



STRUCTURAL & CIVIL ENGINEERING DESIGN CONSULTANTS

PROPOSED NEW RESIDENTIAL 2 DEVELOPMENT ON PORTION 91 OF FARM 304 MATJIESFONTEIN

RESPONSE TO OBJECTIONS RELATING TO CIVIL ENGINEERING PROPOSALS

3 January 2025

Item No	Objection	Poise Consulting Response
1	Traffic	
1.1	Strain on roads capacity	The traffic Impact Study has assessed the peak season peak hour traffic impact of the Development to be insignificant.
2	Water Supply	
2.1	Strain on Water Services capacity - GLS report indicated bulk systems are inadequate to support additional development without significant upgrades.	<p>The GLS report confirms that the Matjiesfontein Reservoir and the reticulation supply line from the Matjiesfontein Reservoir to the site of the proposed development have sufficient capacity to support the development. The supply line feeding the Matjiesfontein Reservoir however requires upgrading and this is being addressed by Bitou, however the timeline can not be determined</p> <p>Notwithstanding the above, Bitou have confirmed that they are able to supply water for the Development. See letter of confirmation attachment to the report.</p>
2.2	<p>Inaccurate Estimates of Water Usage</p> <p>The average daily water consumption per person in South Africa is 237 litres</p>	<p>This objection is baseless and ill informed. The average consumption figure of 237 kilolitres per person per day, which has been quoted in a number of the objections, is based on ill informed interpretation of an AI pop up response to a googled query. The average of 237 litres per day is based on bulk volumes supplied by water authorities and includes extensive municipal leakages, irrigation of parks and sporting facilities and various other usages.</p> <p>The water consumption adopted in the Report is 600 litres per unit per day. This is the figure recommended in the GLS bulk services report. It is also the lower figure of the consumption figures recommended in the CSIR Red Book and the Neighbourhood</p>

		Planning and Design Guidelines, the latter being the default reference of Bitou Water and Sanitation Department. The lower figure is motivated with consideration to the low expected average occupancy and the water harvesting and effluent recycling measures to be adopted.
2.3	ZS2 Consult states that the Keurbooms bulk water supply line is currently at full capacity, the increase due to the development will be 14 % and the supply line will not be able to supply the development with water.	This conclusion by ZS2 is considered flawed. By their own calculation the peak flow demand in the supply pipe will be 7,17 litres per second. This is substantially lower than the flow capacity of the 200mm diameter supply line. The available capacity in this pipe is borne out by the confirmation in the GLS report.
3	Rainwater Harvesting	
3.1	ZS2 Consult states their calculation of maximum rainwater harvesting capacity of 292 kilolires per day per unit, insufficient to accommodate the potable water demand of the development. Cullinan Report Item 35 states that the Civil Engineering report does not quantify the amount of water that could be made available through rainwater harvesting and recycled irrigation, and it is not possible to establish whether such measures will be sufficient to supplement the water requirements for the development.	Refer to the Poise Report Paragraph 4.4. A minimum figure of 170 litres per day per unit is estimated, less than the ZS2 figure quoted. The statement that it is insufficient to accommodate the potable water demand is irrelevant. The Development will not be independent of Bitou water supply and there is no such motivation in the Poise Report
4	Risk of Pollution	
4.1	Risk of pollution and disturbance to the spring during both the construction phase and after the development is operational. The site's permeable soil conditions may not sufficiently prevent surface runoff from carrying construction debris and pollutants into the nearby spring and pond. While detention ponds are planned to contain runoff, they may fail during extreme weather events, increasing the risk of flooding and water contamination.	It is standard required procedure in all responsible construction processes to protect the natural surrounding environment, and in particular in this case, because of the existence of the spring, stringent measures will be required. It is also a requirement that an environmental officer will be appointed to ensure adherence to the necessary protection requirements. It is further noted that, with the exception of the area of the proposed armourflex swale, all construction areas will drain southwards and away from the locality of the spring. All the detention ponds will also be downslope from the area of the spring. It is therefore a physical impossibility that

