

Preparing hospitals for extreme weather events caused by climate change: A Progress Report (presentation)

Creator/Contributor:

Chow, Vivien

Publication Date:

2010

License:

<https://creativecommons.org/licenses/by-nc-nd/3.0/au/>

Link to license to see what you are allowed to do with this resource.

Downloaded from <http://hdl.handle.net/1959.4/45587> in <https://unsworks.unsw.edu.au> on 2024-04-23

BE Research Seminar Series, 11 October 2010

Vivien Chow BArch (Hons), MPD

Research Assistant, Centre for Health Assets Australasia (CHAA)

Faculty of the Built Environment, University of New South Wales, Sydney, Australia



Project Title:

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

Research Question:

How can buildings become more resilient against extreme weather events?

Partners: NSW Health, QLD Health, SA Health and NZ MOH

Staging:

- | | |
|---------------|--|
| Phase 1: 2009 | vulnerability assessment |
| Phase 2: 2010 | assess adaptive capacity / develop adaptation strategies |
| Phase 3: 2011 | action Plan + evidence base for design and adaptation strategies |



Presentation Structure

Research Rationale

- Why climate change?
- Why hospitals?

Research Methodology

- Case studies approach
- Stakeholder Focus Group
- Disaster Management Plans content analysis
- Soft Systems Analysis

Preliminary Findings

Next Steps

What are the effects of Climate Change?

- Recent evidence indicates that as a result of climate change, the frequency and intensity of extreme weather events has increased (CSIRO & BOM, 2007).
- In Australia and New Zealand, warming is associated with more frequent and severe heatwaves, floods and storms (Australian Greenhouse Office, 2006, Preston and Jones, 2005, Hennessy et al., 2007)

Why hospitals? Some thoughts:

○ During (and immediately following) an extreme weather event, hospitals:

- are the main point of contact for coordination exercises
- have to deal with additional patient loads as a direct result of the event
- have to remain functional in adverse circumstances
- become a place of refuge from other less resilient buildings

Case Studies – extreme weather events:



| Jurisdiction | Case study | Study issue |
|--------------|----------------------------------|------------------------------------|
| NSW | Coffs Harbour Base Hospital | flash flooding (creek) |
| QLD | Cairns Base Hospital | cyclone |
| SA | Ceduna Community Health Services | heatwave |
| New Zealand | Whangerei Hospital, Northland | flooding (from river & heavy rain) |

Case Studies Selection Criteria:

- Past records of extreme weather
- Size and age of hospital
- Total population dependencies
- Future climate projections



ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach



Case Studies – extreme weather event: NSW – Coffs Harbour Hospital – flooding

- Largest hospital in North Coast area of NSW
- Major referral hospital in the region
- Serves population of 100,000
- Average annual rainfall is 1700mm during late summer/early autumn
- 6 major flooding events in 2009, which affected other hospitals in region as well
- Impact of residential aged care facilities – evacuation of residents to hospital
- Staff absenteeism; roads cut; damaged local infrastructure

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



Coffs Harbour Base Hospital



ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



Nov 2009

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



Nov 2009

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



Nov 2009

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



Nov 2009

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



31 Mar 2009

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



31 Mar 2009

ARC Linkage Project LP0884116
Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



31 Mar 2009

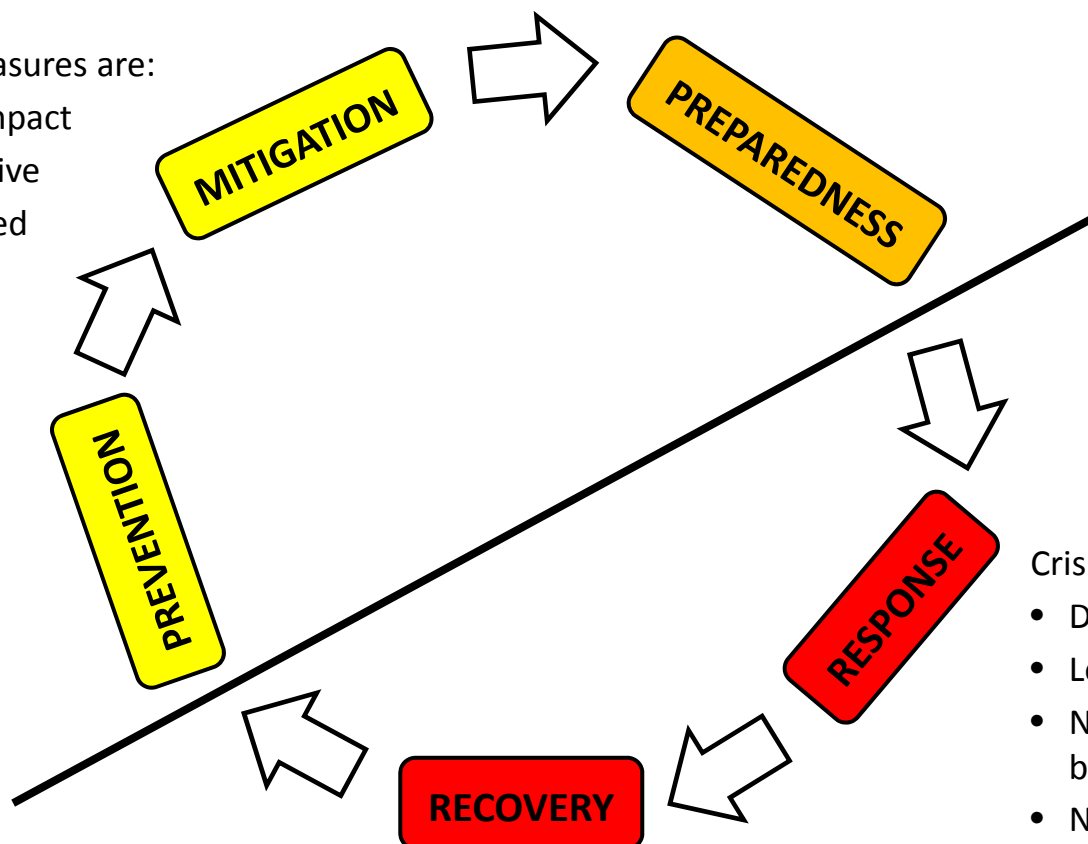
ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

