INTELLIGENT
HOUSING

Water & Drainage Analysis Report

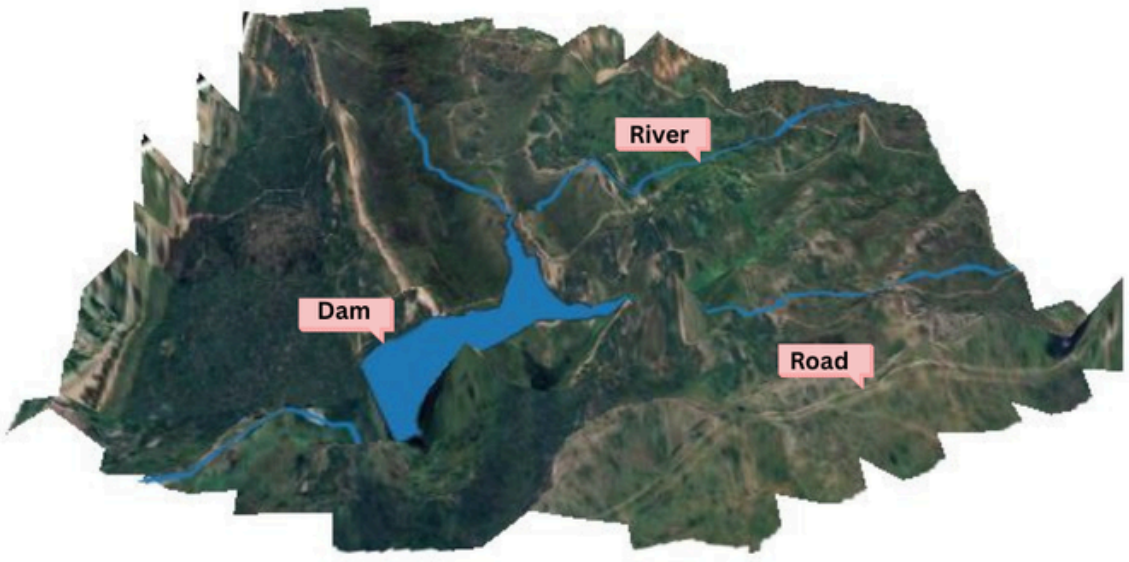
An Analysis of Watershed Dynamics, Groundwater Potential, and Surface Drainage Patterns of Haka Game Park for Water Security and Development Planning

www.housing.co.zw

Executive Summary

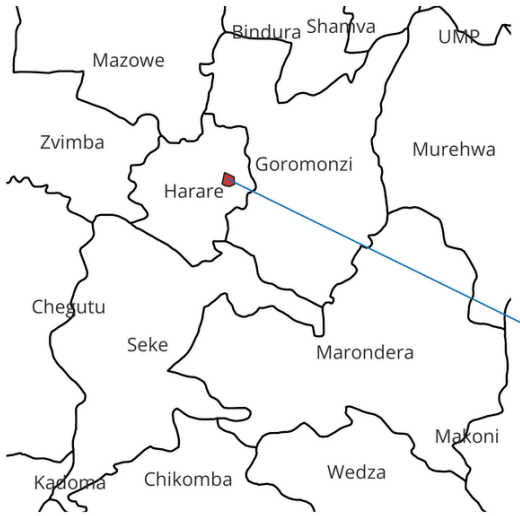
This report analyzes the water resources of Haka Game Park. The property features a wetland, one dam, and two rivers coursing through the eastern section. Watershed delineation shows elevation ranges from 1,518 to 1,570 meters, with streams draining from the eastern ridge toward the river corridor. Flow accumulation identifies primary drainage channels requiring 50m development buffers. Topographic Wetness Index confirms the wetland area as persistently wet, suitable for conservation rather than construction. Underground water potential mapping identifies two high suitability sites for borehole drilling. Based on these findings, the property has reliable surface water for wildlife and livestock, with additional groundwater options available for domestic or irrigation use.

