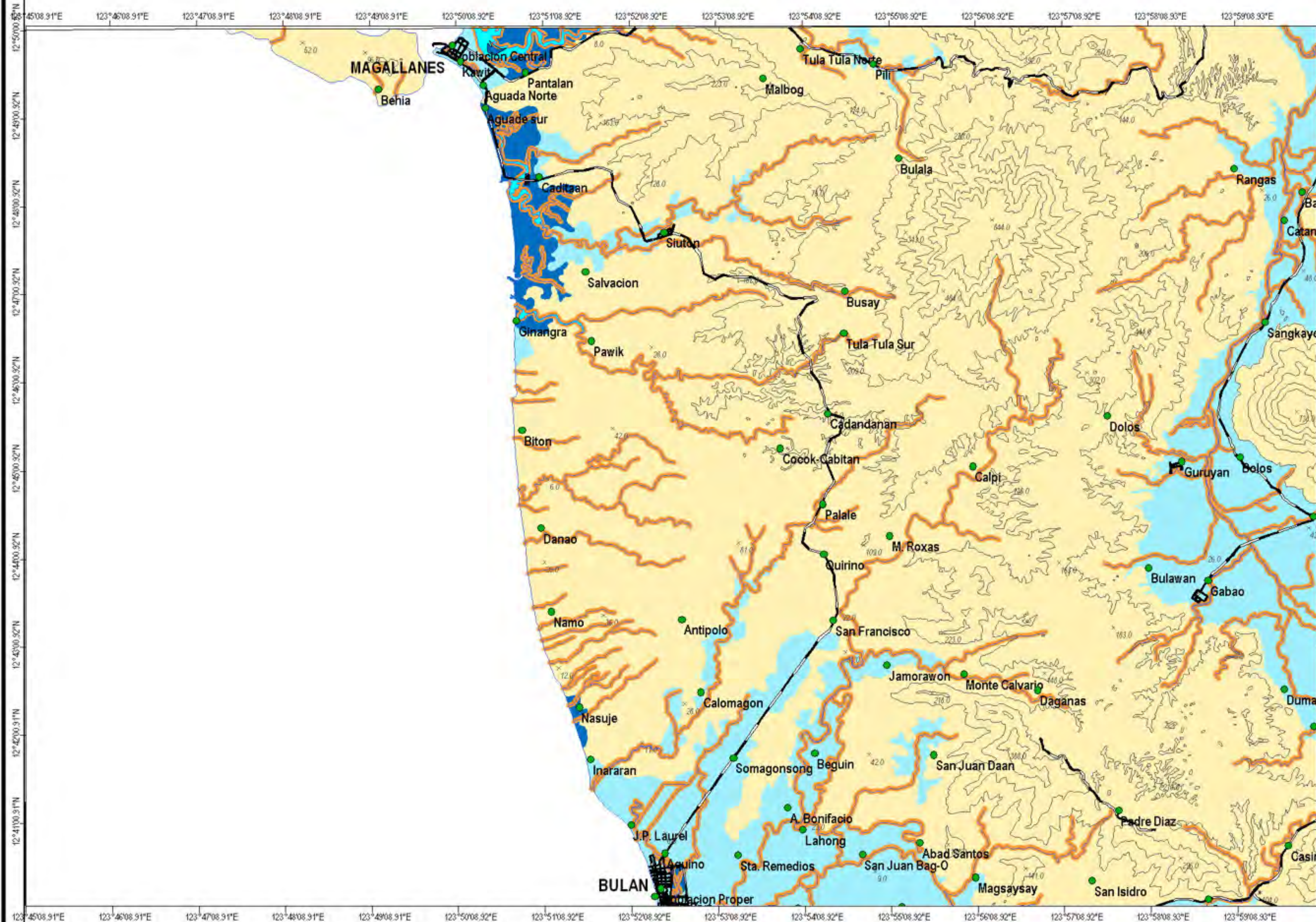


FLOOD HAZARD MAP OF BULAN QUADRANGLE



MAP LEGEND: Flood Hazard Zones:

- regularly to frequently flooded areas
- occasionally to rarely flooded areas
- non flood prone areas
- areas prone to riverbank erosion
- river
- road
- contour

EXPLANATION:

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 0.5 to 2.0 m. in flood waters for a few days to a few weeks. Development of urban settlements in these areas is not recommended.

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

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

Areas Prone to Riverbank Erosion:
Areas 0 to 50 m. from river banks that are prone to scouring and erosion.

Field data collection by: M.R.M.Rint
Geomorphological interpretation by: M.R.M.Rint
Digital cartographic processing by: R.L. Mapalad
GIS processing by: M.R.M.Rint
Checked by: A.E. Dayao
Approved by: R.A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos



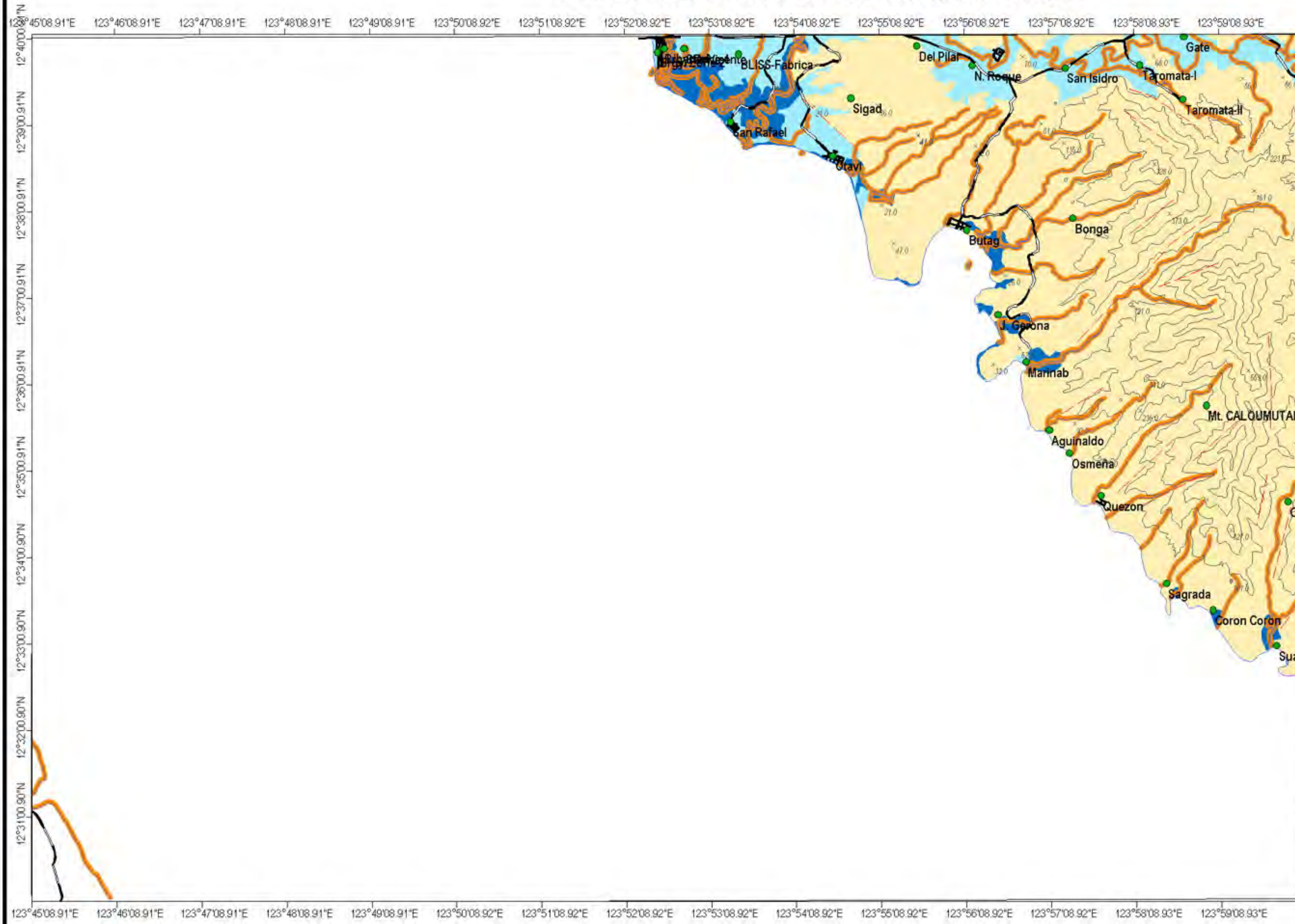
Published by:
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU-RO5
Ranis, Legazpi City
2007

0 4250

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon Datum



FLOOD HAZARD MAP OF BUTAG QUADRANGLE



MAP LEGEND:

Flood Hazard Zones:

- Regularly to frequently flooded areas
- Occasionally to rarely flooded areas
- Non flood prone areas
- Areas prone to bank erosion

- river
- road
- contour

EXPLANATION:

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 0.5 to 2.0 m. in flood waters for a few days to a few weeks. Development of urban settlements in these areas is not recommended.

Occasionally to Rarely Flooded Areas:

Areas that become inundated during moderate to strong typhoons. Flood depths vary from a few centimeters to 1 m. Floods last from a few hours to a few weeks.

Non Flood Prone Areas:

Areas with no reported flood occurrences except along low lying areas adjoining rivers and creeks.

Areas Prone to Riverbank Erosion:

Areas 0 to 50 m. from river banks that are prone to scouring and erosion.

Field data collection by: M.R.M. Rint
 Geomorphological interpretation by: M.R.M. Rint
 Digital cartographic processing by: E. Lagueria & B. Mallo
 GIS processing by: M.R.M. Rint
 Checked by: A.E. Dayao
 Approved by: R.A. Juan

Other sources of information:
 1:50,000 NAMRIA Topographic Map
 1951 B/W Aerial Photos



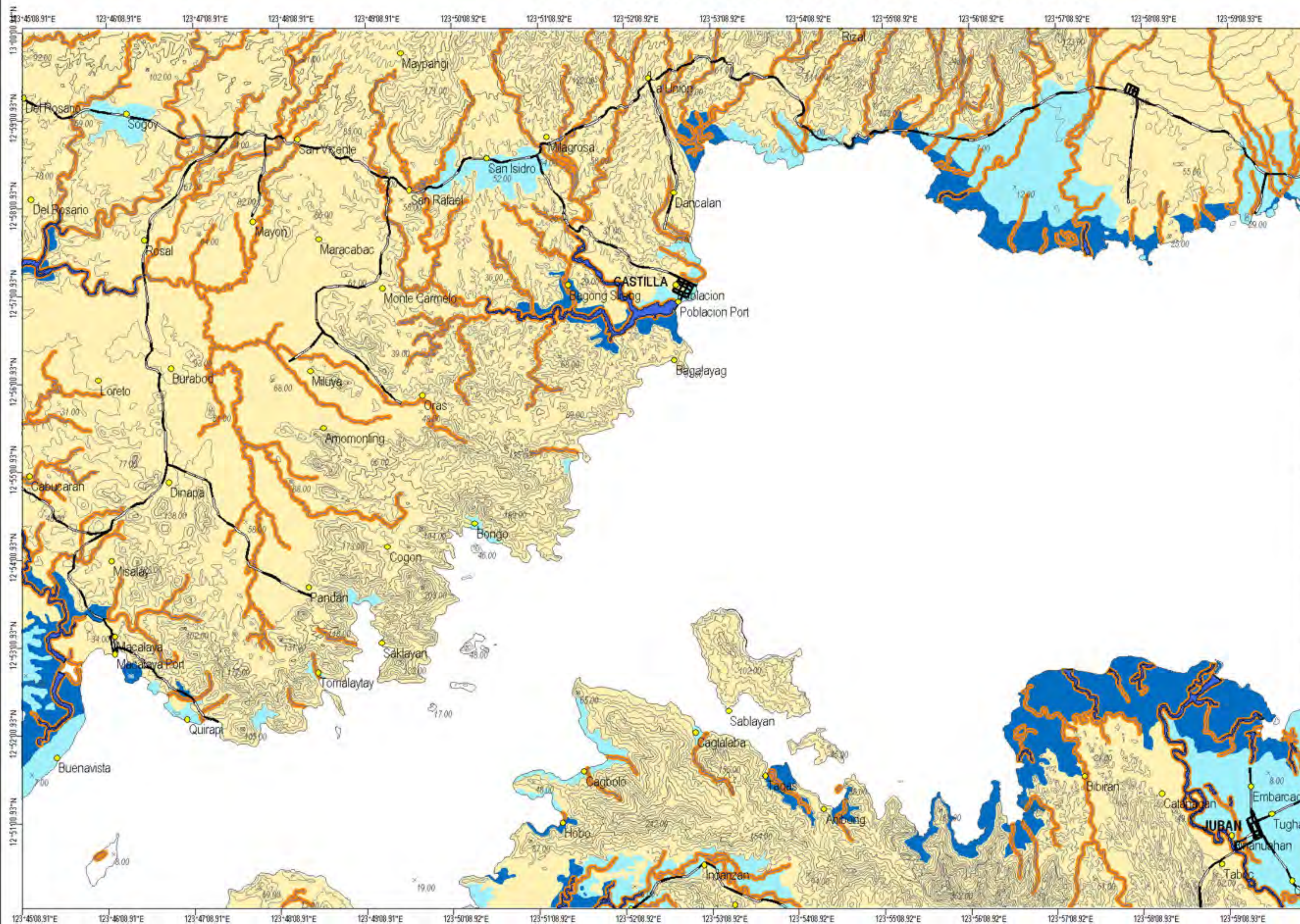
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 MINES AND GEOSCIENCES BUREAU-RO5
 Rawis, Legazpi City
 2007

0 4250 m

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 Clarke 1866, Luzon Datum



FLOOD HAZARD MAP OF CASTILLA QUADRANGLE



MAP LEGEND:

Hazard Susceptibility Zones:

- Regularly to frequently flooded areas
- Occasionally to rarely flooded areas
- Non flood prone areas
- Areas prone to bank erosion

- contour
- fault
- river
- road

EXPLANATIONS:

Flood hazard susceptibility zones were derived based on the geomorphological analysis of landforms and 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 0.5 to 2.0 m. in flood waters for a few days to a few weeks. Development of urban settlements in these areas is not recommended.

Seasonally to Rarely Flooded areas:
Areas that become inundated during moderate to strong typhoons. Flood depths vary from a few centimeters to 1.0 m. Floods last from few hours to a few days.

Non Flood Prone Areas:
Areas with no reported flood occurrences.

Field data collection by: M.R.M. Rint
Geomorphological interpretation by: M.R.M. Rint
Digital cartographic processing by: E. Laguerta & B. Malto
GIS processing by: M.R.M. Rint
Checked by: A.E. Dayao
Approved by: R.A. Juan

Other sources of information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial Photos



Published by:
Department of Environment & Natural Resources
MINES & GEOSCIENCES BUREAU RO-5
Ranis, Legazpi City
2006

0 4250 m

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon datum



FLOOD HAZARD MAP OF GUBAT QUADRANGLE



MAP LEGEND: Flood Hazard Zones:

- Non Flood Prone Areas
- Occasionally to Rarely Flooded Areas
- Regularly to Frequently Flooded Areas
- Areas Prone to Riverbank Erosion

— river
— 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 0.5 to 2.0 m. in flood waters for a few days to a few weeks. Development of urban settlements in these areas is not recommended.

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

Non Flood Prone Areas:
Areas with no reported flood occurrences

Areas Prone to Riverbank Erosion:
Areas 0 to 50 m. from river banks that are prone to scouring and erosion.

