



TOWN OF 1770 WATER SUPPLY RETICULATION PLANNING REPORT

MIRIAM VALE SHIRE COUNCIL

FINAL REPORT

TABLE OF CONTENTS

| | |
|----------------------------------------------------------|----------|
| 1.0 EXECUTIVE SUMMARY | 1 |
| 2.0 INTRODUCTION..... | 2 |
| 3.0 DESIGN CRITERIA..... | 3 |
| 3.1 Equivalent Person Population..... | 3 |
| 3.2 Potable Water Flows..... | 3 |
| 3.3 Fire Fighting Reservoir Storage | 4 |
| 4.0 SCHEME DESCRIPTION AND SOURCES OF SUPPLY..... | 5 |
| 4.1 Existing Water Supply Scheme..... | 5 |
| 4.2 Description of Proposed Water Supply Scheme | 5 |
| 4.3 Sources of Supply..... | 6 |
| 5.0 RETICULATION..... | 7 |
| 6.0 FINANCIAL CONSIDERATIONS | 8 |
| 6.1 Capital Cost, Operation and Maintenance Costs | 8 |
| 6.2 Impact on Water Supply Charges | 8 |
| 7.0 RECOMMENDATIONS..... | 9 |

FIGURES

Figure 1 : Locality Plan

Figure 2 : Town of 1770 Define Water & Sewerage Area

Figure 3 : Proposed Reticulation System

Figure 4 : Reservoir Performance 1.6ML (90% Capacity – commencement)

APPENDICES

APPENDIX A : Static Network Analysis (Coleridge Water Engineers)

| Document Control | | | | | | |
|------------------|----------|--------------|-----------|--------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|
| Version | Date | Status | Author | | Reviewer | |
| | | | Name | Initials | Name | Initials |
| Rev 2 | 27/02/06 | Final Report | Rolf Rees |  | Jamie Alonso |  |

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1.0 EXECUTIVE SUMMARY

This report details the infrastructure required to provide the Town of 1770 with a reticulated water supply. The provision of a reticulated water supply to all residents is important not only in terms of amenity but also in relation to health and fire fighting.

The Town of 1770 reticulation system will be supplied from the Agnes Water's water supply scheme. Consistent with the overall water strategy for both towns the Town of 1770's reticulation system will be connected to the Agnes Water's system via a 150mm dia main.

In the short term the supply from the Agnes Water's Spring Road bores will be augmented by new bores located in the Red Sand Pit area.

In the mid term it is proposed to supply the Agnes Water – Town of 1770 conurbation with desalinated water and to rely on the Spring Road Bores only to supplement the desalinated water supply.

The total capital cost of the Town of 1770 reticulation scheme which involves constructing a 1.6ML reservoir on Lot 26 CP889918 (Reservoir Reserve – Town of 1770) is \$2,086,000. This amount includes an anticipated subsidy of \$225,870.

This report has been partly based on notes and a static network analysis prepared by Coleridge Water Engineers dated 16th May, 2005.

It is recommended that Council:

1. Approve this report and forward copies to the appropriate State Government Departments;
2. Prepare and submit applications for financial assistance for this project and for other necessary projects aimed at ensuring Agnes Water and the Town of 1770 are provided with a reticulated potable water supply that is reliable and able to provide the community with service standard consistent with that of our coastal tourist communities; and
3. Proceed with the construction of the works required to provide the Town of 1770 with a reticulated water supply.

2.0 INTRODUCTION

The Town of 1770 is located immediately north of Agnes Waters and some 50 kilometres by road from Miriam Vale. A locality plan showing the Town of 1770 and surrounding areas is provided as Figure 1.

The existing water supply sources available to service the towns of Agnes Water and 1770 are limited to groundwater, rainwater tankage and some private bores. Currently supplies to the existing Agnes Water's reticulation system are confined primarily to bores. The town of 1770's reticulation system, which currently serves a small number of properties, is supplied with water from an open trench and a bore immediately adjacent to the open trench.

The quality of water obtained from private bores is questionable particularly as the area currently partly relies on septic systems for treatment of liquid wastes. Hence there is a need to provide the Town of 1770 with a reticulated supply of potable water.

The Agnes Water's water supply is sourced from the Spring Road Bores or, if necessary from groundwater discharge to open trenches at the base of the inland secondary dunal system. The supply from the open trench requires treatment particular for the removal of colour whereas the supply from the bore only requires disinfection.

In the mid-term to long term it is intended to supplement the bore supplies with potable water provided from a desalination plant sourcing sea water and to abandon the sourcing of supplies from open trenches.

Existing potable water consumption in the Agnes Waters - Town of 1770 conurbation is low by regional standards. It is possible that overall consumption per equivalent person (EP) will increase slightly with expansion of the reticulation system and with an increase in the reliability of source water able to be distributed. However, to ensure per equivalent person consumption does not increase, Miriam Vale Shire Council's proposes to maintain a demand management policy that ensures overall consumption is maintained within the system's design limits. As part of its demand management policies Miriam Vale Council has a policy which requires rain water tankage to be plumbed to garden taps, toilets and laundry taps.

In conjunction with the proposal to provide the Town of 1770 with a reticulated water supply it is intended to sewer the town. For details of the proposed sewerage system for the Town of 1770 refer to the following planning report prepared by GH&D and entitled "Report for 1770 Sewerage Scheme – Pressure Sewerage System", December 2005.