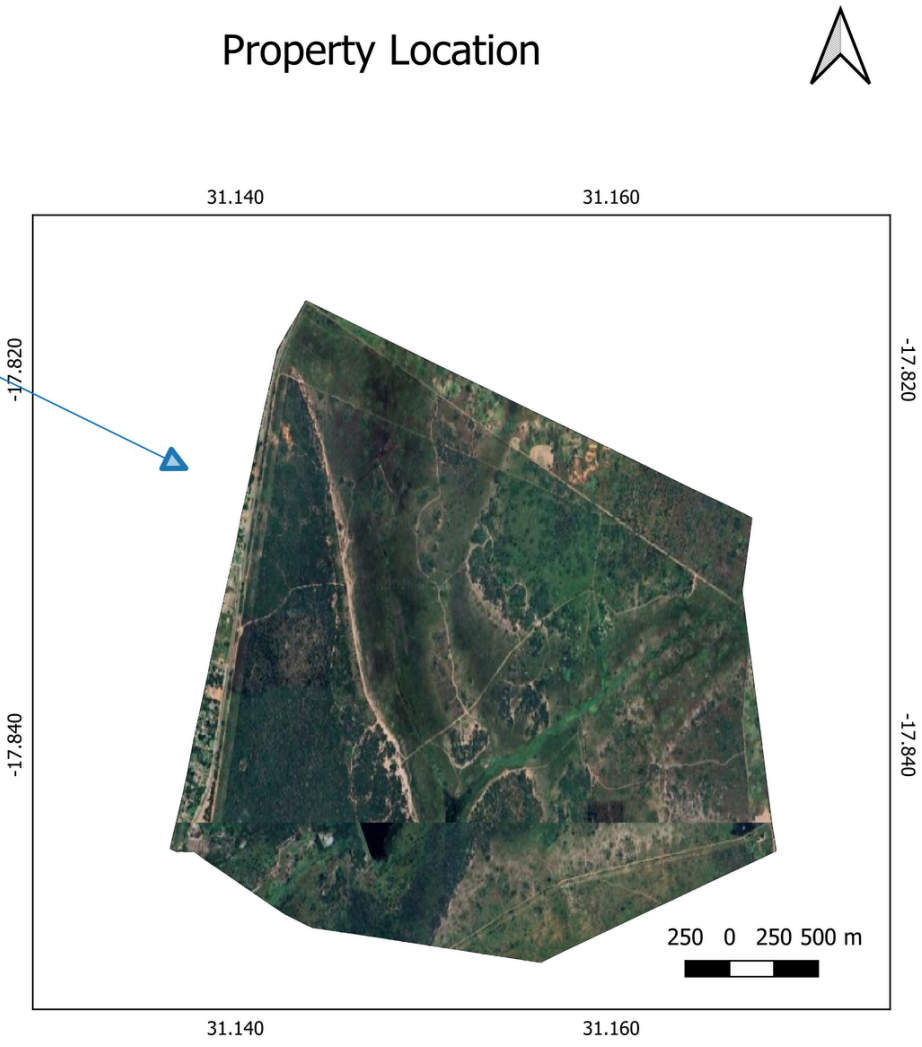
3D MAP



Location

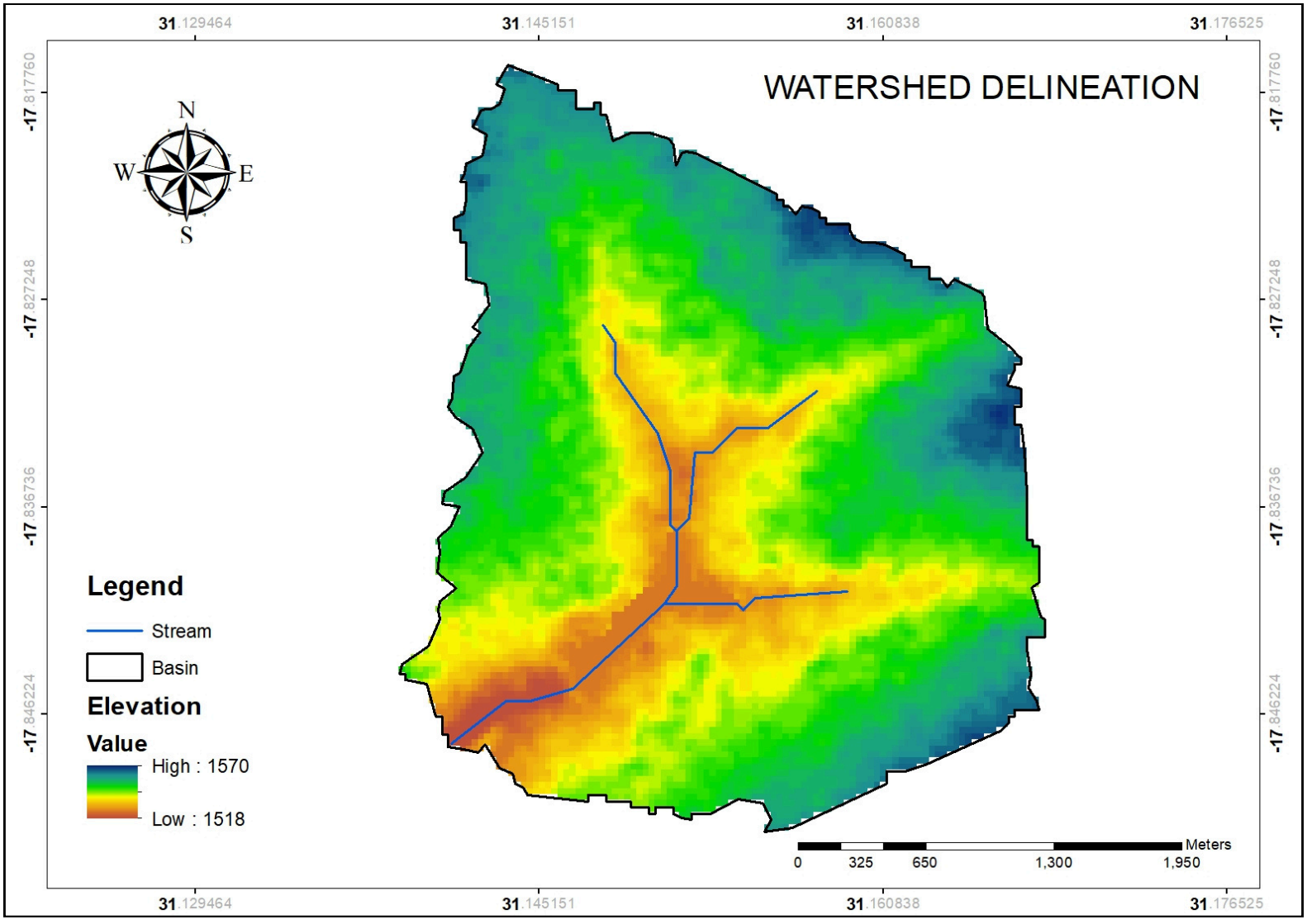
The property is located in Masasa, within the Harare metropolitan area, approximately 10 kilometers southeast of the central business district. It lies close to Goromonzi District but remains within Harare's administrative boundary. The site is accessible via main tarred roads, making it easily reachable in under 15 minutes from the city center. The surrounding landscape is a mix of peri urban settlement and undeveloped bushland, offering a balance of seclusion and accessibility. Nearby suburbs provide essential services while the property itself retains a quiet, undisturbed character suitable for development or conservation.