Field data collection by: A. E. Dayao
Geomorphological interpretation by: A.E. Dayao
Digital cartographic processing by: A.E. Dayao
GIS processing by: A.E. Dayao
Checked by: R.A. Juan
Approved by: R.A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos
1988 B/W Aerial photos
1993 B/W Aerial photos

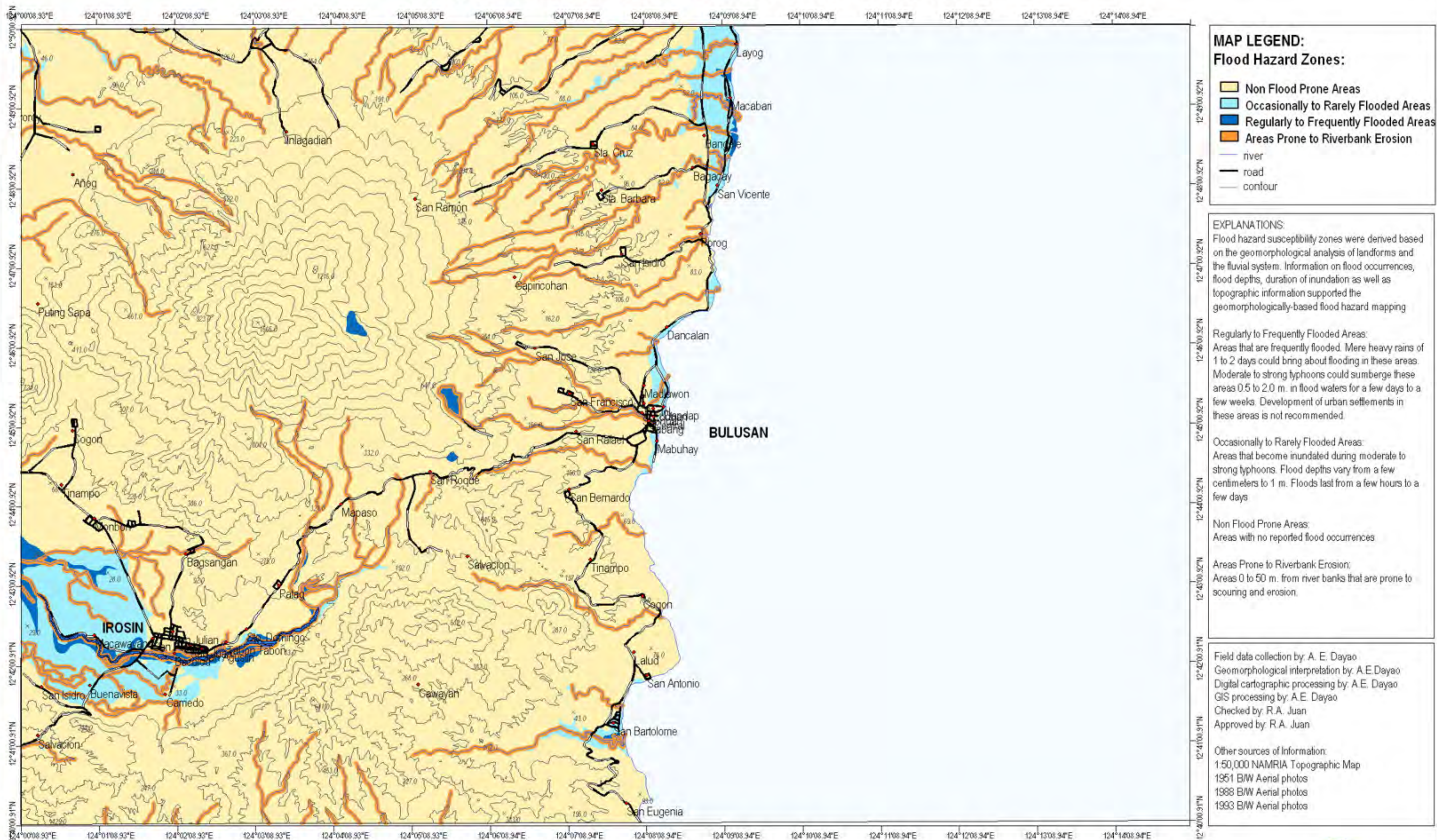


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Daraga, Albay
2007

1 : 85000
0 4250 m
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Clarke 1866, Luzon Datum



FLOOD HAZARD MAP OF IROSIN QUADRANGLE



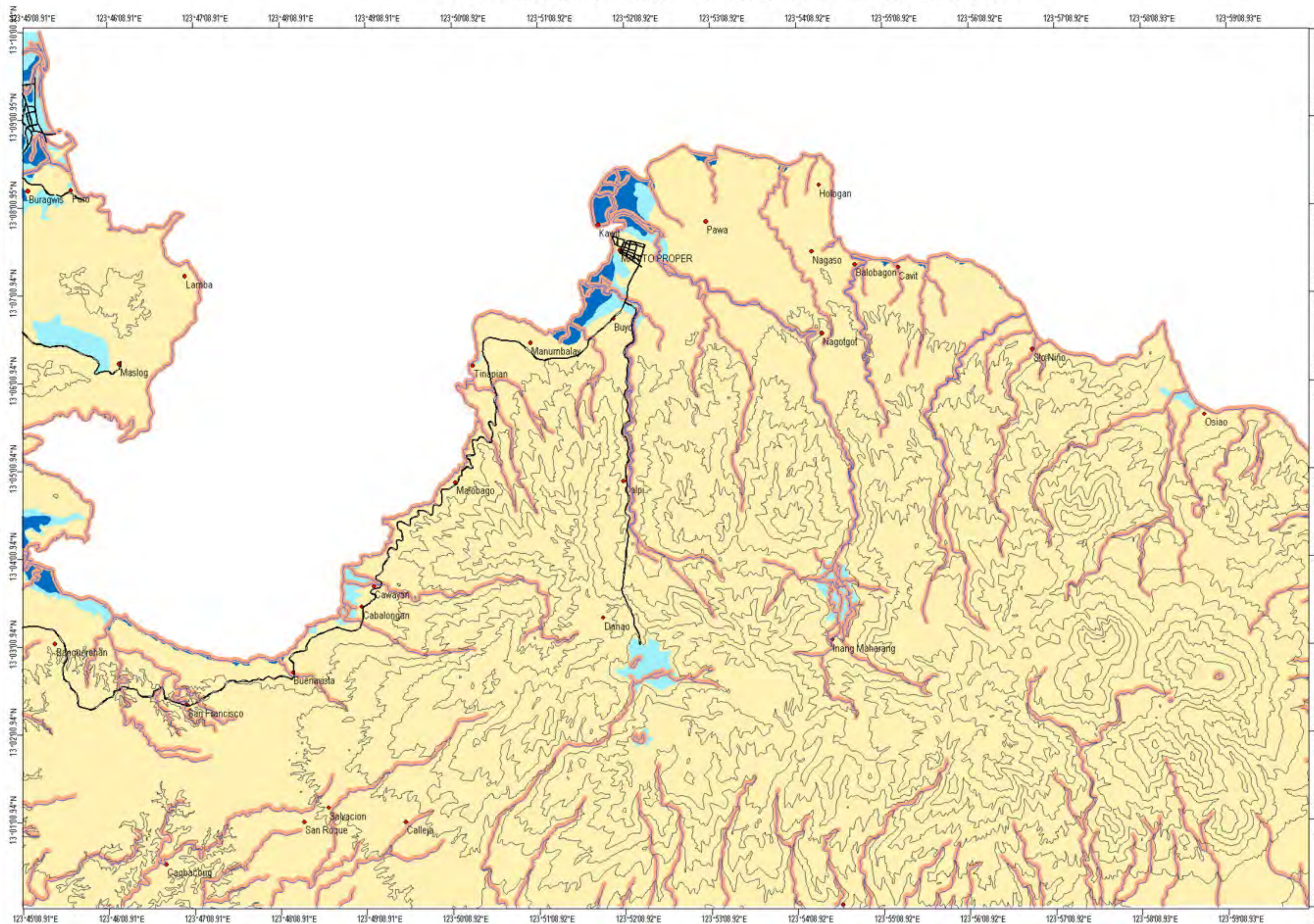
Published by:
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU-RO5
Daraga, Albay
2008

1 : 85000
0 4250 m

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon Datum



FLOOD HAZARD MAP OF MANITO QUADRANGLE



MAP LEGEND:

Flood Hazard Zones:

- Non Flood Prone Areas
- Occasionally to Rarely Flooded Areas
- Regularly to Frequently Flooded Areas
- Areas prone to bank erosion

Symbols:

- road
- river

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 geomorphology-based mapping.

REGULARLY TO FREQUENTLY FLOODED AREAS:
Areas that are frequently flooded. Moderate to heavy rains of 1 to 2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 0.5 to 2.0 m. in flood waters for a few days to a few weeks. This type of floods occurs on swamps, backswamps and fluvial basins and on abandoned river channels. Development of residential and urban settlements in these areas is not recommended.

OCCASIONALLY TO RARELY FLOODED AREAS:
Areas that become inundated during moderate to strong typhoons with high intensity-long duration rains. Flood depths vary from from a few centimeters to 1 m. Floods

Field data collection by: M.R.M. Rint
Geomorphological Interpretation by: M.R.M. Rint
GIS processing by: M.R.M. Rint
Digital cartographic processing by: M.R.M. Rint & B. Malto
Checked by: A.E. Dayao
Approved by: R.A. Juan

Other Sources of Information:
1:50 000 scale NAMRIA Topographic Map



Published by:
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MINES & GEOSCIENCES BUREAU
Regional Office No. 5
2007

0 4250 m

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Clark 1866, Luzon Datum



FLOOD HAZARD MAP OF MATNOG QUADRANGLE



LEGEND:

Map Legend:

- Regularly to frequently flooded areas
- Occasionally to rarely flooded areas
- Non flood prone areas
- Areas prone to riverbank erosion
- contour
- river
- 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. Moderate to heavy rains of 1 to 2 days could bring about flooding in these areas 0.5 to 2.0 m. in flood waters for a few days to a few weeks. This type of floods occurs on the backswamps and fluvial basins and on abandoned river channels. Floodwaters come from either Sipocot and Ragay rivers. Development of residential and urban settlements in these areas is not recommended.

Occasionally to Rarely Flooded Areas

Areas that become inundated during moderate to strong typhoons with high intensity-long duration rains. Flood depths vary from a few centimeters to 1 m. Floods lasts from a few hours to a few days.

Non Flood Prone Areas

Areas with no known or reported flood occurrences.

Field data collection by: M.R.M.Rint
 Geomorphological interpretation by: M.R.M.Rint
 Digital cartographic processing by: R.L. Mapala
 GIS processing by: M.R.M.Rint
 Checked by: A.E. Dayao
 Approved by: R.A. Juan

Other sources of Information:
 1:50,000 NAMRIA Topographic Map
 1951 B/W Aerial photos

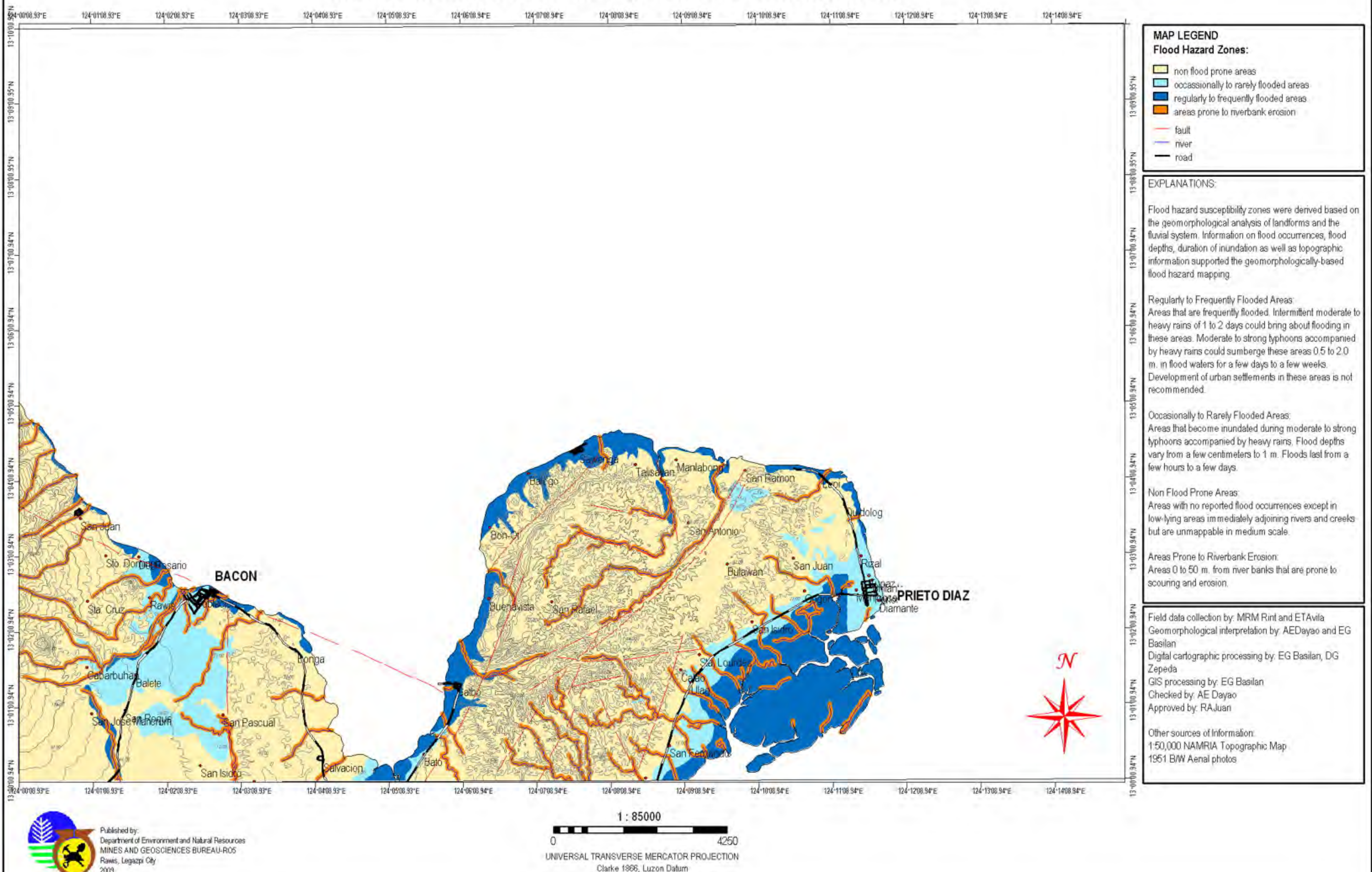


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 Resources
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 Rawis, Legazpi City

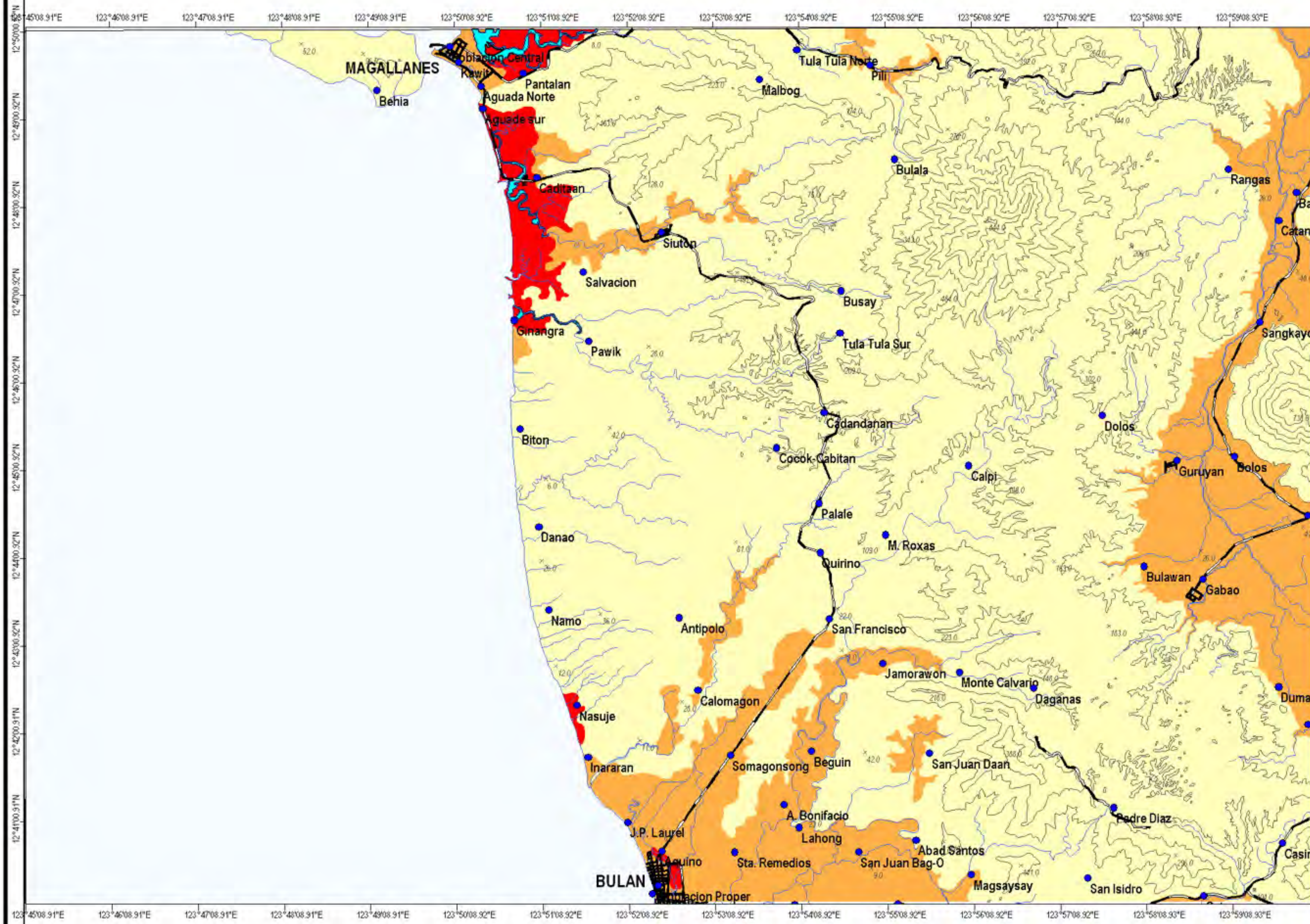
0 4250 m
 Universal Transverse Mercator Projection
 Clark 1886, Luzon Datum



FLOOD HAZARD MAP OF PRIETO DIAZ QUADRANGLE



LIQUEFACTION POTENTIAL MAP OF BULAN QUADRANGLE



MAP LEGEND: Liquefaction Potential Zones:

- Areas where liquefaction is likely
- Areas where liquefaction is possible
- Areas where liquefaction is not likely
- river
- road
- contour

EXPLANATION:

There are no reported liquefaction occurrences in the mapped area based on several field interviews. However, zones of different liquefaction potential were derived based on the geomorphological analysis of the study area following previous studies made by Iwasaki and Yasuda.

