BACKGROUND PAPER FOR SIRA

SCOTLAND ISLAND EMERGENCY WATER SUPPLY

Introduction

This purpose of this paper is to appraise incoming SIRA office-bearers of the history of the Emergency Water Supply (EWS) to Scotland Island (SI) and the proposals for, and eventual replacement of, the interim reticulated system.

Stimulus. In May 2002, a letter from Pittwater Council (PC) advised the Scotland Island Residents Association (SIRA) that the EWS running from Church Point to SI would cease to operate after 30 Jun 2002; approximately one month's notice. Instead, a single standpipe would be provided – a 'Village Well'.

SIRA Compliance with Council Resolutions

- At the PC's meeting of 23 October 2000, the Scotland Island Water Supply Working Paper prepared by Connell Wagner and the proposed Action Plan were tabled. At the time, SIRA was largely in agreement with the plan, which was, in précis:
  - The establishment of a Scotland Island Water Trust or similar instrument
  - The transfer of ownership of the Council's submarine water supply pipeline to the Trust
  - Negotiation between Council and the Trust of the necessary Road Reserve Leases for the installation of the Water Distribution System, and
  - The major upgrading of the Island's water distribution system to comply with the Australian Standard[1] as proposed in Option 3 of the Working Paper
- Insofar as a volunteer residents' association was able, SIRA had endeavoured to progress the Action Plan. Actions completed were:
  - Full plans for the upgrade of the SI water supply (Option 3) had been prepared, costed and submitted to SWC for approval in August 2001. It would have been nugatory to expend funds unless SWC, being the subject matter expert and responsible authority, believed the plan was sound and would connect to it. Despite numerous requests, SWC did not reply.
    - Note the requests also sought advice on what might constitute a minor upgrade to the water distribution system, as proposed in Option 2 of the Working Paper. No answer was received.
  - Legal advice on the establishment and incorporation of a Trust had been obtained. In principle, it should be a Government Instrumentality and the Trustee(s) should be an entity not individuals. Liability is a major determinant and the exact structure of such a Trust will depend on its partnering arrangements.
  - Costing for the insurance of public liability, property damage and the Directors and Officers of the proposed Trust had been obtained. A Lloyd's quotation was for an annual premium of $21,610 (Feb02). This was obviously a considerable burden for a community organisation. Therefore, a request was put to SWC to determine the premium for being included under their Insurance arrangements. Industry advice was that the premium for such inclusion would be *gratis* in the first year and certainly less than a thousand dollars, probably more in the order of a couple of hundred dollars, in ensuing years. No answer to the request was received.
- SIRA is unable to progress past that point until SWC, as the responsible authority, provided answers to the reasonable questions that had been put.

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[1] AS4130 Polyethylene Pipes, Pressure Applications

The Village Well

- Option 1 of the Working Paper was to remove the existing, unauthorised EWS and reduce it to a single standpipe – a 'Village Well' scenario. Due to a lack of progress on this matter, PC had resolved to do this as of the 30 June 2002. SIRA submitted that this was not an option because of the pure Risk Management equation:
  - The risk of a damages claim arising from contaminating 'town water' during its delivery through a constantly monitored pipe system (never happened in 21 years), versus
  - rendering houses uninhabitable, with its potentially catastrophic, financial impact on the families concerned and consequent diminution of house and land values;
  - the threat to public safety by substantially reducing the fire-fighting capacity; and
  - the threat to public hygiene by diminishing the quality of water available.
- There was far less risk to the public in maintaining the *status quo*.
- There was a 'user pays', self-managed solution to attaining an Australian Standard interim reticulated system that would not increase the load on the Island's sewerage systems.
- Whilst SI is unique in an urbanised water supply system, it is recognised as part of SWC's metropolitan area of responsibility but is not recognised as a SWC customer. Note that SI is only 500m from a Sydney Water main supply valve.

Pittwater Council Meeting

- In order to stave off the threat of disconnection, SIRA met with PC on multiple occasions.
- SIRA met with the local member, John Brogden, MP, on 17 June 2002. Later that night, eight SI residents, which included the author and other SIRA officers, were permitted to speak at the formal PC hearing and PC voted to postpone the disconnection.