Disaster Risk Management Cycle

Risk-reduction measures are:

- Delivered pre-impact
- Most cost effective
- Community based
- Sustainable



Crisis-management measures are:

- Delivered post-impact
- Least cost effective
- Nationally and internationally based
- Nonsustainable

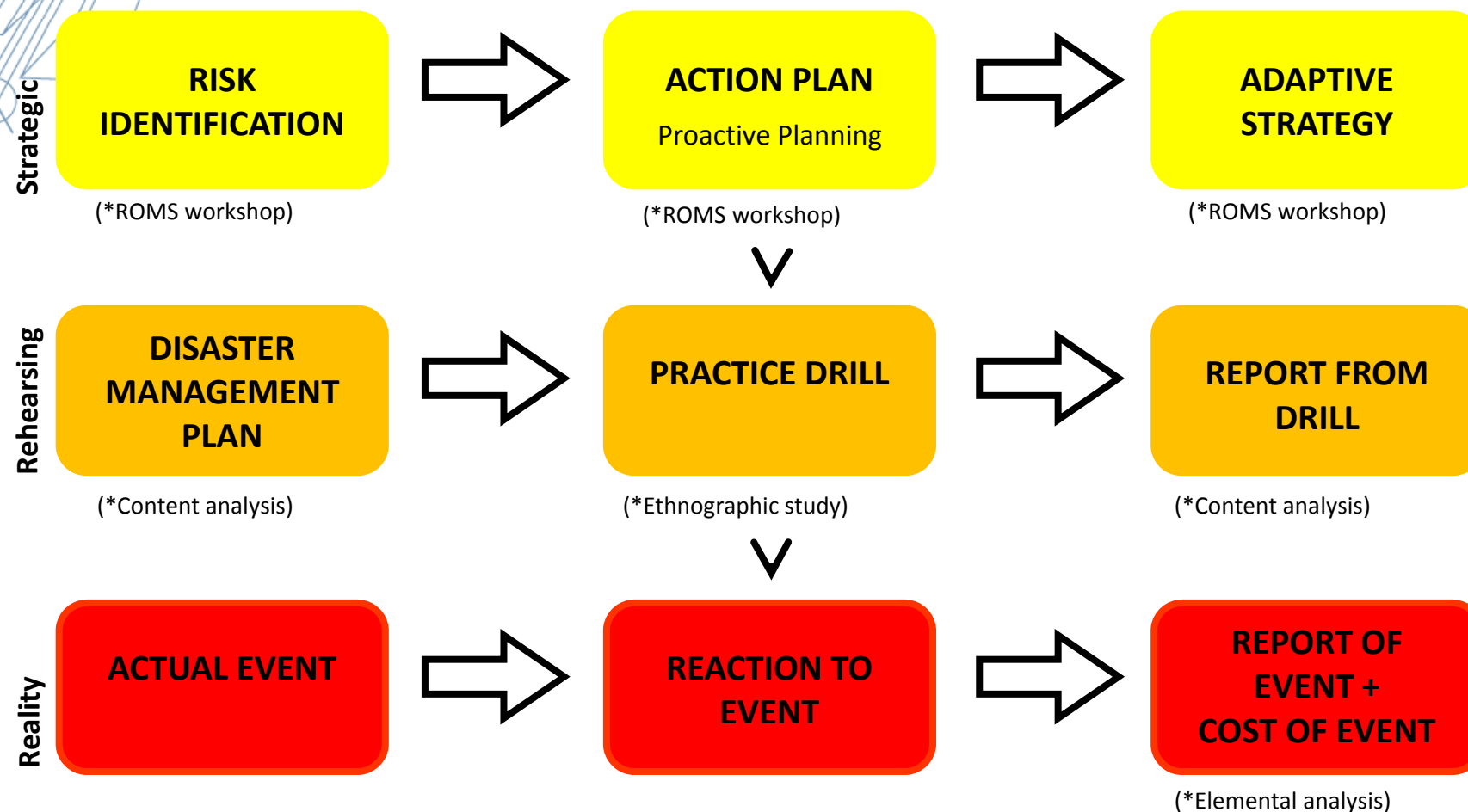
Diagram of the disaster risk management cycle comparing risk-reduction measures (above) to crisis-management measures (below)

Keim (2008, p. 511)

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

Disaster Management Research Framework



“Risk and Opportunity Management System” (ROMS)

Workshop conducted using ROMS
(www.risk-opportunity.com).

- Structured approach / international standards of risk management
- Identify and prioritise stakeholder objectives
- Identify risks and opportunities
- Assess and prioritise
- Develop Action Plan to address

Focus group of key stakeholders

| | | Ability to implement project objectives | |
|---|------|--|--|
| | | Low | High |
| Objectives affected by project outcomes | Low | Minor Stakeholders All Support Services (e.g. Cleaners, Kitchen, etc) Trade Services Other Government Department Laboratories / pathology | Important Stakeholders Utility (essential) services – power, water, gas Civil Defence and emergency service - (SES) Public Works Dept (State level government dept) Security Patients and community (indigenous, socially disadvantaged, aged, disabled, young, LSE) Staff / Services |
| | High | Major Stakeholders Local Government Designers Union | Key Stakeholders Director Corporate Services Director of Nursing Facilities Manager including IT Emergency Management Personnel Director of Medical Services Ambulance / emergency services Corporate Asset Manager Quality and Safety Management Public Relations Personnel |