3.0 DESIGN CRITERIA

3.1 Equivalent Person Population

The following existing and ultimate population data given in Table 2.1 is consistent with both the existing planning undertaken by Miriam Vale Shire Council and the populations detailed in the sewerage planning report prepared by GH&D.

**Table 2.1
Equivalent Person Populations**

| Land Use | Equivalent Persons | | | |
|--------------|--------------------|--------------|--------------|--------------|
| | Existing | Year 2008 | Year 2026 | Ultimate |
| Commercial | 105 | 215 | 247 | 304 |
| Residential | 276 | 862 | 988 | 1,228 |
| Total | 381 | 1,077 | 1,235 | 1,532 |

The average annual population increase expected over the next 20 years is difficult to determine. However, it is likely that the Town of 1770's population will reach the ultimate equivalent person population within this period even if the town does not experience the rapid increase expected in the next couple of years. Given the difficulty involved in predicting population increases it is considered that the population projection given in Table 2.1 provides a reasonable basis for water supply planning.

3.2 Potable Water Flows

Water supply flows adopted are as follows.

| | |
|------------------------------------|------------------------------------|
| Average Day Flow (AD) | = 200 L/EP; |
| Mean Day Maximum Month Flow (MDMM) | = 300 L/EP (MDMM : AD factor 1.5); |
| Maximum Day Flow (MD) | = 460 L/EP (MD : AD factor 2.3); |
| Maximum Hour Flow (MH) | = 0.011L/EP. |

A minimum fire flow of 15L/s and 30L/s will be provided to residential and commercial areas respectively.

Table 2.2 details total daily and daily instantaneous flows for the populations given in Table 2.1.

**Table 2.2
Daily Water Supply Flows**

| Development | Average Day | | MDMM (20hrs) | | Maximum Day | |
|-------------|-------------|--------|--------------|--------|-------------|--------|
| | kL | L/s | kL | L/s | kL | L/s |
| Existing | 77kL | 0.9L/s | 115kL | 1.6L/s | 176kL | 2.1L/s |
| Year 2008 | 216kL | 2.5L/s | 324kL | 4.5L/s | 497kL | 5.8L/s |
| Year 2026 | 247kL | 2.9L/s | 370kL | 5.2L/s | 568kL | 6.6L/s |
| Ultimate | 307kL | 3.6L/s | 460kL | 6.4L/s | 706kL | 8.2L/s |

Table 2.3 details the average annual and maximum hour flows deemed to apply to the Town of 1770's proposed water supply system.

Table 2.3
Maximum Hour and Annual Water Supply Flows

| Development | Maximum Hour | Annual |
|--------------------|---------------------|---------------|
| Existing | 4.2L/s | 28ML |
| Year 2008 | 10.6L/s | 79ML |
| Year 2026 | 13.2L/s | 91ML |
| Ultimate | 16.4L/s | 112ML |

3.3 Fire Fighting Reservoir Storage

A fire storage of 430kL has been assessed on the basis of providing a flow of 30L/s over a 4 hour period. This volume is considered necessary because of the limited water supply sources available in the environs of the conurbation and the remoteness of the town in terms of fire fighting support.

A fire fighting capability is particularly important given the extent of development that has occurred at the Town of 1770.

4.0 SCHEME DESCRIPTION AND SOURCES OF SUPPLY

4.1 Existing Water Supply Scheme

The existing town of 1770 water supply scheme comprises the following components:

- An open trench accessing groundwater from the surrounding dunal system and an adjacent bore. These facilities are located at the southern extremity of the town;
- Sodium hypochlorite disinfection located adjacent to the intake trench and bores. Disinfection is carried out in a 1kL Tank;
- A pipeline conveying disinfected water at a rate of 1L/s to four storage reservoirs located at two sites;
- Two 22kL ground level storage tanks located at Captain Cook Drive near the Caravan Park at an elevation of some 7m AHD. These tanks are about 1km north of the intake trench and bore;
- Two 50kL ground level storage tanks located at the southern end of Orton Street at an elevation of some 30m AHD. These tanks are about 1.2km north of the intake trench and bore; and
- The existing caravan park, public toilets and QPWS building are supplied directly from the supply pipeline.

Figures 2 and 3 show the Defined Water and Sewerage Area for the Town of 1770 and the location of the main components of the existing reticulation system.

4.2 Description of Proposed Water Supply Scheme

The water supply strategy for the Town of 1770 and Agnes Water is based on the Town of 1770 drawing supplies from the Agnes Water's reservoir with supplies to the Agnes Water's reservoir being provided from the existing Spring Road Bores supplemented by bores located in the Red Sand Pit area. A 150mm dia main will connect the Agnes Water's water supply system to the proposed Town of 1770 reticulation system.

In the mid term it is proposed to provide Agnes Water and the Town of 1770 with supplies of potable water drawn from a desalination plant located near the existing water treatment plant and to only use bore water to supplement the supply as necessary.

The proposed town of 1770 water supply scheme will be designed in accordance with State Government Guidelines.