Areas where Liquefaction is Likely:
Areas where liquefaction is likely include river beds, beaches, and active tidal flats. These areas are unsuitable for urban development. Multi-storey buildings should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas where Liquefaction is Possible:
Alluvial plains are areas where liquefaction is possible. Buildings having 5 storeys or more should be required a full geotechnical study.

Areas where Liquefaction is not Likely:
Areas where liquefaction occurrence is unlikely to happen.

Field data collection by: M.R.M.Rint
Geomorphological interpretation by: M.R.M.Rint
Digital cartographic processing by: R.L.Mapelad
GIS processing by: M.R.M.Rint
Checked by: A.E.Dayao
Approved by: R.A.Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos



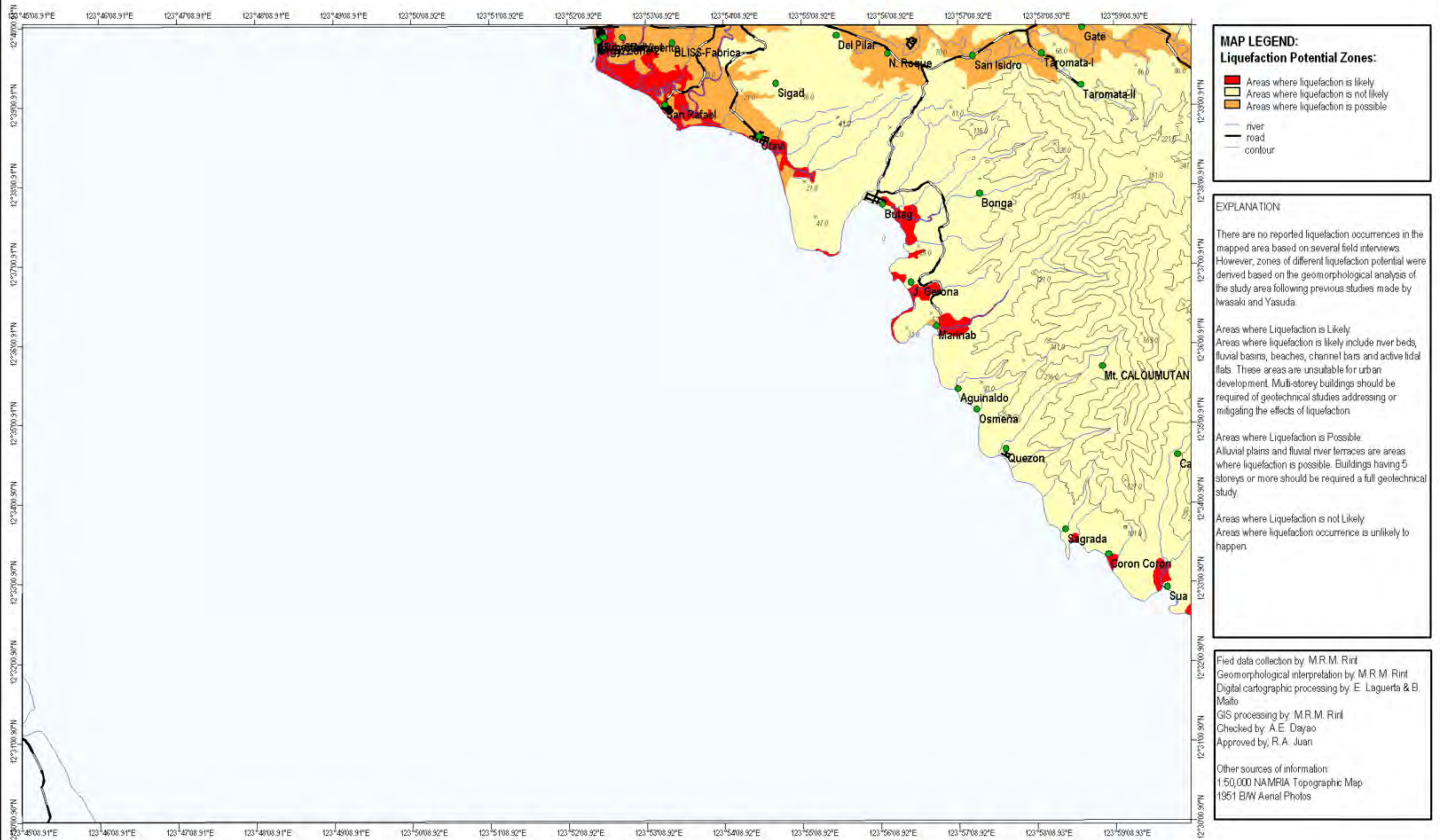
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MINES AND GEOSCIENCES BUREAU-RO5
Ramos, Legazpi City
2007

0 4250

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Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF BUTAG QUADRANGLE



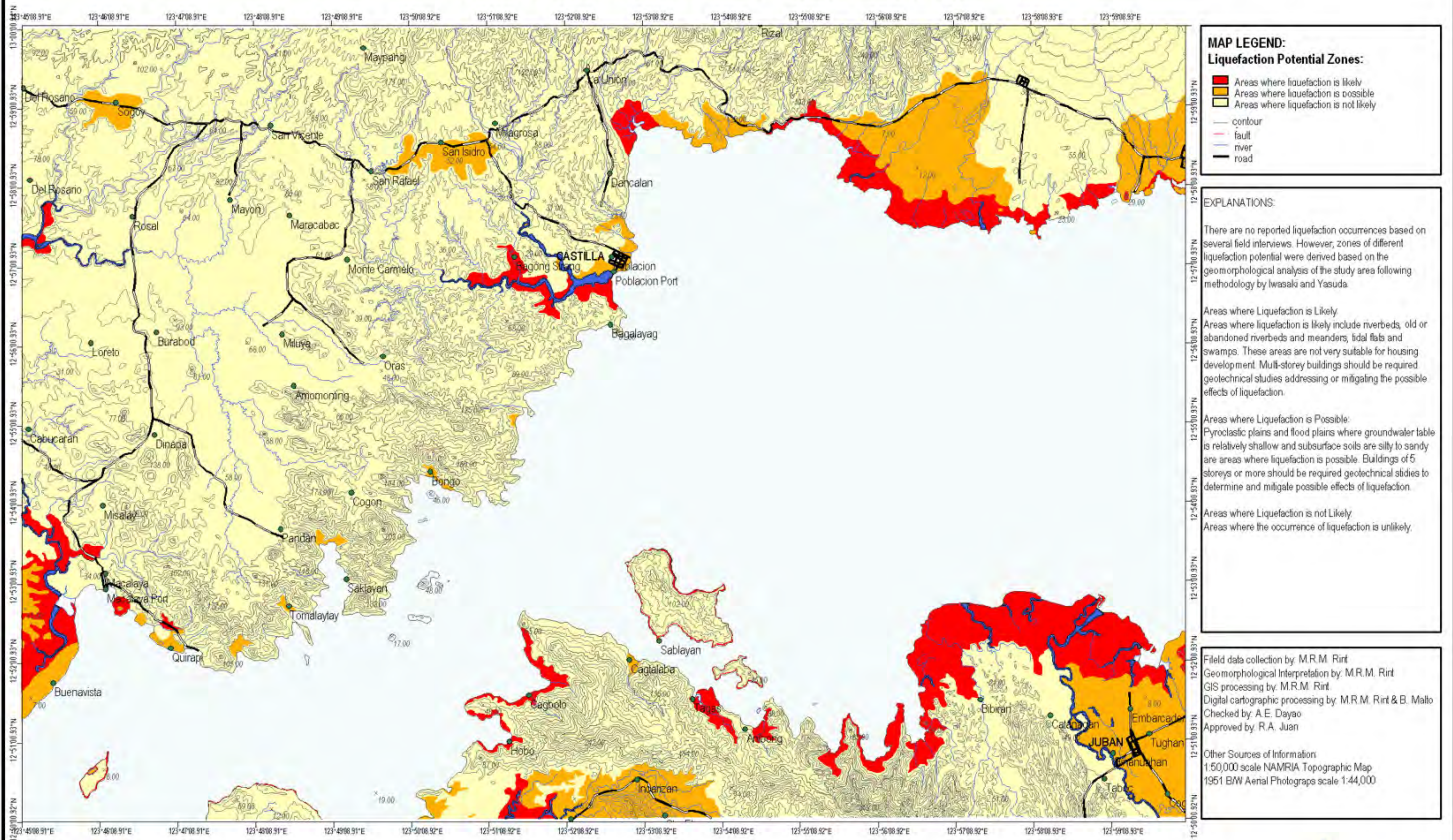
Published by
 Department of Environment and Natural Resources
 MINES AND GEOSCIENCES BUREAU-RO5
 Rawis, Legazpi City
 2007

0 4250 m

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 Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF CASTILLA QUADRANGLE

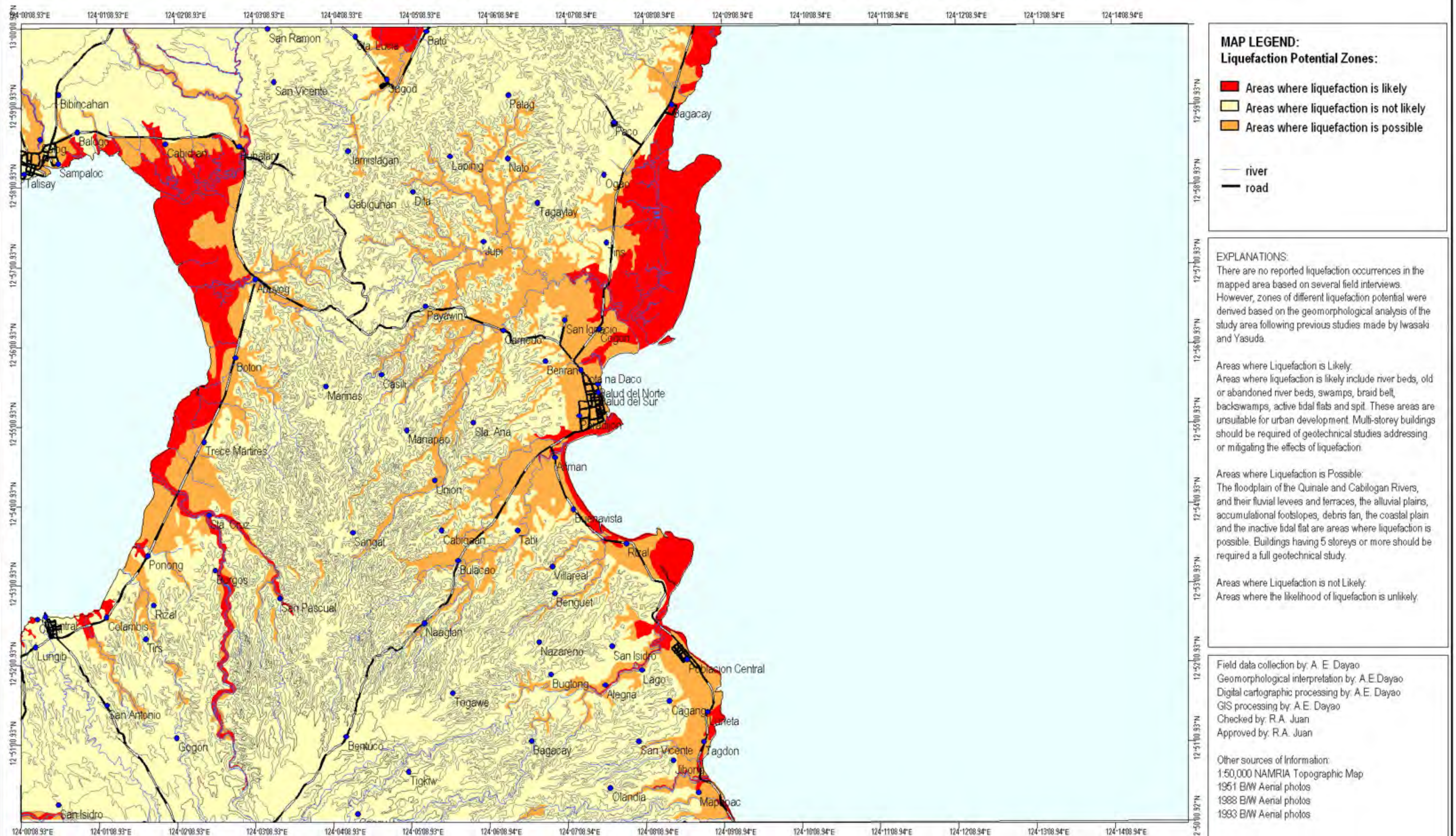


Published by:
Department of Environment & Natural Resources
MINES & GEOSCIENCES BUREAU RO-5
Rawis, Legazpi City
2006

0 4250 m
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Clark 1966, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF GUBAT QUADRANGLE

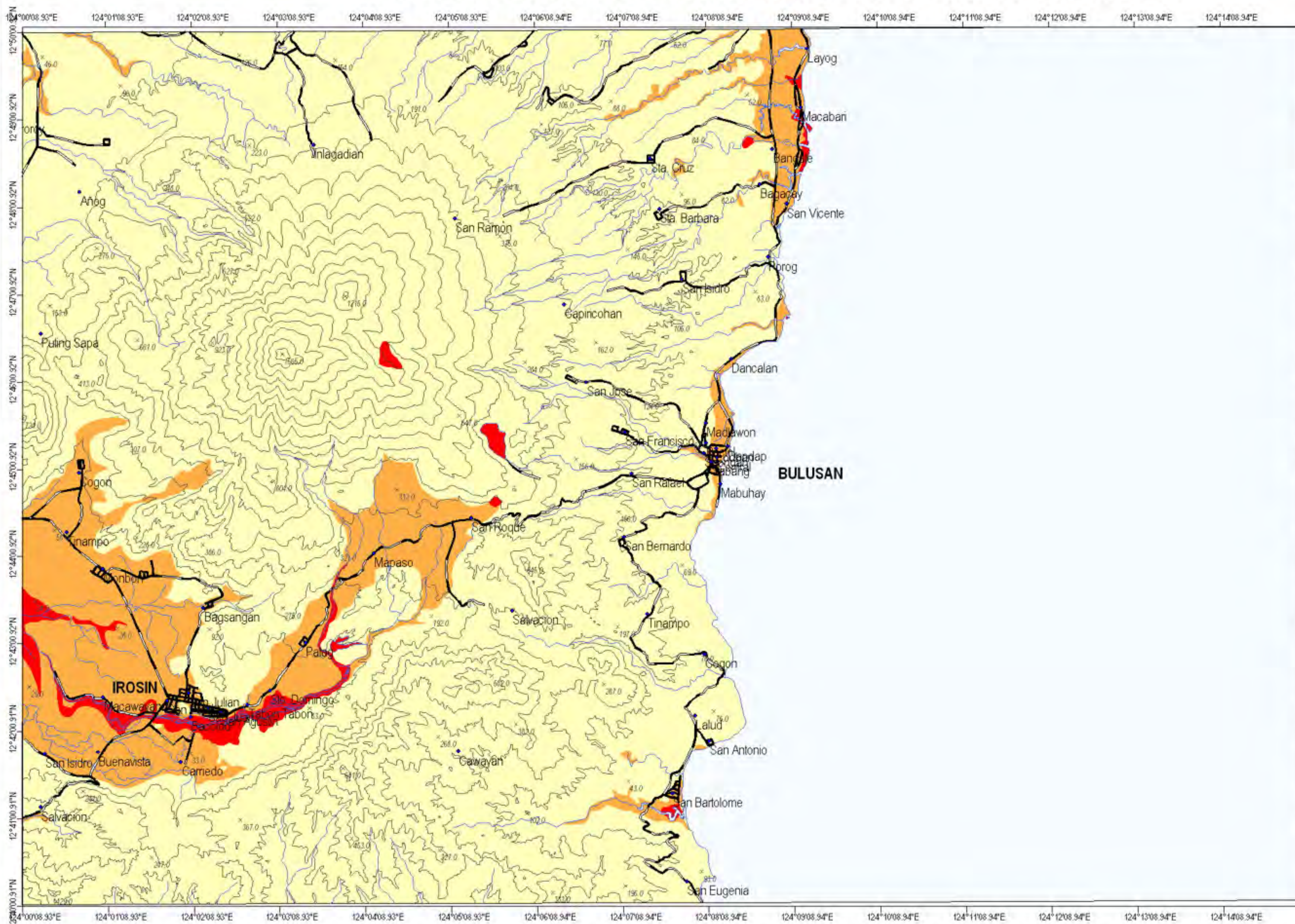


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 Department of Environment and Natural Resources
 MINES AND GEOSCIENCES BUREAU-RO6
 Daraga, Albay
 2007

1 : 85000
 0 4250 m
 UNIVERSAL TRANSVERSE MERCATOR PROJECTION
 Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF IROSIN QUADRANGLE



MAP LEGEND:

Liquefaction Potential Zones:

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

- river
- road
- contour

EXPLANATIONS:

There are no reported liquefaction occurrences in the mapped area based on several field interviews. However, zones of different liquefaction potential were derived based on the geomorphological analysis of the study area following previous studies made by Iwasaki and Yasuda.

