MOSSEL BAY

PROPOSED NEW DEVELOPMENT OF ERF 14796, MOQUINI, MOSSEL BAY

TECHNICAL REPORT ON THE PROVISION OF CIVIL INFRASTRUCTURE SERVICES FOR ERF 14796 DANA BAY

REPORT NO. 01

REVISION 01

MARCH 2026

Compiled by:

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CLIENT	MOQUINI BEACH HOTEL (PTY) LTD.
CONTRACT NO:	N/A
PROJECT DESCRIPTION	PROPOSED NEW DEVELOPMENT OF ERF 14796, MOQUINI, MOSSEL BAY
REPORT DESCRIPTION	TECHNICAL REPORT ON THE PROVISION OF CIVIL INFRASTRUCTURE SERVICES

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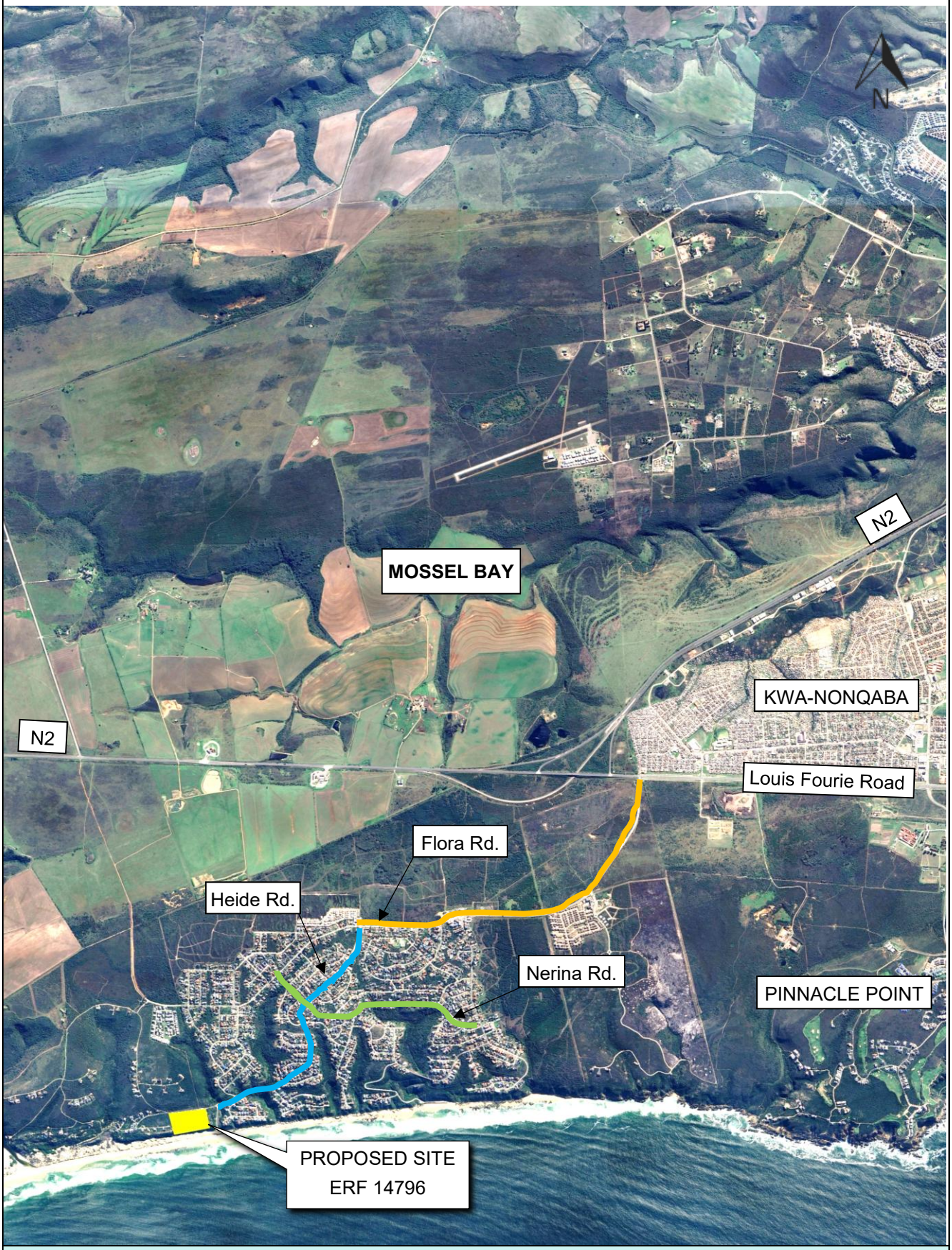
Approver				

Approver's signature

Date 03 March 2026



LOCALITY PLAN – ERF 14796, MOSSEL BAY

PROPOSED NEW DEVELOPMENT OF ERF 14796, MOQUINI, MOSSEL BAY

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1. INTRODUCTION

Moquini Beach Hotel (Pty) Ltd appointed V3 Consulting Engineers (Pty) Ltd to prepare a services report for the provision of Civil Infrastructure Services to the proposed new commercial development on Erf 14796, Dana Bay, Mossel Bay.

The proposed development as depicted by Coetzee Architects, and attached as Annexure A, comprises of the following:

- 10 Apartment Blocks,
- HOA Common Property and Communal Facilities,
- Relevant roads and infrastructure.

2. DESIGN AND CONSTRUCTION STANDARDS

The minimum standards proposed for the civil services and pertaining infrastructure will comply with the "Guidelines for Human Settlements, Planning and Design" as compiled under patronage of the Department of Housing by CSIR Building & Construction Technology (also known as the "Red Book") as well as any specific requirements prescribed by the Local Authority, Mossel Bay Municipality.

The relevant code of standards (i.e. SANS 1200, etc.) should be made applicable to material and construction standards.

3. TOPOGRAPHY

Erf 14796 (*The Site*) is approximately 4,64 hectare in size and is currently not developed.

Figure 1: Site Topography

The topography of the area is sloped as a valley and drains in a Westward direction with a slope of 1:50 or 2%. Hillslopes range between 1:7 and 1:10

4. PROPOSED SERVICES

4.1 Sanitation

Refer to Annexure B, drawing 10186001-001, for the existing and proposed sewer network.

This report is to be read in conjunction with the "*Capacity Analysis of the Bulk Water and Sewer Services*" done by GLS Consulting (Pty)Ltd on the current Municipal water network. Refer to Annexure C.

4.1.1 Internal Sewage Removal

Sewage will be removed by means of a waterborne gravity sewer network connected to the existing municipal network on the western side of the proposed development.

The gravity sewer network will consist of 110mm & 160mm diameter uPVC sewer pipes and 1,0m diameter concrete sewer manholes. The estimated length of the network is approximately 485m and approximately 15 manholes will need to be constructed.

Refer to Annexure B, drawing 10186001-001, for the preliminary sewer network design.

The estimated Sewer load is 30.2kl per day.

All required Sewage infrastructure will be at the developer's cost. No internal Sewage infrastructure will be handed over to the Local Authority after completion.

4.1.2 Bulk Sewage Removal

Sewerage from the development will drain in a westward direction to the Fisherman's Village Sewer Pump Station (FV-PS). From there, sewerage is pumped through a 160mm Ø uPVC rising main along the Fisherman's Village main road to the Municipal sewer network located below Erf 7964 on Lanata Street.

As requested by the Municipality, the existing sewer pump station must be fitted with storage tanks to serve as overflow storage in the event of a power failure. The required storage should accommodate 4-hours of average sewer flow from the proposed development, including sewerage from Fisherman's Village.

4.1.2.1 Masterplan Items

The development will discharge to the existing Moquini PS 1 drainage area. The upstream gravity network and downstream pumping stations (Dana Bay Main Outfall PS and Pinnacle Point Main Outfall PS) have sufficient capacity.

However, specific sections of the main outfall sewer in the Dana Bay drainage area require upgrading to accommodate future developments, including this project. The following master plan items are required:

- DANA-1.2 – New 250 mm outfall sewer
- DANA-1.3 – New 200 mm outfall sewer

4.1.3 Developer Contributions

The developer will be liable for the payment of Development Contributions for both bulk sewer infrastructure in accordance with Mossel Bay Municipality's approved Council Policy. These contributions will assist in funding the required bulk upgrades identified in the master planning.

4.2 Water

Refer to Annexure B, drawing 10186001-001, for the existing Municipal water network.

This report is to be read in conjunction with the "*Capacity Analysis of the Bulk Water and Sewer Services*" done by GLS Consulting (Pty)Ltd on the current Municipal water network. Refer to Annexure C.

4.2.1 Internal Water Supply

The development will be serviced with potable water via a water network comprising uPVC pipes of 32mm to 110mm diameter (total estimated length 320m), installed in road reserves. The proposed connection point is to the existing 110 mm Ø uPVC supply line in the main road, North-East of the development.

Isolating valves will be installed in valve chambers and placed in accordance with the design guidelines.

A bulk water meter chamber with isolation valves will need to be installed in accordance with the Local Authority's prescribed specifications.

The fire-risk category is "Moderate risk," for which specific 75 mm diameter sluice-valve hydrants should be used for fire-fighting.

A dedicated Fire Main consisting of 110mm Ø uPVC (Class 16) water pipes (total estimated length 290m) installed in road reserves will provide a fire water supply.

Visible above-ground fire hydrants with a twin fire booster connection will, however, be located at convenient points, ensuring the spacing does not exceed 200m (estimated total = 5).

Refer to Annexure B, drawing 10186001-001, for the preliminary water network design.

All the Water infrastructure that may be required will be for the cost of the developer. No internal Water infrastructure will be handed over to the Local Authority after completion.

4.2.2 Bulk Water Supply for Domestic Usage

The development will be supplied with potable water from the existing Mossel Bay Municipal Water Treatment Works, situated in Klein Brak River.

The development falls within the existing Dana Bay Pressure Reducing Valve (PRV) 5 zone, which obtains bulk water from the Dana Bay reservoirs.

The AADD and required fire flow for the proposed development on Erf 14796 in Mossel Bay were calculated as follows:

- 144 Apartment units (Very High density) @ 0,3 kL/unit/day = 43,2 kL/d
- Fire flow criteria (Moderate risk) = 25 L/s @ 10 m

The estimated water usage is 43.2 kl per day.

4.2.2.1 Masterplan Items

The proposed development falls within the Dana Bay PRV 5 distribution zone. The existing internal water reticulation network has sufficient capacity to supply the calculated domestic demand under peak conditions. Reservoir storage capacity at the Dana Bay reservoirs is adequate, providing approximately 107 hours of storage based on the fully developed demand scenario.

Bulk water upgrades identified in the Mossel Bay Water Master Plan (June 2025) are required to ensure long-term sustainability of supply to the greater Dana Bay system. These include:

- Master Plan Item MMW.B9.3 – Upgrade of the Bartelsfontein Pump Station.
- Master Plan Item MMW.B4.1 – Upgrade of the bulk supply pipeline to the Dana Bay reservoirs.

The development's proportional impact on the required bulk pipeline upgrade is approximately 1.32% of the total required capacity.

4.2.3 Developer Contributions

The developer will be liable for the payment of Development Contributions for both bulk water infrastructure in accordance with Mossel Bay Municipality's approved Council Policy. These contributions will assist in funding the required bulk upgrades identified in the master planning.

4.3 Roads and Stormwater

4.3.1 Internal Roads

The development will be accessed via the existing Fisherman's Village Road on the North-east side of the proposed development. All new roads and parking for the proposed development will be provided with a permanent surface finish (60mm Interlocking cement pavement blocks). Edging and kerbs will be provided on all sides of the roads and parking in accordance with SANS standards. Designated parking will be provided on one side of the road where required.

The total estimated area to be surfaced is about 4200m² with associated kerbs and edging.

This report should be read alongside the TIA "Proposed Residential Development on Erf 14796, Dana Bay" prepared by SMEC South Africa (Pty) Ltd regarding the current road network. The proposed development will adhere to the approved recommendations. Refer to Annexure D.

4.3.2 Traffic Impact Assessment Recommendations

The assessment from SMEC confirms that the proposed access location complies with Western Cape Government spacing requirements and that the development is expected to generate approximately 95 vehicle trips during both the AM and PM weekday peak hours.

Parking provision is considered adequate for residents, with a minor shortfall of one visitor parking bay to fully satisfy visitor parking requirements.

No loading bays are required based on the proposed land use.

It is recommended that:

- A minimum ingress and egress throat length of 18 meters must be provided at the development access.
- A Box Junction (RM10) road marking be implemented at the access along Fishermans Village Drive.
- The Heide Road/Flora Road and Heide Road/Nerina Road intersections be converted from four-way stops to two-way stop control as specified.
- The new access along Fishermans Village Drive be constructed as proposed.

No additional road capacity upgrades are required for the 2028 forecast year.

Subject to the implementation of the above site-specific and intersection improvements in accordance with applicable design standards, the proposed development is supported from a traffic engineering perspective.

4.3.3 Stormwater drainage and management

There is no existing stormwater network on the site.

The primary dune, which forms the southern boundary of the site, is much higher than any other point on the site; as such, the proposed development site does not drain into the ocean. Currently, all stormwater runoff generated in this area seeps away into the highly permeable dune sands.

Stormwater runoff from hardened surfaces will be managed with surface drainage as a first priority. Sheet flow will be the prime objective of this approach. The concentration of runoff from hardened surfaced areas will be avoided at all costs. Run-off will also be led away from hardened surfaces to seep away into the permeable dune sands at regular intervals. When required, vegetated earth channels will be used as far as possible. In extreme cases, stone-pitched channels may be used. Where necessary, a series of low-level stormwater retention berms will be constructed to reduce flow velocities and peak flood volumes and to promote seepage.

Where necessary, stilling basins will be provided to prevent erosion. Where surface drainage is not possible, i.e., where runoff must pass under building structures, drop-inlet catchpits will be provided and connected to a buried pipe network. This water will be discharged into a buried Soak Away Drain.

Refer to Annexure B, drawing 10186001-001, for the preliminary road layout.

A detailed stormwater master plan must be submitted to the Municipality for approval before construction may begin.

All the Stormwater and Road infrastructure that may be required will be for the cost of the developer. No internal Stormwater and Road infrastructure will be handed over to the Local Authority after completion.

4.4 Refuse Removal

Refuge removal will be done by the Mossel Bay Municipality as part of their normal services provided.

No hazardous waste is expected to be generated, and waste will be normal household waste.

5. GEOTECHNICAL CONDITIONS

A Geotechnical Investigation was not conducted as part of this investigation.

6. CONCLUSION

In conclusion, the provision of civil infrastructure services for the proposed new apartment and hotel development on Erf 14796, Dana Bay, Mossel Bay, as outlined in this report, aims to ensure compliance with established design and construction standards.

The site’s favourable topography and connection to existing municipal sewer and water networks facilitate efficient service delivery. The proposed gravity sewer system, coupled with a reliable water supply, will adequately support daily operational needs.

Due to the site’s locality and soil permeability, all stormwater will need to be handled on-site inside the development footprint. Stormwater will need to be managed and controlled to prevent erosion.