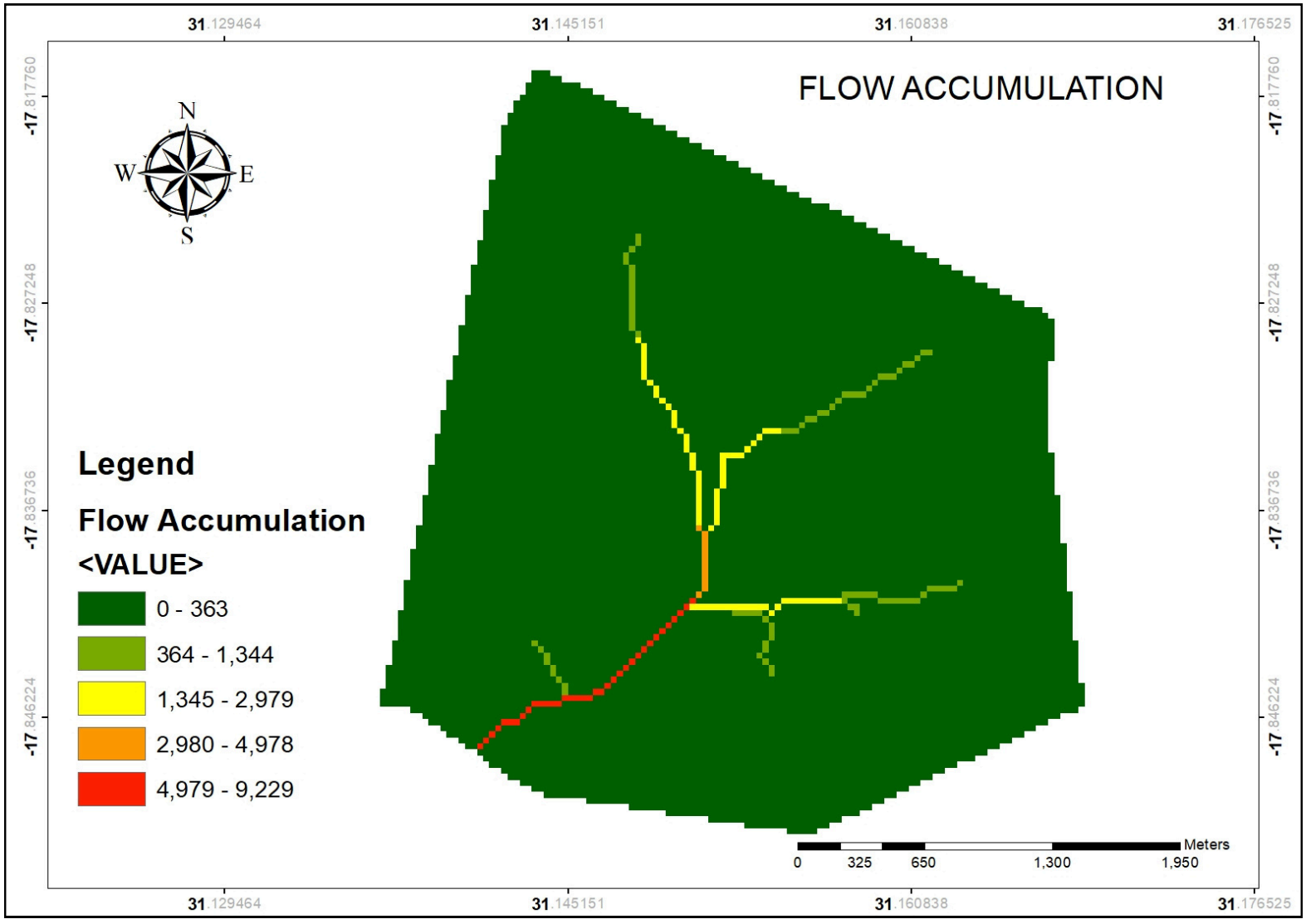
Watershed Delineation

The highest elevation is 1,570 meters along the eastern ridge, while the lowest point is 1,518 meters at the outlet where water converges and leaves the property. This total relief of 52 meters creates sufficient gradient for efficient drainage without excessive erosion. Stream channels originate along the eastern side, flowing westward across the property before exiting at the southwestern corner. The watershed boundary follows the ridgeline along the eastern and northern perimeters. This hydrological independence gives the buyer full control over water management, as all surface water originates from rainfall falling directly within the property boundaries. The stream network consists of a main channel fed by several tributaries, with drainage density highest in the western section where slopes are gentler and water accumulates. The outlet point at 1,518 meters represents the single location where all surface water exits, making it a strategic site for potential water harvesting or erosion control measures. The eastern ridge, being the highest and driest area, is ideal for infrastructure placement away from drainage channels, while the lower western zones are better suited for wetland conservation and wildlife watering points.