Areas where Liquefaction is Likely:

Areas where liquefaction is likely include river beds, river terraces, abandoned river channels and meanders, channel bars, lakes and lake margins, active tidal flats with mangroves, backswamps and fluvial basins. These areas are unsuitable for urban development. Multi-storey buildings should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas where Liquefaction is Possible:

The floodplain of the Cadacan River and its fluvial levees and point bars, the accumulative footslopes, the coastal plains and the beach ridges are areas where liquefaction is possible. Buildings having 5 storeys or more should be required a full geotechnical study.

Areas where Liquefaction is not Likely:

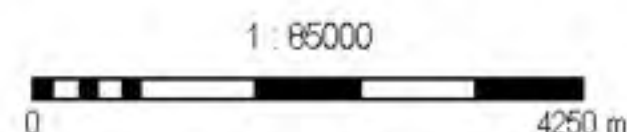
Areas where the likelihood of liquefaction is unlikely.

Field data collection by: A. E. Dayao
 Geomorphological interpretation by: A.E. Dayao
 Digital cartographic processing by: A.E. Dayao
 GIS processing by: A.E. Dayao
 Checked by: R.A. Juan
 Approved by: R.A. Juan

Other sources of Information:
 1:50,000 NAMRIA Topographic Map
 1951 B/W Aerial photos
 1988 B/W Aerial photos
 1993 B/W Aerial photos



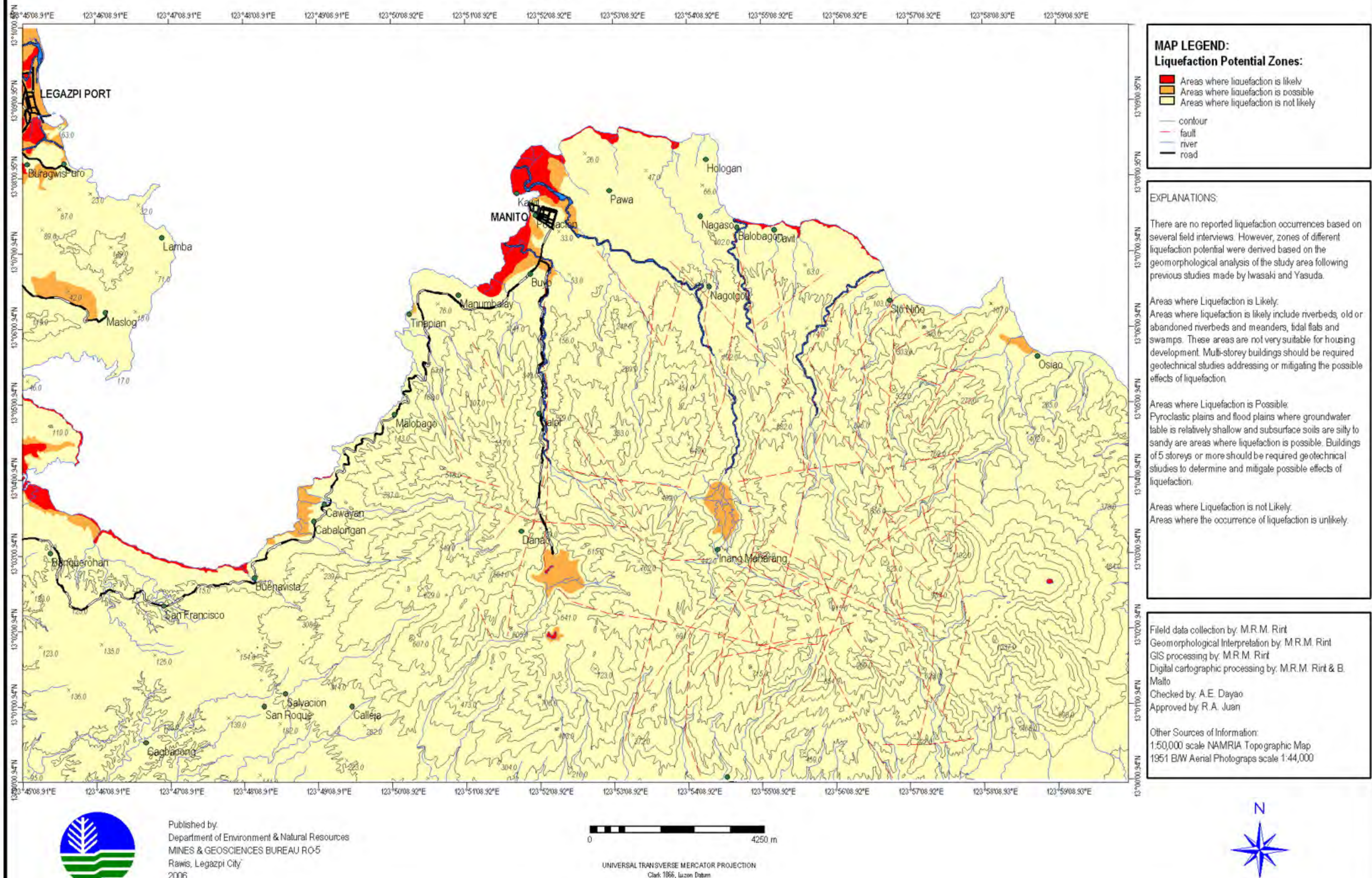
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 Daraga, Albay
 2008



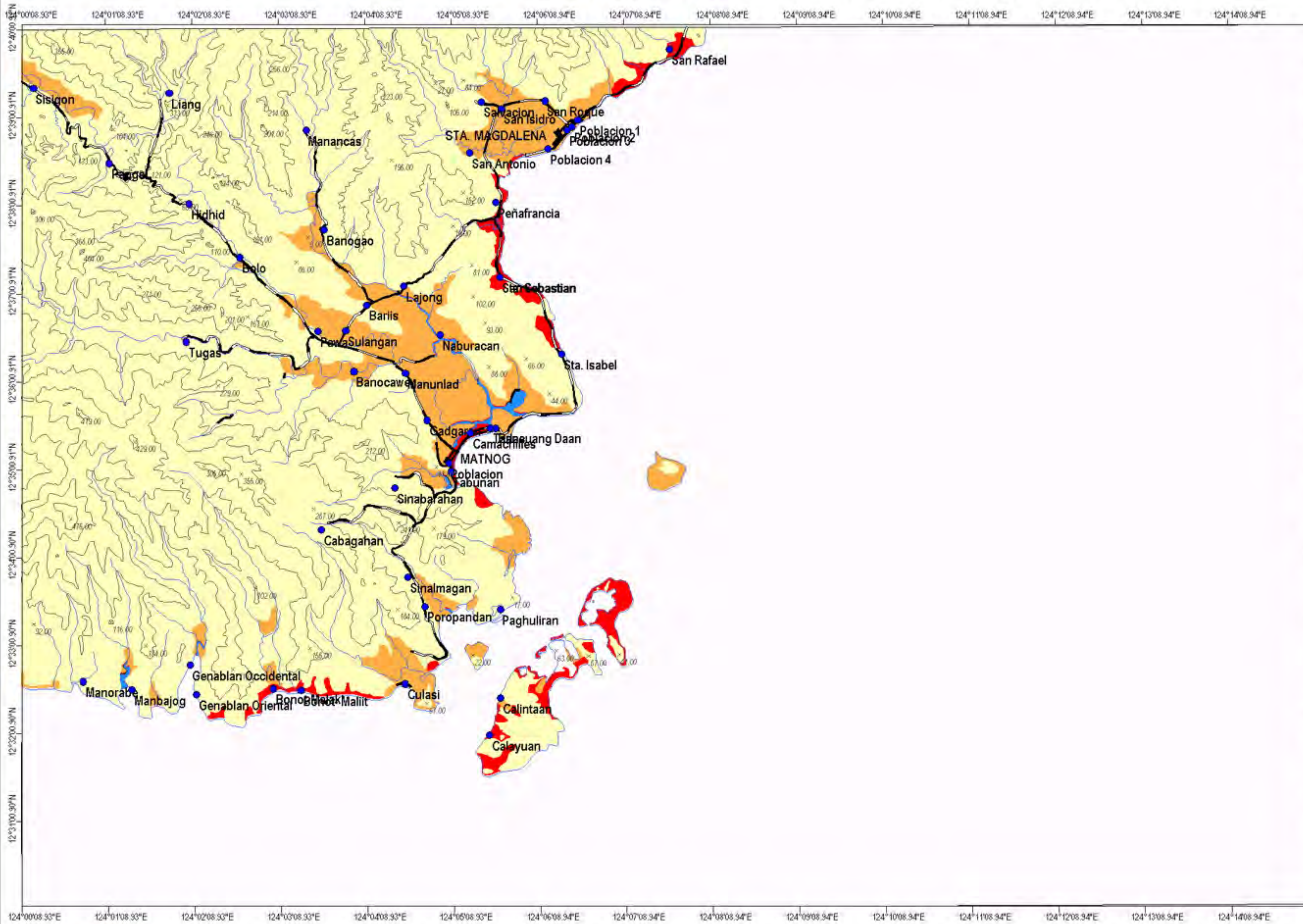
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
 Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF MANITO QUADRANGLE



LIQUEFACTION POTENTIAL MAP OF MATNOG QUADRANGLE



MAP LEGEND:

Liquefaction Potential Zones:

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

- road
- river
- contour

EXPLANATIONS:

There are no reported liquefaction occurrences in the mapped area on several field interviews. However, zones of different liquefaction potential were derived based on the geomorphological analysis of the study area following previous studies made by Iwasaki and Yasuda.

Areas where Liquefaction is Likely:
Areas where liquefaction is likely include active/young tidal flats, beach and riverbed. These areas are unsuitable for urban development. Multi-storey buildings should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas where Liquefaction is Possible:
Alluvial plains and riverbeds are areas where liquefaction is possible. Buildings having 5 storeys or more should be required a full geotechnical study.

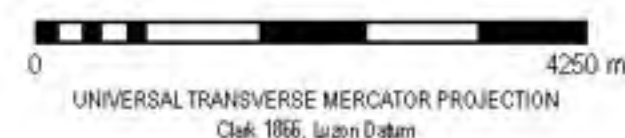
Areas where Liquefaction is not Likely:
Areas where the occurrence of liquefaction is unlikely.

Field data collection by: M.R.M.Rint
Geomorphological interpretation by: M.R.M.Rint
Digital cartographic processing by: R.L.Mapalad
GIS processing by: M.R.M.Rint
Checked by: A.E Dayao
Approved by: R.A. Juan

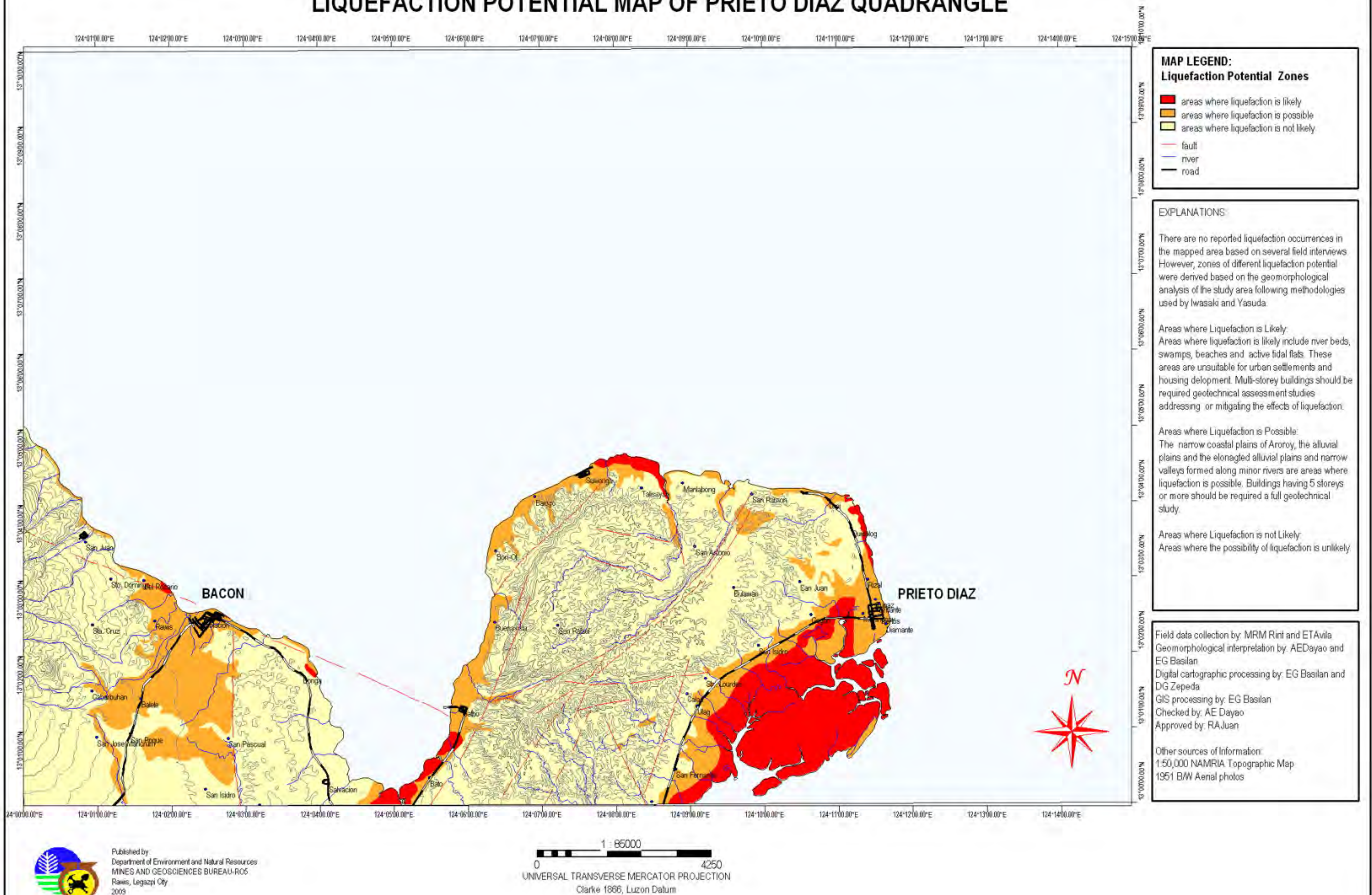
Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos



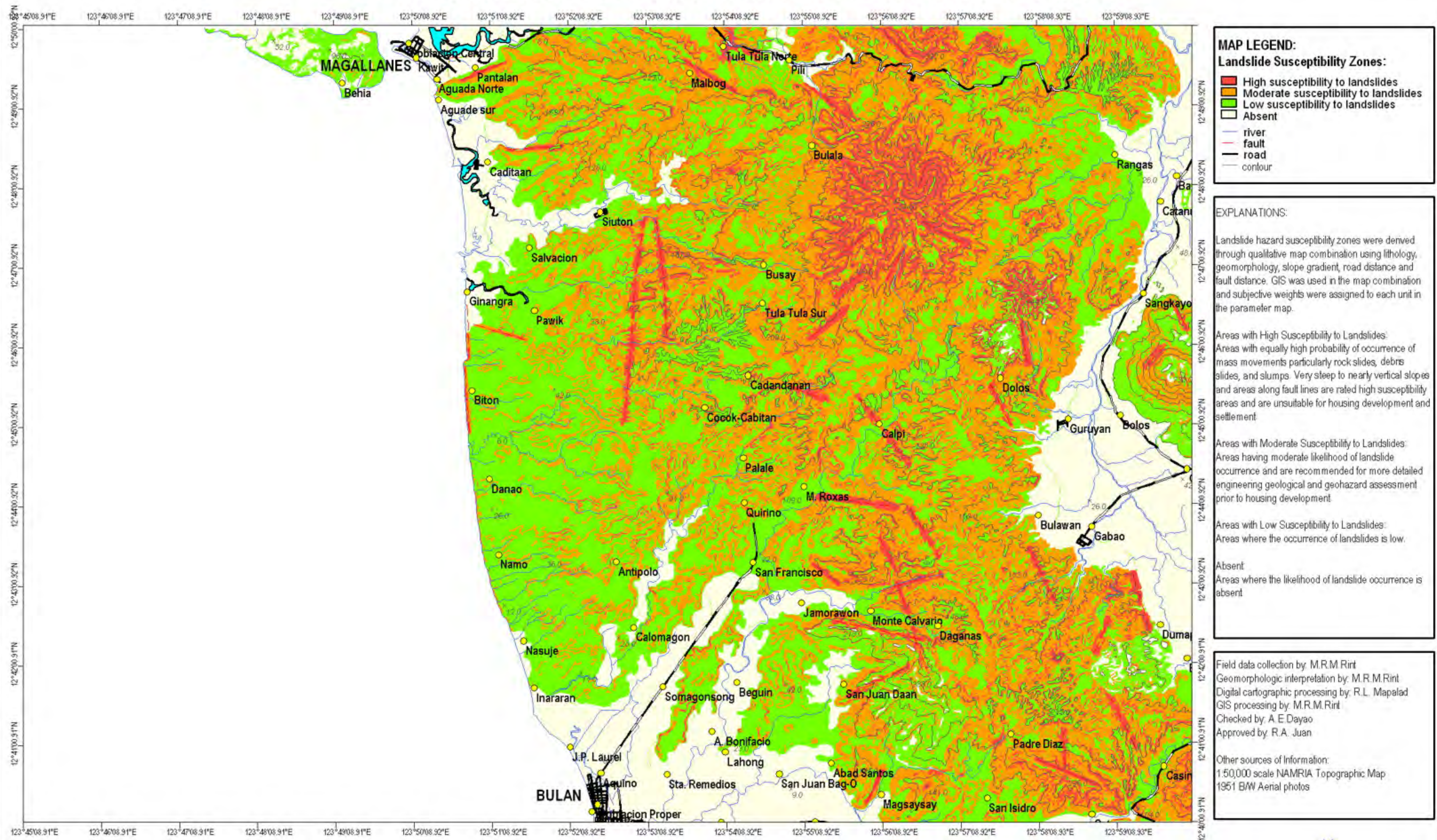
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Rawis, Legazpi City



LIQUEFACTION POTENTIAL MAP OF PRIETO DIAZ QUADRANGLE



LANDSLIDE SUSCEPTIBILITY MAP OF BULAN QUADRANGLE

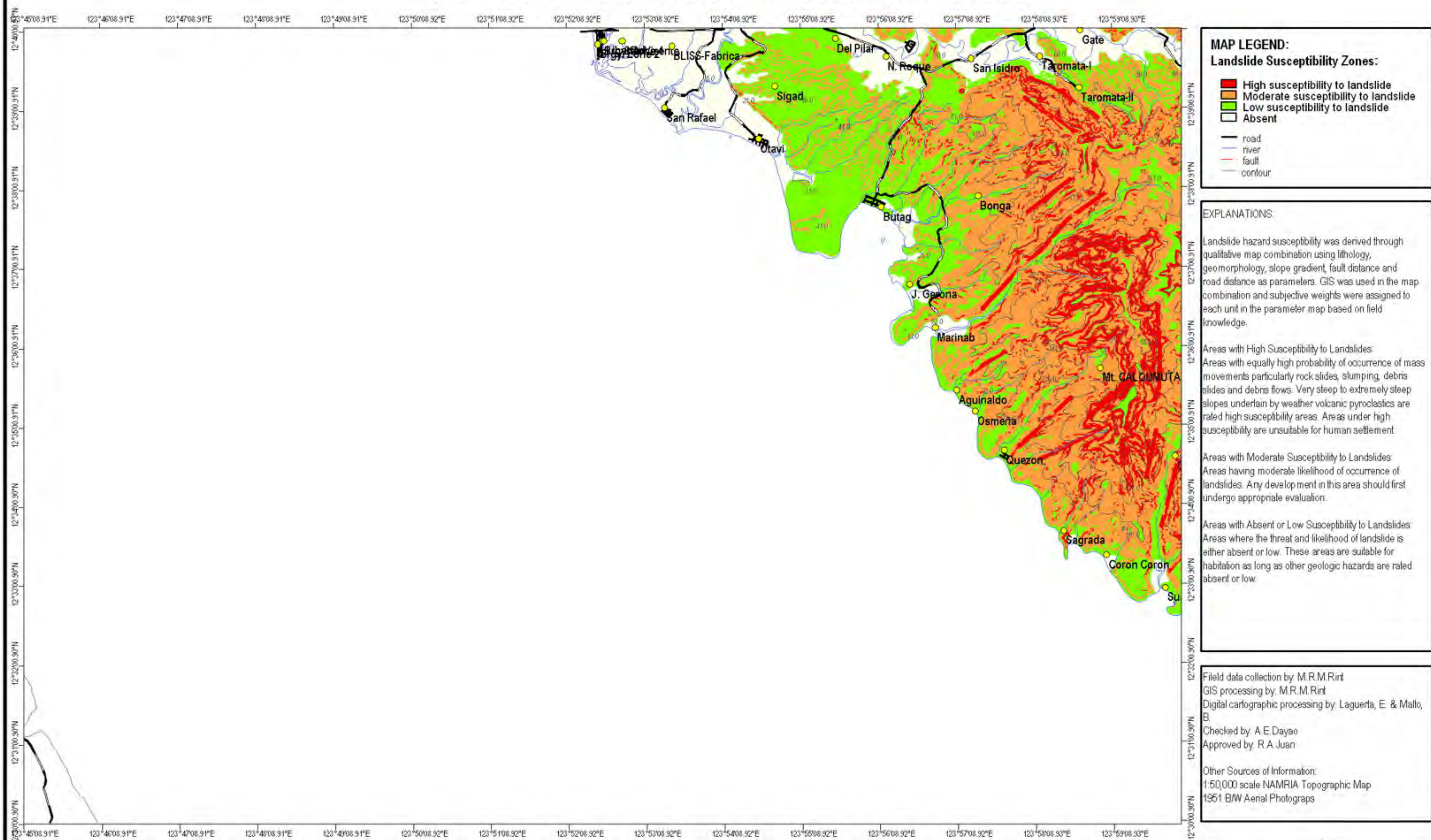


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Daraga, Albay
2007

0 4250
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Clark 1966, Luzon Datum



LANDSLIDE SUSCEPTIBILITY MAP OF BUTAG QUADRANGLE



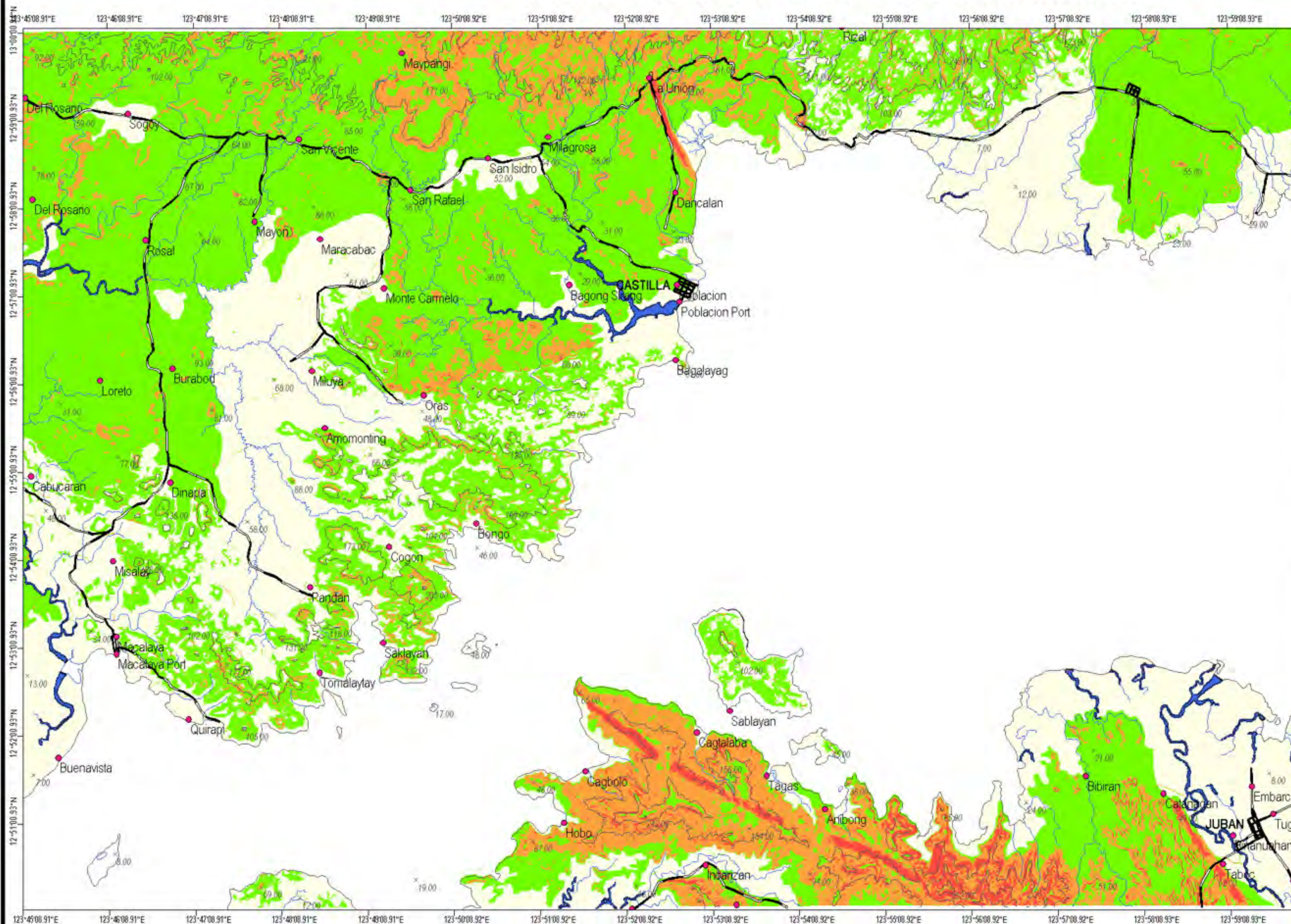
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 Rawis, Legazpi City
 2007

0 4250 m

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 Clarke 1866, Luzon Datum



LANDSLIDE HAZARD MAP OF CASTILLA QUADRANGLE



MAP LEGEND:

Landslide Susceptibility Zones:

- Absent
- Low susceptibility to landslides
- Moderately susceptibility to landslides
- High susceptibility to landslides

- contour
- fault
- river
- road

EXPLANATIONS:

Landslide hazard susceptibility was derived through qualitative map combination using lithology, geomorphology, slope gradient, fault distance and road distance as parameters. GIS was used in the map combination and subjective weights were assigned to each unit in the parameter map based on field knowledge.

Areas with High Susceptibility to Landslides:
Areas with equally high probability of occurrence of mass movements particularly rock slides, slumping, debris slides and debris flows. Very steep to extremely steep slopes underlain by weather volcanic pyroclastics are rated high susceptibility areas. Areas under high susceptibility are unsuitable for human settlement.

Areas with Moderate Susceptibility to Landslides:
Areas having moderate likelihood of occurrence of landslides. Any development in this area should first undergo appropriate evaluation.

Areas with Absent or Low Susceptibility to Landslides:
Areas where the threat and likelihood of landslide is either absent or low. These areas are suitable for habitation as long as other geologic hazards are rated absent or low.

Field data collection by: M.R.M.Rint
GIS processing by: M.R.M.Rint
Digital cartographic processing by: Lagueria, E. & Malto, B.
Checked by: A.E. Dayao
Approved by: R.A. Juan

Other Sources of Information:
1:50,000 scale NAMRIA Topographic Map
1951 B/W Aerial Photographs scale 1:44,000



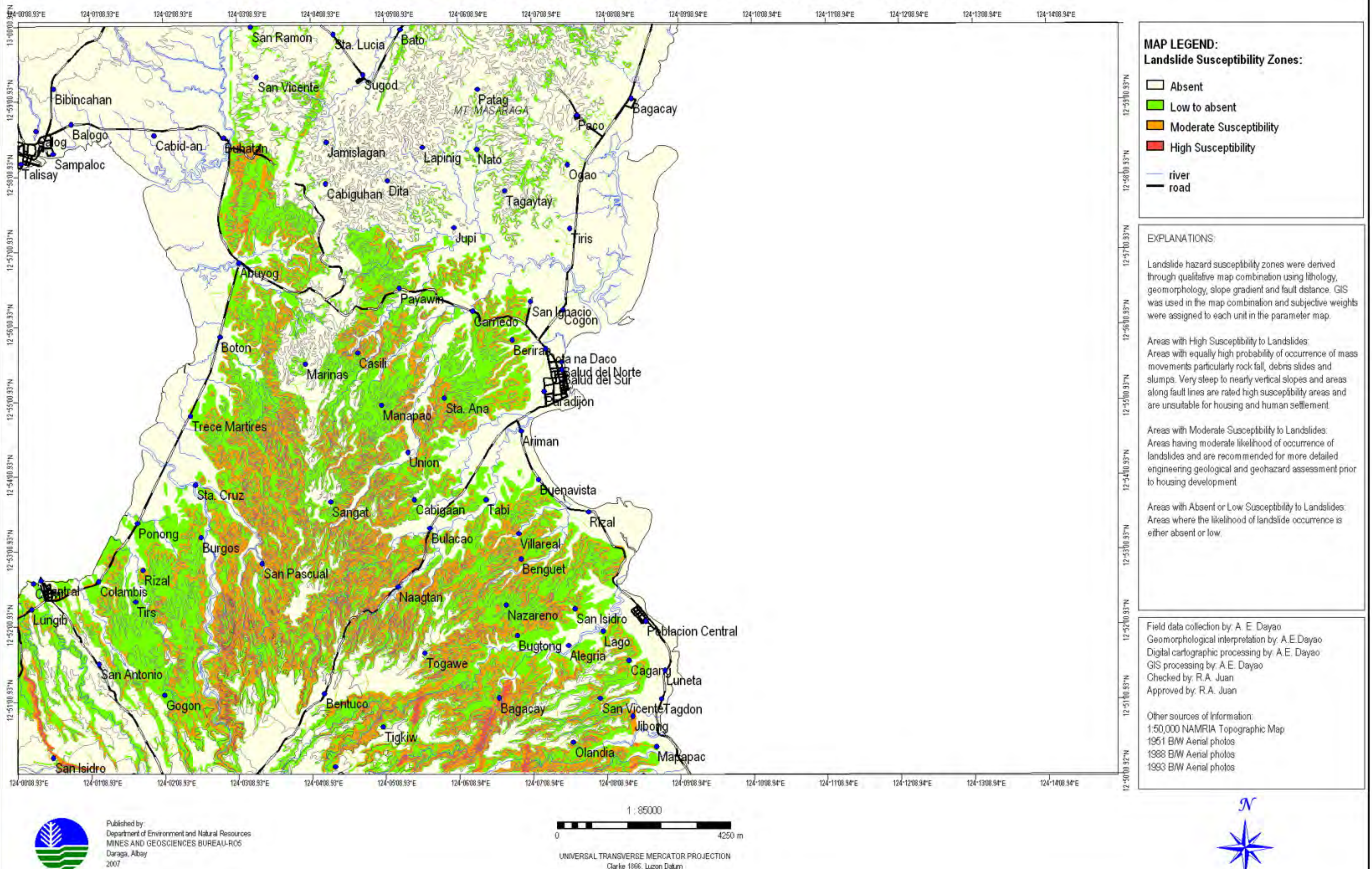
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2006

