/Gericke/Aalwyndal intersection (source: Google Earth, 2017)

Hartenbos

- Louis Fourie road reserve through Hartenbos is generally only 30 m wide. It will not be possible to accommodate even one way frontage roads (3.4m) including a cycle lane (1.2m), parallel parking (2.5m) and landscaped sidewalk (3m) unless adjoining property owners give up a 5m set back. A 40 m reserve is required.
- It must be noted that a 5m setback is required from provincial roads. This may be a good opportunity to enforce this setback where it has not been relaxed.
- The DTPW only goes as far as the R103 intersection.
- The road proposals should be extended through to Sonskynvallei so as to help integrate this currently spatially isolated community with existing nearby urban settlement.

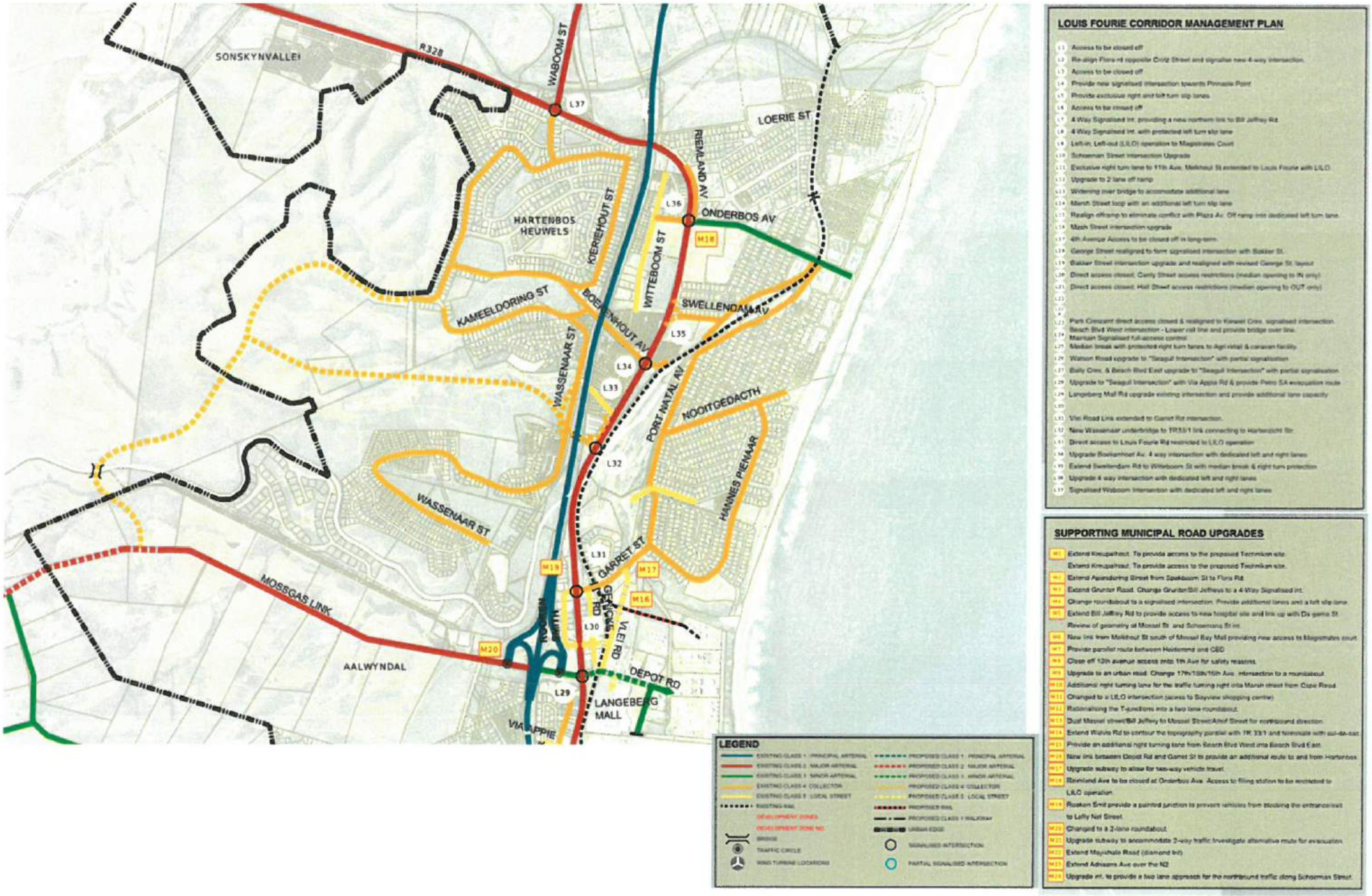


Figure 5.8.1.13 **Louis Fourie Corridor Management Plan** (source: Hatch Goba, 2015)

Figure 5.8.1.14 Hartenbos to Sonskynvallei: R103 /Waboom Street intersection (source: Google Earth, 2017)

