Optimised Replacement Cost of Existing Roma Brisbane Pipeline

PUBLIC VERSION
(confidential text deleted)

24 June 2006

Sleeman Consulting

Contents

1 Executive Summary

This document provides an independent assessment of the optimised replacement cost of the Roma Brisbane Pipeline ('RBP'). To determine the optimised replacement cost a five stage approach, as summarised below, is employed herein.

First, the gas transportation service presently available in the RBP is quantified in order that possible replacement pipelines (each capable of providing the same service) can be identified. The RBP as it is presently configured has capacity to transport 180 TJ/d of gas on a steady state-basis. It is predicted the pipeline will transport an average of 140 TJ/d during 2005/06 although, on a cyclic basis, the peak rate of gas delivery from the pipeline may exceed 180 TJ/d. Peak deliveries at a rate exceeding the steady-state capacity are made possible through use of linepack (whereby the pipeline is packed with gas during low demand periods for subsequent delivery during high demand periods).

Second, a number of feasible, alternative replacement pipeline configurations (each of which is capable of providing on a steady-state basis a level of service comparable to, but not less than, the RBP) are identified. Pipeline configurations investigated range in size from 350 mm to 600 mm diameter, with operating pressures from 7.0 MPa to 15.3 MPa and with varying inlet and/or intermediate compression requirements. The largest (600 mm) diameter configuration does not require compression in order to provide the required level of service while the smallest (350 mm) diameter requires high operating pressures and the installation of multiple compressors.

Third, the capital, operating and maintenance costs (including compressor fuel) of the each of alternative pipeline configurations are estimated on industry indicative basis.

Fourth, the optimal configuration for the replacement pipeline is identified as the configuration that has the lowest overall cost in present value terms. The calculation of present values is carried out over a 25 year analysis period at a discount rate equivalent to the real, risk free interest rate. The optimal replacement pipeline is determined to be 400 mm in diameter over most of its length with an operating pressure of 12.5 MPa upstream of Redbank (near Ipswich) and an operating pressure of 5.0 MPa downstream of Redbank. The optimised pipeline section from Wallumbilla to Arubial (near Condamine) is 350 mm and from Peat to Arubial is 200 mm diameter. Laterals of varying diameters are also required to supply gas to a number of offtakes, including the Swanbank power station.

Finally, the estimated cost of the optimised replacement pipeline is itemised and refined. The optimised replacement cost of the RBP is $371,078,775 with an accuracy of +/- 30%.

2 Background

The Roma Brisbane Pipeline (‘RBP’) is a Covered Pipeline for the purposes of the National Third Party Access Code for Natural Gas Pipeline Systems (‘the Code’). An approved Access Arrangement, setting out terms for access to the RBP over the period to 29 July 2006, is in place.

To develop an Access Arrangement to apply to the RBP after 29 July 2006 a range of matters need to be addressed and approved in accordance with processes and requirements set out in the Code. In particular, as one of the inputs for determination of the Initial Capital Base the Depreciated Optimised Replacement Cost and, hence, the Optimised Replacement Cost (‘ORC’) of the RBP must be determined.

This document has been prepared to assist the Australian Competition and Consumer Commission (‘ACCC’) in its assessment of the ORC. In particular, this document provides an independent estimate of the ORC of the RBP.

3 Process for Determination of ORC

The ORC of a gas pipeline is a measure of the cost of replacing that pipeline in the most efficient (ie, optimal) way. To identify the cost-efficient assets that would (on the basis of current technologies) be necessary to provide services the same as those presently provided by the RBP, the approach adopted herein is as illustrated in Figure 1.

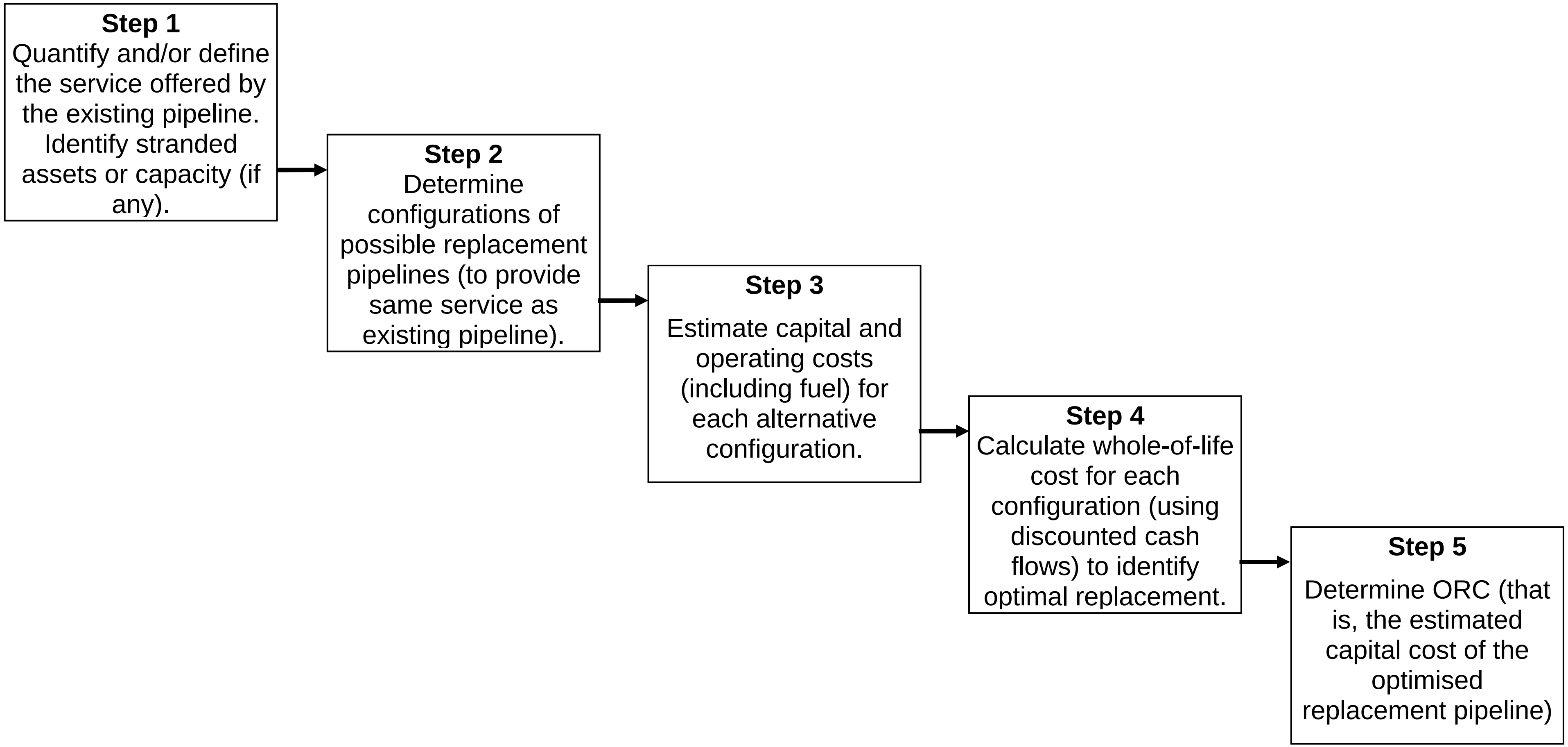
In preparing the ORC estimate:

- reliance has been placed upon gas transportation commitments (quantities and pressures) as advised to the ACCC by APT Petroleum Pipelines Limited (‘APTPPL’);

- pipeline construction costs have been estimated using Sleeman Consulting’s cost database with adjustments, where necessary, to take account of varying pipeline sizes or configurations; and

- operating and maintenance costs used in the optimisation process have been estimated on an industry indicative basis as a function of asset types and costs.

Figure 1: Process for Determination of Optimised Replacement Cost ('ORC') of the RBP



4 Service Presently Available in the RBP

The route of the RBP, showing the location of inlets, delivery points and existing compressor stations, is depicted in Figure 2. As the pipeline is presently configured, it has a nominal licenced capacity of 180 TJ/d[a]. Although the average throughput[b] of the RBP is less than its licenced capacity the pipeline is nonetheless well utilised. This is demonstrated by the throughput forecasts presented in Table 1.

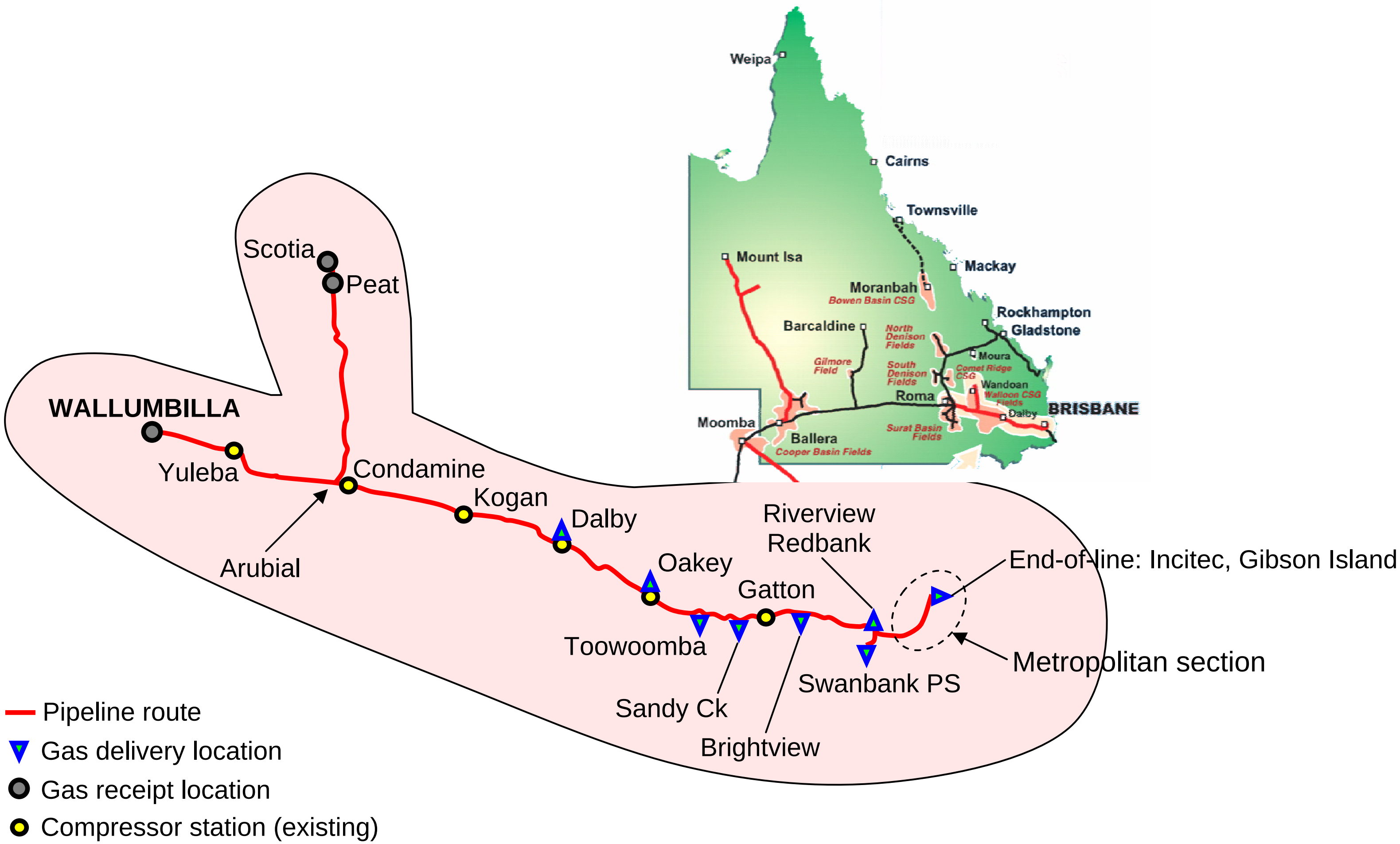
Table 1: Forecast Use of RBP Capacity[c]

Delivery Point	Location (km from Wallumbilla)	MDQ (TJ/d)	Predicted 2006 Load (TJ/d)
Dalby	214.1	confidential	
Oakey PS	266.0		
Oakey			
Toowoomba	298.4		
Sandy Creek	323.3		
Brightview	350.1		
Riverview	391.4		
Redbank	392.1		
Swanbank PS	392.1 + 8.7 km lateral		
'Metropolitan' offtakes			
Ellengrove	403.1	confidential	
Runcorn	420.0		
Mt Gravatt	421.1		
Tingalpa	435.0		
Murarrie	436.4		
BP Bulwer Is.			
Doboy	437.9		
Incitec (end-of-line)	438.4		
	Totals		

[a] Access Arrangement Information for Roma Brisbane Pipeline, 31 January 2006, page 1.
[b] The forecast throughput for 2005/06 (see page 23 of Access Arrangement Information for Roma Brisbane Pipeline, 31 January 2006) is 51.1 PJ (an average of 140 TJ/d) rising to 56.5 PJ in 2006/07 (an average of 155 TJ/d).
[c] Details confidential.