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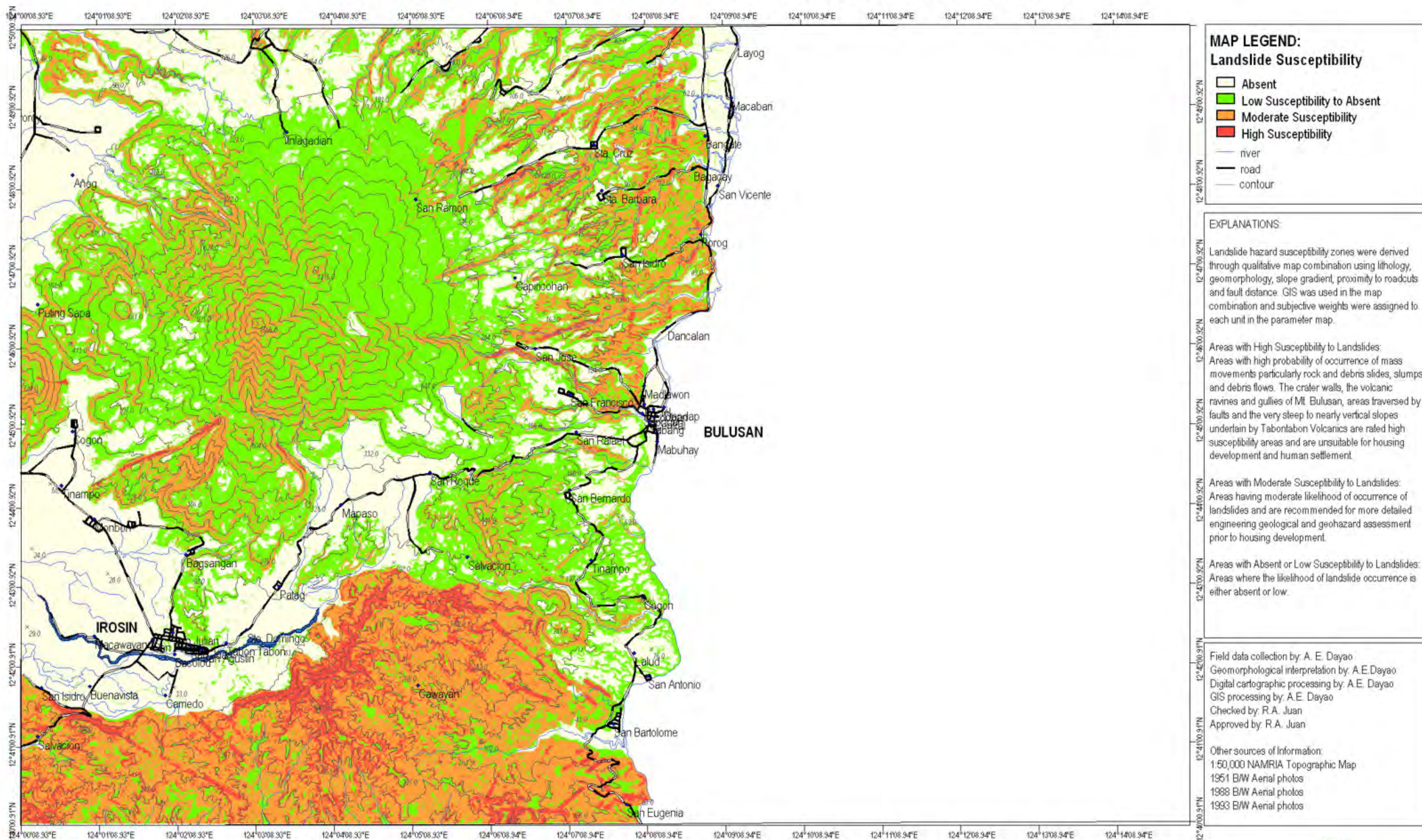
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon Datum



LANDSLIDE SUSCEPTIBILITY MAP OF GUBAT QUADRANGLE



LANDSLIDE SUSCEPTIBILITY MAP OF IROSIN QUADRANGLE



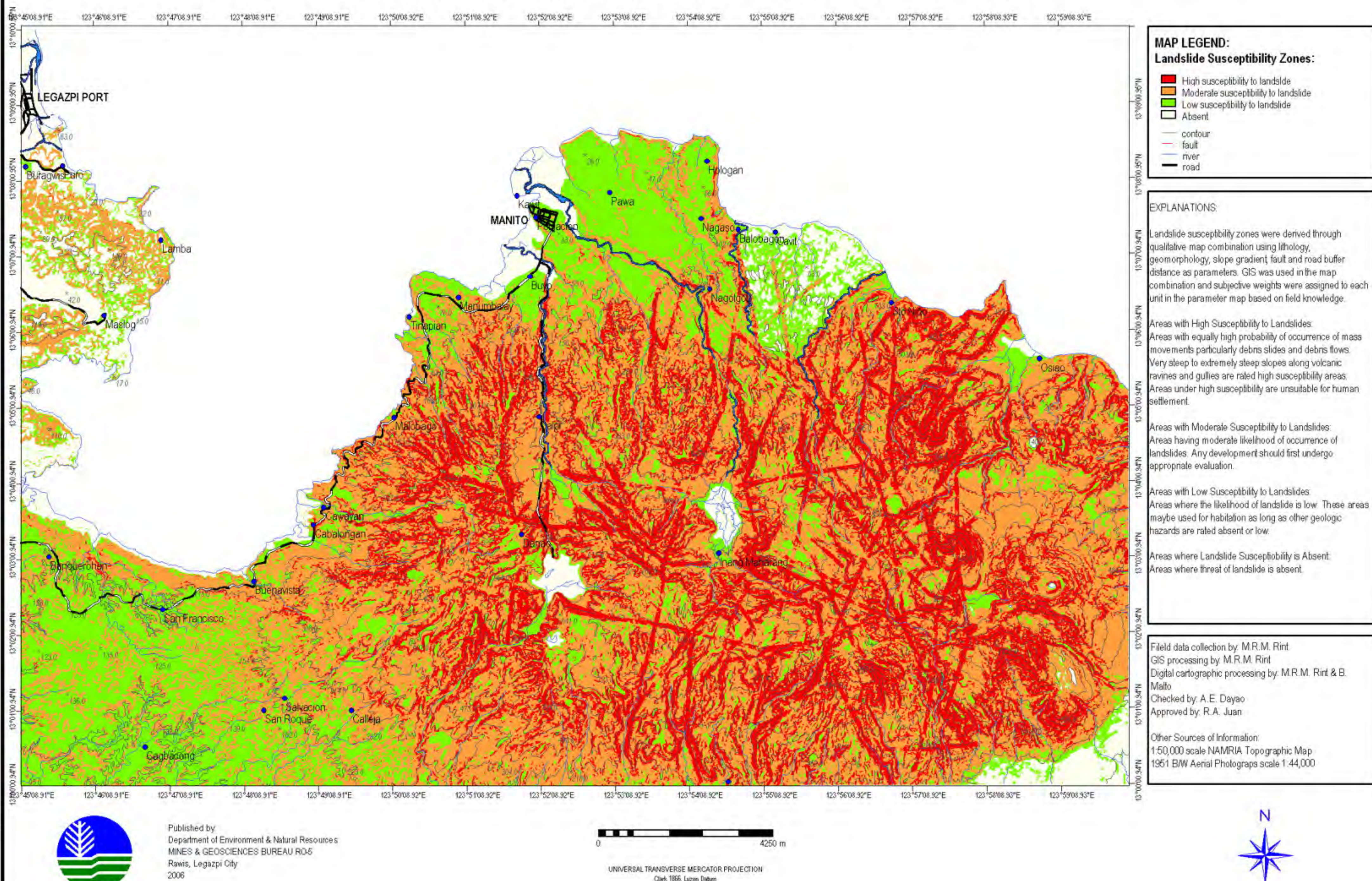
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 Daraga, Albay
 2008

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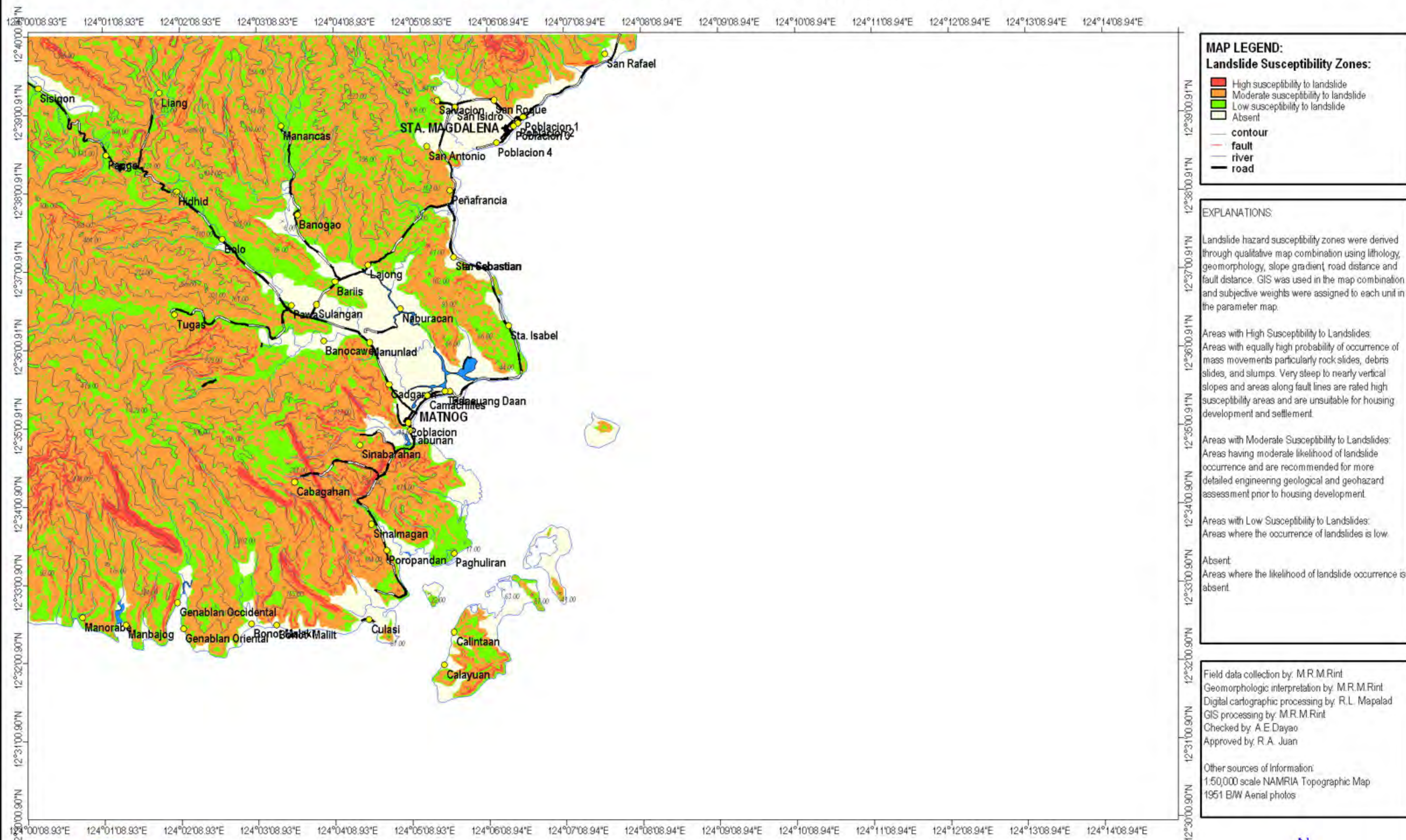
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
 Clarke 1866, Luzon Datum



LANDSLIDE HAZARD SUSCEPTIBILITY MAP OF MANITO QUADRANGLE



LANDSLIDE SUSCEPTIBILITY MAP OF MATNOG QUADRANGLE



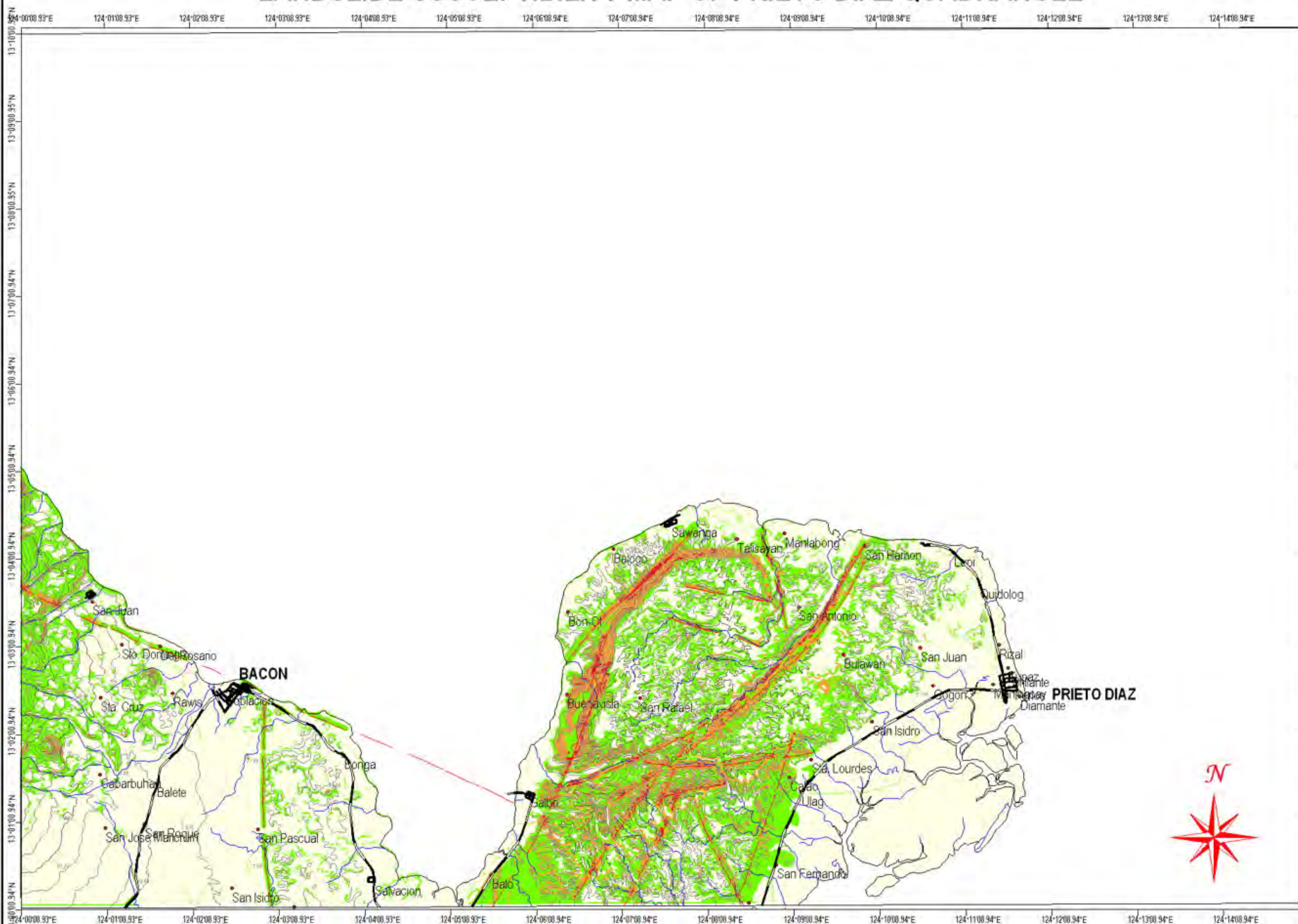
Published by:
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Rarais, Legazpi City
0900



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Clarke 1866, Luzon Datum



LANDSLIDE SUSCEPTIBILITY MAP OF PRIETO DIAZ QUADRANGLE



MAP LEGEND: Landslide Susceptibility Zones

- absent
- low susceptibility to absent
- moderate susceptibility
- high susceptibility
- fault
- river
- road

EXPLANATIONS:

Landslide hazard susceptibility zones were derived through qualitative map combination using lithology, geomorphology, slope gradient, road distance and fault distance as input parameters. 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 having high probability of occurrence of mass movements particularly rock slides, debris slides and slumps. Very steep to nearly vertical slopes and areas along fault lines 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.

Areas with Absent or Low Susceptibility to Landslides:
Areas where the likelihood of landslide occurrence is either absent or low.