5.9 VOORBAAI-HARTENBOS (population: ± 7073 Census 2011)

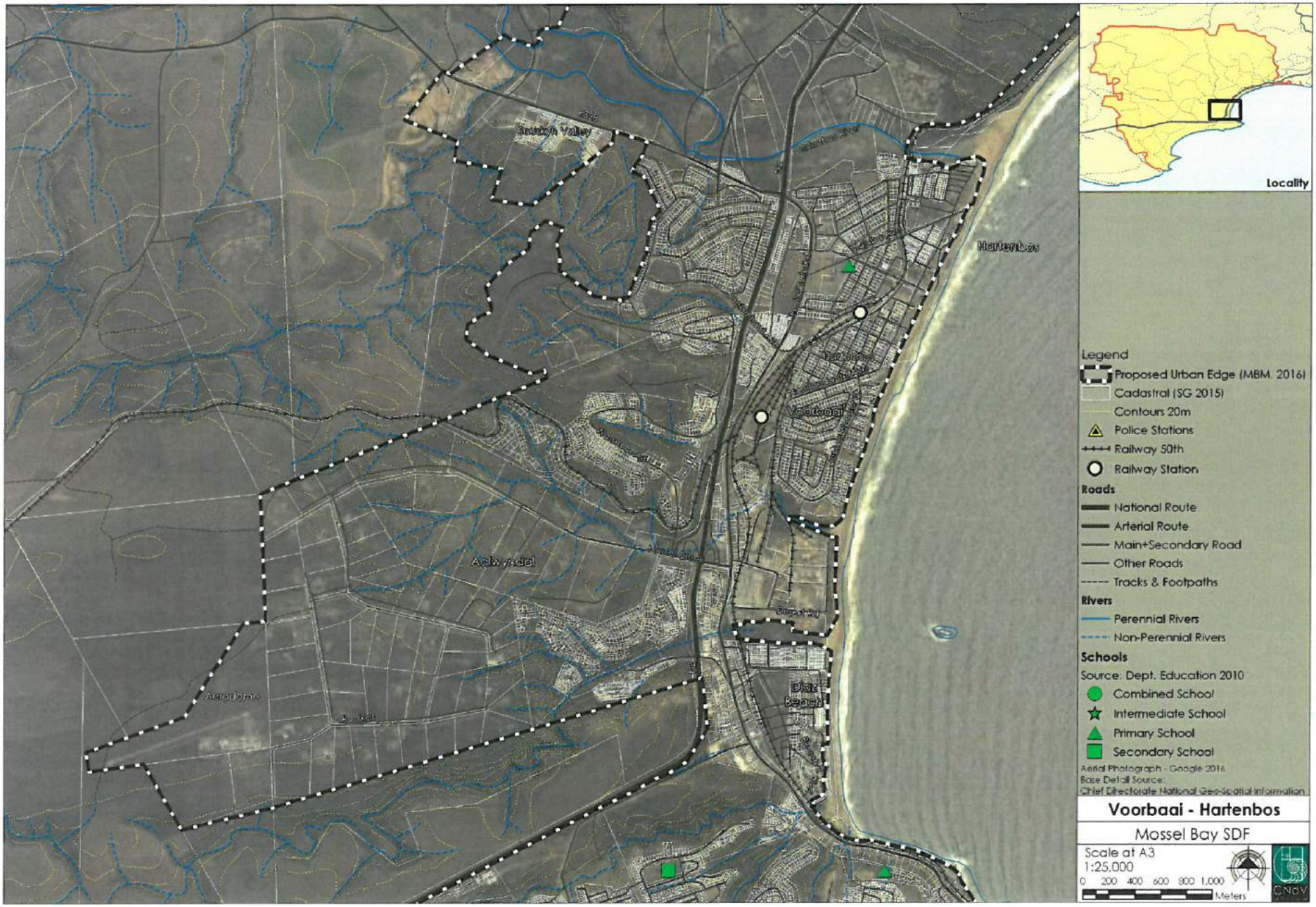


Figure 5.9.1.1 Voorbaai Hartenbos: Aerial photograph

5.9.1 SPATIAL ANALYSIS, see Figures 5.9.1.2

General:
This sub-area includes the following areas between the N2 and the coast; Diaz Industria, Diaz beach, (Die Voorbaai), Bay View and Hartenbos, as well as Aalwyndal and Mossel Bay Aerodrome, and Sonskynvallei to the west along Louis Fourie Road (R328).

Sub-regional location

- Although these sub-areas now form a continuous strip of urban development from Da Nova in the south to the Hartenbos River, their growth has been a response to very different sub regional location opportunities:
  - Diaz Industria was the first relatively flat land near Mossel Bay CBD suitable for industrial purposes along Louis Fourie Road and the railway line.
  - When the N2 was constructed in the 1980s the Aalwyndal intersection gave this area a significant locational advantage over Mossel Bay CBD. This led to the development of Langeberg shopping mall and the transformation of Diaz Industria into a more light industrial, mixed-use business node including offices. As a result, the Louis Fourie- Aalwyndal intersection is now considered the main Mossel Bay town CBD and is known as Voorbaai, see Photo 5.9.1a showing the industrial character;
  - In contrast, Diaz Strand developed as a holiday destination responding to the pristine beaches and views along this coast; The high level of access of this area is further strengthened by the direct connection to Kwanonqaba along the Mayixhale/Watson Road link. This link serves to improve Kwanonqaba's integration into the rest of Mossel Bay town;
  - North of the Aalwyndal Road intersection Hartenbos developed as a holiday resort in the 1930s, first by Transnet's predecessor SAR+H and then an Afrikaans cultural organization (ATKV) in response to the excellent beaches and climate with good access by rail and Louis Fourie Road;
  - Sonskynvallei is a low income area situated along Louis Fourie Road, approximately 2kms from Hartenbos.

