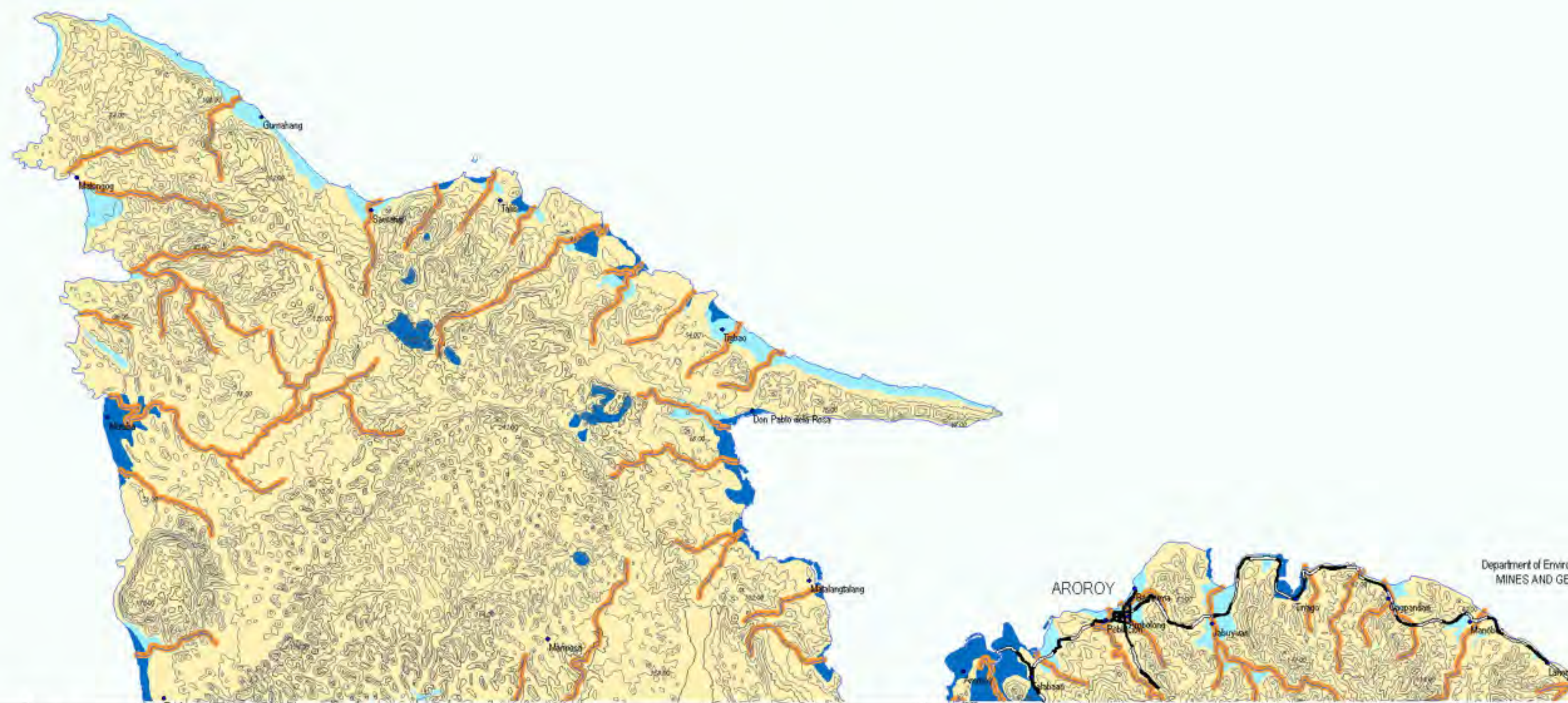


FLOOD HAZARD MAP OF AROROI QUADRANGLE

0 4250 m

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon Datum



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Department of Environment and Natural Resources
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Ramos, Legaspi City
2009



MAP LEGEND Flood Hazard Zones:

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

- contour line
- 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. Intermittent moderate to heavy rains of 1 to 2 days could bring about flooding in these areas. Moderate to strong typhoons accompanied by heavy rains 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 accompanied by heavy rains. 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 except in low-lying areas immediately adjoining rivers and creeks but are unmappable in medium scale.

Areas Prone to Riverbank Erosion:

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

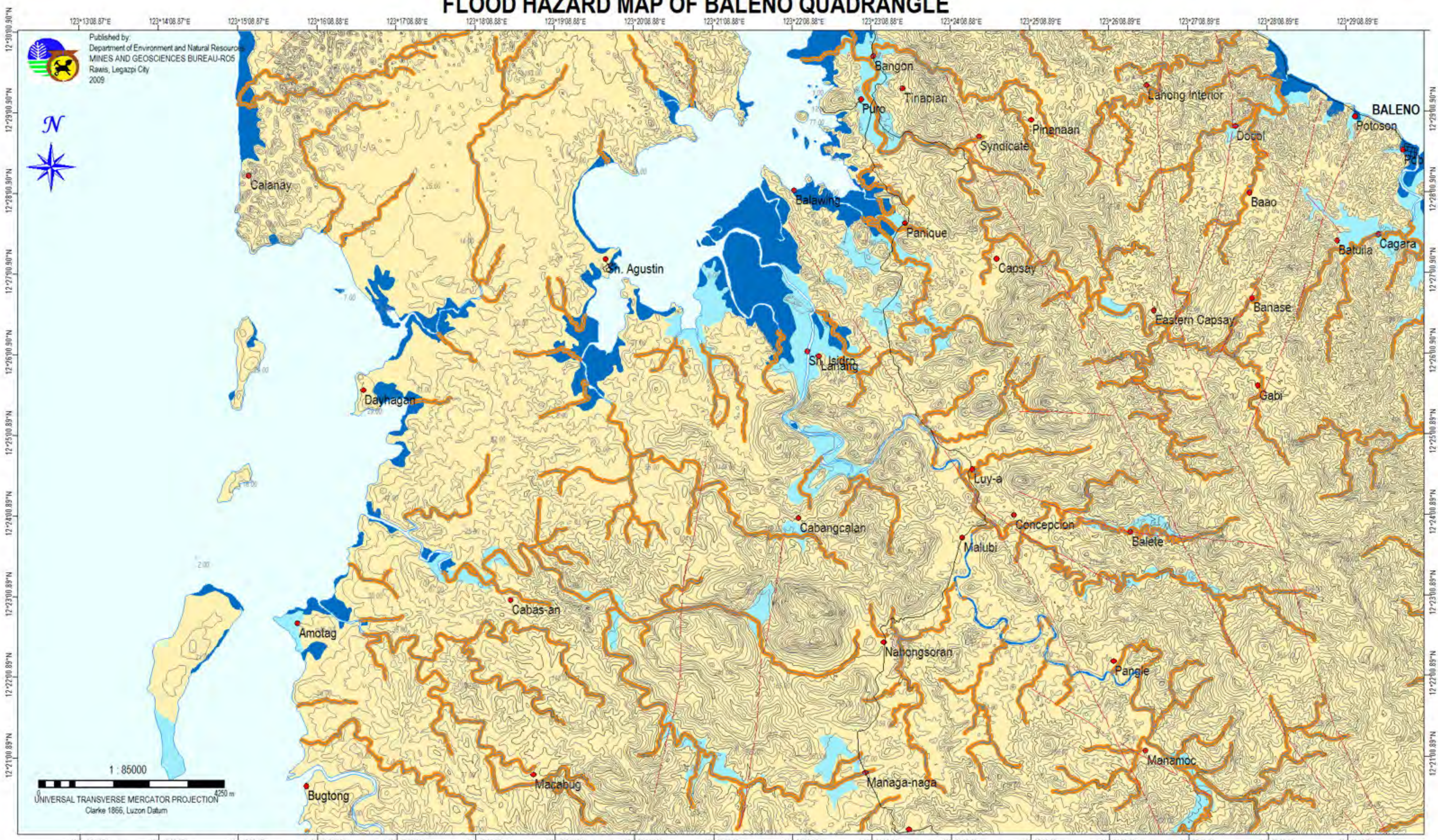
Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMaito
Geomorphological interpretation by: AEDayao
Digital cartographic processing by: AEDayao, RRLMapalad
GIS processing by: AEDayao
Checked by: RAJuan
Approved by: RAJuan

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

FLOOD HAZARD MAP OF BALENO QUADRANGLE



Published by:
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU-ROS
Raisa, Legazpi City
2009



1 : 85000

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon Datum

MAP LEGEND:

Landslide Susceptibility Zones

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

contour line

road

river

fault

EXPLANATIONS:

Flood hazard 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. Intermittent moderate to heavy rains of 1-2 days could bring about flooding in these areas. Moderate to strong typhoons accompanied by heavy rains could submerge these areas 0.5 to 3.0 m. in flood waters for a few days to a few weeks. Development of urban settlements in these areas is not

Occasionally to Rarely Flooded Areas:

Areas become inundated during moderate to strong typhoons accompanied by heavy rains. Flood depths vary from a few centimeters to 1 m. Floods last from a few hours to a few days.

Non Flood Prone Areas:

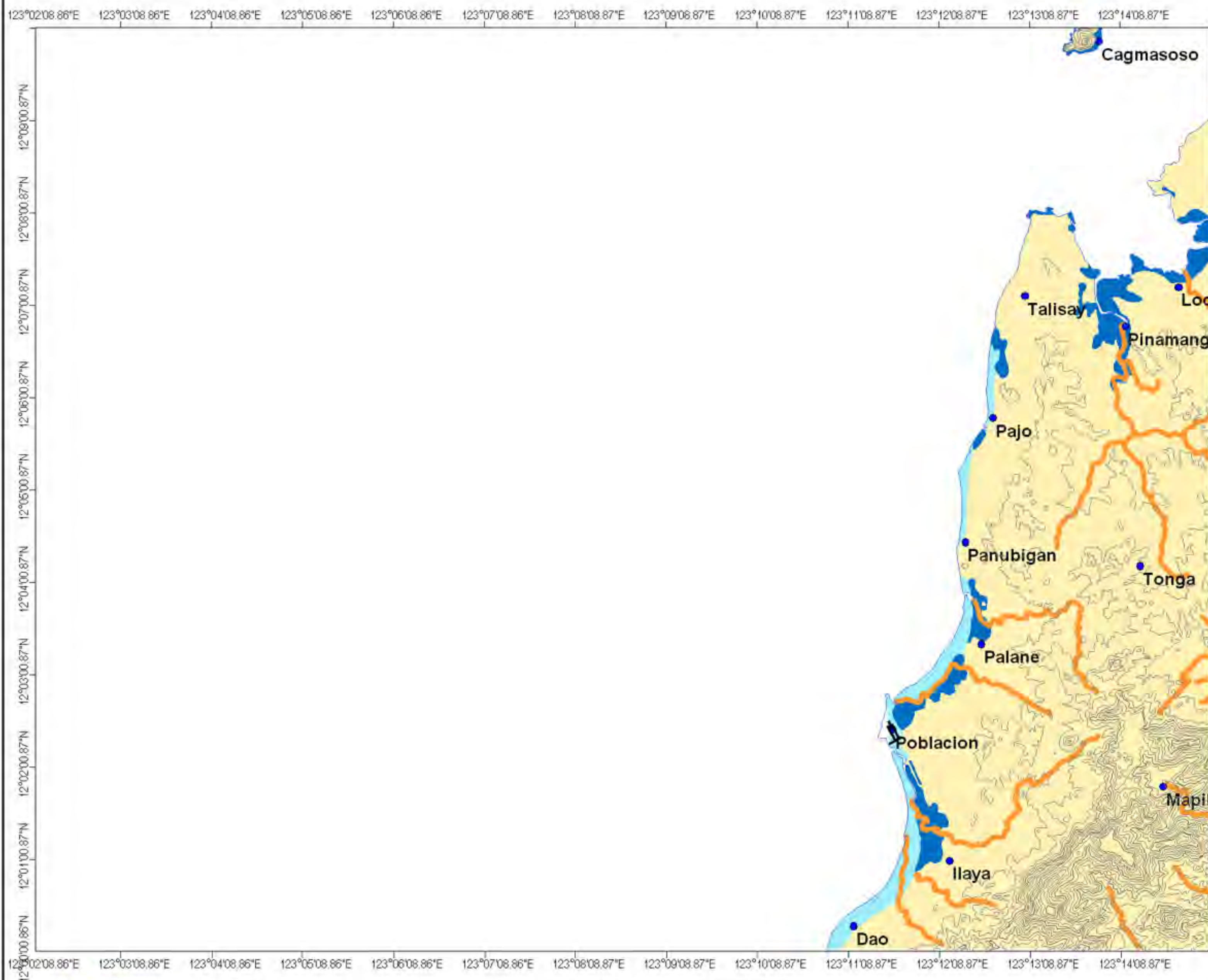
Areas with no reported flood occurrences except along low-lying areas immediately adjoining rivers or creeks but are unmapable in medium scale.

Areas Prone to Riverbank Erosion:

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

Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: EGBasilan
Digital cartographic processing by: AEDayao, RRLMapalad, EGBasilan
GIS processing by: EGBasilan
Checked by: RAJuan
Approved by: RAJuan
Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos

FLOOD SUSCEPTIBILITY MAP OF BALUD QUADRANGLE



MAP LEGEND: Flood Hazard Zones:

- non flood prone areas
- occasionally to rarely flooded areas
- regularly to frequently flooded areas
- sea

EXPLANATIONS:

Flood hazard susceptibility zones were derived based on the geomorphological analysis of landforms and fluvial systems. 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. This type of floods occurs on lake margins, the backswamps and fluvial basins and on abandoned river channels. Housing development in these areas is 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 last from a few hours to a few days.

Non Flood Prone Areas :

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

Areas prone to Bank Erosion :

Field data collection by : D. R. Dizon, E. Basilan, J. Malto, M. Miraballes
 Geomorphological Interpretation by : D.R. Dizon
 Digital cartographic processing by : D.R. Dizon
 GIS processing by : D.R. Dizon
 Checked by : A.E. Dayao
 Approved by : R.A. Juan

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



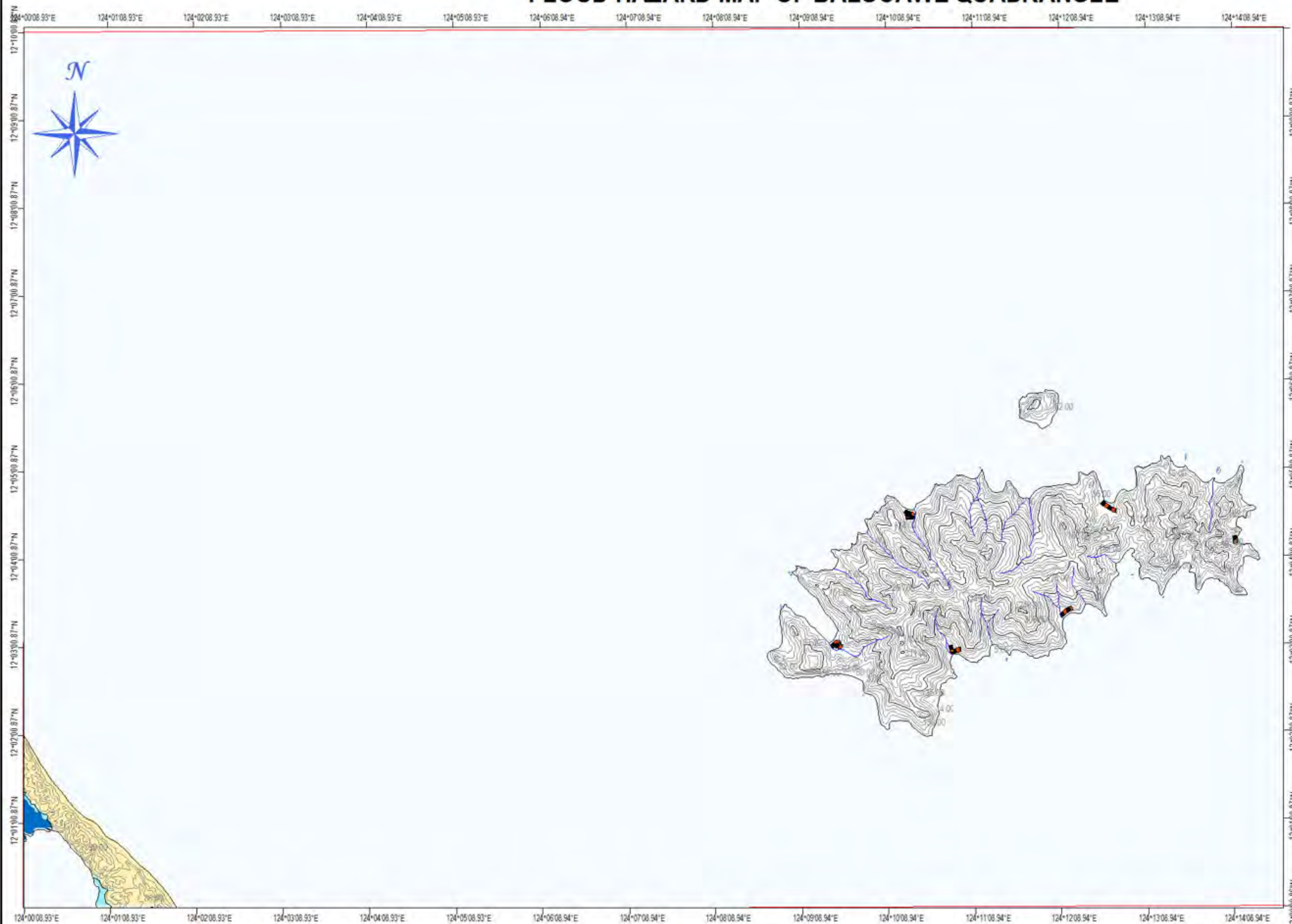
Published by:
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 Natural Resources
 Mines and Geosciences Bureau-RO5
 Rawis, Legaspi City
 2009

0 1:85000 4250

UNIVERSAL TRANSVERSE
 MERCATOR PROJECTION



FLOOD HAZARD MAP OF BALOCAWE QUADRANGLE



MAP LEGEND
Flood Hazard Zones:

- Non Flood Prone Areas
- Occasionally to rarely Flooded Areas
- Regularly to Frequently Flooded Areas

river
 road
 contour

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 1-2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 0.5 to 3.0 m. in flood waters for a few days to a few weeks. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:

Areas 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 except along low lying areas adjoining rivers or 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: A. E. Dayao, JM. S. Laud, E.T. Avila, E. G. Basilan, MN. L. Miraballes, J. N. Malto
 Geomorphological interpretation by: A. E. Dayao, E. G. Basilan
 Digital cartographic processing by: E. G. Basilan, D. G. Zepeda

GIS processing by: A. E. Dayao, E. G. Basilan
 Checked by: R.A. Juan
 Approved by: R.A. Juan

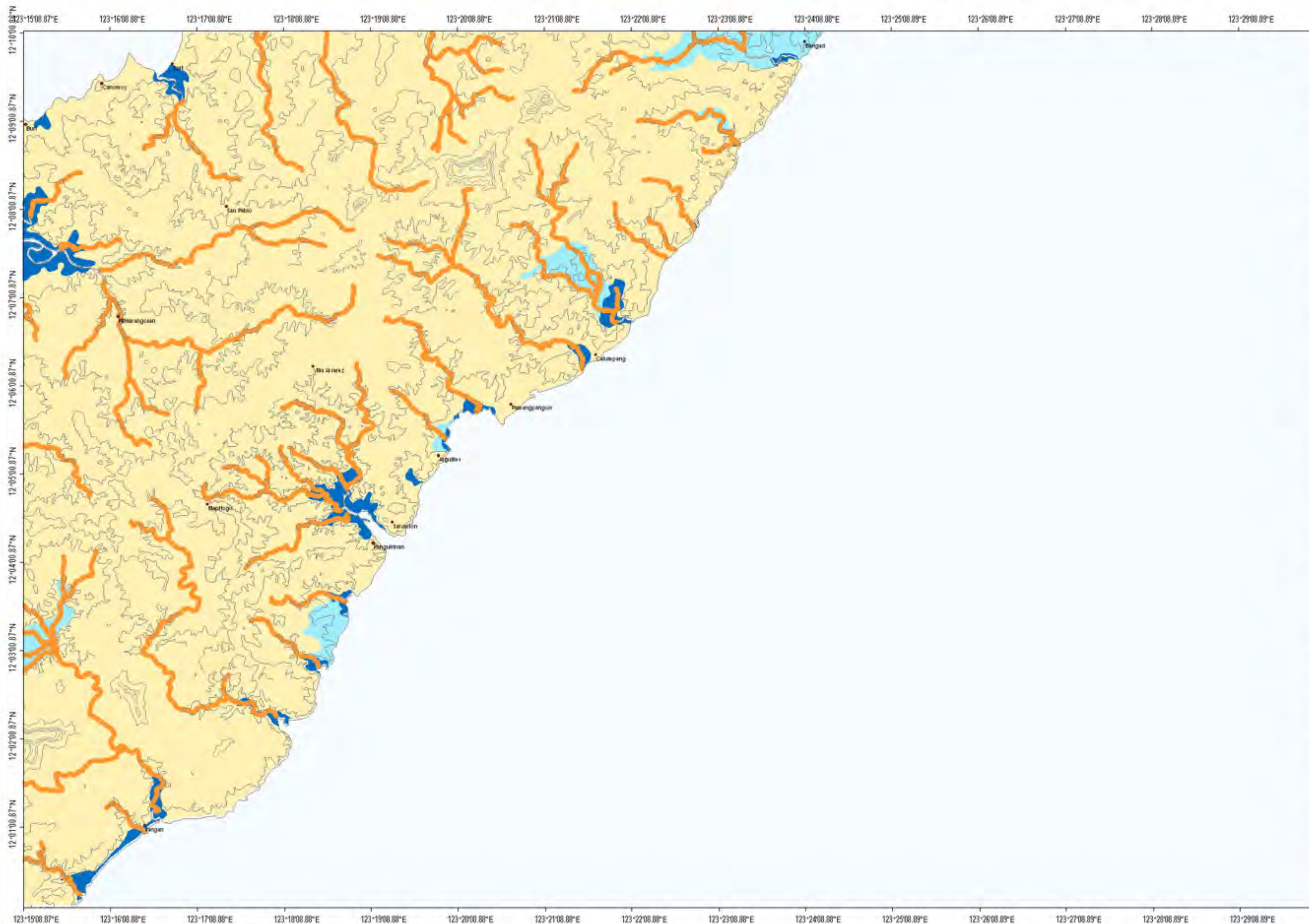
Other sources of information:
 1:50,000 NAMRIA Topographic Map
 1951 B/W Aerial photos



Published by:
 Department of Environment and Natural Resources
 MINES AND GEOSCIENCES BUREAU-RO5
 Rawis, Legazpi City, Albay
 2009

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

FLOOD HAZARD MAP OF CANOMOY QUADRANGLE



MAP LEGEND:

Flood Hazard Zones:

- regularly to frequently flooded areas
- occasionally to rarely flooded areas
- non flood prone areas
- sea
- >50 m. from riverbanks

- contour line
- fault
- 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 geomorphologically-based flood hazard mapping.

Regular 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 depth 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 low lying areas adjoining rivers or creeks.

Areas Prone to River Bank Erosion:
Areas 0 to 50 meters from river banks of active river channels that are prone to bank erosion.

Field Data Collection: A.E. Dayao, D.R. Dizon, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
Geomorphological Interpretation: A. E. Dayao, J. N. Malto
Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
GIS Processing by: A. E. Dayao, J. N. Malto
Checked by: R. A. Juan
Approved By: R. A. Juan

Other sources of information:

1:50,000 NAMRIA Topographic Map

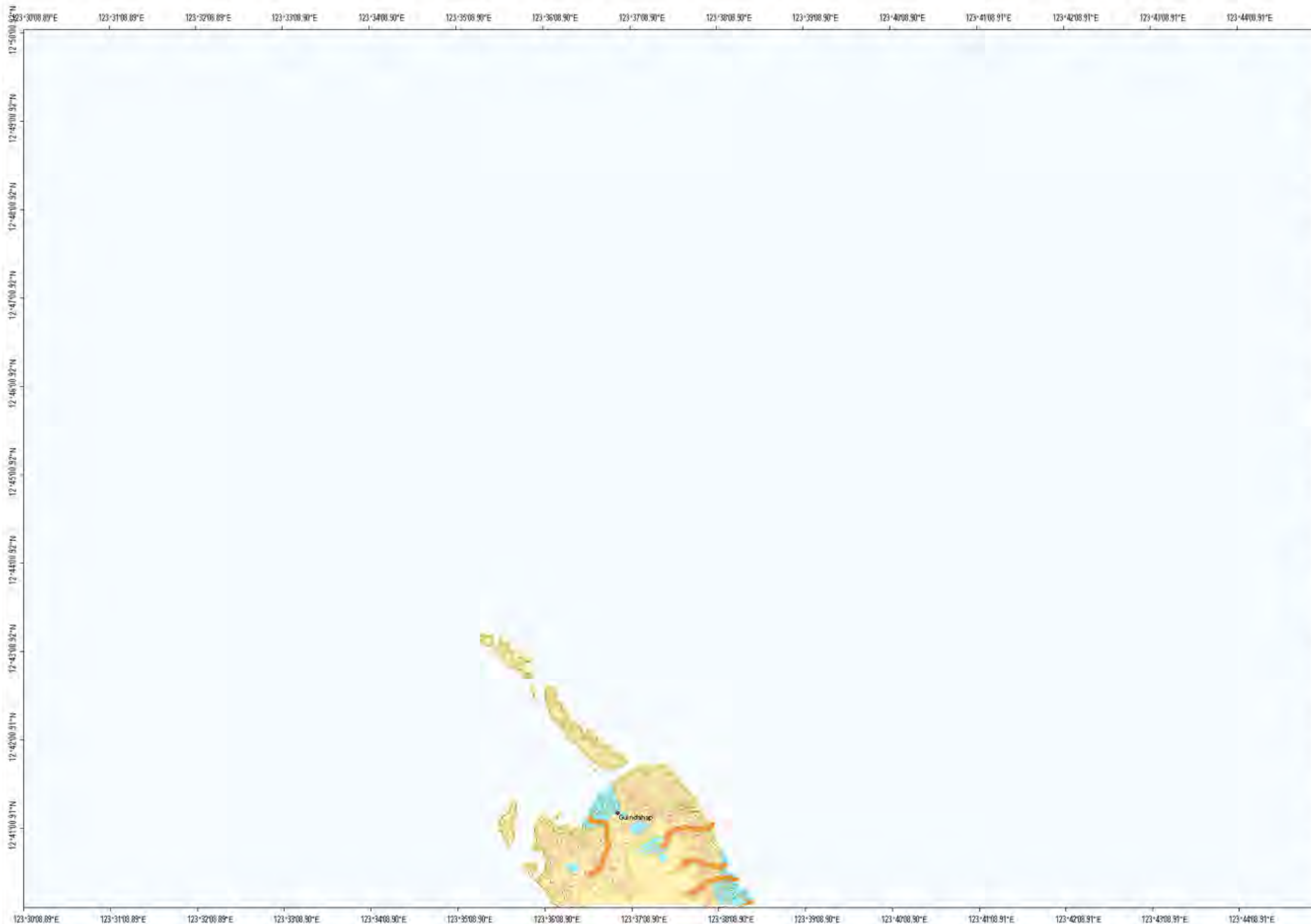


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Rawis, Legazpi City, Albay
2009

1:85000
0 4250 m
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Clarke 1866, Luzon Datum



FLOOD HAZARD MAP OF GUINDAHAP QUADRANGLE



MAP LEGEND:

Flood Hazard Zones:

- non flood prone areas
- occasionally to rarely flooded areas
- regularly to frequently flooded areas
- sea

- 20
- 7
- 7
- 10

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.

Regular 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. In Barangay Matubinao flood depths of 8 m have been reported. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:
Areas that become inundated during moderate to strong typhoons. Flood depth 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 low lying areas adjoining rivers or creeks.

