

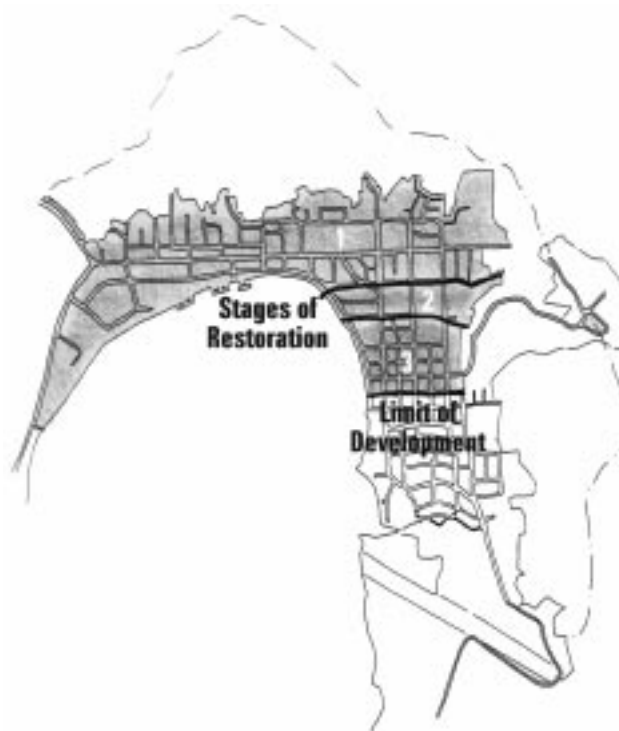
## DEVELOPMENT OF THE ENGINEERING PLAN

Subsequent to the Town Plan, an Engineering Plan was formulated. In general, the Town Plan focused and prioritised the restoration needs of the civil infrastructure. This set the framework for the roads and drainage restoration and other works such as stabilization of the vast ash beds and siltation control. SMEC also coordinated a plan for the reconnection of utilities through the service departments such as Elcom, Telikom and the Waterford. The service departments were genuinely interested in restoring utilities to clients but would only reconnect services in the damaged and unoccupied areas when there was some government-endorsed reconstruction plan.

The Engineering Plan was then determined through a conventional design process from conceptual design to preliminary design through to final engineering design and documentation. The whole design process was monitored by the same committee that supervised the production of the Town Plan to ensure consistency with their restoration approach, and in particular, the staging of works.

**The Restoration Approach.** The Town Plan divided the restoration of Rabaul into three stages with stage one to be implemented immediately and the subsequent stages implemented when further development was warranted. SMEC ensured a controlled and coordinated program (Figure 2) enabling infrastructure to be restored to meet demand. In a generalised form, the works were required to be undertaken in the following order:

- erosion control,
- restoration of roads and stormwater drains,
- reoccupation of individual stages, and
- reconnection of services.



**Figure 2 Stages of Restoration**

*Note that the southern extremity of the town including the airport is to be abandoned.*