Layout pattern

- As a result of the differing sub-regional location and land-use responses there are a number of different components to the layout pattern of this sub-area;
  - Diaz Industria has a large plot industrial grid layout aligned with Louis Fourie Road;
  - Diaz Strand has a rather convoluted curvilinear car orientated layout giving access to beachfront tower blocks and group holiday housing in grid layouts across a large tract of undeveloped land from Louis Fourie Road;
  - The central Langeberg Mall area comprises a large conventional shopping centre with external parking and further industrial grid iron township layouts;
  - There is an oil tank farm occupying prime beachfront land east of the shopping mall. This is also the onshore oil and gas terminal;
  - Hartenbos comprises a number of different residential subdivision layouts following grid iron curvilinear patterns depending on the era in which they were developed. Plot sizes range from 225 m² to 700 - 800 m²;
  - Hartenbos and Voorbaai is bisected by the railway line;
  - There is a large goods yard, currently little used, in Voorbaai. Here the rail line branches to Moss Industria and out of Swellendam;
  - There has been an innovative infill development around Hartenbos station;
  - Inland from the N2 there are a number of partially developed curvilinear residential areas taking access through underpasses under the N2 off Louis Fourie road, Their layout is informed by the shape of the headlands on which they are located;
  - Sonskynvallei represents a new lower income development node some 2.5 km from Hartenbos CBD, see Photo 5.9.1c;
  - Aalwyndal is currently undergoing a precinct planning exercise as it has been identified as the next major development area for Mossel Bay and it can be argued that it is better located than Hartenbos North for this purpose. It is still somewhat peripherally removed from the remainder of the town and will have to take into account residential setback lines arising from the noise contours for the proposed redevelopment of Mossel Bay aerodrome. It is likely that the current boundary layout of the smallholdings will dictate the overall layout of future development as this reflects the land ownership pattern and, therefore, the phasing of development unless ownership consolidation occurs.

- A noticeable pattern from this analysis, (and particularly in Hartenbos North) is that there appears to be a slow take-up and construction of houses on larger properties in the more remote projects. This suggests there is a re-positioning in the market towards better located smaller dwellings on smaller plots. Therefore, it is likely that the market is likely to respond positively to policy directives promoting densification on better located more integrated sites, see Figure 5.9.1.2 which shows the spatial patterns of the area.

Photo 5.9.1(a) **View over Voorbaai showing industrial character with Langeberg mall in middle ground with oil tank farm as backdrop** (source: Google Earth, 2017)

Photo 5.9.1(b) **Louis Fourie corridor through Voorbaai showing traffic congestion and backdrop of Diaz Strand holiday apartment towers** (source: Google Earth, 2017)

Photo 5.9.1(c) **Sonskynvallei showing remote location from Hartenbos visible on horizon near road** (source: Google Earth, 2017)

Hartenbos	
Total Population	7073
Total No. Households	2634
Average Household Size	2.7
Cadastral Erven (CE) (SG 2015)	5476
Proposed & Approved Units (MBM 2016)	560
Total Erven	6036
Urban Edge Area (Ha) (MBM 2016)	1941
Person/Ha	3.6
Household/Ha	1.4
CE/Ha (Registered Erven)	2.8
CE/Ha(incl. proposed projects)	3.1
Permanent Households % assumes all registered erven developed)	48.1