Expanded Arguments to PC and SWC for the Reticulated System

- **Expectation of Service.** Approximately 98% of Island residents had either purchased existing dwellings or built new dwellings on SI in the previous 20 years. That is to say that they researched, identified, purchased and came to live in the former Warringah, now Pittwater, municipality with a perfectly reasonable expectation that the facilities and services as found would at least continue and hopefully improve. In the middle of Sydney's relatively affluent Northern Beaches, the removal of an **existing** service providing something as basic as clean, running water to an **entire suburb**, was not understood. Note that it is less than 500m from SWC's mainland valve to the Island; it could hardly be considered 'remote'.
- If the rainfall patterns in 2002 were similar to those experienced in 2001, cessation of the existing EWS would render many houses on the Island, uninhabitable within six months[2].
- **Public Safety.** The Rural Fire Service's ability to fight any house or bush fire on SI is predicated on the bulk storage of water throughout the Island, that being the resident's rainwater tanks. If the Island's EWS was severed, it is unavoidable that many residents, particularly those with young families, would contravene the Government policy on water storage for fire fighting purposes[3] by falling below the requisite 10,000 litres in storage. This posed a direct threat to the safety of residents as the whole island was already classified as an area of HIGH fire risk. Cutting off the water would remove a major risk mitigation control and raise the Island's classification to EXTREME fire risk.
- Note that during the bushfires of Christmas 2001, the SI Rural Fire Service checked all of the resident's rainwater tanks and then commandeered the water supply line for 10 days straight while they

[2] Based on a family of two adults and two children

[3] GOV-PL 720 Water Storage for Domestic and Rural Fire Fighting Purposes

strategically filled tanks and redistributed water to those areas most likely to require it in the event of fire. There was barely enough water in storage with the EWS in operation.

- **Public Hygiene.** Over 1100 permanent residents inhabit the Island (2002). The removal of an adequate emergency / supplementary water supply would force residents to use nothing but the collected rainwater. During extended dry periods, it is empirically proven that young families will almost certainly run out of water, even with very large storage tanks. Further, in certain areas of the island, collected rainwater is severely tainted by contaminants such as bark and leaf tannins and caterpillar and possum droppings.
  It was submitted that there is considerably greater risk to public health by using such water compared to the perceived risk of contaminating 'town water' during its delivery through a constantly monitored pipe system. Note that we had been unable to discover the existence of any damages claim ever being made in respect of contaminated 'town water' delivered through the Island's reticulated system.

- **Sydney Water.** SWC had no plans for Scotland Island until at least 2008-10.

EWS Infrastructure in 2002

- There were 327 houses and nearly 1,100 residents on SI.
- The vast majority of SI houses had rainwater collection systems.
- The submarine pipeline from Church Point to SI had been in existence for about 25 years (2002). It was and remains the property of PC.
- The polyethylene pipe ring main EWS on SI had been in existence in one form or another for about 21 years (2002). It was fed directly from three aging Sydney Water Corporation (SWC) meters at the top of Bells Wharf steps on SI.
- The EWS comprised a haphazard mix of black, polyethylene Rural-grade pipes of five different diameters and wall thickness; both metric and imperial. Predominant size was one-inch imperial. Residents had both individual (permanent) and shared (flexible conduit) connections to the EWS and there were hundreds of valves. Further, the EWS crossed from one side of the fire trail to the other many times in what should have been straight runs and was buried for much of its length. Private valves and diversions were hidden by undergrowth.
- Residents contacted their respective Water Monitor on the Island and book blocks of time, typically 8 or 12 hours, during which they were permitted to open valves and draw off the EWS into their tanks. The Water Monitors collected money and paid it to PC, which acted as an agent for SWC.
- The typical wait for a water booking was between three and six weeks. Largely because water pressure was abysmal and depending on time of day, may have yielded less than 1000 litres an hour. Over-night bookings were preferred by many residents as the water pressure increased when mainland usage dropped off.
- Significant local knowledge of the EWS and handyman skills were needed to actually use it. A resident could expect to spend the first 60-90 minutes of the booking attempting to get the water flowing. That is, discovering hidden valves that had not been reset and fixing leaks once flow was achieved.
- The permanent connections to the main lines allowed some less scrupulous residents to 'tax' the waterline. That is, just slightly open their valve whilst someone else was buying water downstream from them and get a trickle feed. On at least one occasion, pressure testing revealed someone had drilled a hole through the ball in a quarter-turn valve in the closed position and thus was constantly 'taxing' the line contrary to outward appearance.