Areas Prone to River Bank Erosion:
Areas 0 to 50 meters from river banks of active river channels that are prone to bank erosion.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basitan, M. N. L. Miraballes
Geomorphological Interpretation: A. E. Dayao, J. N. Malto
Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
GIS Processing by: A. E. Dayao, J. N. Malto
Checked by: R. A. Juan
Approved By: R. A. Juan

Other sources of information:

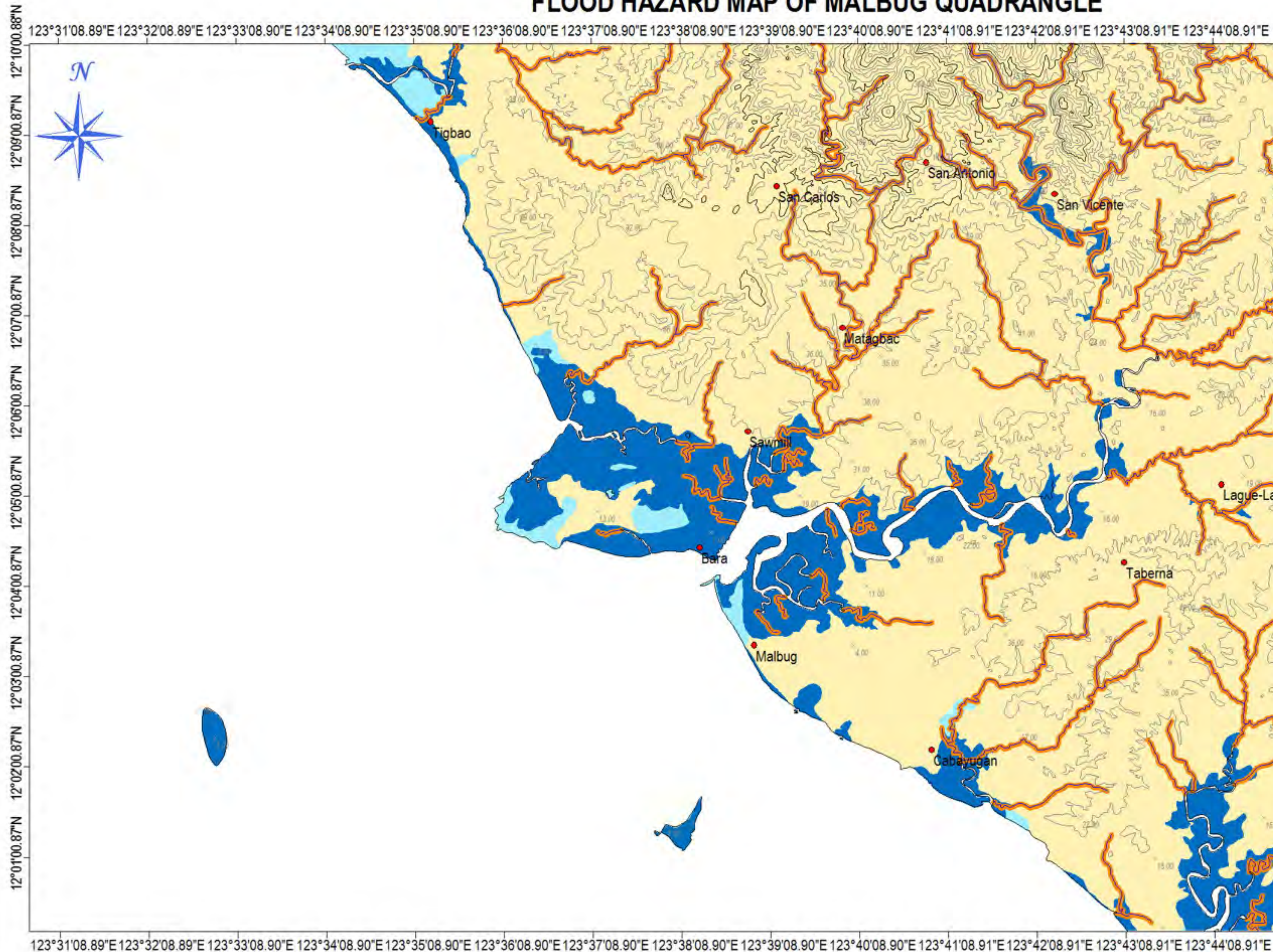


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2008

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0 4250 m
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Clarke 1866, Luzon Datum



FLOOD HAZARD MAP OF MALBUG QUADRANGLE



MAP LEGEND

Flood Hazard Zones:

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

- fault
- river

- contour

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 1-2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 0.5 to 3.0 m. in flood waters for a few days to a few weeks. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:

Areas 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 except along low lying areas adjoining rivers or 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: A. E. Dayao, JM. S. Laud, E.T. Avila, E. G. Basilan, MN. L. Miraballes, J. N. Malto
Geomorphological interpretation by: A. E. Dayao, E. G. Basilan

Digital cartographic processing by: E. G. Basilan, D. G. Zepeda

GIS processing by: A. E. Dayao, E. G. Basilan

Checked by: R.A. Juan

Approved by: R.A. Juan

Other sources of information:

1:50,000 NAMRIA Topographic Map



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Rawis, Legazpi City, Albay
2009

1 : 85000
0 4250
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Clarke 1866, Luzon Datum

FLOOD HAZARD MAP OF MANDAON QUADRANGLE

4250 m
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon Datum



Masbate City



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Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU-RO5
Ranis, Legazpi City
2009

MAP LEGEND

Flood Hazard Zones:

- areas prone to river bank erosion
- non flood prone areas
- occasionally to rarely flooded areas
- regularly to frequently flooded areas
- sea
- contour line
- Railroad
- dike
- river
- fault
- road
- coast

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. Intermittent moderate to heavy rains of 1 to 2 days could bring about flooding in these areas. Moderate to strong typhoons accompanied by heavy rains 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 accompanied by heavy rains. 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 except in low-lying areas immediately adjoining rivers and creeks but are unmappable in medium scale.

Areas Prone to Riverbank Erosion:

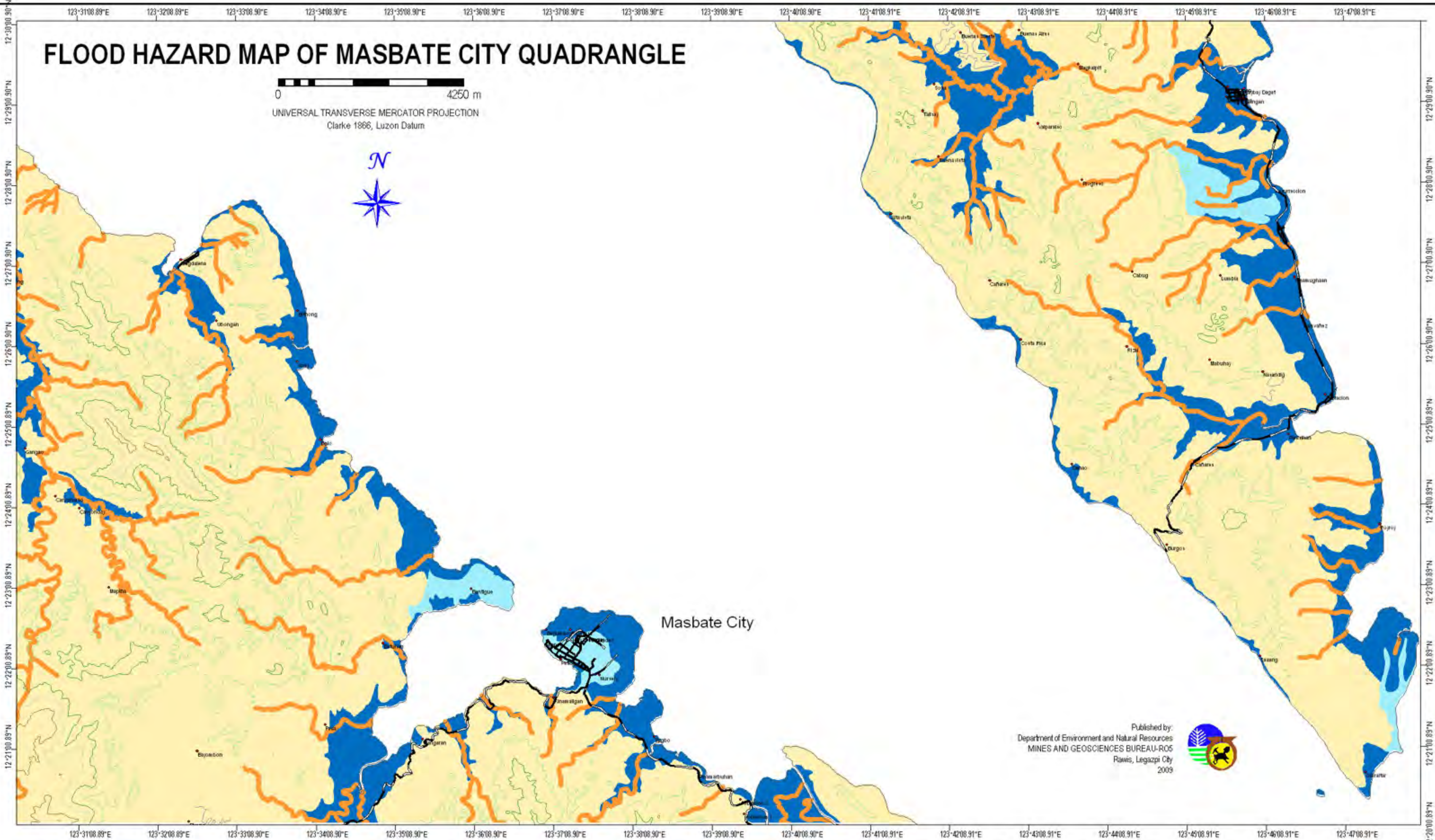
Areas 0 to 50 m. from river banks that are prone to scouring and erosion.

Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: JNMalto
Digital cartographic processing by: JNMalto, RRLMapalad
GIS processing by: JNMalto
Checked by: RAJuan
Approved by: RAJuan

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

FLOOD HAZARD MAP OF MASBATE CITY QUADRANGLE

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



MAP LEGEND

Flood Hazard Zones:

- non flood prone areas
- occasionally to rarely flooded areas
- regularly to frequently flooded areas
- areas prone to river bank erosion

- contour line
- road
- fault

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. Intermittent moderate to heavy rains of 1 to 2 days could bring about flooding in these areas. Moderate to strong typhoons accompanied by heavy rains 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 accompanied by heavy rains. 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 except in low-lying areas immediately adjoining rivers and creeks but are unmappable in medium scale.

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

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Ranis, Legazpi City
2009



Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: JNMalto
Digital cartographic processing by: JNMalto, RRLMapalad
GIS processing by: JNMalto
Checked by: RAJuan
Approved by: RAJuan

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

FLOOD HAZARD MAP OF NARO QUADRANGLE



MAP LEGEND

Flood Hazard Zones:

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

— river
— contour

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 1-2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 0.5 to 3.0 m. in flood waters for a few days to a few weeks. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:

Areas 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 except

Field data collection by: A. E. Dayao, JM. S. Laud, E.T. Avila, E. G. Basilan, MN. L. Miraballes, J. N. Malto
 Geomorphological interpretation by: A. E. Dayao, E. G. Basilan
 Digital cartographic processing by: E. G. Basilan, D. G. Zepeda
 GIS processing by: A. E. Dayao, E. G. Basilan
 Checked by: R.A. Juan
 Approved by: R.A. Juan

Other sources of information:



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 Rawis, Legazpi City, Albay
 2008

1 : 85000
 0 4250
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 Clarke 1866, Luzon Datum

FLOOD HAZARD MAP OF PALANAS 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
- contour line
- fault
- 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.

Regular 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. In Barangay Matubinao flood depths of 8 m have been reported. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:
Areas that become inundated during moderate to strong typhoons. Flood depth 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 low lying areas adjoining rivers or creeks.

Areas Prone to River Bank Erosion:
Areas 0 to 50 meters from river banks of active river channels that are prone to bank erosion.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
Geomorphological Interpretation: A. E. Dayao, J. N. Malto
Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
GIS Processing by: A. E. Dayao, J. N. Malto
Checked by: R. A. Juan
Approved By: R. A. Juan

Other sources of Information:
1:50,000 NAD83 Topographic Maps

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Rawis, Legazpi City, Albay
2008

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



FLOOD HAZARD MAP OF PEÑAFRANCIA QUADRANGLE



Flood Hazard Zones:

- regularly to frequently flooded areas
- occasionally to rarely flooded areas
- non flood prone areas
- areas prone to river bank erosion

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.

Regular 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. In Barangay Matubinao flood depths of 8 m have been reported. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:

Areas that become inundated during moderate to strong typhoons. Flood depth 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 low lying areas adjoining rivers or creeks.

Areas Prone to River Bank Erosion:

Areas 0 to 50 meters from river banks of active river channels that are prone to bank erosion.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basilar, M. N. L. Miraballes
 Geomorphological Interpretation: A. E. Dayao, J. N. Malto
 Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
 GIS Processing by: A. E. Dayao, J. N. Malto
 Checked by: R. A. Juan
 Approved By: R. A. Juan

Other sources of Information:
 1:50,000 NAMRIA Topographic Map



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FLOOD HAZARD MAP OF PLACER 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

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 1-2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 0.5 to 3.0 m. in flood waters for a few days to a few weeks. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:

Areas 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 except along low lying areas adjoining rivers or 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: A. E. Dayao, JM. S. Laud, E.T. Avila, E. G. Basilan, MN. L. Miraballes, J. N. Malto

Geomorphological interpretation by: A. E. Dayao, E. G. Basilan

Digital cartographic processing by: E. G. Basilan, D. G. Zepeda

GIS processing by: A. E. Dayao, E. G. Basilan

Checked by: R.A. Juan

Approved by: R.A. Juan

Other sources of information:

1:50,000 NAMRIA Topographic Map



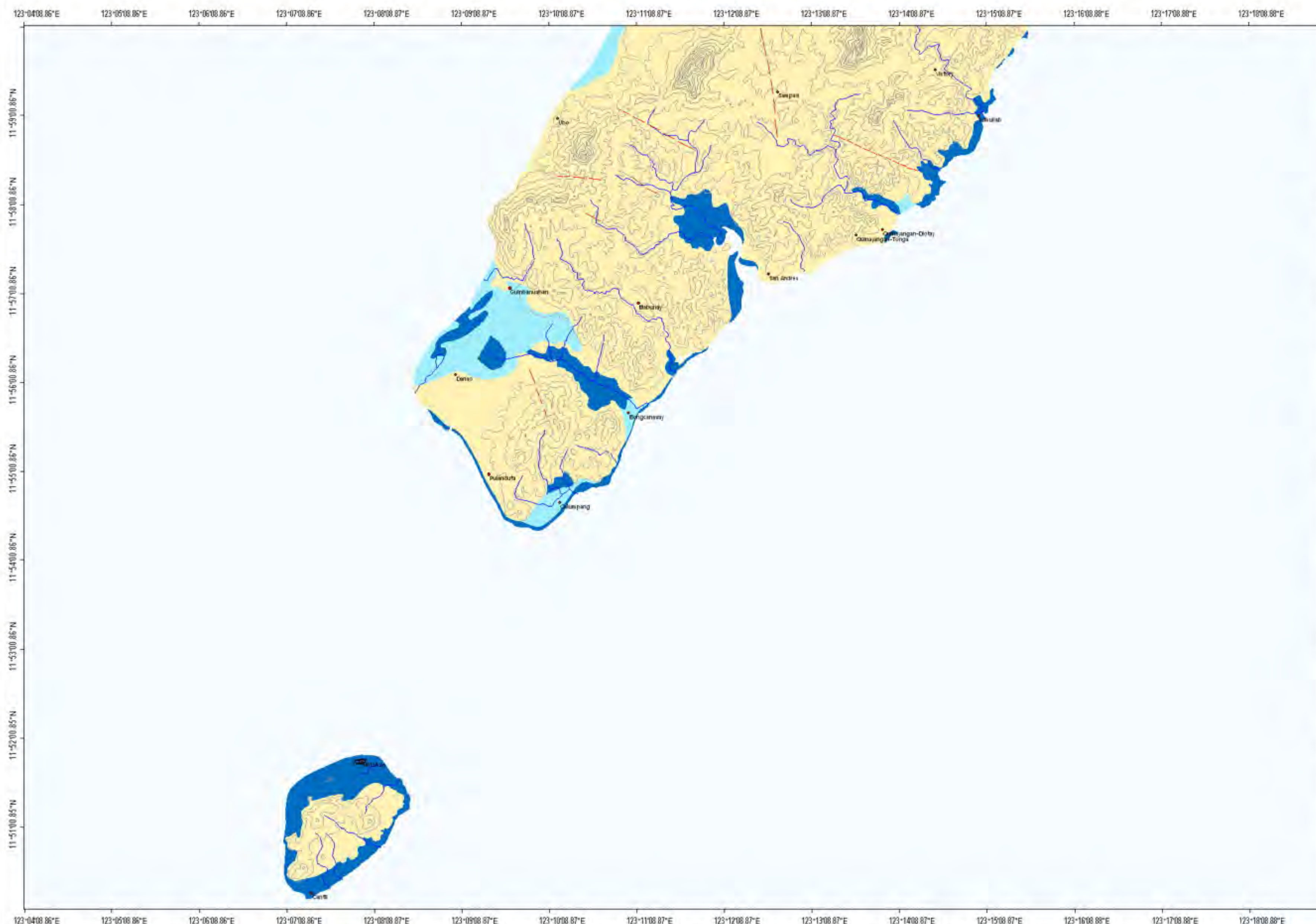
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2008



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Clarke 1866, Luzon Datum



FLOOD HAZARD MAP OF PULANDUTA 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
- sea

— contour line
— fault
— 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.

Regular 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 depth 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 low lying areas adjoining rivers or creeks.

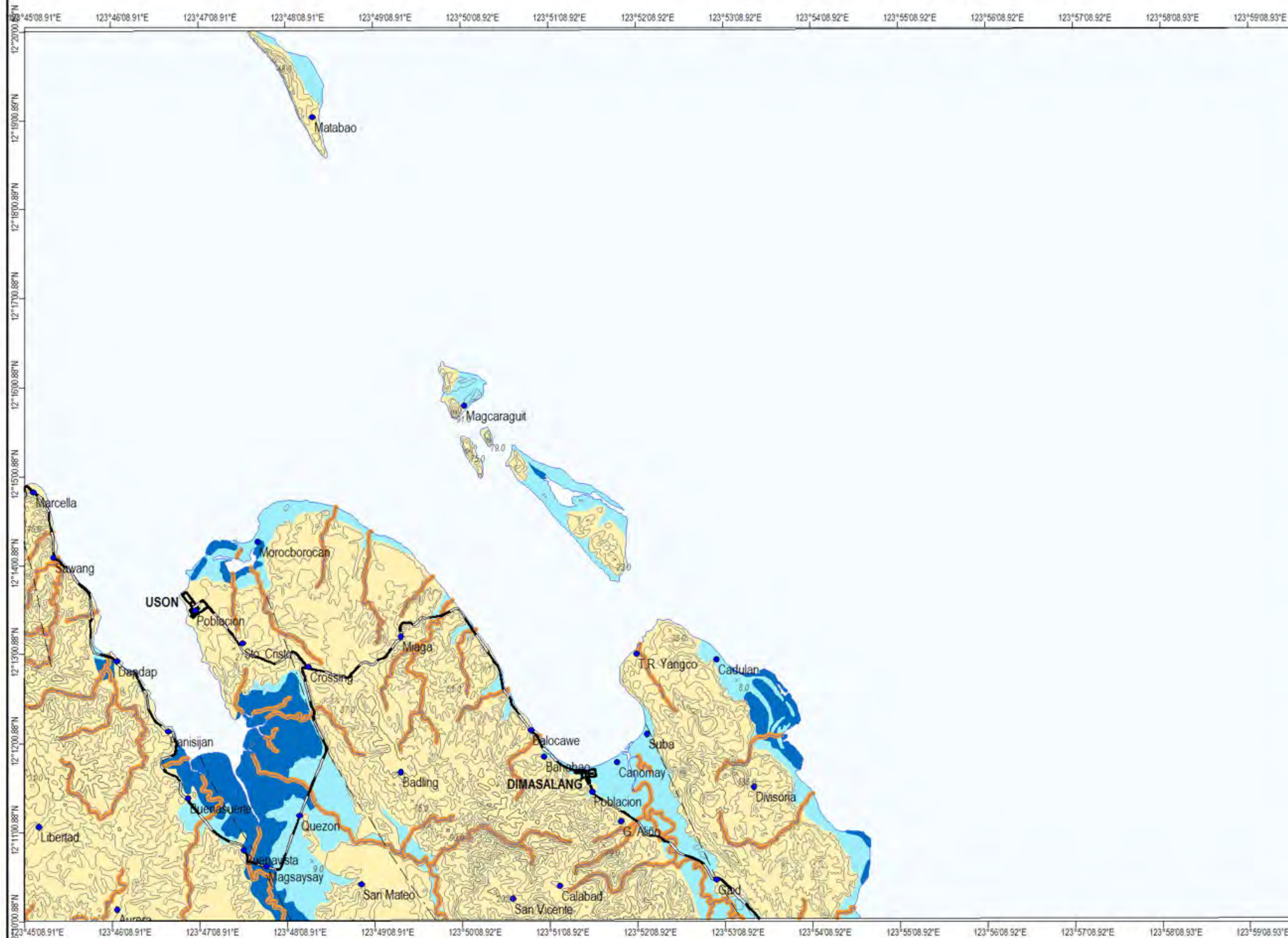
Areas Prone to River Bank Erosion:
Areas 0 to 50 meters from river banks of active river channels that are prone to bank erosion.

Field Data Collection: A.E. Dayao, D.R. Dizon, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
 Geomorphological Interpretation : A. E. Dayao, J. N. Malto
 Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
 GIS Processing by: A. E. Dayao, J. N. Malto
 Checked by: R. A. Juan
 Approved By: R. A. Juan

Other sources of information:
 1:50,000 NAMRIA Topographic Map



FLOOD HAZARD MAP OF USON 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

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 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: A.E. Dayao, J.M.S. Laud, E.T. Avila, M.N.L. Miraballes, E.G. Basilan & J.N. Malto
Geomorphological interpretation by: M.N.L. Miraballes
Digital cartographic processing by: M.N.L. Miraballes
GIS processing by: M.N.L. Miraballes
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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2008

0 4250 m

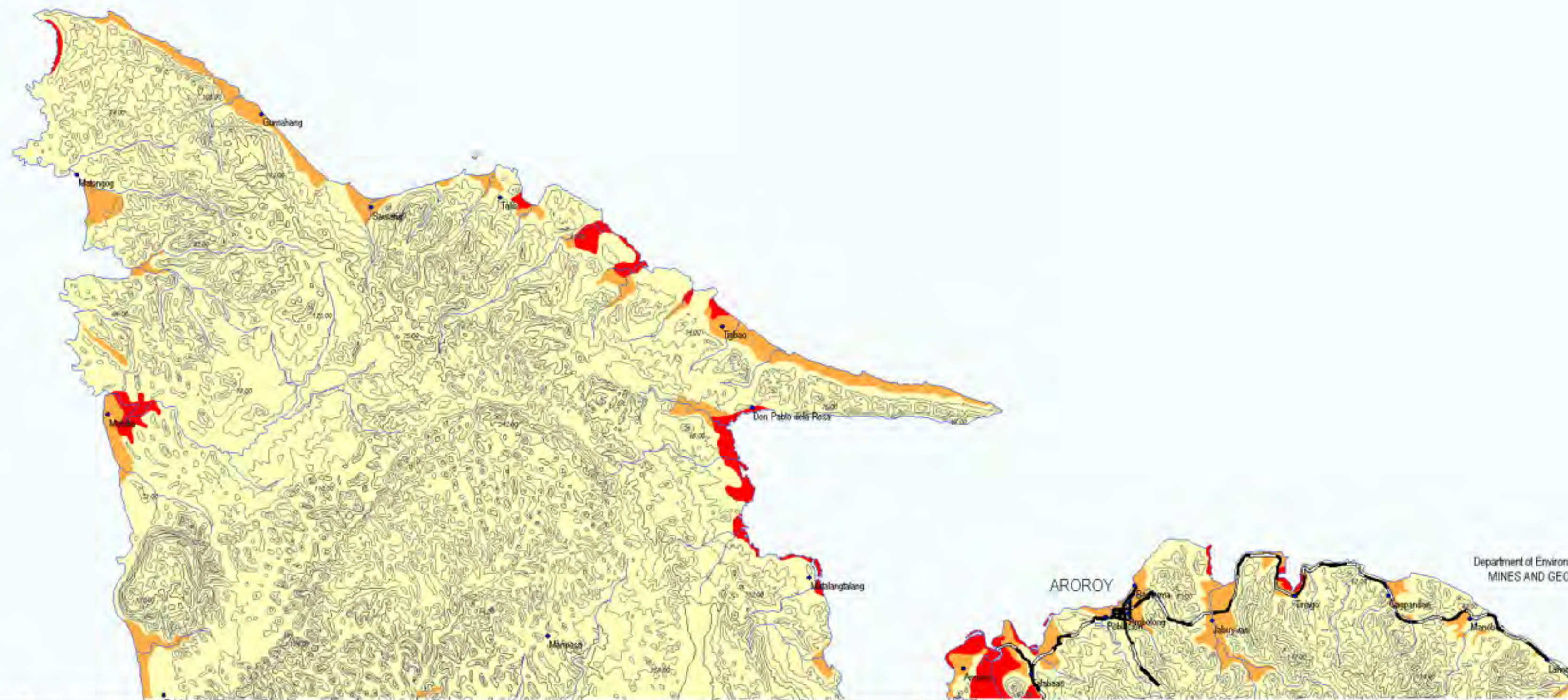
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Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF AROROI QUADRANGLE

0 4250 m

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
Clarke 1866, Luzon Datum



MAP LEGEND: Liquefaction Potential Zones

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

contour line
river
road

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 methodologies used by Iwasaki and Yasuda.

Areas where Liquefaction is Likely:

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

Areas where Liquefaction is Possible:

The narrow coastal plains of Aroroy, the alluvial plains and the elongated alluvial plains and narrow valleys formed along minor rivers 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 possibility of liquefaction is unlikely.

Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMallo
Geomorphological interpretation by: AEDayao
Digital cartographic processing by: AEDayao, RRLMapalad

GIS processing by: AEDayao

Checked by: RAJuan

Approved by: RAJuan

Other sources of Information:
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LIQUEFACTION POTENTIAL MAP OF BALUD QUADRANGLE



MAP LEGEND : Liquefaction Hazard Zones :

- areas where liquefaction is likely
- areas where liquefaction is not likely
- sea

EXPLANATIONS :

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

Areas where Liquefaction is Likely.
Areas where liquefaction is likely to occur include riverbeds, old or abandoned riverbed and meanders and river terraces. These areas are not suitable for housing development. Multi-storey buildings should be required geotechnical studies addressing or mitigating the possible effects of liquefaction.

Areas where Liquefaction is not Likely.

Areas where liquefaction is unlikely to occur: Most parts of the Balud Quadrangle Map Sheet is not prone to liquefaction because of the presence of underlying bedrock.

Field data collection by : D.R.Dizon, M.Miraballes, J. Malto, E. Basilan
Geomorphological Interpretation by : D.R.Dizon
Digital cartographic processing by : D.R. Dizon
GIS Processing by : D.R. Dizon
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

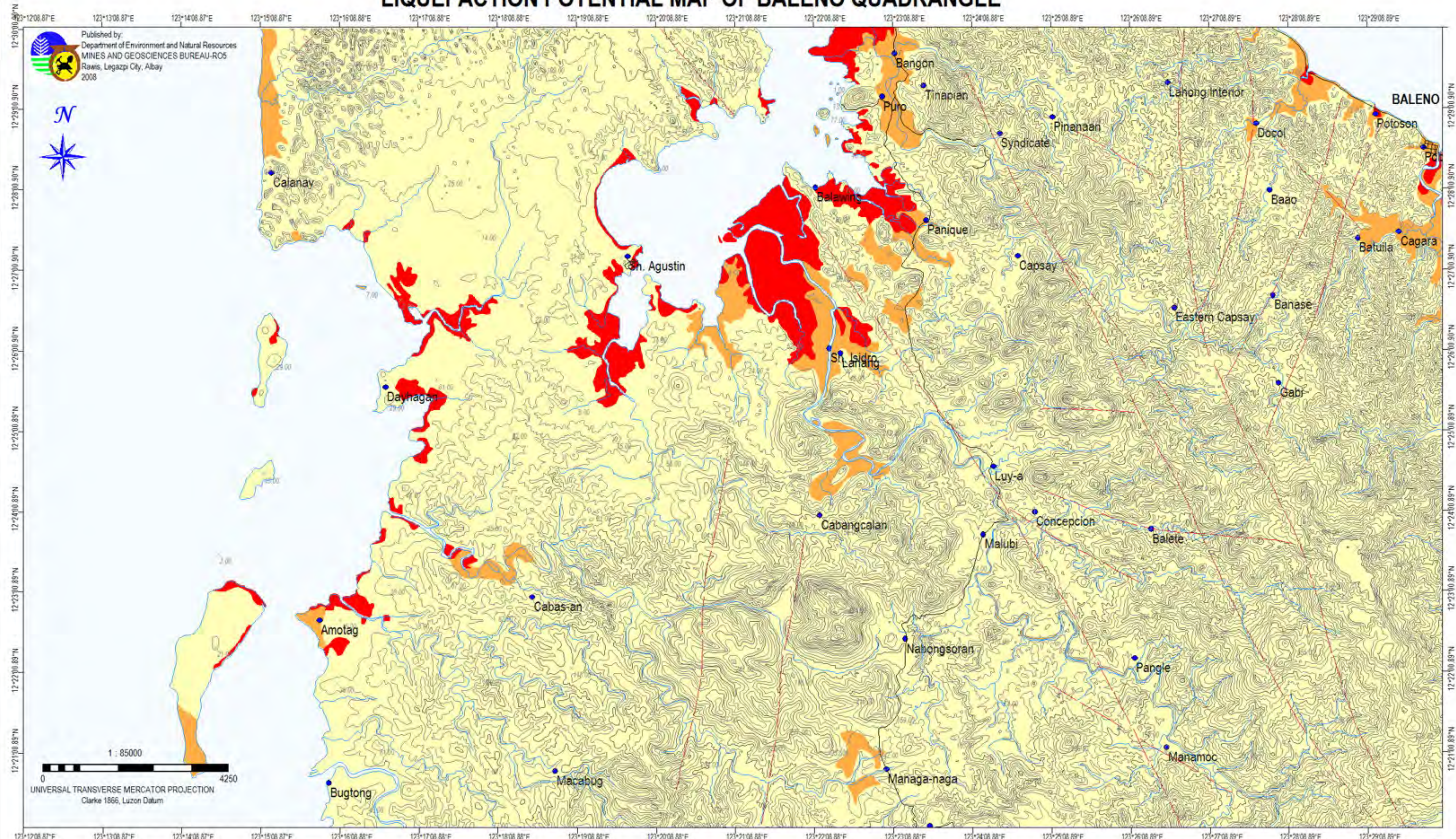


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Rawis, Legaspi City
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Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF BALENO QUADRANGLE



MAP LEGEND:

Liquefaction Potential Zones

- Areas where Liquefaction is Likely
- Areas where Liquefaction is Possible
- Areas where Liquefaction is Not Likely

— contour line

— fault

— river

— road

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 active/young tidal flats with nipa and mangrove, beach ridge and swale complex and spit. These areas are unsuitable for urban development. Multi-storey building should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas Where Liquefaction is Possible:

Coastal plains and the 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 the likelihood of liquefaction is unlikely.

Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMaillo

Geomorphological interpretation by: EGBasilan

Digital cartographic processing by: AEDayao, RRLMapalad, EGBasilan

GIS processing by: EGBasilan

Checked by: RAJuan

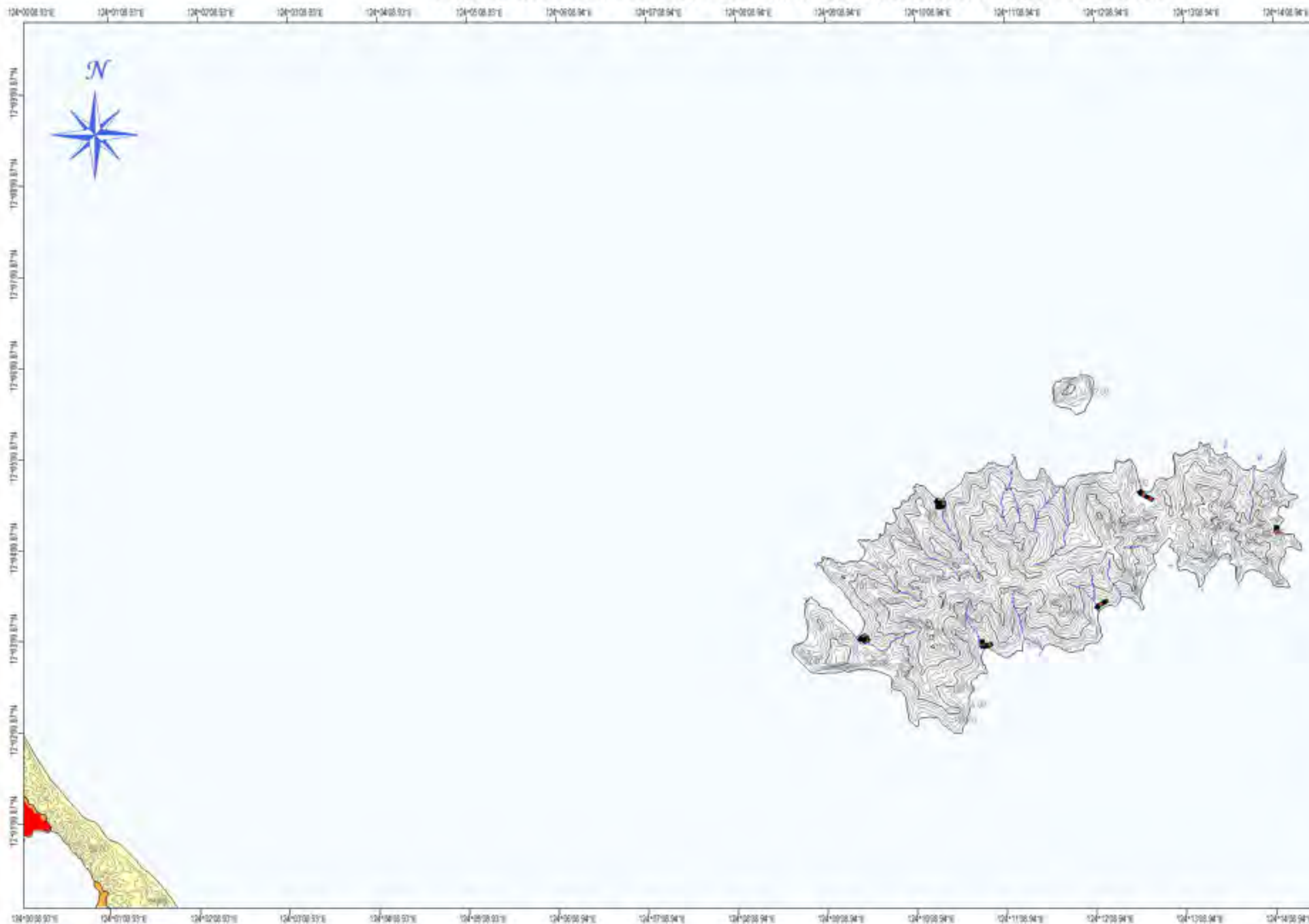
Approved by: RAJuan

Other sources of Information:

1:50,000 NAMRIA Topographic Map

1951 B/W Aerial photos

LIQUEFACTION POTENTIAL MAP OF BALOCAWE 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 active/young tidal flats with nipa and mangrove, beach ridge and swale complex and spit. These areas are unsuitable for urban development. Multi-story building should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas Where Liquefaction is Possible:

Coastal plains and the 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 the likelihood of liquefaction is unlikely.

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T.

Avila, E.G. Baslian, M.N.L. Miraballes, J.N. Malto

Geomorphological interpretation by: A.E. Dayao, E.G. Baslian

Digital cartographic processing by: E.G. Baslian, D.G. Zepeda

GIS processing by: A.E. Dayao, E.G. Baslian

Checked by: R.A. Juan

Approved by: R.A. Juan

Other sources of information:

1:50,000 NAMRIA Topographic Map

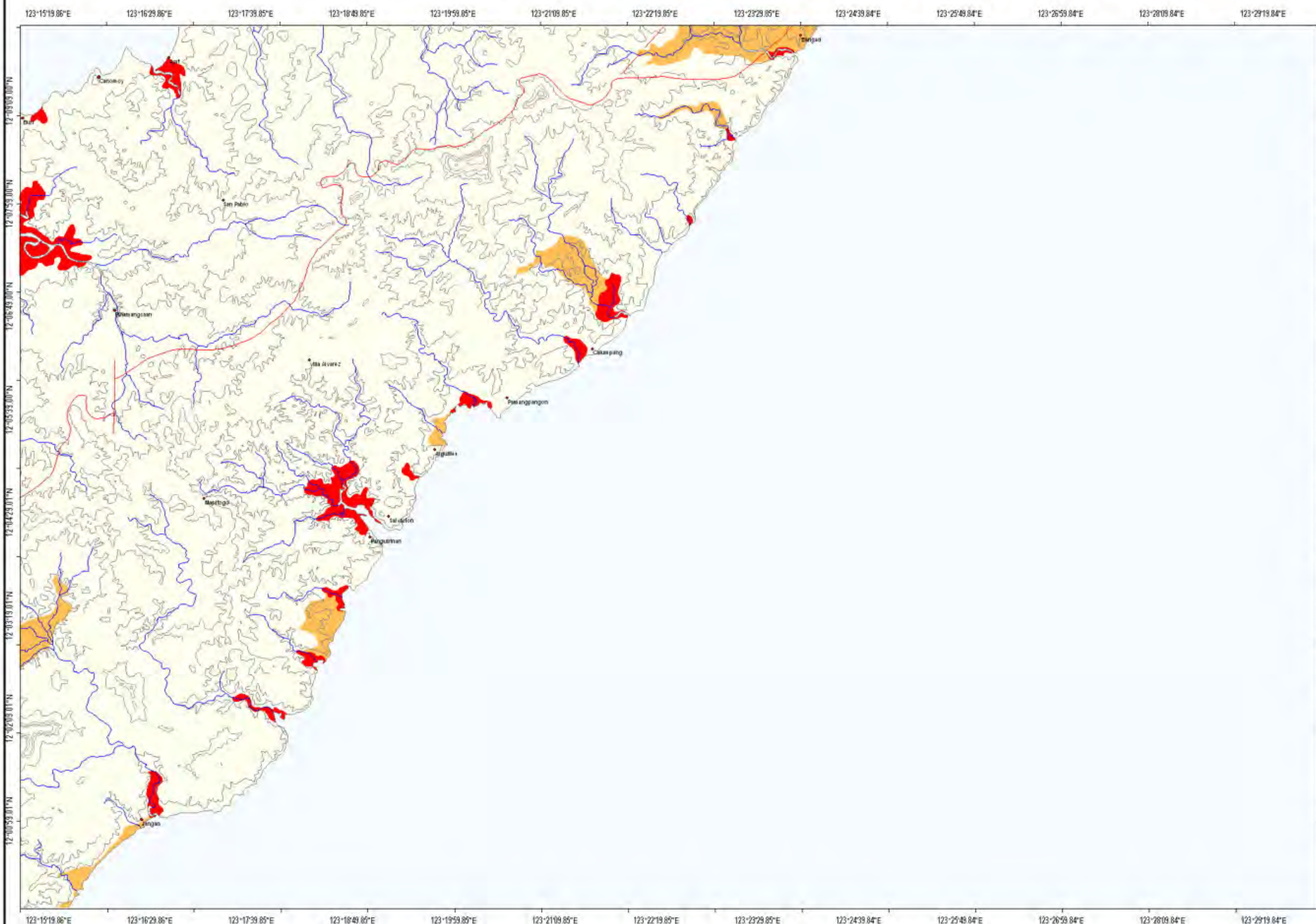
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Roxas, Legazpi City, Albay
2009

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Clarke 1866, Luzon Datum

LIQUEFACTION POTENTIAL MAP OF CANOMOY QUADRANGLE



MAP LEGEND:

Ground Subsidence and Ground Subsidence Susceptibility Zones:

- areas where liquefaction is likely
- areas where liquefaction is not likely
- areas where liquefaction is possible
- sea
- contour line
- fault
- river

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, lakes, lake fan, ponds and coastal plain. 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 Palanas Quadrangle Map sheet is not prone to liquefaction because of the presence of underlying bedrock.

Field Data Collection: A.E. Dayao, D.R. Dizon, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
Geomorphological Interpretation: A. E. Dayao, J. N. Malto
Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
GIS Processing by: A. E. Dayao, J. N. Malto
Checked by: R. A. Juan
Approved By: R. A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map

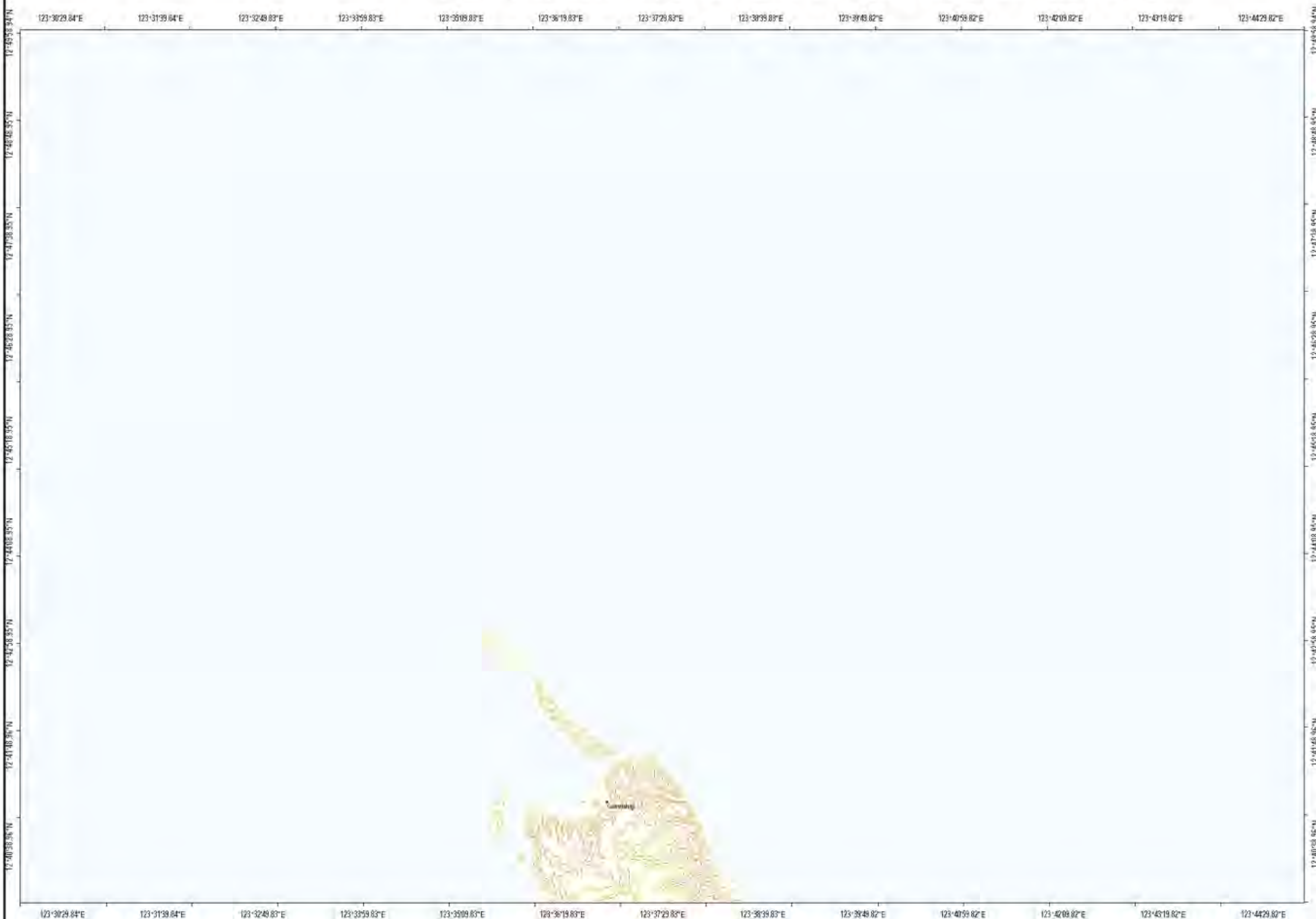


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2009

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Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF GUINDAHAP QUADRANGLE



MAP LEGEND:

Ground Subsidence and Ground Subsidence Susceptibility Zones:

- areas where liquefaction is likely
- areas where liquefaction is not likely
- areas where liquefaction is possible
- contour

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, lakes, lake fan, ponds and coastal plain. 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 Palanas Quadrangle Map sheet is not prone to liquefaction because of the presence of underlying bedrock.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J.N. Malto, E.G. Basilan, M.N.L. Miraballes
Geomorphological Interpretation: A.E. Dayao, J.N. Malto
Digital Cartographic Processing by: J.N. Malto, R.L. Mapalad
GIS Processing by: A.E. Dayao, J.N. Malto
Checked by: R.A. Juan
Approved By: R.A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map

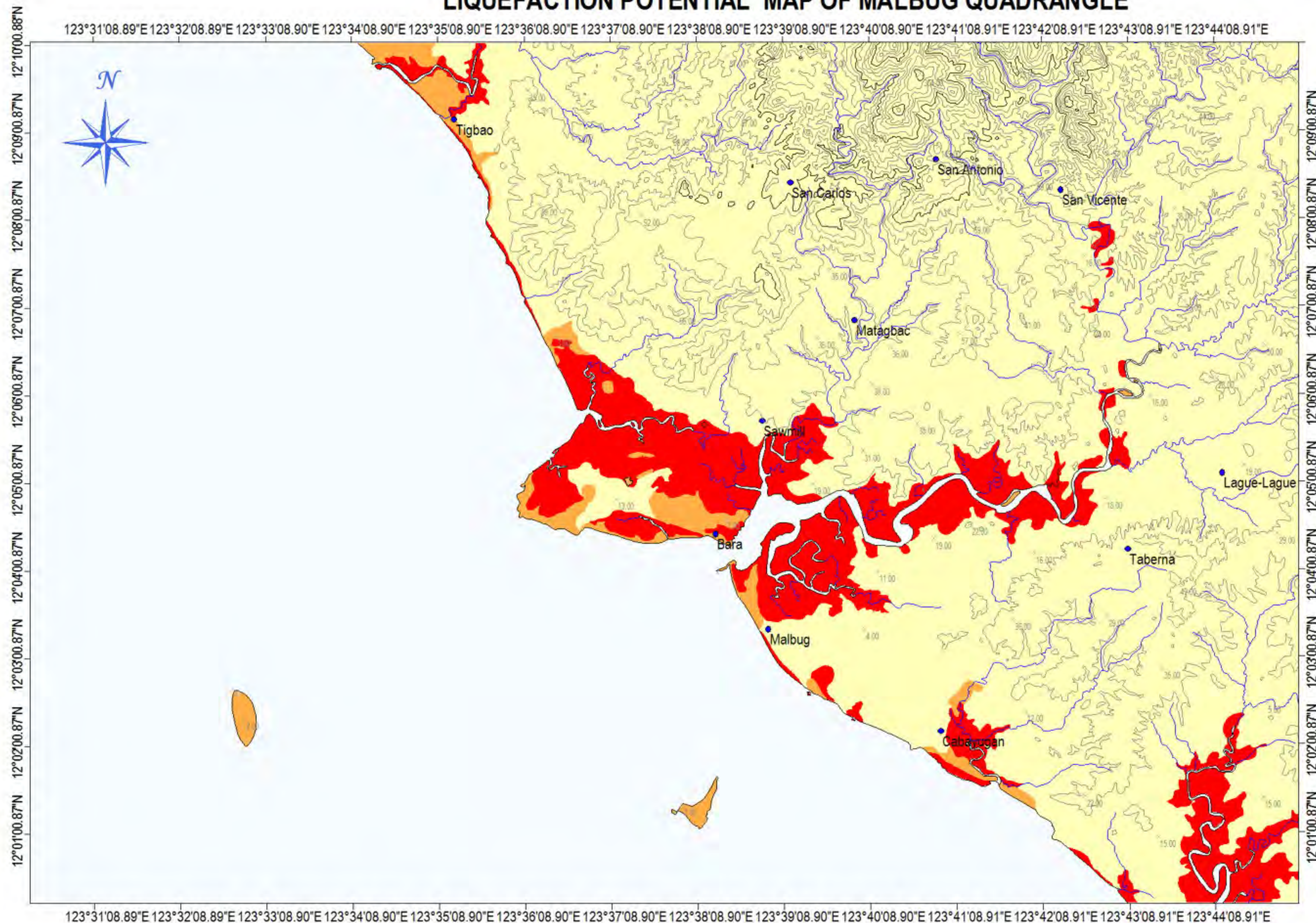


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Rawis, Legazpi City, Albay
2008

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LIQUEFACTION POTENTIAL MAP OF MALBUG QUADRANGLE



MAP LEGEND:
Liquefaction Potential Zones:

- areas where liquefaction is likely
- areas where liquefaction is not likely
- areas where liquefaction is possible

— fault
— river
— 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 active/young tidal flats with nipa and mangrove, beach ridge and swale complex and spit. These areas are unsuitable for urban development. Multi-storey building should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

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

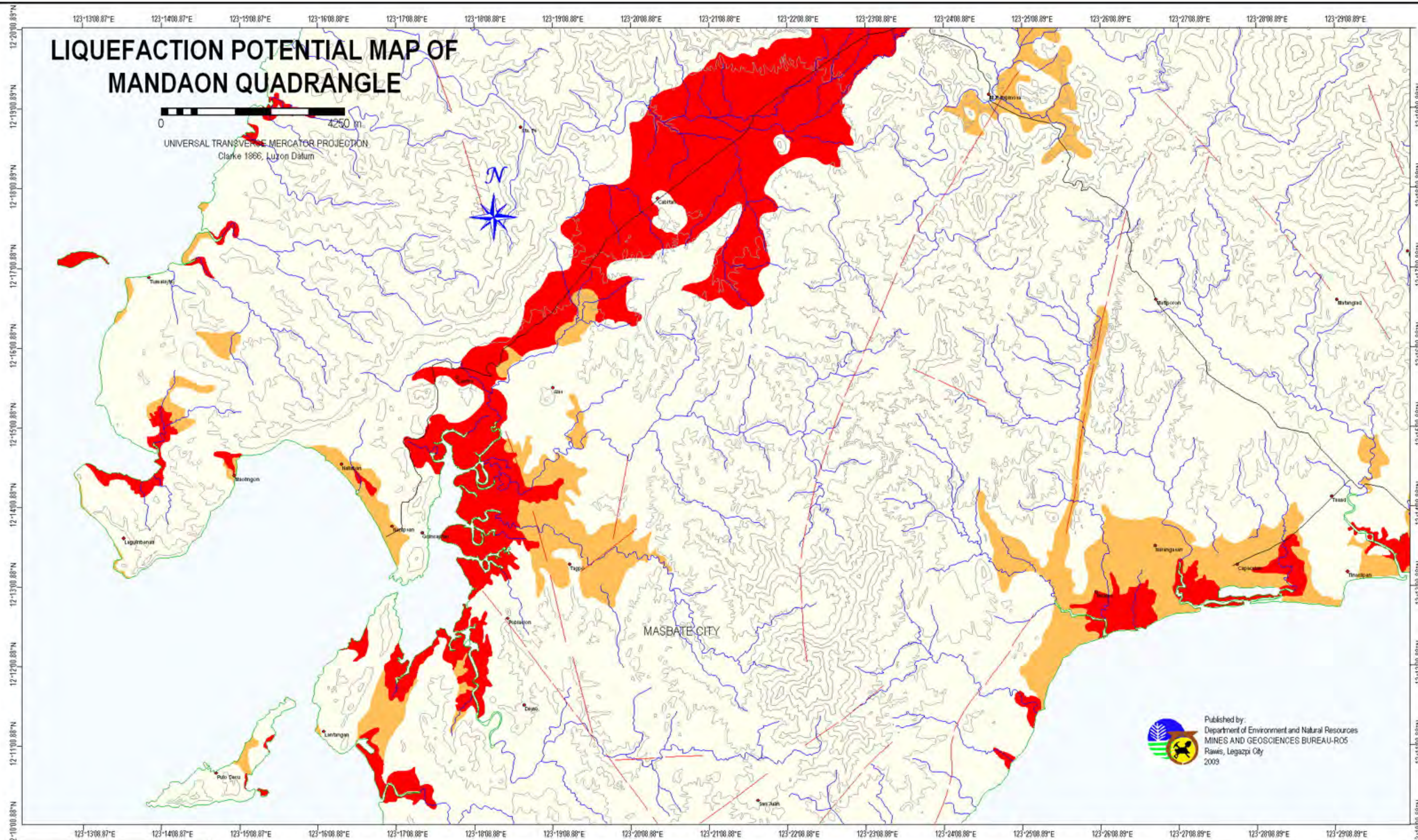
Areas where Liquefaction is not Likely:
Areas where the likelihood of liquefaction is unlikely.

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
GIS processing by: A.E. Dayao, E.G. Basilan
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

LIQUEFACTION POTENTIAL MAP OF MANDAON QUADRANGLE

0 4250 m
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MAP LEGEND: Liquefaction Potential Zones

- areas where liquefaction is likely
- areas where liquefaction is not likely
- areas where liquefaction is possible
- sea
- contour line
- Railroad
- dike
- river
- fault
- road

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 methodologies used by Iwasaki and Yasuda.

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

Areas where Liquefaction is Possible:
The narrow coastal plains of Aroroy, the alluvial plains and the elongated alluvial plains and narrow valleys formed along minor rivers are areas where liquefaction is possible. Buildings having 5 storeys or more should be required a full geotechnical study.

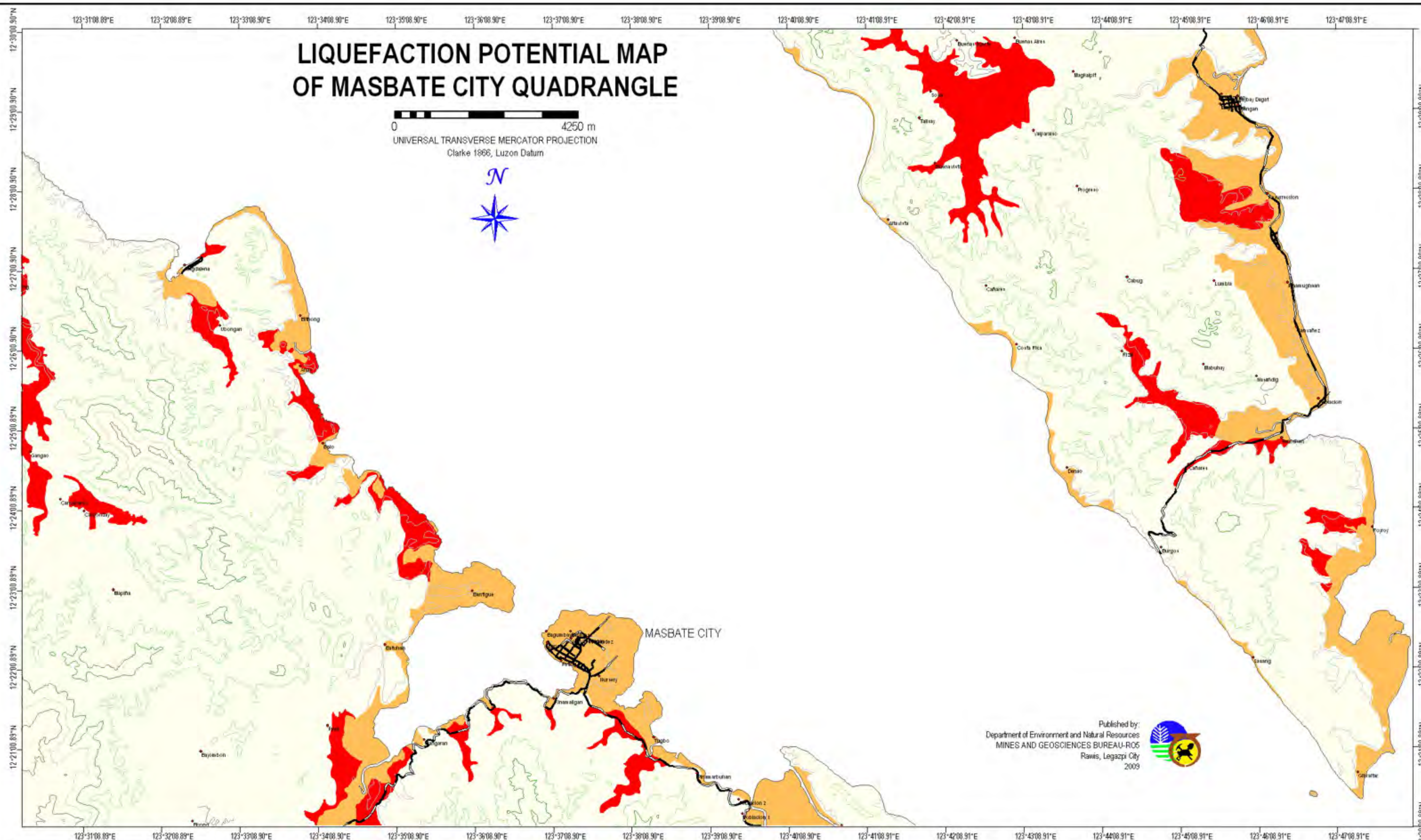
Areas where Liquefaction is not Likely:
Areas where the possibility of liquefaction is unlikely.

Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: JNMalto
Digital cartographic processing by: JNMalto, RRLMapalad
GIS processing by: JNMalto
Checked by: RAJuan
Approved by: RAJuan

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

LIQUEFACTION POTENTIAL MAP OF MASBATE CITY QUADRANGLE

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



MAP LEGEND: Liquefaction Potential Zones

- Areas where liquefaction is likely
- Areas where liquefaction is possible
- Areas where liquefaction is not likely
- sea
- contour line
- fault
- river
- road

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 methodologies used by Iwasaki and Yasuda.

Areas where Liquefaction is Likely:

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

Areas where Liquefaction is Possible:

The narrow coastal plains of Aroroy, the alluvial plains and the elongated alluvial plains and narrow valleys formed along minor rivers 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 possibility of liquefaction is unlikely.

