Investment for Disaster Reduction

-A Case Story of Marikina City, Metro Manila, Philippine-

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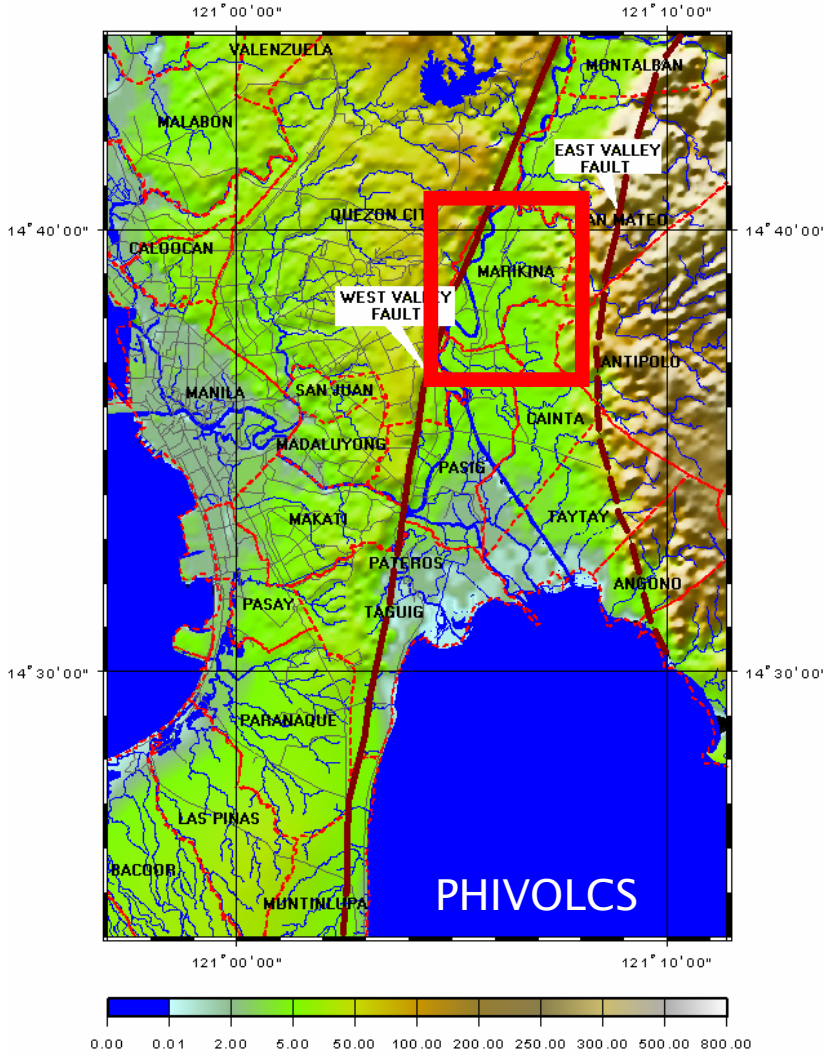
Marikina City & Metro Manila:
17 cities and 10 million people

Earthquake Risk, Local Magnitude 7.2, 350-year return period

Flood risk, 10-year return period



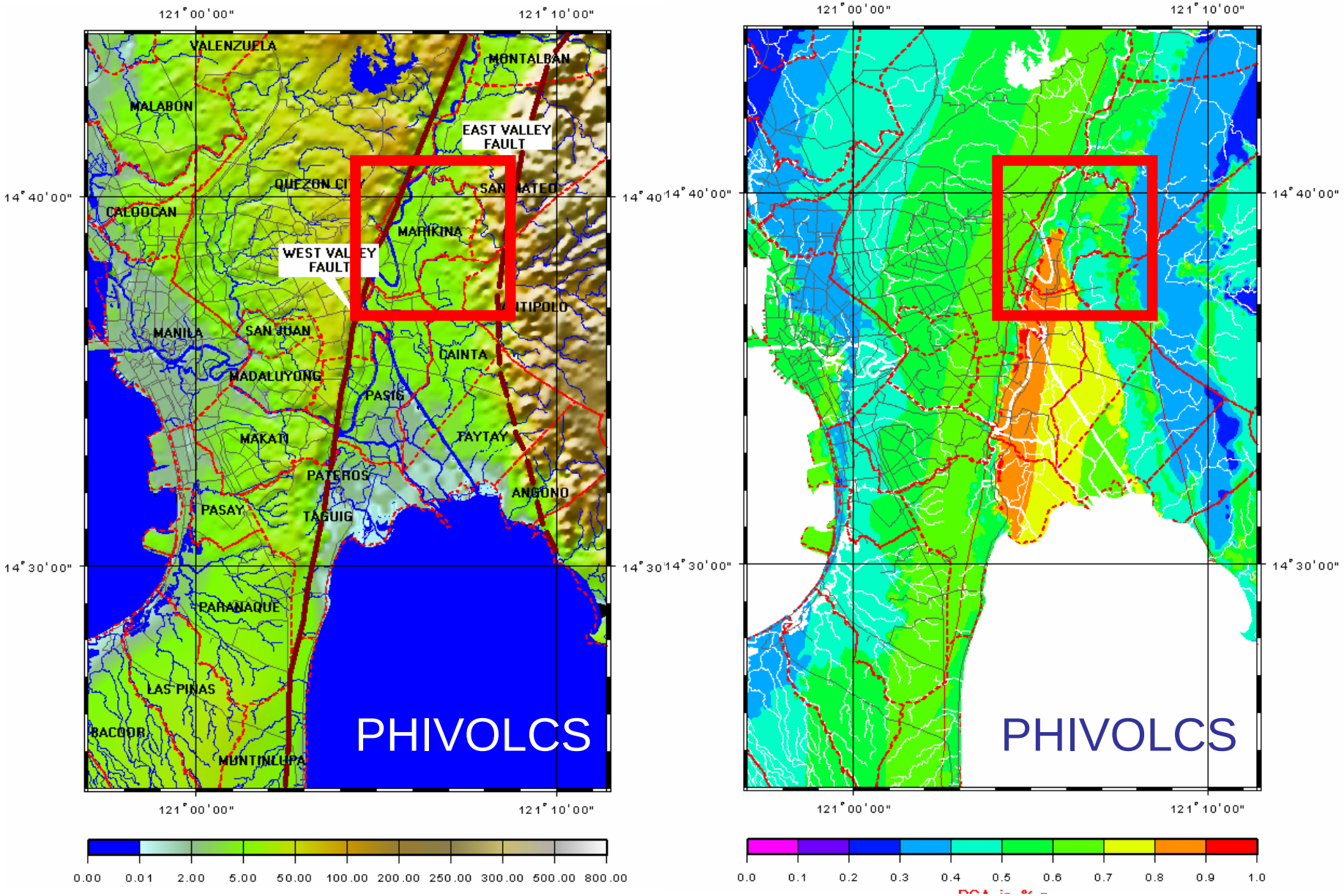
Why we started this project in Marikina: It is for "EqTAP" Master Plan

- EqTAP is a five year multi-national collaborative research project (14 countries) for the development of "Master plan for Earthquake and Tsunami Disaster Reduction in Asia-Pacific Region" (1999-2004)
- Risk Management Framework/Case Study Approach
- Metro Manila has been selected for case study site because of high seismicity and resulting impact

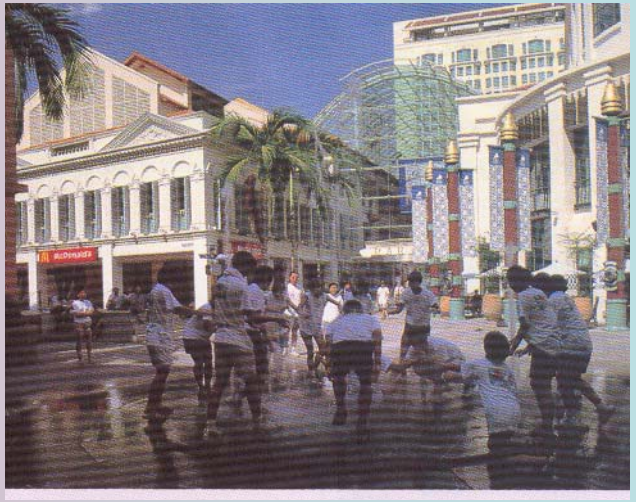
Risk Management Framework

- Management Cycle (PDCA)
  - Risk assessment
  - Strategic planning
- Stakeholder Involvement
  - Workshop: Sense of ownership
- Holistic Framework
  - Disaster reduction as a tool for sustainable economic development
  - Multi-disciplinary array of countermeasures

Marikina Fault & Marikina River:

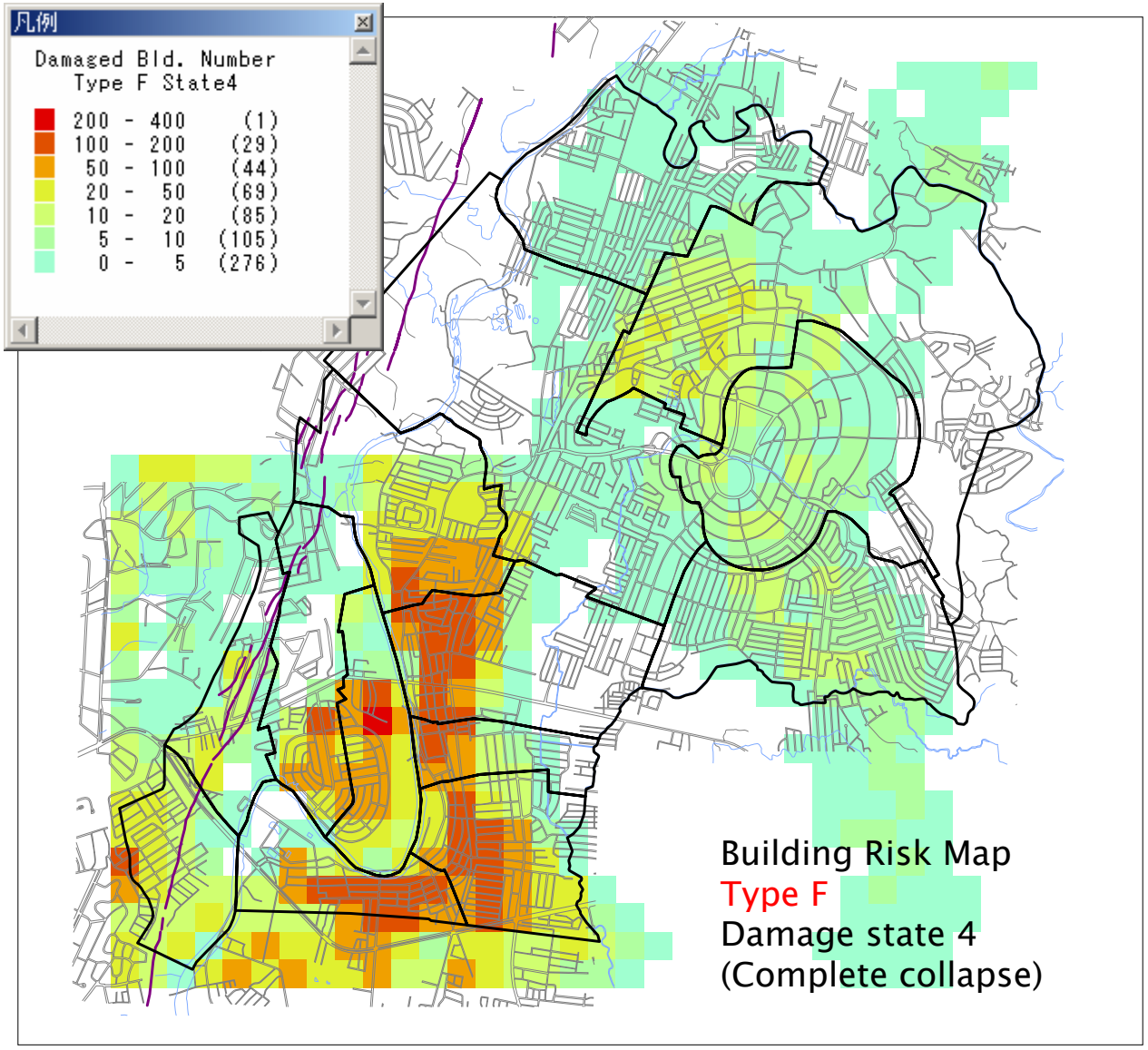


MARIKINA: A World Class City
Marikina as a little Singapore



A civic setting of historically significant buildings at Empress Place

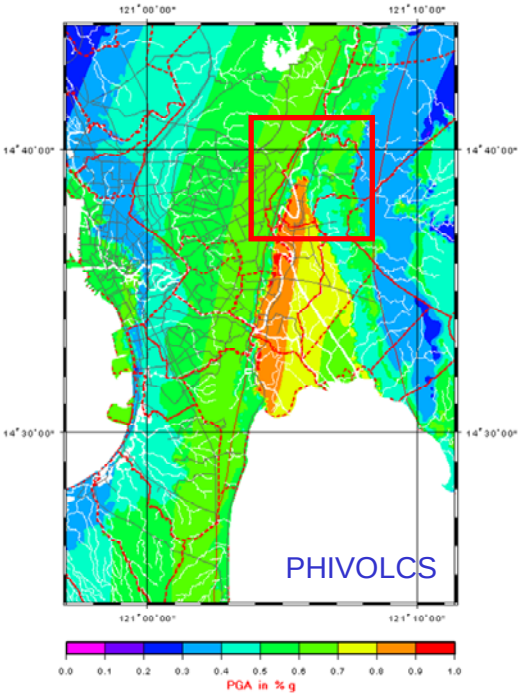
Residential Damage Estimates in Marikina City



Building Risk Map
Type F
Damage state 4
(Complete collapse)

Complete Collapse

13,000+ Buildings



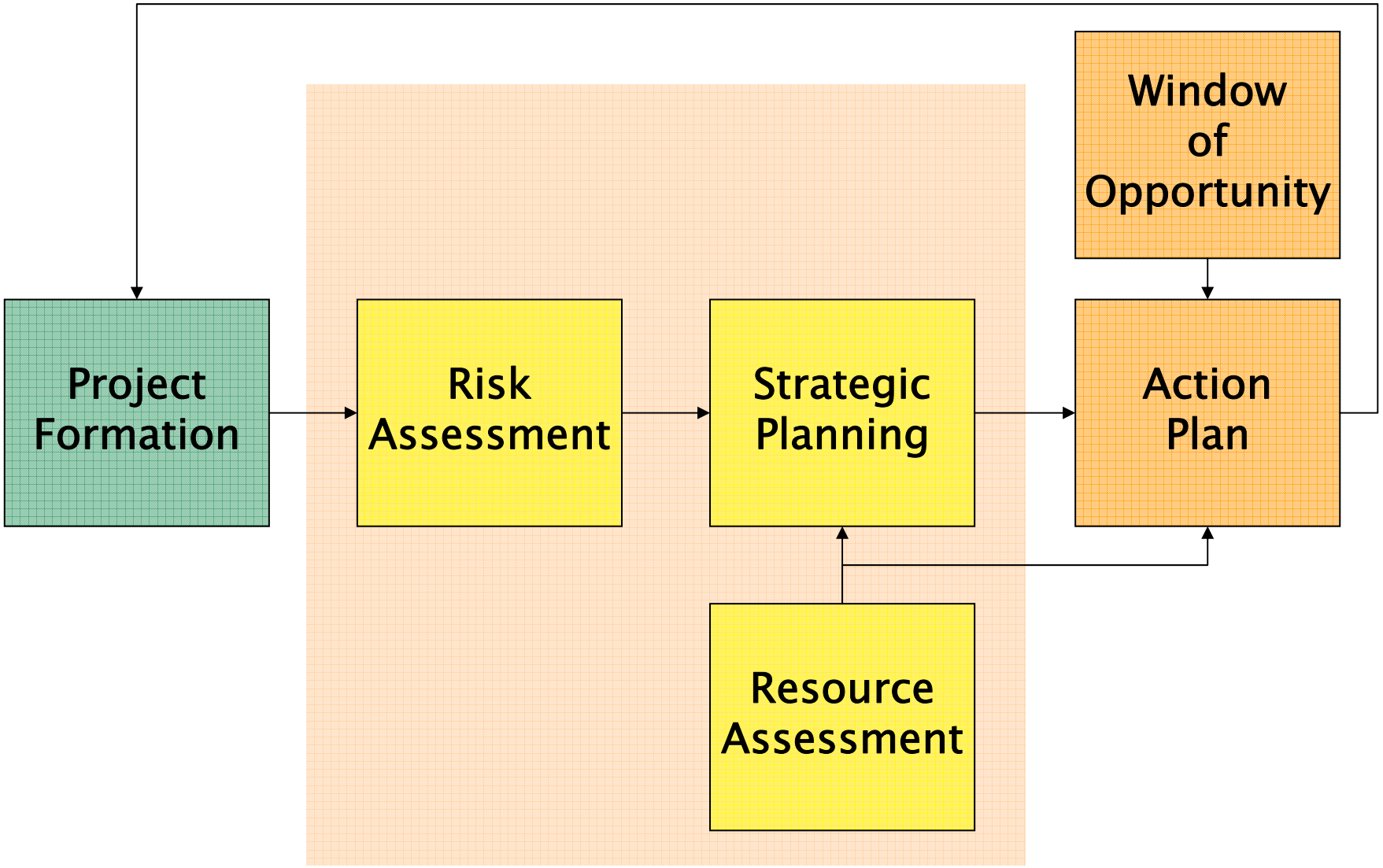
City of Marikina as our partner because of her excellence in self-governance and high motivation for disaster reduction