Proposal for a Replacement Reticulated System

- Some basic tenets of the proposal:
  - In accordance with advice from major insurers, the SI system may not be insurable unless it was upgraded to the Australian Standard.

  - The replacement system must not result in a net increase in water usage by individual households, as the on-site sewerage treatment systems (septic tanks and 'Bio-cycles') may not cope.
  - The few residents that had no access to the EWS would be afforded same.
  - It was a self-managed, 'user pays' system.

- Very briefly, the initial proposal system was as follows:
  - A header tank to be placed on SWC land at the top of the Island. At that time, SWC was happy to accommodate a land lease *(Judith Meeks, Sydney Water).*
  - Three gravity-fed, ring mains, one at each level of housing.
  - Residents who require the service purchase their own meter from SWC and have a plumber connect them to the ring main.
  - A Restrictor is installed on each meter to ensure a trickle flow that is approximately the same, whether drawing water from the top or bottom of the system.
  - Residents still have to contact a Water Monitor and book time. This regulates usage and maintains current throughput. Residents pay Sydney Water direct.
  - A Trust manages the system.

- A Budgetary Estimate for the project was $100,000. Note that this did not budget for the replacement of the submarine pipeline from Church Point to SI, estimated at $35,000. It is considered that the dimensions of the existing pipeline were quite adequate to fill the header tank and therefore meet the trickle feed requirements.
  Further, the environmental impact of removing the old pipeline and replacing it with a larger one could be significant and was unnecessary at that point.

Meeting with SWC 28 June 2002

- SWC advised that the author's project outline was sound in principle but the header tank aspect, whilst logical, was problematic. SWC's ownership of the land did little to mitigate the Reserve Zoning and approval for construction on the site would be difficult to obtain. Further, SWC meters were designed for mains pressure not gravity feed. That said, SWC had no reservation that SIRA could achieve a reticulated system to AS4130 and would have no problem to connecting to the actual hardware.
- SWC's main concern was the fact that there was insufficient water flow through the EWS to maintain the standard for **potable** (drinking) water. The issue was the chlorine levels in the water are time-dependent. Even the increased flow rate calculated for the EWS once upgraded, would probably not meet the standard.

Solution

- Armed with that information, options for improving chlorination and periodic water testing were explored and discarded as impractical. Note that increasing flow rates to the required level would overload on-site sewerage treatment systems.
- Concurrently, legal advice was sought on a way forward. The answer proved simple:
  - SIRA explicitly specify that the EWS provides **non-potable** water and sell it as just that.
  - As a mitigation control, only members of SIRA be permitted to use the EWS.
- This strategy was put to SWC and PC and deemed acceptable by both.

EWS Upgrade Funding

- Fully Funded Option
  - The PC General Manager had publicly declared the existence of "just over $30K in the submarine pipeline maintenance vote". SIRA calculations show the amount paid to PC during their tenure at more than $400K. Subtracting the fees paid to SWC, reasonable management

fees and what little maintenance had been carried out on the submarine pipeline, and there should have been approximately $300K in any such account.

  - Given PC's parlous financial position, it would take considerable political pressure to extract a sum of that magnitude and negotiations would be protracted and adversarial. SIRA considered pursuing the accumulated funds as an action separate to the EWS upgrade.

- Partly Funded
  - Given that PC had publicly declared the existence of approximately $30K and its availability for transfer with the ownership of the submarine pipeline, this was the 'path of least resistance' and most likely scenario. Furthermore, it would allow the EWS upgrade to proceed in the shortest timeframe.