		any flooding of detention ponds will result in contamination of the spring.
4.2	No proposed groundwater monitoring system during operational phase	Groundwater monitoring will be undertaken.. Refer the Poise Report Paragraph 5.4.2
5	<p>Disruption of Groundwater Recharge: The introduction of impermeable surfaces and changes in the landscape's gradient are likely to disrupt natural groundwater recharge processes.</p>	<p>Refer the Poise Report paragraph 8.4 All roads and driveway will remain permeable. The impermeable roof areas will amount to approximately 25% of the development area. By nature of the stand layout roof areas will not be in a concentrated location but will be distributed around the development area. Roofs will discharge to Rainwater Harvesting tanks from which excess water will discharge on surface between and around the units. The landscape levels will be modified however the gradients will remain extremely flat and the majority of runoff will therefore infiltrate the ground before reaching the ponds. Under heavy rainfall conditions runoff reaching the ponds will be stored in the ponds whilst the infiltration process is in progress. Water infiltration around the houses and from within the ponds will spread laterally by capillary action The impermeable areas will therefore have no negative impact on the groundwater recharge process.</p>
6.	The Sewerage Treatment Plant	
6.1	<p>Sewerage Plant Capacity</p> <p>Underestimation of Sewage Generation and Capacity Limitations. Inaccurate Estimates of Water Usage: The proposed sewage system is designed to handle 30 kL per day, allocating only 125 liters per person for a development of 60 houses with four occupants each. However, the average water usage in South Africa is 237 liters per person per day.</p> <p>Z2 Consult presents a calculation indicating a sewerage discharge of 600 litres unit per day.</p>	<p>The water figure usage of 237 kilolitres per day is irrelevant to both water and sewerage. See item 2.2 above.</p> <p>The Z2 Consult figures are subjective and ignore the expected occupancy profile.</p> <p>See the Poise Report Paragraph 5.2. The figure adopted of 500 litres per unit per day is based on the CSIR Red Book and Neighbourhood Planning and Design Guidelines figures of 150 litres per person per day and provides for an average of 3,3 persons per household. The figure is above the GLS recommended figure of 420 litres per unit per day.</p>
6.2	Such systems require ongoing expert management, which may not be feasible	See the Poise Report Paragraph 5.4.3. A trained maintenance manager will be

	given local skill shortages	appointed.
6.3	<p>Inadequate Emergency Response and Contingency Planning</p> <p>Absence of Emergency Infrastructure: There is no comprehensive emergency plan for sewage overflows. The lack of a designated pump station to remove sewage from the site in case of a spill worsens the situation.. Limited Emergency Storage Capacity: The system's emergency storage can hold sewage for only 48 hours.</p>	<p>See the Poise Report Paragraphs 5.4.3, 5.4.4 and 5.4.6.</p> <p>All required regular maintenance can be done within the 48 hour emergency storage period. Spares will be kept on site for all critical mechanical and electrical components.</p> <p>The plant will be powered by a Solar/Eskom charged battery system with a backup generator for emergency supply in the event of extended Eskom down time.</p> <p>See added provision in the Poise Report Paragraph 5.4.6 :</p> <p>A gravity overflow pipe will be installed to link the anaerobic tank to the Bitou municipal sewerage system located on the opposite side of Keurboomstrand Road MR394. This overflow will become operational in the unlikely event of the overflow of the emergency storage. There is therefore no possibility that breakdown could lead to overflow and pollution</p>
6.4	The sewerage treatment plant has not undergone sufficient research or testing. Not proven to work properly	Bio Sewage Systems have been established for over 20 years and have over 800 plants, of size ranging from 5 to 200m ³ per day, operating successfully in Southern Africa. Dr Hughes himself notes that the development does include an interim solution for wastewater treatment which seems to be appropriate.
6.5	<p>Odours</p> <p>The sewerage treatment plant will smell like the one at the Angling Club</p>	<p>Efficiently designed and operated high quality treatment plants do not give off odours.</p> <p>The comment on the Angling Club odours is based on ignorance.</p> <p>The angling club does not have a sewerage treatment plant and the odours emanate from the adjacent Bitou pump station.</p>
6.6	ZS2 Consult includes a comprehensive list of specification requirements to be met by a Package Sewerage Plant.	This presentation by ZS2 Consult is redundant to the objection. The proposed plant will comply with all necessary specifications to deliver treated effluent to DWAS special limits quality
7	Disposal of Treated Effluent by Irrigation	
7.1	ZS2 Consult presents a calculation based	See the Poise Report Paragraph 5.4.2