What this project did in Marikina:

- Risk Assessment
  - Interactive risk assessment
- Strategic Planning Framework
  - Management by Objective
  - Top-down approach
- Comprehensive Earthquake Disaster Reduction (CEDR) Program > Action Plan
- Performance Measurement Scheme
  - Monitoring Tool

- Project Management Framework as the basis

Framework of "Investment for Disaster reduction" Project



Step 0: Project Formation

Goal

Knowing about earthquakes and damage they can cause

Local Input

- Lack of understanding of earthquake damage

Expert Input

Visual Images of major earthquakes such as Baguio, Kobe, Turkey and Taiwan

Deliverables

Clear understanding about earthquake damage among core stakeholders

Step 1:Problem identification WS (January)

Goal

Assessing earthquake risk locally and interactively

Local Input

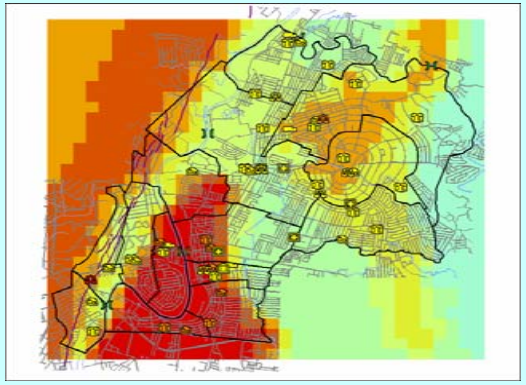
- List of local assets stakeholders want to protect from earthquakes

Expert Input

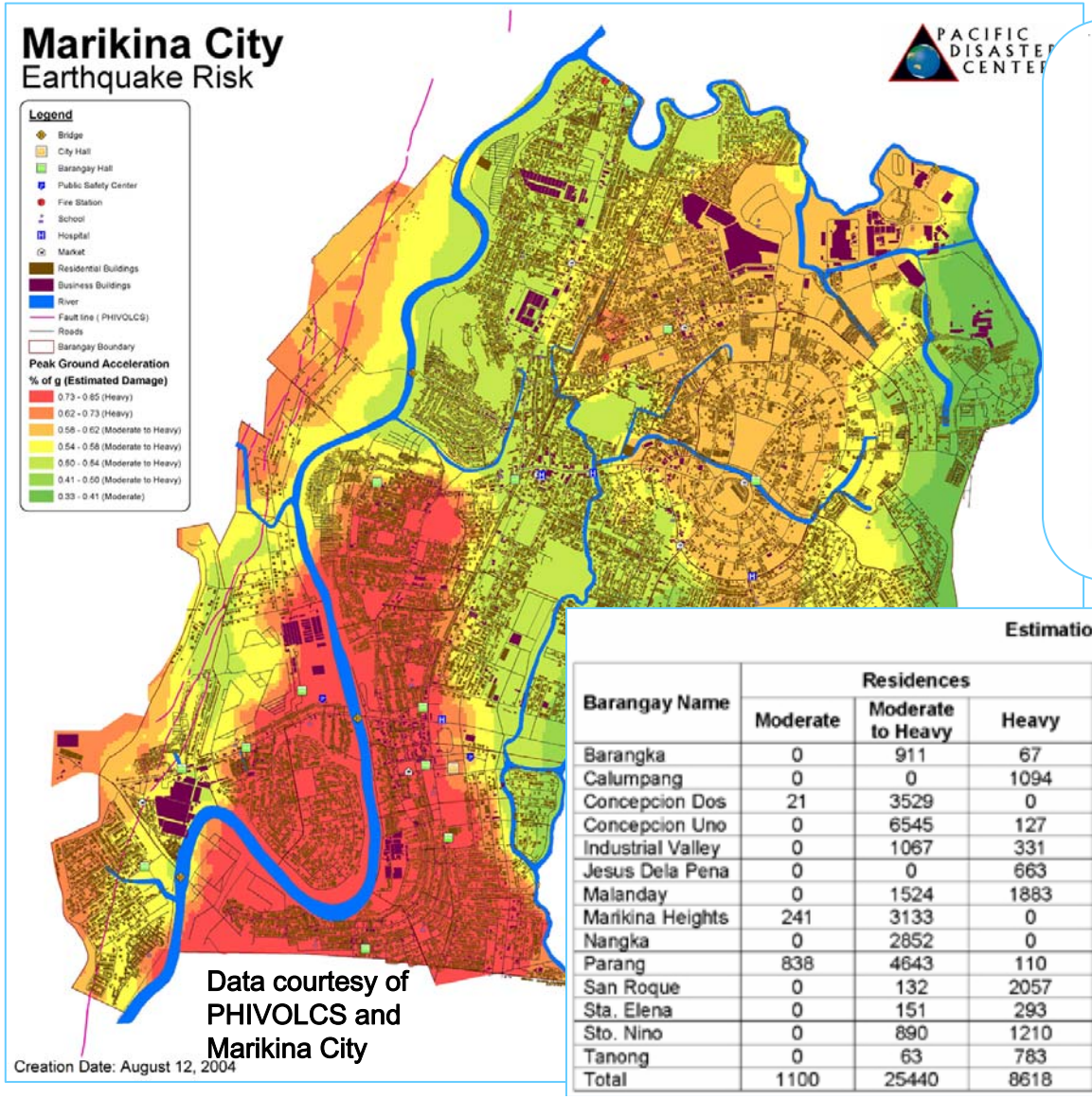
- Risk Assessment method (GESI method by UN) that damage state for individual structure can be obtained

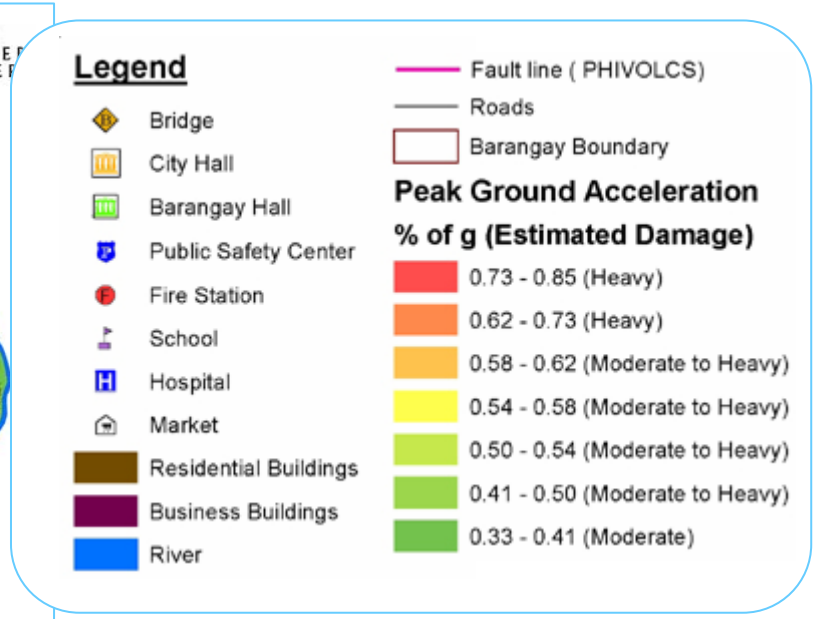
Deliverables

- Risk Assessment results tailored for Marikina City



Earthquake Vulnerability Map





Estimation of Damage to Buildings

Barangay Name	Residences			Businesses			Critical Facilities		
	Moderate	Moderate to Heavy	Heavy	Moderate	Moderate to Heavy	Heavy	Moderate	Moderate to Heavy	Heavy
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Calumpang	0	0	1094	0	0	85	0	0	2
Concepcion Dos	21	3529	0	1	109	0	0	3	0
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Jesus Dela Pena	0	0	663	0	0	16	0	0	2
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Nangka	0	2852	0	0	150	0	0	5	0
Parang	838	4643	110	24	356	5	0	7	0
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Sta. Elena	0	151	293	0	5	153	0	1	4
Sto. Nino	0	890	1210	0	74	145	0	1	3
Tanong	0	63	783	0	8	73	0	1	3
Total	1100	25440	8618	38	1680	793	0	42	17

Step 2: Risk assessment and Goal Setting WS (May)

Goal

Setting Project Goal

Local Input

- Comprehensive Land Use Plan: CLUP(2000)
- Marikina Vision (2002)

Expert Input

Linkage between earthquake disaster reduction and sustainable economic development

Deliverables

- Decision to develop Marikina comprehensive earthquake disaster reduction program

Basis for Long-term Prosperity: Land Use and Economic Changes

- *Marikina is basically a "bedroom community" - a considerable number of people work outside of the city.(CLUP)*
- *...this trend is likely to change within the next 10-15 years. (CLUP)*
- *As jobs are provided closer to homes, Marikina shall no longer be known as a "bedroom community. (Web site)*