Flow Accumulation

The lowest accumulation class (0-363 cells), shown in dark green, represents ridge tops and upper slopes where water originates. These areas have minimal concentrated flow, making them the safest locations for building, roads, and other infrastructure. The next classes (364-1,344 and 1,345-2,979 cells), shown in yellow and orange, indicate moderate flow accumulation along mid slopes and drainage swales. These zones require careful planning. While not primary drainage channels, they may experience intermittent flow during heavy rains and should not be used for critical infrastructure without proper drainage design. The highest accumulation classes (2,980-4,978 and 4,979-9,229 cells), shown in red and dark red, represent the primary drainage channels and stream courses. These are the valley bottoms where water consistently concentrates, forming the river and its major tributaries. Development within these high accumulation zones is strongly discouraged due to flood risk, erosion potential, and regulatory restrictions. The flow accumulation pattern confirms that the eastern ridge (lowest accumulation) is ideal for lodge placement, while the western lowlands (highest accumulation) should be reserved for conservation and wildlife watering points. Road crossings over high accumulation channels will require culverts or bridges sized to accommodate peak flows.

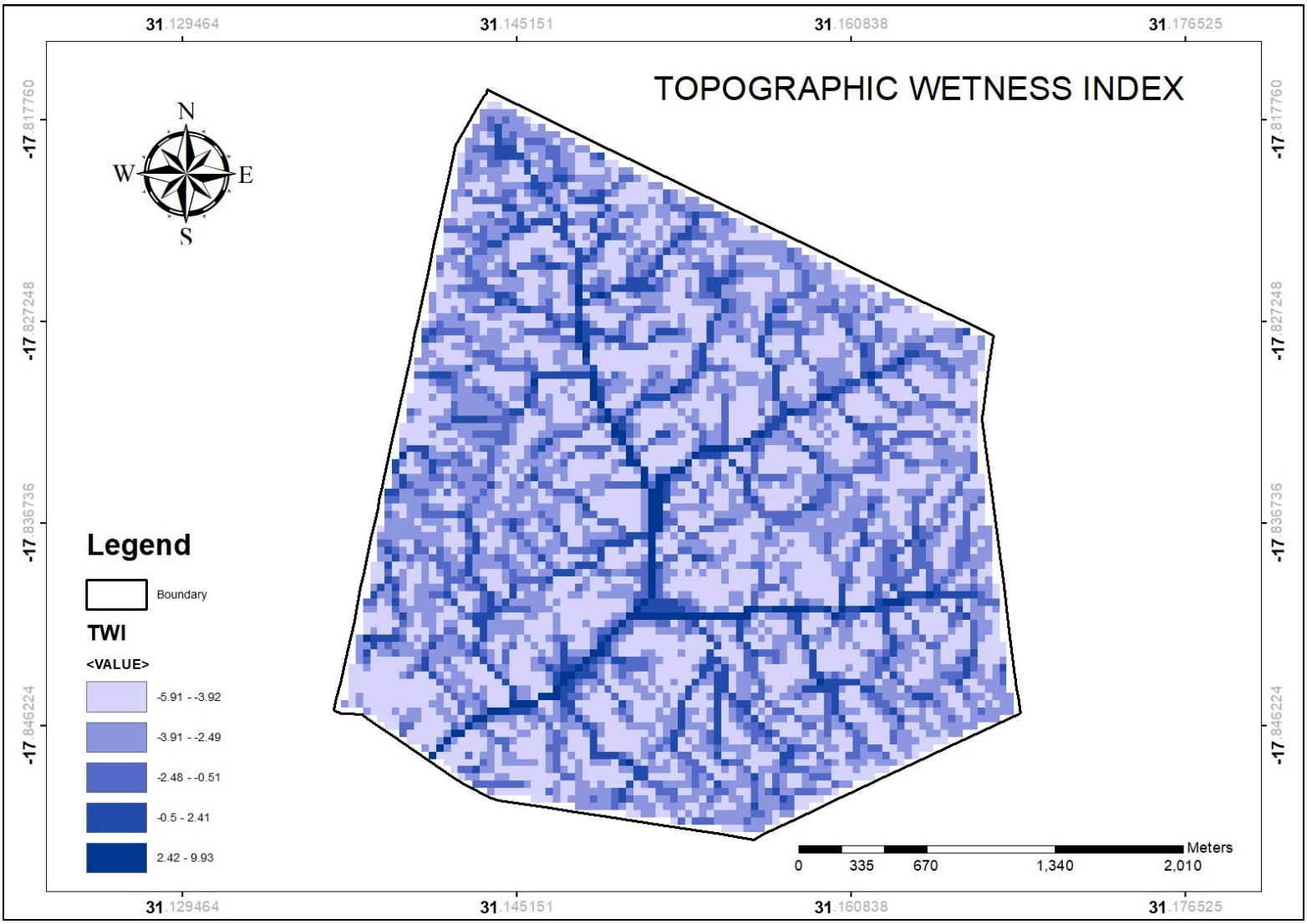


TWI

The dark blue regions, representing the highest Topographic Wetness Index values (up to 9.93), highlight the hydro-active zones where surface and sub-surface water naturally converge. These areas are characterized by high saturation and are the most likely to support wetland vegetation or seasonal seeps. From a construction perspective, these are definitive avoidance zones for permanent infrastructure. Building