Water from the Agnes Water's reservoir will be pumped to a ground level reservoir to be constructed on land described as Lot 26 CP889918 (Reservoir Reserve – 5,166m²). This reservoir will have an elevation of 75m AHD and will be capable of ensuring adequate pressure is maintained. Pressure reducing valves will be installed to limit maximum pressure available to residences located at low elevations.

Figure 3 shows details of the proposed overall water supply scheme for the Town of 1770.

4.3 Sources of Supply

Prior to augmentation of the Agnes Water groundwater supplies with an alternative source such as desalinated water the Agnes Water and Town of 1770 reticulated systems will be supplied from Spring Road Bores and the Red Sand Pit Bores.

Details relating to all the existing bores within the Agnes Water – Town of 1770 conurbation are given in Table 4.1. The location of the bores is shown on Figure 3.

To meet the ultimate demand of the Town of 1770 the Spring Road and Red Sand Pit Bores would need to supply 7.4L/s over at 20 hour period, whereas the existing requirement is 1.8L/s. Both of these flows assume 15% system losses.

On the basis that an alternative source of supply (ie. desalination) will be available by the year 2009 the maximum MDMM demand from the bores in order to meet the requirements of the Town of 1770 will be 5.2L/s. This flow represents about 34% of the combined total MDMM demand of Agnes Water and the Town of 1770 for the year 2009 of 15.3L/s. The current available bore capacity able to be supplied from the Red Sand Pit Bores and Spring Road Bores is some 10.7L/s. However, it is believed that additions flows to that shown in Table 4.1 could be obtained from the Red Sand Pit Area. Notwithstanding the available bore capacity within the conurbation it is clear that the proposed desalination plant will need to be operational within a few years and preferably prior to the year 2009.

**Table 4.1
Details of Bores**

| Bore Name | No. | Capacity (L/s) | Quality | Operational Status |
|--------------------|------|----------------|-------------------------------------------------|--------------------|
| Trench Bore | | <1.0 | pH Correction Reqd. | Connected |
| Caravan Park Bore | | 1.2 | High Risk of Salt Intrusion | Connected |
| Red Sand Pit Bores | | 1.4 | Excessive Iron | Connected |
| | | 1.9 | | Not Connected |
| | | 1.2 | | Not Connected |
| Spring Road Bores | 96/3 | 3.85 | Treatment Reqd. for Turbidity and pH Correction | Connected |
| | 97/6 | 2.37 | | Connected |

Following installation of the proposed desalination plant supplies to Agnes Water and the Town of 1770 will be obtained primarily from the desalination plant and Spring Road Bores.

The Trench Bore, Caravan Park Bore and Red Sand Pit Bores are not regarded as reliable long term sources of good quality water. Hence the need for the desalination plant to be brought on-line as soon as practicable.

5.0 RETICULATION

To confirm the reticulation sizing a static network analysis was undertaken by Coleridge Water Engineers. Details of the analysis area given in Appendix A. The analysis examines the network based on maximum hour flow being drawn from the reservoir, with a fire flow of 30L/s and no inflow from the various bores.

Figure 3 shows details of the reticulation sizing adopted.

Hazen-Williams coefficients of 100 and 110 have been adopted for less than 200mm and greater than 200mm respectively. Given the type of pipe to be installed these roughness coefficients are conservative.

To reduce the overall pressure in those areas of the town located at low elevations it is proposed to install 3 No. pressure reducing valves at specific locations.

Table 5.1 summaries the reticulation required.

**Table 5.1
Summary of Reticulation**

| Pipe Diameter | Pipe Type and Class | Pipe Length |
|---------------|---------------------|-------------|
| 200 | oPVC : PN 12.5 | 998 |
| 150 | oPVC : PN 12.5 | 3,081 |
| 100 | oPVC : PN 12.5 | 1,623 |
| Total Length | | 5,702 |

Because the maximum day demand exceeds the average day demand by a factor slightly greater than 2.25 dynamic analyses were undertaken to assess the performance of the system based on 3 MDMM demands followed by 3 MD demands (Refer Table 5.2 of the State Government's Guidelines) and to assess the performance of the system based on 6 MD. The 6MD analysis was undertaken because the historical water usage record indicates that long periods of maximum day demands have been experienced.

This analysis indicated that in order to meet the above criteria and maintain a fire fighting reserve a reservoir capacity of 1.6ML should be provided. Figure 4 shows the performance of the reservoir based 6 MD demands.

6.0 FINANCIAL CONSIDERATIONS

6.1 Capital Cost, Operation and Maintenance Costs

The capital cost of installing the water reticulation system is detailed in Table 6.1.

Table 6.1
Capital Cost of Reticulation to Town of 1770

| Item No. | Description | Amount | |
|----------|------------------------------------------------------|--------------------|-----------------------------------------|
| | | Total Capital Cost | Total Capital Cost Exclusive of Subsidy |
| 1 | Ground Level Reservoir 1.6ML | \$580,000 | \$580,000 |
| 2 | 200mm PVC Reticulation complete 998m | \$127,000 | \$127,000 |
| 3 | 150mm PVC Reticulation complete 3.081m | \$325,000 | \$325,000 |
| 4 | 100mm PVC Reticulation complete 1,623m | \$175,000 | \$175,000 |
| 5 | 150mm PVC Connection to Agnes Water's system 1,731m* | \$183,000 | \$109,800 |
| 6 | Red Sand Pit Bores | \$265,000 | \$159,000 |
| | Sub Total | \$1,655,000 | \$1,475,800 |
| | Contingencies 20% | \$331,000 | \$295,160 |
| | Sub Total | \$1,986,000 | \$1,770,960 |
| | Surveys, Engineering etc | \$100,000 | \$89,170 |
| | Total | \$2,086,000 | \$1,860,130 |

On the basis that Item Nos. 5 and 6 are subject to a 40% subsidy (ie. \$225,870) from the Stage Government the overall capital cost to Miriam Vale Shire Council will be \$1.86M.