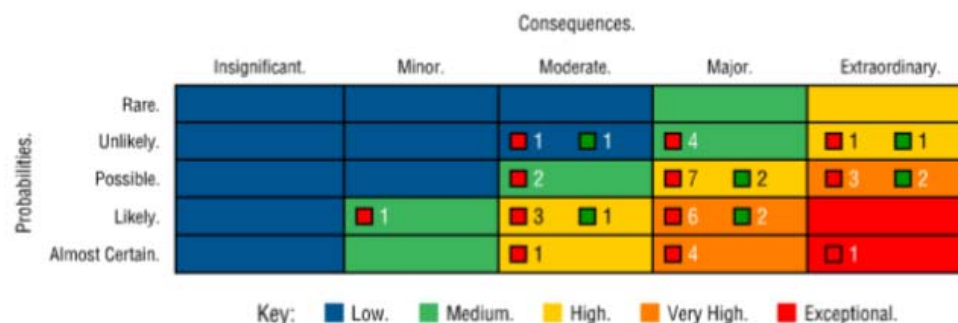
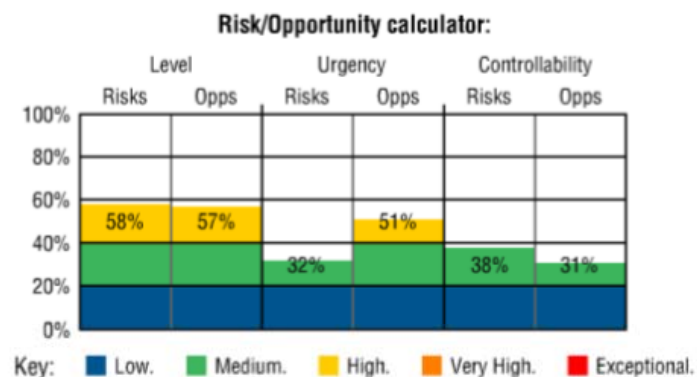
Focus group of key stakeholders – common objectives

| Common Objectives | Weighting |
|---|-----------|
| To ensure staff and patient safety (including vulnerable patients within the community) | 40% |
| Maintain essential services and physical fabric (water, electricity, gas, communications (IT), sewerage and sufficient supplies). | 20% |
| To ensure continuity of service delivery (core clinical services – theatres, emergency, maternity, ICU and ensuring adequate staff resources to deliver health services – senior management and health staff) | 20% |
| To ensure timely access in and out of facilities for staff, patients and emergency vehicles (to ensure we maintain adequate resources and staff available to cope, patients can get treatment etc) – including wider access in catchment area | 10% |
| Effective internal and external communications. | 10% |

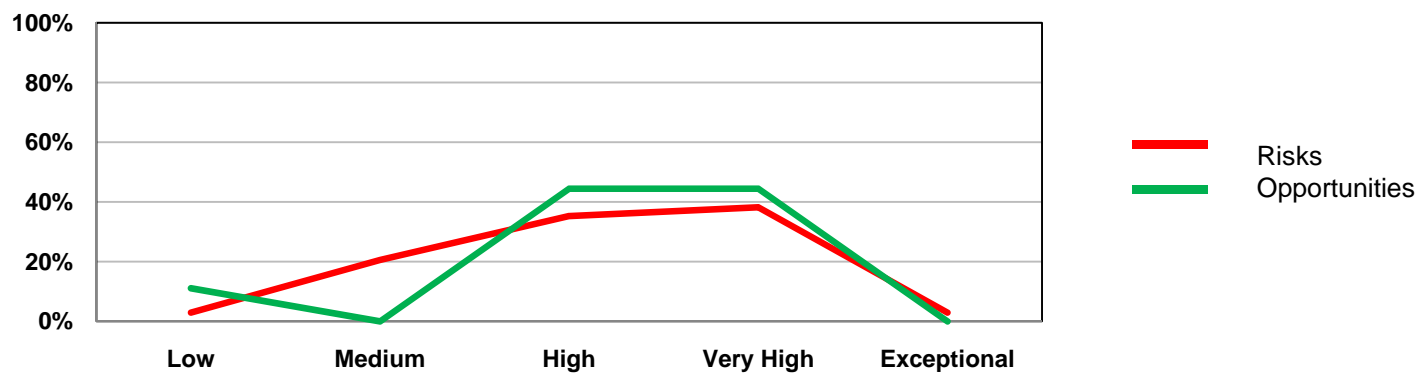
Focus group of key stakeholders – risks & opportunities

| Common Objective | Risks | Opportunities |
|---|---|--|
| To ensure staff and patient safety (including vulnerable patients within the community) | Flooding into clinical areas | Develop and implement flood mitigation strategy for the site (eg. Coffs Harbour bypass may present opportunity, engage with urban planning controls) |
| | Roads being cut | |
| | Inability to respond to speed of event | |
| | Lack of disaster procedures for vulnerable patients | |
| | Lack of ability to cope with surge of demand | |
| | Unpredictability of pattern of event (intensity, nature/pattern/location of impact, etc) | |
| | Not having leadership available ON SITE causing poor coordination during event | Build a multi-storey car park |
| | Adequacy of community age care facilities BCM plans and capacity to implement those plans | |