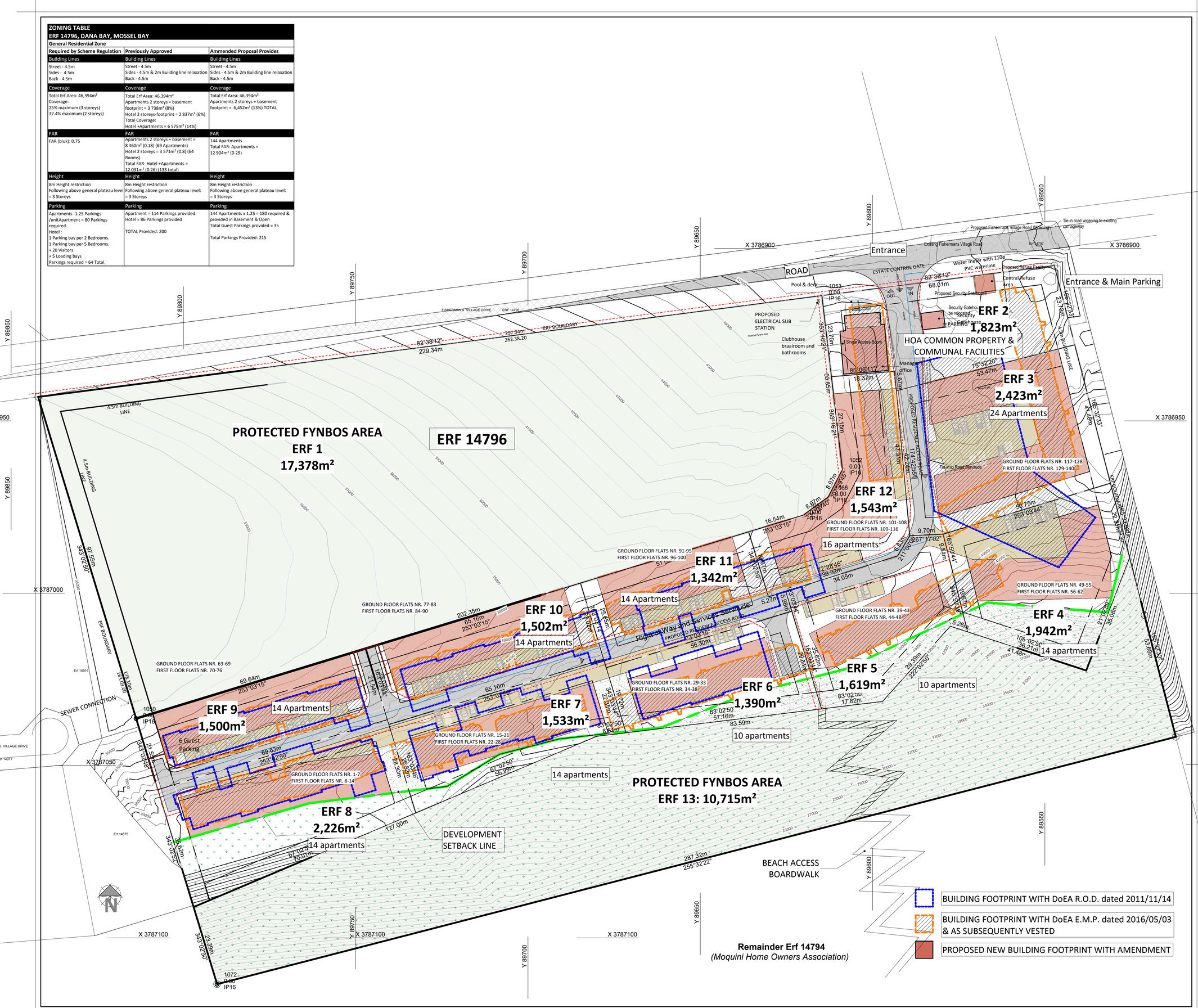
The Site is deemed viable for development and will contribute positively to the broader development of Dana Bay.

--END—

ANNEXURE A

PROPOSED SITE DEVELOPMENT PLAN

ZONING TABLE ERF 14796, DANA BAY, MOSSEL BAY		
General Residential Zone		
Required by Scheme Regulation	**Previously Approved**	**Ammended Proposal Provides**
Building Lines	**Building Lines**	**Building Lines**
Street - 4.5m Sides - 4.5m Back - 4.5m	Street - 4.5m Sides - 4.5m & 2m Building line relaxation Back - 4.5m	Street - 4.5m Sides - 4.5m & 2m Building line relaxation Back - 4.5m
Coverage	**Coverage**	**Coverage**
Total Erf Area: 46,394m² Coverage: 25% maximum (3 storeys) 37.4% maximum (2 storeys)	Total Erf Area: 46,394m² Apartments 2 storeys + basement footprint = 3 738m² (8%) Hotel 2 storeys-footprint = 2 837m² (6%) Total Coverage: Hotel +Apartments = 6 575m² (14%)	Total Erf Area: 46,394m² Apartments 2 storeys + basement footprint = 6,452m² (13%) TOTAL
FAR	**FAR**	**FAR**
FAR (bluk): 0.75	Apartments 2 storeys + basement = 8 460m² (0.18) (69 Apartments) Hotel 2 storeys = 3 571m² (0.8) (64 Rooms) Total FAR- Hotel +Apartments = 12 031m² (0.26) (133 total)	144 Apartments Total FAR: Apartments = 12 904m² (0.29)
Height	**Height**	**Height**
8m Height restriction Following above general plateau level = 3 Storeys	8m Height restriction Following above general plateau level: = 3 Storeys	8m Height restriction Following above general plateau level: = 3 Storeys
Parking	**Parking**	**Parking**
Apartments -1.25 Parkings /unitApartment = 80 Parkings required . Hotel : 1 Parking bay per 2 Bedrooms. 1 Parking bay per 5 Bedrooms. + 20 Visitors + 5 Loading bays Parkings required = 64 Total.	Apartment = 114 Parkings provided. Hotel = 86 Parkings provided TOTAL Provided: 200	144 Apartments x 1.25 = 180 required & provided in Basement & Open Total Guest Parkings provided = 35 Total Parkings Provided: 215



NOTES:

- WRITTEN NOTICE MUST BE OBTAINED FOR ANY AESTHETICAL AND STRUCTURAL CHANGES FROM COETZEE ALBERTS ARCHITECTS (PTY) LTD AND THE APPOINTED ENGINEER ON SITE. NO DEVIATION FROM THESE PLANS WILL BE PERMITTED.
- THE DESIGN OF THIS DRAWING REMAINS THE PROPERTY OF COETZEE ALBERTS ARCHITECTS (PTY) LTD.
- SANS 10400 TO BE SATISFIED PER MEANS SPECIFIED IN SCHEDULE A AND B, SANS 10400-A: FORM 1.
- DO NOT SCALE, REFER ONLY TO FIGURED DIMENSIONS.
- ALL LEVELS, DIMENSIONS, GRADIENTS AND STEPS TO BE CHECKED ON SITE PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT IMMEDIATELY.
- ALL WORK TO COMPLY TO SANS 10400 AND SANS 204.
- VERTICAL D.P.C. TO BE FIXED AT CHANGES IN ALL LEVELS.
- INSPECTION EYES TO ALL DRAINAGE AND SEWAGE PIPE WORK TO BE ACCESSIBLE AND TO BE SUITABLY MARKED AT GROUND LEVEL.
- ALL PIPE WORK TO CONFORM TO SANS 10400, SANS 204 & SANS 10252 AS WELL AS SPECIFICATIONS.
- THE FALL OF THE SITE IS ACCORDING TO THE SURVEYOR.
- DETERMINE FINAL POSITION OF MUNICIPALITY SEWAGE CONNECTION ON SITE.
- DETERMINE POSITION OF EXISTING SEWERLINE, BEFORE BUILDING.
- CONCRETE LINTELS OVER EVERY WINDOW, DOOR AND OPENING.
- FLOORPLAN SECTION 1,6m FROM UNFINISHED FLOOR LEVEL.
- ALL CONSTRUCTION WORK TO COMPLY TO SANS 2001- CONSTRUCTION WORKS.
- ALL MATERIALS, PRODUCTS OR COMPONENTS AS SPECIFIED TO BE USED. SUBSTITUTION OF THESE ARE TO BE REQUESTED IN WRITING TO THE ARCHITECT BEFORE ANY SUCH MATERIALS, COMPONENTS OR PRODUCTS ARE ORDERED.
- ALL BUILDING WORD MUST COMPLY WITH SABS 0155, ACCURACY LEVEL 2, EXCEPT WHERE SPECIFIED OTHERWISE.
- WORK CARRIED OUT TO BE IN COMPLIANCE TO NHBRC IF APPLICABLE.

AT ALL TIMES COMPLIANCE TO THE OCCUPATIONAL HEALTH & SAFETY ACT NO 85 OF 1993 AND THE REGULATIONS INCLUDING CONSTRUCTION REGULATIONS 2018 ARE REQUIRED.

DRAFT

COSTA ZERVAS PROJECTS
Reg. CK1991/025257/23

Erf 78
(Public F

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PROJECT
PROPOSED NEW DEVELOPMENT ON ERF 14796, DANA BAY, MOSSEL BAY FOR MOQUINI BEACH HOTEL DEVELOPMENT (Pty) Ltd

DRAWING
SITE DEVELOPMENT PLAN FOR EIA

ENVIRONMENTAL

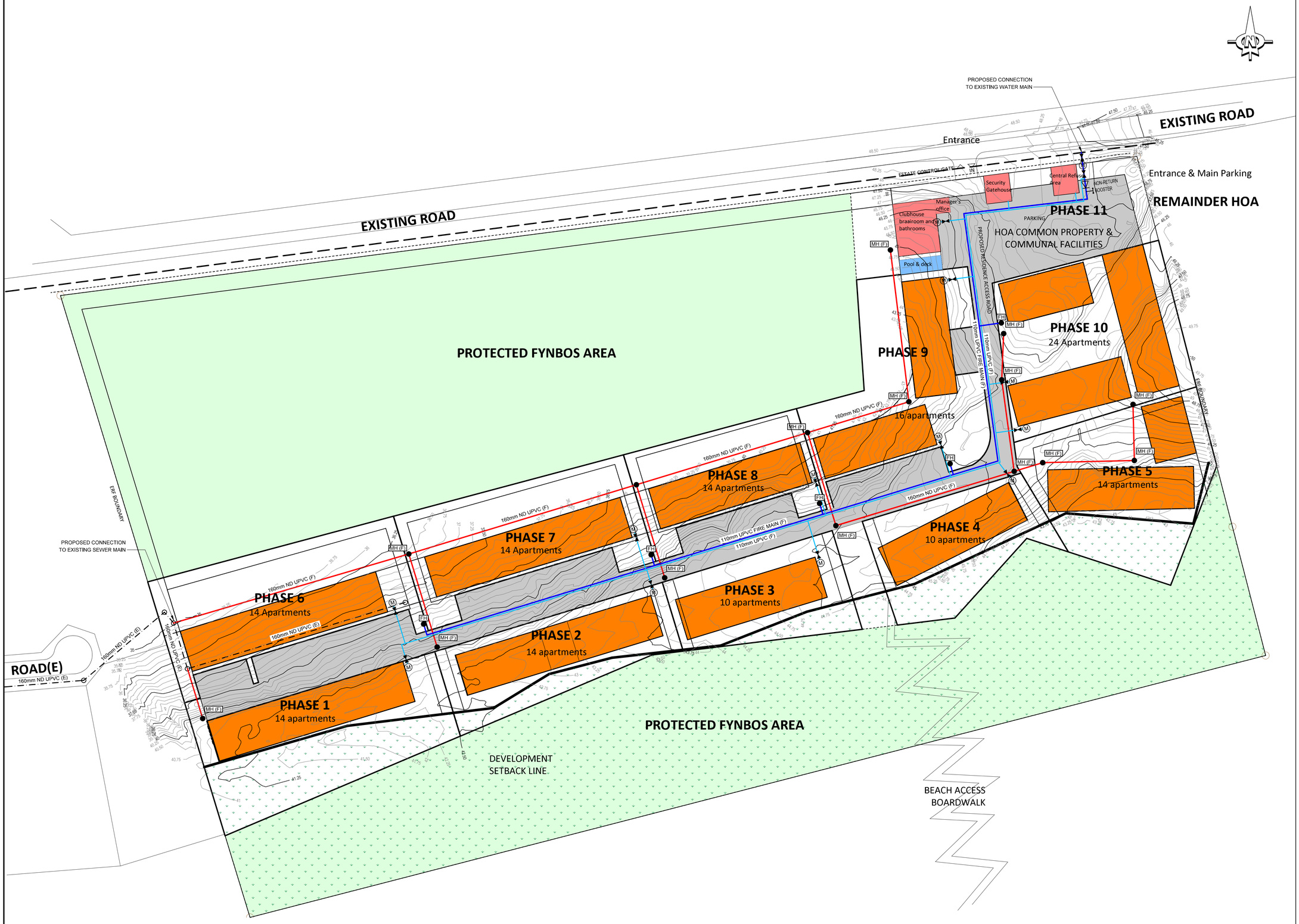
ARCHITECT SIGNATURE		CLIENT SIGNATURE	
SCALE 1 : 500	PAGE SIZE A1	DRAWN LJC	DESIGNED LJC
DATE 2026/01/26		REVISION NR. Rev.:	

DRAWING NR.
13-44/25/SDP Rev 8

Z:\01 - Projects\2013 # 13 Projects\13-44 Moquini Apartments\13-44 # (New Development 2013)\02 - Drawings\01 - Concept\01 - Revit File\Site Development Plan (Moquini, 13-44) Rev - 7.rvt

ANNEXURE B

PROPOSED CIVIL INFRASTRUCTURE LAYOUT



LEGEND

- EXISTING SERVICES
- PROPOSED SEWER PIPE WITH MANHOLE
- PROPOSED WATER FIRE MAIN PIPE WITH FIRE HYDRANT
- PROPOSED POTABLE WATER CONNECTION WITH CLOSE VALVE AND WATER METER

NOTES

01. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.

02. ABBREVIATIONS:

C.O.S.	-	CONFIRM ON SITE
E	-	EXISTING
F	-	FUTURE
FH	-	FIRE HYDRANT
LOC	-	LIMIT OF CONSTRUCTION
PI	-	POINT OF INTERSECTION
R	-	RADIUS OF CURVE
M	-	METER (WATER)
MH	-	MANHOLE (SEWER)
SV	-	STAKE VALUE

03. ALL CO-ORDINATES OF PI'S, BC'S, EC'S, ETC. NEED TO BE SURVEYED AND CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORKS.

04. NO DIMENSIONS MAY BE SCALED FROM DRAWINGS.

05. ANY ERRORS OR DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER FOR CLARIFICATION PRIOR TO ANY WORK BEING UNDERTAKEN.

06. UNLESS OTHERWISE SPECIFIED ALL CONCRETE WORKS TO BE 30MPa.

FOR INFORMATION
(for discussion purposes only)

100 MILLIMETRES ON ORIGINAL DRAWING

DRAWING REVISIONS:

A BEFORE CONTRACT COMMENCES

A AFTER CONTRACT HAS COMMENCED

No.	DATE	AMENDMENTS

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PROJECT
PROPOSED NEW DEVELOPMENT OF ERF 14796, MOQUINI, MOSSEL BAY

DRAWING DESCRIPTION
PLAN - CONCEPT SERVICES LAYOUT

DRAWING NO.
10186001 - 001

DESIGNED:	DKJ		CHECKED:	DKJ	
DRAWN:	DKJ		SCALE:	1:500	A1
APPROVED:			DATE:	2024-11-02	

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ANNEXURE C

CAPACITY ANALYSIS OF THE BULK WATER AND
SEWER SERVICES
by GLS Consulting (Pty)Ltd

Infrastructure planning

1 December 2025

V3 Consulting Engineers
PO Box 730
MOSSEL BAY
6500

Attention: Mr Dean Jacobs
Dear Sir,

DEVELOPMENT ON ERF 14796, MOSSEL BAY: CAPACITY ANALYSIS OF THE BULK WATER AND SEWER SERVICES

Your request for GLS Consulting to investigate and comment on the bulk water and sewer supply to the proposed development (residential development on Erf 14796, Mossel Bay), refers.

This document should inter alia be read in conjunction with the following reports:

- "Mossel Bay Municipality Water Master Plan", dated June 2025.
- "Mossel Bay Municipality Sewer Master Plan", dated June 2025.

Future development area M08, which includes the proposed development, was conceptually taken into consideration for the June 2025 master plans for the water and sewer networks.

1 WATER DISTRIBUTION SYSTEM

1.1 Distribution zone

The master planning indicated that the proposed development should be accommodated in the existing Dana Bay Pressure Reducing Valve (PRV) 5 zone which obtains bulk water from the Dana Bay reservoirs. The proposed connection to the existing water reticulation network is to the 110 mm Ø pipeline situated in Fisherman's Village Street (North of the proposed development area).

The combined reservoir capacity for the two Dana Bay reservoirs is 4 800 kL with a reservoir Top Water Level (TWL) of 207,0 m above mean sea level (a.s.l.).

The development is situated inside the water priority area.

1.2 Water demand

The original water analysis for the master plan was performed with a total annual average daily demand (AADD) for the proposed development area (future development area M08 in the water master planning) of 30,0 kL/d.

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Directors: PC du Plessis, T Mokoena, K Tshikane

The AADD and required fire flow for the proposed development on Erf 14796 in Mossel Bay was calculated as follows:

- 144 Apartment units (Very High density) @ 0,3 kL/unit/day [(1)] = 43,2 kL/d

[(1)] As per Table J.2 from Section J - Water Supply of "The Neighbourhood Planning and Design Guide" (so called "Red book").