The overall operating and maintenance cost of the reticulation to the Town of 1770 is estimated to be \$25,000 per annum.

6.2 Impact on Water Supply Charges

The annual increase in water charges has been assessed as shown in Table 6.2, based on a capital cost of \$1.86M (loan period of 20 years @ 5%), operation and maintenance of \$25,000 per annum and an annual depreciation of \$48,000.

Table 6.2
Charge for Connection

| Year | Connections | Charge per Connection |
|------|-------------|-----------------------|
| 2009 | 1,024 | \$108 |
| 2011 | 1,217 | \$91 |
| 2016 | 1,626 | \$68 |
| 2021 | 2,072 | \$53 |
| 2026 | 2,614 | \$42 |

Current water charges for Agnes Water are \$325 plus \$2.80 per kilolitre per connection. Hence the above additional charge is expected to impact significantly on the overall water charge required to finance the proposed works.

7.0 RECOMMENDATIONS

It is recommended that Council :

1. Approve this report and forward copies to the appropriate State Government Departments;
2. Prepare and submit applications for financial assistance for this project and for other necessary projects aimed at ensuring Agnes Water and the Town of 1770 are provided with a reticulated potable water supply that is reliable and able to provide the community with a level of service consistent with that of our coastal tourist communities; and
3. Proceed with the construction of the works required to provide the Town of 1770 with a reticulated water supply.

REFERENCES

- 1) Seventeen Seventy Reticulation Notes as at 16th May 2005 for discussion from - 'Draft Agnes Water & Seventeen Seventy Water Supply Planning Report' prepared for Miriam Vale Shire Council by Coleridge Water Engineers.
- 2) 'Report for 1770 Sewerage Scheme Pressure Sewerage Scheme' prepared for Miriam Vale Shire Council by GH&D, December 2005.

FIGURES



Locality Map

FIGURE 1

**MIRIAM VALE SHIRE COUNCIL
SEVENTEEN SEVENTY - WATER & SEWERAGE DEFINED AREAS
Adopted 16 May 2005**



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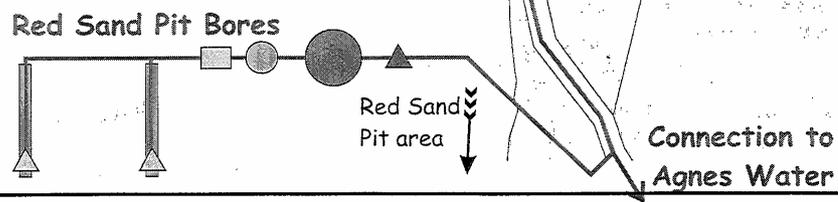
Defined Water & Sewerage Area FIGURE 2

MIRIAM VALE SHIRE COUNCIL
 PROPOSED
 SEVENTEEN SEVENTY
 WATER SUPPLY
 Diagrammatic Sketch
 CWE D404SK11.cdr/pdf, 15th May 2005



SEVENTEEN SEVENTY WATER SUPPLY
 Ultimate Scheme (1532EP)

- Grey - bore
- Pink - submersible pump
- Yellow - limestone contactor
- Green - aerator
- Blue - reservoir or tank
- Red - high lift pump (VFD)
- Purple - link to AWWWS
- Black - reticulation
- Pressure Reducing Valve (PRV)