	<p>on an assumed available area for irrigation and their assumed daily effluent quantity and concludes that the volume is more than double the average rainfall, calculated over the irrigatable area, and that the volume is too excessive to be disposed of by irrigation.</p>	<p>The stated ZS2 calculation result is incorrect. The annual projected effluent irrigation quantity is 45% of the annual rainfall calculated over the irrigatable area and 22% over the development area.</p> <p>What is however significant is that to dispose of the daily effluent quantity, Irrigation once per week for a period of 15 minutes, of only 52% of the 3.0 hectare irrigatable area will be required. See Poise Report Paragraph 5.4.2.</p>
7.2	<p>Cullinan Report Paragraph 6.2 states: The Wula report has sought to sidestep bulk services constraints through the implementation of a temporary wastewater system without appreciating the implication of those measures in the context of high rainfall conditions.</p> <p>Item 34: No consideration has been given to how effluent will be disposed of during wet periods and suggests irrigation may contribute to flood risks</p>	<p>The wastewater treatment plant will have no implications under high rainfall conditions. The volume of daily effluent is 22.5kl which translates to less than 0.5mm over the site development area and less than 1% of the storage volumes of the attenuation ponds.</p>
8	Stormwater Management and Flooding	
8.1	<p>The site serves as crucial natural floodplain and soakaway</p>	<p>The site levels will be reshaped to drain toward the new ponds, and the surrounding pond catchment crest levels will be designed such that the overall site flood storage volume is not reduced from that of its current natural state. The site will continue to serve as a soakaway.</p>
8.2	<p>ZS2 Consult state that the proposed stormwater management system utilising 3 attenuation ponds is flawed their reasons being that the ponds will obviously be at the low points on the site, and the bottom levels of the ponds will be very close to the high water table, perhaps even below the existing water table level and the high water table will prevent the ponds from draining.</p> <p>ZS2 Consult also present images indicating that the water table on Portion 14/91, across the road from the site, varies</p>	<p>ZS2 Consult make this assumption without examining the engineering drawings or applying the content of the geotechnical report.</p> <p>According to the Geotechnical report 10 testpits were dug. Groundwater was found in Testpits 1 and 5, positioned on the southern lowest side of the site, at depths 1,95m and 2,3m respectively. The other 8 pits were dug to depth varying between 2,3m and 3m without encountering groundwater. The preliminary designs indicate that the bottom level of the ponds will all be in</p>