- Fire flow criteria (Moderate risk) = 25 L/s @ 10 m

The AADD for the existing stands (fully occupied) as well as the proposed development in the Dana Bay PRV no. 5 water distribution zone were calculated as follows:

• Dana Bay reservoirs supply zone fully occupied		=	1 033,0 kL/d
• Proposed development		=	43,2 kL/d
	Total	=	1 076,2 kL/d

1.3 Present situation

1.3.1 Bulk supply system

There is insufficient capacity in the existing bulk supply system to the Bartelsfontein reservoir as well as the bulk supply system from Bartelsfontein reservoir to the Dana Bay reservoirs to accommodate the proposed development. The Bartelsfontein Pump Station (PS), which supplies bulk water to the Bartelsfontein reservoir, requires upgrading to ensure sufficient bulk water supply to the reservoir during peak demand conditions.

Furthermore, a portion of the existing 250 mm Ø bulk supply between the Bartelsfontein reservoir and Dana Bay reservoir zone, which experiences significant energy losses due to the extended length of the bulk supply pipeline, also requires upgrading to accommodate the proposed development and other future development in the Dana Bay water distribution system.

Network upgrades:

• MMW.B9.3 : Upgrade Pump Station (80 L/s @ 85 m)	R	1 192 000 *
• MMW.B4.1 : 7 575 m x 650 mm Ø upgrade bulk supply pipeline	R	147 380 000 *
Total	R	148 572 000 *

* Including P & G, Contingencies and Fees, but excluding VAT - Year 2025/26 Rand Value. (This is a rough estimate, which does not include major unforeseen costs).

The current required bulk supply capacity for the pipeline between Bartelsfontein reservoir and the Dana Bay reservoirs is ± 76 L/s, whereas the modelled demand of the proposed development which contributes to the required supply capacity is ± 1 L/s. Therefore, it should be noted that the impact of the proposed development on the proposed bulk supply upgrade to the Dana Bay reservoirs (master plan item MMW.B4.1) will be 1,32 %.

GLS

1.3.2 Reticulation network

It is proposed that the development is accommodated in the existing Dana Bay PRV 5 water distribution zone. The existing Dana Bay water distribution system has sufficient capacity to supply the domestic water demand during peak demand conditions to the proposed development.

Currently a maximum fire flow of 20,5 L/s @ 10 m pressure head can be supplied to the proposed development. It is therefore proposed that the setting of the Dana Bay PRV 5 with the current PRV setting of 20 m (EGL = 93,0 m) is adjusted to a PRV setting of 33 m (EGL = 106 m).

After the implementation of the proposed adjustment to the setting of the Dana Bay PRV 5 the existing system will be able to provide fire flow of more than 25,0 L/s @ 10 m water head to the proposed development on Erf 14796.

1.3.3 Reservoir capacity

The criteria for total reservoir volume used in the Mossel Bay Water Master Plan is 48 hours of the AADD (of the reservoir supply zone) for gravity and pumped supply to the reservoir.

According to the re-analysis of the fully occupied AADD scenario for the Dana Bay reservoirs water distribution zone, the AADD for the distribution zone can potentially increase to approximately 1 076,2 kL/d when the development has been fully developed. The storage capacity of the existing Dana Bay reservoirs is 4 800 kL, which results in a storage capacity of 107 hours of the AADD.

Therefore, sufficient capacity is available at the Dana Bay reservoirs to accommodate the proposed development.

1.4 Minimum requirements

The minimum requirements to accommodate the proposed development on Erf 14796 in the existing water system are the implementation of master plan item MMW.B9.3 to augment the bulk water supply to the Bartelsfontein reservoir, and master plan item MMW.B4.1 to improve bulk supply to the Dana Bay reservoirs. These bulk supply upgrades are required to accommodate the proposed development as well as other future developments within the Dana Bay water distribution zone.

2 SEWER NETWORK

2.1 Drainage area

It is proposed that the development on Erf 14796 is accommodated within the existing Moquini pumping station (PS) 1 drainage area. The proposed connection point for the development is to the existing gravity sewer at the western boundary of the proposed development on Erf 14796, as shown in Figure 2 attached.

The development is inside the sewer priority area.

2.2 Sewer flow

In the original sewer master plan, the peak day dry weather flow (PDDWF) for the proposed development area (future development area M08 in the sewer master planning) was calculated as 24,5 kL/d.

For this re-analysis of the sewer master plan, the PDDWF for the proposed development was calculated as 30,2 kL/d.

2.3 Present situation

2.3.1 Gravity sewers

There is sufficient spare capacity available in the existing gravity sewer system which gravitates west from the proposed connection to the Moquini PS 1. Furthermore, there is sufficient spare capacity available in the portion of the existing gravity sewer system which gravitates eastwards from the connection point of the Moquini PS 1 rising main to the Dana Bay main outfall drainage area, towards where the main outfall sewer crosses Heide Road. Downstream of this point, there are however sections of the main gravity sewer with insufficient spare capacity to accommodate the proposed development during peak demand conditions.

The sections without sufficient spare capacity to accommodate the proposed development are on the main outfall sewer pipeline to the south of the Dana Bay PS drainage area which gravitates towards the Dana Bay Main Outfall PS, as indicated on Figure 2 attached.

In the sewer master plan upgrading of the following bulk sewer infrastructure is proposed in the Dana Bay Main Outfall PS drainage area to accommodate future developments in the area (including the proposed development):

Network upgrades:

• DANA-1.2 : 645 m x 250 mm Ø new outfall sewer		R 2 295 000 *
• DANA-1.3 : 425 m x 200 mm Ø new outfall sewer		R 1 370 000 *
	Total	R 3 665 000 *

* Including P & G, Contingencies and Fees, but excluding VAT - Year 2025/26 Rand Value. (This is a rough estimate, which does not include major unforeseen costs).

GLS

2.3.2 Pumping stations and rising mains

Moquini PS 1

The existing Moquini PS requires a minimum capacity of 10,5 L/s (based on the diameter of the accompanying 150 mm Ø rising main) to accommodate the proposed development on Erf 14796. The capacity of the PS and the diameter of the accompanying rising main is assumed to be as stated above but should be verified by Mossel Bay Municipality through flow readings at the PS.

Dana Bay Main Outfall PS

The existing Dana Bay Main Outfall PS with a capacity of 25 L/s and accompanying 200 mm Ø rising main has sufficient spare capacity to accommodate the proposed development on Erf 14796.

Pinnacle Point Main Outfall PS

The existing Pinnacle Point Main Outfall PS with a capacity of 71 L/s and accompanying 355 mm Ø rising main has sufficient spare capacity to accommodate the proposed development on Erf 14796.

2.4 Minimum requirements

The minimum requirements to accommodate the proposed development on Erf 14796 in the existing sewer system are master plan items DANA-1.2 & DANA-1.3 to upgrade the existing main outfall sewer in the Dana Bay Main Outfall PS drainage area, as shown on Figure 2.

3 CONCLUSION

The developer of Erf 14796 in Mossel Bay will be liable for the payment of a Development Contribution (as calculated by Mossel Bay Municipality) for bulk water and sewer infrastructure as per Council Policy.

The existing water reticulation system downstream of the Dana Bay reservoir has sufficient capacity to accommodate the proposed development in peak demand conditions. The setting of the existing Dana Bay PRV 5 should however be adjusted from 20 m to 33 mm to be able to supply a fire flow of more than 25 L/s @ 10 m pressure head to the proposed development.

Furthermore, upgrading of the bulk supply system between the Aalwyndal reservoir and the Bartelsfontein reservoir as well as the bulk supply system between the Bartelsfontein reservoir and the Dana Bay reservoirs is, however, required to accommodate the proposed development. Master plan item MMW.B9.3 is proposed to augment the bulk water supply to the Bartelsfontein reservoir, and master plan item MMW.B4.1 to improve bulk supply to the Dana Bay reservoirs.

There is insufficient capacity in the existing sewer reticulation system to accommodate the proposed development. Master plan items DANA-1.2 & DANA-1.4 are required to accommodate the proposed development on Erf 14796 in the existing sewer system.

We trust you find this of value.

Yours sincerely,

GLS CONSULTING (PTY) LTD
REG. NO.: 2007/003039/07

_____

Per: PC DU PLESSIS

cc. The Manager: Civil Engineering Services
Mossel Bay Municipality
Private Bag X29
MOSSEL BAY
6500

Attention: Mr Eric Louw

Legend

- Existing water pipes
- Existing Bartelsfontein reservoir zone
- Existing Dana Bay Tower zone
- Existing Dana Bay reservoir zone
- Existing Dana Bay PRV 7 zone
- Existing Dana Bay PRV 5 zone
- Master Plan Item
- Internal pipes (schematically)
- Existing reservoir
- Proposed development

MMW.B9.3

Bartelsfontein PS

Aalwyndal reservoir 3 000 kL TWL = 166.6m

Langeberg PS

Bartelsfontein reservoir 5 000 kL TWL = 246.0 m

300d

350d

400d

MMW.B4.1 650 d

250 d

Kwanonqaba PS (not in use)

Dana Bay PS (not in use)

Dana Bay 2 reservoir 2 300 kL TWL = 207.0m

Dana Bay 1 reservoir 2 500 kL TWL = 207.0m

Dana Bay booster PS

Dana Bay PRV 7

Dana Bay PRV 5

Connect to existing 110 d pipe

Proposed development

INDIAN OCEAN

December 2025

Proposed Development, Erf 14796 - Mossel Bay

GLS Infrastructure planning

Figure 1
Proposed Development
Erf 14796 - Mossel Bay
Existing water system

Legend

- Existing sewer system
- Existing sewer rising main
- Master plan item
- Internal sewer pipes (schematic)
- Existing pump station
- Existing WWTP
- Proposed development

Mossdustria PS

160 ⌀

200 ⌀

160 ⌀

200 ⌀

200 ⌀

Fynbos Paradise PS

Blue Ridge PS

Proposed development

DANA-1.3 200 ⌀

Grandiceps PS

P.S carta PS

Penisola PS

DANA-1.2 250 ⌀

Dana Bay Main Outfall PS

PINNACLE POINT WWTP

Pinnacle Point Intermediate PS

Pinnacle Point Grootkloof PS

Moquini PS 2

Moquini PS 1

Connect to existing 160 ⌀ outfall sewer

INDIAN OCEAN

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December 2025

Proposed Development, Erf 14796 - Mossel Bay

GLS Infrastructure planning

Figure 2
Proposed Development
Erf 14796 - Mossel Bay
Existing sewer system

ANNEXURE D

PROPOSED RESIDENTIAL DEVELOPMENT ON
ERF 14796, DANA BAY
by SMEC South Africa (Pty) Ltd

SMEC
South Africa
Member of the Surbana Jurong Group

SMEC INTERNAL REF. C3321

Traffic Impact Assessment

Proposed Residential Development on Erf 14796, Dana Bay

Reference No. C3321
Prepared for Costa Zervas Projects
31 October 2023

Document	Traffic Impact Assessment
File Location	P:\C3321_TIA Moquini Beach Development\3_Working\3-4_DivT\Reports
Project Name	Moquini Beach Development, Erf 14796 Dana Bay
Project Number	C3321

Revision History

Revision No.	Date	Prepared By	Reviewed By	Approved for Issue By
0	2023/10/31	M Geldenhuys	M Holmes	EB Jordaan, IntPE

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Important Notice

This report is confidential and is provided solely for the purposes of the Traffic Impact Assessment for the Proposed Monquini Beach Hotel Development on Erf 14796, Dana Bay, Western Cape. This report is provided pursuant to a Consultancy Agreement between SMEC South Africa Pty Limited ("SMEC") and Costa Zervas Projects, under which SMEC undertook to perform a specific and limited task for Costa Zervas Projects. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

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The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents, or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

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List of Figures

1 Introduction

SMEC South Africa (Pty) Ltd was appointed by Costa Zervas Projects to conduct a Traffic Impact Assessment for the proposed Monquini Beach Development on Erf 14796, Dana Bay, Western Cape. The site is bounded by Fishermans Village Drive to the north. A locality plan is shown in **Figure 1-1**.

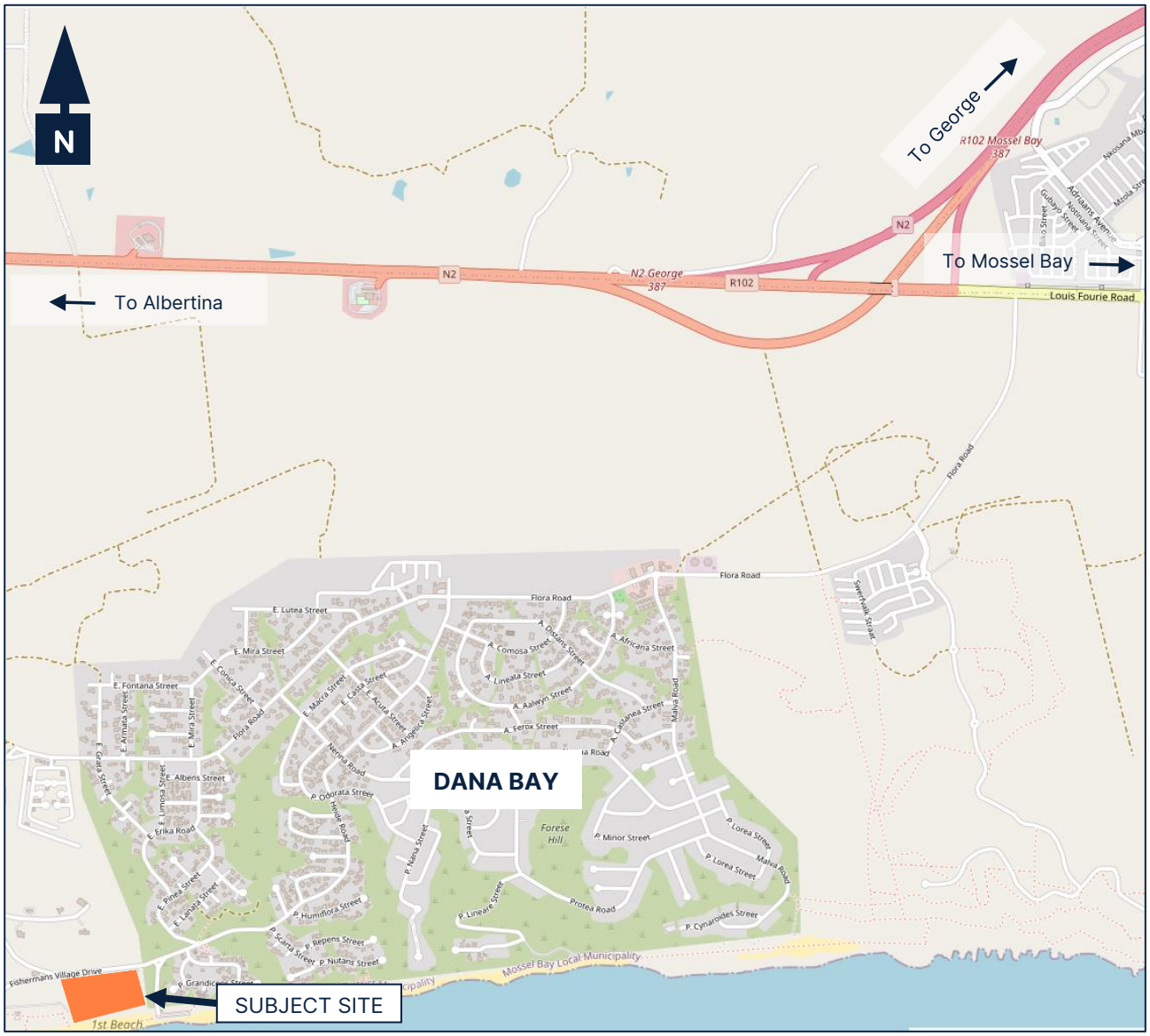

Figure 1-1: Locality Plan (Source: OpenStreetMap)

The subject site measures approximately 4.6 hectares in extent and will comprise of 144 apartments with a communal clubhouse and pool area. The development layout and phasing plan is shown in **Figure 1-2**.

The purpose of the Traffic Impact Assessment is to quantify the anticipated impact of the development traffic on the surrounding road network, and recommend remedial measures as required. The study was conducted in accordance with The Committee of Transport Officials South African Traffic Impact and Site Traffic Assessment Manual (COTO, TMH 16 Volume 1).