Caravan Park Bore

Reservoir

Pipeline to follow
 Ergon thro' Reserve

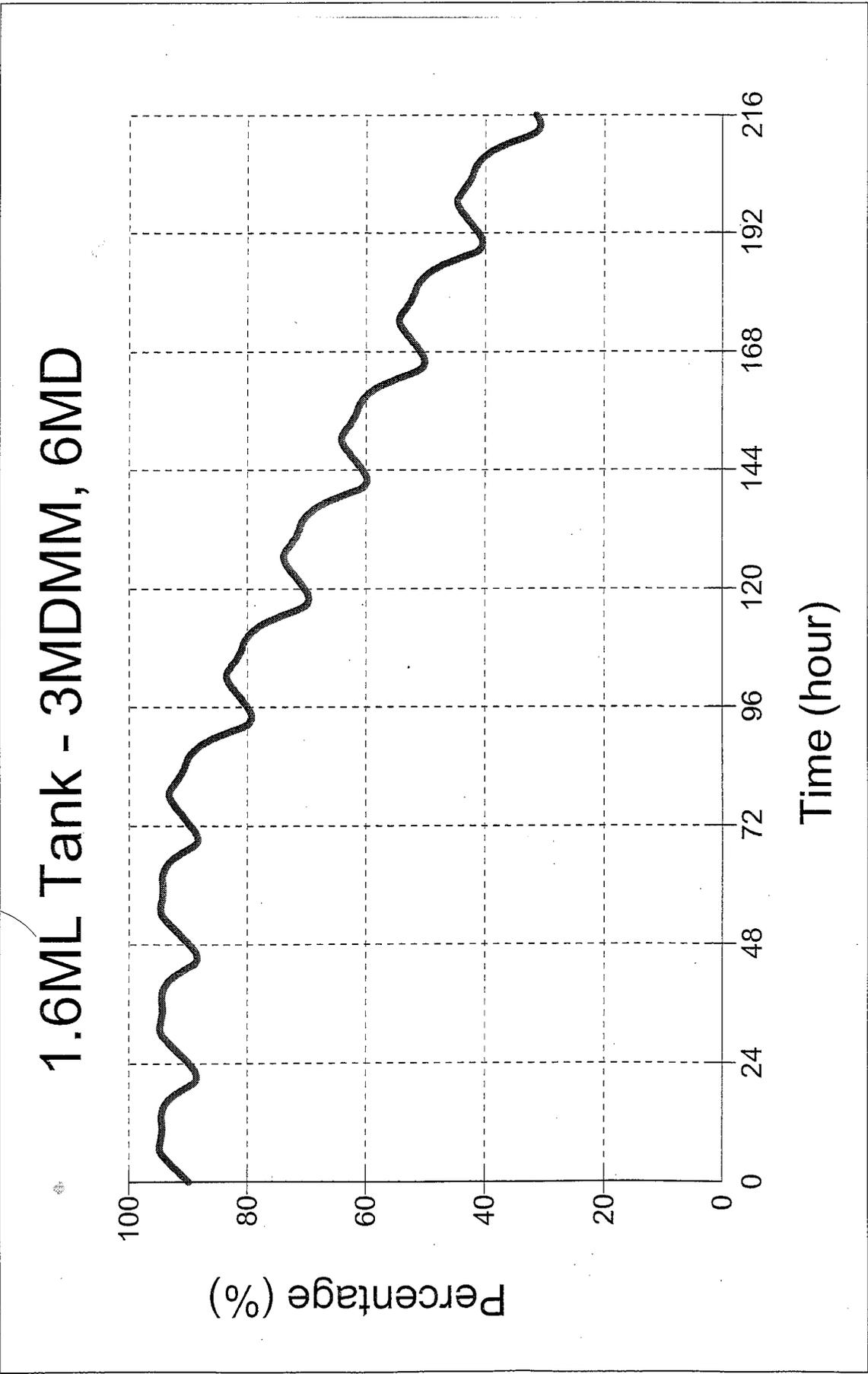
SKETCH PLAN ONLY
 REFER WATERCAD DRAWINGS
 FOR ACTUAL LOCATION OF MAINS

Trench Bore

Connection to
 Agnes Water

Proposed Reticulation System

FIGURE 3



**Reservoir Performance 3Days MDMM Demand and
6Days MD Demand
Figure 4**

APPENDIX A

***Static Network Analysis
(Coleridge Water Engineers)***

MVSC - AGNES WATER & SEVENTEEN SEVENTY WATER SUPPLY PLANNING REPORT

CWE

SEVENTEEN SEVENTY WATER RETICULATION

D412DESE.XLS

PIPELINES

15 May 2005

| No. | PIPE | | | | MAXIMUM HOUR | | | | | | | FIRE FLOW | | | | | | PIPE No. | NODES | | NOTES |
|----------------------------------|------------------|---------------------------------------------------------------------------|----------|------------------|---------------------------------------------|-----------------|-------|----------------|--------------------|----------|-------|-----------------|-------|----------------|--------------------|----------|------|----------|-------|-------------------|-------|
| | LENGTH | DIAMETER | MATERIAL | HAZEN-WILLIAMS C | FLOW | HYDRAULIC GRADE | | PIPE HEAD LOSS | HEAD LOSS GRADIENT | VELOCITY | FLOW | HYDRAULIC GRADE | | PIPE HEAD LOSS | HEAD LOSS GRADIENT | VELOCITY | FROM | | TO | | |
| | m | mm | | | l/s | U/S m | D/S m | m | m/km | m/s | l/s | U/S m | D/S m | m | m/km | m/s | | | | | |
| P702 | 53.0 | 167.2 | oPVC | 100 | 0.0 | 75.7 | 75.7 | 0.00 | 0.00 | | 0.0 | 63.9 | 63.9 | 0.00 | 0.00 | | P702 | PMP71 | N701 | | |
| P703 | 1286.0 | 167.2 | oPVC | 100 | -3.6 | 75.7 | 76.1 | 0.49 | 0.38 | | -3.6 | 63.9 | 64.4 | 0.49 | 0.38 | | P703 | N701 | N702 | | |
| P704 | 245.5 | 167.2 | oPVC | 100 | -4.5 | 76.1 | 76.3 | 0.14 | 0.58 | | -4.5 | 64.4 | 64.6 | 0.14 | 0.58 | | P704 | N702 | N703 | | |
| P705 | 165.0 | 167.2 | oPVC | 100 | 5.1 | 76.4 | 76.3 | 0.12 | 0.73 | | 13.8 | 65.3 | 64.6 | 0.76 | 4.59 | | P705 | N704 | N703 | | |
| P706 | 118.0 | 114.7 | oPVC | 100 | -0.3 | 76.3 | 76.3 | 0.00 | 0.02 | | 8.4 | 64.6 | 63.2 | 1.35 | 11.44 | | P706 | N703 | N705 | | |
| P707 | 8.0 | 167.2 | oPVC | 100 | 1.3 | 76.3 | 76.3 | 0.00 | 0.06 | | 18.5 | 63.2 | 63.2 | 0.06 | 7.94 | | P707 | N705 | PRV71 | | |