Table 5.9.1 Urban Analysis

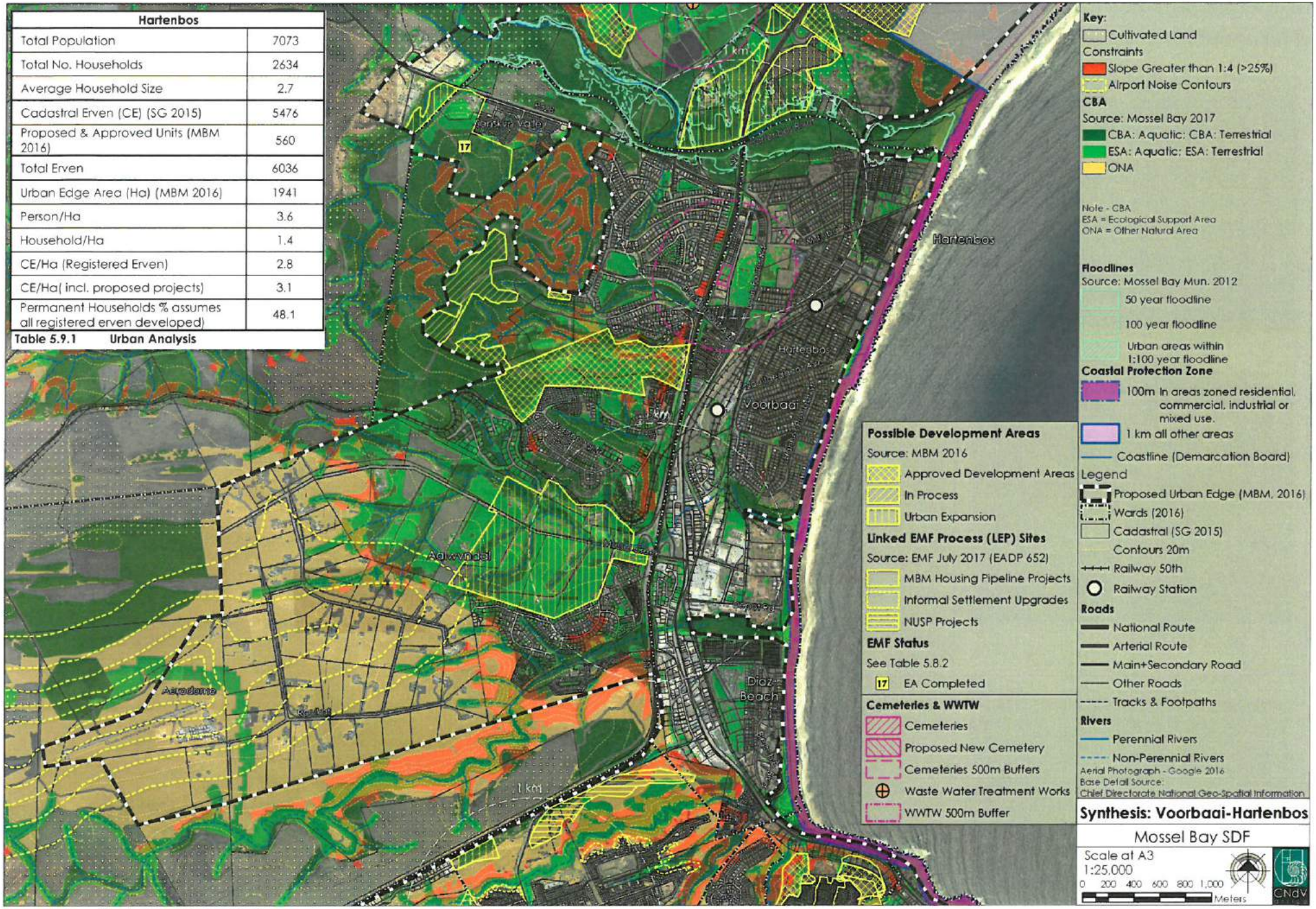


Figure 5.9.1.2 Voorbaai - Hartenbos: Synthesis

Urban quality

- Activity levels are intense through Diaz Industria between Da Nova and the Louis Fourie/Aalwyndal road intersection and beyond. Traffic congestion is experienced over increasingly longer periods of the day and outside of the tourist season and there is a lot of pedestrian traffic although there are few pedestrian and non-motorised transport facilities along the route. Cycling also occurs although there are no facilities for this;
- The urban character in the Diaz Industria/Voorbaai area varies considerably. It ranges from repurposed industrial buildings, the conventional Langeberg mall shopping centre with its large parking forecourt fronting onto Louis Fourie road and the high-rise apartments of Diaz Strand to the east. To the west of the partially developed residential housing estates setback on the headlands overlooking the N2;
- In Hartenbos activity levels drop significantly in this mainly low density residential environment. Hartenbos has a large retiree and holiday character which also results in a much quieter urban character for much of the year except over the festive season;
- During this period Hartenbos is a major destination for cultural events and festivals as well as holidaymakers from all over South Africa;
- Sonskynvallei is very much tucked away with its residents having to commute a significant distance either by foot, bicycle or minibus taxi into Hartenbos or further to Mossel Bay CBD.

Challenges and opportunities

- The centre of gravity of business and employment activity has clearly moved from the historic CBD to Diaz Industria/Voorbaai;
- However, this growth has not been planned but has arisen as part of a series of ad hoc developments and planning decisions over a couple of decades;
- It is clear that supporting infrastructure, particularly transport, is increasingly less able to cope with the greater demands.
- A land-use balance between residential and economic opportunities and social facilities that can be measured by reduction in travel will need to be found as soon as possible, preferably in the 5 year time horizon of this SDF, so as to ensure that this area doesn't become so congested that businesses and people move away from it.
- Mossel Bay as a whole and particularly this part of the town is showing signs of becoming stuck with densities that are too low to support public and non-motorised transport services and a land use pattern that creates an excessive need for travel.
- This is why Louis Fourie road needs to be transformed from a class 2 exclusive mobility route that tries to function as a limited access high-speed road primarily favouring private motor vehicle travel, to a public and non-motorised transport route with a high quality pedestrian environment, including tree planting.
- Its design should be based on "complete streets" design principles but which still permits a high level of car movement.
- To support this improved functionality of Louis Fourie Road, a more intense and mixed land use pattern should be promoted in a corridor close to the road. Gross average floor area ratios should increase to at least 1.0 and dwelling unit densities to 25 dwelling units per hectare.
- Further challenges relating to transport include:
  - The tank farm behind the Langeberg shopping mall is also the offshore crude oil and gas terminal for Mossgas refinery's feedstock. There are a large number of road freight tankers using the road network around the shopping mall taking access onto the N2 on and adding to the general traffic congestion in the area;
  - The importance of retaining the rail lines and reserves as a future high-capacity transport service has been noted several times in this report. Level crossings present a particular challenge in terms of integrating rail services safely into surrounding urban areas. There is a level crossing at the busy entrance to the Langeberg mall which is used by shoppers and industrial freight traffic. Consideration will need to be given to a road over rail or rail over road crossing or to an alternative rail based service such as a tram whereby level crossings function as normal intersections;
- Hartenbos' densities should be considerably increased. This can happen over time by permitting subdivision as per municipal policy and redevelopment of large properties particularly those between the N2 and the coast. It is interesting to note that the small plots in the blocks bounded by Paardekraal, Majuba and Dalmanutha streets and Port Natal, Harts and Mooinooientje streets of approximately 225 to 250 m² already achieve gross densities of 25du/ha. It is easy to achieve these densities with 2 to 3 storey apartment buildings;
- Better integrating Sonskynvallei into Hartenbos is a challenge particularly because of the steep hills that cut it off from the remainder of the settlement. A transport solution to integration will be to improve the connectivity and functionality of Louis Fourie Road by enabling it for public and non-motorised transport. Creating a small business node as well as promoting an industrial area at the nearby brickworks could help to some extent but will not completely address the disconnect between where major economic opportunities will be found for many years into the future and the peripheral location of the settlement.