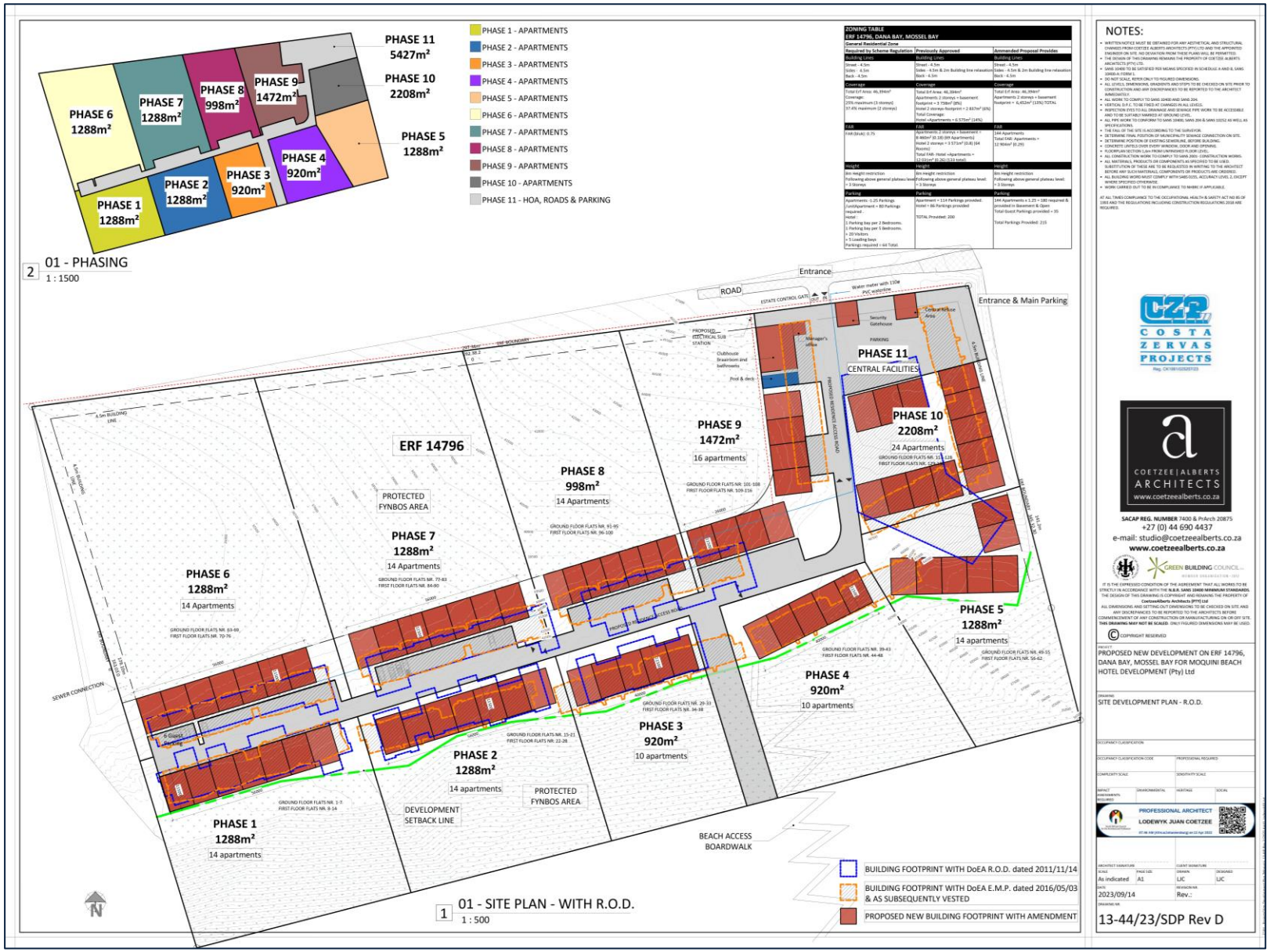

Figure 1-2: Site Development Plan (Source: Coetzee Alberts Architects)

2 Background Information

2.1 Existing Roads

Flora Road is classified as a Class 4b Residential Collector Street providing access to the surrounding residential area. It comprises of one lane per direction and experiences moderate traffic flows during peak hours.

Heide Road is a classified Class 4b Residential Collector Street providing access to the surrounding residential area. It comprises of one lane per direction and experiences moderate to low traffic flows during peak hours.

Fishermans Village Drive is classified as a Class 4b Residential Collector Street providing access to a private residential estate. It comprises of one lane per direction and experiences low traffic flows during peak hours.

Refer to **Figure 2-1**.

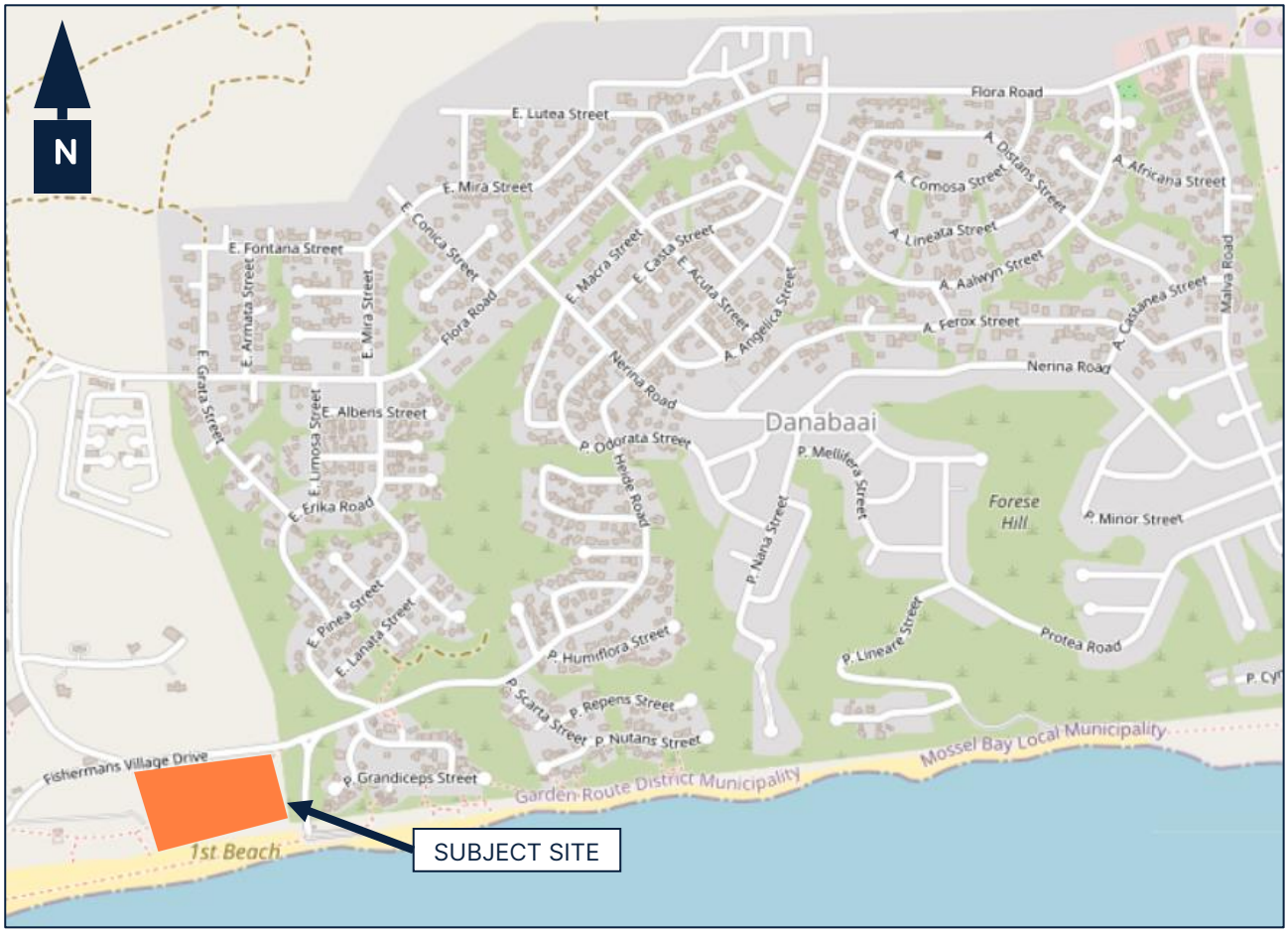

Figure 2-1: Existing Road Network (Source: OpenStreetMap)

2.2 Public Transport Facilities

There are no public transport lay-byes in the vicinity of the site.

2.3 Non-Motorised Transport Facilities

There are no pedestrian sidewalks along the existing roads in the vicinity of the site.

2.4 Site Access

The access spacing requirements were derived from the Western Cape Government (WCG) Access Management Guidelines (2020). The minimum spacing requirement for a Class 4 Road within a suburban roadside development environment is as follows:

- 115 m from an unsignalized full intersection to an unsignalized full intersection along a Class 4b Collector Road

It is planned for the development to be served by a single access along Fishermans Village Drive ~ 130 metres west of the unsignalized full intersection with Heide Road and ~ 260 metres to the east of the nearest internal road within Fisherman's Village Coastal Estate, the latter being permanently closed. Also to consider is that there is a security access gate serving Fisherman's Village Coastal Estate directly to the east of the proposed Site Access. Refer to **Figure 2-2**.

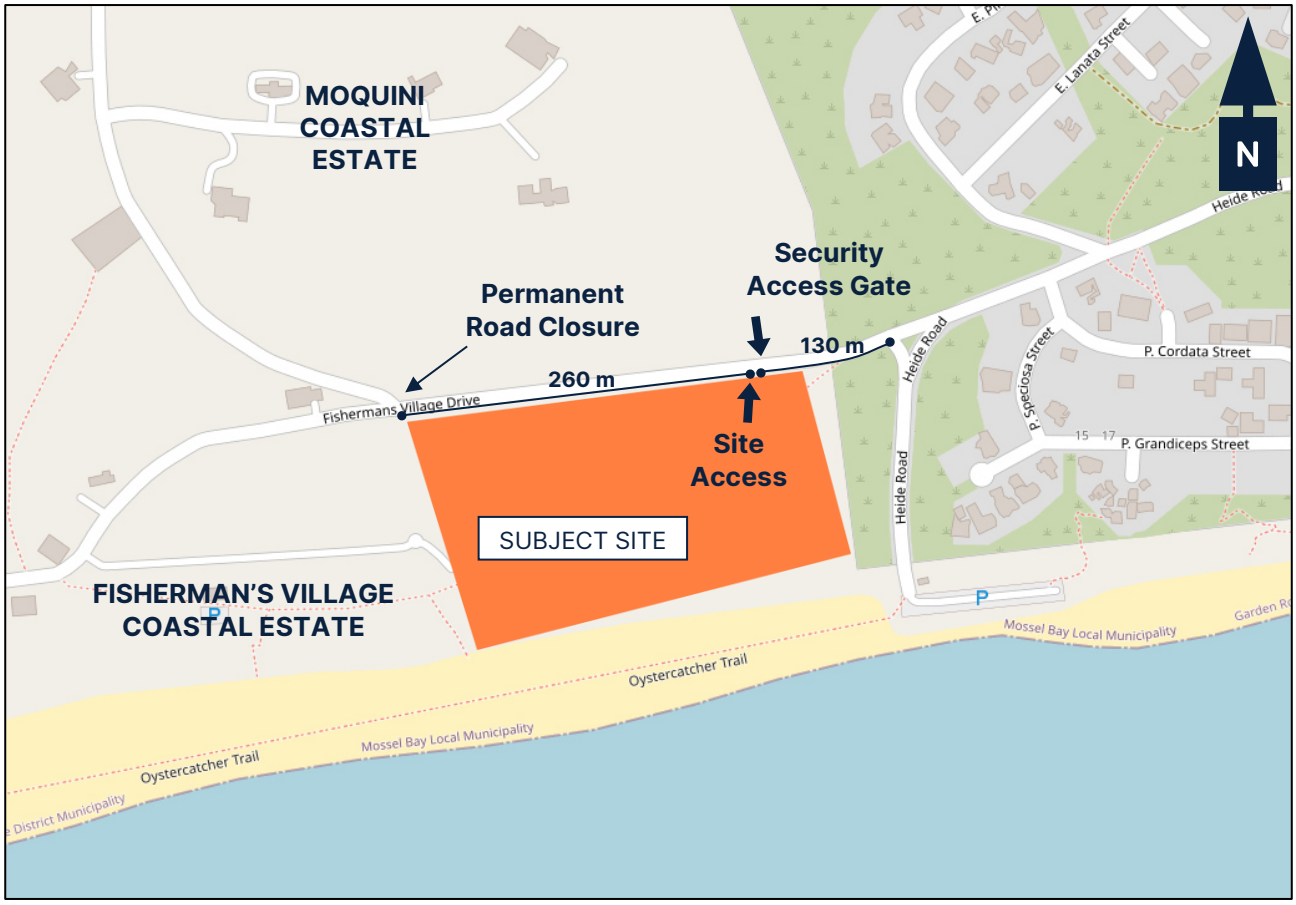

Figure 2-2: Proposed Site Access (Source: OpenStreetMap)

The proposed access is classified as an Equivalent Collector (thus the junction is seen as an unsignalized full intersection), as it is anticipated to serve between 60 - 500 vehicles per hour per direction. It is our submission that the proposed development access conforms to the WCG access spacing requirements.

Road users entering and exiting Fisherman's Village Coastal Estate will bring their vehicles to a standstill when approaching the security access gate, with limited queuing anticipated along each approach. It would therefore be advantageous to provide a Box Junction road marking (RM10) to prevent motorists from obstructing the site access.

3 Traffic Demand Estimation

3.1 Assessment Years

A base year assessment was undertaken to identify shortcomings in the road-based capacity in the short term, if any. In addition thereto, it is required to grow traffic flows to an acceptable forecast year in order to ensure that the proposed road network would be able to operate satisfactorily once the development traffic is added to the surrounding road network.

TMH 16 Volume 1 Version 1.0, states that transportation improvements for developments must be designed for a forecast year of 5 years. Hence, a 2023 Base Year and a 2028 Design Year was used for this TIA.

3.2 Assessment Hours

The assessment has been undertaken considering the periods during which the combined effect of background and development traffic would result in the highest traffic demand. Hence, it was deemed suitable to assess the Weekday AM and PM Peak Hours.

3.3 Traffic Counts

Taking into consideration the location and extent of the proposed development with relation to the surrounding road network, the following traffic count surveys were undertaken as part of this project assignment:

- Counting Station 1: Intersection of Heide Road and Flora Road
- Counting Station 2: Intersection of Heide Road and Nerina Road
- Counting Station 3: Intersection of Heide Road, Pinea Road, and Cordata Road

Traffic count locations are shown in **Figure 3-1**.

Figure 3-1: Traffic Count Locations

Details of the traffic survey are provided below:

- Date counted 27 September 2023
- Day Weekday AM and Weekday PM
- Congestion levels Moderate
- Enumerator SMEC South Africa (Pty) Ltd

The detailed traffic survey data is provided in **Annexure A.**

Typical peak hours for the intersections under discussion are as follows:

- Weekday AM Peak Hour 07h00 – 08h00
- Weekday PM Peak Hour 16h15 – 17h15

The 2023 Base Year traffic flows are shown in **Figure 3-2**.

