

MAP LEGEND:

Flood Hazard Zones:

- Areas prone to riverbank erosion
- Non flood prone areas
- Occasionally to rarely flooded areas
- Regularly to frequently flooded areas
- Areas affected by coastal floods and/or storm surges

Symbols:

- river
- contour line
- road

EXPLANATIONS:

Flood hazard susceptibility zones were derived based on the geomorphological analysis of landforms and the fluvial system. Information on flood occurrences, flood depths, duration of inundation as well as topographic information supported the geomorphologically-based flood hazard mapping.

Regularly to Frequently Flooded Areas:
 Areas that are frequently flooded. Mere heavy rains of 1 to 2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 1 to 3 meters or more in flood waters for a few days to a few weeks.

Occasionally to Rarely Flooded Areas:
 Areas that become inundated during moderate to strong typhoons. Flood depths vary from a few centimeters to 1 meter. Floods last from a few hours to a few days.

Non-Flood Prone Areas:
 Areas with no reported flood occurrences except along low lying areas immediately adjoining rivers or creeks.

Areas Prone to Riverbank Erosion:
 Areas 0 to 50 meters from river banks of active river

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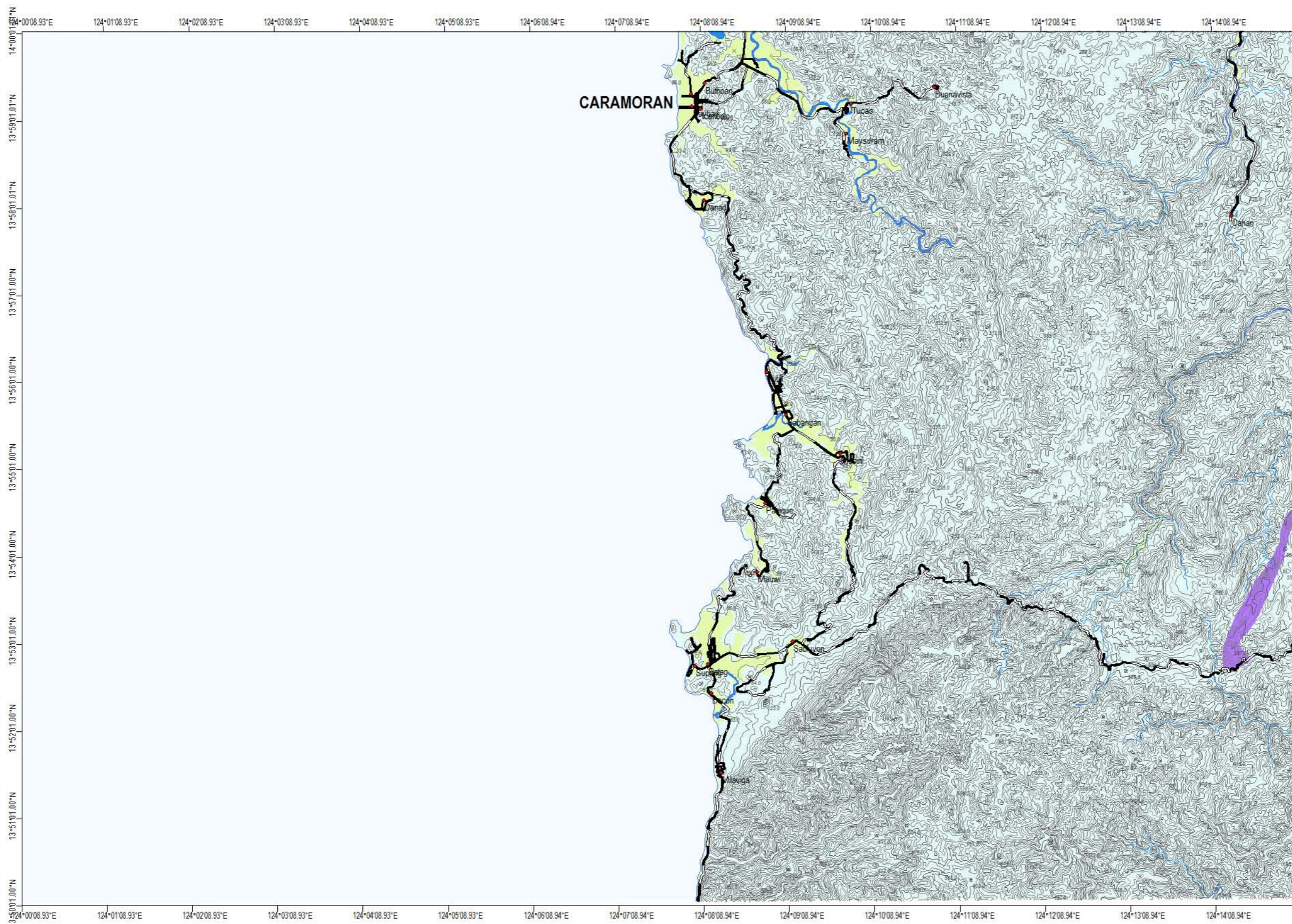
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MAP LEGEND:

Ground Subsidence and Ground Settlement Susceptibility Zones:

- Areas susceptible to ground subsidence
- Areas susceptible to ground settlement
- Areas not susceptible to ground settlement/subsidence

Symbols:

- river
- contour line
- road

EXPLANATIONS:

Susceptibility map for ground subsidence due to karst or solution processes was primarily derived from the lithologic map of the study area. Field observations on ground subsidence observed on concrete roads and damaged houses supported the mapping. Areas of possible ground settlement were delineated through the analysis of the geomorphological lay of the study area, the sub-surface soils and the ground water levels.

Areas Susceptible to Ground Subsidence:
Areas that are prone to ground cavitation, sinkhole formation and ground subsidence in areas underlain by limestone and calcareous siltstones and shales.

Areas Susceptible to Ground Settlement:
Areas where marine fluvialite sands, silts and clays coupled with shallow ground water table are silts of possible ground settlement. Ground settlement may be reduced through appropriate foundation design. Buildings having 3 storeys or more should be tested for settlement and/or consolidation. Buildings having 5 storeys or more should undergo detailed geotechnical studies.

Areas Not Susceptible to Ground Settlement or Ground Subsidence:
Areas where the possibility of ground settlement or ground

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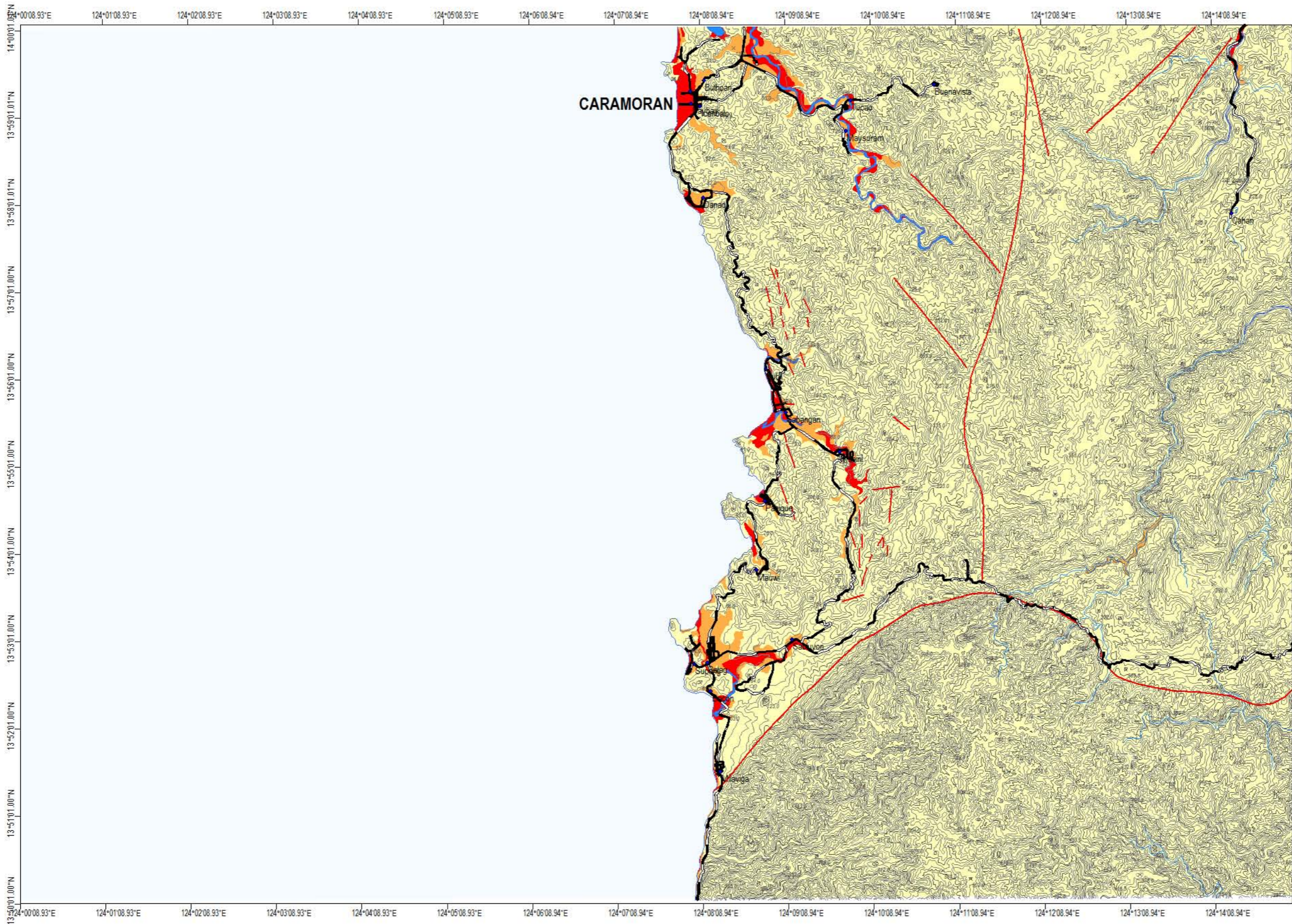
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MAP LEGEND:

Liquefaction Potential Zones:

- Areas where liquefaction is likely
- Areas where liquefaction is possible
- Areas where liquefaction is not likely

Symbols:

- river
- road
- fault
- contour line

EXPLANATIONS:

There are no reported liquefaction occurrence in the study area based on several interviews. However, zones of different liquefaction potential were derived based on the geomorphological lay of the study area following criteria made by Iwasaki and Yasuda.

Areas where liquefaction is likely to occur include the riverbeds, mangrove swamps, beach, abandoned over channels and meanders, channel bars and river terraces. These areas are unsuitable for community or urban settlement.

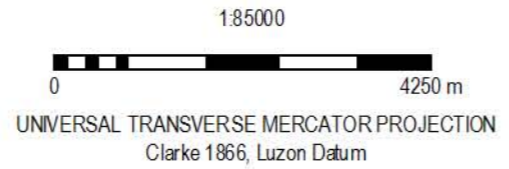
Areas Where Liquefaction is Possible:
The likelihood of liquefaction occurrence is less for these areas.

Areas Where Liquefaction is not Likely:
Areas where liquefaction is unlikely to occur. Most parts of the Caramoran Quadrangle Map sheet is not prone to liquefaction because of the presence of underlying bedrock.

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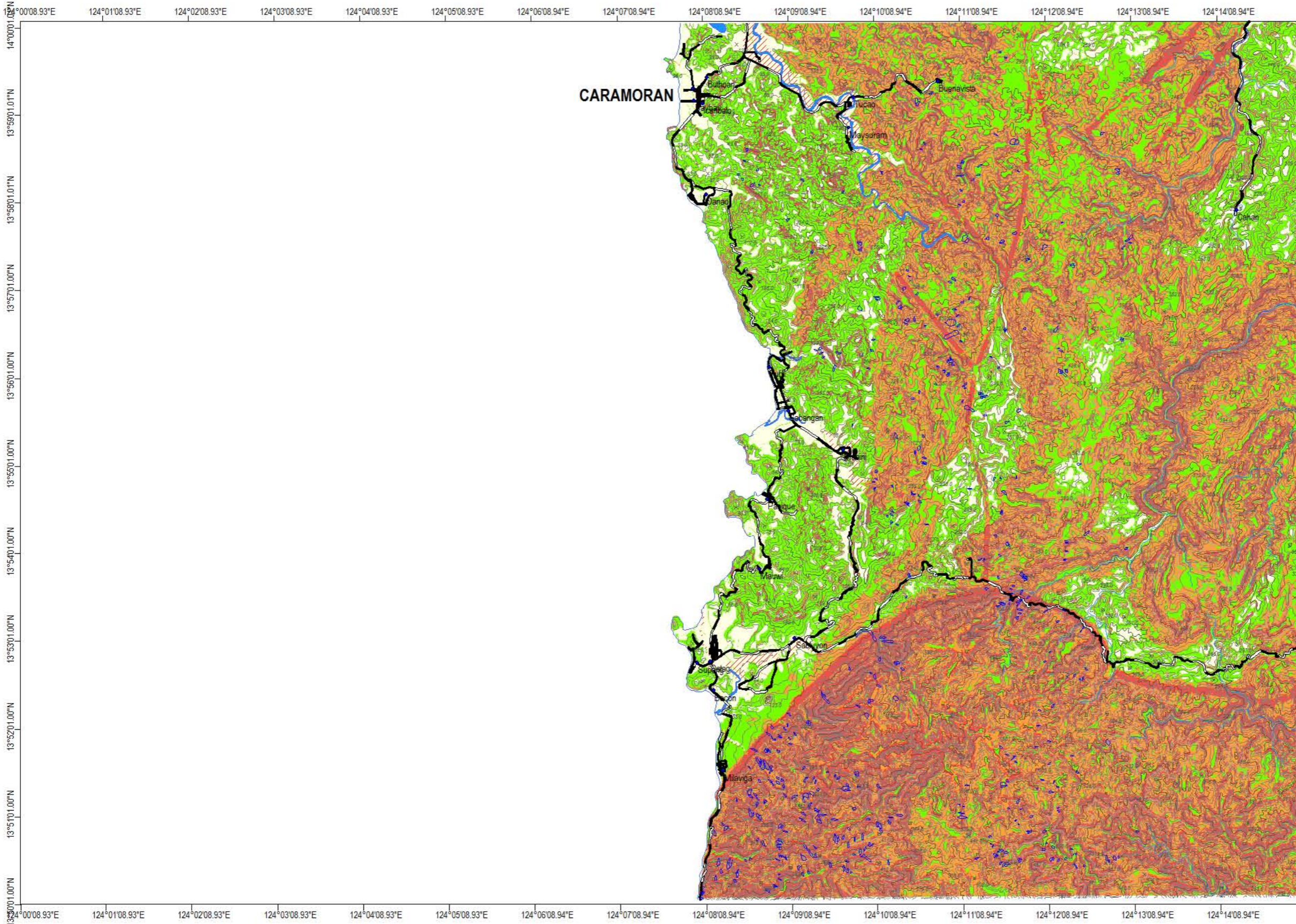
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LANDSLIDE SUSCEPTIBILITY MAP OF CARAMORAN QUADRANGLE



MAP LEGEND:

Landslide Susceptibility Zones:

- Absent
- Low Susceptibility to Absent
- Moderate Susceptibility
- High Susceptibility
- Debris flow path

Symbols:

- river
- road
- fault
- contour line
- landslide

EXPLANATIONS:

Landslide hazard susceptibility zones were derived through qualitative map combination using lithology, geomorphology, slope gradient, proximity to roadcuts and fault distance. GIS was used in the map combination and subjective weights were assigned to each unit in the parameter map.

Areas with High Susceptibility to Landslides:
Areas with high probability of occurrence of mass movements particularly rock and debris slides, slumps and debris flows. The very steep V-shaped river valleys and areas traversed by major faults are rated high susceptibility areas and are unsuitable for housing development and human settlement.

Areas with Moderate Susceptibility to Landslides:
Areas having moderate likelihood of occurrence of landslides and are recommended for more detailed engineering geological and geohazard assessment prior to housing development. Most of the highly dissected low hills and slopes underlain by Payo Formation siltstones and shales are rated moderately susceptible to landslides.

Areas with Absent or Low Susceptibility to Landslides:

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UNIVERSAL TRANSVERSE MERCATOR PROJECTION
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