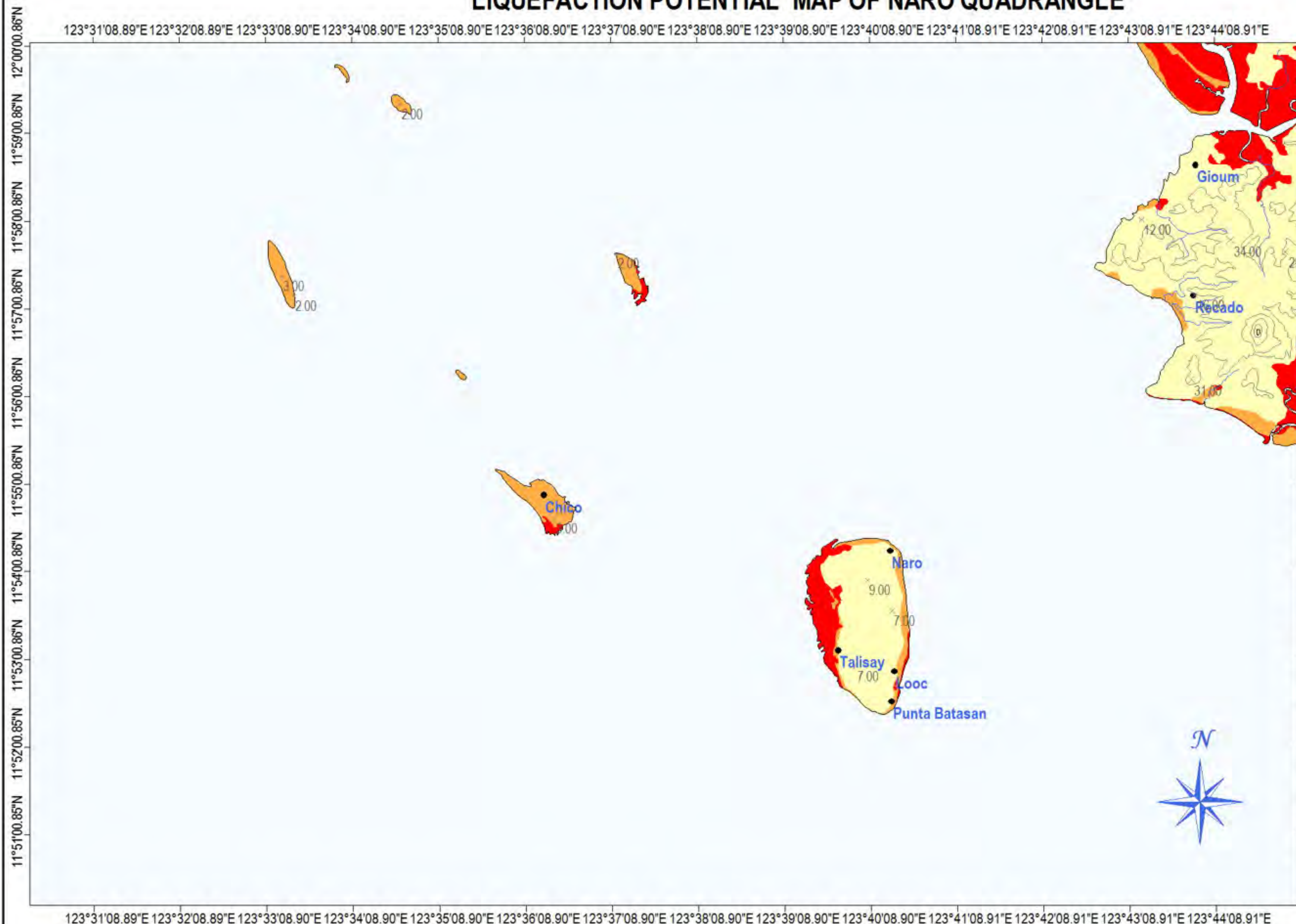
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Rawis, Legazpi City
2009



Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: JNMalto
Digital cartographic processing by: JNMalto, RRLMapalad
GIS processing by: JNMalto
Checked by: RAJuan
Approved by: RAJuan

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

LIQUEFACTION POTENTIAL MAP OF NARO QUADRANGLE



MAP LEGEND:
Liquefaction Potential
Zones:
■ Areas where Liquefaction is Likely
■ Areas where Liquefaction is not Likely
■ Areas where Liquefaction is Possible
— river
— 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.

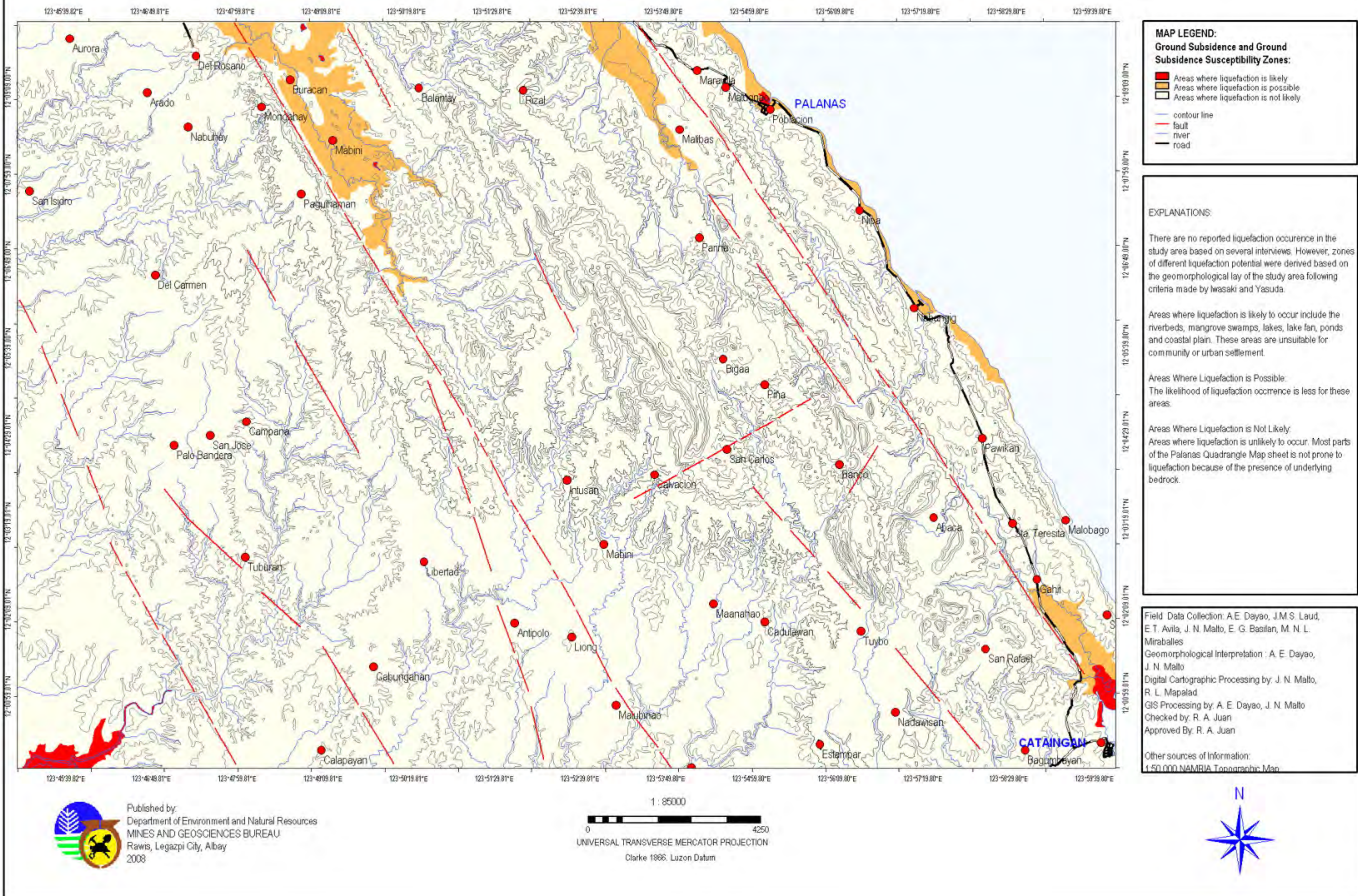
Areas where Liquefaction is Likely:
 Areas where liquefaction is likely include active/young tidal flats with nipa and mangrove, beach ridge and swale complex and spit. These areas are unsuitable for urban development. Multi-storey building should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas Where Liquefaction is Possible:
 Coastal plains and the alluvial plains are areas where liquefaction is possible. Buildings having 5 storeys or more should be required a full

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
 Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
 Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
 GIS processing by: A.E. Dayao, E.G. Basilan
 Checked by: R.A. Juan
 Approved by: R.A. Juan

Other sources of information:
 1:50 000 NAMRIA Topographic Map

LIQUEFACTION POTENTIAL MAP OF PALANAS QUADRANGLE



LIQUEFACTION POTENTIAL MAP OF PEÑAFRANCIA QUADRANGLE



MAP LEGEND:

Ground Subsidence and Ground Subsidence Susceptibility Zones:

- areas where liquefaction is likely
- areas where liquefaction is not likely
- areas where liquefaction is possible
- sea

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, lakes, lake fan, ponds and coastal plain. 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 Palanas Quadrangle Map sheet is not prone to liquefaction because of the presence of underlying bedrock.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
Geomorphological Interpretation: A. E. Dayao, J. N. Malto
Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
GIS Processing by: A. E. Dayao, J. N. Malto
Checked by: R. A. Juan
Approved By: R. A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map

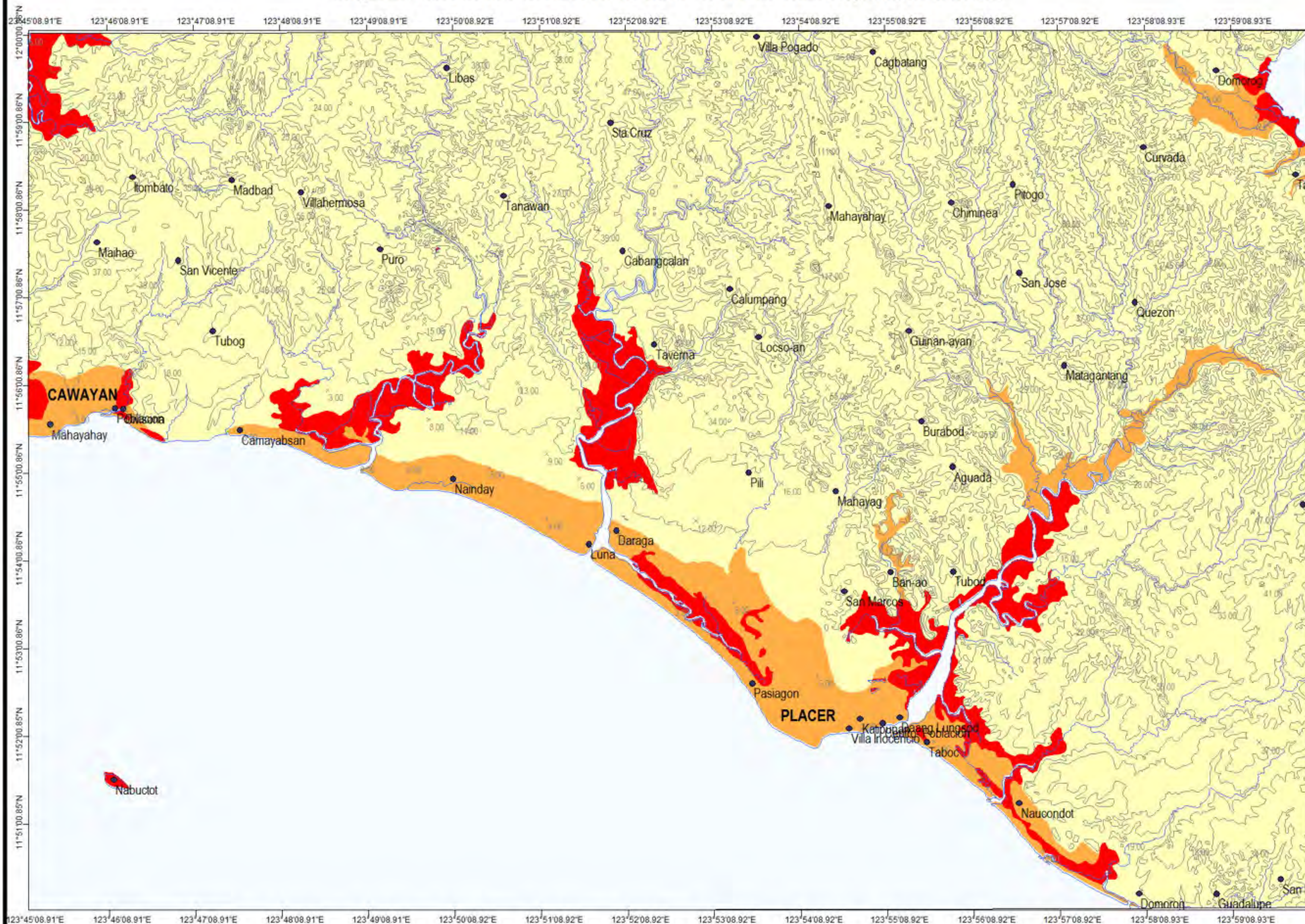


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LIQUEFACTION POTENTIAL MAP OF PLACER QUADRANGLE



MAP LEGEND

Liquefaction Potential Zones:

- Areas where Liquefaction is Likely
- Areas where Liquefaction is Possible
- Areas where Liquefaction is not Likely

- river
- road
- contour

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 active/young tidal flats with nipa and mangrove, beach ridge and swale complex and spit. These areas are unsuitable for urban development. Multi-storey storey building should be required of geotechnical studies addressing or mitigating the effects of liquefaction.

Areas Where Liquefaction is Possible:
Coastal plains and the 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 the likelihood of liquefaction is unlikely.

Field data collection by: A. E. Dayao, JM. S. Laud, E.T. Avila, E. G. Basilan, MN. L. Miraballes, J. N. Malto
Geomorphological interpretation by: A. E. Dayao, E. G. Basilan
Digital cartographic processing by: E. G. Basilan, D. G. Zepeda
GIS processing by: A. E. Dayao, E. G. Basilan
Checked by: R.A. Juan
Approved by: R.A. Juan

Other sources of information:
1:50,000 NAMRIA Topographic Map
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2008

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LIQUEFACTION POTENTIAL MAP OF PULANDUTA QUADRANGLE

MAP LEGEND:
Ground Subsidence and Ground Subsidence Susceptibility Zones:

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

— contour line
— fault
— river
— road

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, lakes, lake fan, ponds and coastal plain. 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 Palanas Quadrangle Map sheet is not prone to liquefaction because of the presence of underlying bedrock.

Field Data Collection: A.E. Dayao, D.R. Dizon, E.T. Avila, J.N. Malto, E.G. Basilan, M.N.L. Miraballes
Geomorphological Interpretation: A.E. Dayao, J.N. Malto
Digital Cartographic Processing by: J.N. Malto, R.L. Mapalad
GIS Processing by: A.E. Dayao, J.N. Malto
Checked by: R.A. Juan
Approved By: R.A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map

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Rawis, Legazpi City, Albay
2009

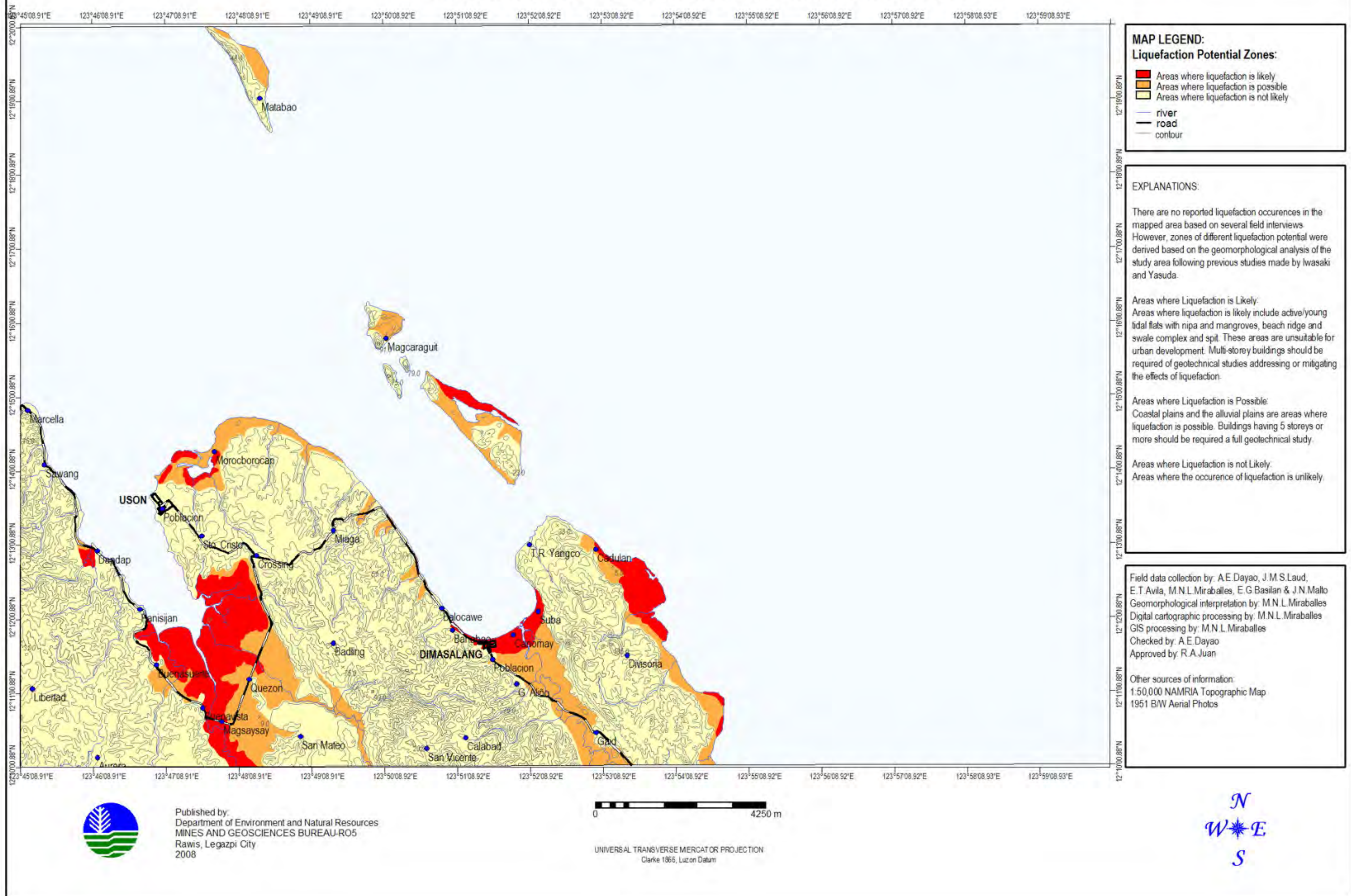
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Clarke 1866, Luzon Datum

Other sources of information:
1:50,000 NAMBIA Topographic Map

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0 4250
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Clarke 1866, Luzon Datum



LIQUEFACTION POTENTIAL MAP OF USON QUADRANGLE



LANDSLIDE SUSCEPTIBILITY MAP OF BALENO QUADRANGLE

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2009



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0 4250 m
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Clarke 1866, Luzon Datum

- MAP LEGEND:**
Landslide Susceptibility Zones
- Absent
 - Low Susceptibility to Landslides
 - Moderate Susceptibility to Landslides
 - High Susceptibility to Landslides
 - contour line
 - road
 - river
 - fault

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.

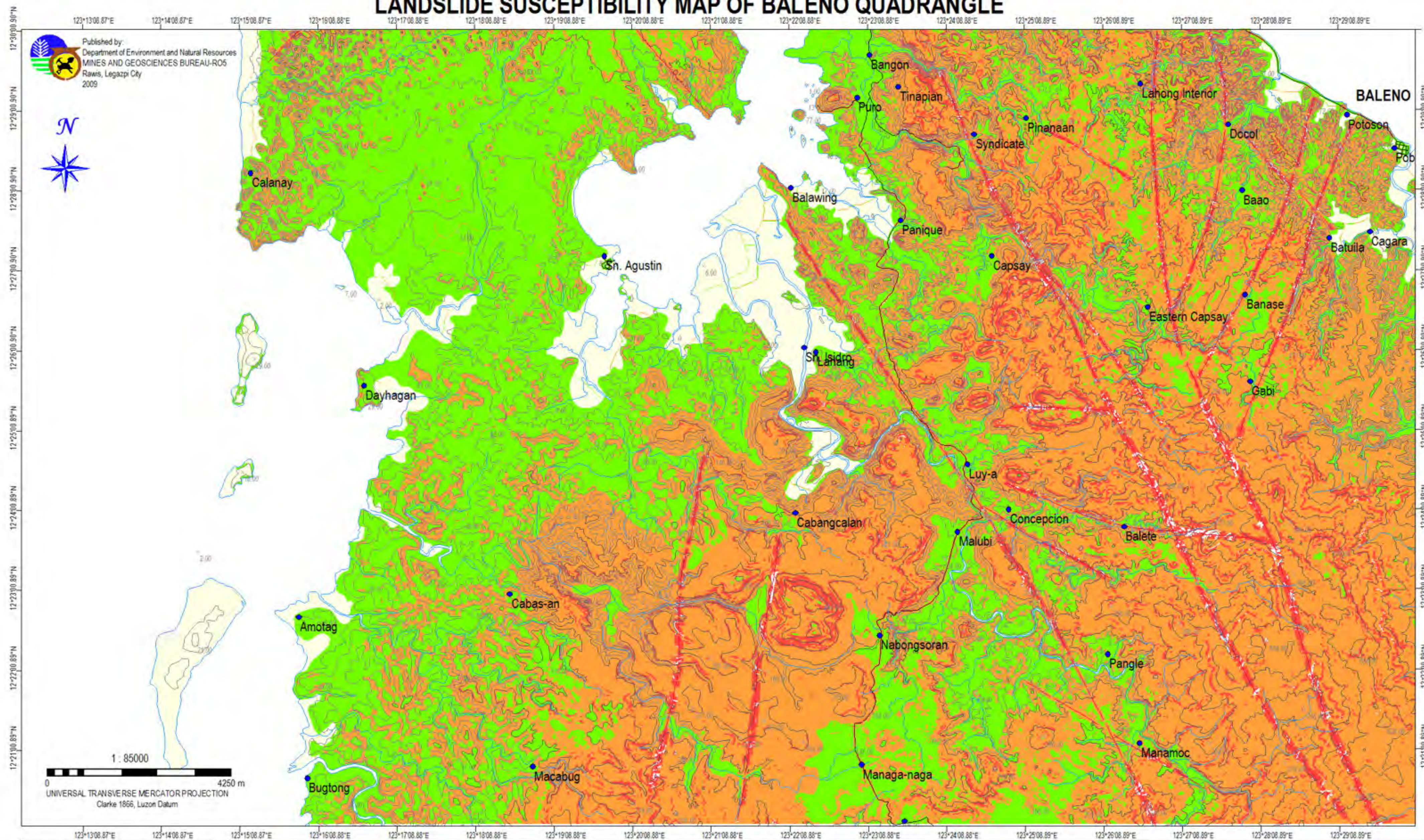
Areas with Moderate Susceptibility to Landslides:

Areas having moderate likelihood of occurrence of landslides and are recommended for more detailed engineering geological and geohazard assessment prior to housing development.

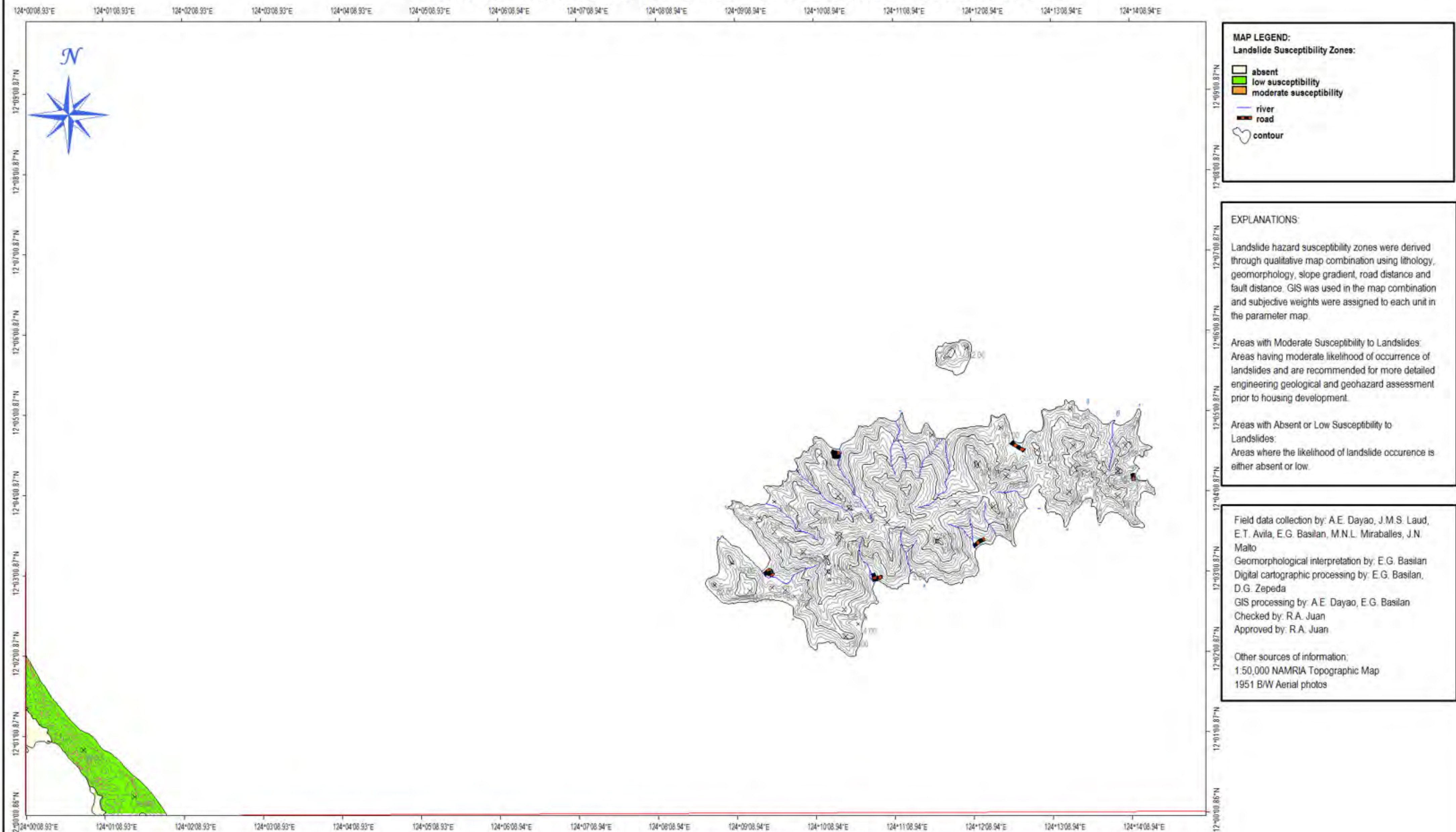
Areas with Absent or Low Susceptibility to Landslides:

Areas where the likelihood of landslide occurrence is either absent or low.

Field data collection by: AEDayao, DRDizon, ETAvila,
MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: EGBasilan
Digital cartographic processing by: AEDayao,
RRLMapalad, EGBasilan
GIS processing by: EGBasilan
Checked by: RAJuan
Approved by: RAJuan
Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos



LANDSLIDE SUSCEPTIBILITY MAP OF BALOCAWE QUADRANGLE



MAP LEGEND:

Landslide Susceptibility Zones:

- absent
- low susceptibility
- moderate susceptibility
- river
- road
- contour

EXPLANATIONS:

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

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: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
Geomorphological interpretation by: E.G. Basilan
Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
GIS processing by: A.E. Dayao, E.G. Basilan
Checked by: R.A. Juan
Approved by: R.A. Juan

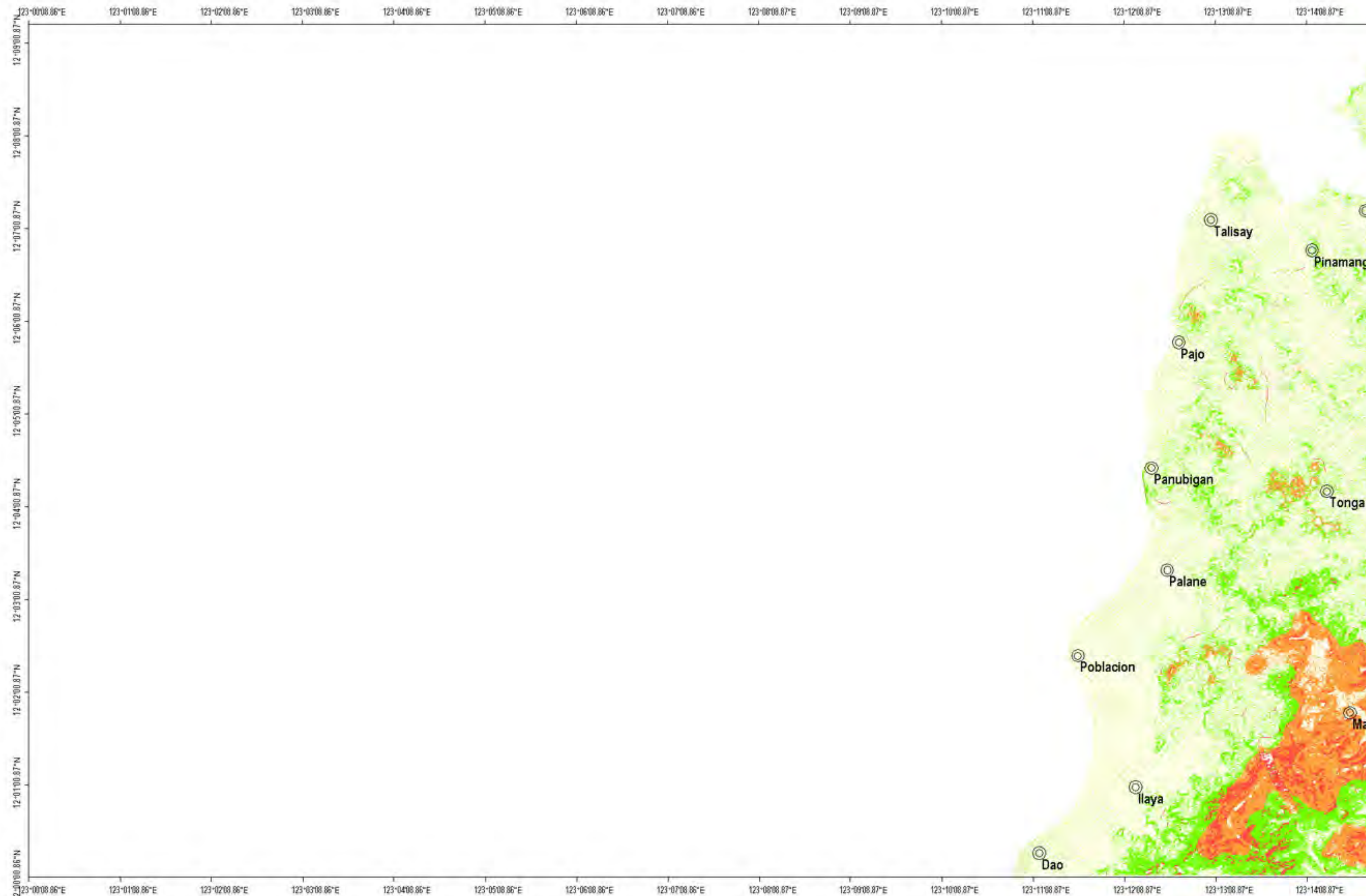
Other sources of information:
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1951 B/W Aerial photos



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Clarke 1866, Luzon Datum

LANDSLIDE SUSCEPTIBILITY MAP OF BALUD QUADRANGLE



LEGEND:

Landslide Susceptibility

- Low to Absent
- Low Susceptibility
- Moderate Susceptibility
- High Susceptibility

10
fault
river
road

EXPLANATIONS:

Landslide hazard susceptibility zones were derived through qualitative map combination using lithology, geomorphology, slope gradient, road distance 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 equally high probability of occurrences 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 Low Susceptibility to Landslides :
Areas where the occurrence of

landslides is low.