Figure 2: Location of RBP

(Derived from schematic provided by APTPPL)



The RBP is able to service the loads set out in Table 1 since:

a) the individual, maximum daily deliveries are not coincident or do not use the full length of the pipeline; and

b) a significant proportion of the contracted load of the RBP is for supply of gas on a cyclic basis to gas fired power stations. This allows gas to be packed into (ie, stored within) the RBP during periods of lower than average demand for subsequent withdrawal on a short-term basis at rates in excess of the reported steady state capacity of the pipeline.

APTPPL anticipates an expansion of the RBP will be necessary within the next 5 years[d].

APTPPL advises[e] that, to meet contractual obligations, gas must be available at pressures not less than those specified in Table 2.

Table 2: Minimum Gas Pressure Requirements
(Source: APTPPL)

Delivery Location	Minimum Pressure (MPa)
Upstream of Redbank	3.0
Swanbank PS	4.5
End-of-line	1.5

5 Possible Configurations of Replacement Pipelines

5.1 Modelling Approach

For the purpose of this report, to investigate pipeline configurations that could represent possible replacements for the existing, fully-looped and partially compressed RBP, steady-state pipeline modelling techniques have been employed. The modelling objective has been to replicate the licenced, steady-state capacity of the RBP on the basis that linepack variations will be used to allow daily and/or weekly fluctuations in pipeline throughput to be accommodated (in the same way that the RBP is presently operated to meet market requirements presented in section 4). Requirements in terms of peak (instantaneous) gas delivery rates and the ability of the pipeline to be used to store gas during off-peak periods have not been specifically addressed.

[d] Arrangement Information for Roma Brisbane Pipeline, 31 January 2006, page 4.
[e] Access Arrangement Information for Roma Brisbane Pipeline, 31 January 2006, page 25.

For modelling purposes, the RBP has been represented as shown in Figure 3. The following simplifying assumptions, all of which are conservative[f], have been made for modelling purposes.

a) Since markets that are supplied from the RBP upstream of Redbank are typically[g] modest in size and their relationship with major loads (in terms of timing of peak demands) is unknown, they have been aggregated with downstream (metropolitan) loads for modelling purposes. This approach is conservative since its leads to modelled pipeline operating requirements being more onerous than actual operating requirements.

b) All loads other than Swanbank, Redbank and Riverview have been assumed to be collocated at the end of the pipeline. This approach is particularly conservative for the reason set out above.

c) The requisite length[h] of hypothetical pipeline to replace the RBP is estimated to be 454 km, which is around 4% longer than the present length of the RBP. The increased length reflects a requirement for metropolitan re-routing of a hypothetical replacement pipeline to avoid areas of urban development and provides also for a probable need for re-routing through areas such as Ipswich and Toowoomba. The preferred route of the optimised replacement pipeline in the Brisbane metropolitan area, as depicted in Attachment 2, has been identified on a desk-top basis with complementary field inspections carried out to confirm the viability of the preferred route.

d) A minimum steady-state pipeline throughput of 180 TJ/d has been assumed, reflecting the licenced capacity of the RBP. Two modelling scenarios, as presented in Table 3, have been developed to reflect possible different operating conditions depending upon Swanbank power station requirements.

Table 3: Modelling Scenarios

Load	Scenario 1	Scenario 2
Swanbank PS	confidential	
Redbank locality		
End of line		

[f] Conservative is used in the context that any bias introduced as a result of the assumptions will be toward larger pipelines.
[g] Although the Oakey power station has a maximum demand of [confidential] TJ/d its average gas usage is only [confidential] TJ/d. This is because the power station operates on a peaking basis for short periods of time only and is able to use distillate in the event gas is not available.
[h] Measured from Wallumbilla to Gibson Island (end-of-line) and exclusive of the Peat, Swanbank and other laterals.

e) It has been assumed that gas will be received from Scotia and Woodroyd at a rate of [confidential] TJ/d, reflecting APTPPL forecasts for 2006. The rate at which gas is received at Wallumbilla is therefore assumed to be [confidential] TJ/d.

Other technical assumptions adopted for modelling purposes are set out in Table 4.

Table 4: Modelling Assumptions

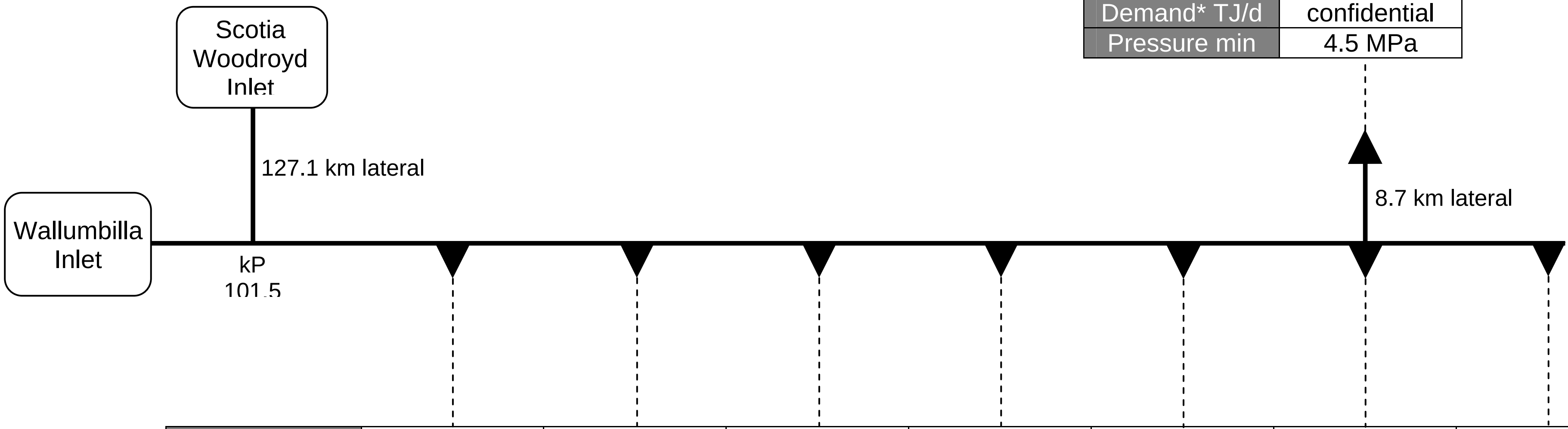
Item	Assumption
Elevations (ASL)	Wallumbilla: 300 m Toowoomba: 600 m Redbank / Swanbank: 27 m Brisbane: 5 m
Gas specification	HHV: 37.4 MJ/m^3 Specific Gravity: 0.562
Pipeline roughness	7 microns

The gas specification presented in Table 4 is based upon coal seam gas and is therefore conservative[i]. The heating value and specific gravity of gas from conventional sources or gas that may be delivered from the PNG project are both higher than the tabulated values. To the extent that gas from such sources is transported, pipeline performance will exceed modelled performance.