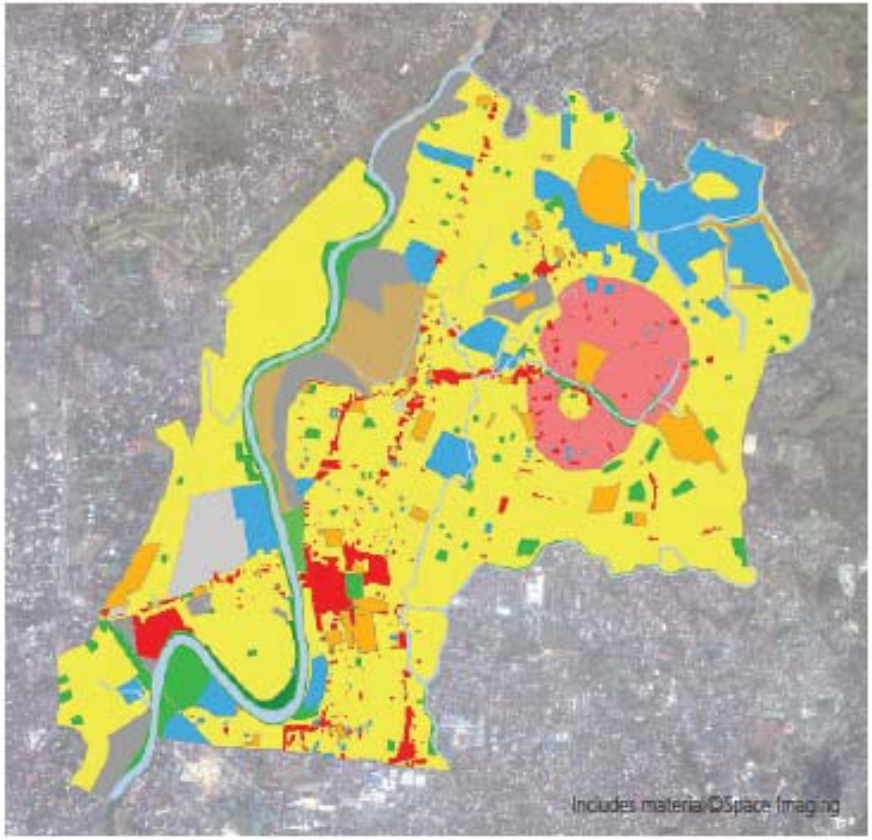


Figure 2. Existing Land Use

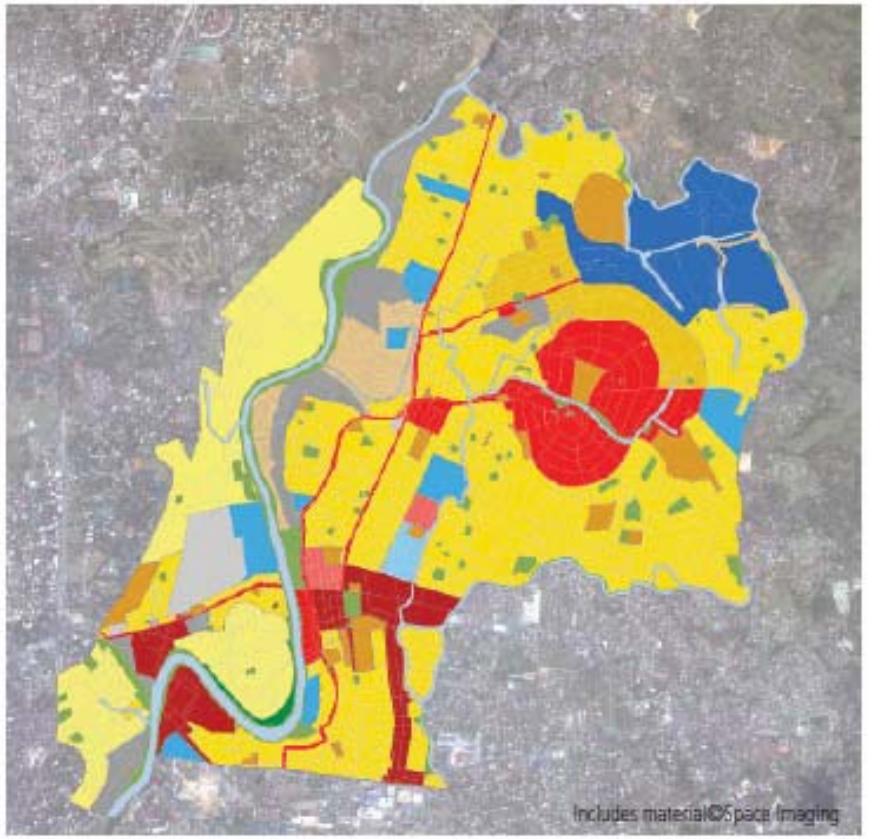


Figure 3. Planned Land Use

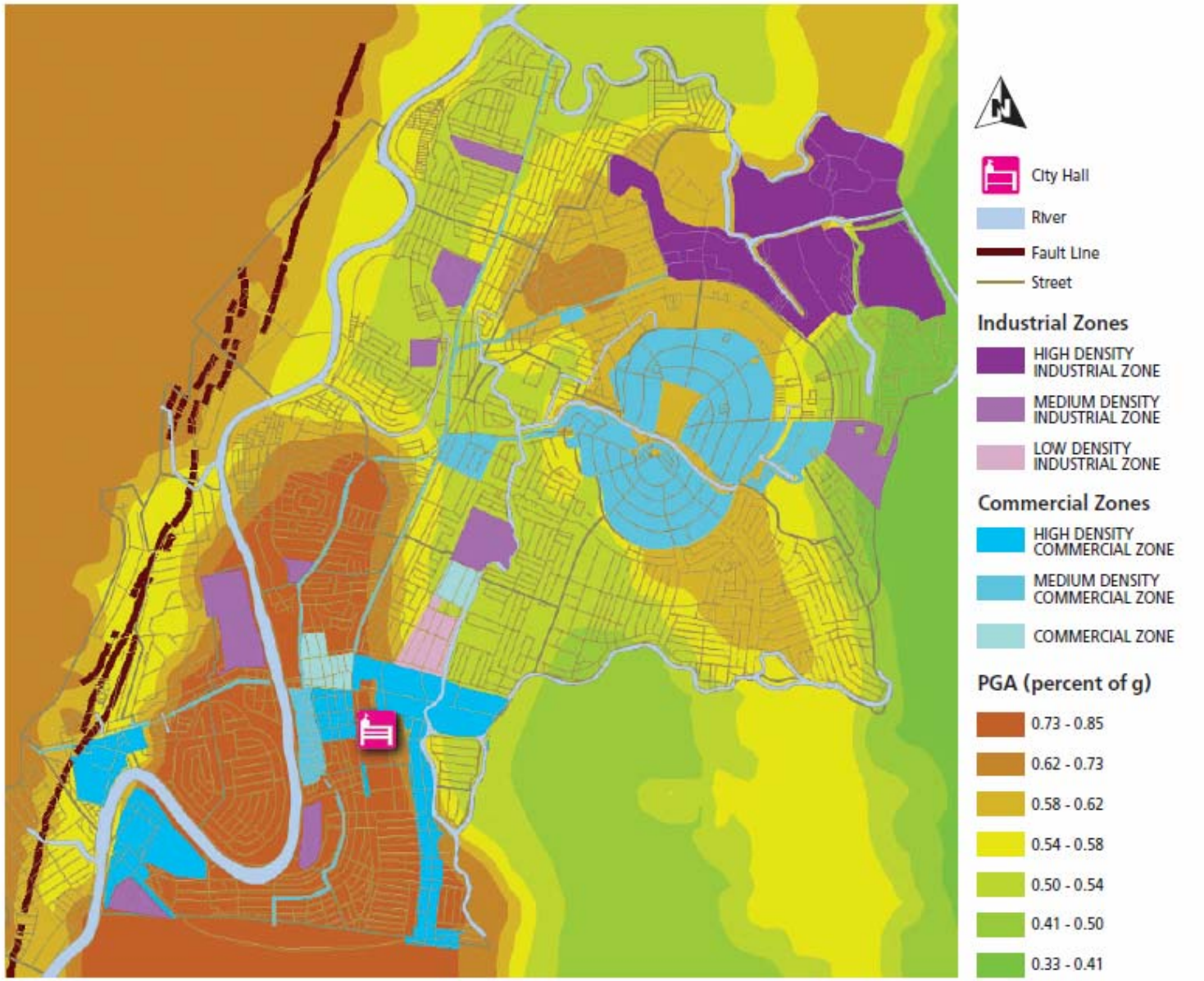


Figure 5. Commercial and Industrial Areas Subject to Heavy Shaking

Needed: A Disaster Reduction Plan

- *Marikina City must expand its vision, goals and objectives to include disaster reduction*
- *What should be the City's disaster reduction goals and objectives?*
- *What disaster reduction targets, programs and projects should Marikina pursue?*

Step 3: Plan-concept WS (July)

Goal

Policy & Strategy, Program & Project Identification

Local Input

Strategic Planning structure used in CLUP

Expert Input

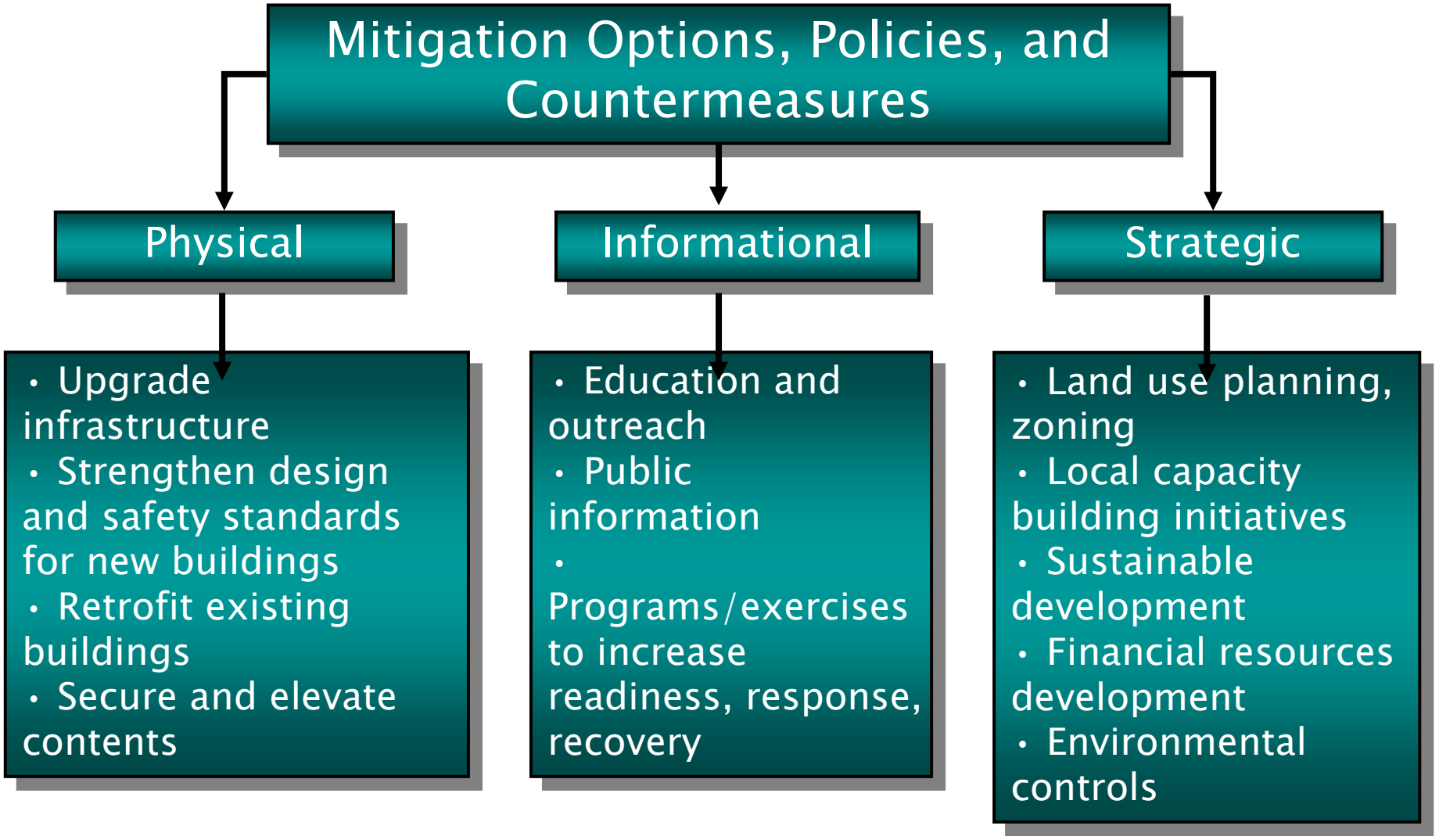
Concept Plan Matrix

	OBJECTIVES	Mitgation	Prepared ness	Respon se	Recovery
1	Critical Facilities				
2	New Buildings				
3	Existing Buildings				
4	Education				
5	Research & Technology				
6	Public Information				
7	Land Use Planning				
8	Institutional Initiatives				
9	Economic Development				
10	Sources of Finance				

Deliverables

Comprehensive Earthquake Disaster Reduction Program consists of 1 goal, 10 objectives,

DPRI Planning Process has led to Local Advocacy for Mitigation Policies



Step 4: Implementation WS (October)

Goal

Resource Assessment

Local Input

Individual Evaluation of 216 policies

Expert Input

Nominal Group technique

Deliverables

Evaluation results of 216 policies in terms of internal and external resource availability

Comprehensive Earthquake Disaster Reduction (CEDR) Program

- Goal: The City of Marikina is committed to accomplishing the following goal: to protect human safety, property, and activities.
- Objectives: 10 Objectives reflecting 10 fields of countermeasures
- Policies: 56 Policies
- Actions: 216 Actions taken by Marikina City

Physical Countermeasures

1. Critical Facilities

- Protect and strengthen infrastructure facilities to prevent loss of lives and damage to properties, to allow continued use, and to restore normalcy quickly following disasters.

2. New Buildings

- Improve the quality of building design and standards to encourage and safeguard investment and to protect human lives, property, and activities.

3. Existing Buildings

- Identify the condition of existing buildings and take corrective action to prevent loss of lives and properties and to allow continued use.

Informational Countermeasures

4. Education

- Raise consciousness and preparedness of all citizens of Marikina through education and training about earthquake disaster issues.

5. Research & Technology

- Identify and evaluate high risk areas through research and appropriate technologies.

6. Public Information

- Formulate, maintain, and sustain a continuous public information campaign strategy before, during, and after earthquakes.

Strategic Countermeasures

7. Land Use Planning

- Realize the vision of Marikina as a little Singapore facing minimal risk of earthquake disaster damage through a well defined land use plan and disaster management program.

8. Institutional Initiatives

- Build Marikina's capacity to mitigate, prepare, respond and recover from a major earthquake through developing a Disaster Reduction Plan.

9. Economic Development

- Incorporate disaster management into the enhancement of livelihoods and economic development.

10. Sources of Finance

- Identify existing local sources of finance and generate additional funding from other sources to support earthquake disaster reduction.

Step 5: Action Plan WS (November)

Goal

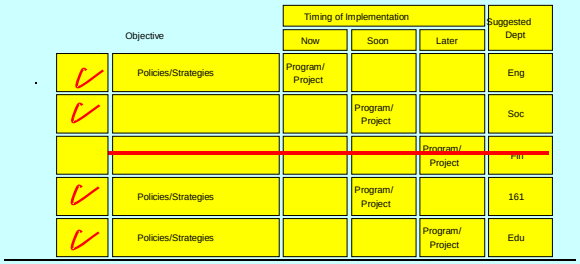
Action Plan Formation

Local Input

Feasibility check of prioritized policies

Expert Input

Prioritization method

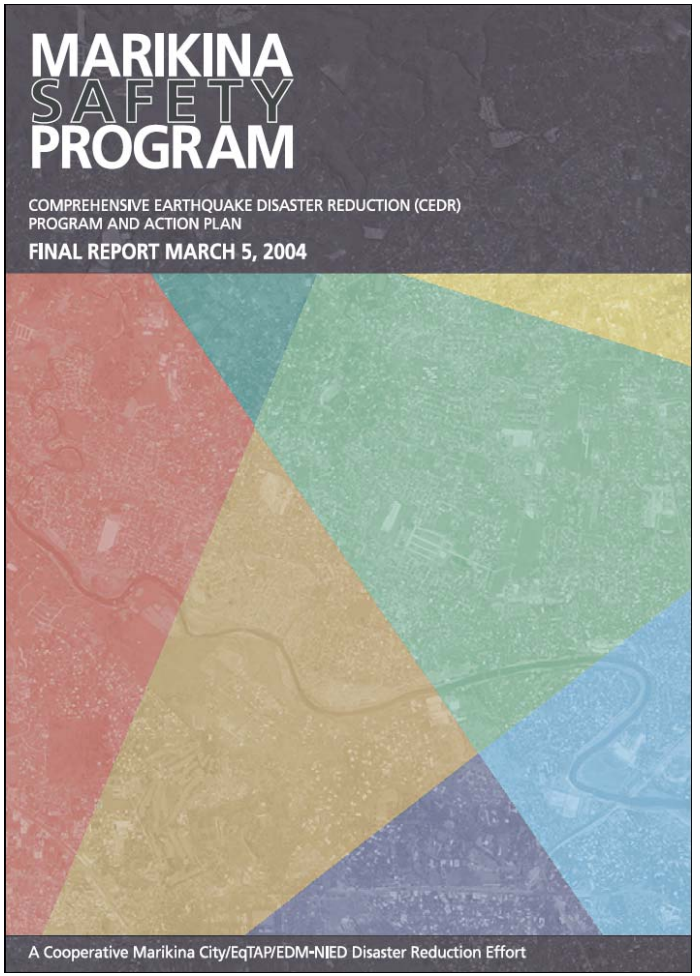


Deliverables

Action plan consists of 113 policies for the achievements of 10 objectives

Stakeholder-driven strategic planning workshops produced:

- a GIS-based earthquake risk assessment
- a long-term Comprehensive Disaster Reduction Program, identifying objectives, policies, and programs
- an Action Plan identifying actions prioritized by time, plus assignments of lead agencies and departments