Field data collection by : D. R. Dizon, E. B. Bant, J. Malto, M. Mirabelles

GIS processing by : D.R. Dizon

Checked by : A.E. Dayao

Approved by : R.A. Juan

Other sources of Information :
1:50,000 NAMRIA Topographic Map



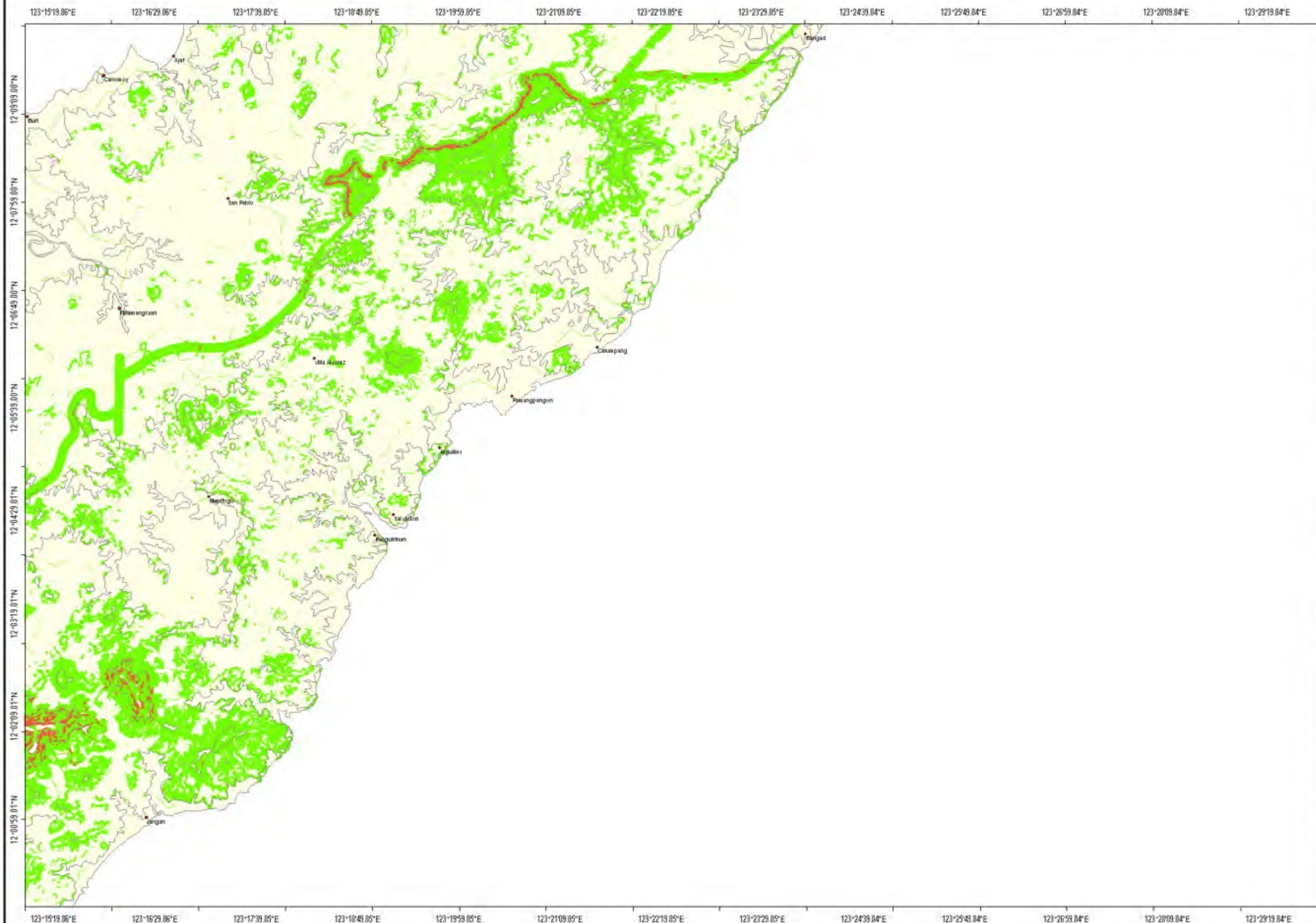
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LANDSLIDE SUSCEPTIBILITY MAP OF CANOMOY QUADRANGLE



MAP LEGEND:

Landslide Susceptibility Zones:

- high susceptibility
- moderate susceptibility
- low to absent
- absent

- contour line
- river
- fault

EXPLANATIONS:

Landslide hazard susceptibility zones were derived through qualitative map combination using lithology, geomorphology, slope gradient, road distance 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 equally high probability of occurrence of mass movements particularly rock slides, debris slides 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 to landslide occurrence and are recommended for more detailed engineering geological and geohazard assessment prior to housing development.

Areas with Low Susceptibility to Landslides:
Areas where the occurrence of landslides is low.

Absent:
Areas where the likelihood of landslide occurrence is absent.

Field Data Collection: A.E. Dayao, D.R. Dizon, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
Geomorphological Interpretation: A. E. Dayao, J. N. Malto
Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
GIS Processing by: A. E. Dayao, J. N. Malto
Checked by: R. A. Juan
Approved By: R. A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map

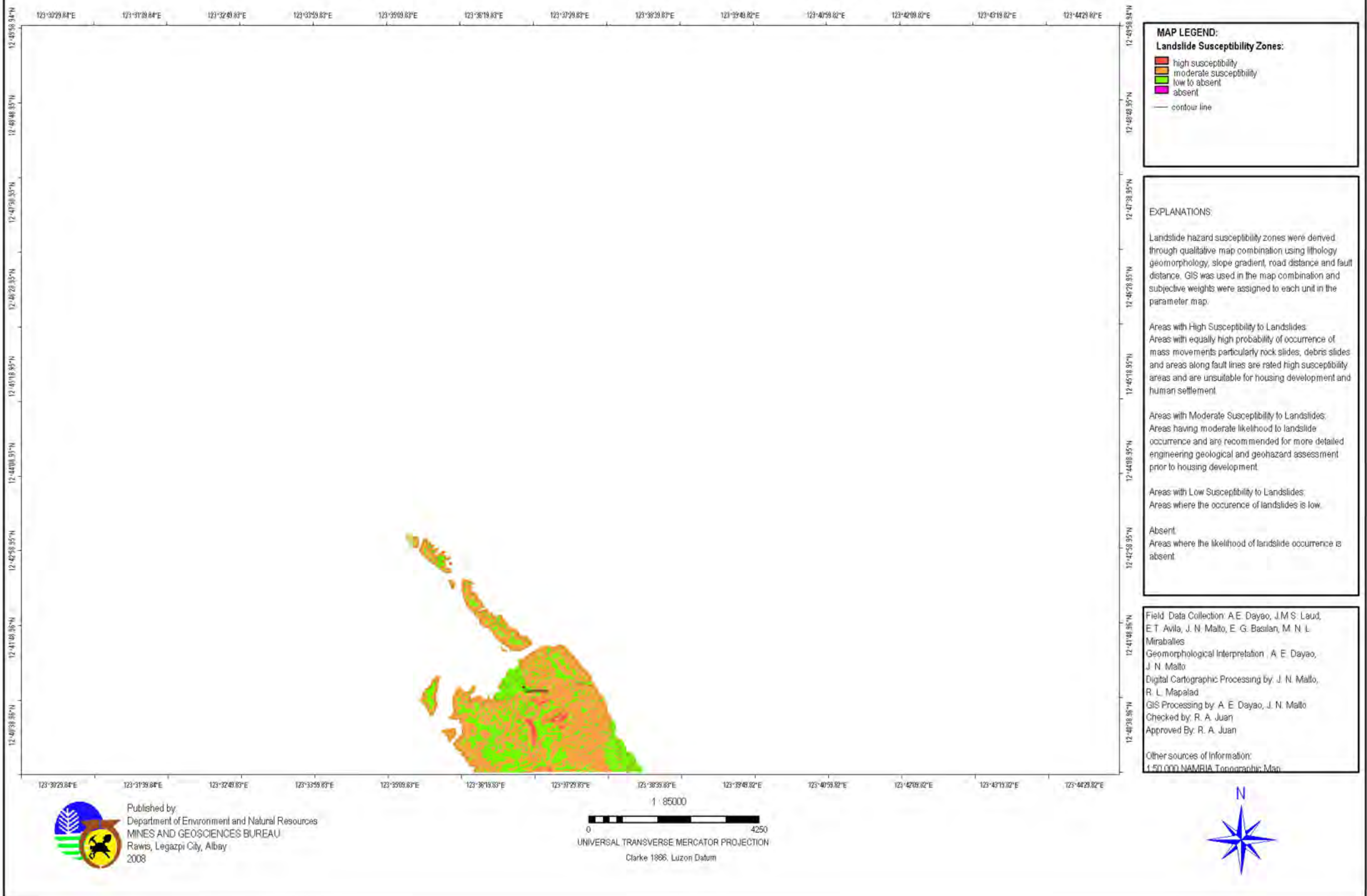


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LANDSLIDE SUSCEPTIBILITY MAP OF GUINDAHAP QUADRANGLE



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Clarke 1866, Luzon Datum



MAP LEGEND:

Landslide Susceptibility Zones:

- high susceptibility
- moderate susceptibility
- low to absent
- absent
- contour line

EXPLANATIONS:

Landslide hazard susceptibility zones were derived through qualitative map combination using lithology, geomorphology, slope gradient, road distance 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 equally high probability of occurrence of mass movements particularly rock slides, debris slides 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 to landslide occurrence and are recommended for more detailed engineering geological and geohazard assessment prior to housing development.

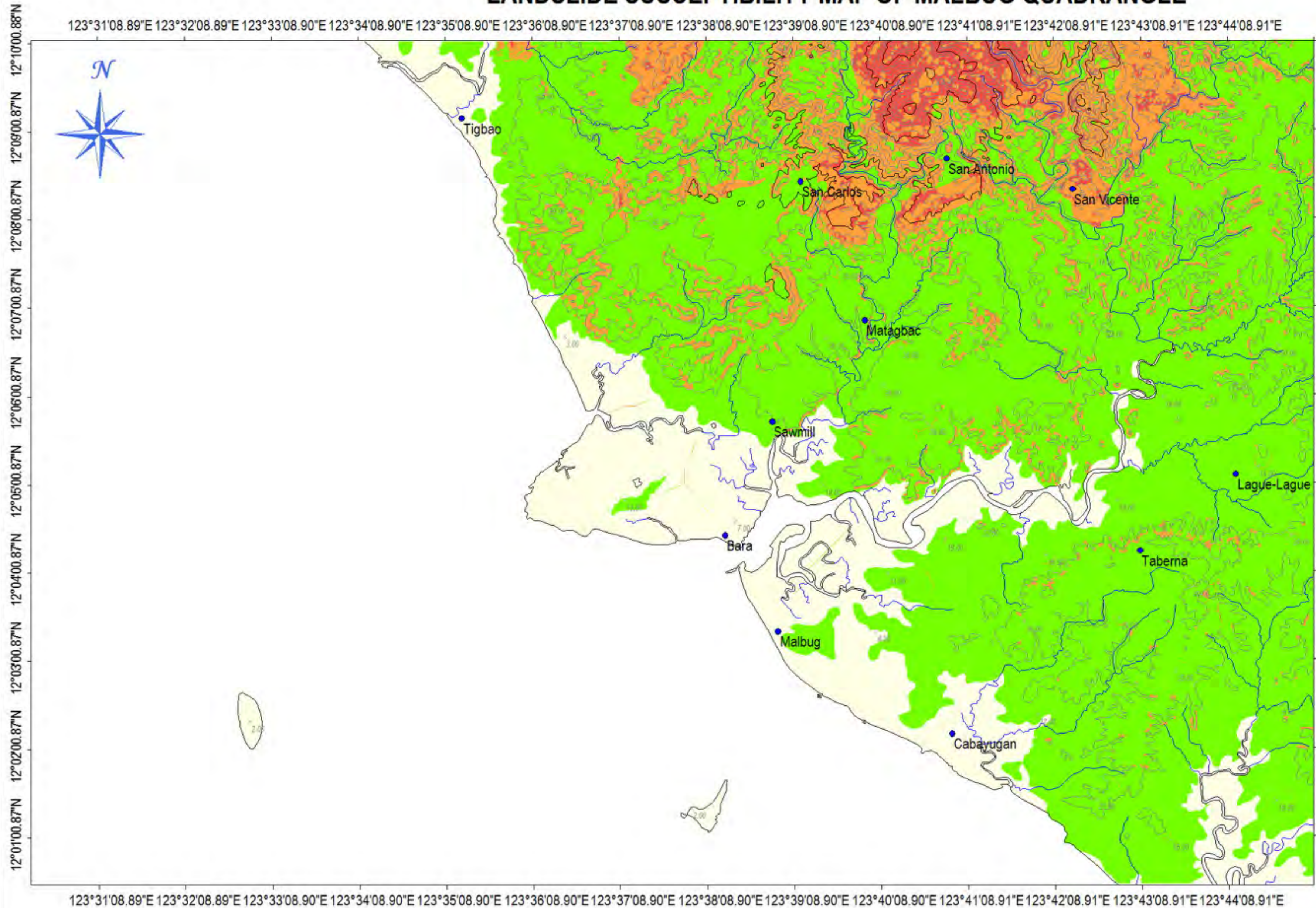
Areas with Low Susceptibility to Landslides:
Areas where the occurrence of landslides is low.

Absent:
Areas where the likelihood of landslide occurrence is absent.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J.N. Malto, E.G. Basilan, M.N.L. Miraballes
Geomorphological Interpretation: A.E. Dayao, J.N. Malto
Digital Cartographic Processing by: J.N. Malto, R.L. Mapalad
GIS Processing by: A.E. Dayao, J.N. Malto
Checked by: R.A. Juan
Approved By: R.A. Juan

Other sources of Information:
1:50,000 NAMRIA Topographic Map

LANDSLIDE SUSCEPTIBILITY MAP OF MALBUG QUADRANGLE



MAP LEGEND:
Landslide Susceptibility Zones:

- Absent
- Low Susceptibility to Landslides
- Moderate Susceptibility to Landslides
- High Susceptibility to Landslides
- fault
- river
- contour

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.

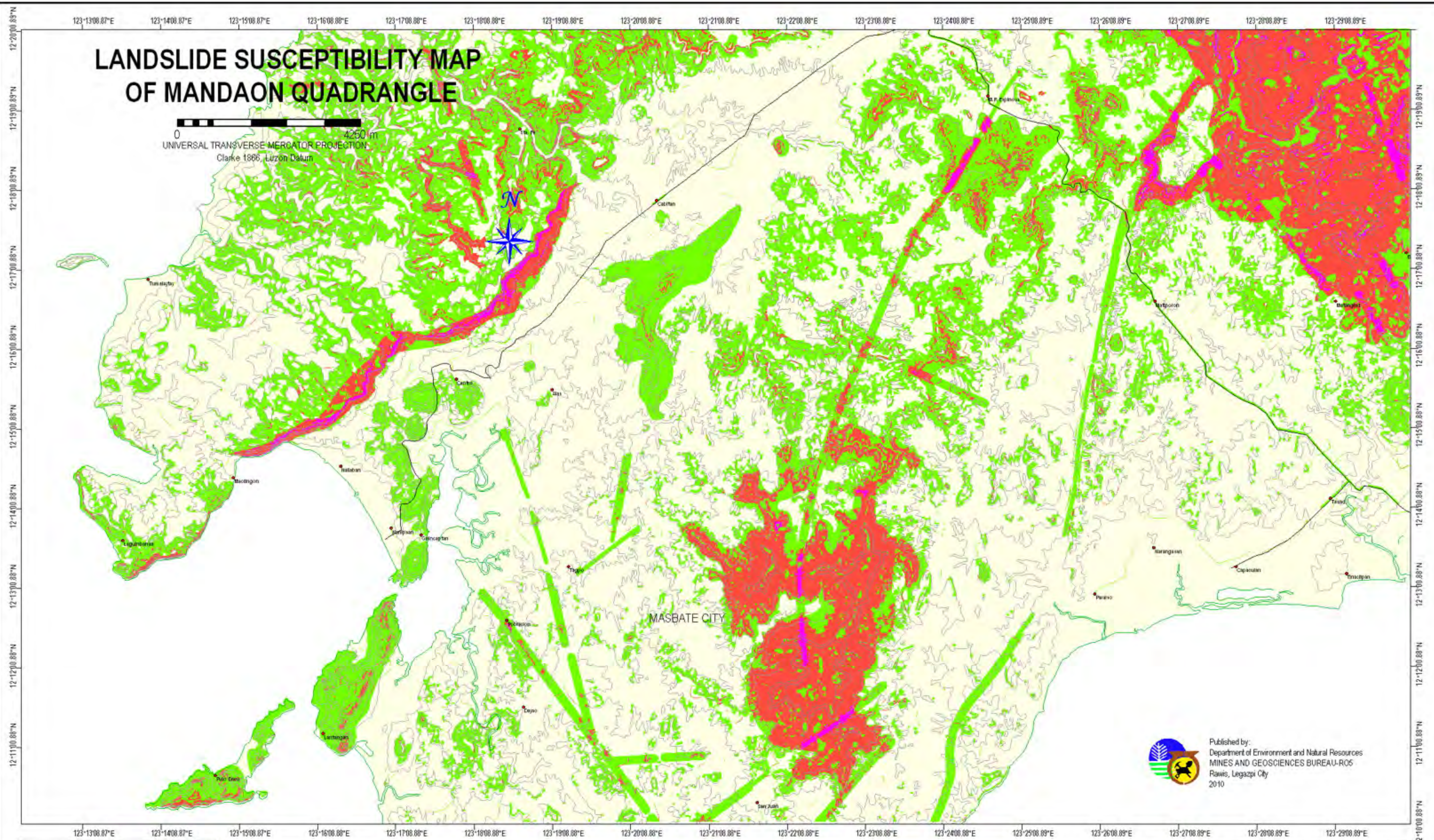
Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
GIS processing by: A.E. Dayao, E.G. Basilan
Checked by: R.A. Juan
Approved by: R.A. Juan

Other sources of information:
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MAP LEGEND:
Landslide Susceptibility

- absent
 - low to absent
 - moderate susceptibility
 - high susceptibility
-
- contour line
 - Railroad
 - dike
 - river
 - fault
 - 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.



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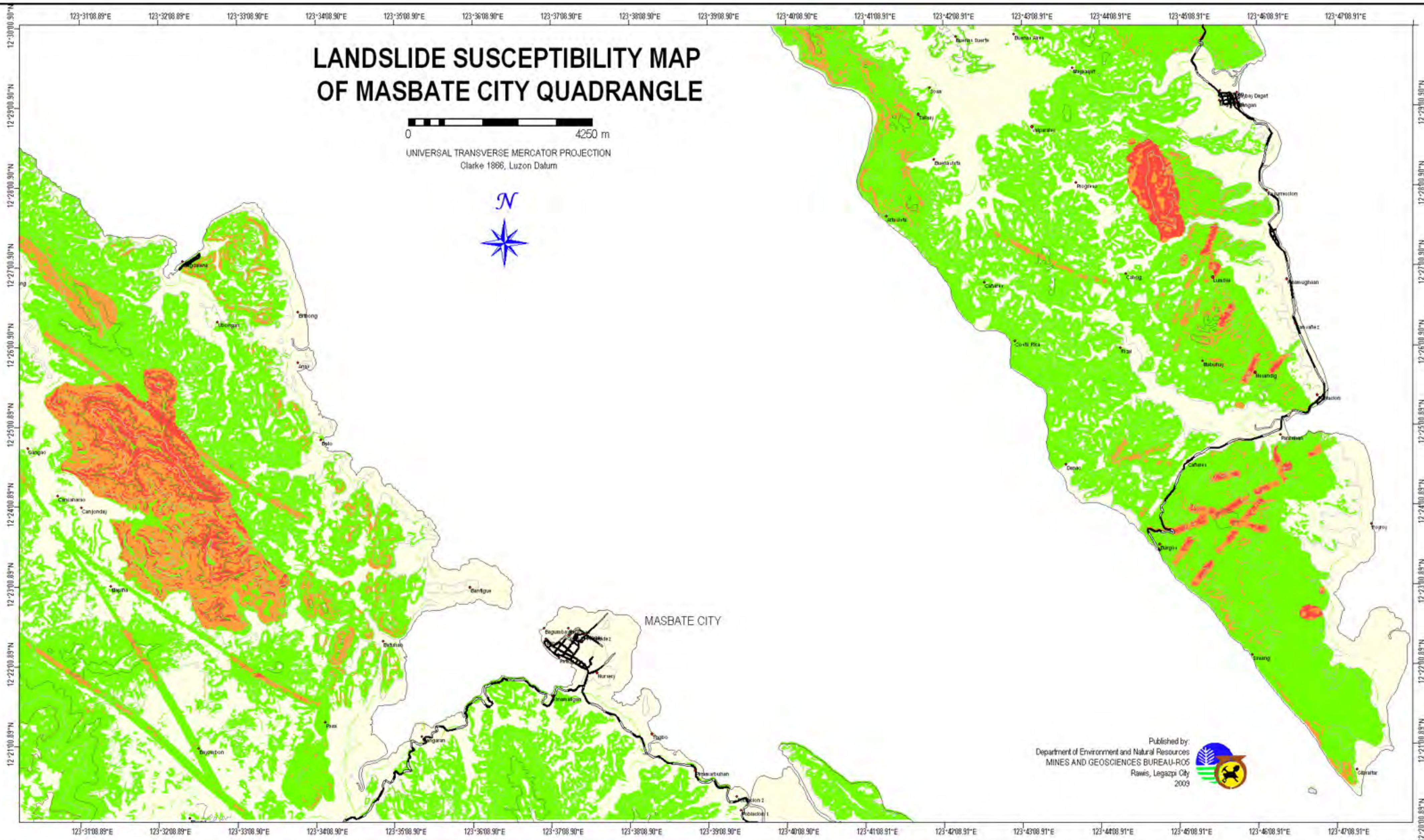
Field data collection by: AEDayao, DRDizon, ETAvila,
MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: JNMalto
Digital cartographic processing by: JNMalto,
RRLMapalad
GIS processing by: JNMalto
Checked by: RAJuan
Approved by: RAJuan

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

LANDSLIDE SUSCEPTIBILITY MAP OF MASBATE CITY QUADRANGLE

0 4250 m

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2009



MAP LEGEND: Landslide Susceptibility

- absent
- low to absent
- moderate susceptibility
- high susceptibility

- contour line
- fault
- road
- river

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.

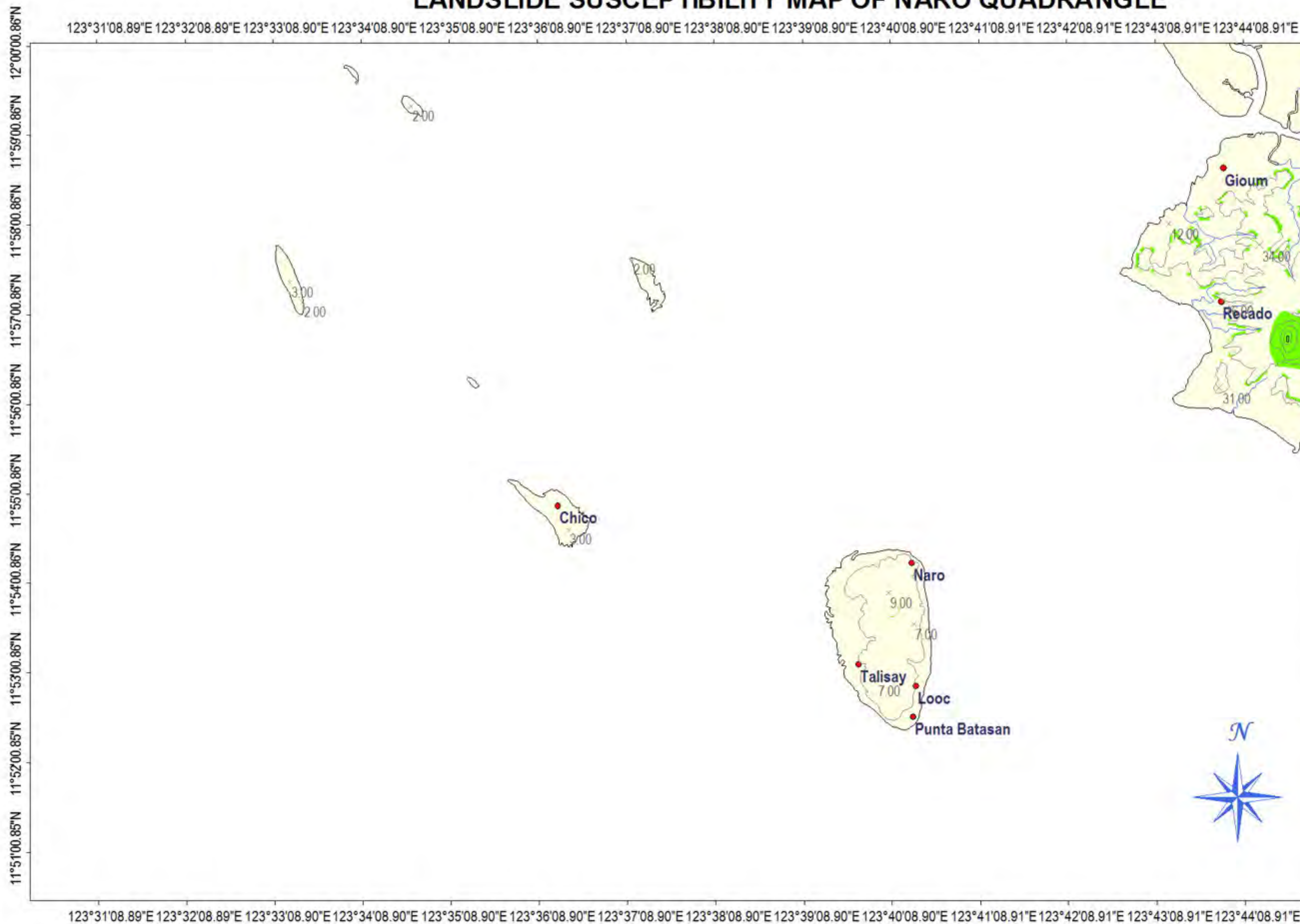
Areas with Moderate Susceptibility to Landslides:
Areas having moderate likelihood of occurrence of landslides and are recommended for more detailed engineering geological and geohazard assessment prior to housing development.