EWS Design Philosophy – Mains Pressure

- The header tank and the mains pressure solutions were not mutually exclusive.
- The simplest and easiest design to implement was to simply replace the existing EWS with Polyethylene (PE) of the appropriate pressure rating (PN16 = 1600kPa) and continue to run off the mains pressure coming across the submarine pipeline.
- Note that the existing PE pipe EWS had five (5) different gauge pipes in operation, of which the most common size was one-inch (25mm) Rural pipe. Empirically, this had proven be:
  - adequate in the majority of connections around SI, particularly at the lower levels;
  - barely acceptable some of the upper levels, and
  - no service achievable to some houses at the top of the Island.
- **Allowance for Future Header Tank.** Pressure and flow calculations showed that on a ring-main, gravity-feed, header-tank system, **40mm** PE pipes would quite adequate for the existing standard operating procedure of using only one water line at a time; note the pressure is only gravity-feed. Installing a header tank of 65,000 litres or more and increasing the pipe gauge to **50mm**, would substantially improve flow rates and would permit two or three lines to be used at once if required for, say, fire-fighting.
- Working group discussions (Smith, Page, Hebden, Morgan, *et al*) agreed that 40mm PE pipe would improve the **mains-pressure** situation by decreasing line friction but still may not achieve service to some houses at the very top of SI. Increasing the pipe diameter above 40mm would probably do little to overcome the height problem but an increase to 50mm would provide flexibility for future upgrades.
- The use of standpipes was mandated to:
  - minimise the number of (costly) fittings;
  - minimise the number of joins in the lines; and
  - prevent theft of water by making connections blatantly obvious.

Implementation

- Accordingly, the author produced and tabled a Schedule of Works (with Phasings) 04 November 2002. Thereafter, Phil Hebden and Mark Morgan expended considerable effort to identify sources and obtain price and availability of components. Project cost with contingency was detailed at just over $90,000 (2003).
- Upgrade outline and reasoning as follows:
  - Phase 1 Top Ring in 2 Stages– the Bush Fire season for obvious reasons
  - Phase 2 Bottom Ring in 3 Stages– the most profitable line for ongoing funding
  - Phase 3 Middle Ring in 2 Stages
  - Phase 4 Header Tank in 2 Stages

- Costing for each Stage was put to Committee as the Treasurer identified funding and replacement commenced. Early in the project, considerable savings were achieved in one bulk purchase of pipe; 8.5km of 50mm PE from a source in Nowra where the ordering customer had gone broke and never collected. Further, bulk purchases of 50mm and 40mm quarter-turn valves through Phil Hebden garnered substantial discounts and we were able to stockpile components at Mark Morgan's property on top the Island.
- The original plan to issue a formal Request for Quotation (RFQ) to industry for each Phase/Stage was abandoned almost at the outset as it become obvious the in-house implementation would be far more efficient for both time and budget.
- Residents in the path of the next rollout were consulted on-site and best positions for standpipes were determined; usually one between four houses. Acceptance of the new system was almost universal with most enquiries wanting to know when they would be connected. This intensified after the improved flow rates experienced on the Top Ring were proven and became common knowledge.
- Both the author and the local installer left the project with Phase 1 complete, Phase 2 largely complete and Phase 3 commenced. The SIRA Committee had expressed dissatisfaction at the ongoing labour bill for installation wished to put the remainder of the works out to Tender.

Ongoing Concerns

- Incoming SIRA office-bearers continue to struggle with two particular managerial aspects of the EWS:
  - the Contract for Sale of non-potable water, which residents who buy water from the EWS are required to sign; and
  - the requirement for the residents to be members of SIRA if they wish to use the EWS.
- SIRA is a limited-scope business unit that has an ABN. Short of outright criminality or negligence by SIRA officers, the Contract for Sale of non-potable water provides explicit legal protection to SIRA. It is a simple and effective legal instrument. Any proposals to improve efficiency and convenience, such as digitally signing the contract on-line, should be implemented with formal legal advice to avoid compromising SIRA's insured position.
- The strategy of requiring SIRA membership is less tangible. Under Australian Law, you cannot sue yourself. To that end, there are precedents that show that a member of club or association would have difficulty in suing that club or association. *Associations Incorporation Act 1984* was germane at the time. The requirement was a mitigation control only. As the *Associations Incorporation Act 2009* is now extant, SIRA may wish to consider seeking formal legal advice as to whether requiring SIRA membership offers any tangible benefit.
- Notwithstanding the above, SIRA is the formal owner and operator of the EWS and as such, it is free to impose any requirement for the use of EWS it sees fit.

R.G. SMITH, RANR
Lieutenant Commander

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