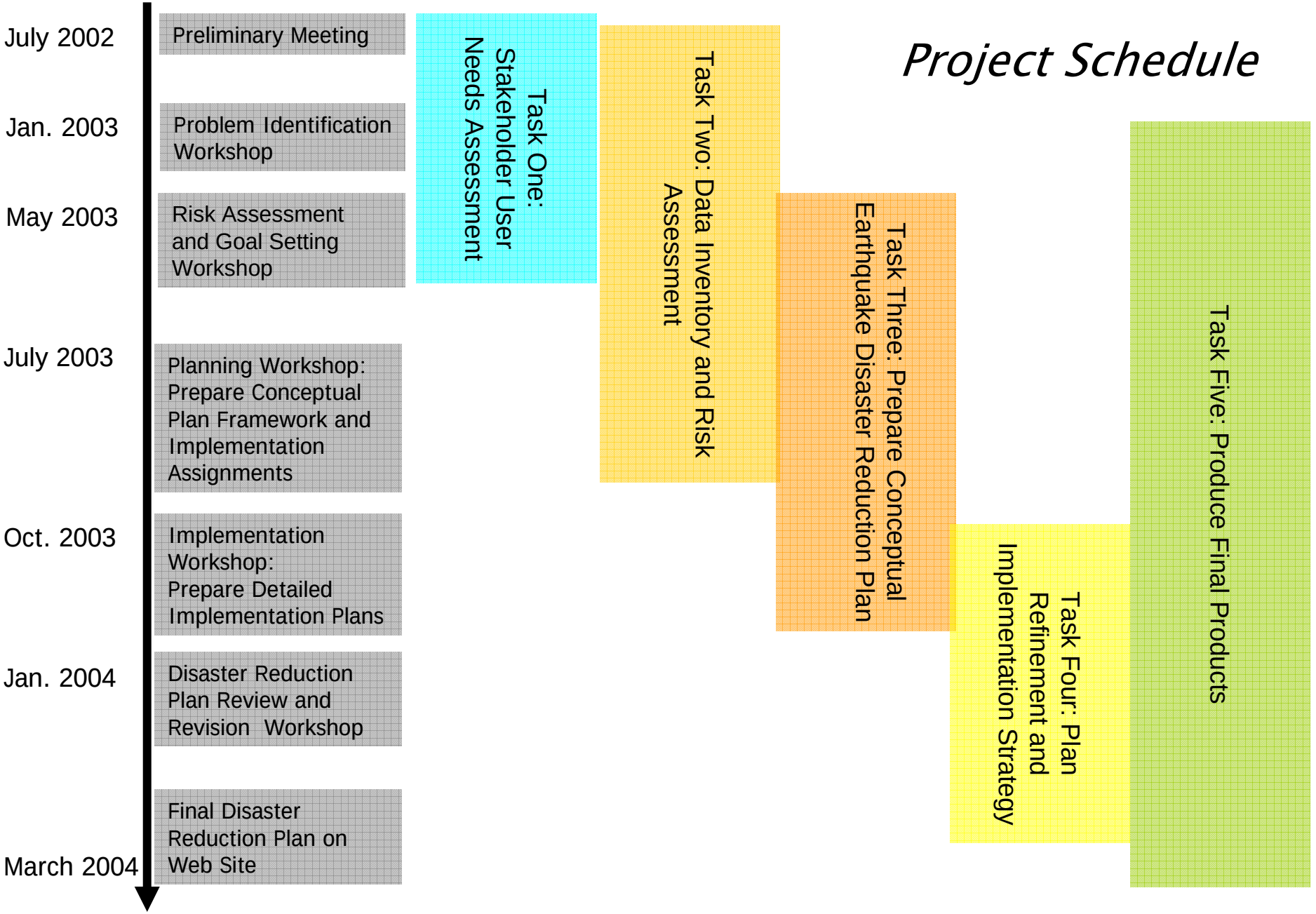


How we did it with Marikina people: Stakeholder Involvement

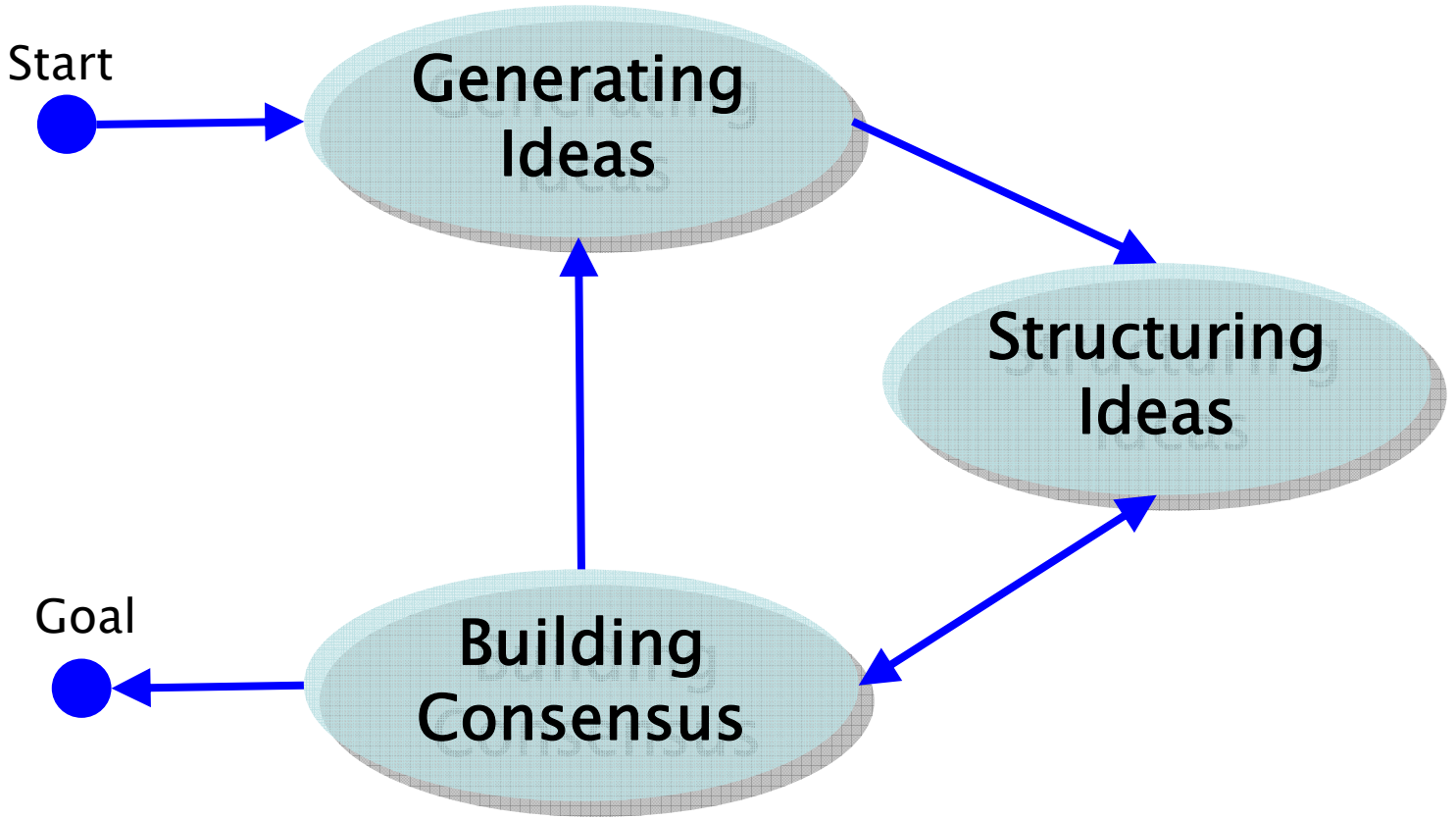
- Bottom- up Approach
  - Local Government Unit as a Core Stakeholder
  - Community-based Capacity Building
- Participatory Approach
  - Participation through Workshop
  - Sense of ownership
- Outreach Mechanism
  - Exhibition
  - House Demolition Experiment

Five Workshop Series

Project Schedule

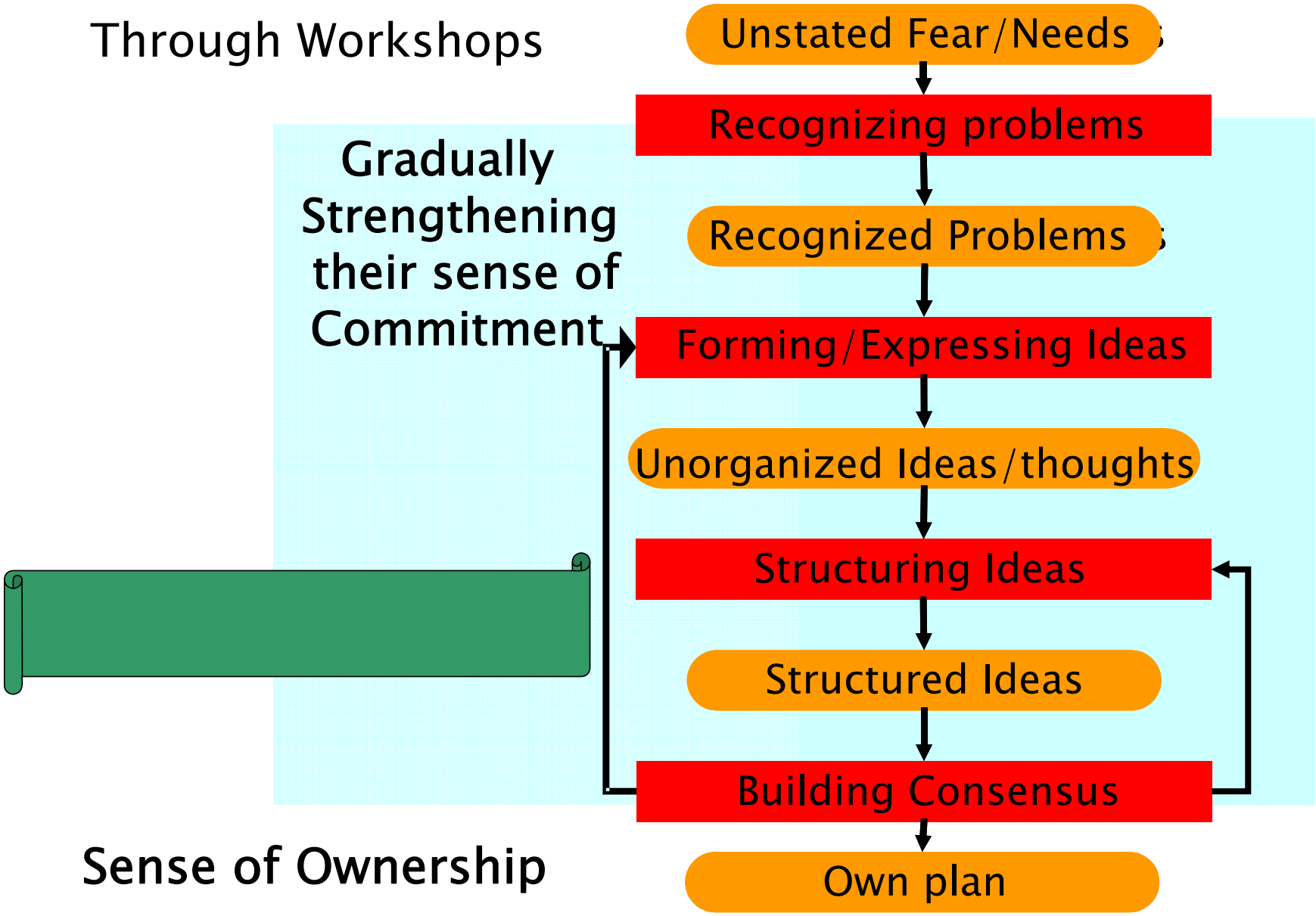


Workshop as thinking process



Just Like Project Management Process

Through Workshops



Sense of Ownership

Workshop is a powerful capacity building tool for stakeholders

1. By Providing a deeper understanding of issue
2. By Improving facilitation skills at workshop setting
3. By improving oral presentation skills (including PowerPoint)
4. By giving them a sense of ownership about the issue and the plan
5. By expanding their social network

July Exhibition in Marikina City:

Preserving Marikina's Future through Earthquake Disaster Reduction

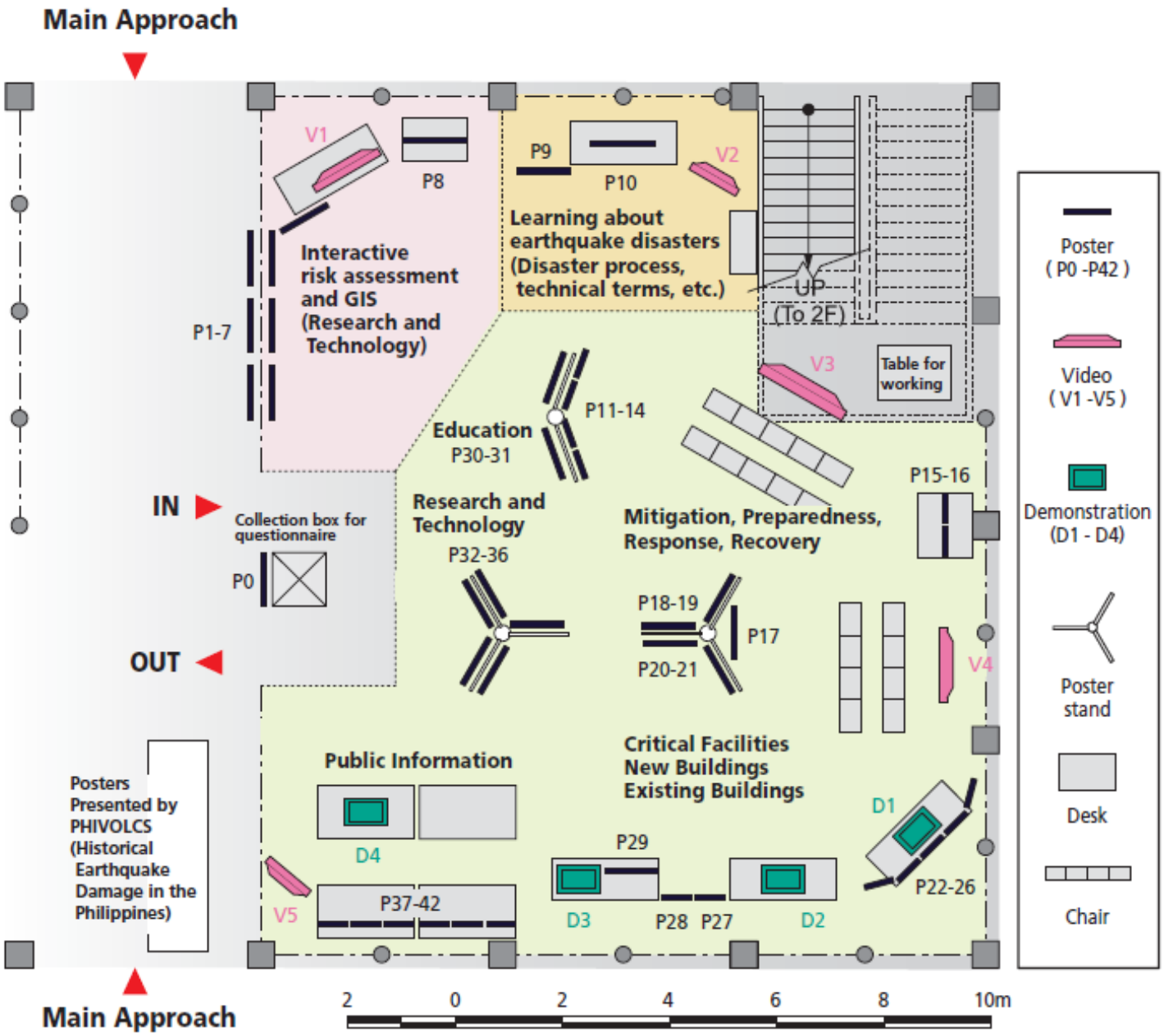
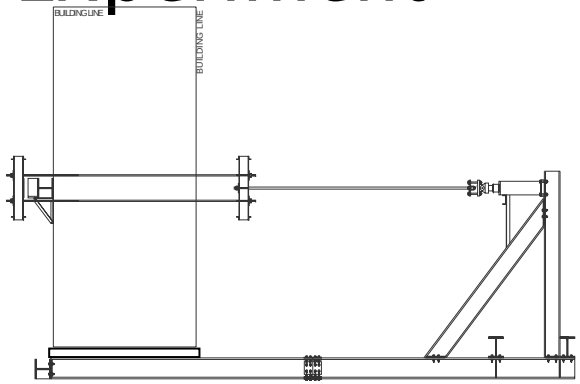
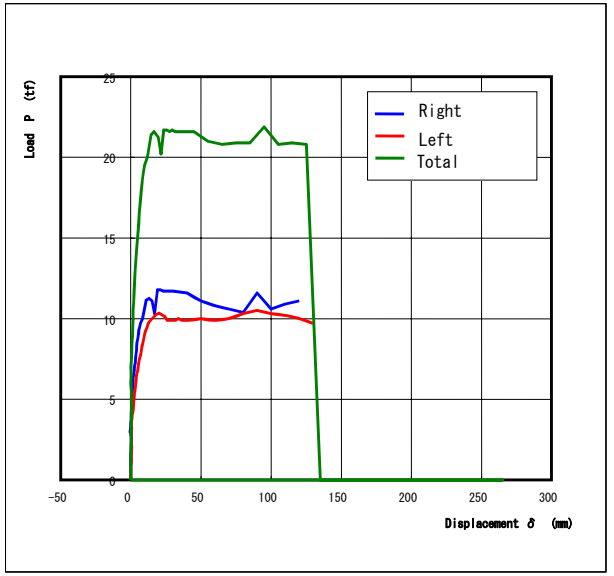


Figure 3. Layout of Marikina Exhibition

Local Mitigation Project:
Improving Non-Engineered Housing Construction Practice -Loading Experiment-



Loading Equipment



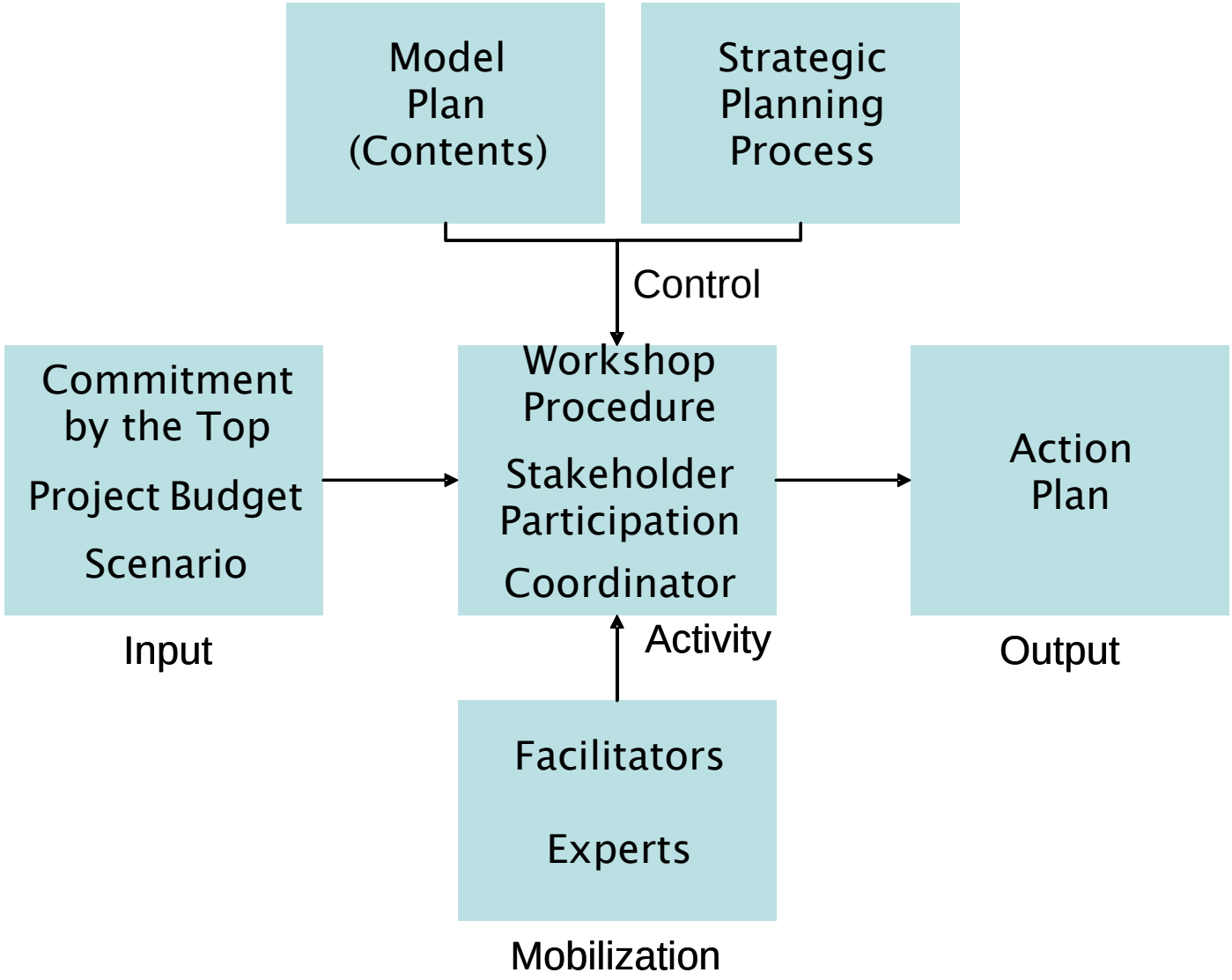
Significance of Marikina Study:

- Processes
  - Establishing a standard procedure for participatory strategic planning
- Deliverables
  - Building capacity of key local stakeholder
  - Making disaster reduction as a tool for sustaining local economic development
  - Developing a holistic framework
    - Forming a long-term comprehensive plan:
    - Conducting multi-disciplinary research:

Local Capacity Building through Stakeholder-based Strategic Planning

- How can governments and businesses develop the capacity for improved disaster mitigation, preparedness and recovery through capacity-building stakeholder participation?
  - Involve stakeholders at the outset
  - Avoid arbitrary imposition of top-down solutions
  - Provide expertise to widen stakeholder knowledge
- Challenge stakeholders to deal with all aspects of disaster management

Model for Successful Participatory Strategic Planning



Participatory Strategic Planning may be successful if

1. Participants generate ideas, structure them, and reach consensus by themselves
2. Objectives and Policies, i.e. "what" part of the plan, may be formulated by the participations of Citizens
3. Actions and Projects, i.e. "how" part of the plan, may be finished by those stakeholders who will take part in the implementation of the plan
4. With a help of a team of experts consisting of multi-disciplinary backgrounds and skills
5. Coordinator team should be formed by Local stakeholders and Expert team.