in high TWI areas often leads to rising damp, shifting foundations, and the failure of subterranean utilities. However, these zones are the crown jewels of a safari property; they are the natural locations for waterholes and lush grazing meadows that draw high concentrations of game, making them the ideal focus for guest viewing activities from a safe, non-intrusive distance.

The intermediate blue tones (ranging from -2.48 to 2.41) represent the transition zones where moisture is present but less concentrated. These areas are excellent for the soft infrastructure of the park, such as well drained road networks or elevated timber viewing decks. Because these zones are less prone to extreme saturation than the deep blue channels. They offer a balance of accessibility and proximity to the park's water features. These area may require slight elevation or specialized permeable paving to ensure year round access during the rainy season without disrupting the natural infiltration of water into the soil.

The light-lilac areas indicating the lowest TWI values (-5.91 to -3.92), represent the dry zones, typically the ridge tops and steeper upper slopes identified in the elevation and contour maps. These are the most stable and buildable portions of the property. With minimal risk of soil saturation or ponding, these dry zones are the optimal sites for primary lodge structures, kitchen facilities, and guest suites. By situating the main camp in these low-wetness areas, the developer ensures the longevity of the buildings and a more comfortable, insect-free environment for guests. Ultimately, the TWI map provides the final layer of safety for the master plan, ensuring that every structure is placed on firm, dry ground while the most vibrant, water-rich ecological zones remain untouched for the wildlife to flourish.