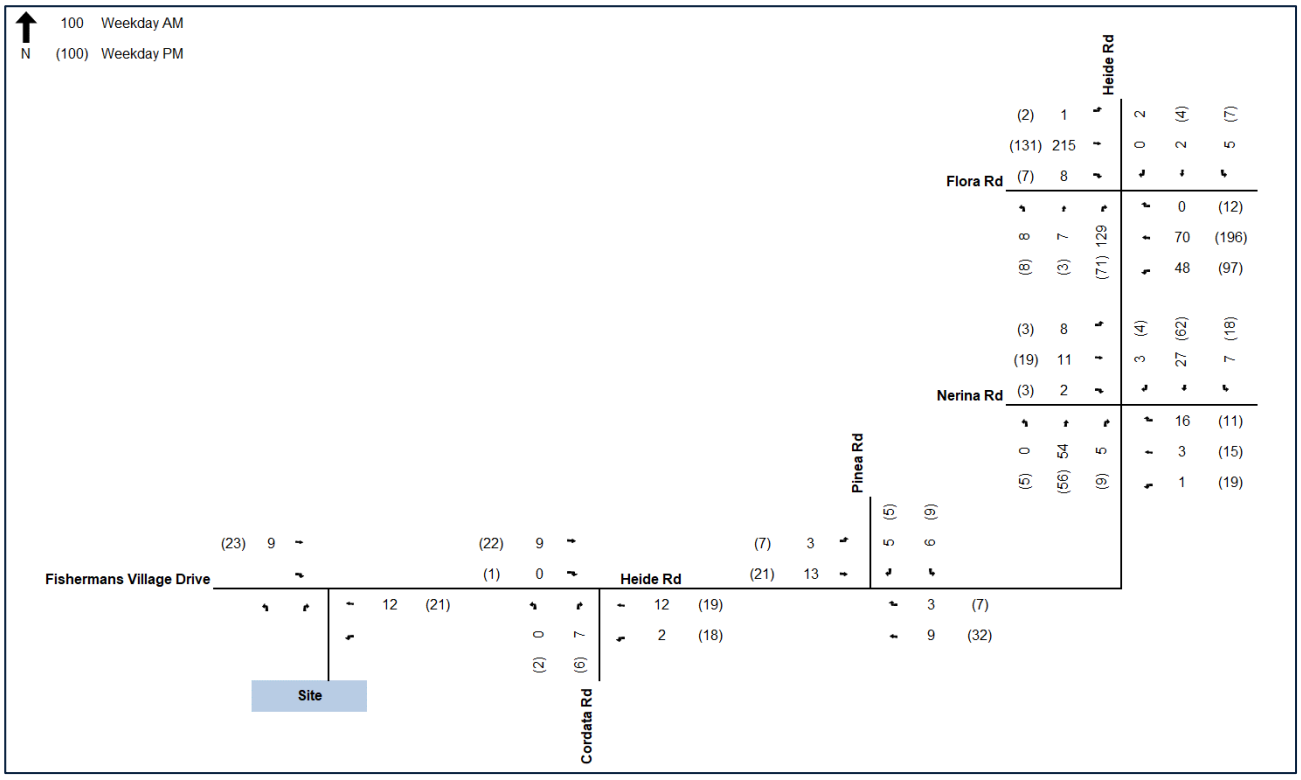

Figure 3-2: 2023 Base Year Peak Hour Traffic Flows

3.4 Traffic Growth Rates

A traffic growth rate is applied to background traffic in order to determine the anticipated growth in this traffic besides that relating to planned and new developments. The Committee of Transport Officials Trip Data Manual (COTO, TMH 17 Volume 1 Version 1.01) provides typical growth rates to be used for growth areas based on the existing/anticipated rate of growth. Refer to **Table 3-1**.

Table 3-1: Typical Growth Rates

Development Area	Growth Rate
Low Growth Areas	0% - 3%
Average Growth Areas	3% - 4%
Above Average Growth Areas	4% - 6%
Fast Growing Areas	6% - 8%
Exceptionally High Growth	> 8%

Taking into consideration the nature and extent of development within this area, an annual compounded traffic growth rate of 3.0% was applied to the 2023 Background Traffic in order to derive the 2028 Design Year traffic flows. The 2028 Forecast Year traffic flows are shown in **Figure 3-3**.

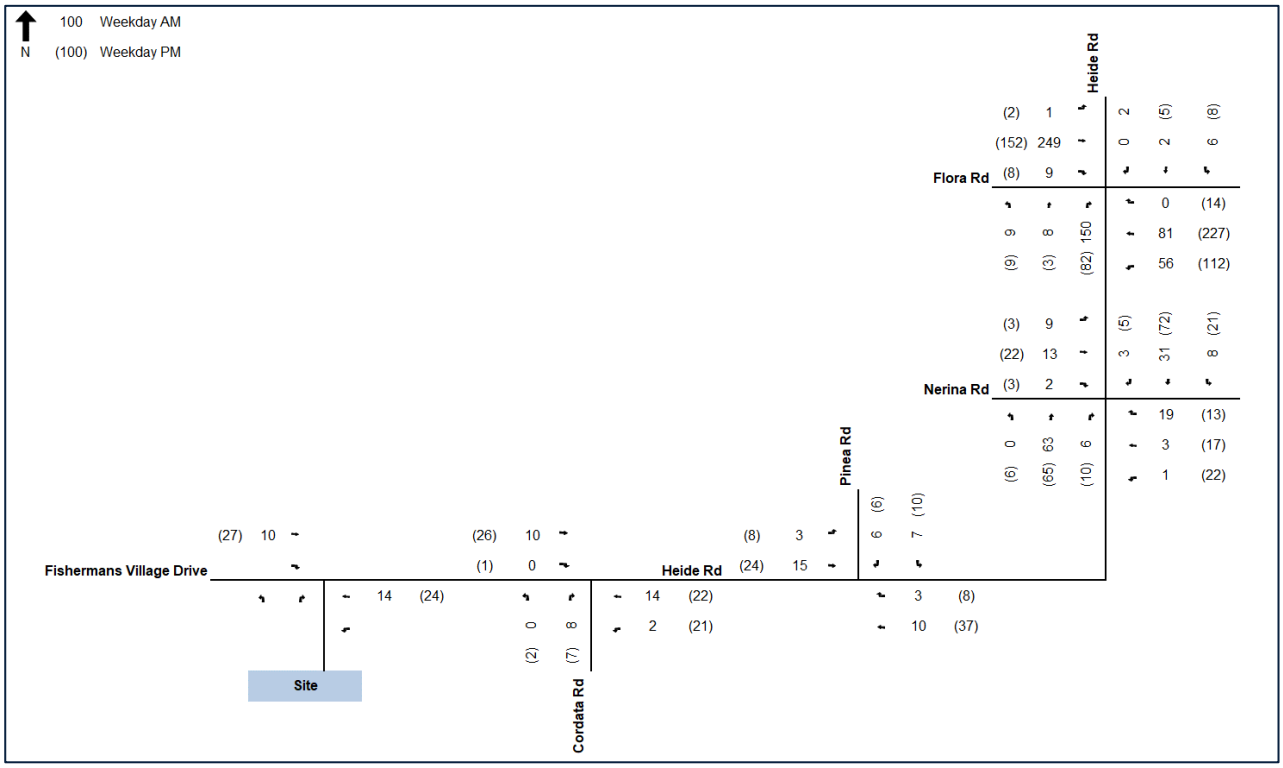

Figure 3-3: 2028 Forecast Year Traffic Flows

4 Trip Generation, Distribution and Assignment

4.1 Trip Generation

The Trip Generation Rates for the land use types forming part of the development were obtained from the COTO TMH 17 South African Trip Data Manual dated September 2013.

4.1.1 Moquini Development

The trip generation potential of the proposed development is shown in **Table 4-1.**

Table 4-1: Proposed Development Trip Generation

Land Use	Quantity	Trip Generation Rates		Traffic Generation (vph)			
		Weekday		Weekday		Weekday	
		Weekday		AM		PM	
		AM	PM	IN	OUT	IN	OUT
Apartments	144 units	0.65	0.65	24	71	66	29
New Trips				**95**		**95**	

It is anticipated that the proposed development would generate 95 new vehicular trips during both the Weekday AM and PM Peak Hours.

4.1.2 Other Development Trip Generation

Other developments in the area must be considered in the estimation of future background traffic. As a result, the future trip generation potential of Fisherman's Village Coastal Estate was taken into consideration. Refer to **Table 4-2.**

Table 4-2: Other Development Trip Generation

Land Use	Quantity	Trip Generation Rates		Traffic Generation (vph)			
		Weekday		Weekday		Weekday	
		Weekday		AM		PM	
		AM	PM	IN	OUT	IN	OUT
Single Dwelling Units	25 Units	1.00	1.00	7	19	18	8
New Trips				**26**		**26**	

It is anticipated that the Fisherman's Village Coastal Estate would generate a further 26 new vehicular trips during both the Weekday AM and PM Peak Hours once fully developed.

4.2 Trip Distribution

Trip distribution was estimated manually based on existing traffic flows, the land use of the surrounding areas and the development access location. The trip distribution figures provided are as follows:

- Figure 4-1: Trip Distribution (New Trips - Moquini Development)
- Figure 4-2: Trip Distribution (New Trips – Other Developments)

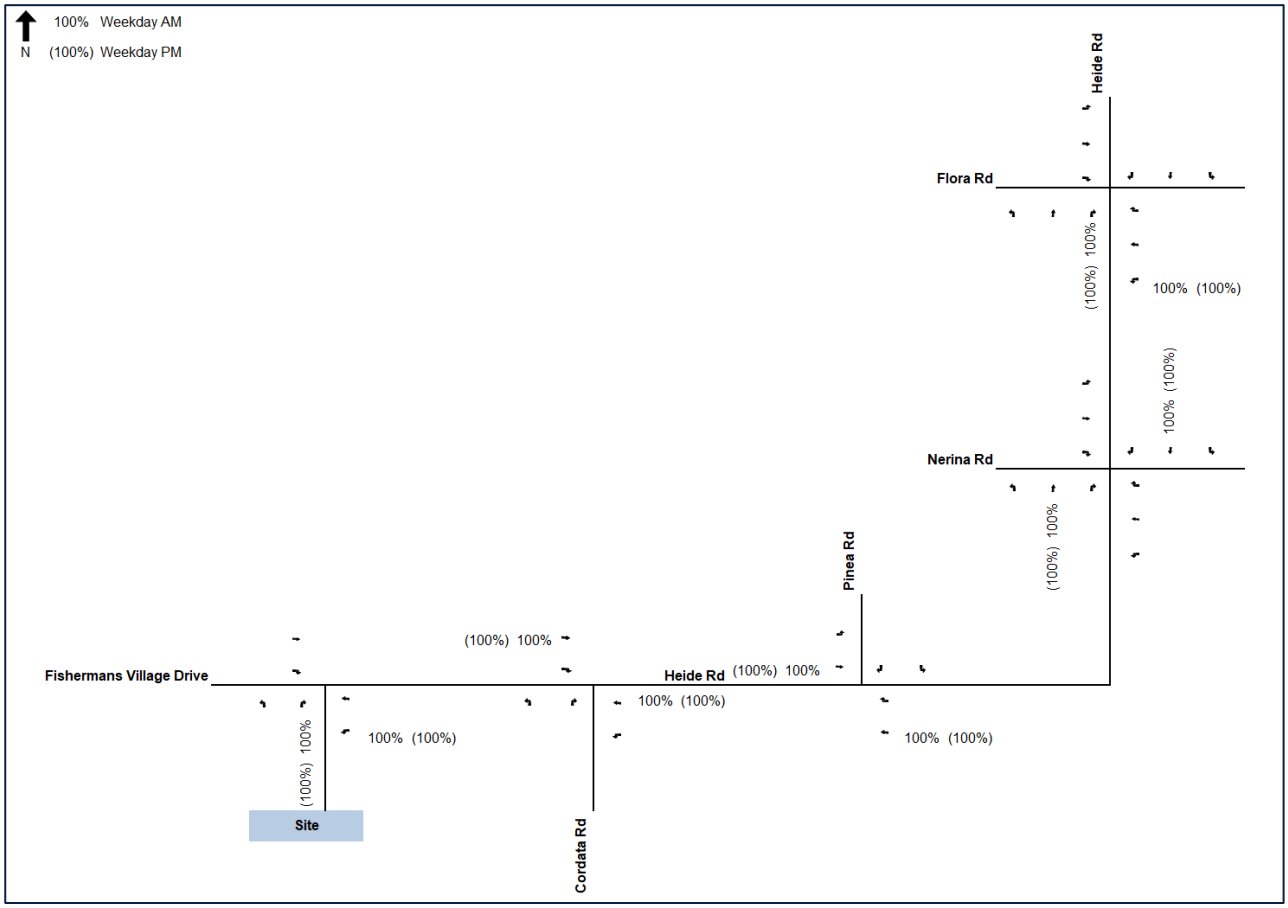

Figure 4-1: Trip Distribution (New Trips - Moquini Development)

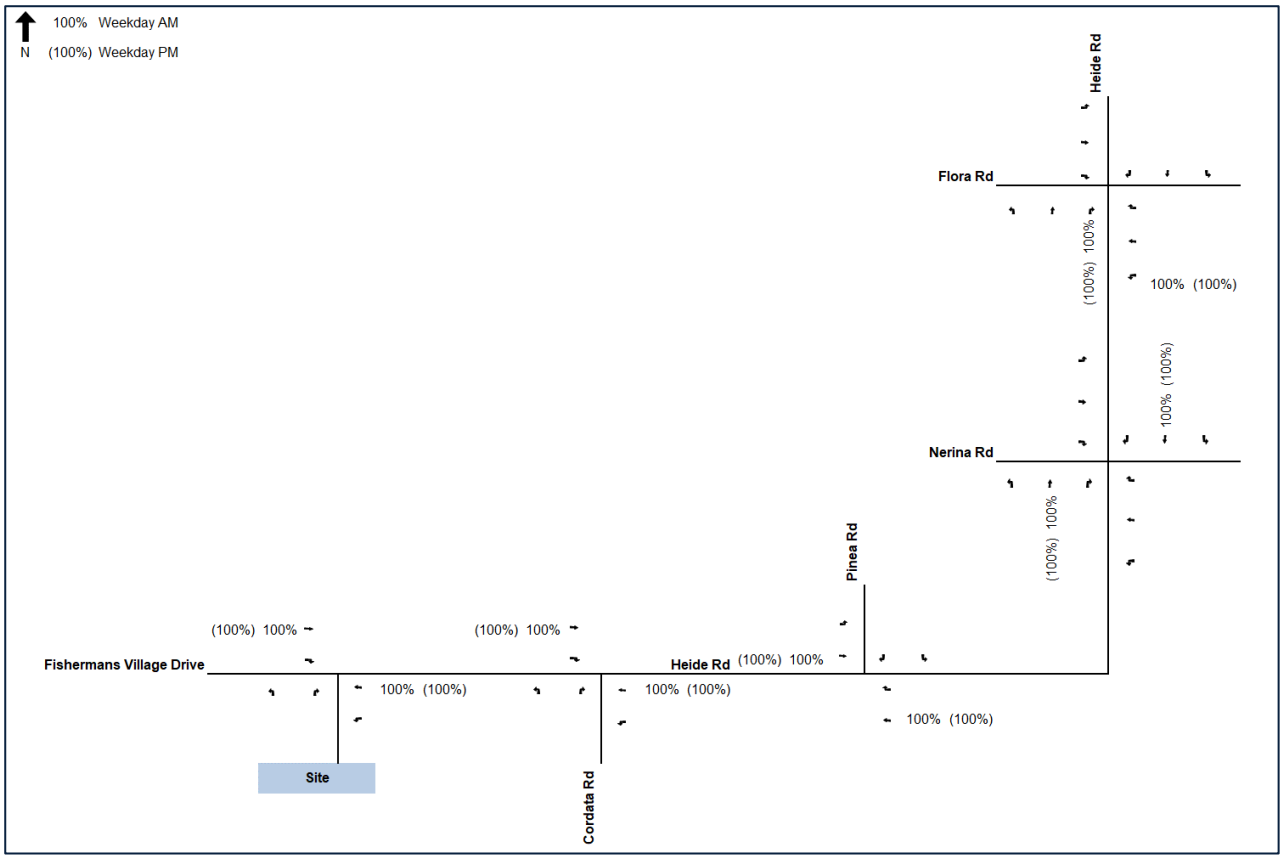

Figure 4-2: Trip Distribution (New Trips – Other Developments)

4.3 Traffic Assignment

Traffic assignment involves determining the amount of traffic that will use specific routes in the network based on the associated trip distribution. The traffic assignment figures provided are as follows:

- Figure 4-3: Traffic Assignment (New Trips - Moquini Development)
- Figure 4-4: Traffic Assignment (New Trips – Other Developments)