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

Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: JNMalto
Digital cartographic processing by: JNMalto, RRLMapalad
GIS processing by: JNMalto
Checked by: RAJuan
Approved by: RAJuan

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

LANDSLIDE SUSCEPTIBILITY MAP OF NARO QUADRANGLE



MAP LEGEND: Landslide Susceptibility Zones:

- Absent
- Low to Absent
- river
- contour

EXPLANATIONS:

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

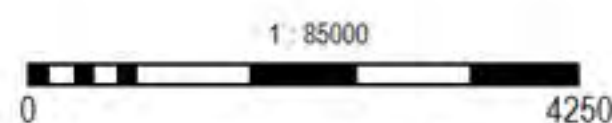
Areas with Absent or Low

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
 Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
 Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
 GIS processing by: A.E. Dayao, E.G. Basilan
 Checked by: R.A. Juan
 Approved by: R.A. Juan

Other sources of information:
 1:50,000 NAMRIA Topographic Map

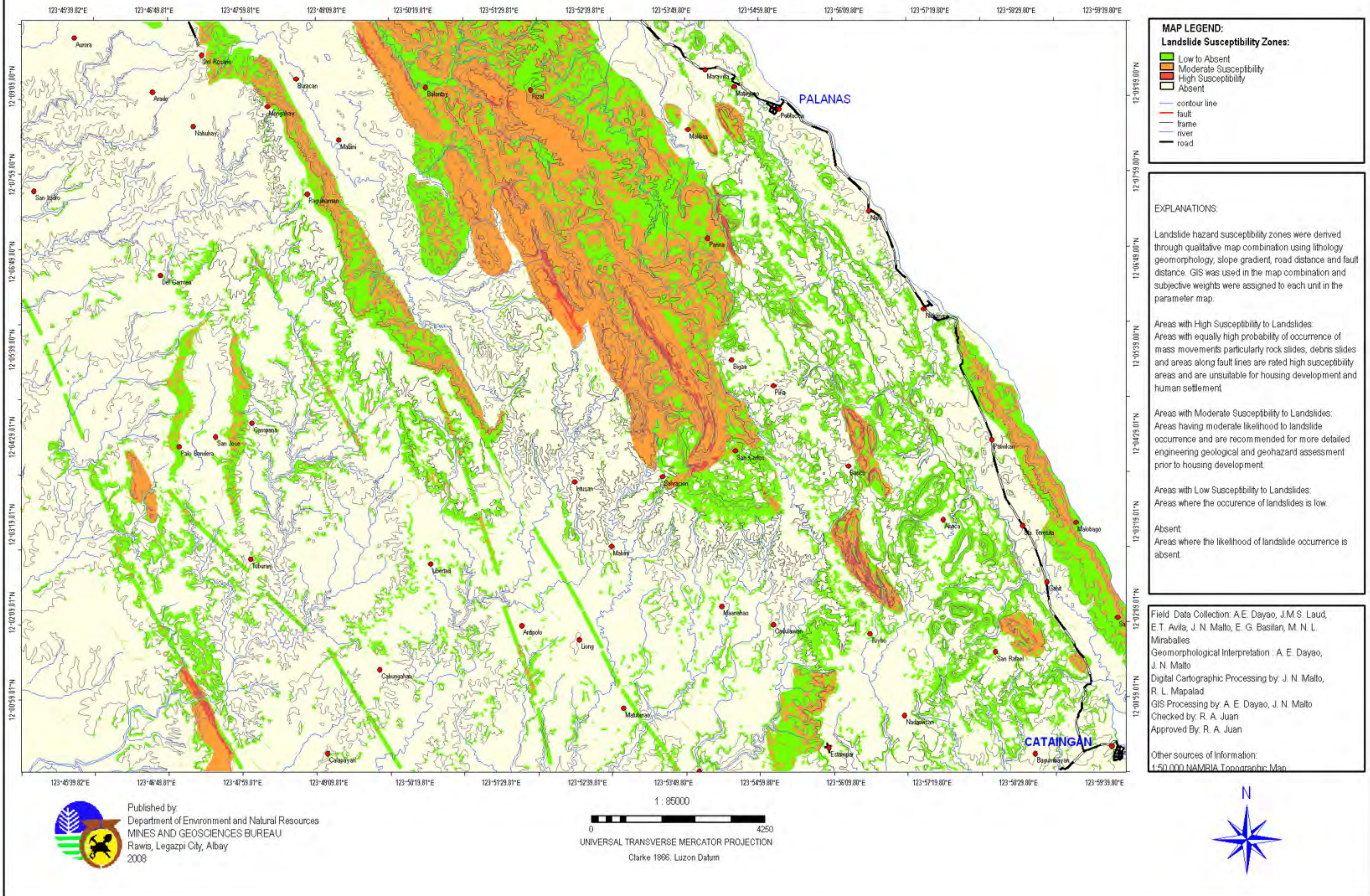


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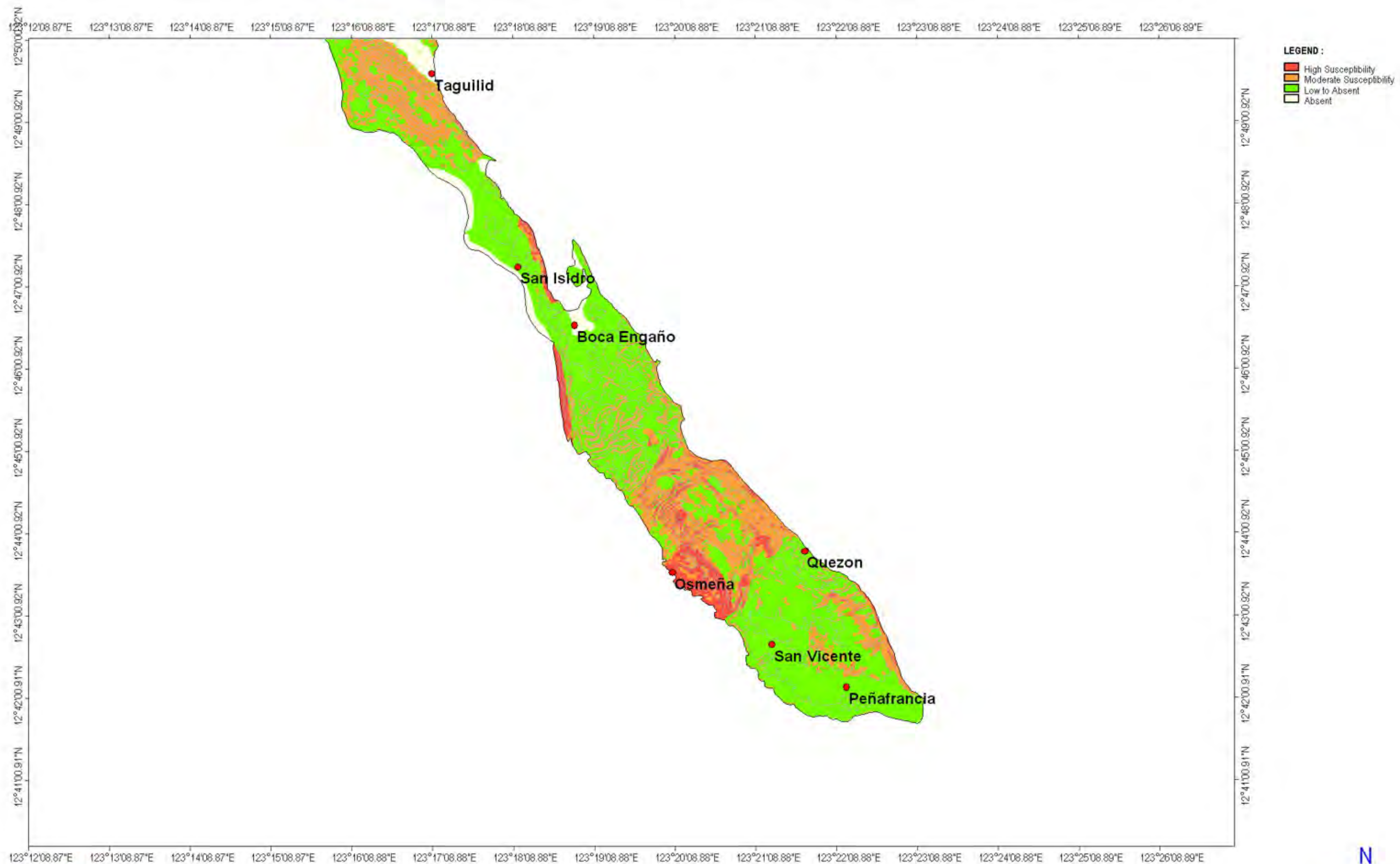


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LANDSLIDE SUSCEPTIBILITY MAP OF PALANAS QUADRANGLE



LANDSLIDE SUSCEPTIBILITY MAP OF PEÑAFRANCIA QUADRANGLE



LEGEND :

- High Susceptibility
- Moderate Susceptibility
- Low to Absent
- Absent

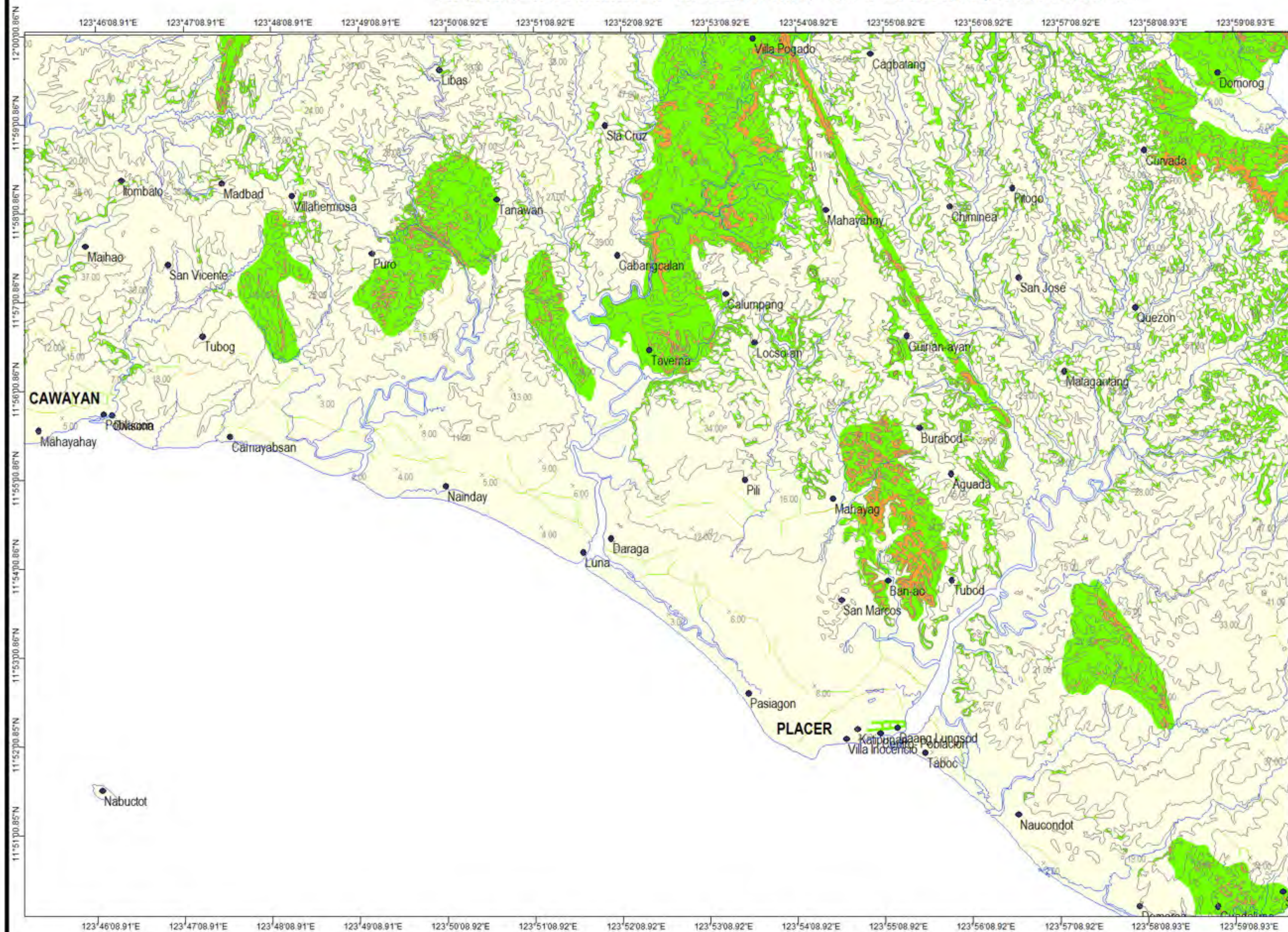


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LANDSLIDE SUSCEPTIBILITY MAP OF PLACER QUADRANGLE



MAP LEGEND:

Landslide Susceptibility Zones:

- Absent
- Low to Absent
- Moderate susceptibility to landslides

- fault
- river
- road

EXPLANATIONS:

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

Areas with Moderate Susceptibility to Landslides:

Areas having moderate likelihood of occurrence of landslides are recommended for more detailed engineering geological and geohazard assessment prior for 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: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
 Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
 Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
 GIS processing by: A.E. Dayao, E.G. Basilan
 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



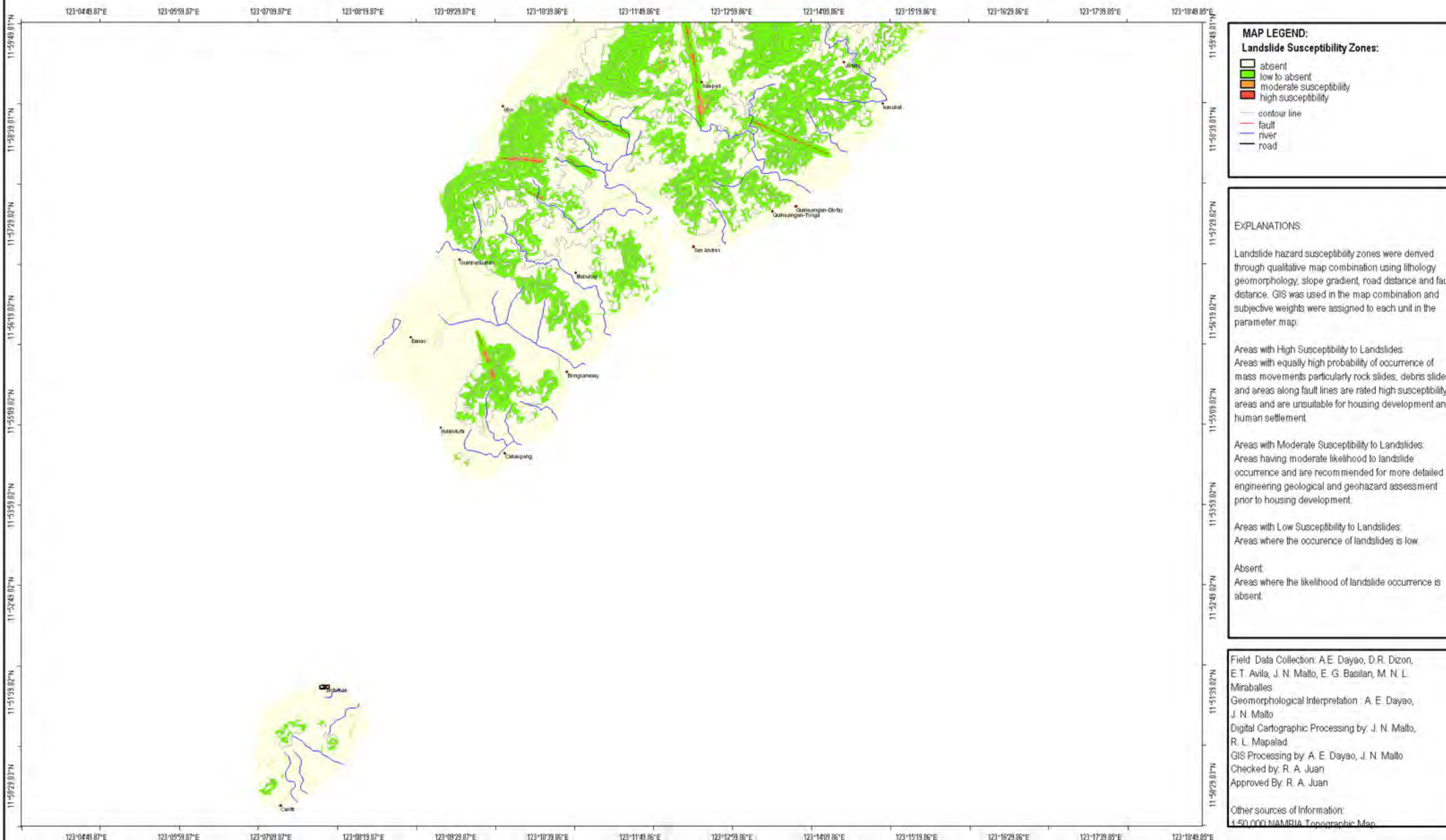
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LANDSLIDE SUSCEPTIBILITY MAP OF PULANDUTA QUADRANGLE

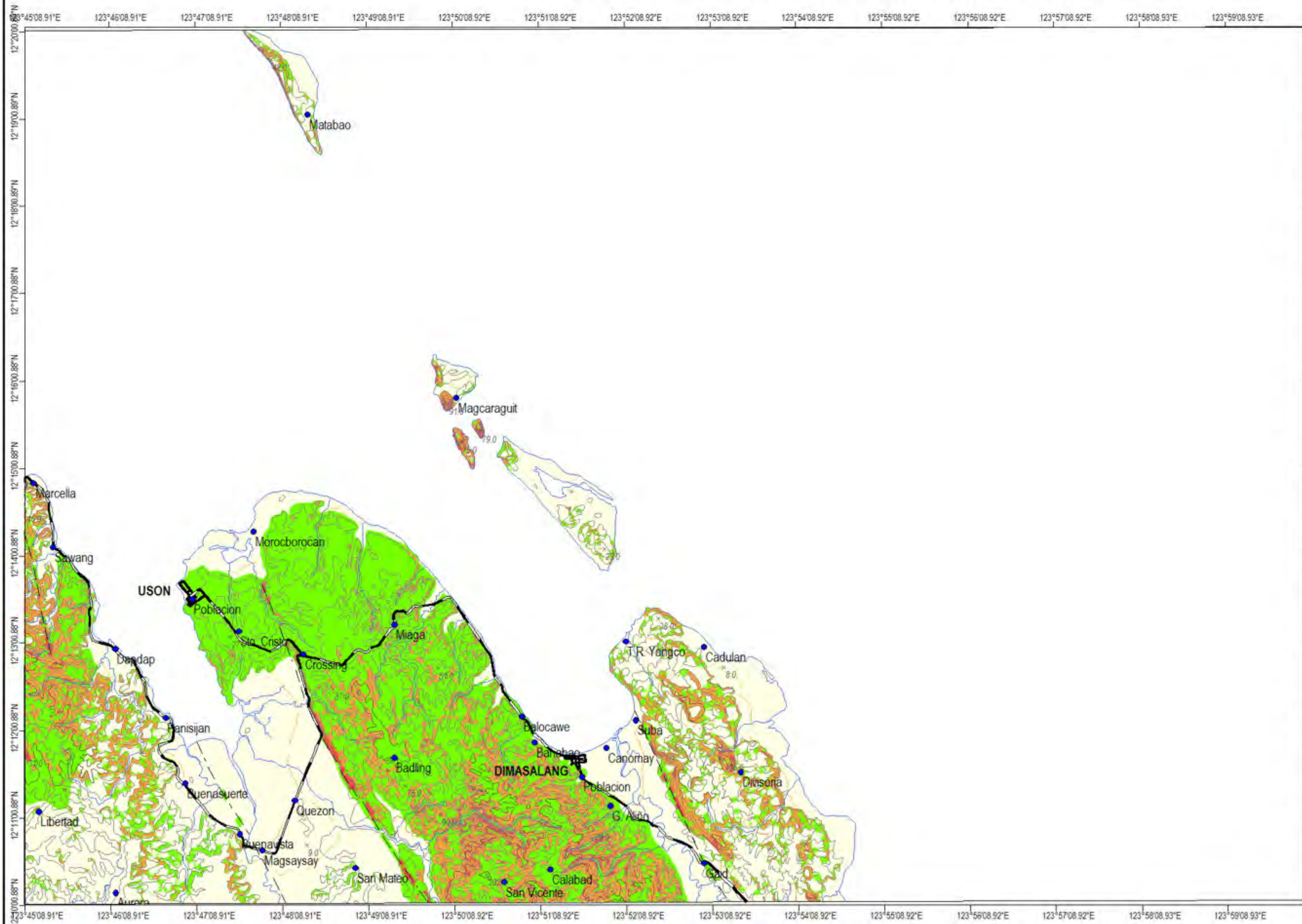


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LANDSLIDE SUSCEPTIBILITY MAP OF USON QUADRANGLE



MAP LEGEND:

Landslide Susceptibility Zones:

- Low to Absent
- Low Susceptibility to Landslides
- Moderate Susceptibility to Landslides
- High Susceptibility to Landslides
- road
- fault
- river
- contour

EXPLANATIONS:

Landslide hazard susceptibility zones were derived through qualitative map combination using lithology, geomorphology, slope gradient, road distance 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 equally high probability of occurrence of mass movements particularly rock slides and slumps. Very steep to nearly vertical slopes and areas along faultlines are rated high susceptibility areas and are unsuitable for housing and human settlement. Detailed engineering geological and geohazard assessment is needed.

Areas with Moderate Susceptibility to Landslides:
Areas having moderate likelihood of landslide occurrence 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: A.E. Dayao, J.M.S. Laud,
E.T. Avila M.N.L. Miraballes, E.G. Basilan & J.N. Malto
Geomorphological interpretation by: M.N.L. Miraballes
Digital cartographic processing by: M.N.L. Miraballes
GIS processing by: M.N.L. Miraballes
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



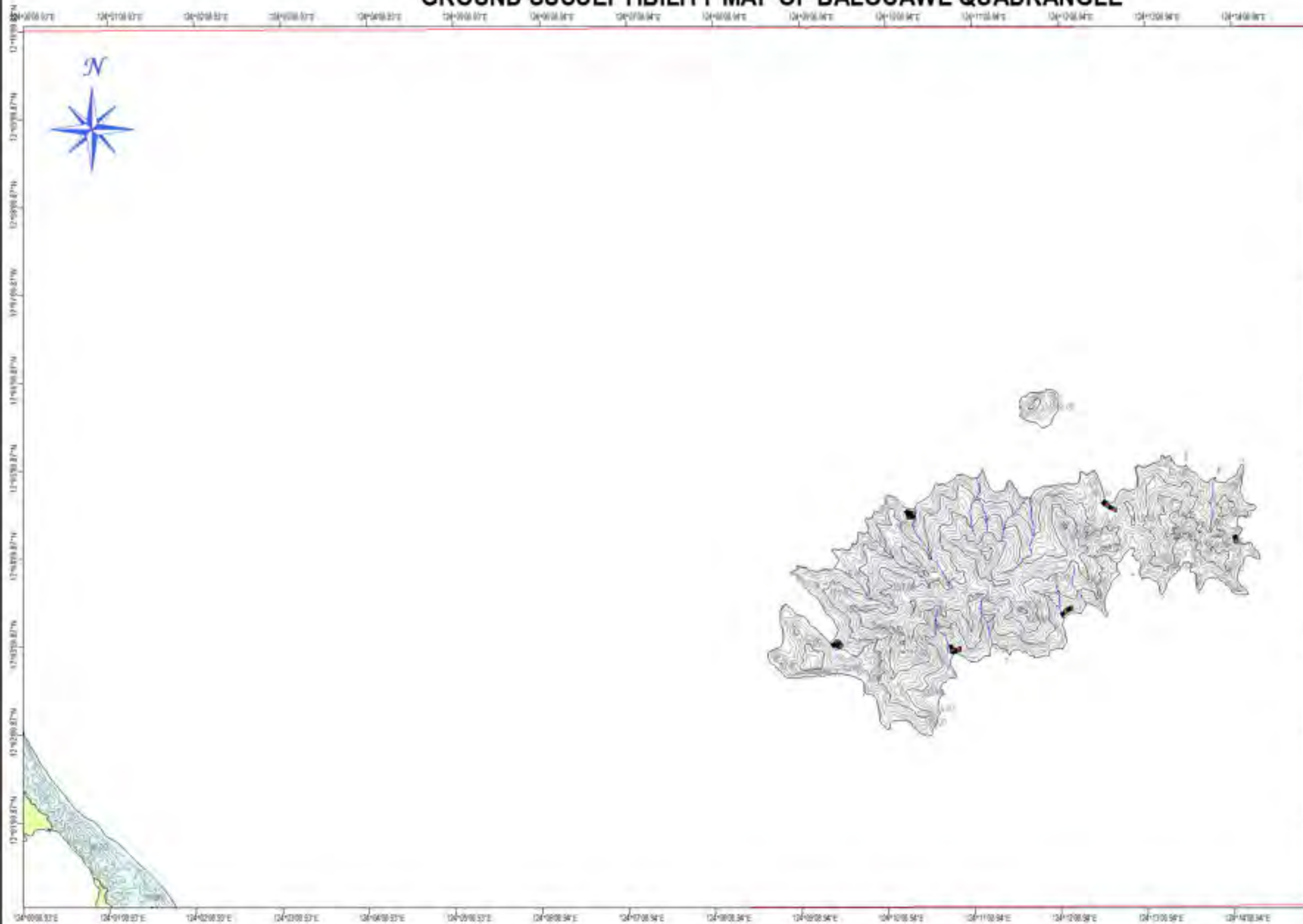
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GROUND SUSCEPTIBILITY MAP OF BALOCAWE QUADRANGLE



MAP LEGEND:
Ground Subsidence and
Ground Susceptibility Map

- Areas not susceptible to ground settlement
- Areas susceptible to ground settlement

river

road

contour

EXPLANATIONS

Susceptibility map for ground subsidence due to karst or solution processes was primarily derived from the lithologic map of the study area. 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 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.
Areas where the possibility of ground settlement is low or absent.

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Baslan, M.N.L. Mirabales, J.N. Maito
Geomorphological interpretation by: A.E. Dayao, E.G. Baslan
Digital cartographic processing by: E.G. Baslan, D.G. Zepeda
GIS processing by: A.E. Dayao, E.G. Baslan
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



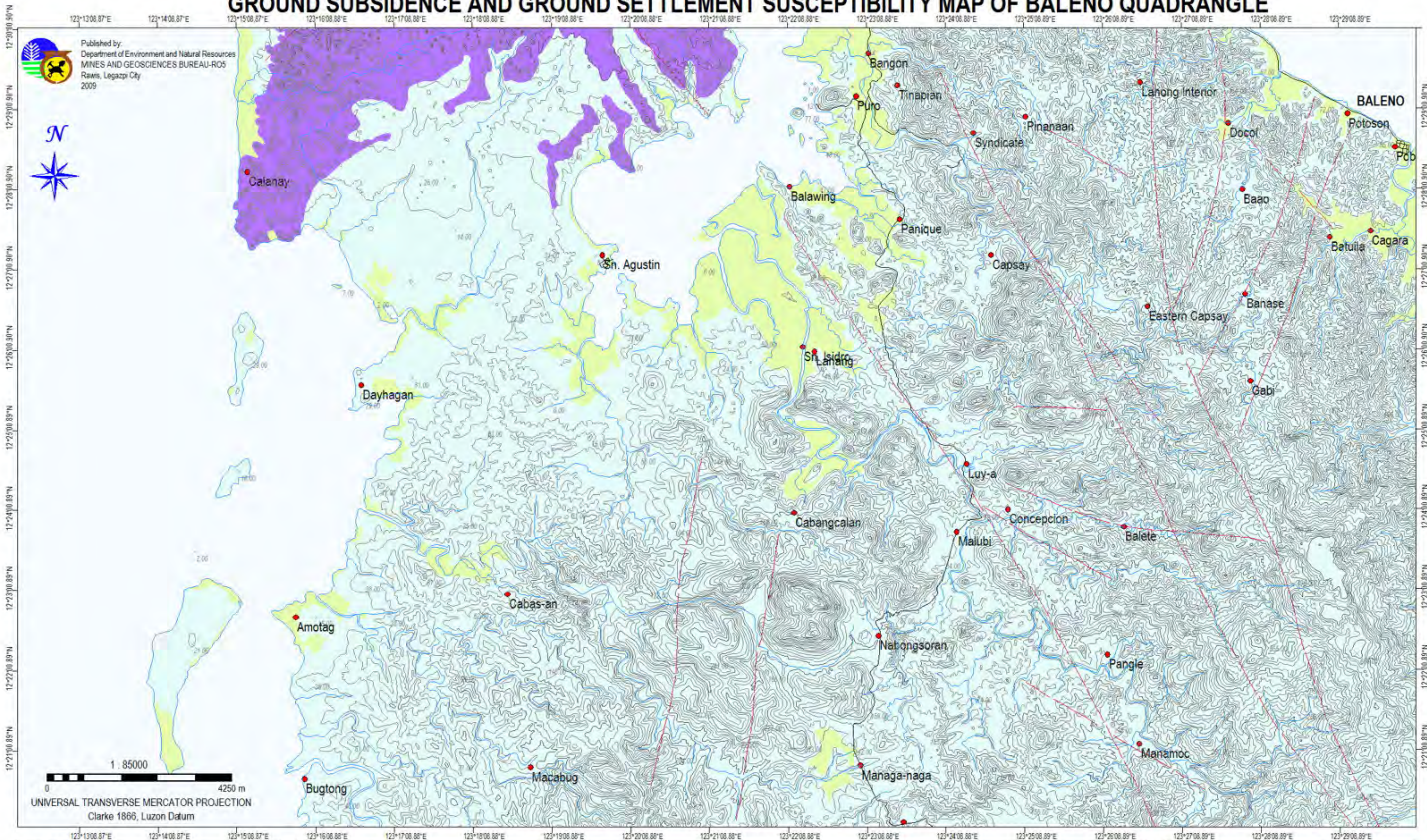
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2009

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GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF BALENO QUADRANGLE



MAP LEGEND:

Ground Subsidence and Ground Settlement Map

- Areas not susceptible to ground subsidence/settlement
- Areas susceptible to ground settlement
- Areas susceptible to ground subsidence
- contour
- 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 and calcareous siltstones and shales.