[i] Not all of the gas to be transported will be coal seam gas. Gas from conventional sources, or from the PNG Project, will also be transported (leading to improved pipeline performance).

Figure 3: Representation of RBP Used for Modelling Purposes

Load	Swanbank
kP#	214.1
Demand* TJ/d	confidential
Pressure min	4.5 MPa



Load	Dalby	Oakey	Toowoomba	Sandy Ck	Brightview	Redbank	End of line
kP#	214.1	266.0	298.4	323.3	350.1	392.1	453.5
Demand* TJ/d	-	-	-	-	-	confidential	
Pressure min	-	-	-	-	-	4.5 MPa	1.5 MPa

kilometre points (kP's) are measured from Wallumbilla
* This is the peak demand to be used for pipeline sizing
Pipeline offtakes are represented thus: ▼

5.2 Use of discounted, whole-of-life costs

The gas transportation requirements set out in section 3 can be satisfied with a number of different pipeline configurations (that is, diameters, operating pressures and compression arrangements). To determine which of the alternative configurations is optimal, the indicative capital and operating costs of the alternative configurations have been estimated and the present value of the costs compared.

5.3 Modelling Results – Pipeline Sizing

Key options for sizing of the various sections of the RBP are as follows.

a) Metropolitan Section

For this investigation the metropolitan section of the RBP is considered to be the section of the pipeline that is downstream of Redbank (where the lateral to the Swanbank power station commences).

An operating pressure of 5.0 MPa (corresponding with class 300 design) for the metropolitan section is well matched with upstream pipeline pressures[j] and is considered appropriate for adoption. To meet the gas delivery requirement set out in Tables 2 and 3, a pipeline nominal diameter of 400 mm (16") is necessary. Since the metropolitan section of the pipeline traverses or is close to built-up areas, its design wall thickness must be increased to achieve an acceptable level of puncture resistance and to ensure the hoop stress in the pipewall does not exceed 30% of the maximum yield stress of the pipeline steel when the pipeline is operating at its maximum pressure. A pipeline wall thickness of 10 mm is appropriate for the metropolitan section.

If the operating pressure for the metropolitan section is constrained to a level below about 4.5 MPa, a 450 mm (18") pipeline would be required and the cost of the pipeline would be increased with little[k], if any, ongoing technical or safety[l] related benefits.

b) Swanbank Lateral

The requisite diameter of the pipeline lateral from Redbank to Swanbank is dependent upon the gas pressure available at Redbank which, in turn, is dependent upon the configuration

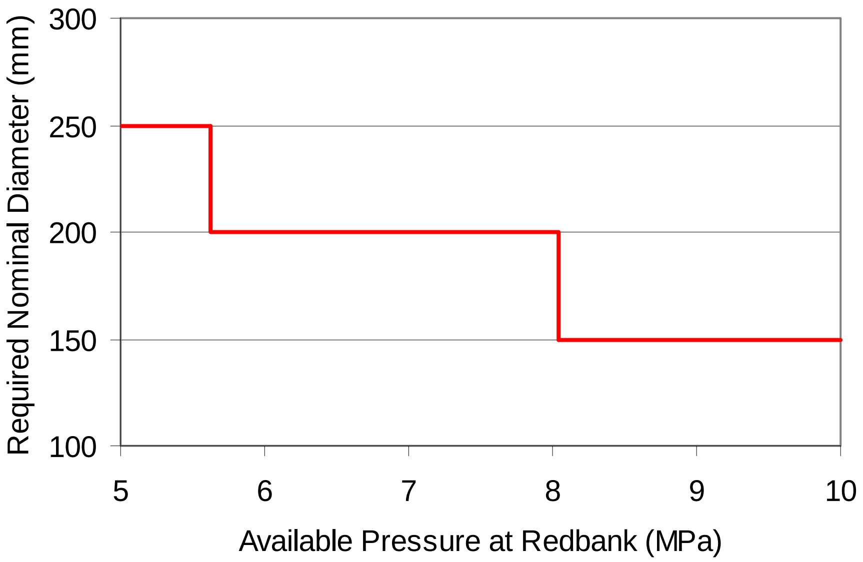
[j] This is evident in Figure 6, later in this report.

[k] There could be some reduction in the cost of operating gas heaters during periods of high pipeline pressure and/or low ambient temperature.

[l] Safety related matters are addressed through use of the proposed increased wall thickness of the metropolitan section.

selected for upstream infrastructure. Sizing options that are capable of meeting contract commitments are indicatively as depicted in Figure 4.

Figure 4: Sizing of Swanbank Lateral



c) Arubial to Redbank

Practical options for the RBP mainline from Arubial to Redbank include pipelines of nominal diameter 350 mm, 400 mm and 450 mm. In addition, the use of a 500 mm and 600mm nominal diameter pipelines (which do not require installation of inlet compression to raise pressures from those presently available) has been investigated. Relevant pipeline configuration options are as summarised in Table 5.

Table 5: Mainline Configuration Options

Option	Diameter	MAOP[m]	Compression
1	350 mm	10.2 MPa	Inlet + 3 Intermediate
2		12.5 MPa	Inlet + 2 Intermediate
3		15.3 MPa	Inlet + 1 Intermediate
4	400 mm	10.2 MPa	Inlet + 1 Intermediate
5		12.5 MPa (or more)	Inlet only
6	450 mm	10.2 MPa (or more)	Inlet only
7	500 mm	~ 7.0 MPa	1 Intermediate
8	600 mm		None

[m] Maximum Allowable Operating Pressure

Each of the tabulated configuration options is capable of delivering not less than 180 TJ/d of gas from Arubial to Redbank at pressures that satisfy downstream requirements.

d) Wallumbilla to Arubial and Scotia to Arubial

On the basis that gas is received at the rates set out in section 4.1, the requisite sizes of pipelines from Wallumbilla to Arubial and from Scotia to Arubial are dependent upon the pressure at which gas is received into the pipelines and the pressure at which gas must be available at Arubial to meet downstream requirements. Inlet gas compression is required in all but scenarios 7 and 8 since the pressure at which gas is presently received from producers is below that required for efficient pipeline sizing and operation.

For the options set out in Table 5, the required nominal diameters of pipelines from Wallumbilla or Peat to Arubial are as set out in Table 6.