	between 1,5m and 1,8m below natural ground level and state that the water table level at the low points of the site may be similar	excess of 1,5m above the groundwater level. The Z2Consult comments on their images presented do not define the ground and water table level at the positions of their depth measurements. Without that information they are incomparable with the conditions on the Development site and the comments are meaningless. The lowest areas of Portion 14/91 are up to 500mm lower than the ground level at Testpit 1.
8.3	ZS2 Consult state that the homeowners will have a problem with homeowners insurance as insurance companies will identify the site as a high risk prone to flooding.	The site levels will be designed to ensure that homes are not flooded, the floor levels of which will all be set higher than the level of the Road 394, the existing southern flood containment level.
8.4	ZS2 Consult also present a typical section through the site illustrating the landlocked feature created by Keurboomstrand Road and also indicating a 5m above sea level high watermark.	The section is not relevant in the context of the proposed stormwater management plan. The section does not correctly reflect the lower natural ground levels on the southern side of Road 394. The indication of the 5m MSL line on the section, and the labelling of it as a high water mark is subjective and of no relevance to the current or future stormwater management characteristics.
8.5	The Cullinan Report	
8.5.1	Paragraph 7 states: The significant impacts of flooding on the proposed development and the surrounding properties have not been taken into account.	This is not correct. The Development stormwater management plan mitigates the impact of flood conditions for the Development and ensures that the Development will not negatively impact on surrounding properties under flooding conditions.
8.5.2	The Keurbooms Environs local area spacial plan identifies areas that are most vulnerable to coastal estuarine and fluvial erosion and inundation based on 3 swash runup contours including the 4.5m mamsl swash contour which is relevant to the property.	This is considered misinterpretation. The 3 swash lines are 2.5m for sheltered or rocky coastlines, 4,5m for exposed or sandy coastlines and 6,5m for headland and pocket bay beaches. The development is 2,8km from 100m high water mark, and outside of the 1 in 100 year backwater floodline. The floodplain of the estuary downstream from the Development is extensively barriered by building structures and dense vegetation. It is clear that in reality no swash whatsoever can be applicable.

8.5.3	<p>Paragraph 16 states: The 1 in 100 year floodline generally tracks the Keurboomstrand Road meaning that it will be unlikely to act as a barrier to the flooding of the property</p>	<p>This statement is considered flawed. The exact floodline level is not indicated on the floodline plan, however the position at which the floodline is plotted and comparison to surveyed levels on the southern side of Keurboomstrand Road indicate the floodline to be approximately 500mm lower than the crest of the road.</p>
8.5.4	<p>Paragraph 17 states Keurbooms Road was impassable and the Dunes Resort was 1.5m underwater. From here water spilled over both sides of Keurbooms Road.</p>	<p>This statement is considered to be misrepresentative. It refers to “Keurbooms Road”, not Keurboomstrand Road, and implies that water spilled over the road at the Dunes Resort. The level of the floodwater at the Dunes Resort was at least a meter lower than Keurboomstrand Road level. We have consulted Keurboomstrand residents who witnessed the 2007 floods, who have asserted that Keurboomstrand Road 394 was not affected by flooding at the Dunes Resort, nor in the vicinity of the Development and was not impassable. Keurboomsriver Road, more than 2 kilometers to the west, was flooded and impassable.</p>
8.5.5	<p>Paragraph 18 states: The very real risks for the property and the surrounding areas are borne out by the photographs (annexed as F) which show high groundwater levels on an adjacent property as well as flooding of properties in close proximity to the proposed development site.</p>	<p>The photographs presented indicating flooding are not in close proximity to the site. The Dunes Resort is 1,1 kilometers west of the site, Silverstream and Matjiesfontein Estates are 2,9 kilometers west, on the banks of the Keurbooms River and Twin Rivers is further west between the Bitou and Keurbooms River. Reports received from local residents indicate that at the time of the 2007 floods, the estuary flooding did not back up to the area of the Development.</p>
8.5.6	<p>Paragraph 21: Addresses the Stormwater Management Report which provides for the 3 attenuation ponds and states that in the event of overflow the runoff will be to the Keurboomstrand road reserve. No provision has been made for management along Keurboomstrand Road.</p>	<p>The 3 attenuation ponds will be designed to ensure no overtopping under 100 year RI storm conditions. In the highly likely event of such conditions being exceeded the overflow will reach the Keurboomstrand Road Reserve. There will however not be any impact more severe than under the current natural state. There is no warrant for Keurboomstrand Road Reserve management provisions.</p>
8.5.7	22 to 24 refer to the Hughes report.	See Items 8.6.1 to 8.6.13 for Hughes report