Photo 5.9.2(d) **Image showing variation in urban character, with residential and industrial buildings across each other** (source: CNdV Africa, 2017)

Photo 5.9.2(e) **High level of traffic on Louis Fourie Road** (source: CNdV Africa, 2017)

Photo 5.9.2(f) **The low density found in Hartenbos** (source: CNdV Africa, 2017)

5.9.2 DIAZ – VOORBAAI - HARTENBOS: SPATIAL DEVELOPMENT FRAMEWORK AND DESIRED STATE OF THE ENVIRONMENT, see Figure 5.9.2.1

5.9.2.1 Core landscape and agricultural areas

- This sub-region was richly endowed with a striking natural landscape consisting of rolling hills incised by steep valleys through which rivers flowed across a narrow coastal plain to the sea.
- This landscape has largely been obscured by low-density housing estates across the hills, urban development that turns its back on the river valleys and transport infrastructure, commercial and industrial development on the coastal plain. The only exception to this pattern is the Deacon Street development with closely set houses in a regional architectural style around large open areas, see Photo 5.9.2a on previous page. This should be promoted as the model for future development in Hartenbos' scenic highlands.
- The river valleys should form part of a municipal open space system with proper cleansing management and lined with single sided development facing onto roads, tracks and trails fringing the open spaces so that they become part of a continuous, safe and secure cycling, running and pedestrian recreational network through out Mossel Bay's urban areas.
- Intensive agricultural areas should be conserved, particularly those close to urban settlements. Their use in urban agricultural projects should be promoted.
- The 100m coastal setback line should be strictly observed until it is replaced by the current setback determination being undertaken by Eden District Council.

5.9.2.2 Urban Development

- Small-scale densification should be promoted in all sub-urban areas between the N2 and the coast subject to service availability.
- Mixed land uses that are compatible (i.e. non-noxious and disturbing activities should not be permitted) with residential areas should also be promoted in the Voorbaai area.
- New Development Areas I and II should accommodate further extensions to Sonskynvallei including an industrial component which may arise from redeveloping the brick fields to accommodate employment needs here.
- New Development Areas III to VI should accommodate extensions to high income low-density development should the market support this. These properties should be served by off-grid technologies as much as possible rather than relying on municipal services which should be prioritised for lower-income areas, e.g. Sonskynvallei, as much as possible.
- New Development Area VII should be investigated for urban development or to be retained as open space. It has not been identified as a CBA nor ABA but its hydrological suitability for urban development should be checked.
- New Development Area VIII comprises the Voorbaai rail yard originally developed for materials trans-shipping for the construction of the Mossgas refinery. A rationalisation plan should be conducted to see there are development opportunities on surplus land in this well located site.
- New Development Areas IX, X and XI comprise the lower portion of the Aalwyndal smallholding below the escarpment and outside the 55 DBA noise contour for the proposed airport within which no residential development should be located. The Aalwyndal precinct plan should be used as development guide for the total Aalwyndal area.
- It includes approximately 320 ha which could accommodate 7 500 dwelling units at an average gross density of 20 - 25 du/ha.
- This implies that this land would be suitable for a new model integrated settlement along the lines of the principles contained in section 5.4.
- New Development Area XII could potentially be utilised as a small railway station surrounded by high density development.

5.9.2.3 Heritage Areas

- Not applicable

Photo 5.9.2(a) **Proposed node site: Mandela Street/Louis Fourie road: Sonskynvallei** (source: Google Earth, 2017)

Photo 5.9.2(b) **Proposed site of Aalwyndal mixed use, mixed income model integrated human settlement** (source: Google Earth, 2017)

Photo 5.9.2(c) **Mayixhale/Louis Fourie intersection showing 3 storey apartment building and mixed land uses already contributing to nodal development** (source: Google Earth, 2017)