Table 6: Pipeline Diameters Upstream of Arubial

Scenario	From Wallumbilla	From Peat
1	350 mm	200 mm
2	300 mm	
3	350 mm	
4	400 mm	
5	350 mm	
6	400 mm	
7 & 8	450 mm	250 mm

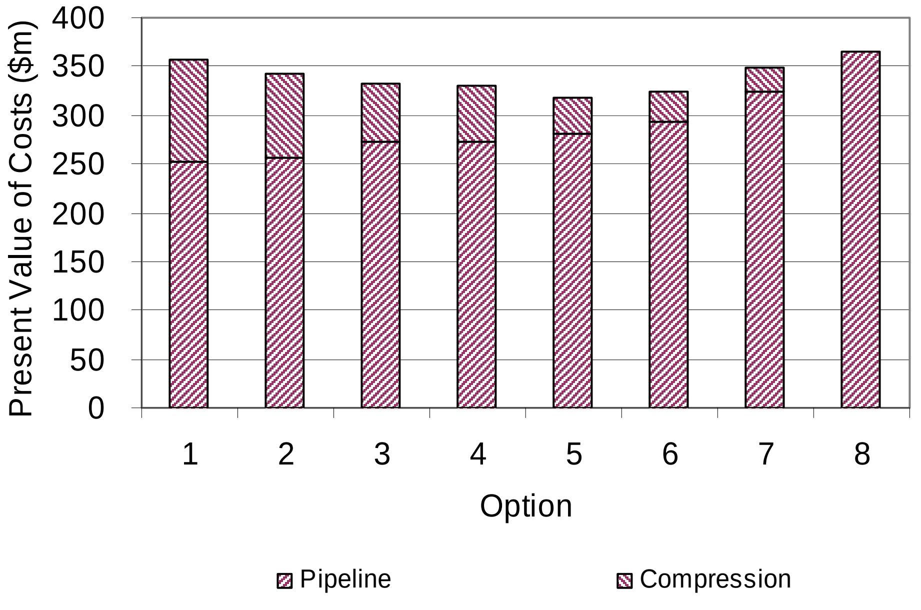
6 Cost Comparison and Selection of Optimised Replacement

The present values of the capital and operating costs of each of the practical pipeline configurations are presented in Figures 5(a), (b) and (c). Present values have been calculated on the following basis:

- 25 operating years (with construction taking place in year 0):
- A real discount rate of 2.6%, which reflects the present real risk free interest rate[n]; and
- The pipeline having no residual value at the end of the analysis period. This is because, at the end of the life of a gas pipeline, the costs pipeline abandonment, removal of above ground facilities and restoration of land would offset the scrap value of material and/or land that might be saleable.

Figure 5(a) illustrates the relativity between the capital costs[o] of the alternative replacement pipeline options. Moving from left to right in the Figure, as pipeline diameter is increased the reduced need for compression leads to initial reductions in capital cost. Subsequently, for pipelines with little or no compression, the cost of larger diameter pipeline and fittings leads to increases in capital cost.

Figure 5a: Capital Costs of Alternative Replacement Pipelines



[n] The value for the real risk free rate was advised by the ACCC.
[o] The capital costs set out in Figure 5a do not include provision for unidentified costs or for interest during construction.

Figure 5(b) shows the present values of the operating, maintenance and compressor fuel costs of the alternative replacement pipeline options. The declining costs reflect savings associated with the use of smaller compression (or, for option 8, no compression). For pipeline diameters larger than those included in Figure 5(b) the present value of operations and maintenance costs will rise slowly, reflecting increased costs of maintaining larger pipeline facilities in the absence of any further compression related operating and maintenance cost savings.

Compressor fuel gas has been assigned a value of $3.00/GJ for the purpose of cost analyses. Although it is understood sales of gas may have been completed at prices lower than this on a wholesale basis, the assumed figure is considered to be a fair reflection of the present market value of gas.

Figure 5b: PV of O&M of Alternative Replacement Pipelines

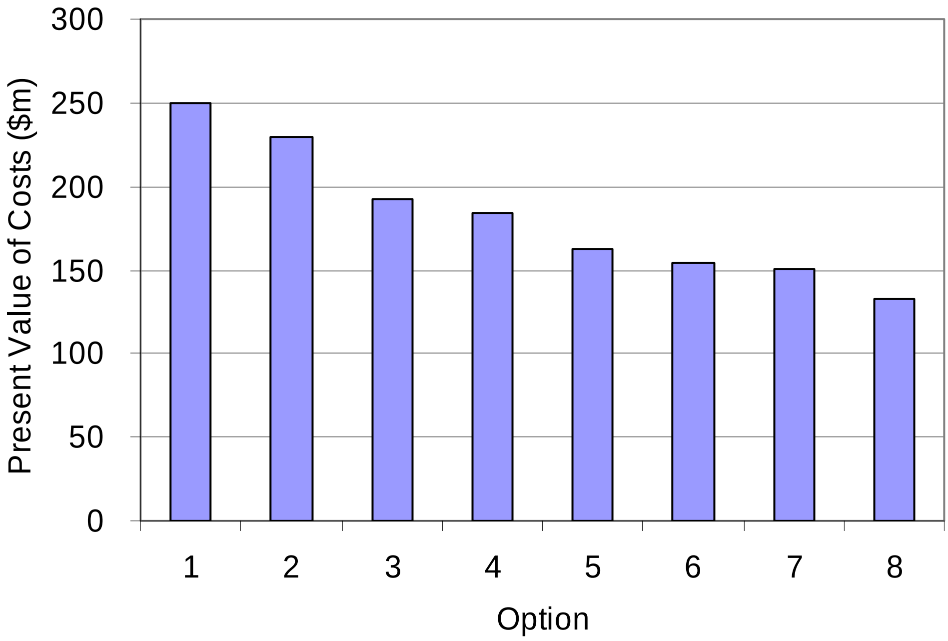


Figure 5(c) shows the aggregate costs (ie, capital cost plus the present value of operations, maintenance and compressor fuel costs) for each of the alternative replacement pipeline scenarios. It is evident that:

- the economics of smaller diameter pipelines (options 1 to 4) suffer in that they require the installation of excessive amounts of intermediate compression capacity: and
- larger diameter pipelines (options 7 and 8) would necessitate significant pipeline investment without offsetting reductions in ongoing costs of operations and maintenance.

