



## Hot Spots

~ September 2007

### Background

- **OBJECTIVE** identification of network areas where numerous services are co-located, and the vulnerability of each site to external influences such as third party disruption, earthquakes, slips, and floods.
- **SERVICES** included transportation routes, telecommunications, energy and water infrastructure. Each of these 100m by 100m sites was eventually classified as a “hotspot”.

## General Principles

- Each sector confirmed critical sites required for function at a regionally significant level.
- Priority locations were defined as sites (places) or links (rings).

The following were considered when deciding what level of detail to list sites:

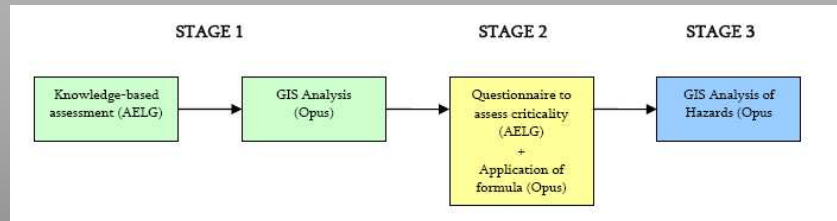
- The network as it is today;
- Whether the area of outage would be regionally significant if the site failed;
- Whether there is sufficient redundancy that you would reasonably assume an alternative supply point will be operating (if there is, the site is not a priority);
- Consideration of loss of supply effect on other critical community and utility sites (e.g. hospitals).

## Outcomes

The consultants (OPUS) were asked to provide the following by the AELG Project Committee:

- 1) A list of areas (hotspots) in the Auckland region where several utilities converge;
- 2) An assessment of service impact if the utilities within each area were to fail completely; and
- 3) An assessment of the vulnerability experienced by each hotspot to various hazards, including ground shaking, flooding, etc.

## Methodology



First assessment carried out by the AELG project committee using knowledge-based appraisal of the utilities and transport services in the Auckland region.

Following the GIS analysis, a questionnaire was used to qualitatively determine the relative importance of the assets within each hotspot. A logarithmic scale was applied to the responses to each question as this provided a greater differentiation between each level of importance.

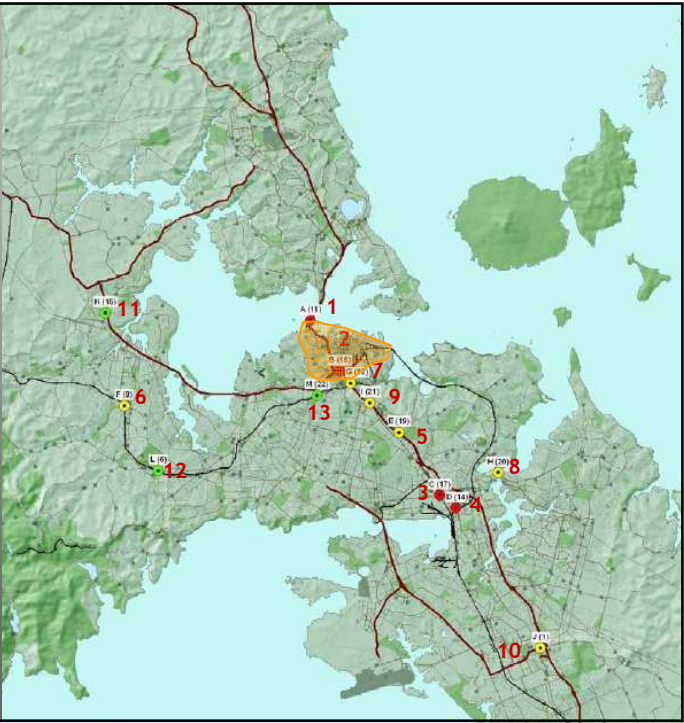
Vulnerability of each asset on the list of 13 hotspots was compared, using GIS, to the hazard information. In cases where the hotspots were affected by a specific hazard, vulnerability to that hazard was gauged. The type of asset (overhead or underground) had to be taken into consideration at this stage.

## Findings

Thirteen infrastructure hotspots were identified based on the number of utilities within the immediate area as well as the overall service impact the area would have if hotspot were to suffer extensive utility failure.

1. Auckland Harbour Bridge
2. Upper Queen Street
3. Church Street East
4. Sylvia Park
5. Greenlane Roundabout
6. Great North Road
7. Newmarket Viaduct
8. Panmure Bridge
9. St. Marks Road
10. Wiri Station Road
11. Makora Road
12. Waikumete Road
13. New North Road

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SLOPE  
INSTABILITY -  
GENERAL



## Sector & Cascade Effect

Significant disruptive effects on regional supply of electricity, water, waste water, access and telecommunications

- Evacuation of facilities
- Capacity of businesses to relocate
- Security for sites.
- Impact of any evacuation
- Hospitals and community services
- Food supplies
- Power loss affecting fuel supply
- Economic impact
- Impact outside the region

## Recommendations

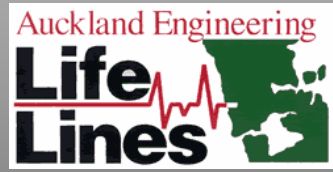
Carry out a more detailed analysis of effects on each utility network to determine the impacts of utility failure; in order to do this, obtain an extensive knowledge of the assets, for example, whether an asset is above or below ground, the interdependencies of the utilities within an area, etc. This would lead to the development of hazard and effect matrices as seen in the Stage 1 Lifelines report.

Utility management services to consider report to determine the potential vulnerabilities that may exist in areas that host a large number of utility networks.

The development of contingency plans should be made to accommodate the possibility of large scale utility failure in the hotspots identified by this project.

Each utility to investigate the current level of redundancy within their systems for provision of sufficient back up resources should utility failure occur.

Consider these hotspots when planning for future asset placement, in order to reduce the co-location of several utilities in vulnerable areas.



Thank you