Participatory Strategic Planning is so new and different approach in Japan that it still has several difficulties such as

1. Difficult to get the commitment by the Top
2. Difficult to be appreciated as legitimate work in terms of funding
3. Difficult to come up with quantitative targets
4. Rather labor Intensive
5. Few number of good facilitators and experts with wide interests are available

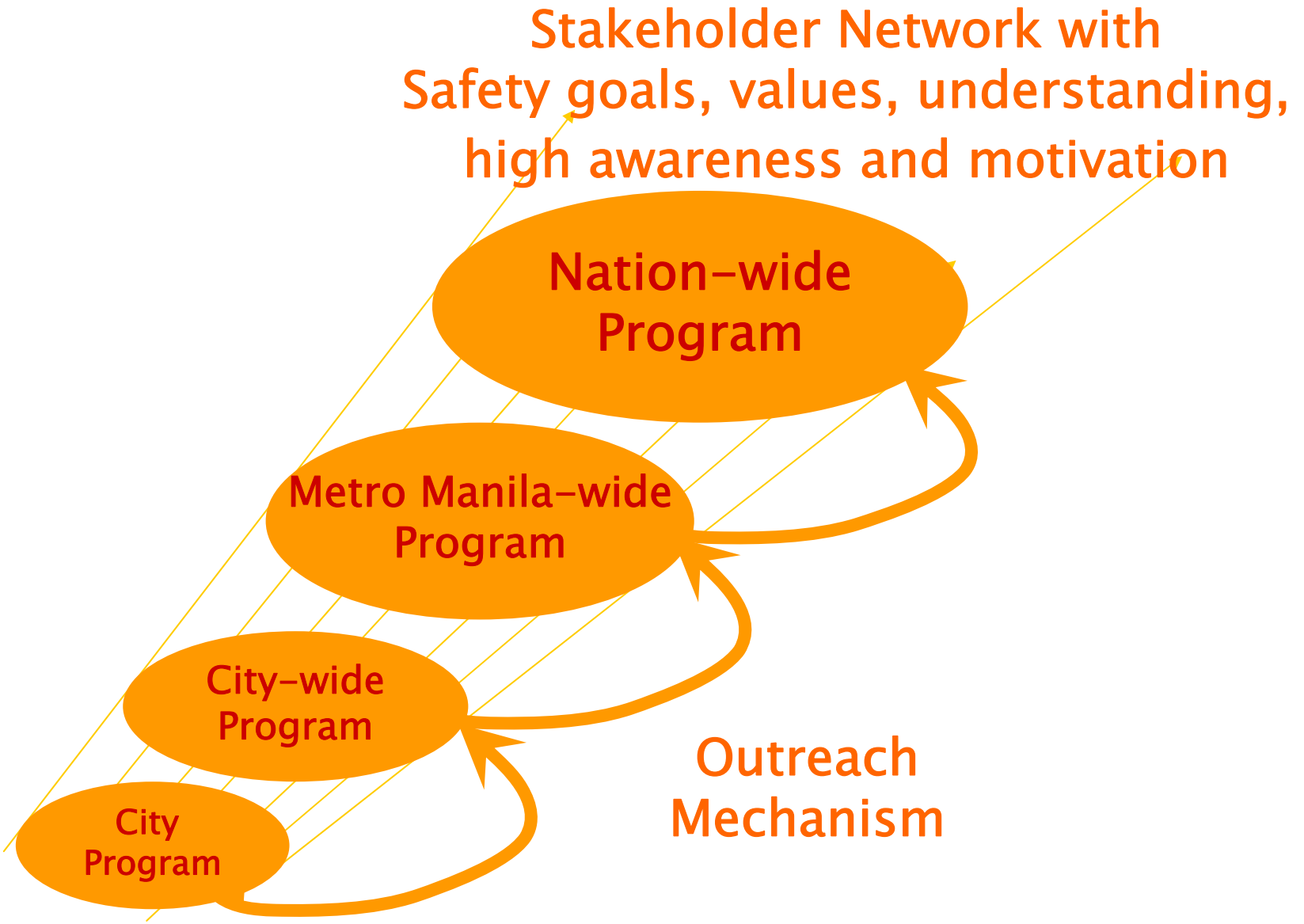
Our interpretation of Master plan " Strategy for bottom-up capacity building"

- Disaster reduction should be closely linked with sustainable development of the city and city planning
- Continuous process to improve capability
- Local stakeholder initiatives helped by experts
- Integrated approach with the collaboration of many different disciplines
- Customer oriented participatory approach
- Looking for inexpensive but effective countermeasures of all kinds

Components of "EqTAP" Master Plan for Promoting Community-based Earthquake Disaster Reduction Capacity

- Safety goals, values, and understanding
- Stakeholder awareness and motivation
- Comprehensive earthquake disaster reduction program
- Outreach mechanism
- Stakeholder network

Bottom-up Capacity Building Processes

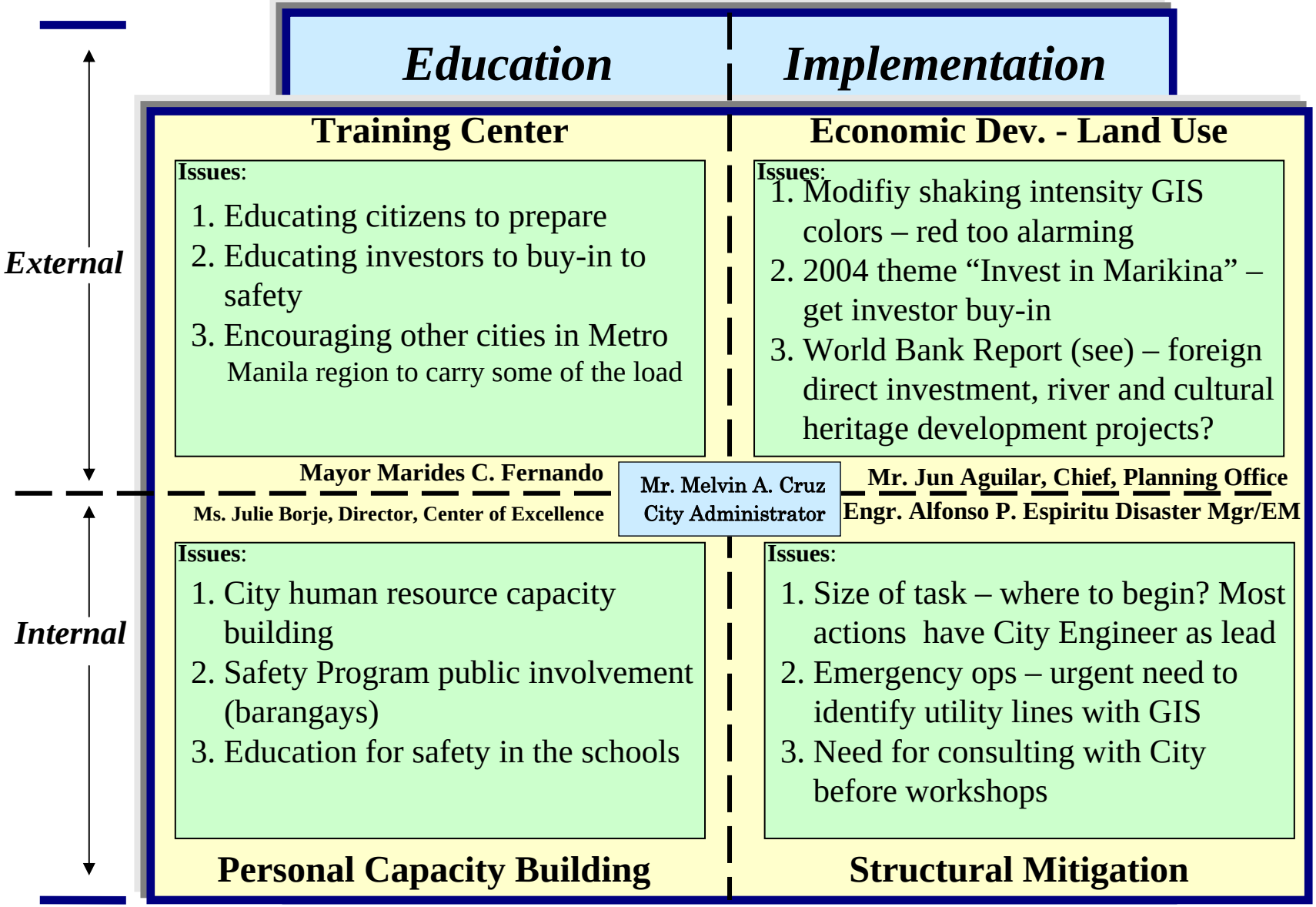


A Follow-up: PDC's Involvement and Contributions

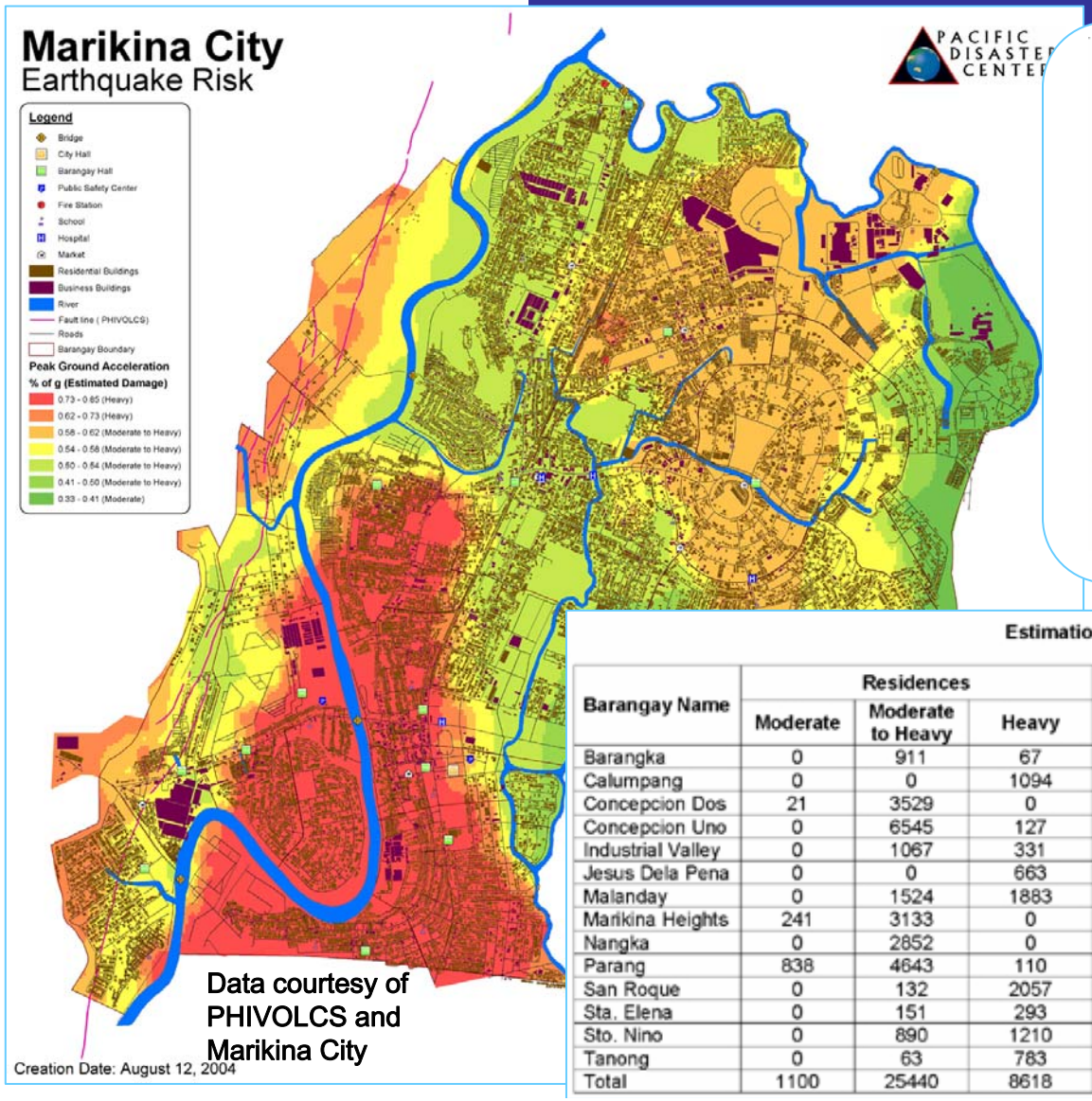
1. Initial engagement and transition to PDC
2. PDC expansion of hazards mapping and GIS, to include flooding, for land use & economic development
3. Development of Risk Communications Tools
4. Expanding Marikina City effort to Metro Manila
5. Comments on Key Components for Successful Project Planning required to build Researcher-Practitioner-Stakeholder Coalitions

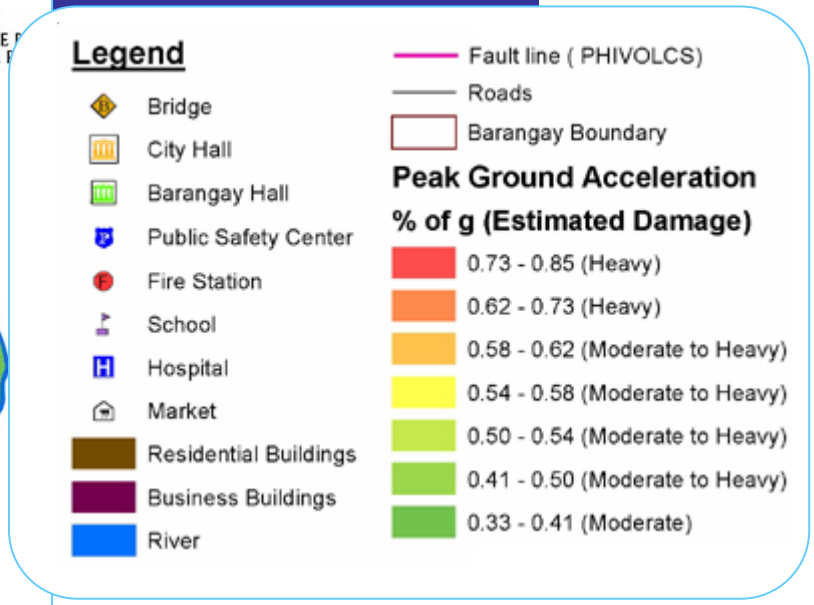
Japan-Philippines-U. S. Collaborative Planning Process: 2004 -2006