| P708 | 166.0 | 167.2 | oPVC | 100 | 1.3 | 50.0 | 50.0 | 0.01 | 0.06 | | 18.5 | 50.0 | 48.7 | 1.32 | 7.94 | | P708 | PRV71 | N708 | Fire flow at N708 | |
| P709 | 114.0 | 114.7 | oPVC | 100 | -2.3 | 76.3 | 76.4 | 0.12 | 1.03 | | -10.9 | 63.2 | 65.3 | 2.11 | 18.48 | | P709 | N705 | N704 | | |
| P710 | 76.0 | 167.2 | oPVC | 100 | -8.1 | 76.4 | 76.5 | 0.13 | 1.71 | | -25.3 | 65.3 | 66.4 | 1.08 | 14.17 | | P710 | N704 | N706 | | |
| P711 | 189.5 | 167.2 | oPVC | 100 | -8.2 | 76.5 | 76.9 | 0.33 | 1.75 | | -25.4 | 66.4 | 69.1 | 2.70 | 14.27 | | P711 | N706 | N707 | | |
| P712 | 10.0 | 167.2 | oPVC | 100 | -1.1 | 76.9 | 76.9 | 0.00 | 0.04 | | -13.9 | 69.1 | 69.1 | 0.05 | 4.64 | | P712 | PRV72 | N707 | | |
| P713 | 284.5 | 167.2 | oPVC | 100 | -1.1 | 50.0 | 50.0 | 0.01 | 0.04 | | -13.9 | 48.7 | 50.0 | 1.32 | 4.64 | | P713 | N708 | PRV72 | Fire flow at N708 | |
| P714 | 188.0 | 219.3 | oPVC | 110 | -10.0 | 76.9 | 77.0 | 0.11 | 0.57 | | -40.0 | 69.1 | 70.5 | 1.39 | 7.38 | | P714 | N707 | N709 | | |
| P715 | 263.5 | 219.3 | oPVC | 110 | -10.8 | 77.0 | 77.1 | 0.17 | 0.65 | | -40.8 | 70.5 | 72.5 | 2.02 | 7.66 | | P715 | N709 | N710 | | |
| P716 | 30.5 | 114.7 | oPVC | 100 | 4.3 | 77.1 | 77.0 | 0.10 | 3.33 | | 4.3 | 72.5 | 72.4 | 0.10 | 3.33 | | P716 | N710 | N711 | | |
| P717 | 287.5 | 219.3 | oPVC | 110 | -15.8 | 77.1 | 77.5 | 0.38 | 1.32 | | -45.8 | 72.5 | 75.2 | 2.73 | 9.49 | | P717 | N710 | N712 | | |
| P718 | 185.5 | 114.7 | oPVC | 100 | 2.7 | 77.5 | 77.3 | 0.26 | 1.41 | | 2.7 | 75.2 | 75.0 | 0.26 | 1.41 | | P718 | N712 | N713 | | |
| P719 | 148.5 | 114.7 | oPVC | 100 | 1.2 | 77.3 | 77.2 | 0.05 | 0.31 | | 1.2 | 75.0 | 74.9 | 0.05 | 0.31 | | P719 | N713 | N714 | | |
| P720 | 237.5 | 219.3 | oPVC | 110 | -18.5 | 77.5 | 77.9 | 0.42 | 1.77 | | -48.5 | 75.2 | 77.7 | 2.51 | 10.55 | | P720 | N712 | N715 | | |
| P721 | 21.5 | 219.3 | oPVC | 110 | 22.6 | 78.0 | 77.9 | 0.06 | 2.56 | | 52.6 | 78.0 | 77.7 | 0.26 | 12.26 | | P721 | R72 | N715 | | |
| P722 | 241.5 | 167.2 | oPVC | 100 | 4.1 | 77.9 | 77.8 | 0.12 | 0.49 | | 4.1 | 77.7 | 77.6 | 0.12 | 0.49 | | P722 | N715 | N716 | | |
| P723 | 50.0 | 167.2 | oPVC | 100 | 4.0 | 77.8 | 77.8 | 0.02 | 0.46 | | 4.0 | 77.6 | 77.6 | 0.02 | 0.46 | | P723 | N716 | N717 | | |