Field data collection by: MRM Rint and ETAvila
Geomorphological interpretation by: AEDayao and EG Basilan
Digital cartographic processing by: EG Basilan, DG Zepeda
GIS processing by: EG Basilan
Checked by: AE Dayao
Approved by: RAJuan

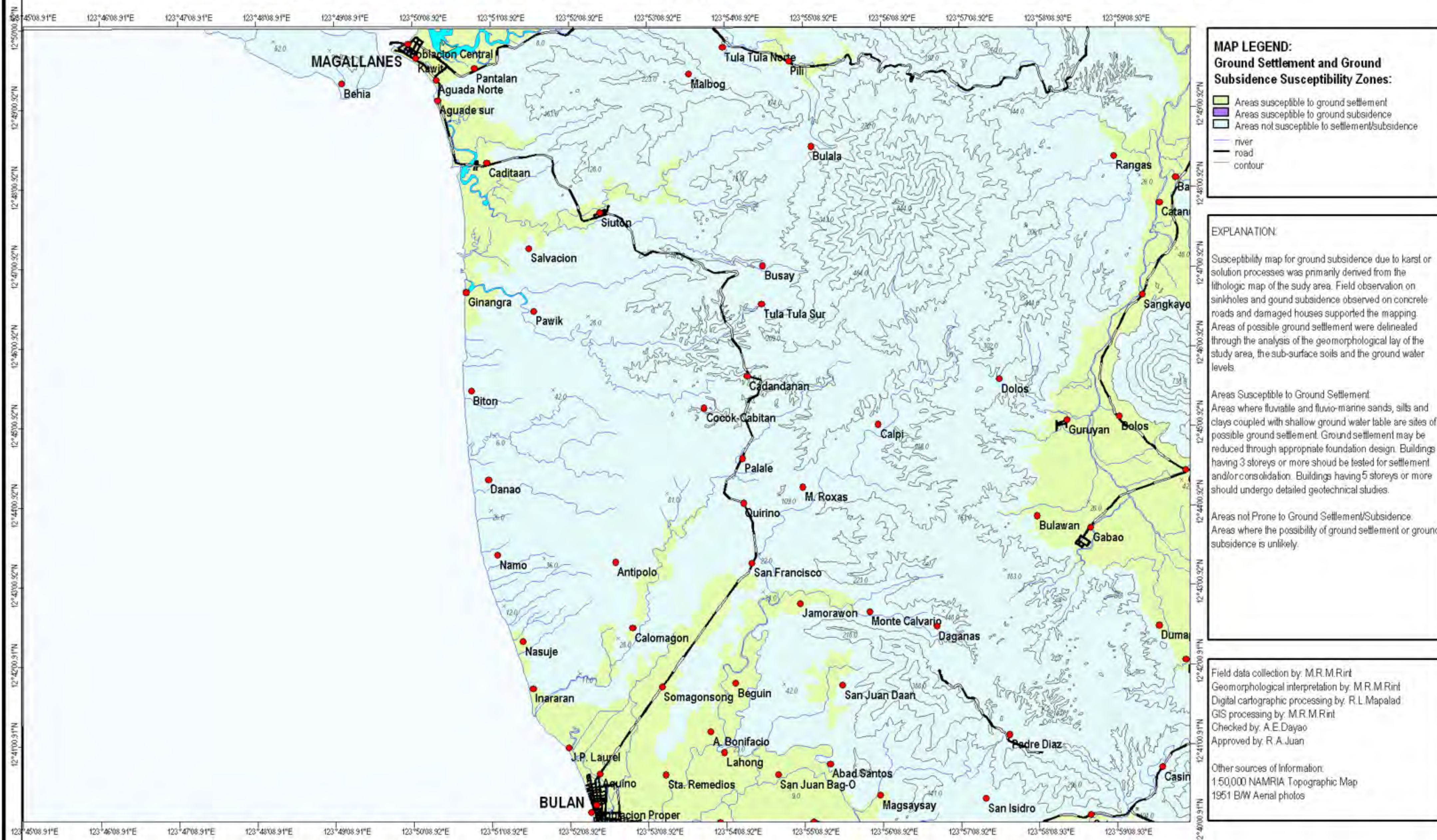
Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos



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2009

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GROUND SETTLEMENT AND GROUND SUBSIDENCE SUSCEPTIBILITY MAP OF BULAN QUADRANGLE



MAP LEGEND:
Ground Settlement and Ground Subsidence Susceptibility Zones:

- Areas susceptible to ground settlement
- Areas susceptible to ground subsidence
- Areas not susceptible to settlement/subsidence
- river
- road
- contour

EXPLANATION:

Susceptibility map for ground subsidence due to karst or solution processes was primarily derived from the lithologic map of the study area. Field observation on sinkholes and 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 Settlement:
 Areas where fluvial and fluvio-marine sands, silts and clays coupled with shallow ground water table are sites 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 Prone to Ground Settlement/Subsidence:
 Areas where the possibility of ground settlement or ground subsidence is unlikely.

Field data collection by: M.R.M.Rint
 Geomorphological interpretation by: M.R.M.Rint
 Digital cartographic processing by: R.L. Mapalad
 GIS processing by: M.R.M.Rint
 Checked by: A.E. Dayao
 Approved by: R.A. Juan

Other sources of information:
 1:50,000 NAMRIA Topographic Map
 1951 B/W Aerial photos



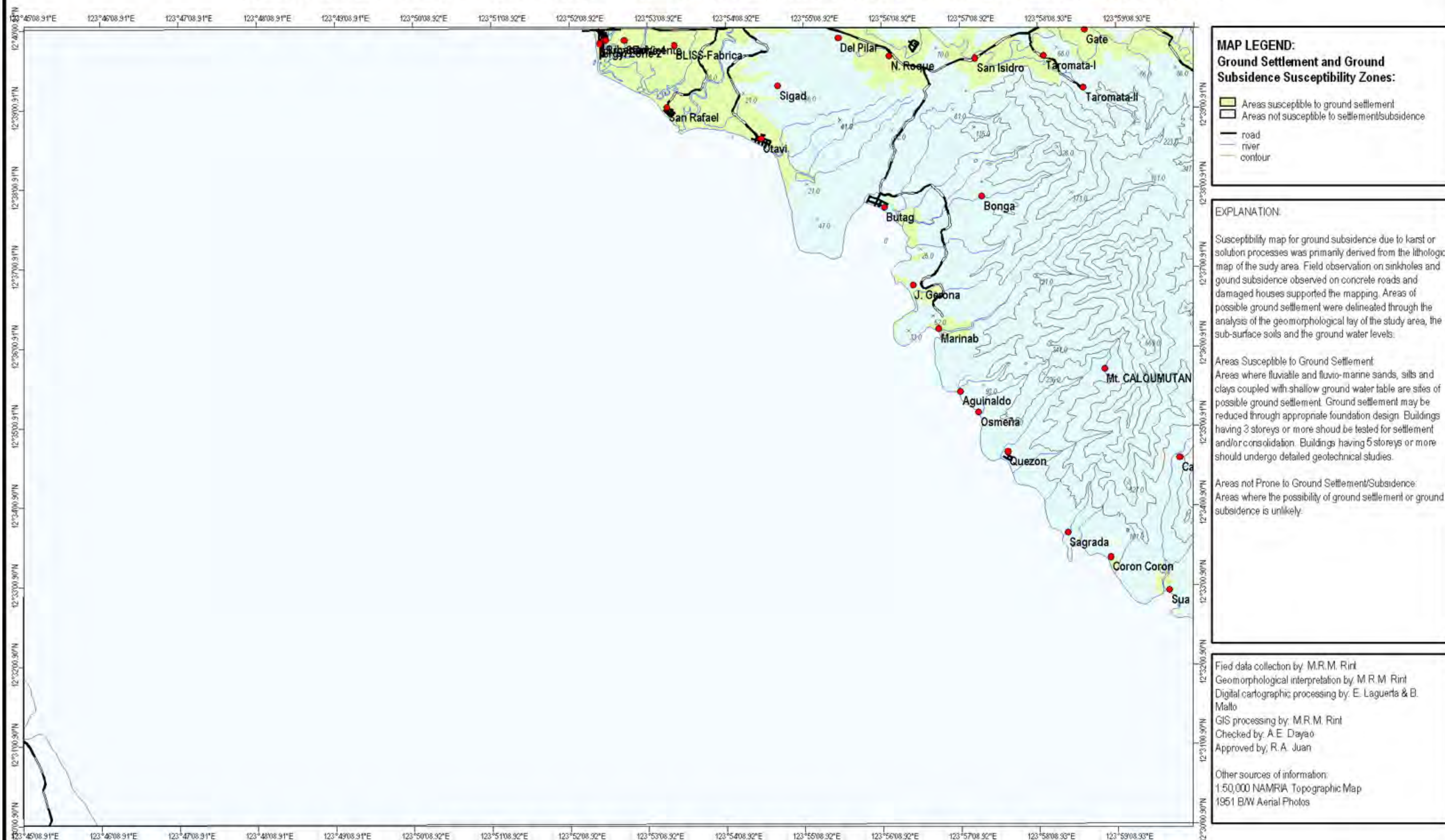
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GROUND SETTLEMENT AND GROUND SUBSIDENCE SUSCEPTIBILITY MAP OF BUTAG QUADRANGLE



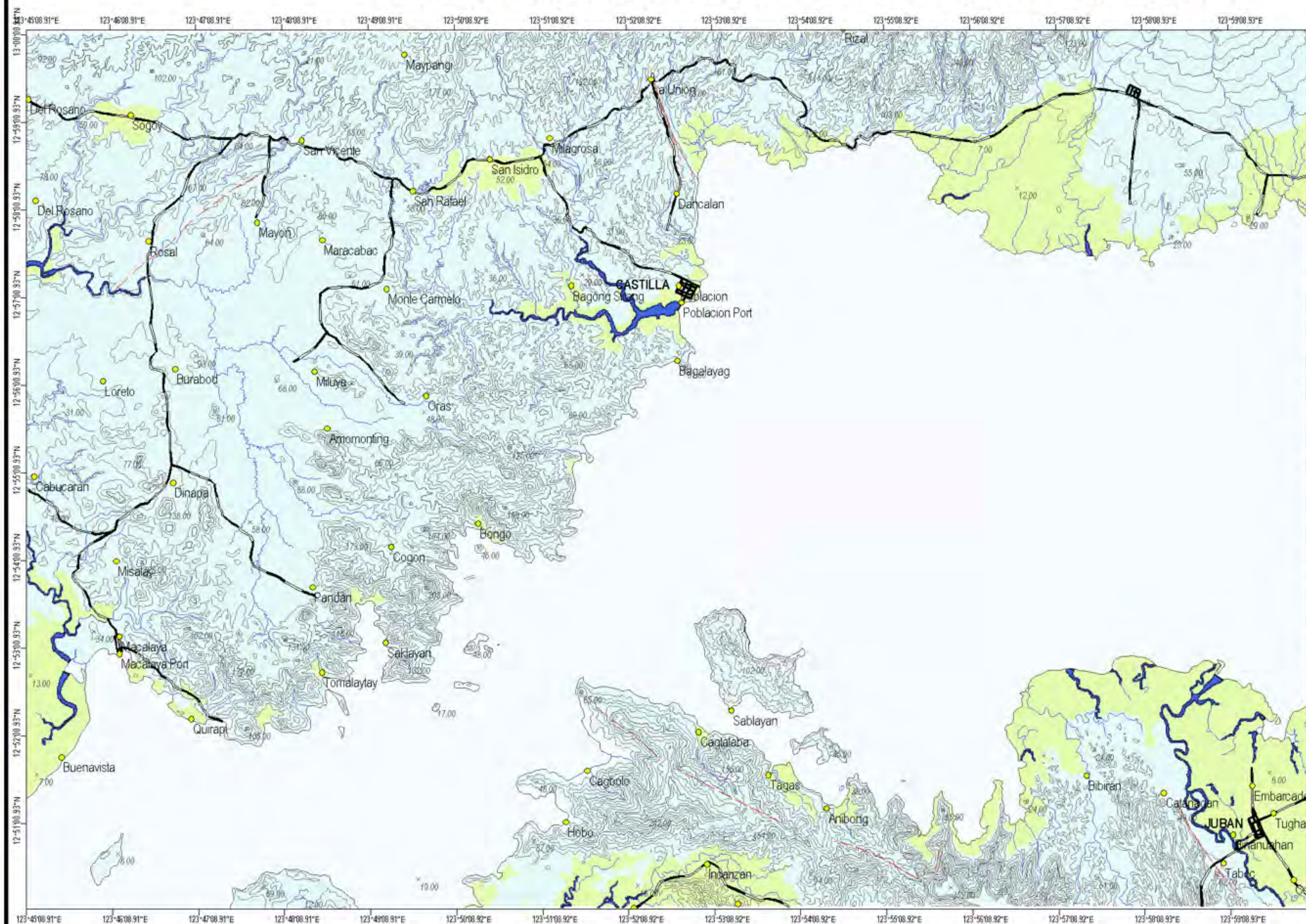
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GROUND SETTLEMENT SUSCEPTIBILITY MAP OF CASTILLA QUADRANGLE



MAP LEGEND:

Ground Settlement Suceptibility Zones:

- Areas not susceptible to ground settlement
- Areas susceptible to ground settlement
- contour
- fault
- river
- road

EXPLANATIONS:

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 Settlement:
Areas where fluvialite and fluvio-deltaic sands, silts and clays coupled with shallow ground water table are sites 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 and more should undergo detailed geotechnical studies

Areas not Susceptible to Ground Settlement
Areas where the possibility of ground settlement is low or absent but still, buildings of 5 storeys or more should undergo geotechnical studies

Field data collection by: M.R.M. Rint
Geomorphological Interpretation by: M.R.M. Rint
GIS processing by: M.R.M. Rint
Digital cartographic processing by: M.R.M. Rint & B. Mallo
Checked by: A.E. Dayao
Approved by: R.A. Juan

Other Sources of Information:
1:50,000 scale NAMRIA Topographic Map
1951 B/W Aerial Photographs scale 1:44,000



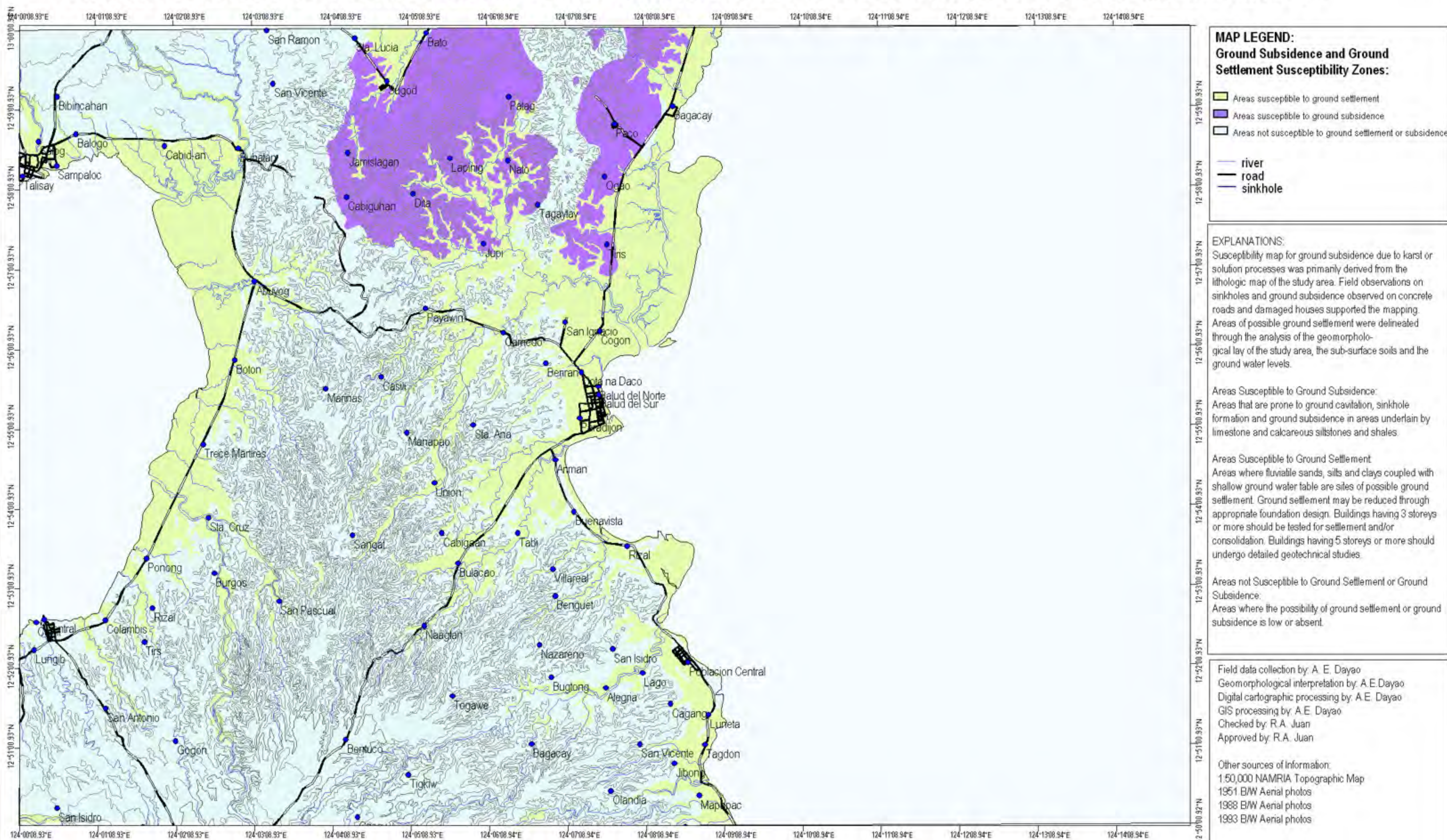
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GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF GUBAT QUADRANGLE