Areas Susceptible to Ground Settlement:

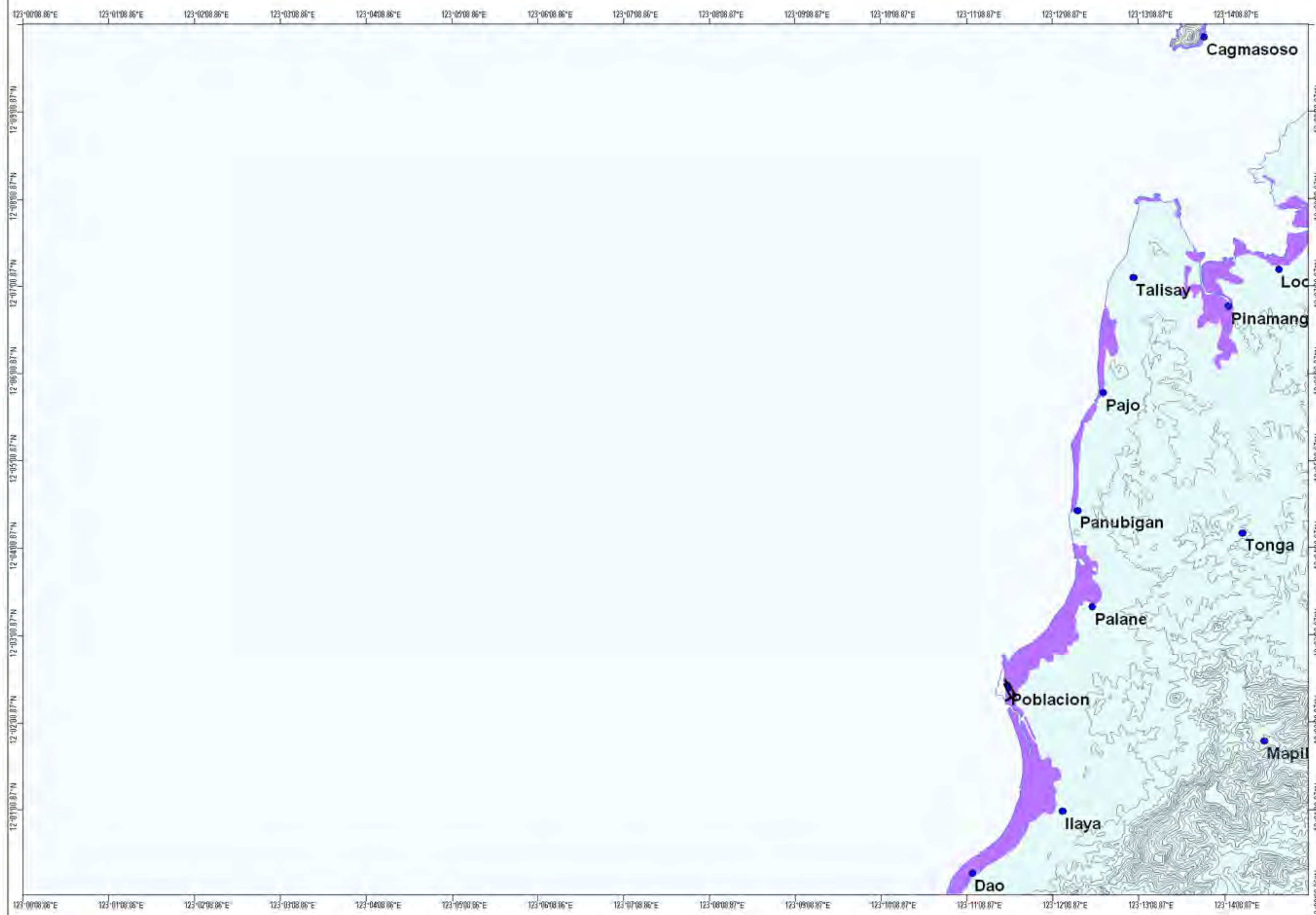
Areas where fluvialite sands, silts and clays coupled with shallow ground water tables are site of possible ground settlement. Ground settlement may be reduced through appropriate foundation design. Buildings having 3 storeys or more should be tested for settlement and/or consolidation. Buildings having 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: AEDayao, DRDizon, ETAvila,
MNLMiraballes, EGBasilan, JNMaito
Geomorphological interpretation by: EGBasilan
Digital cartographic processing by: AEDayao,
RRLMapalad
GIS processing by: EGBasilan
Checked by: RAJuan
Approved by: RAJuan
Other sources of Information:
1:50,000 NAMRIA Topographic Map
1951 B/W Aerial photos

GROUND SETTLEMENT SUSCEPTIBILITY MAP OF BALUD QUADRANGLE



MAP LEGEND :

Ground Subsidence and Ground Settlement Susceptibility Zones

- areas not prone to ground settlement/subsidence
- areas susceptible to ground settlement

EXPLANATIONS

Susceptibility map for ground subsidence due to karst of solution processes was primarily derived from the lithologic map of the study area. Areas of possible ground settlement were delineated through the analysis of the geomorphology of the study area, the sub-surface soils and the ground water levels.

Areas Susceptible to ground settlement : areas where fluvatile sands, silts and clays coupled with shallow ground water table 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 susceptible to ground settlement or ground Subsidence:
Areas where the possibility of ground settlement or ground subsidence is low or absent.

Field data collection by : D. R. Dizon, J. Malto, M. Miraballes, E. Basilan
Geomorphological Interpretation by : D. R. Dizon
Digital cartographic processing by : D. R. Dizon
GIS Processing by : D. R. Dizon
Checked by : R. A. Juan
Approved by : R. A. Juan

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



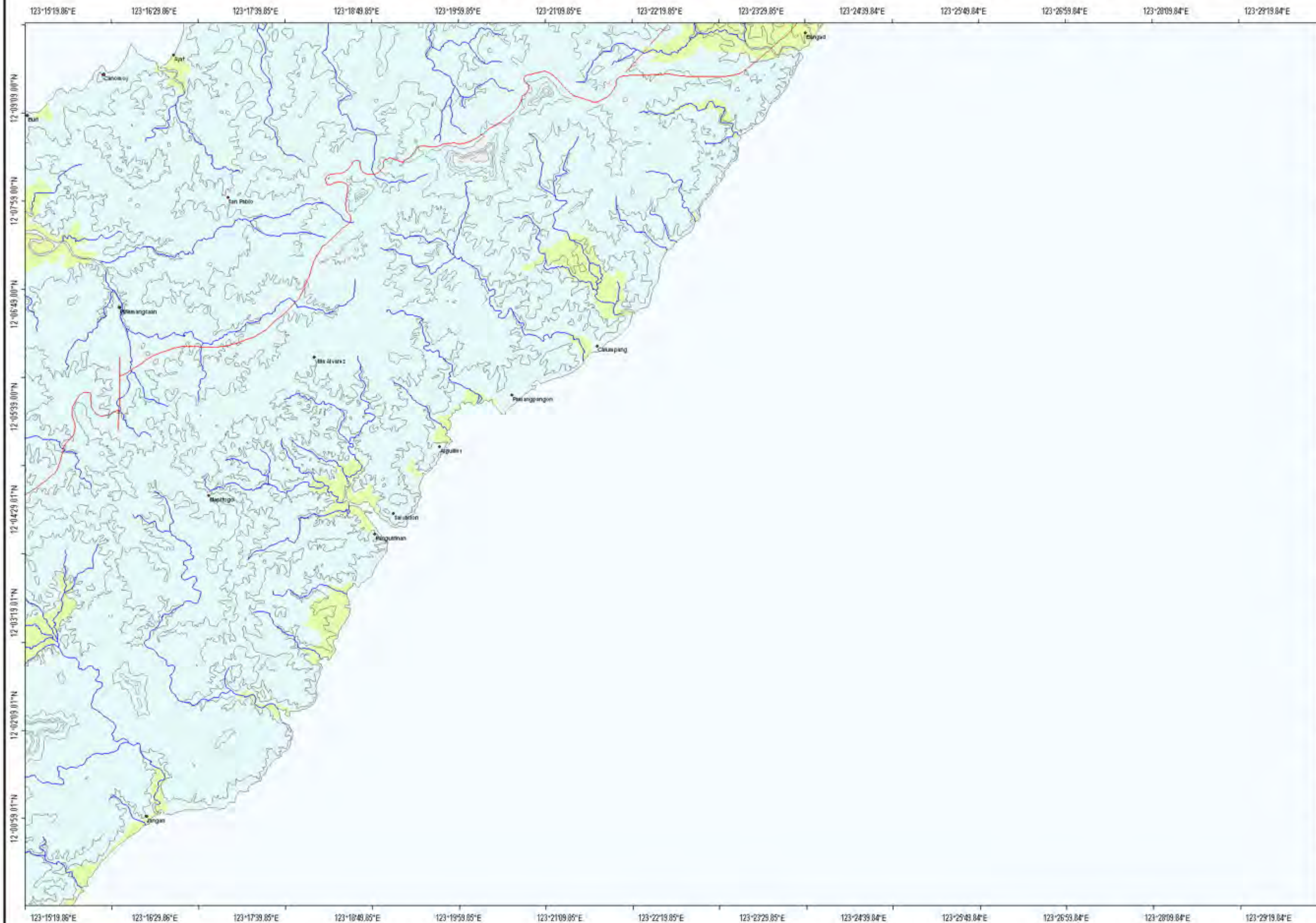
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Resources
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Rawis, Legaspi City
2009

0 4250

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Clarke 1866, Luzon Datum



GROUND SETTLEMENT SUSCEPTIBILITY MAP OF CANOMOY QUADRANGLE



MAP LEGEND:

Ground Subsidence and Ground Settlement Susceptibility Zones:

- areas susceptible to ground settlement
- areas not susceptible to ground settlement
- sea
- contour line
- fault
- river

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 fluviatile 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 subsidence is low or absent.

Field Data Collection: A.E. Dayao, D.R. Dizon, E.T. Avila, J.N. Malto, E.G. Basilan, M.N.L. Miraballes
 Geomorphological Interpretation: A.E. Dayao, J.N. Malto
 Digital Cartographic Processing by: J.N. Malto, R.L. Mapalad
 GIS Processing by: A.E. Dayao, J.N. Malto
 Checked by: R.A. Juan
 Approved By: R.A. Juan

Other sources of Information:
 1:50,000 NAMRIA Topographic Map

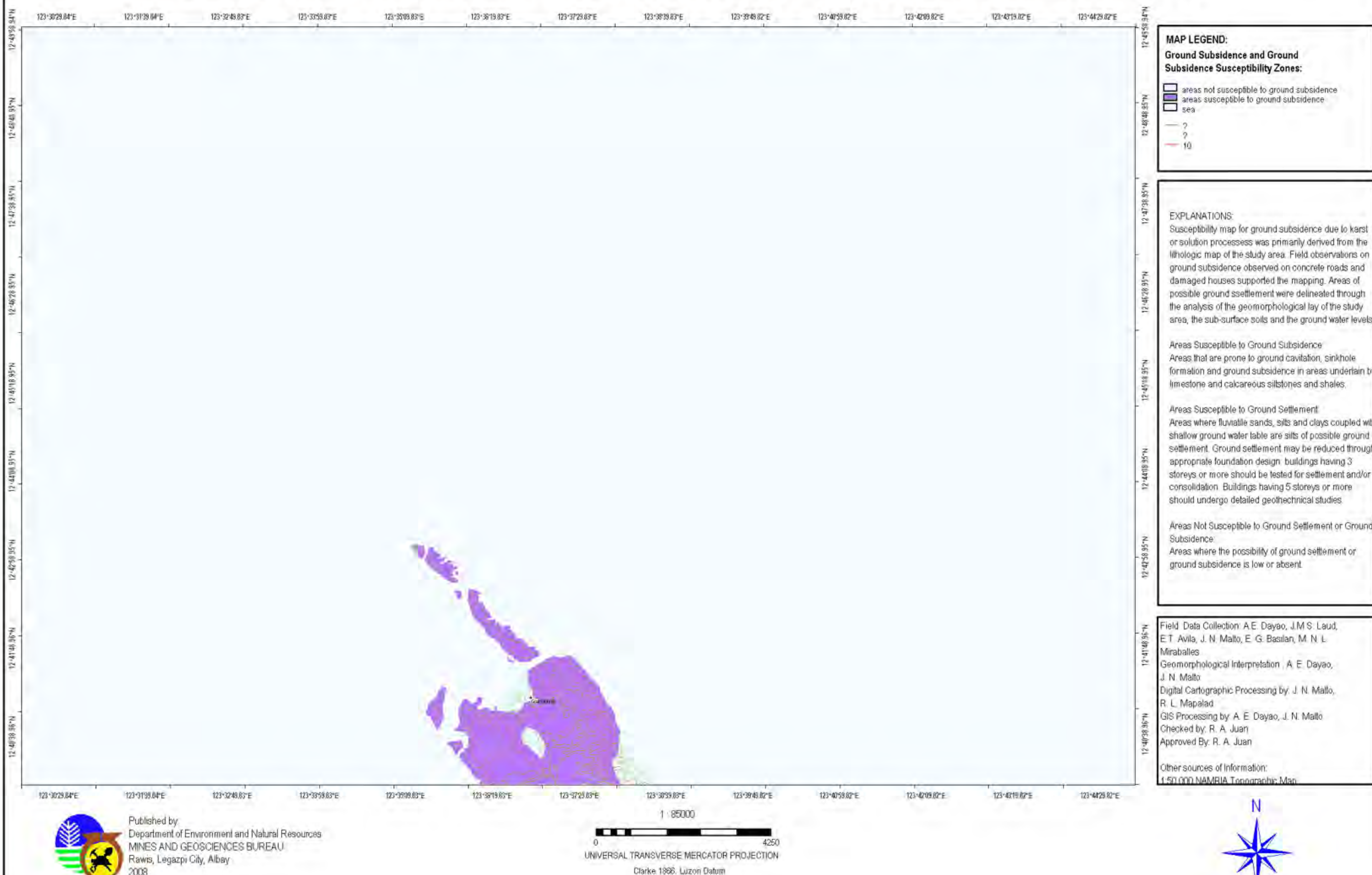


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 2009

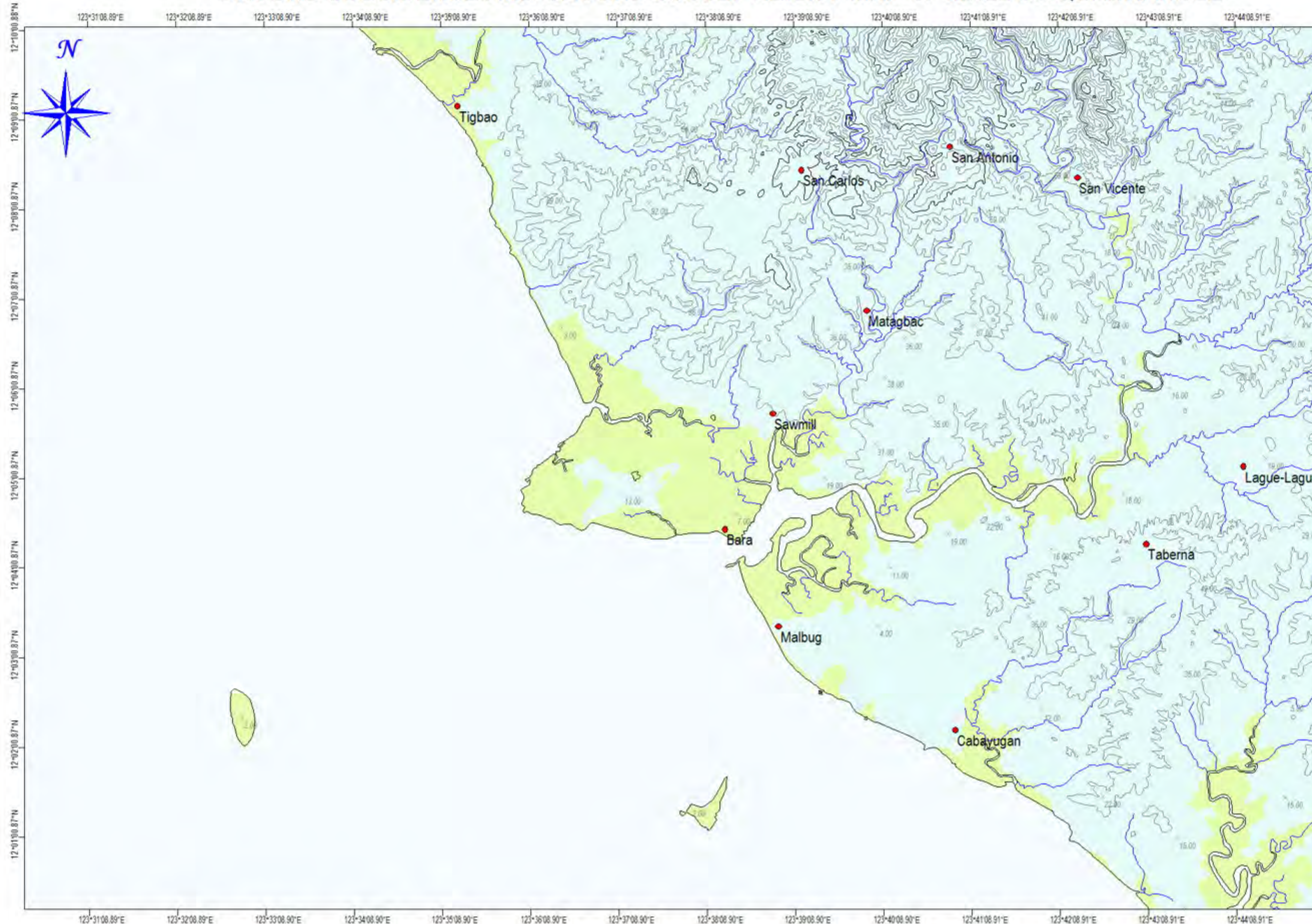
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GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF GUINDAHAP QUADRANGLE



GROUND SUBSIDENCE AND GROUND SUSCEPTIBILITY MAP OF MALBUG QUADRANGLE



MAP LEGEND:

Ground Subsidence and
Ground Susceptibility Map

- Areas Not Susceptible to Ground Settlement
- Areas Susceptible to Ground Settlement
- fault
- river
- contour

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 and calcareous siltstones and shales.

Areas Susceptible to Ground Settlement:
Areas where fluvial 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

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Mallo
Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
GIS processing by: A.E. Dayao, E.G. Basilan
Checked by: R.A. Juan
Approved by: R.A. Juan

Other sources of information:
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Clarke 1866, Luzon Datum

GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF MANDAON QUADRANGLE

0 4250 m

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Clarke 1866, Luzon Datum



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MINES AND GEOSCIENCES BUREAU-RO5
Ranis, Legazpi City
2009

MAP LEGEND: Liquefaction Potential Zones

- areas not susceptible to ground subsidence/settlement
- areas susceptible to ground settlement
- areas susceptible to ground subsidence
- sea

- contour line
- coast
- dike
- fault
- Railroad
- 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 underlain by limestone, calcarenites and calcareous siltstones and shales are prone to ground cavitation, sinkhole formation and ground subsidence.

Areas Susceptible to Ground Settlement:

Areas where fluvialite 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 Susceptible to Ground Settlement or Ground Subsidence:

Areas where the possibility of ground settlement or ground subsidence is low or absent.

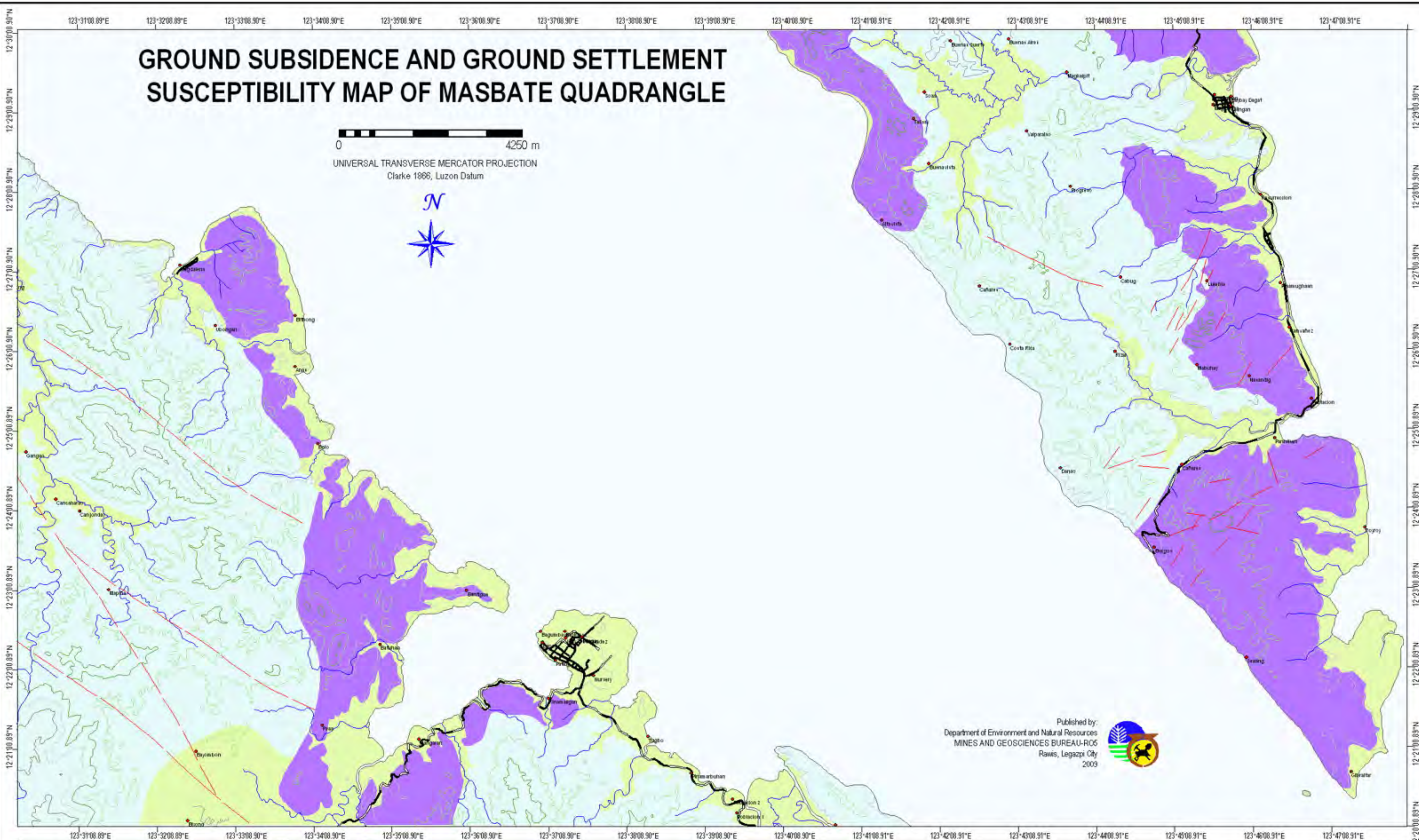
Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMalto
Geomorphological interpretation by: JNMalto
Digital cartographic processing by: JNMalto, RRLMapalad
GIS processing by: JNMalto
Checked by: RAJuan
Approved by: RAJuan

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

GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF MASBATE QUADRANGLE

0 4250 m

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Published by:
Department of Environment and Natural Resources
MINES AND GEOSCIENCES BUREAU-RO6
Roxas, Legazpi City
2009



MAP LEGEND:

Liquefaction Potential Zones

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

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 underlain by limestone, calcarenites and calcareous siltstones and shales are prone to ground cavitation, sinkhole formation and ground subsidence.

Areas Susceptible to Ground Settlement:

Areas where fluvialite 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.

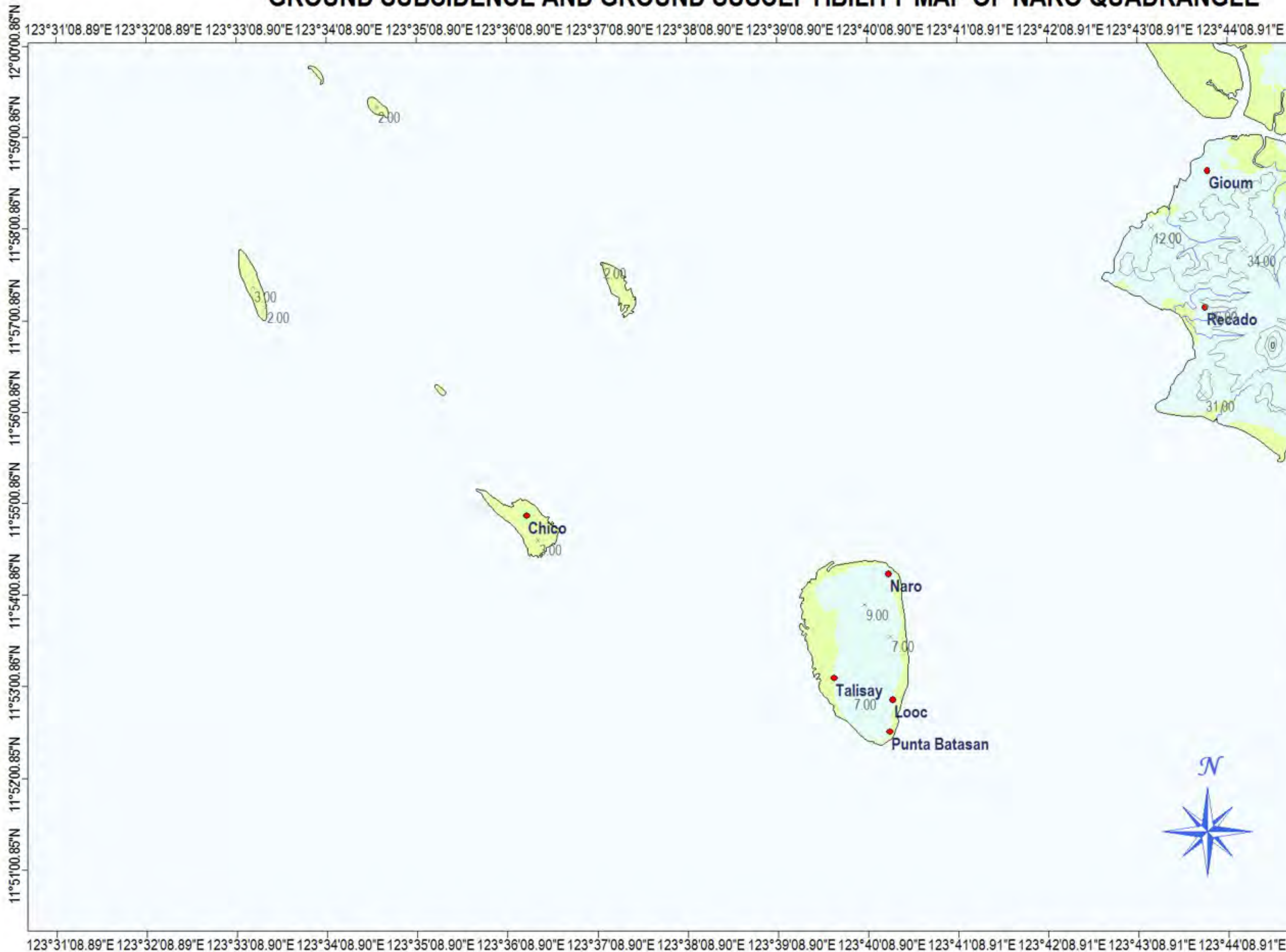
Areas not Susceptible to Ground Settlement or Ground Subsidence:

Areas where the possibility of ground settlement or ground subsidence is low or absent.

Field data collection by: AEDayao, DRDizon, ETAvila, MNLMiraballes, EGBasilan, JNMallo
Geomorphological interpretation by: JNMallo
Digital cartographic processing by: JNMallo, RRLMapalad
GIS processing by: JNMallo
Checked by: RAJuan
Approved by: RAJuan

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

GROUND SUBSIDENCE AND GROUND SUSCEPTIBILITY MAP OF NARO QUADRANGLE



MAP LEGEND:
Ground Subsidence and Ground Susceptibility Map

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

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 and calcareous silts and shales.