ROMS Step 5 Output – Risk/Opportunity profile



Risk/Opportunity profile

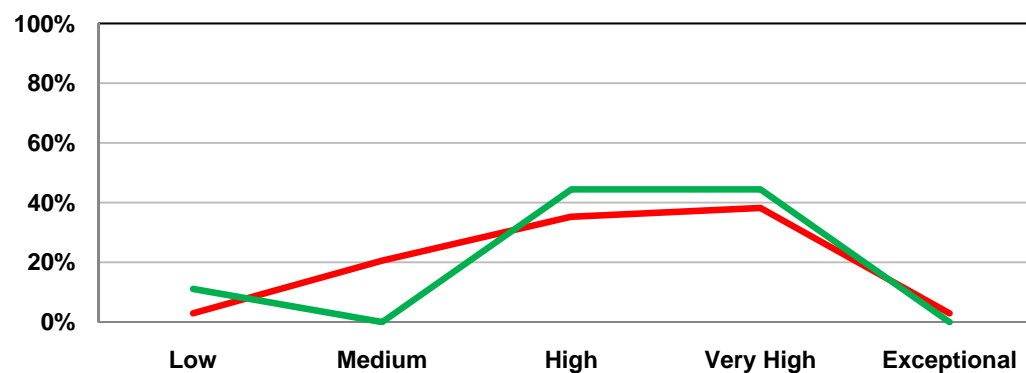


Focus group of key stakeholders – developing action plan

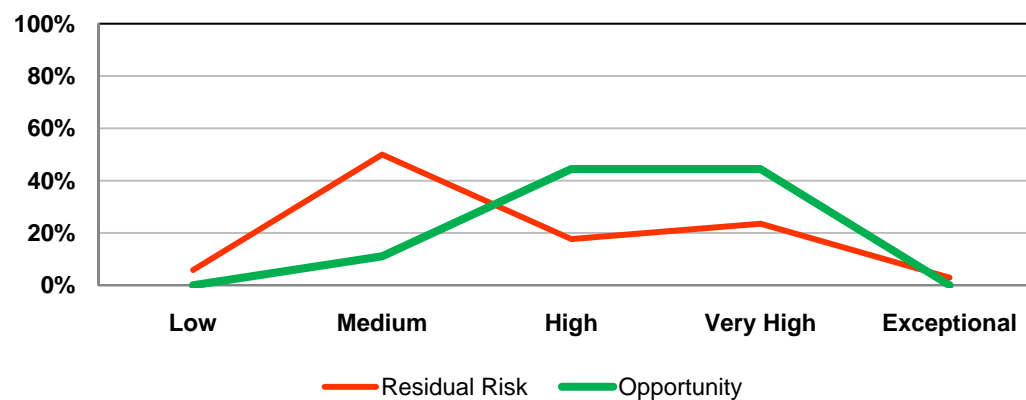
| Objective | Risks | Additional Controls |
|---|---|--|
| To ensure staff and patient safety (including vulnerable patients within the community) | (13) Roads being cut (Almost Certain, Major, Very High) | Lobby RTA/Council to upgrade roads from hospital to bypass – as part of Pacific Highway upgrade and Coffs Harbour bypass to ensure all weather access |
| | | Further develop support provided to local hospitals |
| | | Developing a process of when we receive early warning that those on call physically come into the facility so we have them on site (intensivist, O & G, Anaesthetist, general surgeon etc) |
| | (21) Adequacy of community age care facilities BCM plans and capacity to implement those plans (Possible, Major, High) | Help age care providers to secure funding to develop risk management/emergency/BCM plans |
| | | Lobby commonwealth to make risk management plans/BCM part of age care facility accreditation process |
| | | Lobby local Government planners to make location of age care facilities in DA approval consider risk of where they are building |