Figure 5c: PV of Total Costs of Alternative Replacement Pipelines

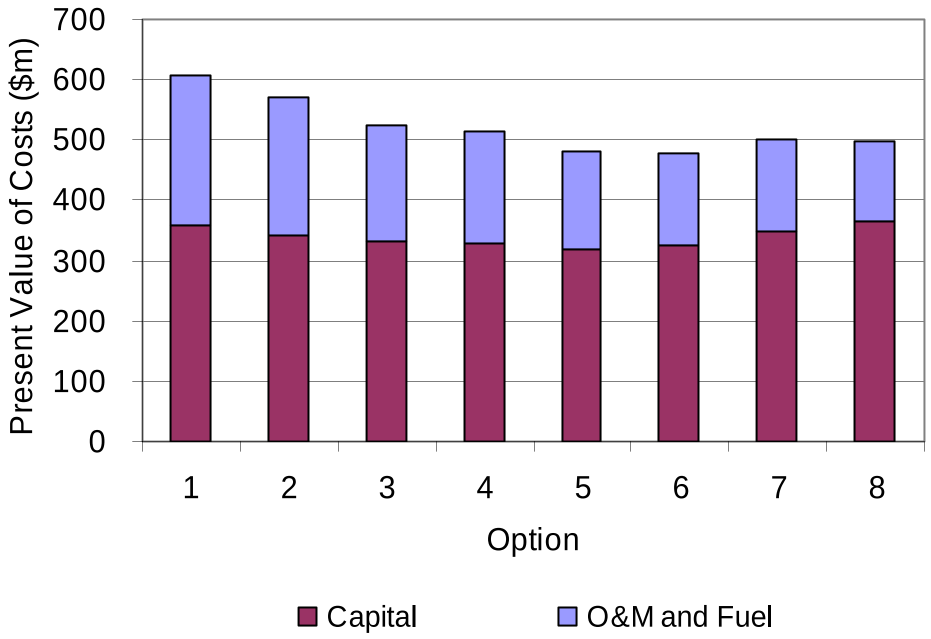


Figure 5(c) demonstrates that, in total cost terms, there is little differentiation between options 5 and 6. Given the conservative nature of the analyses undertaken for the purpose of this report (as outlined in section 5.1) and since option 5 has a lower initial cost than option 6[p], option 5 is considered to be the optimal pipeline configuration to provide a steady state 180 TJ/d service.

Within the limits of accuracy applicable to data used in this report, the relativities between the costs of alternative options are unaltered[q] for variations in the discount rate or for variations in the analysis period although:

- lower discount rates or longer analysis periods have a favourable impact upon option 6 relative to option 5 (in view of the lower ongoing costs of option 6); and

- higher discount rates or shorter analysis periods have a favourable impact upon option 5.

The key features of option 5, the optimised replacement configuration, are outlined in Table 7. For the pipeline section from Peat to Arubial the selected pipeline wall thickness (4.8 mm) has been increased from that required for pressure design purposes (4.0 mm) to allow for improved

[p] The capital cost of option 5 is estimated in detail in section 7. For comparative purposes, the capital cost of option 6 has also bee estimated. On the basis of the detailed estimates, the capital cost of option 6 is $10.4m higher than the cost of option 5.
[q] This has been confirmed through sensitivity analyses carried out using discount rates from 0% to 8% and for an analysis periods ranging from 20 to 50 years.

constructability and impact resistance. Although this would allow the use of X60 rather than X70 steel, it has been conservatively assumed that the steel grade will be unchanged.

It has also been conservatively assumed that the Redbank to Swanbank lateral will be unchanged from its present length of 8.7 km. In practice, in developing a new pipeline to replace the RBP the opportunity might exist, through minor re-routing of the pipeline in the Ipswich locality, to considerably reduce the length of the Swanbank lateral.

Table 7: Description of Optimised Replacement

Pipeline Specification, API 5L X70			
Pipeline Section	Nominal Diameter	Operating Pressure	Typ. Wall Thickness
Wallumbilla to Arubial	350 mm	12.5 MPa	6.4 mm
Peat to Arubial	200 mm		4.8 mm
Arubial to Redbank	400 mm		7.6 mm
Redbank to Swanbank (lateral)	250 mm		5.2 mm
Redbank to Gibson Island	400 mm	5.0 MPa	10.0 mm
Installed Compression			
Location	Power Required	Assumed Power Installed	
Wallumbilla	3,925 kW	2 x 4,570 kW Centaur 50	
Peat	635 kW	2 sites, each with 850 kW reciprocating compression	

The pressure profile of the optimised replacement pipeline, when transporting 180 TJ/d with maximum flows to the end-of-line, is depicted in Figure 6.

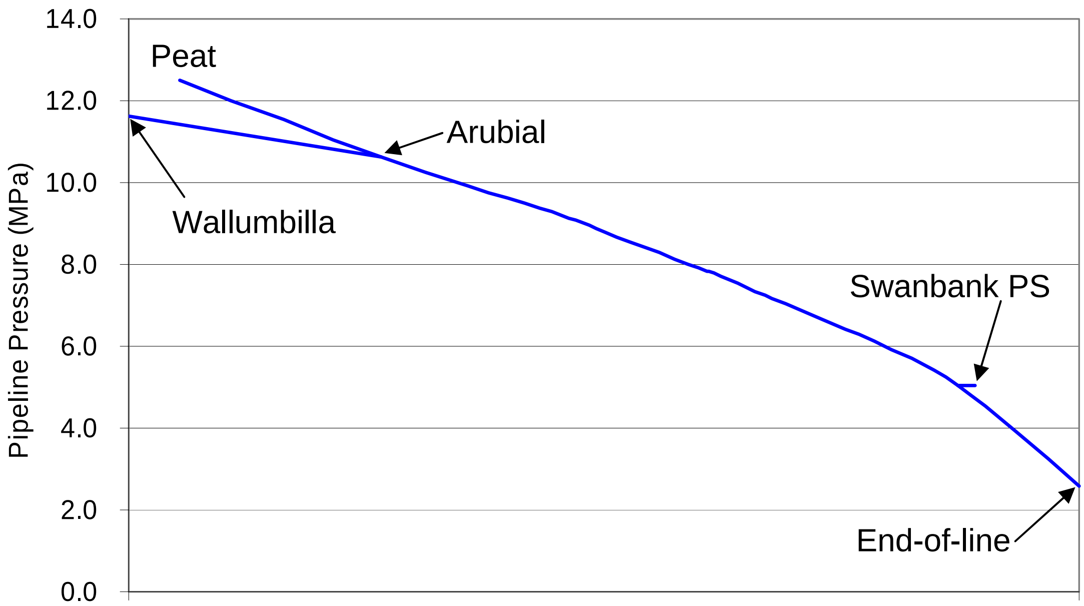
When analysed on a steady-state basis the optimised replacement pipeline has some limited spare capacity. That is, it could deliver marginally in excess of 180 TJ/d whilst still achieving an end-of-line gas delivery pressure of at least 1.5 MPa.

In comparison, if analysed on a dynamic basis, taking into account variations in gas flow rates, it would be determined that that optimised replacement pipeline could for short periods of time deliver gas a rates considerably in excess of 180 TJ/d. This is because:

- during periods of lower than average flow, the quantity of gas (or 'linepack') contained within the optimised replacement pipeline could be increased. Associated with this would be an increase in average pipeline pressure; and

- linepack built up during periods of low flow can be subsequently drawn-down to facilitate delivery of gas at rates in excess of 180 TJ/d.