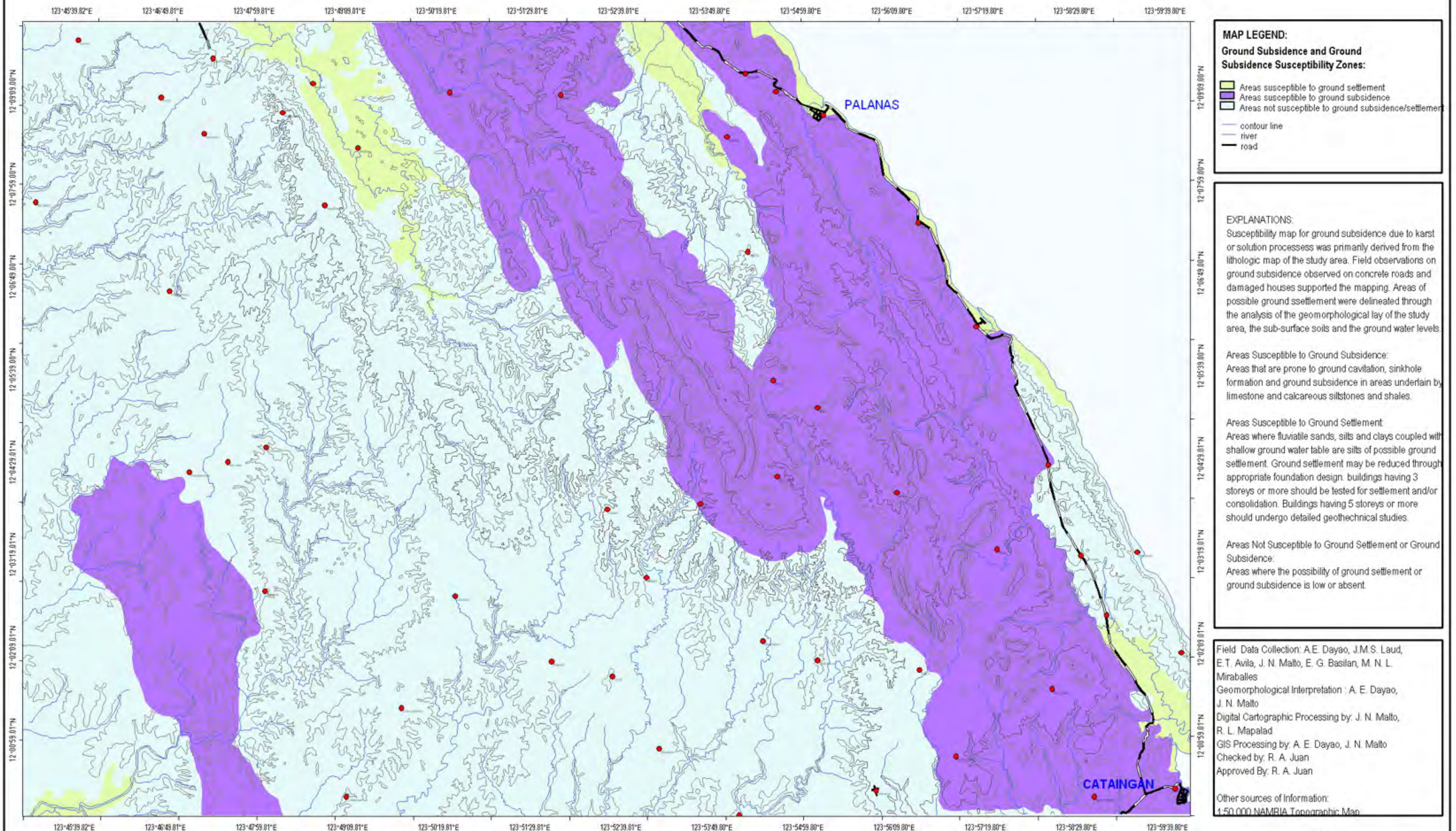
Areas Susceptible to Ground Settlement:
 Areas where fluvial sands, silts and clays coupled with shallow ground water tables are site of possible ground settlement. Ground settlement may be reduced through appropriate foundation design. Buildings having 3 storeys or more should be tested for settlement 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: A.E. Dayao, J.M.S. Laud, E.T. Avila, E.G. Basilan, M.N.L. Miraballes, J.N. Malto
 Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
 Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
 GIS processing by: A.E. Dayao, E.G. Basilan
 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

GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF PALANAS QUADRANGLE



MAP LEGEND:
Ground Subsidence and Ground Settlement Susceptibility Zones:

- Areas susceptible to ground settlement
- Areas susceptible to ground subsidence
- Areas not susceptible to ground subsidence/settlement
- contour line
- 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 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 fluviatile 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 subsidence is low or absent.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
 Geomorphological Interpretation : A. E. Dayao, J. N. Malto
 Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
 GIS Processing by: A. E. Dayao, J. N. Malto
 Checked by: R. A. Juan
 Approved By: R. A. Juan

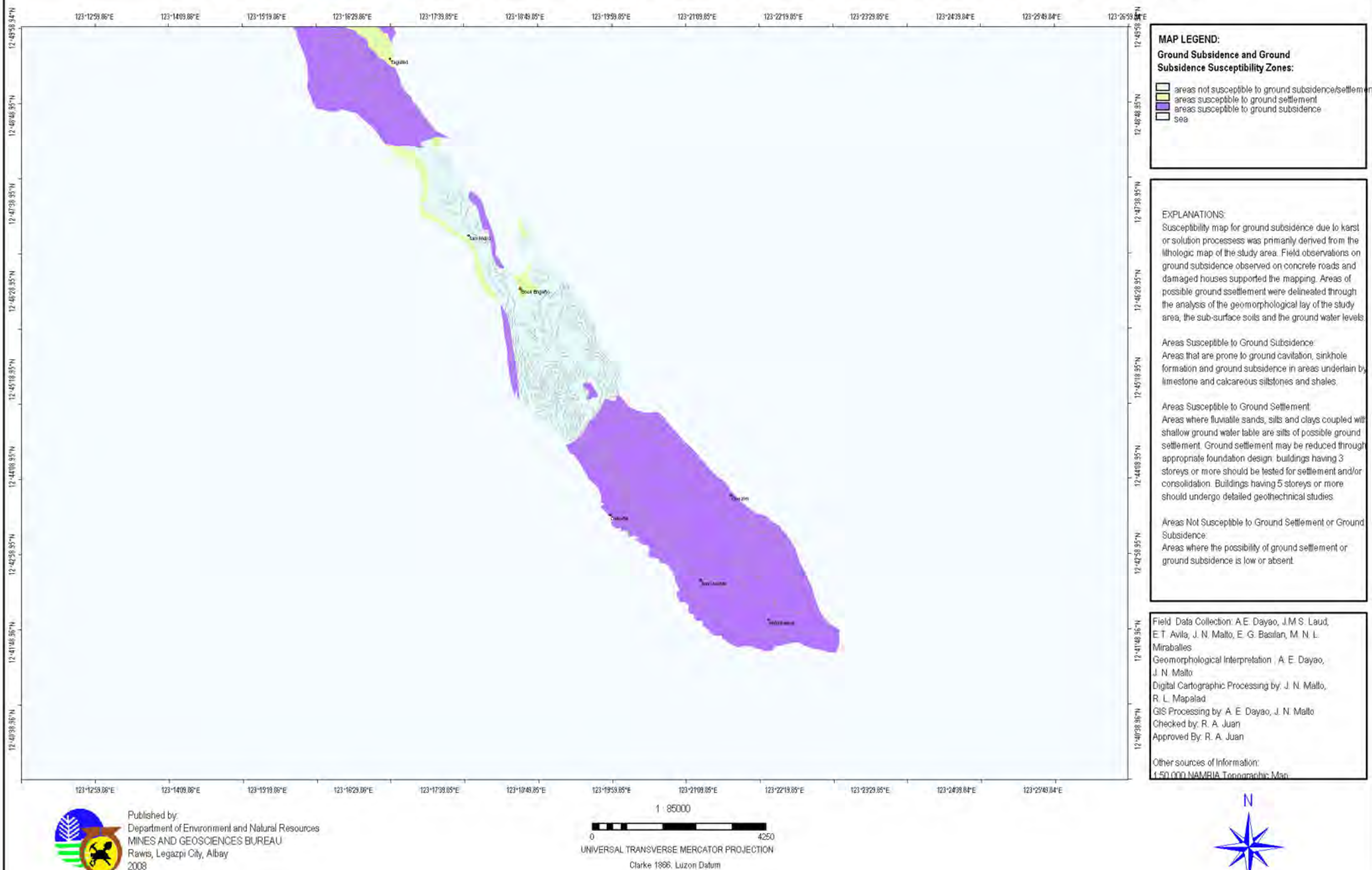
Other sources of Information:
 1:50 000 NAMRIA Topographic Map

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 2008

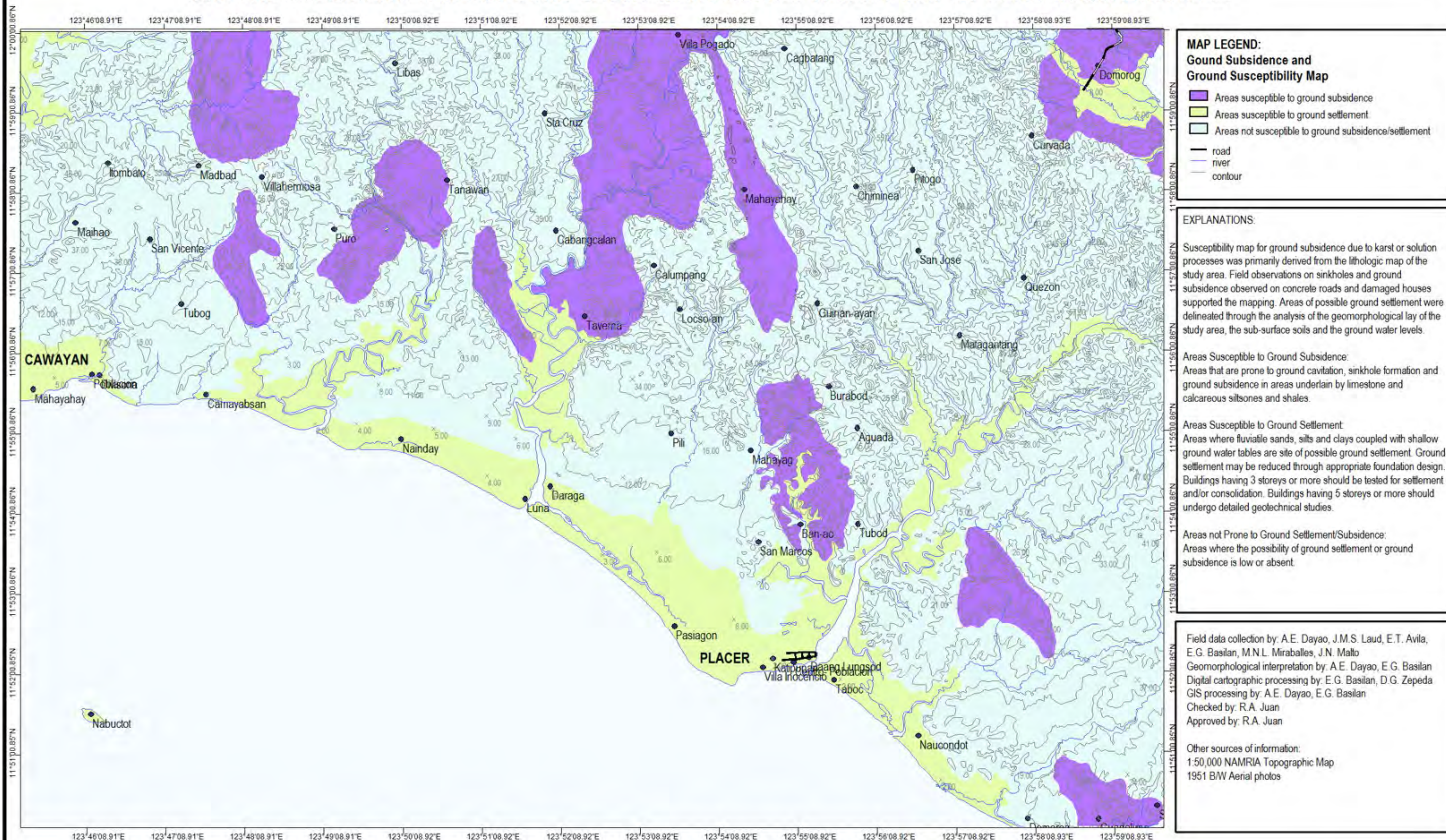
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 Clarke 1866, Luzon Datum



GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF PEÑAFRANCIA QUADRANGLE



GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF PLACER QUADRANGLE

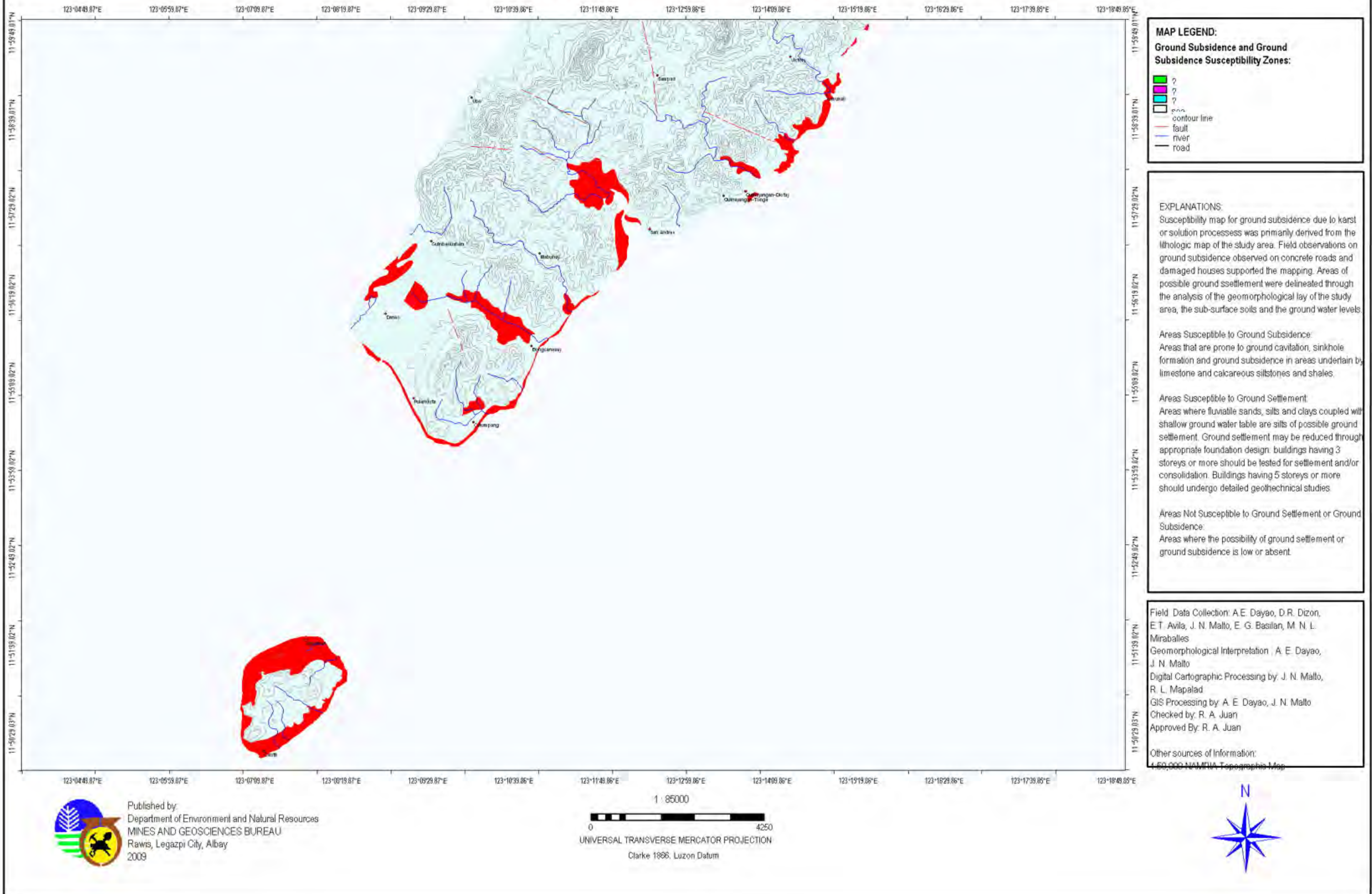


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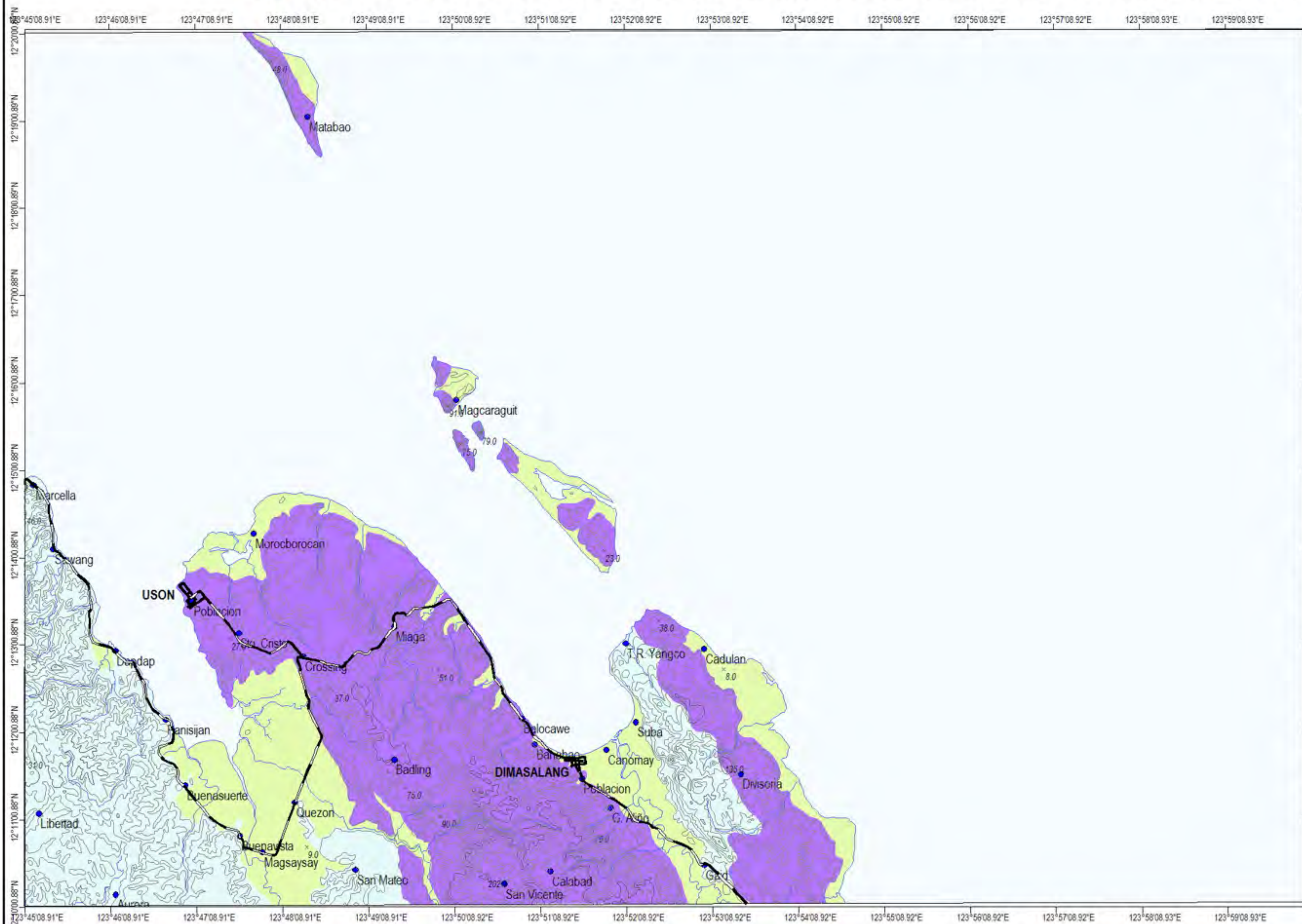
0 4250
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GROUND SETTLEMENT SUSCEPTIBILITY MAP OF PULANDUTA QUADRANGLE



GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF USON QUADRANGLE



MAP LEGEND:
Ground Subsidence and Ground Settlement Susceptibility Zones:

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

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 and calcareous siltstones and shales.

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 occurrence of ground settlement or ground subsidence is unlikely.

Field data collection by: A.E. Dayao, J.M.S. Laud, E.T. Avila, M.N.L. Miraballes, E.G. Basilan & J.N. Malto
 Geomorphological interpretation by: M.N.L. Miraballes
 Digital cartographic processing by: M.N.L. Miraballes
 GIS processing by: M.N.L. Miraballes
 Checked by: A.E. Dayao
 Approved by: R.A. Juan

Other sources of information:
 1:50,000 NAMRIA Topographic Map
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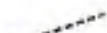
GEOMORPHOLOGIC MAP OF PLACER QUADRANGLE

LEGEND:

Geomorphologic Units

-  Alluvial Plain
-  Coastal Plain
-  Karstic Plateau
-  Lake
-  Lowlands underlain by Cawayan Clastics
-  Moderately Dissected Karstic Hills
-  Moderately Dissected Plateau-like Terrain
-  Moderately Dissected Plateau-like Terrain
-  Plateau Scarp
-  Sand Bar
-  Sea
-  Slightly Dissected Plateau-like Terrain
-  Very low Karstic Hills w/ Convex Slope
-  Young Tidal Flat

MAP SYMBOLS:

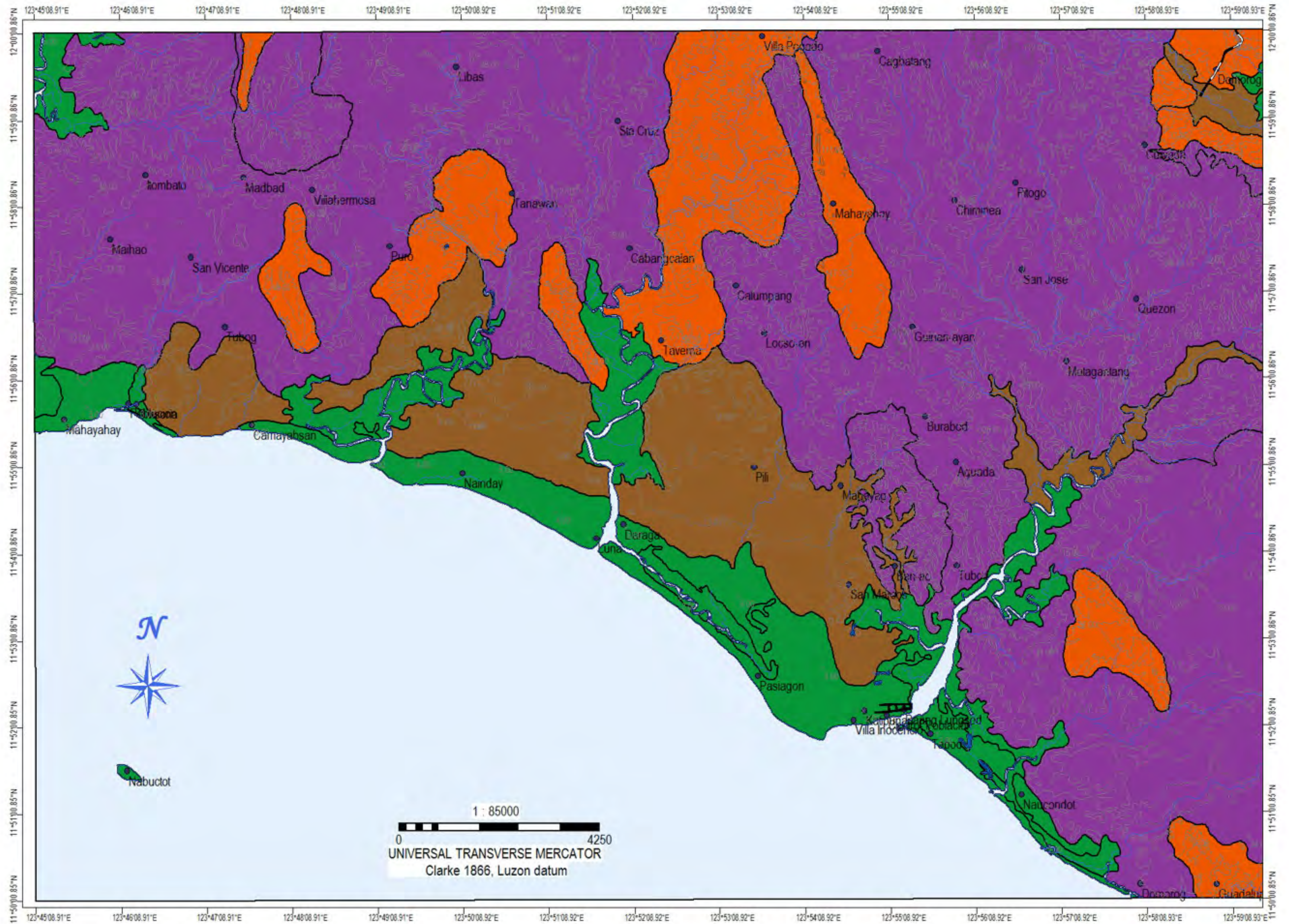
- Road 
- River 
- Contour 



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Rawis, Legazpi City, Albay
2000

Geomorphological interpretation by: A.E.
Dayao, E.G. Basilan
Digital cartographic processing by: E.G.
Basilan, D.G. Zepeda
GIS processing by: A.E. Dayao, E.G. Basilan
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



Alluvial Plain
Flat terrain found at the interface of the inactive
debris flow plan and the coastal plain.

Coastal Plain
Flat terrain behind the beach. Formed by marine
processes.

Young Tidal Flat
Areas affected by tidal fluctuations where nipa grove
thrive.

GEOLOGIC MAP OF PLACER QUADRANGLE

LEGEND:

Geologic Units

- Bugui Pt. Limestone
- Cawayan Clastics
- ?
- Quaternary Alluvium

MAP SYMBOLS:

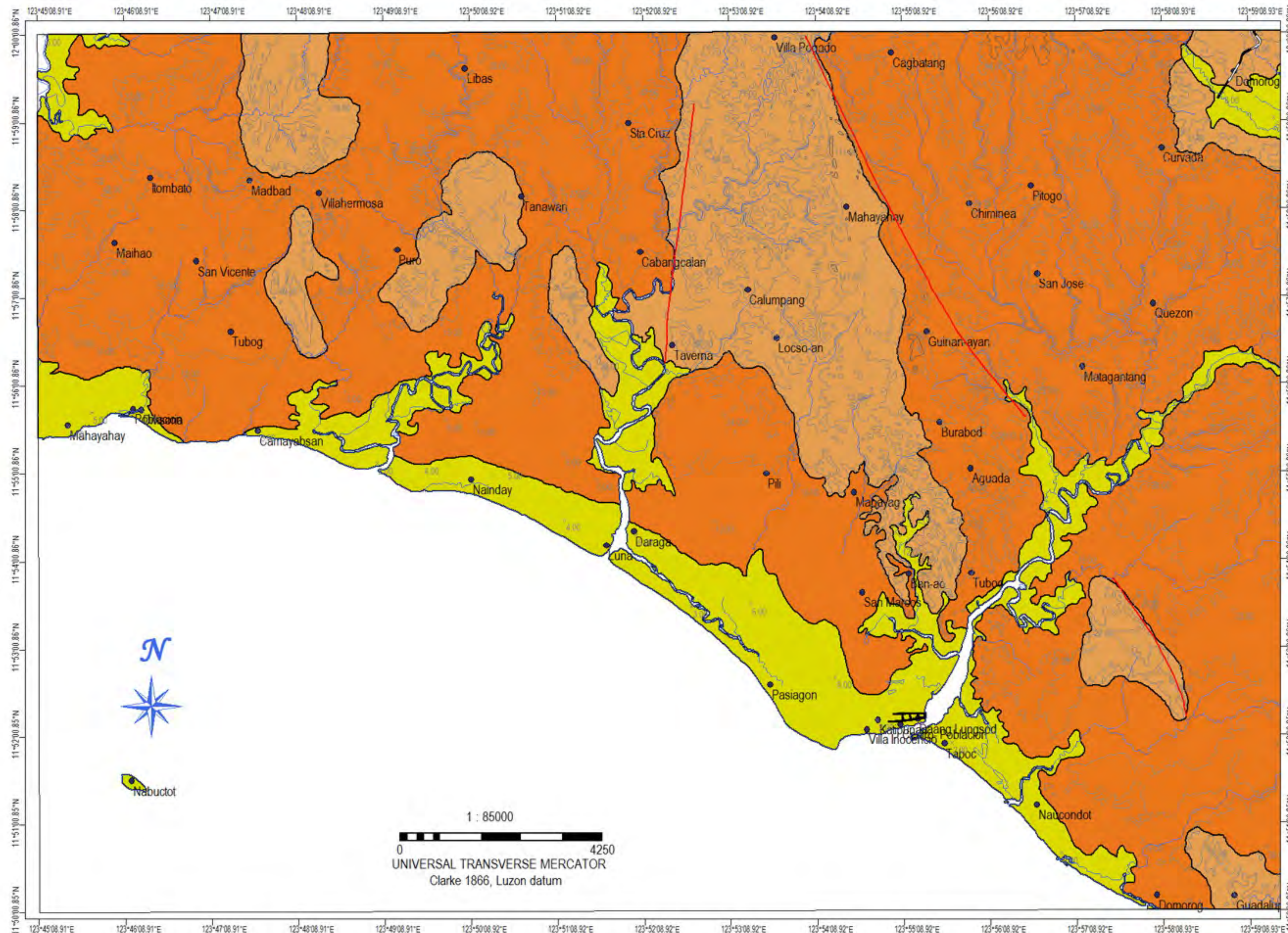
- Road
- River
- Contour
- Fault



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Geomorphological interpretation by: A.E. Dayao, E.G. Basilan
Digital cartographic processing by: E.G. Basilan, D.G. Zepeda
GIS processing by: A.E. Dayao, E.G. Basilan
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



Alluvium

Alluvial deposits consisting of fluvial deposits, beach sands and coral and shell fragments and other unconsolidated sediments. These sediments have mostly been deposited by floods, slope wash processes, swash and backwash of tides and storm surges.