ROMS Step 5 Output – Risk/Opportunity profile

Risk/Opportunity profile



Residual Risk/Opportunity profile



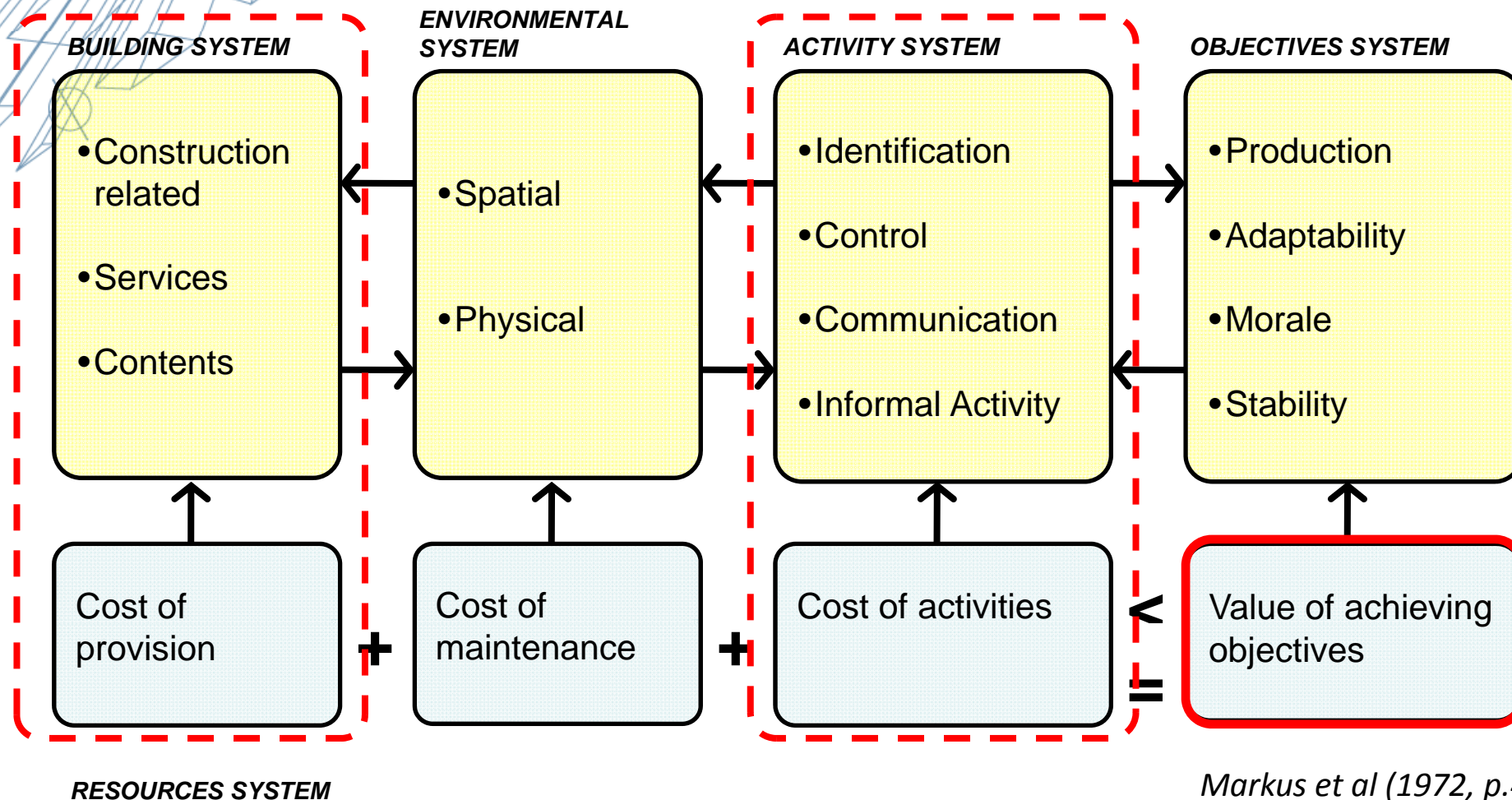
Main objectives identified in ROMS

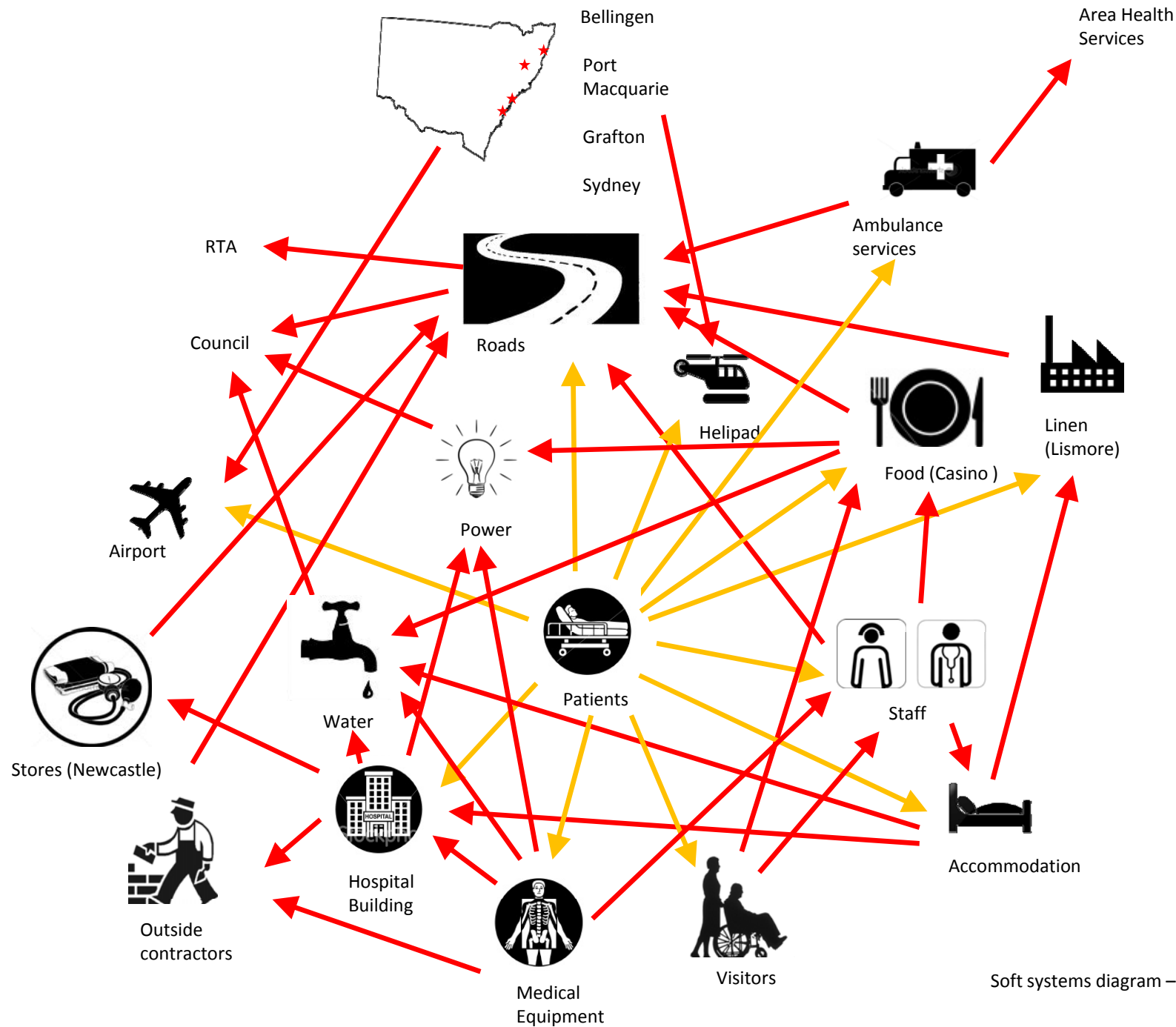
Overall goal = maintaining continuity of service delivery during and extreme weather event

4 key areas associated with vulnerability:

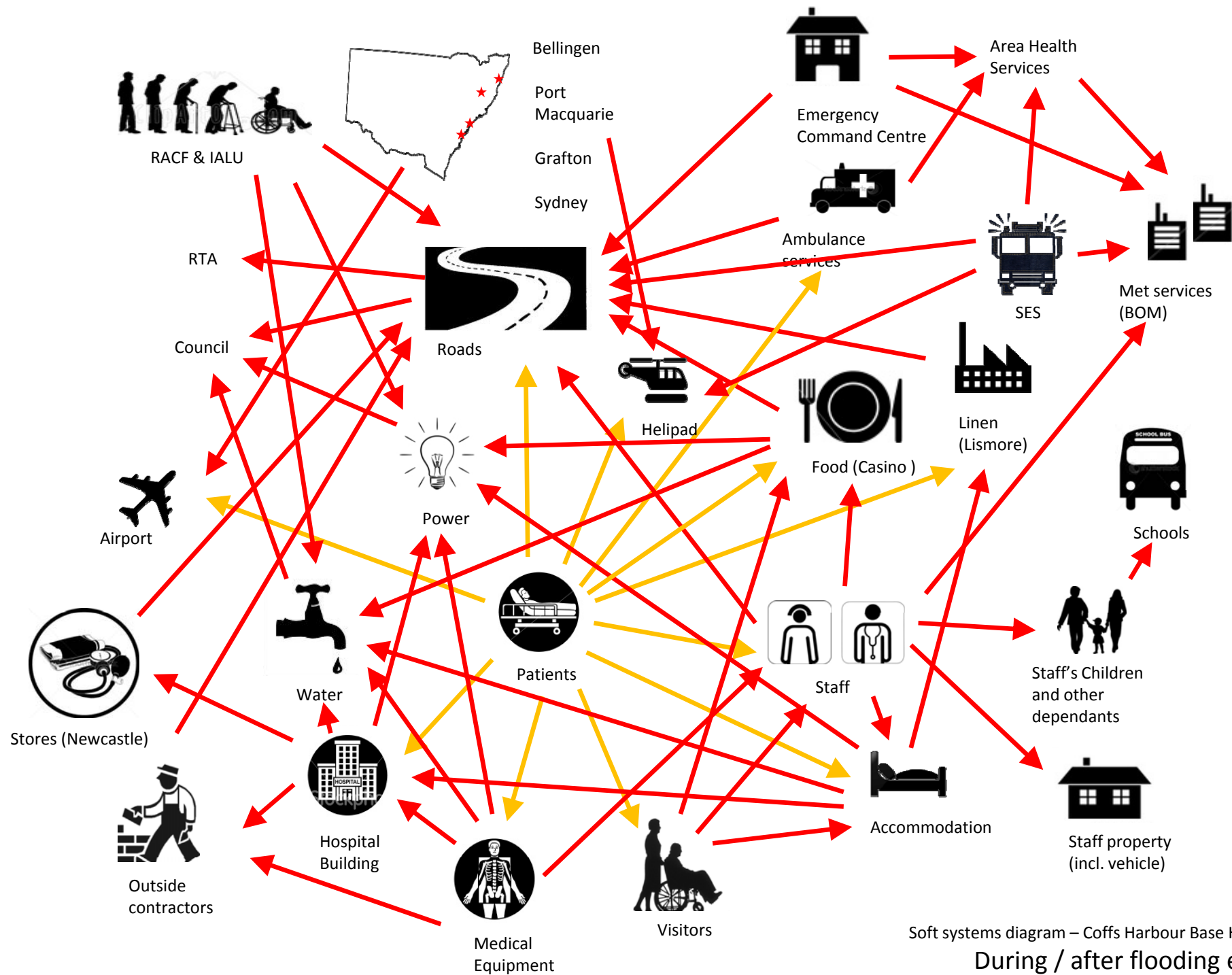
1. Availability of essential building services - supported by
2. Ensuring the physical integrity of the hospital
3. Effective inter-agency communication
4. Maintaining access to the hospital for staff and patients