PDC Starting Point: Sustained Feedback from Decision Makers



Earthquake Vulnerability Map





Estimation of Damage to Buildings

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Total	1100	25440	8618	38	1680	793	0	42	17

2005.11.04
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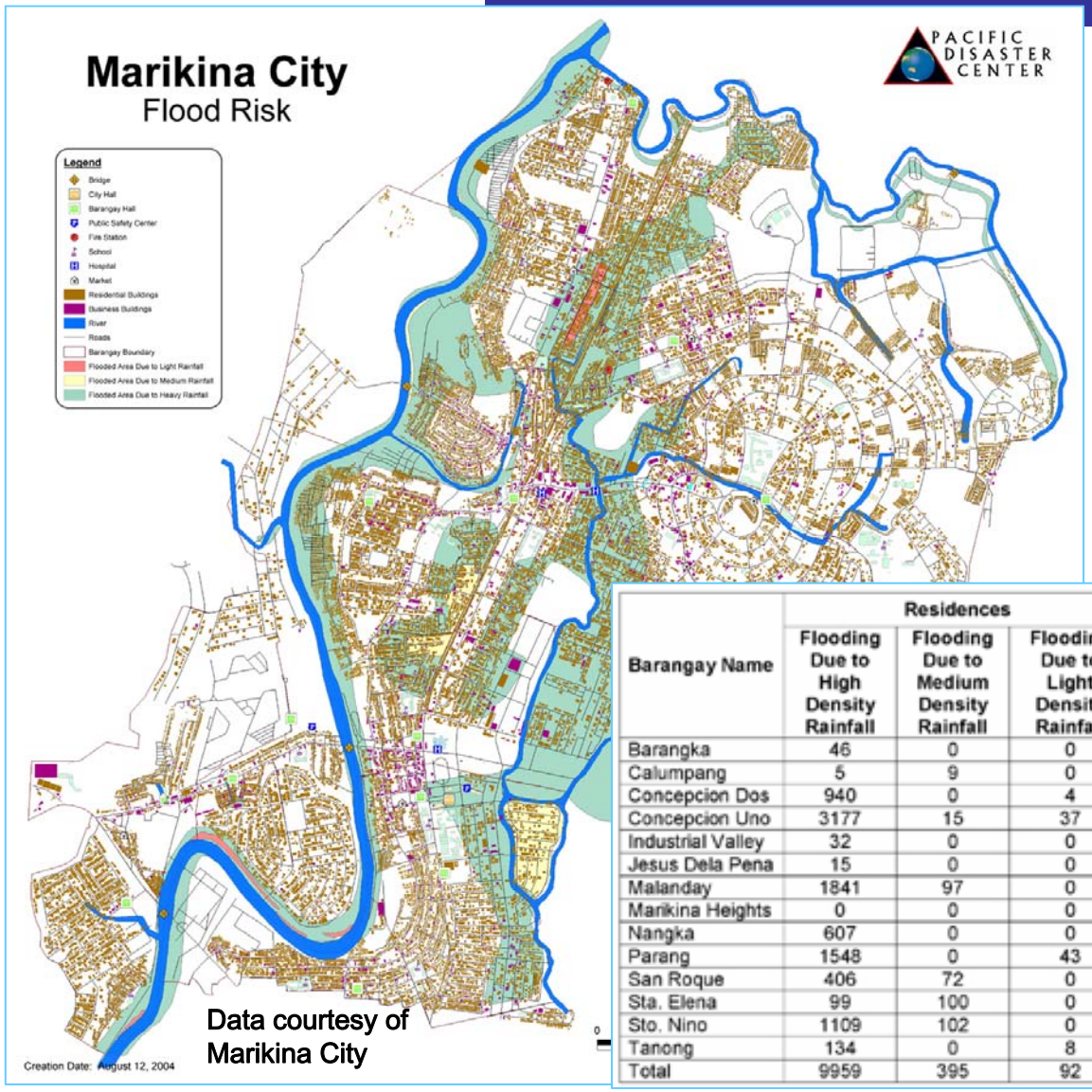
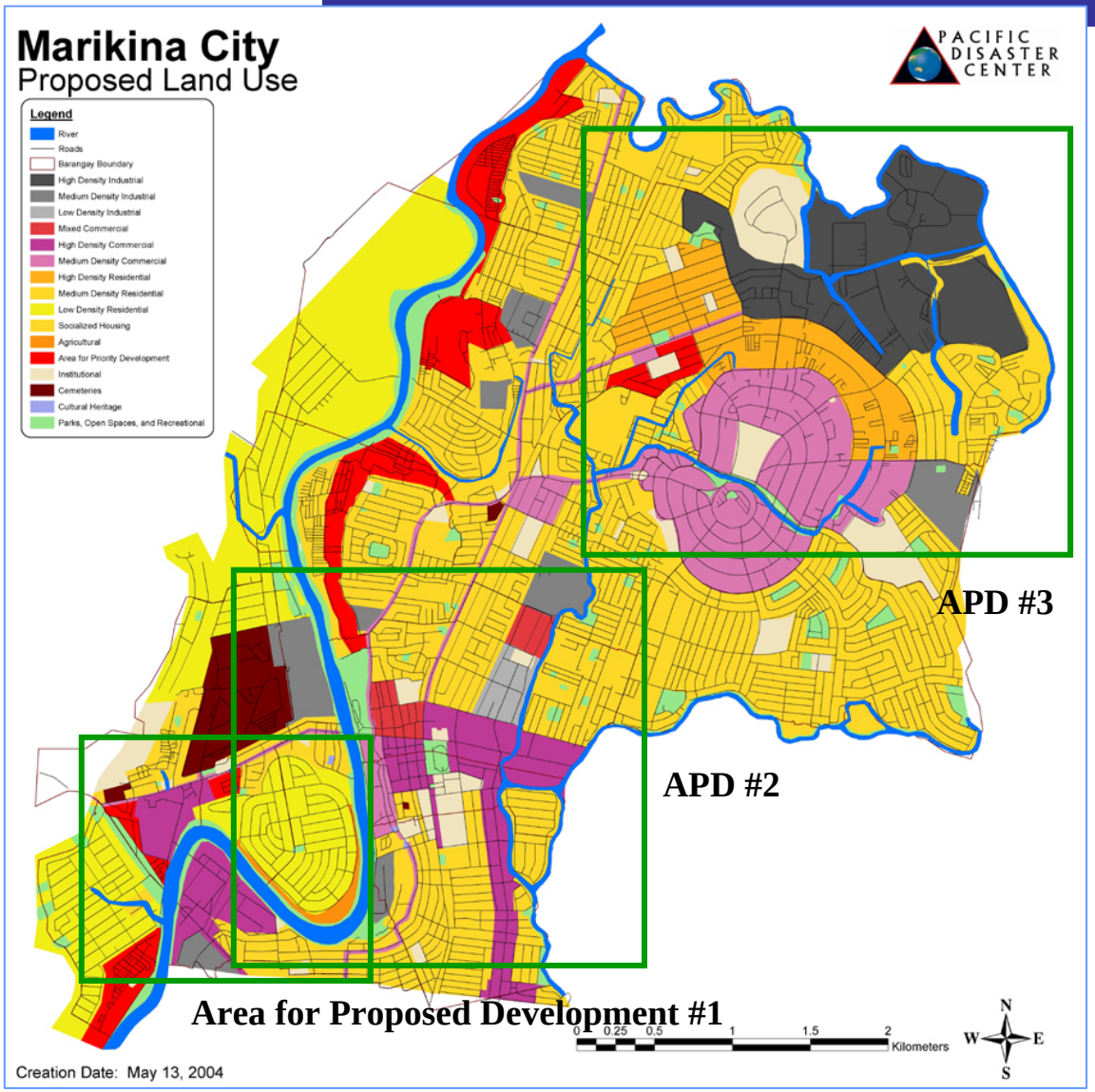
Riverine Flood Vulnerability Map



Barangay Name	Residences			Businesses			Critical Facilities		
	Flooding Due to High Density Rainfall	Flooding Due to Medium Density Rainfall	Flooding Due to Light Density Rainfall	Flooding Due to High Density Rainfall	Flooding Due to Medium Density Rainfall	Flooding Due to Light Density Rainfall	Flooding Due to High Density Rainfall	Flooding Due to Medium Density Rainfall	Flooding Due to Light Density Rainfall
Barangka	46	0	0	9	0	0	0	0	0
Calumpang	5	9	0	0	0	0	0	0	0
Concepcion Dos	940	0	4	21	0	0	0	0	0
Concepcion Uno	3177	15	37	184	0	1	3	0	0
Industrial Valley	32	0	0	0	0	0	1	0	0
Jesus Dela Pena	15	0	0	0	0	0	1	0	0
Malanday	1841	97	0	18	4	0	0	0	0
Marikina Heights	0	0	0	0	0	0	0	0	0
Nangka	607	0	0	16	0	0	2	0	0
Parang	1548	0	43	53	0	0	1	0	0
San Roque	406	72	0	53	0	0	0	0	0
Sta. Elena	99	100	0	17	1	0	2	0	0
Sto. Nino	1109	102	0	65	2	0	1	0	0
Tanong	134	0	8	6	0	0	0	0	0
Total	9959	395	92	442	7	1	11	0	0

Land-use Planning Example: Areas for Proposed Development



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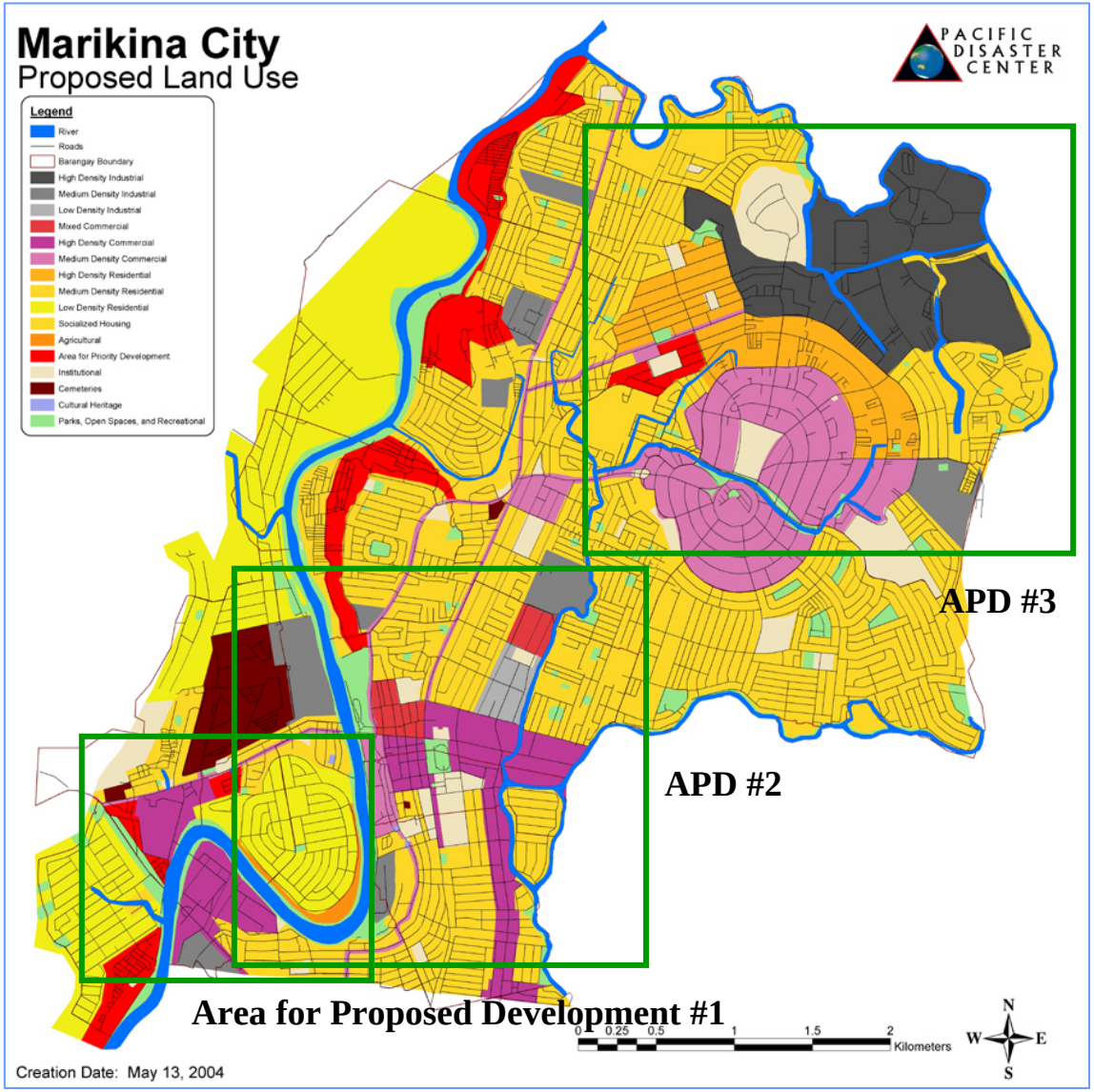
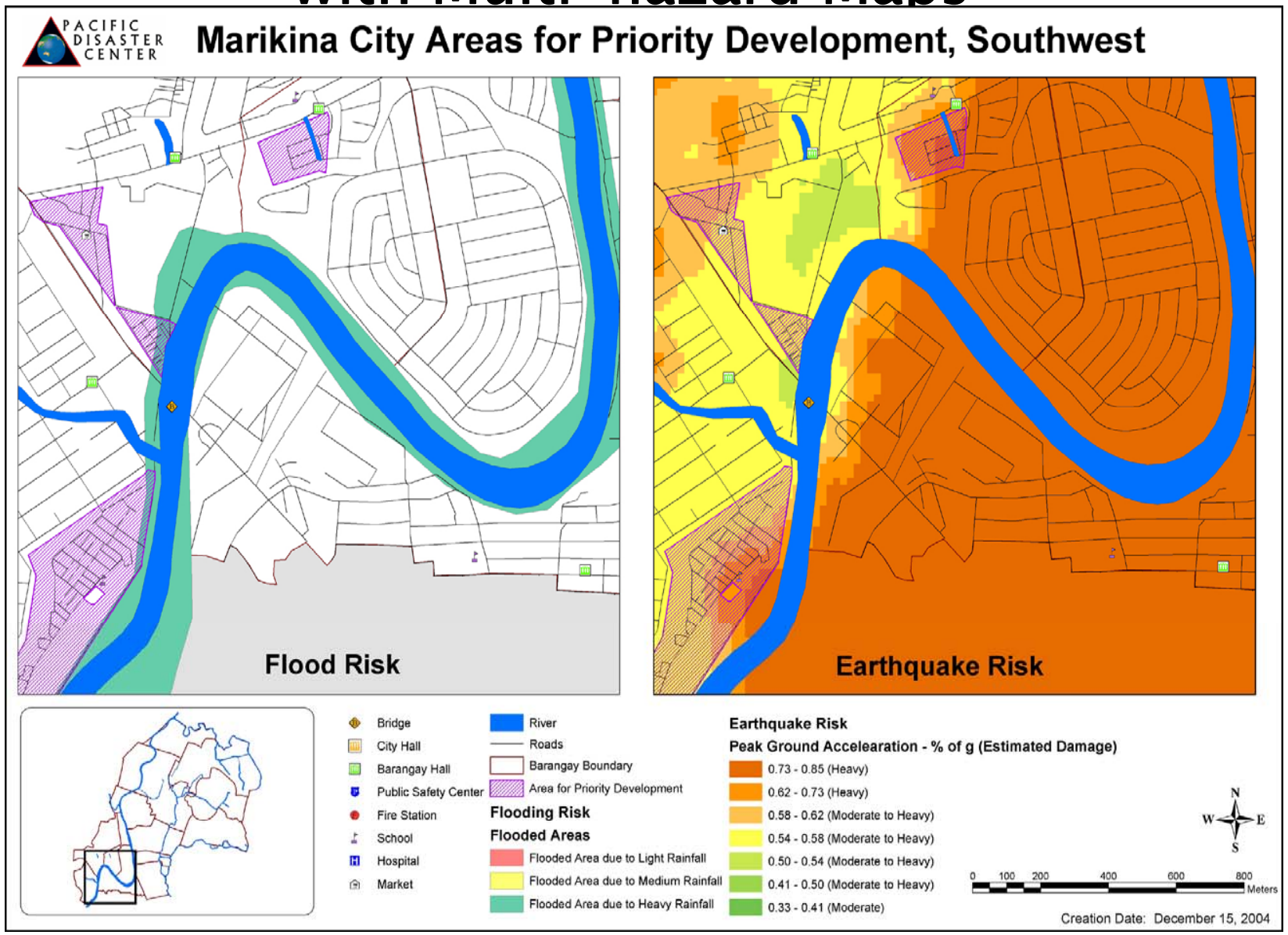
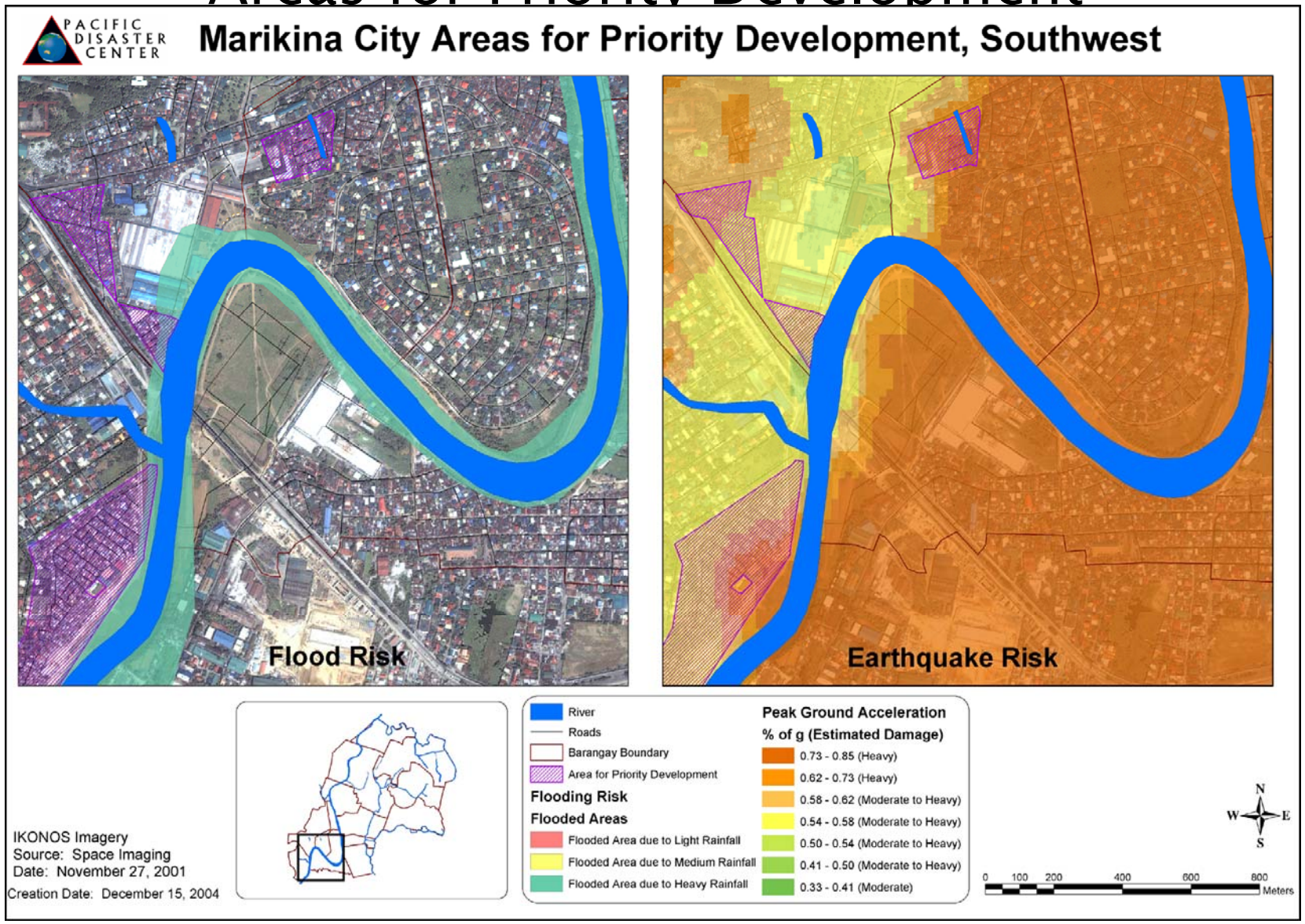