| P724 | 65.5 | 114.7 | oPVC | 100 | 2.1 | 77.8 | 77.8 | 0.06 | 0.89 | | 2.1 | 77.6 | 77.5 | 0.06 | 0.89 | | P724 | N717 | N722 | | |
| P725 | 80.5 | 114.7 | oPVC | 100 | -1.6 | 77.8 | 77.8 | 0.04 | 0.53 | | -1.6 | 77.6 | 77.6 | 0.04 | 0.53 | | P725 | N718 | N717 | | |
| P726 | 101.5 | 114.7 | oPVC | 100 | -0.9 | 77.7 | 77.8 | 0.02 | 0.18 | | -0.9 | 77.5 | 77.6 | 0.02 | 0.18 | | P726 | N719 | N718 | | |
| P727 | 127.5 | 114.7 | oPVC | 100 | -0.5 | 77.7 | 77.7 | 0.01 | 0.06 | | -0.5 | 77.5 | 77.5 | 0.01 | 0.06 | | P727 | N720 | N719 | | |
| P728 | 107.5 | 114.7 | oPVC | 100 | -0.2 | 77.7 | 77.7 | 0.00 | 0.01 | | -0.2 | 77.5 | 77.5 | 0.00 | 0.01 | | P728 | N721 | N720 | | |
| P729 | 72.5 | 114.7 | oPVC | 100 | 0.9 | 77.8 | 77.7 | 0.01 | 0.17 | | 0.9 | 77.5 | 77.5 | 0.01 | 0.17 | | P729 | N722 | N721 | | |
| P730 | 112.5 | 114.7 | oPVC | 100 | -0.7 | 77.7 | 77.7 | 0.01 | 0.10 | | -0.7 | 77.5 | 77.5 | 0.01 | 0.10 | | P730 | N723 | N721 | | |
| P731 | 125.5 | 114.7 | oPVC | 100 | -0.3 | 77.7 | 77.7 | 0.00 | 0.02 | | -0.3 | 77.5 | 77.5 | 0.00 | 0.02 | | P731 | N724 | N723 | | |
| P732 | 76.5 | 114.7 | oPVC | 100 | 0.1 | 77.7 | 77.7 | 0.00 | 0.01 | | 0.1 | 77.5 | 77.5 | 0.00 | 0.01 | | P732 | N725 | N724 | | |
| P733 | 157.0 | 114.7 | oPVC | 100 | 0.8 | 77.8 | 77.7 | 0.03 | 0.16 | | 0.8 | 77.5 | 77.5 | 0.03 | 0.16 | | P733 | N722 | N725 | | |
| P734 | 305.5 | 167.2 | oPVC | 100 | 3.6 | 75.7 | 75.5 | 0.12 | 0.38 | | 3.6 | 63.9 | 63.8 | 0.12 | 0.38 | | P734 | N701 | N726 | | |
| TOTAL | 5701.5 m | | | | Length of Reticulation at Seventeen Seventy | | | | | | | | | | | | | | | | |
| | 1623.0 m | 100mm | oPVC | PN12.5 | | | | | | | | | | | | | | | | | |
| | 3080.5 m | 150mm | oPVC | PN12.5 | | | | | | | | | | | | | | | | | |
| | 998.0 m | 200mm | oPVC | PN12.5 | | | | | | | | | | | | | | | | | |
| TOTAL | 5701.5 m (check) | | | | | | | | | | | | | | | | | | | | |
| AGNES WATER TO SEVENTY LINK MAIN | | | | | | | | | | | | | | | | | | | | | |
| P999 | 1731.0 | 167.2 | oPVC | 100 | 0.0 | 75.5 | 75.5 | 0.00 | 0.00 | | 0.0 | 63.8 | 63.8 | 0.00 | 0.00 | | P999 | N726 | N999 | | |
| TOTAL | 1731.0 m | Length of Reticulation at Seventeen Seventy including Link to Agnes Water | | | | | | | | | | | | | | | | | | | |
| | 1731.0 m | 150mm | oPVC | PN12.5 | | | | | | | | | | | | | | | | | |