Relationship between facilities and activities

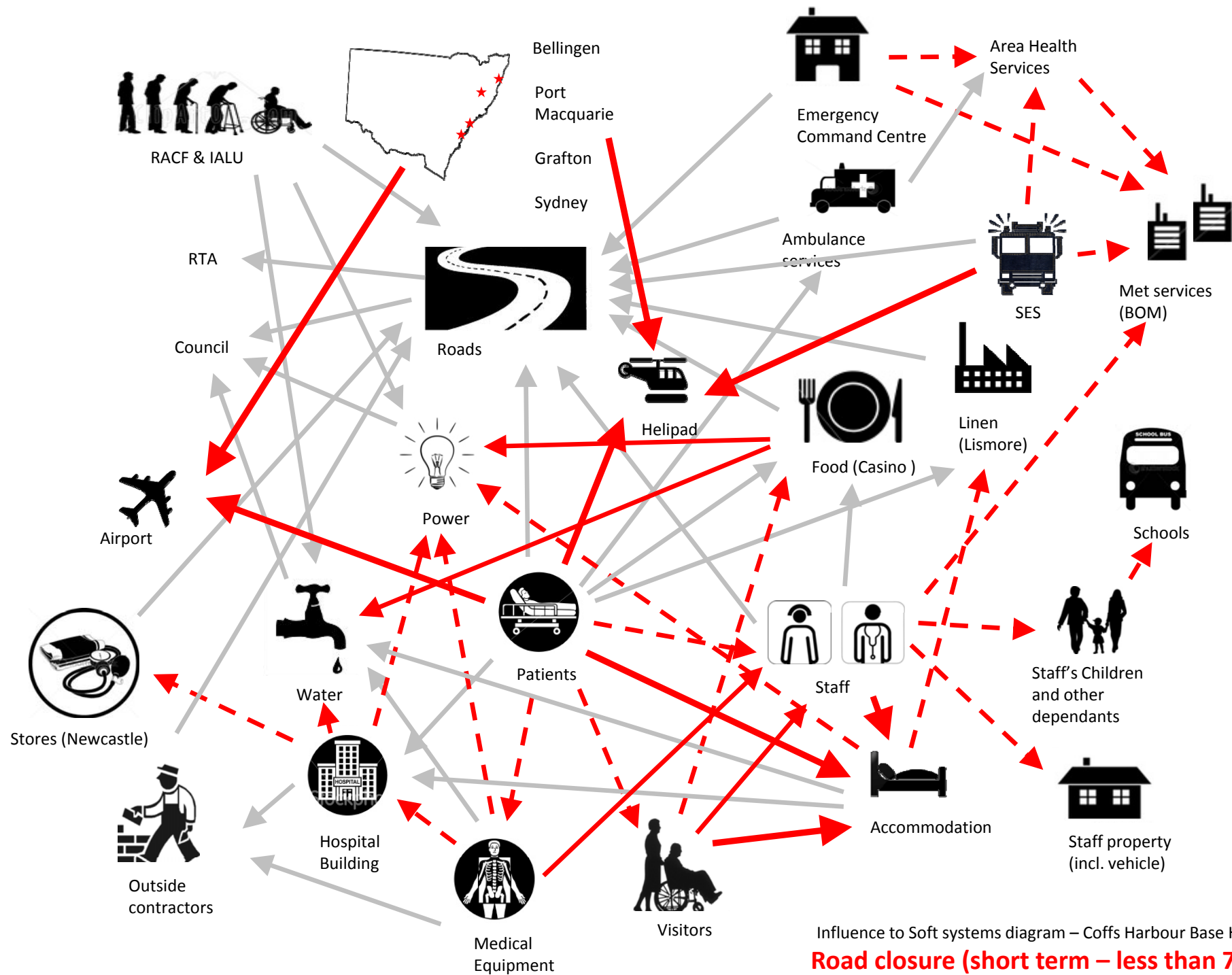




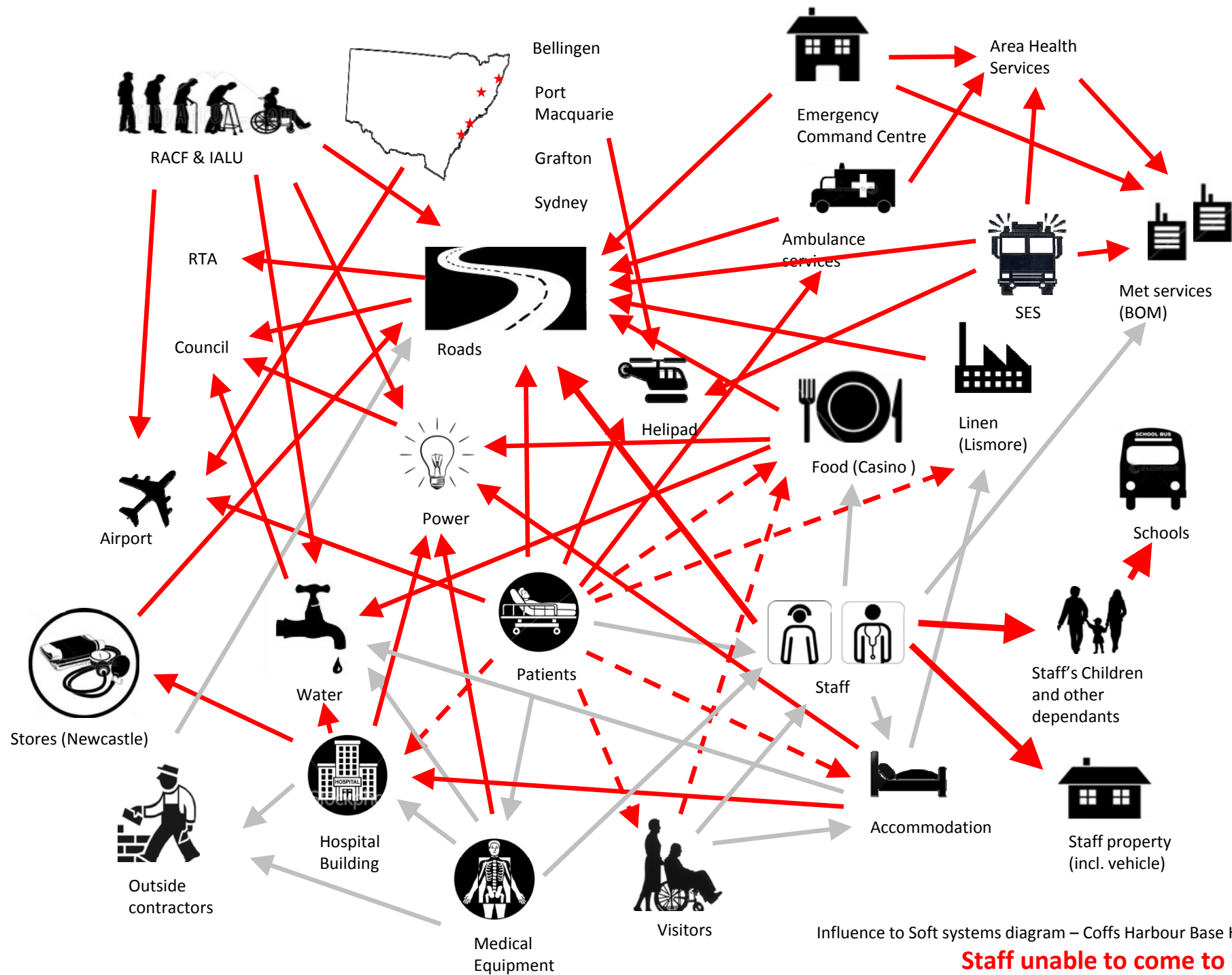
Soft systems diagram – Coffs Harbour Base Hospital
Stable scenario