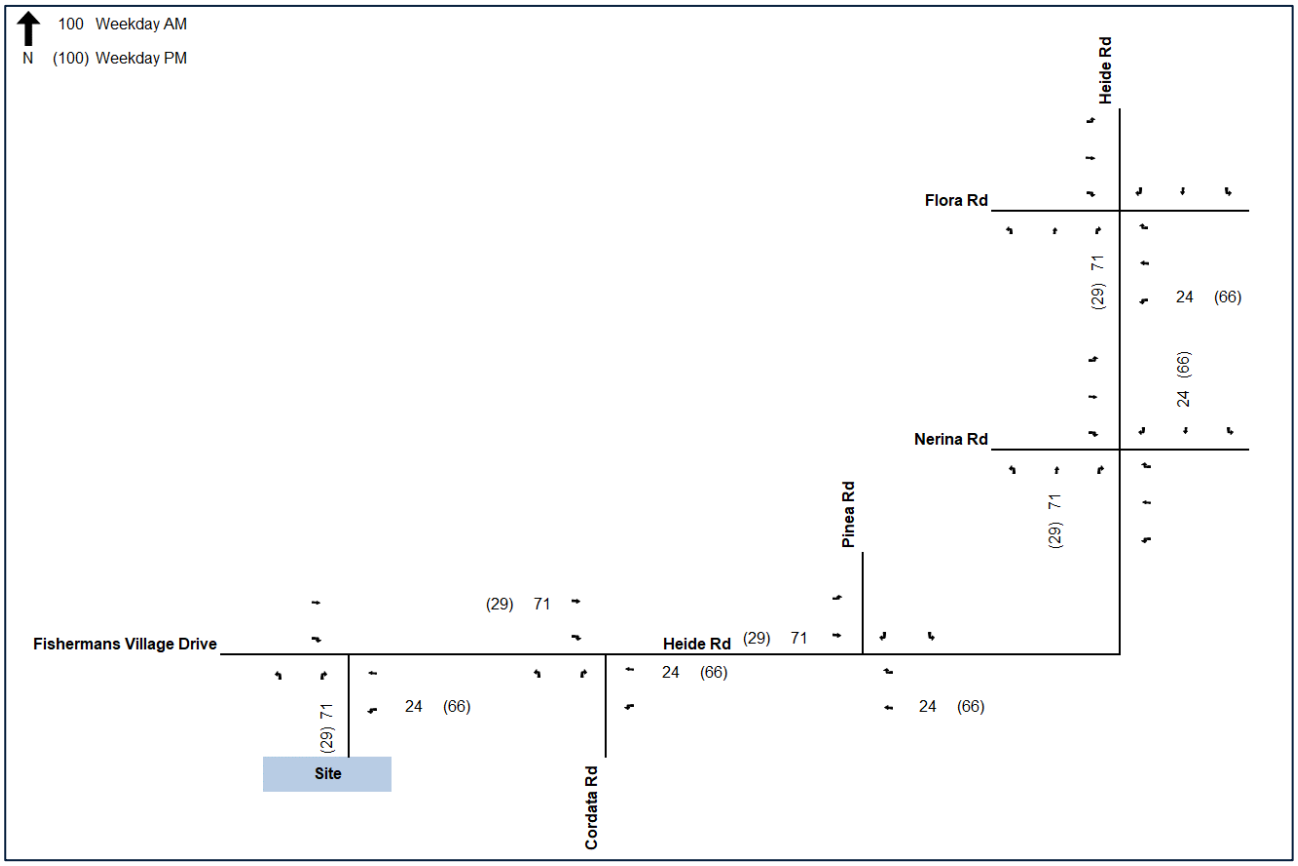

Figure 4-3: Traffic Assignment (New Trips - Moquini Development)

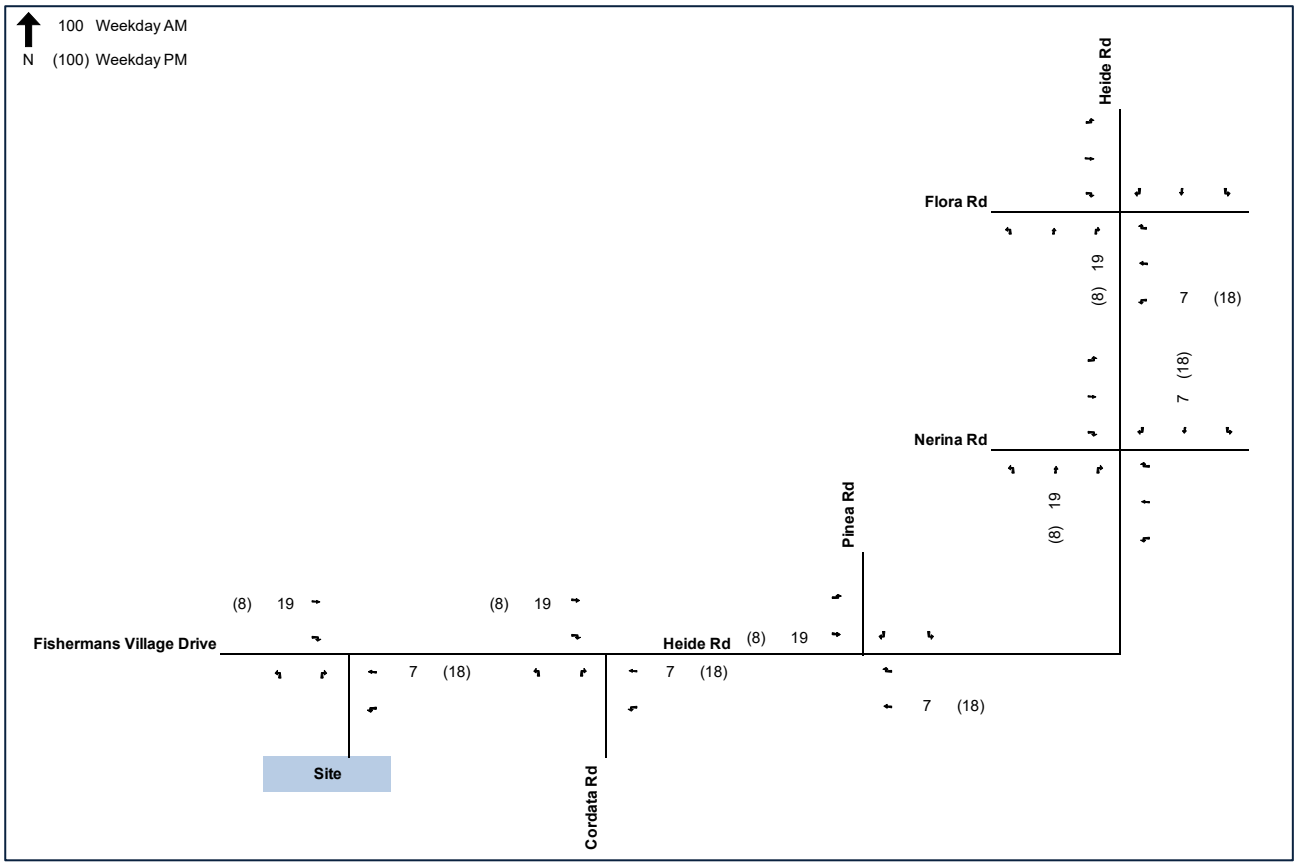

Figure 4-4: Traffic Assignment (New Trips – Other Developments)

4.4 Total Traffic Demand

Total traffic demand is provided for each horizon year and peak hour that is assessed. The total traffic demand figures provided are as follows:

- Figure 4-5: 2023 Base Year Traffic Flows + Development Trips
- Figure 4-6: 2028 Forecast Year Traffic Flows + Development Trips
- Figure 4-7: 2028 Forecast Year Traffic Flows + Development Trips + Other Development Trips

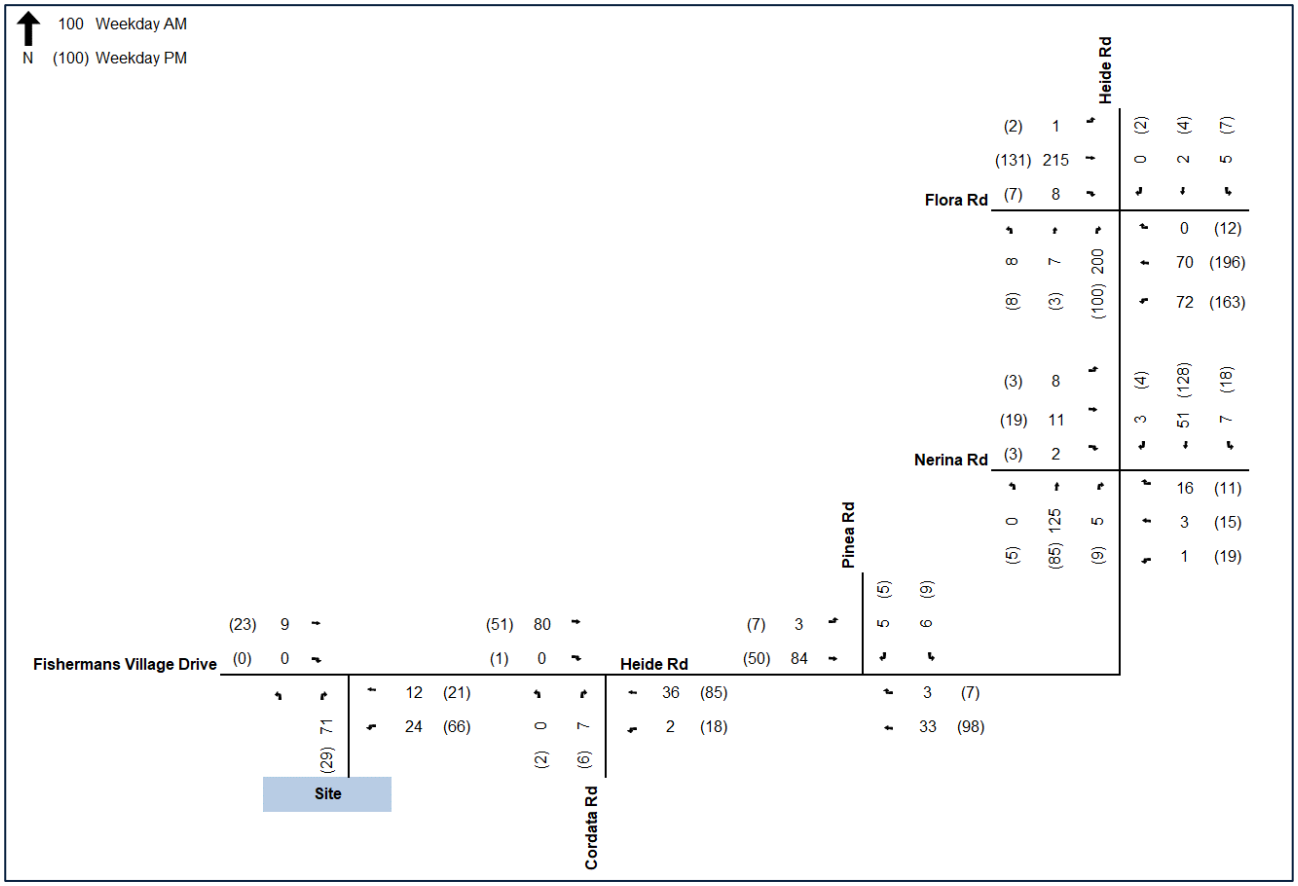

Figure 4-5: 2023 Base Year Traffic Flows + Development Trips

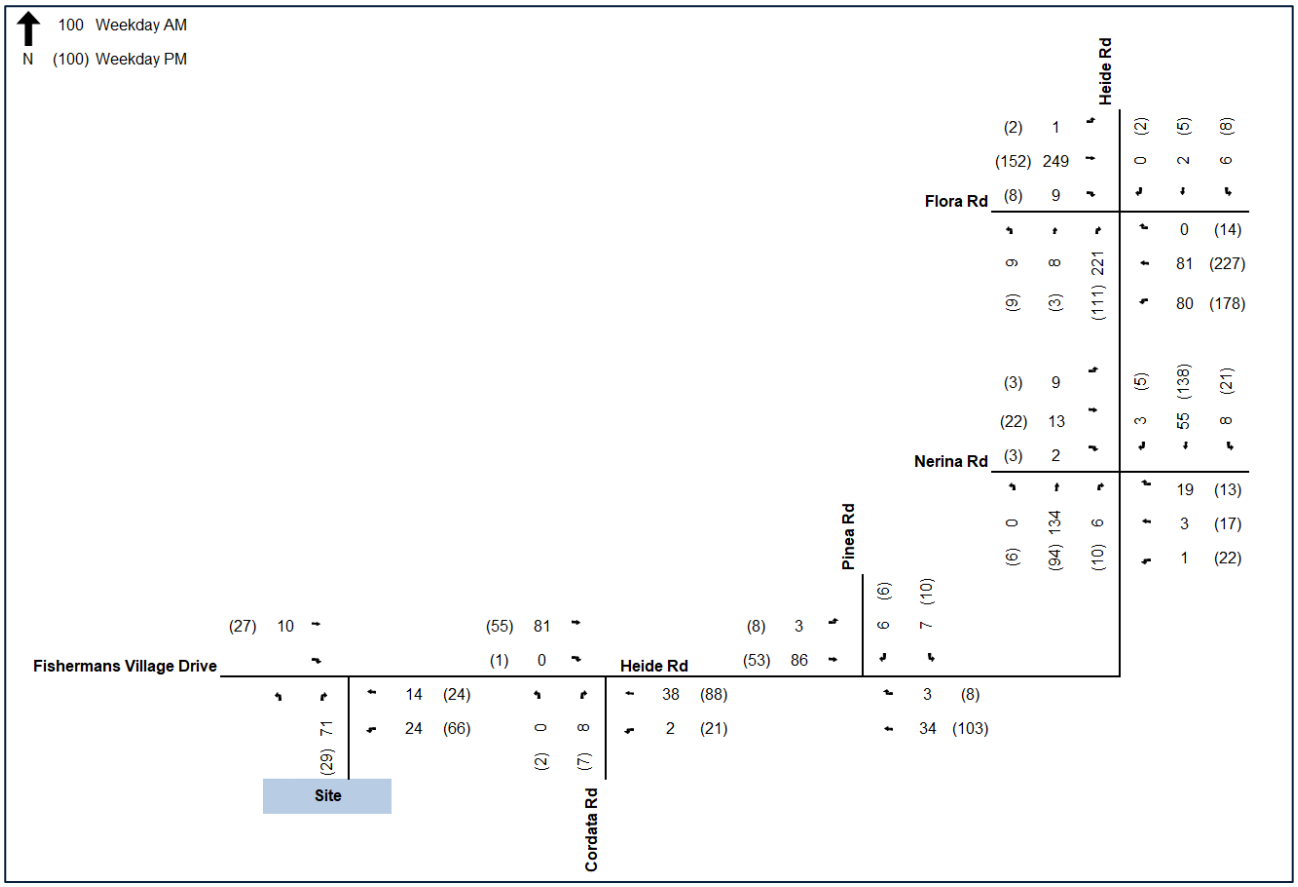

Figure 4-6: 2028 Forecast Year Traffic Flows + Development Trips

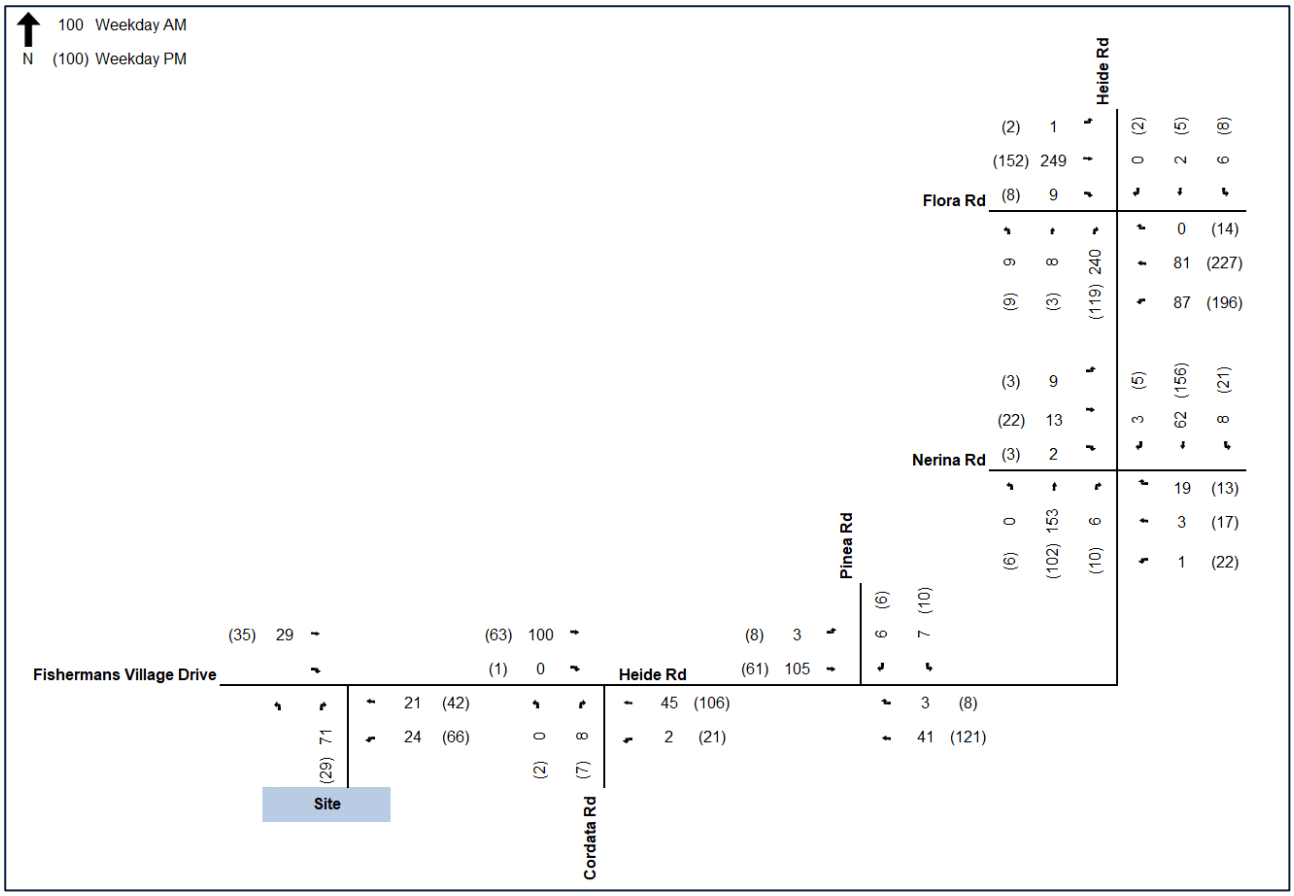

Figure 4-7: 2028 Forecast Year Traffic Flows + Development Trips + Other Development Trips