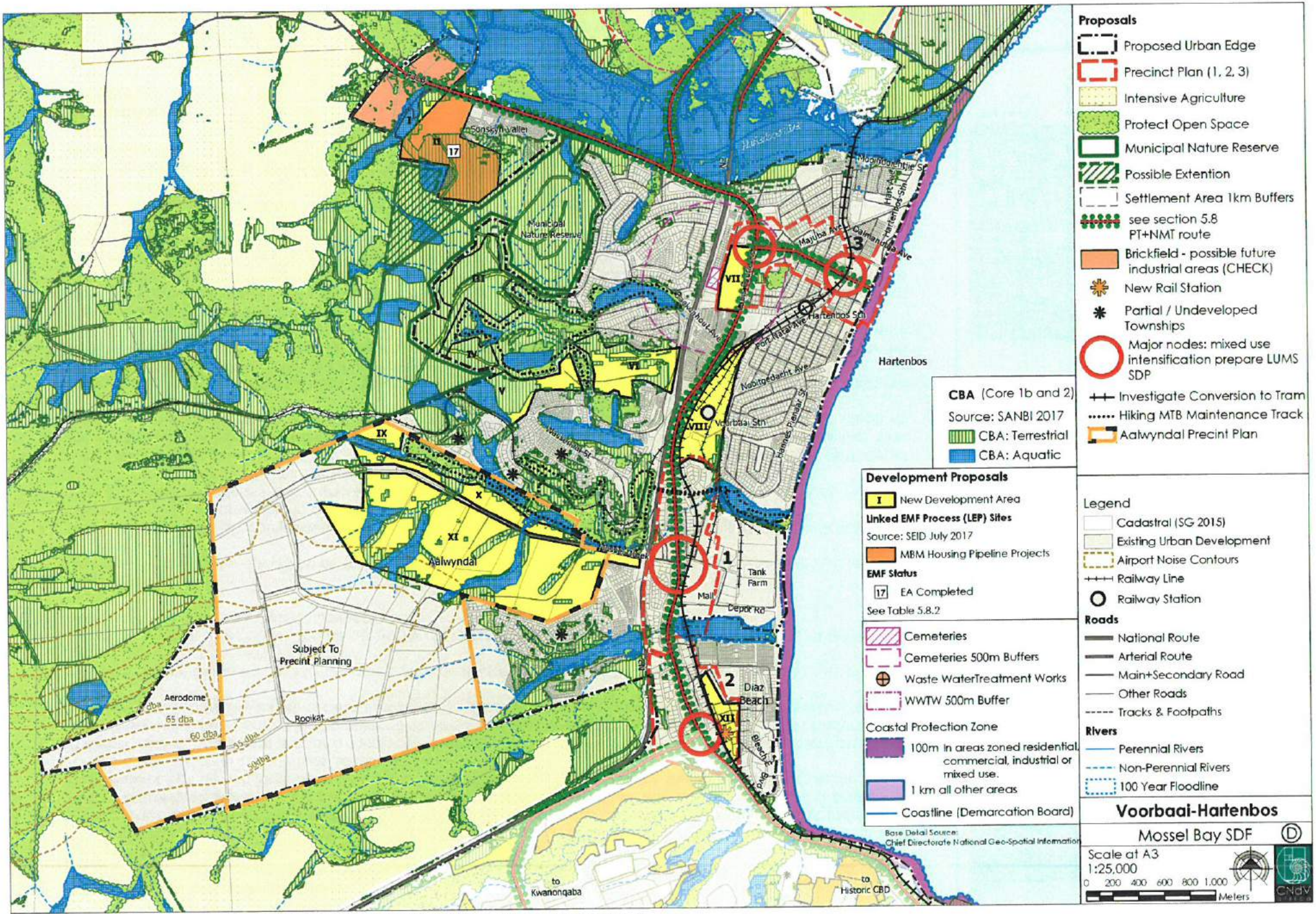


Figure 5.9.2.1 Voorbaai - Hartenbos: Spatial Development Framework and Desired State of the Environment

5.9.2.4 Urban Restructuring

- This sub area is already experiencing the disadvantages of an uncoordinated urban structure only held together by roads limited access arterial roads even though existing urban development and activity patterns are in direct contradiction.
- Louis Fourie Road should become a class III mobility/access street in an Intermediate and CBD Roadside Development Environment (Access management Guidelines 2016) with a "complete streets" cross-section providing urban design guidelines for the development of kerb side activities and buildings and accommodating public and non-motorised transport;
- Major nodes are proposed at Mayixhale/Watson streets, Aalwyndal and Onderbos intersections on Louis Fourie with a minor node at the intersection of Mandela Street in Sonskynvallei and Boekenhout Ave in Hartenbos.
- In Hartenbos, further compact high-density, low rise development should be encouraged along the entire length of Kaap De Goede Hoop Avenue from Louis Fourie Road to the to the coast, where a major coastal tourist and retail node is under construction.
- Detailed precinct plans should be drawn up for Hartenbos, Voorbaai and Diaz CBDs.
- The possibility of a new rail station should be investigated at Diaz Industria on New Development Area XII.
- Attention will have to be given to the level crossings in this sub-area.
- A precinct plan should be prepared for the Louis Fourie Corridor from the N2 through to Sonskynvallei, see Sections 5.7 and 5.8.
- A precinct plan should be prepared for a "model urban village" to be located in the Aalwyndal area, see Figure 5.9.2.1 according to the Tools and Principles contained in Section 5.4.

NDA Site No	Area (Ha)	Engineering Services	Comments
I	4.9	• Water: Future network pipes required. • Waste water: Future sewer network system required • Stormwater: Stormwater drainage infrastructure required. Implementation of Sustainable Urban Drainage Systems (SUDS) are proposed for new residential developments. • Electricity: Access to electricity required. MV upgrade at Sonskynvallei substation. Street lighting to be provided. • Solid waste: Limited land availability for waste management facilities. Households will require refuse removal by local authority or private company. Refuse Drop-off sites required.	Possible industry in process Mixed use
II	15.0	• Water: Future network pipes required. • Waste water: Future sewer network system required • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. MV upgrade at Sonskynvallei substation. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	EA Approved
III	30.3	• Water: Distribution main proposed to supply Seemeeu Park area from Hartenbos Kop reservoir. Booster pump station required to supply high lying areas. Pipe network required for future development. • Waste water: Sanitation link services required for future developments. • Stormwater: Stormwater drainage infrastructure required • Electricity: Electrical Reticulation for residential application needed. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	EA process to be followed
IV	5.3	• Water: Distribution main proposed to supply Seemeeu Park area from Hartenbos Kop reservoir. Hartenbos pumping station and main requires upgrade to increase supply to Hartenbos Kop reservoir. • Waste water: Sanitation link services required for future developments. • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	EA refused, on appeal Approved Off-grid services
V	20.4	• Water: Distribution main proposed to supply Seemeeu Park area from Hartenbos Kop reservoir. • Waste water: Future sewer network system required • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	EA refused, on appeal Approved
VI	22.8	• Water: Future network pipes required. • Waste water: Future sewer network system required. • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	EA refused, on appeal Approved Off-grid services
VII	8.8	• Water: Infrastructure information not included in Water Master Plan (GLS, 2017). Additional information required. • Waste water: Infrastructure information not included in Sewer Master Plan (GLS, 2017). Additional information required. • Stormwater: Stormwater drainage infrastructure required. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	Investigate low-lying ground, wetland
VIII	25.4	• Water: Infrastructure information not included in Water Master Plan (GLS, 2017). Additional information required. • Waste water: Infrastructure information not included in Sewer Master Plan (GLS, 2017). Additional information required. • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	Check CBA and floodlines Investigate repurposing goods yard for mixed use
IX	4.6	• Water: Future network pipes required. New parallel rising main required to Aalwyndal reservoir (GLS, 2017). • Waste water: Sanitation link services required for future developments. • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	Investigate Model Urban Village, see principles, section 5.4
X	21.0	• Water: Pipe network required. New parallel rising main required to Aalwyndal reservoir (GLS, 2017). • Waste water: Sanitation link services required for future developments. Also see Site No. 11 below. • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	Investigate Model Urban Village, see principles, section 5.4
XI	130.7	• Water: Pipe network required. Upgrade Bartelsfontein pumping main station to increase supply to Bartelsfontein reservoir. Augment supply to Aalwyndal and future area and upgrade Aalwyndal pumping station. • Waste water: Sanitation link services required for future developments. New 22l/s pumping station required, including a new 140mm diameter rising main. New 250mm and 200mm diameter gravity sewers required respectively (GLS, 2017). • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Electrical Reticulation for residential application needed. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	Model Urban Village, see principles, section 5.4
XII	8.9	• Water: Infrastructure information not included in Water Master Plan (GLS, 2017). Additional information required. • Waste water: Infrastructure information not included in Sewer Master Plan (GLS, 2017). Additional information required. • Stormwater: Stormwater drainage infrastructure required. Implementation of SUDS Systems are proposed for new residential developments. • Electricity: Access to electricity required. Street lighting to be provided. • Solid waste: See notes at Site No. 1.	Investigate – possible wet low lying area for high density development
Total	**298.2**		