Figure 6: Pressure Profile of Optimised Replacement



7 Optimised Replacement Cost

The estimated capital cost of the optimised replacement pipeline (ie, the optimised replacement cost) is $371,078,775 calculated as set out in Attachment 1. The estimate is based upon industry indicative costs, scaled as necessary, and takes into account the following factors:

- Provision has been allowed for use of heavy wall pipe along 10% of the mainline route (eg, for creek or road crossings). Provision has also been allowed for purchase of 2.5% more pipe than the overall estimated pipeline length (to provide for cut-outs and spares);

- Provision has been made for short lateral pipelines to interconnect the optimised replacement pipeline with existing gas delivery points. The lateral pipelines are required since (as noted in section 4.1) the route of the optimised pipeline deviates from that of the existing RBP. The following allowances have been made for gas laterals:

    - Runcorn: 2.6 km of 200 mm diameter pipeline;

    - Redbank and Mt Gravatt: total 6.0 km of 150 mm diameter pipeline.

  Provision has also been made, as part of the mainline construction cost, for an 8.7 km lateral to supply gas to the Swanbank power station.

- Provision has been made for the cost of road, rail, creek and service crossings, including the use of horizontal directional drilling where necessary. Estimates of the number of crossings have been made on the basis of desk-top investigations. The costs of restoring fences and gates are included as part of construction restoration costs.

- Accommodation costs have been based upon 15,000 mandays being required during the construction period. Although the option would arguably exist to accommodate the pipeline construction workforce in existing premises, to do so would require personnel to be somewhat dispersed and would, in any case, be unlikely to result in lower cost. It is logistically preferable for the workforce to be collocated and, therefore, accommodation costs have been based upon the use of special purpose construction camp. In order to optimise daily travel requirements, it is necessary to allow for one relocation of the camp during the pipeline construction period.

- It is estimated, on the basis of geological information presented in Attachment 3, that:

    - up to 10% of the pipeline route will pass through terrain that necessitates drilling, blasting and excavation;

    - 45% of the pipeline route will require the use of a rock trencher; and

  - the remaining 45% of the pipeline route will be suitable for bucket wheel trenching.

- Burial of the pipeline at a minimum depth of 750 mm is assumed. The cover will be increased to at least 1,200 mm at road and creek crossings, and to 2,000 mm at rail crossings. In populated areas it is anticipated a minimum depth of cover of up to 1,200 will be appropriate.

- Provision has been made for APTPPL owned gas delivery facilities at Oakey, Toowoomba, Sandy Creek, Brightview and Redbank and for remote operated valves at all other gas receipt or delivery locations. The gas delivery facilities have capacities ranging from 2 TJ/d to 6 TJ/d.

  A pressure control facility (referred to as Swanbank city gate) is also required at Redbank to regulate the pressure of gas delivered into the metropolitan pipeline section. The pressure regulation facility will include gas filtration and heating.

  The optimised pipeline configuration does not require the installation of pressure reduction or control facilities at Arubial.

- Linepack required for operations of the RBP will, for steady state operations as depicted in Figure 6, be around 6.1 million cubic metres with a value of around $684,000 (based upon the assumed heating value of 37.4 J/ m^3 and a gas price of $3.00/GJ).

  It is understood[r] that APTPPL will provide a portion of the requisite linepack to a value of $180,000 with the balance to be provided by users of the RBP.

- Provision has been made for interest incurred during construction of the optimised replacement pipeline. The interest amount has been calculated on the basis of:

  - a nominal, pre-tax cost of capital of 10.0%[s]; and

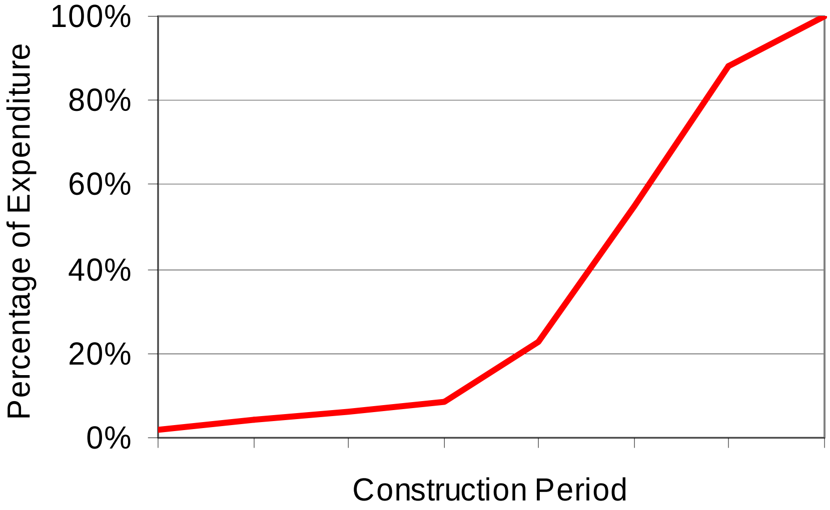
  - an estimated profile for expenditure of pipeline capital costs, as depicted in Figure 7.

- No provision has been made for GST since such amounts would, in any case, be refunded to a pipeline developer.

[r] "Access Arrangement Information for Roma Brisbane Pipeline", 31 January 2006, Page 6, footnote 5

[s] The value for the pre-tax nominal interest rate was advised by the ACCC.

Figure 7: Expenditure Profile



The estimated optimised replacement cost is considered to have an accuracy of +/- 30%.

Attachment 1

Optimised Replacement Cost

Item	Quantity	Unit cost	Cost
Coated Linepipe, delivered			
168.3 mm X70 3.2 mm WT	6.0 km	$35/m	$210,000
219.1 mm X70 4.8 mm WT	133.0 km	$63/m	$8,379,000
273.1 mm X70 5.2 mm WT	8.9 km	$84/m	$749,070
355.6 mm X70 6.4 mm WT	93.6 km	$130/m	$12,168,000
355.6 mm X70 7.8 mm WT	10.4 km	$153/m	$1,591,200
406.4 mm X70 10.0 mm WT	62.9 km	$218/m	$13,719,830
406.4 mm X70 7.6 mm WT	268.0 km	$172/m	$46,096,000
406.4 mm X70 9.3 mm WT	30.0 km	$205/m	$6,150,000
Subtotal Linepipe	*612.9 km*		*$89,063,100*
Construction			
nominal 150 mm	6.0 km	$98/m	$588,000
nominal 200 mm	129.7 km	$118/m	$15,239,750
nominal 250 mm	8.7 km	$136/m	$1,178,850
nominal 350 mm	101.5 km	$167/m	$16,975,875
nominal 400 mm	352.0 km	$186/m	$65,560,000
Trench breakers	250	$915 ea	$228,750
Road, rail, creek, river and other service crossings			$18,608,400
Commissioning	600 km	$1,000/km	$600,000
Signage	600 km	$1,500/km	$900,000
Subtotal Construction	*597.9 km*		*$119,879,625*
Main Line Valves			
nominal 200 mm cl 600	1 off	$164,000	$164,000
nominal 350 mm cl 600	1 off	$236,000	$236,000
nominal 400 mm cl 600	4 off	$261,000	$1,044,000
nominal 400 mm cl 300	3 off	$235,000	$705,000
Subtotal MLV's			*$2,149,000*
Receipt, Delivery and Related Facilities			
Actuated valves	20 off	$81,000	$1,620,000
Delivery facilities	5 off	$700,000	$3,500,000
Redbank pressure regulation	1 off	$2,000,000	$2,000,000
Subtotal Facilities			*$7,120,000*