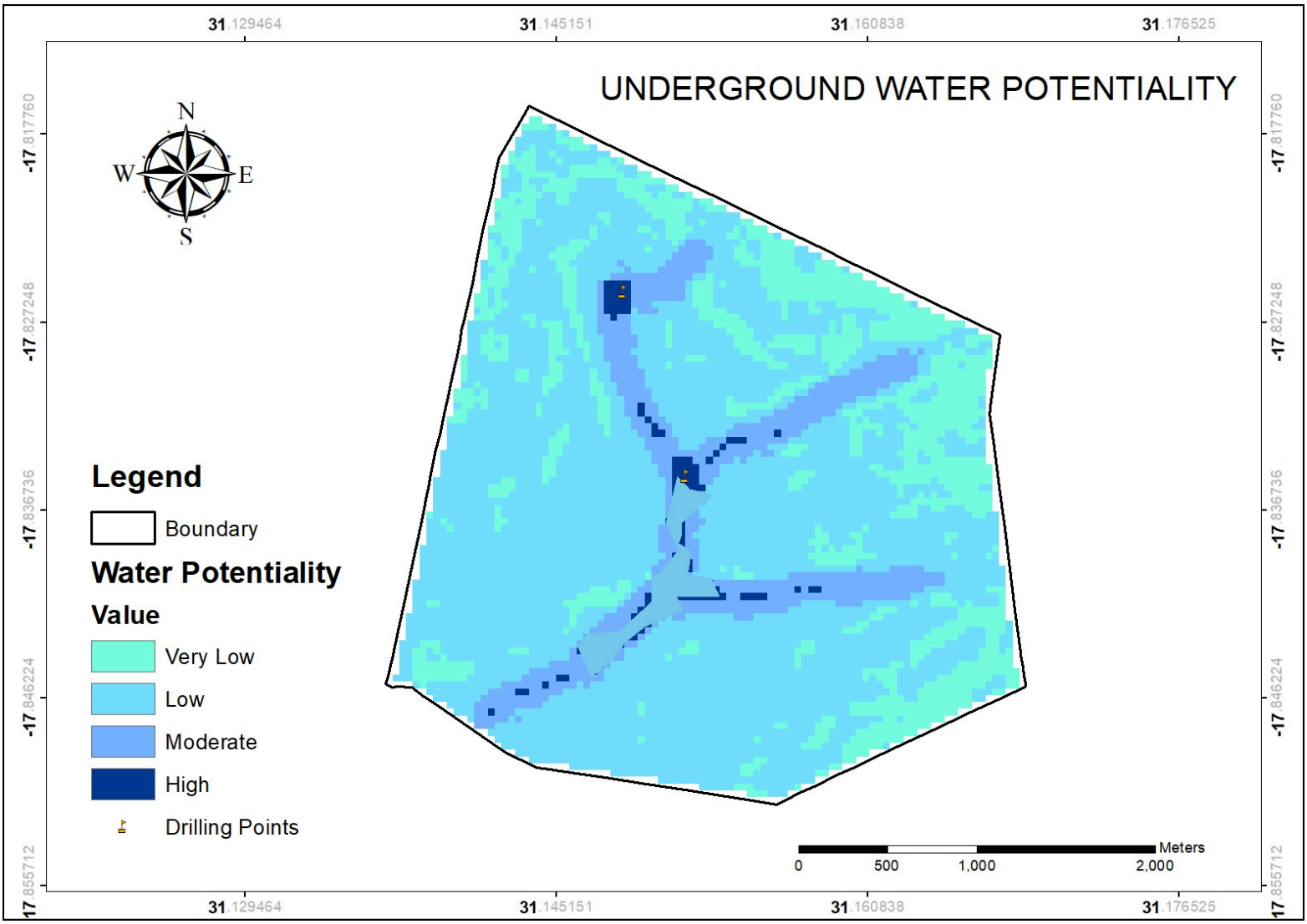
Underground Water Potentiality

The high potentiality zones, indicated by the dark blue clusters, represent the primary subterranean reservoirs where water accumulation is most concentrated. These areas coincide with the deep drainage basins identified in previous topographical layers, suggesting that surface runoff and sub-surface infiltration have created reliable aquifers. The survey has strategically identified two specific Drilling Points within these high potential zones. These sites should be prioritized for the park's primary water supply, as they offer the highest probability of a significant yield, ensuring that lodges can maintain luxury amenities, such as swimming pools and green landscapes even during prolonged dry seasons.

The moderate potentiality zones (medium blue) radiate outward from the primary aquifers and follow the central valley floor.

These areas represent secondary targets for water extraction and are ideal for lower yield requirements, such as supplying remote satellite camps or wildlife drinking troughs. While these zones may not support the high volume extraction required for a main lodge, they provide a necessary backup and help distribute water access across the property, reducing the ecological pressure on a single extraction point and allowing for more diverse wildlife distribution throughout the park.

Conversely, the very low and low potentiality zones (teal and light blue) cover the vast majority of the peripheral higher ground. These areas correspond to the ridge tops and steeper slopes previously identified as the most stable for construction. While these dry zones are optimal for building foundations, they are statistically unlikely to yield productive boreholes. For the developer, this creates a clear spatial strategy: heavy infrastructure and luxury guest suites should be positioned on the stable low potential heights for safety and views, while the high potential valley floors should be strictly reserved for water extraction and ecological preservation. This synergy ensures that the park's primary life support systems are protected from the physical footprint of development.



Confident Real Estate Decisions

Powered by Geospatial Data

Drainage & Water Resources Analysis Report of Haka Game Park

INTELLIGENT HOUSING

PROPERLY PREPARED BY:

INTELLIGENT HOUSING

Zimbabwe's first intelligent property platform, combining detailed listings with verified geospatial insights, offering flood risk maps, water potential analysis, 3D terrain models, and proximity reports.

FOR MORE INFORMATION

+263719655402

www.housing.co.zw

9a William Gale Close, Malborough