Soft systems diagram – Coffs Harbour Base Hospital
During / after flooding event

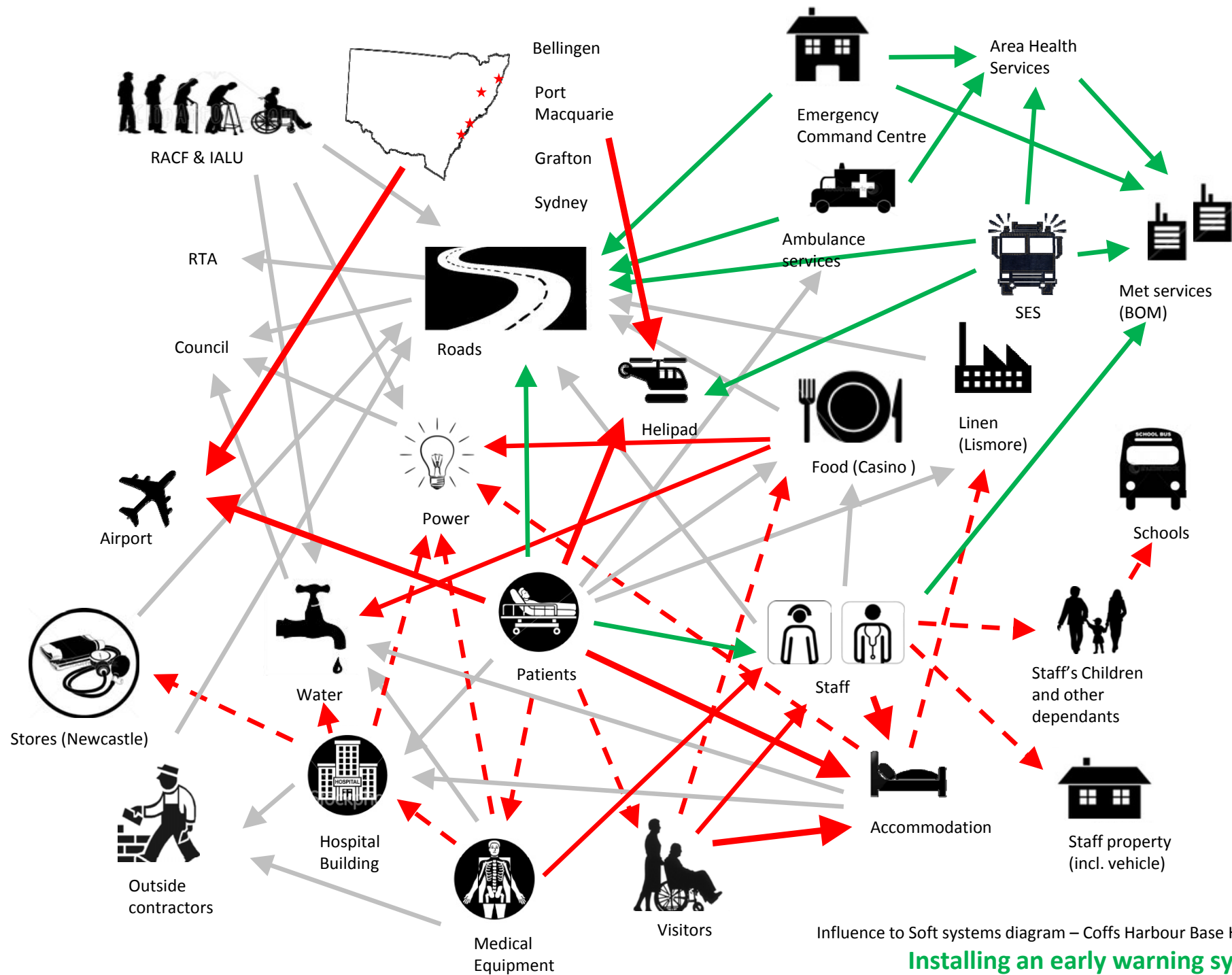


Influence to Soft systems diagram – Coffs Harbour Base Hospital
Road closure (short term – less than 72 hr)



Influence to Soft systems diagram – Coffs Harbour Base Hospital

Staff unable to come to work



Influence to Soft systems diagram – Coffs Harbour Base Hospital
Installing an early warning system

Next Steps

- Explore relationship between building and organisational resilience
- Investigate “systems boundary” for hospitals at stable situation and during an event
- Examine the cost of extreme weather events
- Develop an action plan to address issues identified
- Develop an evidence base regarding design and facilities management adaptation strategies for hospitals faced with increasing exposure to floods and other extreme weather events

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



For more information about this project

Please contact:

Vivien Chow v.chow@unsw.edu.au

(02) 9385 4795

Professor Denny McGeorge denny.mcgeorge@unsw.edu.au

(02) 9385 5178

Or visit:

www.chaa.net.au

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

010101011110100100001
0101101011100

UNSW
f b e

Centre for Health Assets Australasia



Thank you...

ARC Linkage Project LP0884116

Assessing the adaptive capacity of hospital facilities to cope with climate-related extreme weather events: a risk management approach

References

Australian Greenhouse Office. (2006). *Climate change scenarios for initial assessment of risk in accordance with risk management guidance* Canberra: Commonwealth Scientific and Industrial Research Organisation.

CSIRO & BOM (2007). "Climate change in Australia: Technical report 2007." Retrieved 22 February 2010, from http://www.climatechangeinaustralia.gov.au/technical_report.php.

Hennessy, K., Fitzharris, B., Bates, B. C., Harvey, N., Howden, S. M., Hughes, L., et al. (2007). Australia and New Zealand. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. 507-540.

Keim, M. E. (2008). Building Human Resilience: The Role of Public Health Preparedness and Response as an Adaptation to Climate Change. *American Journal of Preventive Medicine*, 35(No. 5), 508-516.

Markus, T. A., Whyman, P., Morgan, J., Whitton, D., Maver, T., Canter, D., et al. (1972). *Building Performance*. London: Applied Science Publishers Ltd.

Preston, B. L., & Jones, R. N. (2005). *Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions: CSIRO*.