MVSC - AGNES WATER & SEVENTEEN SEVENTY WATER SUPPLY PLANNING REPORT

GWE

SEVENTEEN SEVENTY WATER RETICULATION

D412DESE.XLS

NODES, LEVELS, MAXIMUM HOUR & FIRE FLOWS

15 May 2005

| NODE | ELEVATION (Estimated) m AHD | RESIDENTIAL | | COMMERCIAL | | TOTAL POPULATION EP | MH FLOW | | WATERCAD RESULTS | | | | | | NOTES |
|----------------------------------------------------------------------|---------------------------------------|----------------|----------------------|------------------------------|----------------------|-------------------------------|-----------------|-----------------|------------------|---------------------|-----------------|---------------------|--------|-------|-----------|
| | | LOTS EL | POPULATION EP | DESCRIPTION | POPULATION EP | | UNIT l/s | NODE l/s | MAXIMUM HOUR | | FIRE FLOW | | | | |
| | | | | | | | | | FLOW l/s | PRESSURE AT NODE | FLOW l/s | PRESSURE AT NODE | | | |
| | | | | | | | | | | | | m AHD | m head | m AHD | |
| R71 | 85 | 0 | 0 | | | 0.0 | | | | | | | | | |
| R72 | 75 | 0 | 0 | | | 0.0 | | | | | | | | | |
| N701 | 3 | 0 | 0 | | | 0.0 | 0.014815 | 0.0 | 0.0 | 75.7 | 72.5 | 0.0 | 63.9 | 60.8 | |
| N702 | 2 | 0 | 0 | Marina, VMR, QPWS, Toilets | 60.8 | 60.8 | 0.014815 | 0.9 | 0.9 | 76.1 | 74.0 | 0.9 | 64.4 | 62.3 | |
| N703 | 28 | 11 | 62 | | | 61.6 | 0.014815 | 0.9 | 0.9 | 76.3 | 48.2 | 0.9 | 64.6 | 36.5 | |
| N704 | 38 | 9 | 50 | | | 50.4 | 0.014815 | 0.7 | 0.7 | 76.4 | 38.3 | 0.7 | 65.3 | 27.3 | |
| N705 | 27 | 9 | 50 | | | 50.4 | 0.014815 | 0.7 | 0.7 | 76.3 | 49.2 | 0.7 | 63.2 | 36.1 | |
| N706 | 50 | 1 | 6 | | | 5.6 | 0.014815 | 0.1 | 0.1 | 76.5 | 26.5 | 0.1 | 66.4 | 16.4 | |
| N707 | 20 | 8 | 45 | | | 44.8 | 0.014815 | 0.7 | 0.7 | 76.9 | 56.8 | 0.7 | 69.1 | 49.0 | |
| N708 | 5 | 8 | 45 | Shop, Toilets | 119.0 | 163.8 | 0.014815 | 2.4 | 2.4 | 50.0 | 44.9 | 32.4 | 48.7 | 43.6 | Fire flow |
| N709 | 8 | 10 | 56 | | | 56.0 | 0.014815 | 0.8 | 0.8 | 77.0 | 68.8 | 0.8 | 70.5 | 62.4 | |
| N710 | 5 | 8 | 45 | | | 44.8 | 0.014815 | 0.7 | 0.7 | 77.1 | 72.0 | 0.7 | 72.5 | 67.4 | |
| N711 | 2 | 0 | 0 | MVSC Caravan Park | 291.2 | 291.2 | 0.014815 | 4.3 | 4.3 | 77.0 | 74.9 | 4.3 | 72.4 | 70.3 | |
| N712 | 21 | 0 | 0 | | | 0.0 | 0.014815 | 0.0 | 0.0 | 77.5 | 56.4 | 0.0 | 75.2 | 54.1 | |
| N713 | 32 | 2 | 11 | NR&M Motel | 89.6 | 100.8 | 0.014815 | 1.5 | 1.5 | 77.3 | 45.2 | 1.5 | 75.0 | 42.9 | |
| N714 | 45 | 14 | 78 | | | 78.4 | 0.014815 | 1.2 | 1.2 | 77.2 | 32.2 | 1.2 | 74.9 | 29.9 | |
| N715 | 74 | 0 | 0 | | | 0.0 | 0.014815 | 0.0 | 0.0 | 77.9 | 3.9 | 0.0 | 77.7 | 3.7 | |
| N716 | 57 | 1 | 6 | | | 5.6 | 0.014815 | 0.1 | 0.1 | 77.8 | 20.8 | 0.1 | 77.6 | 20.6 | |
| N717 | 50 | 4 | 22 | | | 22.4 | 0.014815 | 0.3 | 0.3 | 77.8 | 27.7 | 0.3 | 77.6 | 27.5 | |
| N718 | 43 | 8 | 45 | | | 44.8 | 0.014815 | 0.7 | 0.7 | 77.8 | 34.7 | 0.7 | 77.6 | 34.5 | |
| N719 | 30 | 5 | 28 | | | 28.0 | 0.014815 | 0.4 | 0.4 | 77.7 | 47.6 | 0.4 | 77.5 | 47.4 | |
| N720 | 31 | 4 | 22 | | | 22.4 | 0.014815 | 0.3 | 0.3 | 77.7 | 46.6 | 0.3 | 77.5 | 46.4 | |
| N721 | 37 | 5 | 28 | | | 28.0 | 0.014815 | 0.4 | 0.4 | 77.7 | 40.7 | 0.4 | 77.5 | 40.4 | |
| N722 | 43 | 5 | 28 | | | 28.0 | 0.014815 | 0.4 | 0.4 | 77.8 | 34.7 | 0.4 | 77.5 | 34.5 | |
| N723 | 30 | 5 | 28 | | | 28.0 | 0.014815 | 0.4 | 0.4 | 77.7 | 47.6 | 0.4 | 77.5 | 47.4 | |
| N724 | 37 | 5 | 28 | | | 28.0 | 0.014815 | 0.4 | 0.4 | 77.7 | 40.6 | 0.4 | 77.5 | 40.4 | |
| N725 | 45 | 8 | 45 | | | 44.8 | 0.014815 | 0.7 | 0.7 | 77.7 | 32.7 | 0.7 | 77.5 | 32.4 | |
| N726 | 22 | 0 | 0 | Captain Cook Holiday Village | 243.2 | 243.2 | 0.014815 | 3.6 | 3.6 | 75.5 | 53.4 | 3.6 | 63.8 | 41.7 | |
| N999 | 3 | 0 | 0 | | | 0.0 | 0.014815 | 0.0 | 0.0 | 75.5 | 72.4 | 0.0 | 63.8 | 60.7 | |
| Note: PRVs set to 50m head for Captain Cook Drive; not optimised yet | | | | | | | | | | | | | | | |
| TOTAL | | 130.0 | 728.0 | EP | 803.8 | 1531.8 | EP | 22.7 | 22.6 | l/s | 52.6 | l/s | | | |
| | | 5.6 | | EP/Lot | 478.7 | | EL | | | | | | | | |