5 Traffic Analysis

Intersection capacity analyses were undertaken to determine the anticipated operational performance of the site access and surrounding road network, taking into consideration the implementation of the development and associated development trips. The state-of-the-art traffic engineering software package, SIDRA Intersection 9.0 software, was used. The intersections analysed for the development are listed below:

- Heide Road and Flora Road Intersection
- Heide Road and Nerina Road Intersection
- Heide Road and Pinea Road Intersection
- Heide Road and Cordata Road Intersection
- Fishermans Village Drive and the Proposed Site Access

The following scenarios were analysed as part of this project assignment:

- 2023 Base Year
- 2023 Base Year + Development Trips
- 2028 Forecast Year + Development Trips
- 2028 Forecast Year + Development Trips + Other Development Trips

The operational performance of an intersection is typically quantified in terms of Level of Service as defined by the SIDRA Intersection User Guide Ver. 8 (2018). These definitions relate average delays at intersections (for individual turning movements, for each approach and for the overall intersection) to a level of service ranging from A to F, as are shown in **Table 5-1.**

Table 5-1: Intersection-Based Level of Service Criteria

Level of Service	Control Delay per Vehicle in Seconds (d)			LOS for V/C Ratio
	Signals	Roundabouts	Stop Signs and Yield Signs	V/C > 1
A	d ≤ 10	d ≤ 10	d ≤ 10	F
B	10 <d ≤ 20	10 < d ≤ 20	10 <d ≤ 15	F
C	20 < d ≤ 35	20 < d ≤ 35	15 < d ≤ 25	F
D	35 < d ≤ 55	35 < d ≤ 50	25 < d ≤ 35	F
E	55 < d ≤ 80	50 < d ≤ 70	35 < d ≤ 50	F
F	80 < d	70 < d	50 < d	F

Detailed SIDRA outputs are contained in **Annexure B.**

5.1 Heide Road and Flora Road Intersection

The existing intersection of Heide Road and Flora Road takes the form of a four-way stop. All approaches comprise of a single lane serving all movements. Refer to **Figure 5-1**.

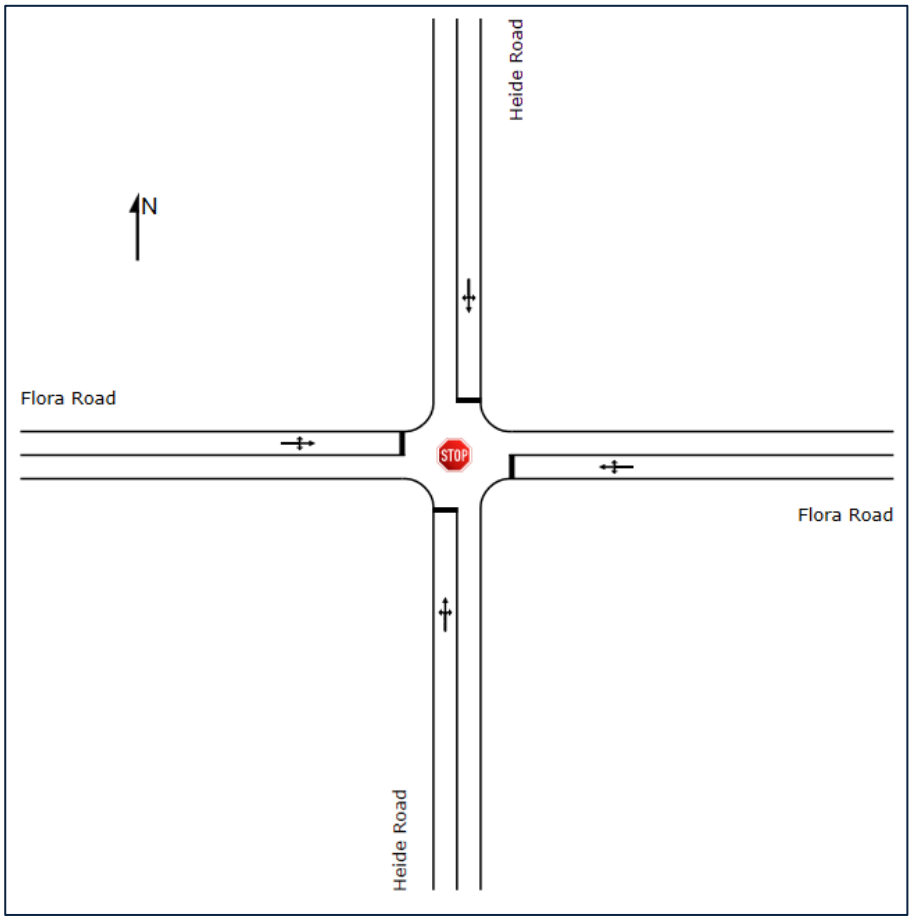

Figure 5-1: Existing Intersection Layout: Heide Road and Flora Road

2023 Base Year Traffic Flows

Taking into consideration the existing intersection layout as well as the 2023 Base Year Traffic flows, the intersection is currently operating at an overall Level of Service C during the Weekday AM and PM Peak Hours, with an average delay of approximately 17 and 18 seconds respectively. The north approach, however, operates at an unacceptable Level of Service E and F during the Weekday AM and PM Peak Hours, with an average delay of approximately 50 and 118 seconds respectively.

It is therefore our submission to convert the existing four-way stop to a two-way stop, with stop control along the north and south approaches. Refer to **Figure 5-2**.

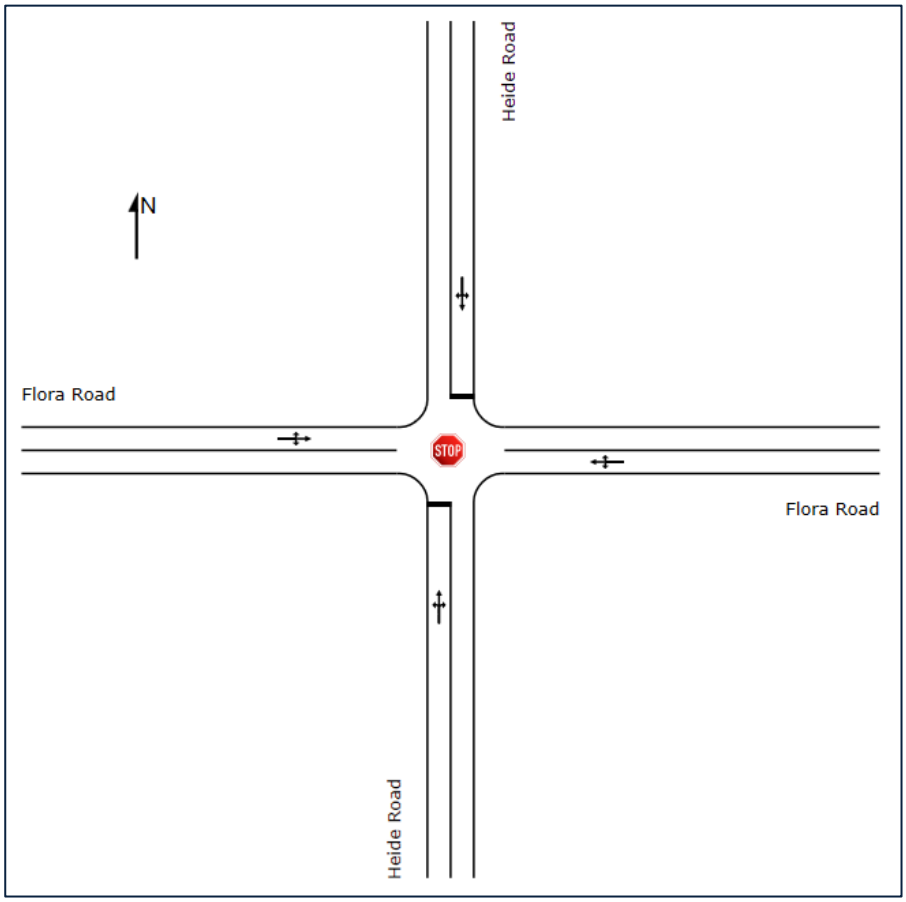

Figure 5-2: Proposed Intersection Layout: Heide Road and Flora Road

2023 Base Year Traffic Flows + Upgrades

Taking into consideration the proposed intersection layout as well as the 2023 Base Year traffic flows, the critical movements under stop control are anticipated to operate at a Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 10 seconds.

2023 Base Year + Development Trips

Taking into consideration the proposed intersection layout as well as the 2023 Base Year traffic flows plus the anticipated development trips, the critical movements under stop control are anticipated to operate at a Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 11 seconds.

2028 Forecast Year + Development Trips

Taking into consideration the proposed intersection layout as well as the 2028 Forecast Year traffic flows plus the anticipated development trips, the critical movements under stop control are anticipated to operate at a Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 12 seconds.

2028 Forecast Year + Development Trips + Other Development Trips

Taking into consideration the proposed intersection layout as well as the 2028 Forecast Year traffic flows plus the anticipated development trips plus other development trips, the critical movements under stop control are anticipated to operate at a Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 12 seconds.

5.2 Heide Road and Nerina Road Intersection

The existing intersection of the Heide Road and Nerina Road takes the form of a four-way stop. All approaches comprise of a single lane serving all movements. Refer to **Figure 5-3**.

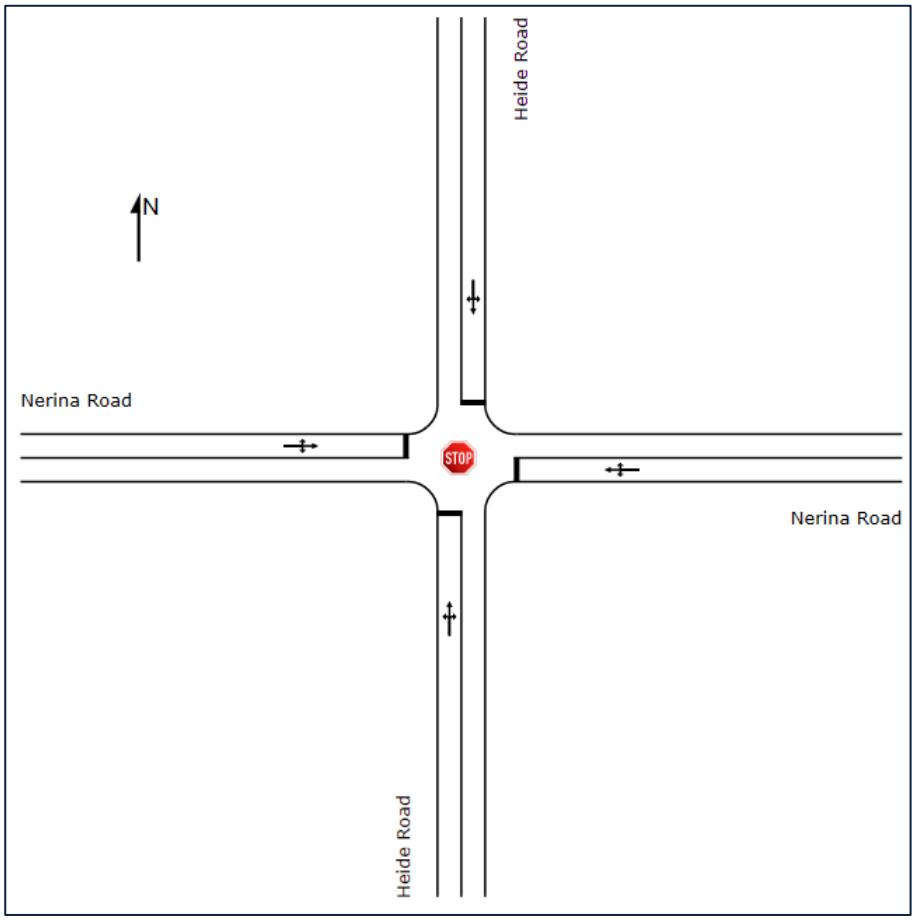

Figure 5-3: Existing Intersection Layout: Heide Road and Nerina Road

2023 Base Year Traffic Flows

Taking into consideration the 2023 Base Year traffic flows, the intersection is currently operating at an overall Level of Service C and B during the Weekday AM and PM Peak Hours, with an average delay of approximately 17 and 13 seconds respectively. The west approach, however, operates at an unacceptable Level of Service E and C during the Weekday AM and PM Peak Hours, with an average delay of approximately 42 and 17 seconds respectively.

It is therefore our submission to convert the existing four-way stop to a two-way stop, with stop control applied along the east and west approach to the intersection. Refer to **Figure 5-4**.

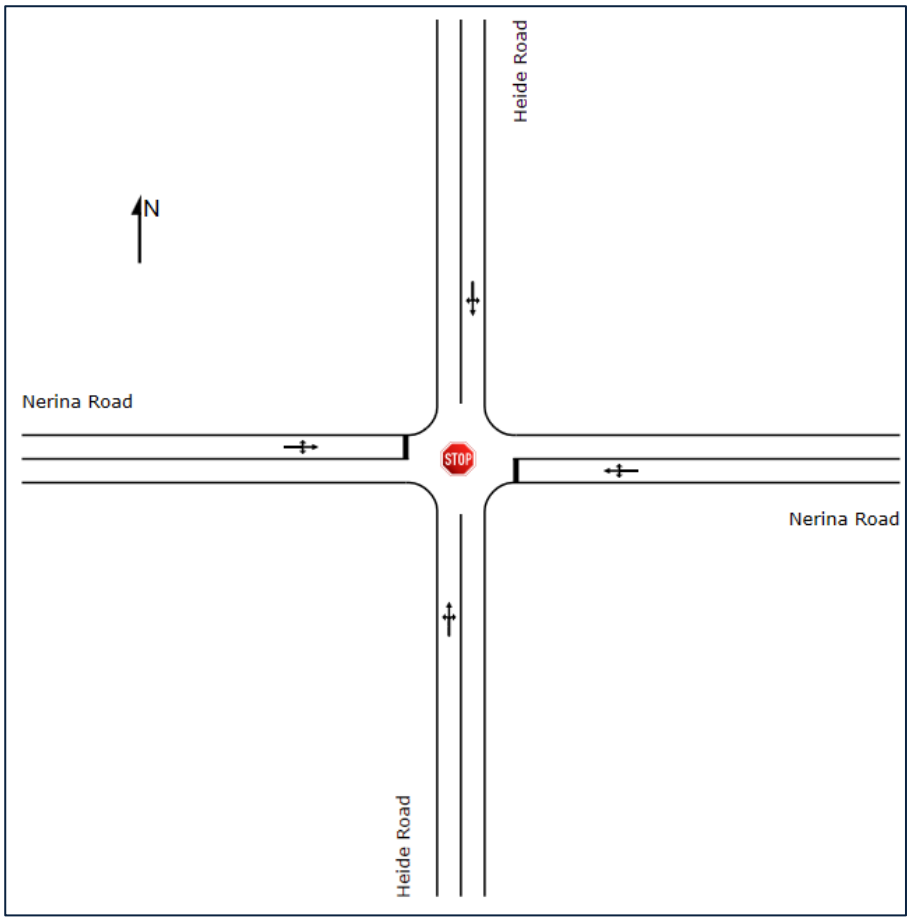

Figure 5-4: Proposed Intersection Layout: Heide Road and Nerina Road

2023 Base Year Traffic Flows

Taking into consideration the proposed intersection layout as well as the 2023 Base Year traffic flows, the critical movements under stop control are anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 8 and 9 seconds respectively.