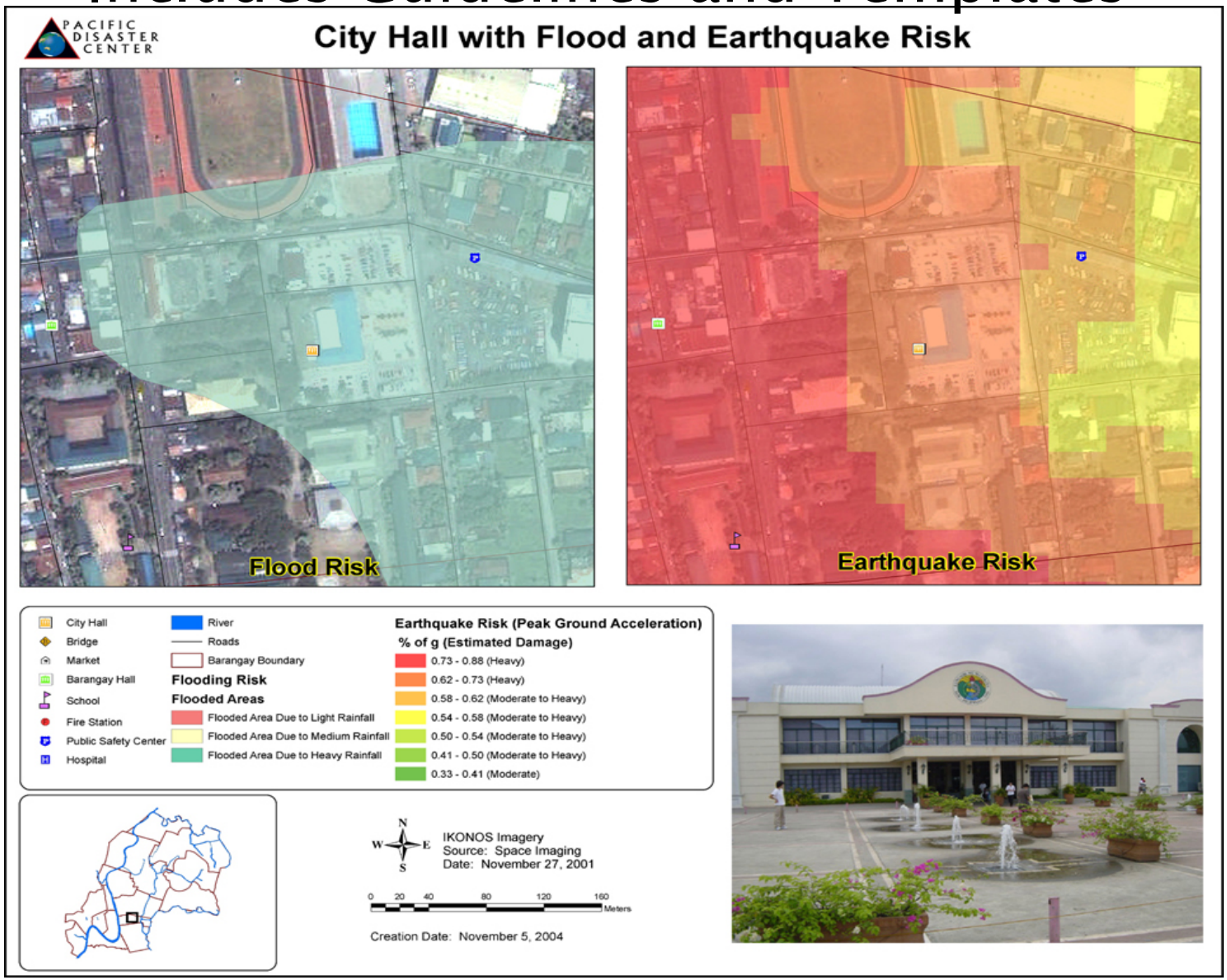
Used GIS to combine Land use with Multi-hazard Maps



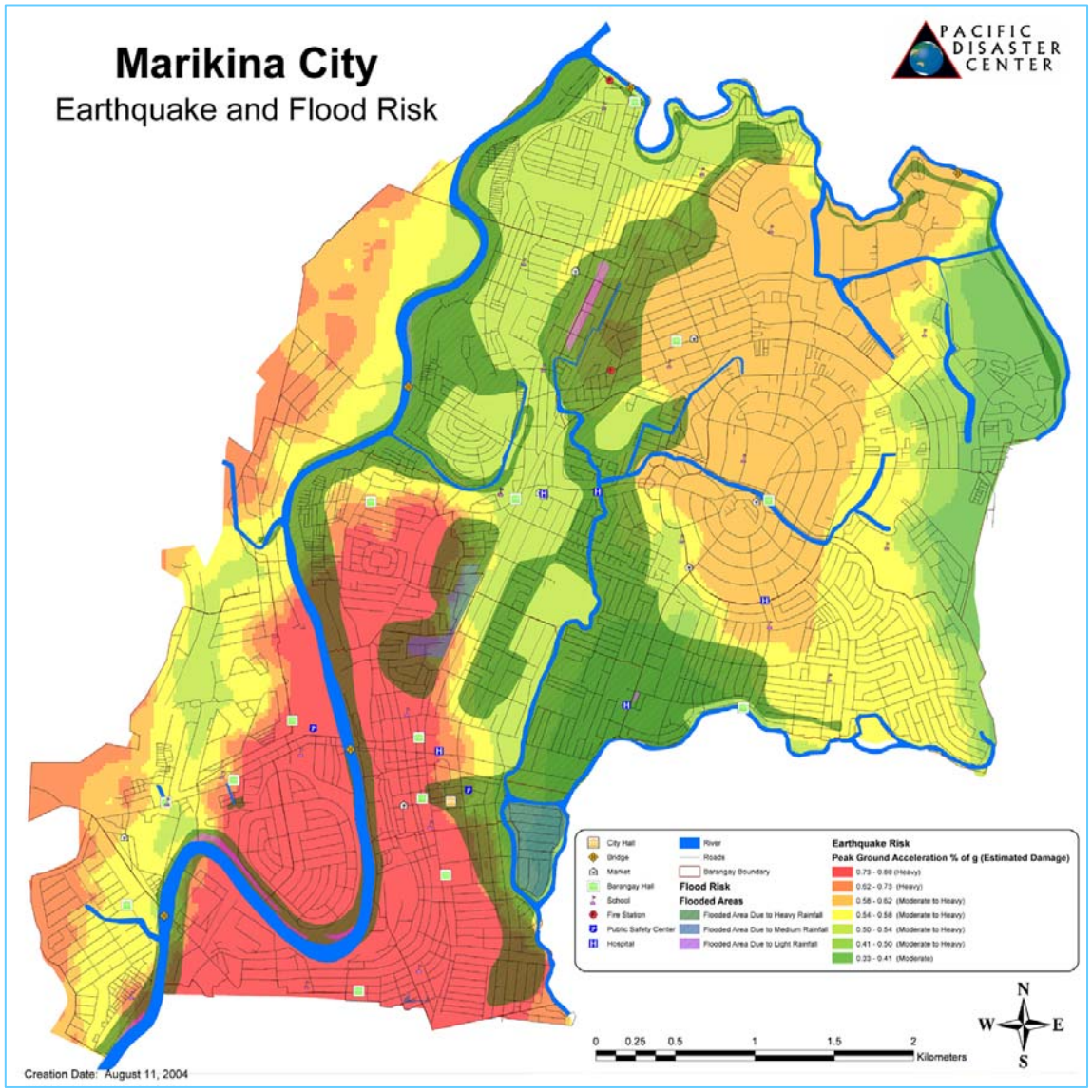
Creating Awareness of Vulnerability for Areas for Priority Development