Table 5.9.2 New Development Areas: Voorbaai – Diaz - Hartenbos

5.9.3 ENGINEERING INFRASTRUCTURE ANALYSIS AND PROPOSALS

- 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.
- The high lying area of the Aalwyndal zone should be supplied from the Bartelsfontein reservoir. The area currently supplied by a PRV from Aalwyndal should be supplied from Hartenboskop reservoir in future (GLS, 2017).
- The Hartenbos WWTW, with a hydraulic capacity of 17.8 kl/day, requires an upgrade.
- Slope stability, soil displacement, and groundwater table investigations are required for future developments in the vicinity of Rylaan 2 since foundations and walls of existing houses have experience extreme cracking.
- Alternative access road to Waasenaar Street is proposed.
- The Municipality prioritised the electrification of 696 Housing units in Sonskynvallei that are in line with the approved Human Settlement Pipeline.
- Expanding the electricity capacity include moving of certain sub-stations.
- Non-motorised transport (NMT) infrastructure required from Sonskynvallei to Hartenbos.
- Upgrade of the refuse drop-off site in island view is proposed.
- The coastal stormwater outfalls should be regularly maintained.

5.9.3.1 Water

- Table 5.9.3 describes the respective reservoir capacities and the actual and future estimated AADD for various water system zones within the study area.

Reservoirs Capacity (kl)	Actual AADD of present zone (kl/d)	AADD of future zone (kl/d)
Aalwyndal Reservoirs: 3000	Aalwyndal: 270	Aalwyndal: 1572
Hartenboskop: 3500	Hartenboskop: 425	Hartenboskop: 1399
Langeberg 1: 3400	Langberg: 310	Langberg: 373
Langeberg 2: 4000	-	Hartenboskop booster: 573
Langeberg 3: 10 000	Aalwyndal PRV: 119	Aalwyndal PRV: 279
Hartenbos: 9140	Hartenbos: 1633	Hartenbos: 1700

Table 5.9.3 Reservoir capacity and present and future AADD (GLS, 2017).

- The high lying area of the Aalwyndal zone should be supplied from the Bartelsfontein reservoir. The area is currently supplied by a PRV from Aalwyndal should be supplied from Hartenboskop reservoir in future (GLS, 2017).
- 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. GLS (2017) proposed the following works:
  - New supply main is required at Aalwyndal to supply Aalwyndal and future developments;
  - Connection data and the 250 mm diameter rising main between Langeberg and Aalwyndal reservoir should be clarified;
  - Feeder main from Langeberg to Aalwyndal reservoir require upgrading in the future;
  - Feeder main from Klein Brak WTP to Langeberg reservoir;
  - Feeder Main From Hartenboskop to Seemeeupark, Num Num and future areas require upgrading in future;
  - Upgrading of the existing Bartelsfontein, Aalwyndal and Hartenbos pumping station is also required in the future;
  - Booster pumping station (refer to Table 5.9.3 above) to supply high lying areas such as site 3 and site 4.

5.9.3.2 Waste water

- The Hartenbos WWTW, with a hydraulic capacity of 17.8 kl/day, requires an upgrade. The phased upgrade include the reinforcement and refurbishment of the electrical, mechanical, and civil infrastructure (IDP, 2017-2022). The main outfall sewer in Diaz, draining to the Voorbaai Pump station, has spare capacity less than 30% and will need to be investigated for the new development Site 12.
- The following waste water upgrades were identified as development needs in the Fourth Generation IDP 2017-2022:
  - Reroute sewer pumpline between Riviera pumpstation and Louis Fourie Road;
  - New sewer pumpstation at La Palma;
  - Replacement of the main sewer pipeline between Mossel Bay and Hartenbos.