2023 Base Year + Development Trips

Taking into consideration the proposed intersection layout as well as the 2023 Base Year traffic flows plus the anticipated development trips, the critical movements under stop control are anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 9 seconds.

2028 Forecast Year + Development Trips

Taking into consideration the proposed intersection layout as well as the 2028 Forecast Year traffic flows plus the anticipated development trips, the critical movements under stop control are anticipated to operate at a Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 9 seconds.

2028 Forecast Year + Development Trips + Other Development Trips

Taking into consideration the proposed intersection layout as well as the 2028 Forecast Year traffic flows plus the anticipated development trips plus other development trips, the critical movements under stop control are anticipated to operate at a Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 9 and 10 seconds respectively.

5.3 Heide Road and Pinea Road Intersection

The existing intersection of Heide Road and Pinea Road takes the form of a priority-controlled T-junction with all approaches under stop control. The north approach comprises of one lane serving all movements. The east approach comprises of a shared through-and-right-turn lane. The west approach comprises of a shared left-and-through lane. Refer to **Figure 5-5**.

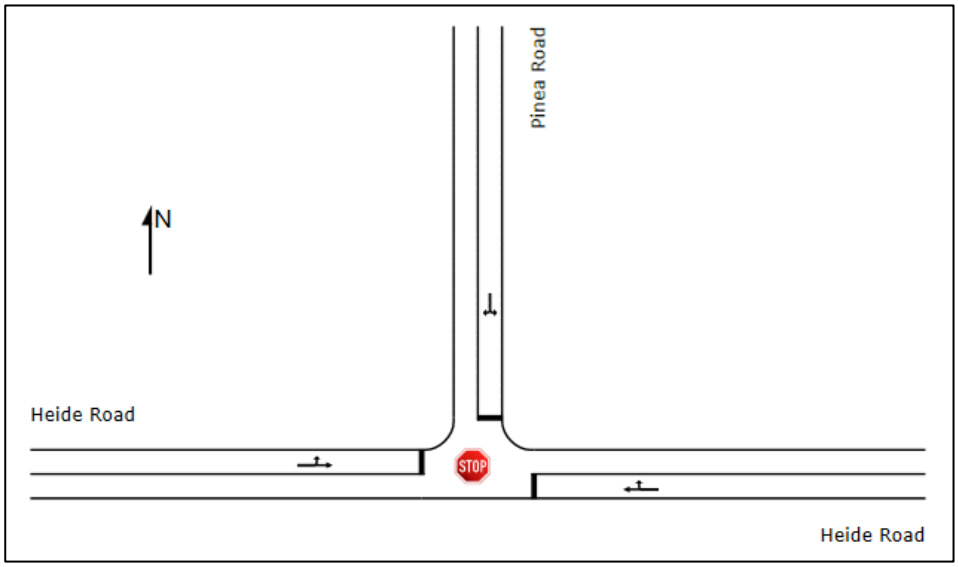

Figure 5-5: Existing Intersection Layout: Heide Road and Pinea Road

2023 Base Year Traffic Flows

Taking into consideration the 2023 Base Year traffic flows, the intersection is currently operating at an overall Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 12 and 11 seconds respectively.

2023 Base Year + Development Trips

Taking into consideration the 2023 Base Year traffic flows the plus anticipated development trips, the intersection is anticipated to operate at an overall Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 11 seconds.

2028 Forecast Year + Development Trips

Taking into consideration the 2028 Forecast Year traffic flows plus the anticipated development trips, the intersection is anticipated to operate at a Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 11 seconds.

2028 Forecast Year + Development Trips + Other Development Trips

Taking into consideration the 2028 Forecast Year traffic flows plus the anticipated development trips plus other development trips, the intersection is anticipated to operate at a Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 11 seconds respectively.

5.4 Heide Road and Cordata Road Intersection

The existing intersection of Heide Road and Cordata Road takes the form of a priority-controlled T-junction with the south approach being under yield control. The south approach comprises of one lane serving all movements. The east approach comprises of a shared through-and-left-turn lane. The west approach comprises of a shared through-and-right-turn lane. Refer to **Figure 5-6**.

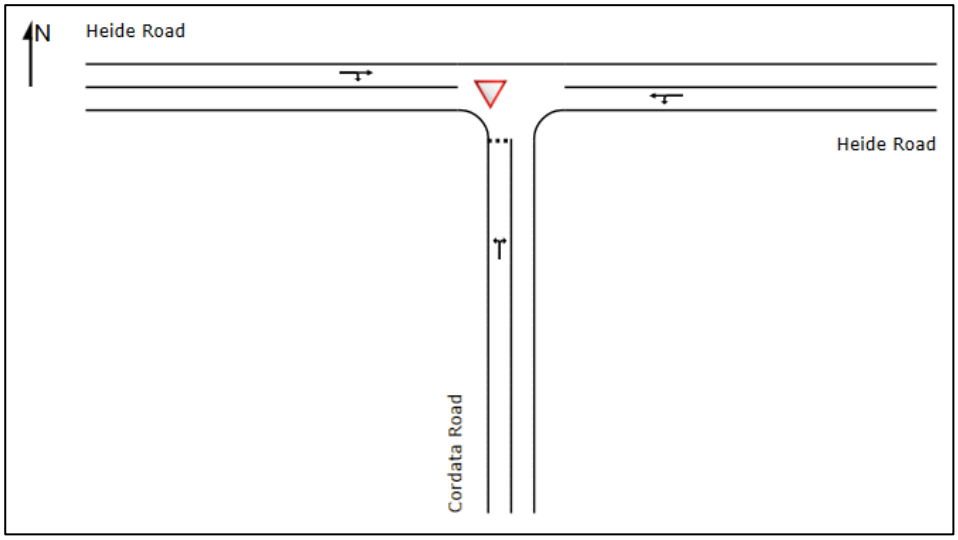

Figure 5-6: Existing Intersection Layout: Heide Road and Cordata Road

2023 Base Year Traffic Flows

Taking into consideration the 2023 Base Year traffic flows, the priority-controlled side road is currently operating at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 6 seconds.

2023 Base Year + Development Trips

Taking into consideration the 2023 Base Year traffic flows plus the anticipated development trips, the priority-controlled side road is anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 6 seconds.

2028 Forecast Year + Development Trips

Taking into consideration the 2028 Forecast Year traffic flows plus the anticipated development trips, the priority-controlled side road is anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 6 seconds.

2028 Forecast Year + Development Trips + Other Development Trips

Taking into consideration the 2028 Forecast Year traffic flows plus the anticipated development trips plus other development trips, the priority-controlled side road is anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 6 seconds.

5.5 Fishermans Village Drive and Proposed Site Access

The intersection of Fishermans Village Drive and Proposed Site Access is proposed to take the form of a priority-controlled T-junction with the south approach being under stop control. The south approach comprises of one lane serving all movements. The east approach comprises of a shared through-and-left-turn lane. The west approach comprises of a shared through-and-right-turn lane. Refer to **Figure 5-7**.

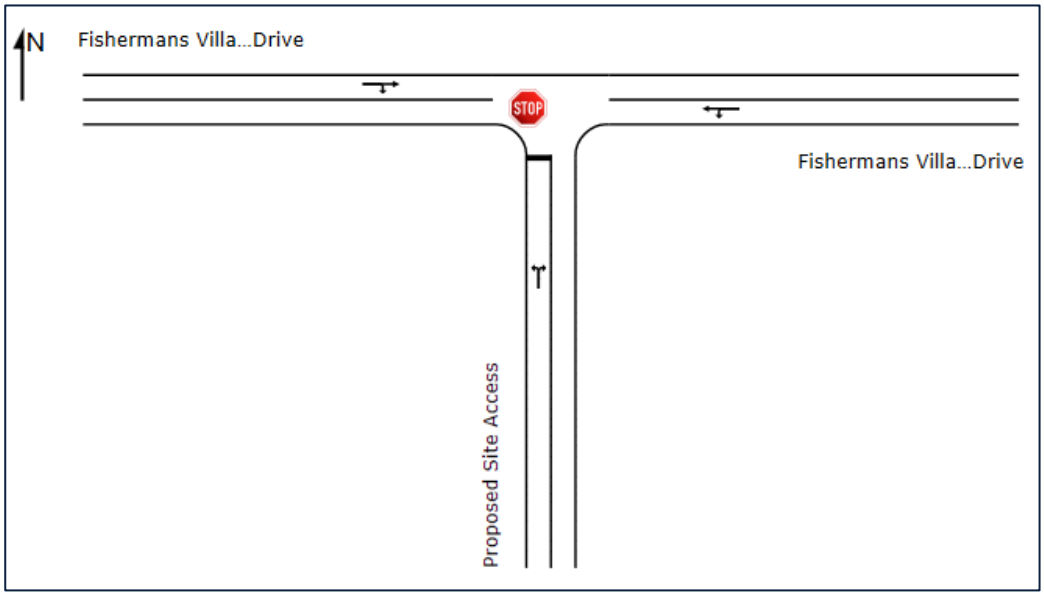

Figure 5-7: Existing Intersection Layout: Fishermans Village Drive and Proposed Site Access

2023 Base Year + Development Trips

Taking into consideration the 2023 Base Year traffic flows, the stop-controlled side road is anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 8 seconds.

2028 Forecast Year + Development Trips

Taking into consideration the 2028 Forecast Year traffic flows plus the anticipated development trips, the priority-controlled side road is anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 8 seconds.

2028 Forecast Year + Development Trips + Other Development Trips

Taking into consideration the 2028 Forecast Year traffic flows plus the anticipated development trips plus other development trips, the priority-controlled side road is anticipated to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 8 seconds.

5.6 Analysis Summary

A summary of the analysis outputs is provided in **Table 5-2**.

Table 5-2: Analysis Summary

Intersection	2023 Base Year	2023 Base Year + Upgrades	2023 Base Year + Development Trips	2028 Forecast Year + Development Trips
Heide Road and Flora Road	C / C	B / B*	B / B*	B / B*
Heide Road and Nerina Road	C / B	A / A*	A / A*	A / A*
Heide Road and Pinea Road	B / B	-	B / B	B / B
Heide Road and Cordata Road	A / A*	-	A / A*	A / A*
Fishermans Village Drive and Proposed Site Access	-	-	A / A*	A / A*

* Critical Priority Controlled Movement LOS.

6 Site Impact Assessment

A site traffic impact assessment was undertaken to evaluate internal operations, parking and loading bay requirements as well as the access throat length. Where necessary, suitable mitigation measures are proposed.

6.1 Internal Operations

The internal layout of the planned development should be designed in such a way to promote ease of movement. A minimum 12-metre bellmouth radius is recommended for use at all internal road junctions. The access and internal road layout should be such to allow for the swept path of fire trucks. Should the internal road network not be designed to cater for moving company vehicles, suitable provision should be made outside the development, in the direct vicinity of the access.

6.2 Parking

Parking provision is an important consideration of any development and would ultimately ensure that vehicular traffic is accommodated on-site in its entirety. Insufficient parking provision would have dire consequences on the operational performance of the site and surrounding public roads, as well as on road safety.

The Mossel Bay Municipality Zoning Scheme By-Law (2021) was used to ascertain the applicable parking requirements. For the purpose of determining parking requirements, the Moquini Beach Development is taken to fall within a Normal Area. Refer to **Table 6-1.**

Table 6-1: Parking Requirements

Land Use	Quantity	Minimum Parking Ratio	Parking Requirement (bays)
Apartments	144 units	1 bay per dwelling 0.25 bays/unit for visitors	144 for residents 36 for visitors
Total			**180**

The SDP provides 180 parking bays for residents and 35 for visitors. It is therefore concluded that the development adequately accommodates the parking bay requirements for residents, however, one additional parking bay should be provided for visitors to satisfy visitors parking bay requirement.

6.3 Loading

The Mossel Bay Municipality Zoning Scheme By-Law (2021) was used to ascertain the loading bay requirements to be adhered to. Taking into consideration the planned land uses, no loading bays would be required for the development.

6.4 Throat Length

Adequate throat length provision is essential in ensuring efficient operation of a development access and preventing possible spill-back onto the surrounding public road. The throat length requirements were derived from the Committee of Transport Officials South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual (COTO, TMH 16 Volume 2).

Considering the priority control access onto a Class 4b Residential Collector Street, the minimum requirement for both ingress and egress throat lengths is 15 metres.

Allowing for the provision of a security-controlled access to Moquini Residential Development, a queue length analysis was undertaken to assess the operational performance thereof. The following assumptions were made:

- The ingress would have one lane for residents and one lane for visitors
- The egress would have one lane serving all vehicles
- A service rate of 240 and 60 vehicles per hour for residents and visitor's lanes respectively
- 20% of vehicles arriving/departing during the respective critical Weekday Peak Hour would be visitors

Taking the above into consideration, the queue length analysis results are provided in **Table 6-2**.

Table 6-2: Queue Length Analysis

Intersection	Units	Ingress		Egress
		Residents	Visitors	Residents and Visitors
Number of service lanes	lanes	1	1	1
Service rate	veh/h/lane	240	60	240
Arrival distribution per lane	%	80%	20%	100%
Arrival rate per lane	veh/h/lane	53	13	71
95th percentile queue per lane	veh	1.8	1.8	2.3
95th percentile queue length per lane	metres	12	12	18

Taking the above into consideration, a minimum ingress and egress throat length of 12 and 18 metres, respectively, is required to serve the development. It is, however, recommended that both an ingress and egress throat length of 18 metres be provided to accommodate a truck accessing the development. The access road should be designed in such a way to ensure that both access lanes are accessible with consideration of the anticipated queue lengths.

7 Proposed Capacity Improvements

The following transport improvements are proposed as part of the planned development, to be implemented at the cost of the developer:

2023 Base Year

- New development access along Fishermans Village Drive approximately 130 metres to the west of the intersection of Fishermans Village Drive and Heide Road.
- Provide a Box Junction road marking (RM10) along Fishermans Village Drive at the development access.
- Convert the Heide Road and Flora Road four-way stop intersection to a two-way stop intersection with stop control on the north and south approaches (Heide Road).
- Convert the Heide Road and Nerina Road four-way stop intersection to a two-way stop intersection with stop control on the east and west approaches (Nerina Road).

2028 Forecast Year

- No further road capacity improvements would be required as part of the planned development.

8 Conclusion and Recommendations

SMEC South Africa (Pty) Ltd was appointed by Costa Zervas Projects to conduct a Traffic Impact Assessment for the proposed Moquini Beach Development on Erf 14796, Dana Bay, Western Cape.

The subject site measures approximately 4.6 hectares in extent and will comprise of 144 apartments with a communal clubhouse and pool area.

It is planned for the development to be served by a single access along Fishermans Village Drive ~ 130 metres west of the unsignalised full intersection with Heide Road and ~ 260 metres to the east of the nearest internal road junction. It is our submission that the proposed development access conforms to the WCG access spacing requirements.

It is anticipated that the development would generate 95 new vehicular trips during both the Weekday AM and PM Peak Hours, respectively.

The SDP provides 180 parking bays for residents and 35 for visitors. It is therefore concluded that the development adequately accommodates the parking bay requirements for residents however an additional parking bay should be allocated to visitors to satisfy visitor parking bay requirements.

Taking into consideration the planned land uses, no loading bays would be required for the development.

It is our submission that a minimum ingress and egress throat length of 18 metres be provided in order to accommodate a truck accessing the development. The access road should be designed in such a way to ensure that both access lanes are accessible with consideration of the anticipated queue lengths.

Following our assessment, the following capacity improvements are required as part of the planned development:

2023 Base Year

- New development access along Fishermans Village Drive approximately 130 metres to the west of the intersection of Fishermans Village Drive and Heide Road.
- Provide a Box Junction road marking (RM10) along Fishermans Village Drive at the development access.
- Convert the Heide Road and Flora Road four-way stop intersection to a two-way stop intersection with stop control on the north and south approaches (Heide Road).
- Convert the Heide Road and Nerina Road four-way stop intersection to a two-way stop intersection with stop control on the east and west approaches (Nerina Road).

2028 Forecast Year

- No further road capacity improvements would be required as part of the planned development.

Taking the above into consideration, it is concluded that this development is supported from a traffic engineering perspective, provided that the site-specific requirements are implemented as per the applicable design standards.