Risk Reduction Framework
Includes Guidelines and Templates

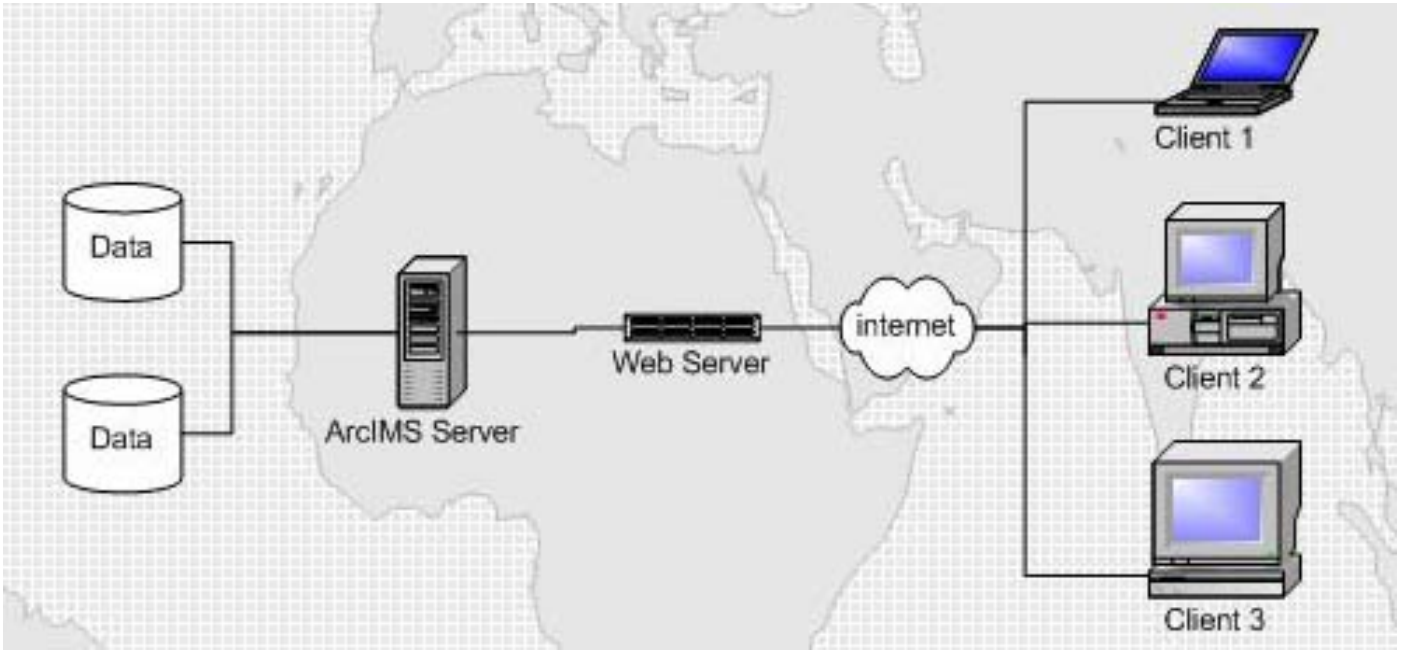


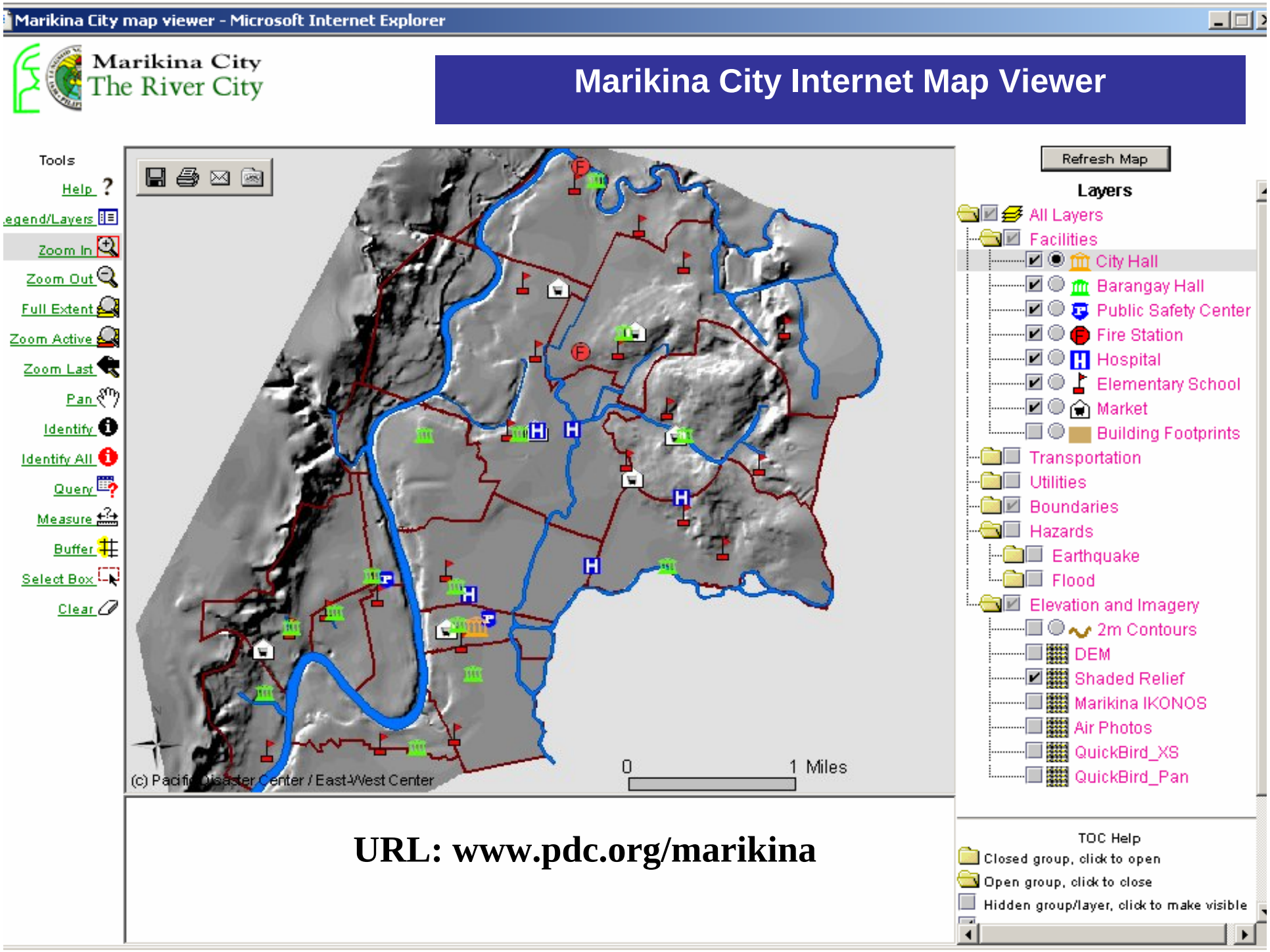
Multi-Hazard Risk Map



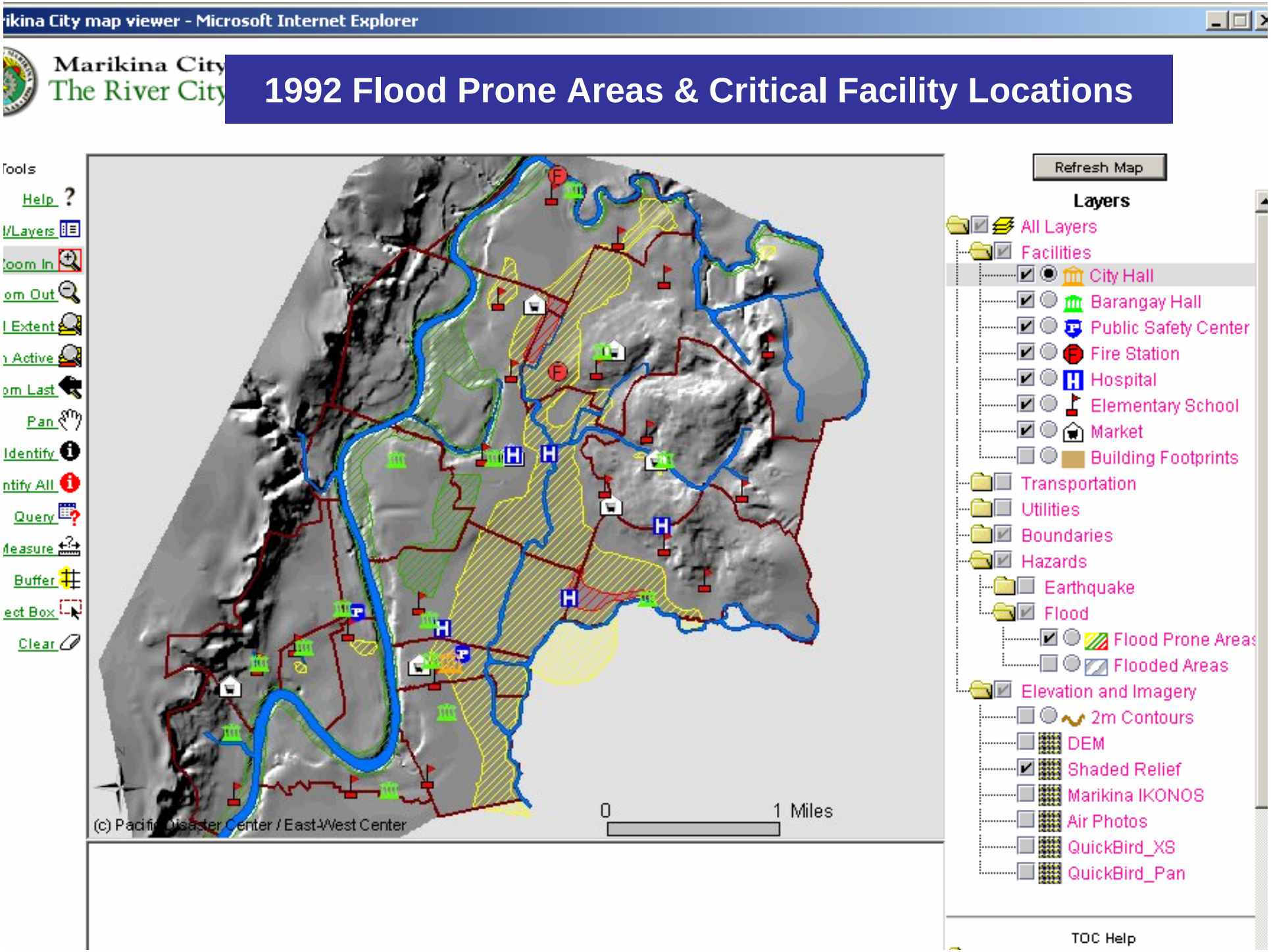
Web Accessible GIS

- A web accessible GIS system allows users to access GIS information via the internet.

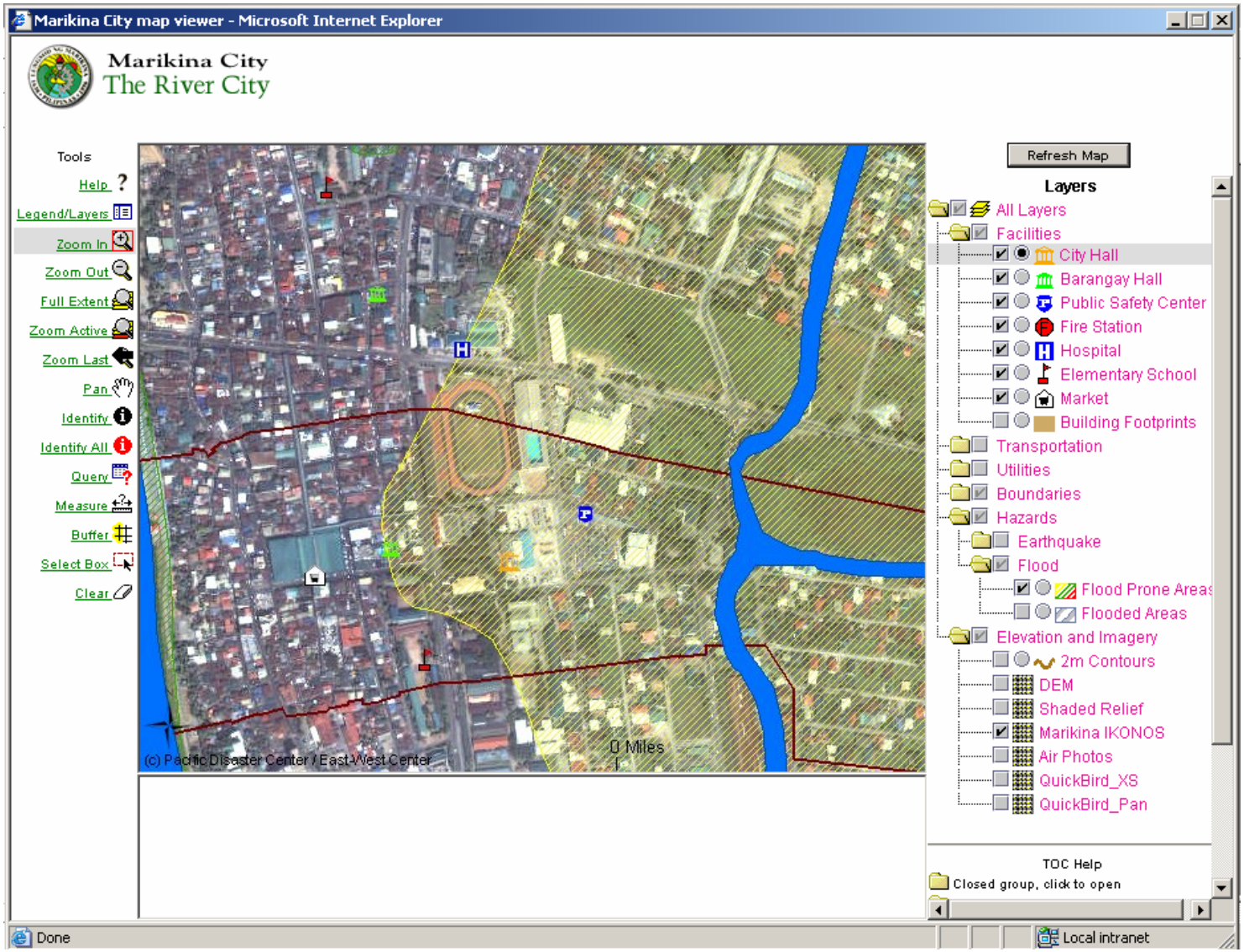



Marikina City map viewer - Microsoft Internet Explorer
Marikina City
The River City
Marikina City Internet Map Viewer
Tools
Help
Legend/Layers
Zoom In
Zoom Out
Full Extent
Zoom Active
Zoom Last
Pan
Identify
Identify All
Query
Measure
Buffer
Select Box
Clear
Refresh Map
Layers
All Layers
Facilities
City Hall
Barangay Hall
Public Safety Center
Fire Station
Hospital
Elementary School
Market
Building Footprints
Transportation
Utilities
Boundaries
Hazards
Earthquake
Flood
Elevation and Imagery
2m Contours
DEM
Shaded Relief
Marikina IKONOS
Air Photos
QuickBird_XS
QuickBird_Pan
TOC Help
Closed group, click to open
Open group, click to close
Hidden group/layer, click to make visible
0
1 Miles
(c) Pacific Disaster Center / East-West Center
URL: www.pdc.org/marikina

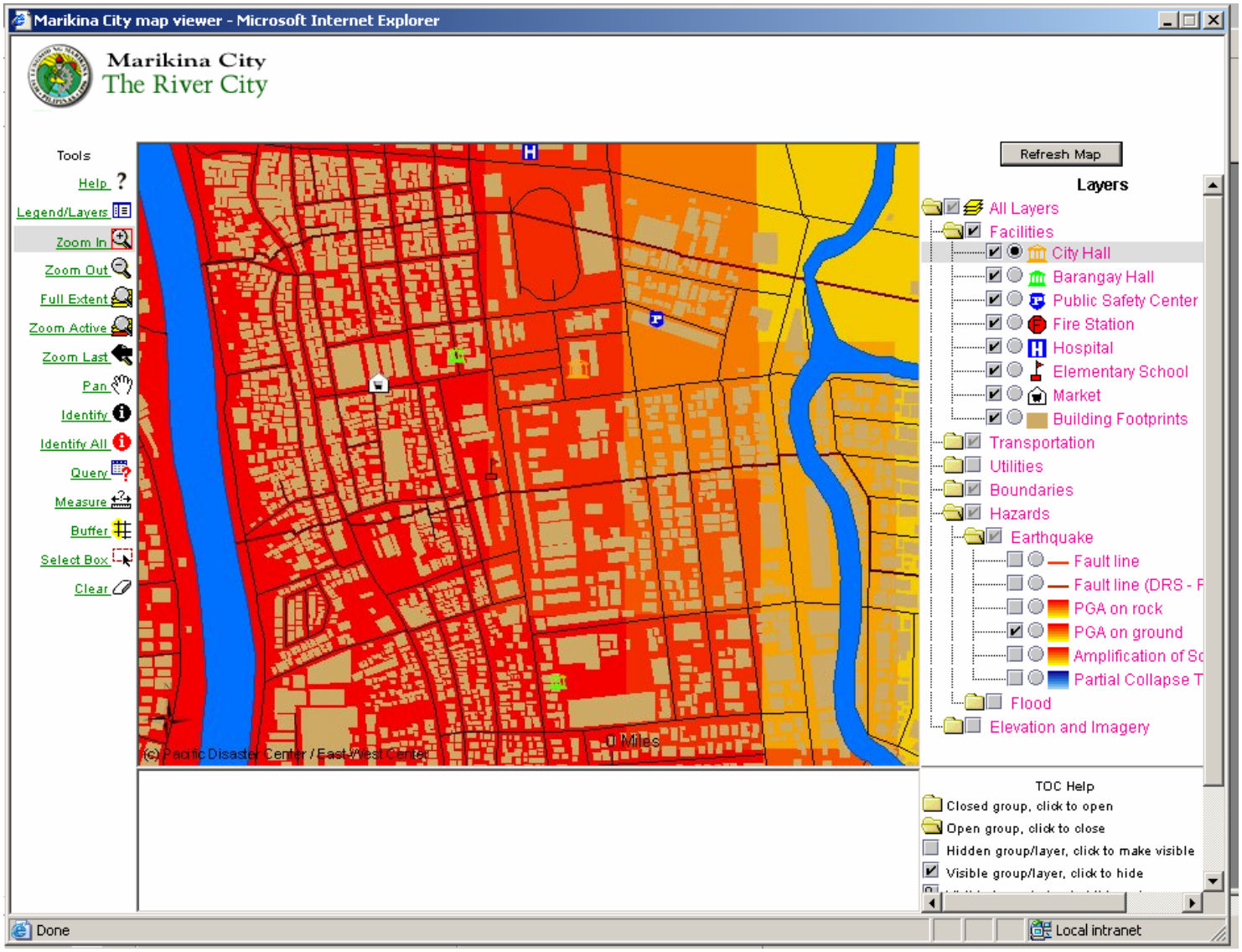
1992 Flood Prone Areas & Critical Facility Locations



Flood Prone Area Near City Hall



Peak Ground Acceleration Near City Hall



Lessons from Marikina City: Key Components for Successful Planning (1)

1. Sustained involvement by international experts
2. Advocacy by local political leaders
3. Risk Reduction Planning Framework that makes sense to local stakeholders
4. Sustained feedback from City decision makers

Lessons from Marikina City: Key Components for Successful Planning (2)

5. Proactive City Practitioner Advisory Committee
6. Involvement of local subject matter experts
7. Informed citizenry through project participation and training
8. Awareness and lessons learned from disasters and emergency events

Conclusion: Researcher-Practitioner-Stakeholder Coalitions

Our Japan-Philippines-United States collaborative planning process for Marikina City, Philippines has created a Researcher-Practitioner-Stakeholder Coalition and has led to a Disaster Risk Management Master Planning Agenda for addressing urban risk around the globe, including Metro Manila and Kathmandu