## Rebuilding Rabaul

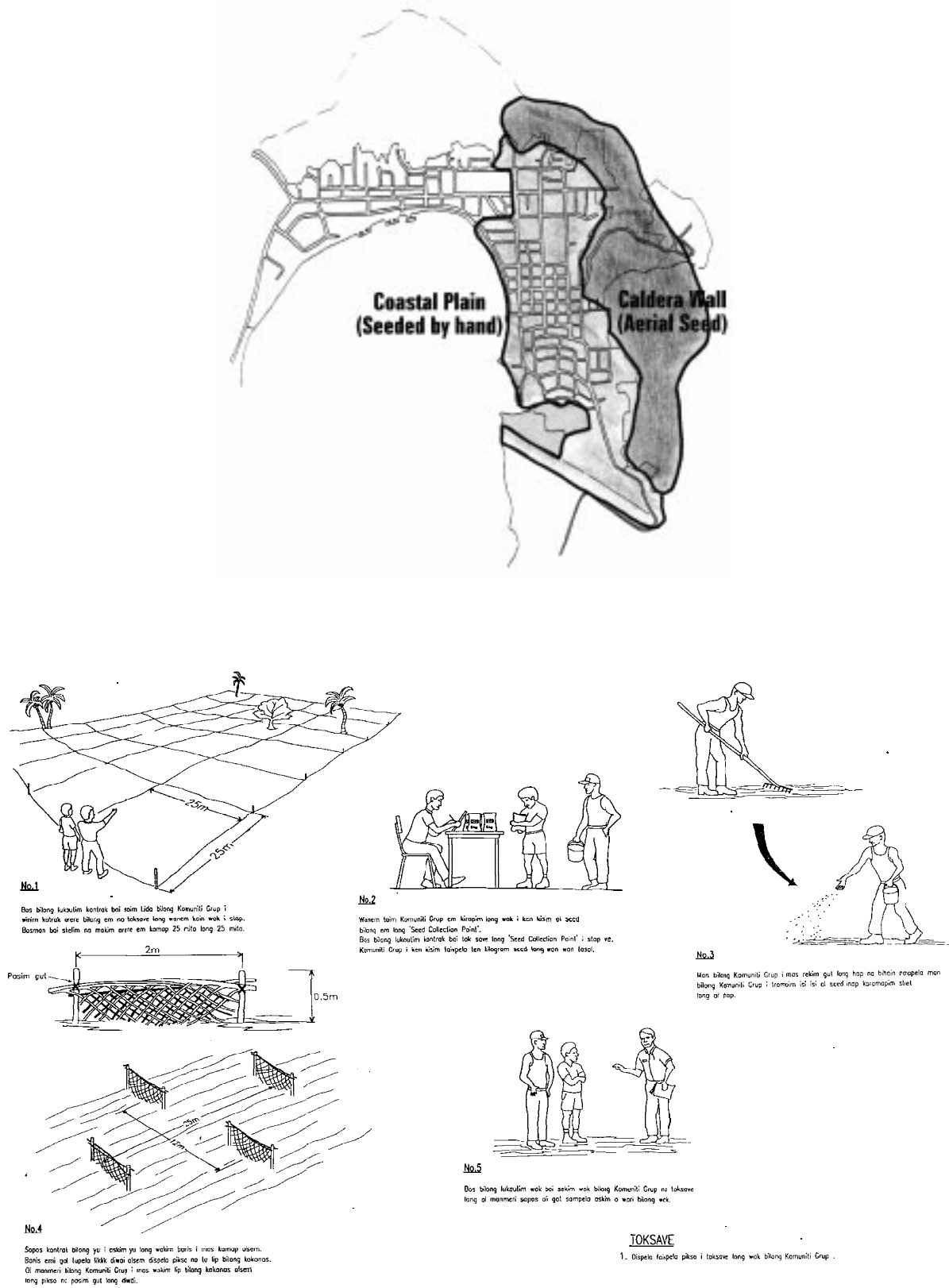
***Erosion Control.*** The stabilisation of ash beds on the caldera wall and the coastal plain was deemed to be the first and most important step in the restoration of Rabaul (Figure 3). Ash will readily choke drains, inundate cleared roads, and frustrate attempts to reconnect utilities. Stabilization was proposed through the revegetation of these areas however ash is essentially sterile as it does not contain nitrogen or phosphorus. To achieve this aim SMEC instigated independent research to be undertaken by the Lowlands Agricultural Experimentation Station (LAES) in East New Britain to identify species and varieties of plants that would grow in this environment.

The caldera wall and coastal plain were considered separately, the former would be aeri ally seeded using a crop duster or helicopter, the latter by hand using community groups. Involvement of community groups in a large-scale revegetation project was seen as an important and positive means of including the general community to assist in the restoration of the town.

Revegetation of the entire caldera wall and coastal plain was considered, irrespective of the relevant planned stages, as it was a strategic measure to stabilise these areas for future development and reduce the airborne dust problem.

***Siltation Control.*** Erosion of the ash beds will continue no matter how effective the erosion control or revegetation program. Control of the deposition of material was considered using a restored or upgraded drainage system combined with strategically placed gully check dams, bamboo planting, silt traps and groynes.

Protection of the vital port facilities was deemed to be highest priority. Figures 4 and 5 show the measures established to protect the port from siltation using gully check dams and bamboo stands at the base of the caldera wall, and large silt traps adjacent to the wharves. Littoral drift of ash along the coastline was addressed as a separate threat, which will be alleviated by the construction of a groyne.



**Figure 3 Broadacre Grassing**

Community Group involvement was considered an important part in the restoration program. Design of the stabilisation of the ashbeds on the coastal plain and on the steep caldera wall proved to be the most challenging design component. Contracts were written in Melanesian Pidgin and drawings produced in cartoon form for easy understanding.