5.9.3.3 *Stormwater*

- The following stormwater upgrades were identified as development needs in the Fourth Generation IDP 2017-2022:
  - Stormwater channel at Boland Park;
  - New concrete stormwater channel at Deoville Park, Hartenbos Hills (completed);
  - Improve the stormwater drainage in the area close to Trio Towers;
  - Reconstruction of the stormwater network in Kerriehout Street (completed);
  - New soak-away at the corner of Bloedriver and Vegkop road.
- A new stormwater watercourse has been constructed at Nautica near Bakke/ Mossel Street to accommodate runoff from the stormwater catchment area that lies between Louis Fourie Road in the south through the D'Almeida Residential area, to Louis Fourie Road in the North. The municipality has undertaken to compile Stormwater Master Plans for Voorbaai/ Bayview, Bulhoek Avenue (Hartenbos), and Sonskynvallei area.

5.9.3.4 *Solid waste*

- The Mossel Bay Municipality transports its general waste to dispose at the PetroSA waste disposal facility. Limited land available for waste management facilities. Landfill site required next to PetroSA to address this challenge. The Sonskynvallei Transfer Station is located to the north-west of Hartenbos just off the R328. Waste is offloaded here into skips, from where it is hauled to the PetroSA waste disposal facility. The upgrade of the refuse drop-off site in island view is seen as a development need in the Fourth Generation IDP 2017-2022. A Weight pad at the Sonskynvallei Transfer Station is also planned.

5.9.3.5 *Transport*

- Alternative access roads to Sites 3, 4, 5, and 6 are required. The Roads Master Plan proposed a new Wassenaar underbridge to TR33/1 link connecting to Hartenzicht Street. Alternative options entail linking Wassenaar Street, adjacent to the Langeberg reservoir, to Aalwyn road (Mossgas Link Road) adjacent to the Main Intake Substation, or connecting Rylaan 7 with Aalwyn road (Mossgas Link Road). A future class 4 collector road is proposed between Mossgas link road and Geelhout Avenue/Kameeldoring Avenue.
- There is also a need for non-motorised transport infrastructure between Sonskynvallei and Hartenbos. The opportunity also exists to develop a reliable public transport system from Hartenbos to Mossel Bay. The following municipal road upgrades were identified as development needs in the Roads Master Plan (Hatch Goba, 2014) and the Fourth Generation IDP 2017-2022:
  - Access road to the Heuwel road;
  - Rebuild of Vlei Street in Voorbaai;
  - New Traffic Circle at Kaap de Goede Hoop;
  - Upgrade Wassenaar Street.
  - Upgrade of Henning Drive (Tar and widen road);
  - Joining of Garret and Nestle Streets to improve traffic flow;
  - Upgrade of Louis Fourie intersections and maintenance and sidewalks along Louis Fourie road reserve;
  - Fencing R328 Road Reserve parallel to Sonskynvallei;
  - Upgrade the subway at Garret street to allow for two-way travel to Bayview;
  - New link between Depot Road and Garret Street to provide an additional route to and from Hartenbos;
  - Extend Swellendam Road to Witteboom Street with median break and right turn protection.
  - Upgrade Graceland Street Sidewalks, Kerbs, and Stormwater.
  - Signalised Waboom Intersection with dedicated left and right lanes;
  - Upgrade Boekenhout Avenue four-way intersection with dedicated left and right lanes;
  - Langeberg Mall road- upgrade existing intersection and provide additional lane capacity.

5.9.3.6 *Electricity*

- The following electricity upgrades were identified as development needs in the Fourth Generation IDP 2017-2022:
  - Replacement of the old electricity network in Hartenbos;
  - MV upgrade at Sonskynvallei substation;
  - Relocation of Sonskynvallei Transfer Station;

5.9.3 SOCIAL FACILITY INFRASTRUCTURE ANALYSIS

Category	Facility Description	Population Threshold: Small to Medium Towns (CSIR, 2012)	Requirements based on Total Erven (2016) (Table 5.9.1, Row 6/Table 5.9.2) + NDA @ gross average 25du/ha (2.7 persons/household) = 36 412 persons			
			Overall Need	Existing Facilities	Facilities Required (CSIR, 2015)	Total Land needed (ha)
Health	Community Health Centres	60 000 - 100 000	0	0	0	
	Primary Health Clinic	24 000 - 70 000	1	2	0	
Culture	Local Library	20 000 - 70 000	1	2	0	
	Community Hall	60 000	0	2	0	
	Cultural Facilities (Community Performing Arts Centre)	50 000	0	0	0	
Education	Primary School (incl. sportsfield) (@ 2.8 has)	**7000**	**5**	**1**	**4**	**19.2**
	Secondary School (incl. sportsfield) (@ 4.8 has)	**12 500**	**2**	**0**	**2**	**5.6**
	Small Créche / Early Childhood Development Centre (@ 0.2 has)	**2 400 - 3 000**	**12**	**5**	**7**	**0.02ha/ 100 children**
	Skills Training (Adult Education Training Centres / Further Education Training Colleges) (@ 1 ha)	**1 per town larger than 5000**	**1**	**0**	**1**	**1**
Sport	Sports Complex	60 000	0	0	0	
	Multipurpose Sports Hall	100 000	0	0	0	
	Community Park	60 000	0	0	0	

Table 5.9.4 Voorbaai – Hartenbos Social Facilities Requirements for small to medium town (source: CSIR Guidelines for the Provision of Social Facilities in South African Settlements, 2015)

Note: If existing erven were permanently occupied, household and population – under threshold.

***ISSUES**

1. Settlement considered "small to medium town" ito CSIR definition;
2. All registered erven permanently occupied;
3. All NDAs developed and occupied at gross average 25du/ha;
4. There is a strong case for decreasing site areas for certain facilities, e.g. primary and secondary schools; and,
5. Exact location of required social facilities to be identified in new development areas, see Figure 5.9.1 and Table 5.9.3, if and when they are developed.