		Comments below
8.6	Hughes Report	
8.6.1	<p>The stormwater management report concludes that the proposed stormwater attenuation ponds might be sufficient to contain the 24 hr runoff based on a 24 hr rainfall of 77mm.</p> <p>Flooding events in the region are typically the result of rainfall of a longer duration than 24 hours and a 24 hour period is unlikely to provide an accurate value for storage required.</p>	<p>Dr Hughes' calculation of the 24 hour rainfall is incorrect.</p> <p>He incorrectly derived it from the figure from the Poise Report after application of the Coefficient of Discharge. The 50 year 24 hour rainfall depth is actually 140 mm.</p> <p>The pond storage values have been tested for storms of all durations up to 72 hours, and are sufficient.</p>
8.6.2	The effects of antecedent wetness conditions have been ignored	This is not correct. The stormwater runoff coefficient used in the calculations includes an adjustment factor which varies for storm return intervals and accounts for higher runoff under higher RI conditions.
8.6.3	The report assumes a high rate of drainage from the ponds and the capacity of the soil below the ponds is likely to be low due to the high water table.	The pond design infiltration rate has been reduced. See the Poise Report Paragraph 8.5. Percolation occurs through gravity and lateral capillary action which increases on approach to the water table.
8.6.4	The report appears to ignore the runoff from the forested slope to the north.	The runoff from the forested slope has been accounted for. See the Poise Report Paragraphs 8.2 and 8.3.
8.6.5	The geotechnical report noted that the groundwater was found in testpits at an average depth of 2 meters	See Item 8.2 above
8.6.6	The potential benefits of the proposed stormwater retention ponds for reducing the flooding impacts of surface water runoff have been quite substantially overestimated.	<p>This is considered an unsubstantiated, subjective opinion, formulated without design review.</p> <p>The pond designs compensate for the lesser infiltration area due to impermeable surfaces for the 1 in 100 year storm interval</p> <p>The pond catchment basins will ensure that overall storage volume is not less than the current natural state.</p>
8.6.7	No mention is made on the risk of flooding from the Keurboom River estuary.	At the time of the 2007 event, which arguably exceeded a 1 in 100 year flood, the estuary backwater did not reach the Development site. The Keurbooms River Estuary is not considered a flood risk.
8.6.8	With regard to the 1 in 100 year floodline Dr Hughes presents Figure 2 which indicates	See items 8.4 and 8.5.3 above

	that at Portion 91 the road does not appear to be above the surrounding ground levels and it is therefore possible that the extent of the floodline could continue to the north of the road.	
8.6.9	Dr Hughes cites the occasion of the 2007 floods, stating that the Road 394 was reported to be impassable and assumes that the existing properties to the south of the road were also flooded.	See item 8.5.4 above
8.6.10	Dr Hughes also comments that there seems little doubt that the site does play a role in providing some flood storage and is highly likely to be flooded during heavy and prolonged rainfall events.	The design of the stormwater management system for the Development will take cognisance of and ensure that the current flood storage role of the site is not compromised.
8.6.11	Dr Hughes reached the conclusion that the development plans and proposals generally fail to give due consideration to potential future flooding risks associated with the development. His evaluation of the available information is that the risks of flooding on the development site itself have been quite seriously underestimated. These include risks of flooding from the Keurbooms River estuary and risks of localised flooding.	These conclusions have been reached, clearly based on issues addressed in items 8.6.1 to 8.6.10, 8.6.12 and 8.6.13. Refer to our responses to these items
8.6.12	The extent to which these flood risks are likely to extend to adjacent properties is more difficult to be sure about but there seems little doubt that the development will remove some flood retention storage and could therefore impact on existing developments to the south of the road.	The Development will not remove any flood retention storage. See Item 8.6.6 above
8.6.13	Dr Hughes states his assumption that under existing conditions any floodwaters that inundate the property will gradually decrease through either evaporation or drainage through the soils and states that there is potential for compacted foundations to reduce the potential for subsurface drainage and prolong the period of inundation.	The stormwater management proposals mitigate reduced infiltration capacity relating to foundations.