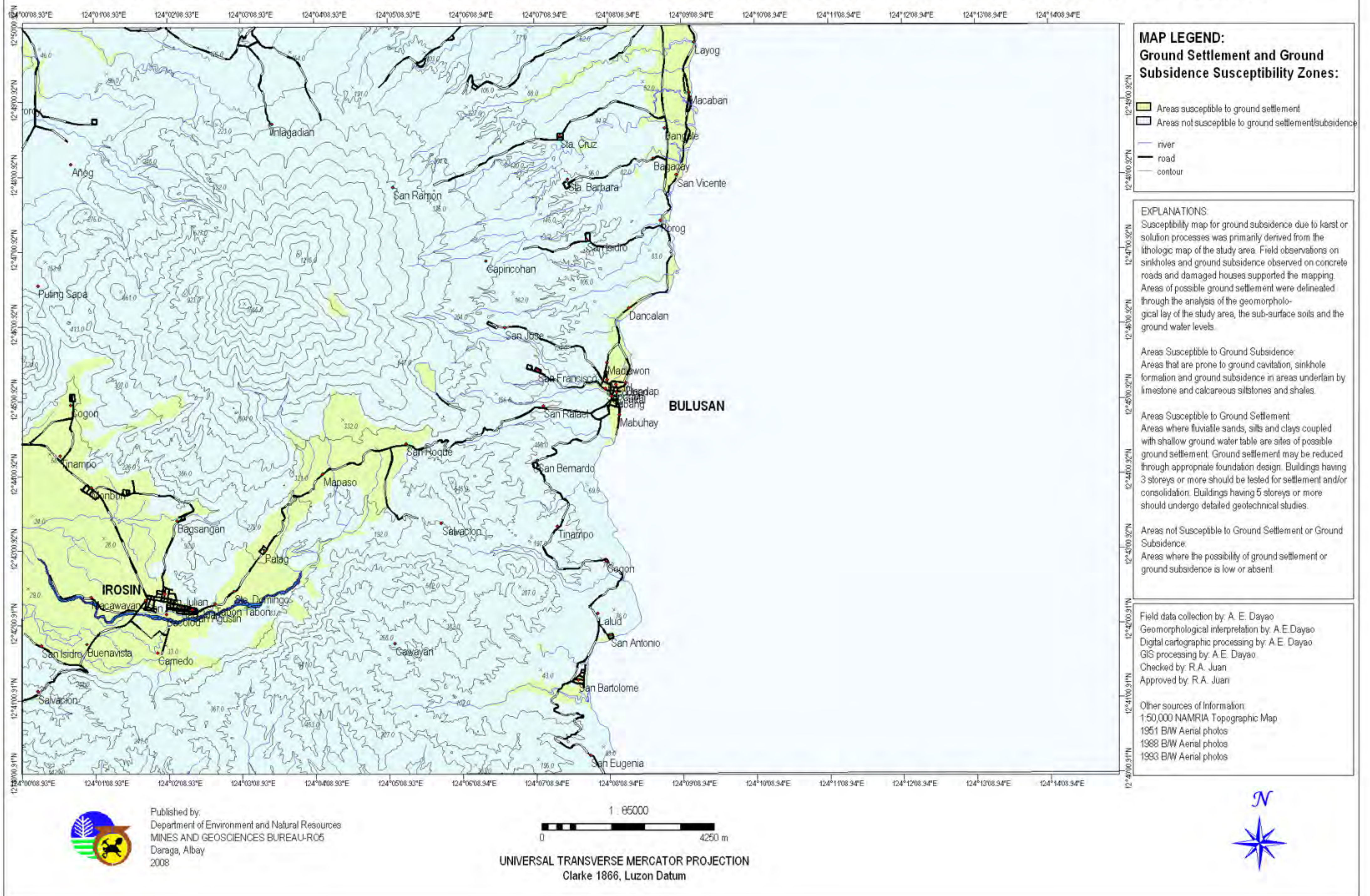


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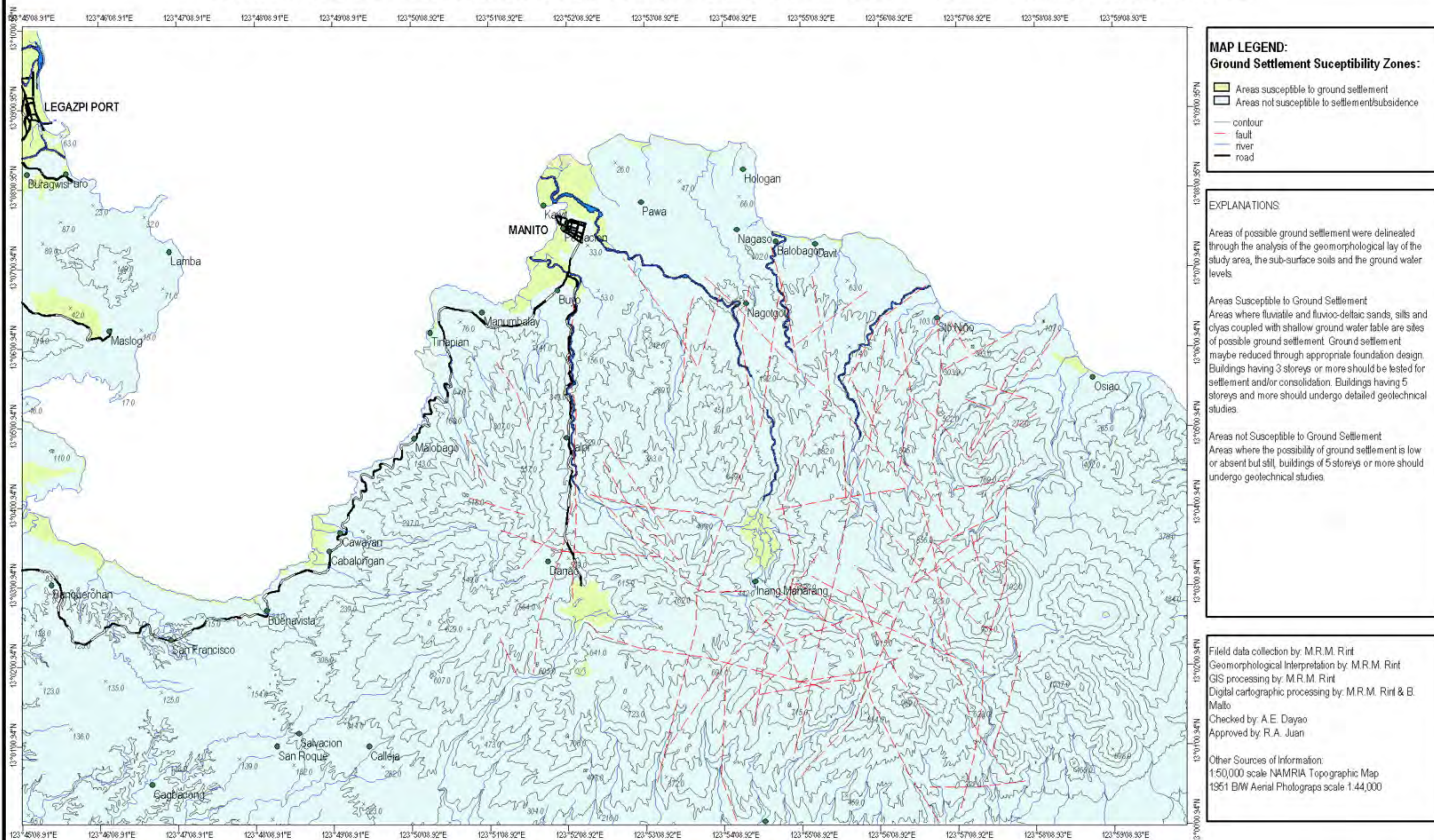
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 Clarke 1866, Luzon Datum



GROUND SETTLEMENT AND GROUND SUBSIDENCE SUSCEPTIBILITY MAP OF IROSIN QUADRANGLE



GROUND SETTLEMENT AND GROUND SUBSIDENCE SUSCEPTIBILITY MAP OF MANITO QUADRANGLE



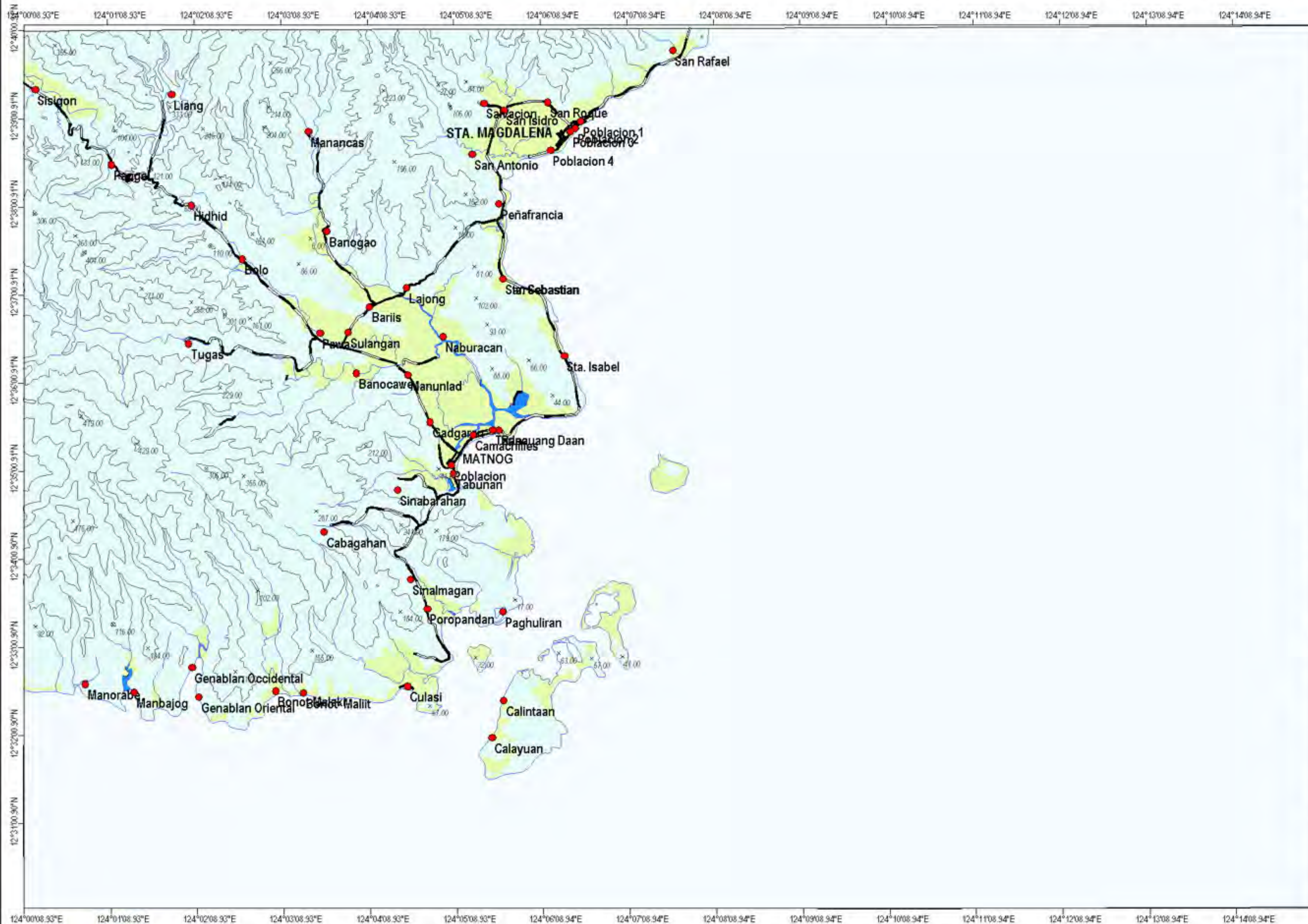
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Regional Office No. 5
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GROUND SETTLEMENT AND GROUND SUBSIDENCE SUSCEPTIBILITY MAP OF MATNOG QUADRANGLE



MAP LEGEND: Ground Settlement and Ground Subsidence Susceptibility Zones:

- Areas susceptible to ground settlement
- Areas not prone to settlement/subsidence
- road
- river
- contour

EXPLANATION:

Susceptibility map for ground subsidence due to karst or solution processes was primarily derived from the lithologic map of the study area. Field observation on sinkholes and 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 Settlement:
Areas where fluviatile and fluvio-marine sands, silts and clays coupled with shallow ground water table are sites 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 Prone to Ground Settlement/Subsidence:
Areas where the possibility of ground settlement or ground subsidence is unlikely.

Field data collection by: M.R.M.Rint
Geomorphological interpretation by: M.R.M.Rint
Digital cartographic processing by: R.L.Mapala
GIS processing by: M.R.M.Rint
Checked by: A.E.Dayao
Approved by: R.A.Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos

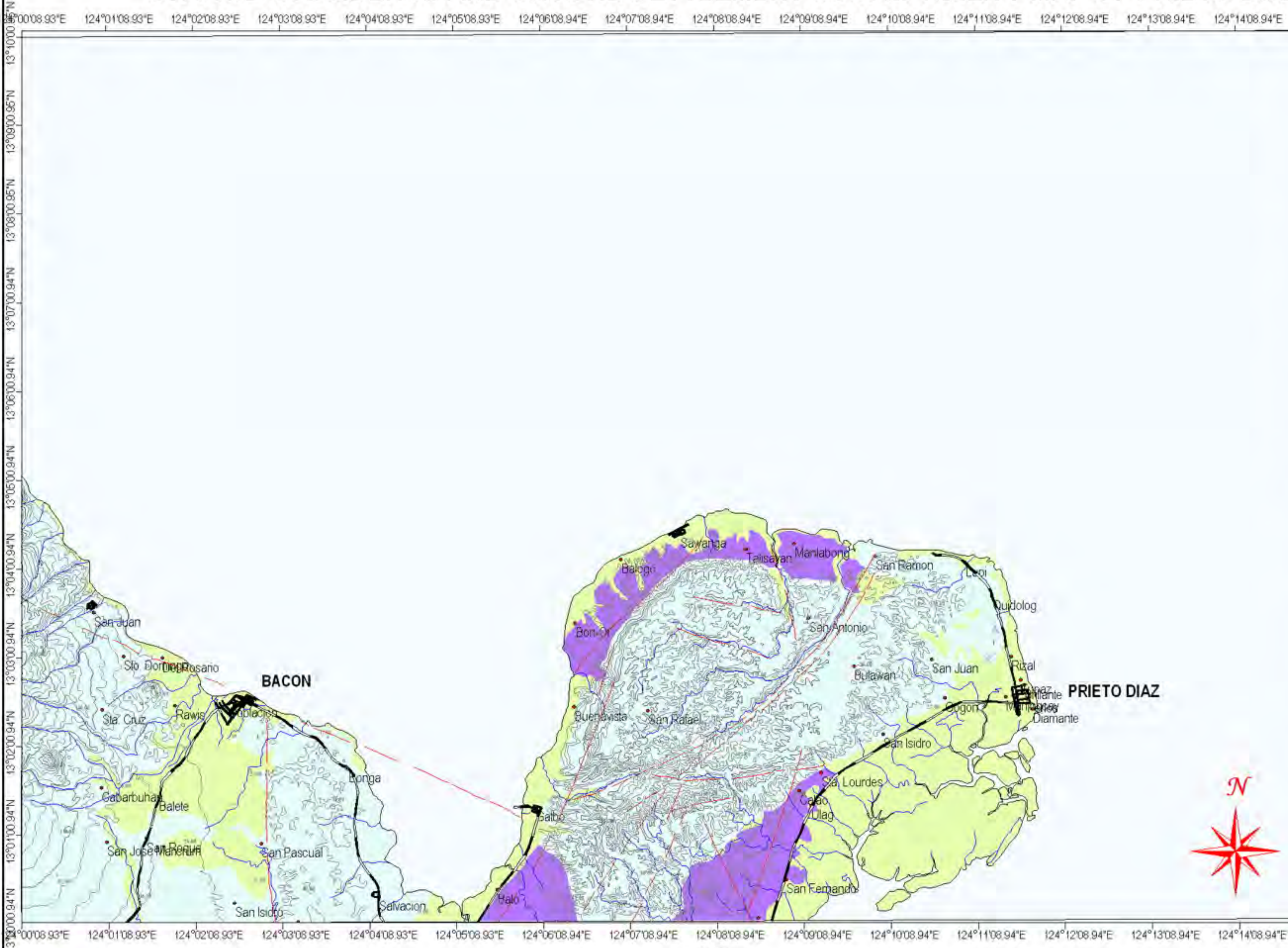


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GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF PRIETO DIAZ QUADRANGLE



MAP LEGEND:
Ground Subsidence and Ground Settlement Zones

areas not susceptible to ground subsidence/settlement

areas susceptible to ground settlement

areas susceptible to ground subsidence

fault

river

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 sinkholes and 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 calcarenites and calcareous siltstones and shales.

Areas Susceptible to Ground Settlement:
 Areas where fluviatile and coastal sands, silts and clays coupled with shallow ground water tables are site 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 Prone to Ground Settlement/Subsidence
 Areas where the possibility of ground settlement or ground subsidence is low or absent.

Field data collection by: MRM Rint and ET Avila
 Geomorphological interpretation by: AE Dayao, EG Basilan
 Digital cartographic processing by: EG Basilan, DG Zepeda
 GIS processing by: EG Basilan
 Checked by: AE Dayao
 Approved by: RA Juan

 Other sources of information:
 1:50,000 NAMRIA Topographic Map
 1951 BW Aerial photos