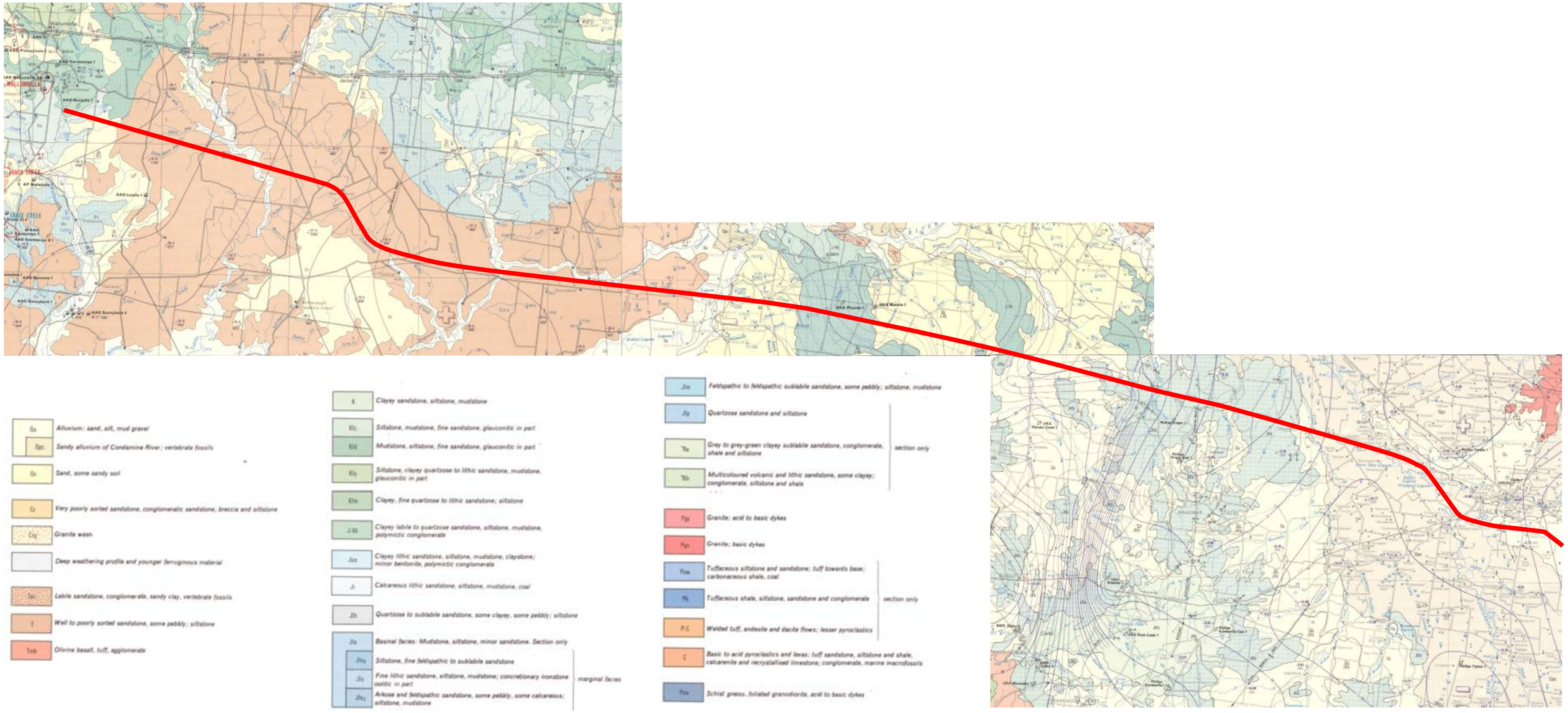
table continued on next page………

Scraper Stations (Inlet or Outlet)				
Nom 200 mm	2 off	$232,221	$464,441	
Nom 250 mm	2 off	$283,008	$566,017	
Nom 350 mm	2 off	$335,000	$670,000	
Nom 400 mm	6 off	$359,598	$2,157,587	
Subtotal Scrapers				*$3,858,044*
SCADA and Communications				
Provision				*$4,000,000*
Compressor Stations				
Wallumbilla	2 x Solar Centaur 50		$25,928,701	
Peat	2 x Reciprocating		$8,470,000	
Subtotal Compressors				*$34,398,701*
Camps				
Camp mob-relocate-demob cost provision			$3,030,000	
Accommodation mandays	150,000	$85/manday	$12,750,000	
Subtotal				*$15,780,000*
Equipment mobilisation and demobilisation				
Allowance				*$5,000,000*
Project Costs				
Approvals (inc. Environmental and Compliance)			$6,000,000	
Land Access and Management	600 km	$15,000/km	$9,000,000	
Geotechnical	600 km	$600/km	$360,000	
Surveying	600 km	$2,500/km	$1,500,000	
Office/workshop			$1,700,000	
Linepack		APTPPL Share	$180,000	
Subtotal				*$18,740,000*
Cumulative costs			*$299,988,470*	
Project Costs				
Engineering and Project Management		7.50%	$22,485,635	
Owner's Costs (commercial, legal, etc)		2.00%	$5,996,169	
Provision for unspecified items		7.04%	$20,901,837	
Subtotal				*$49,383,642*
Interest During Construction				
Calculated at 10% nominal pre-tax				*$21,706,663*
Optimised Replacement Cost				**$371,078,775**

Attachment 2: Preferred Metropolitan Pipeline Route to Avoid Heavy Urban Development

Existing pipeline route (indicative) Proposed metropolitan deviation

Attachment 3, Part 1: Indicative Pipeline Route Wallumbilla to Dalby



Attachment 3, Part 2: Indicative Pipeline Route Dalby to Brisbane