# Potential to promote competition in sewerage markets

*Advice prepared by Marsden Jacob Associates*
*for Services Sydney*

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Associates

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# 1. Introduction

1. Services Sydney has requested advice from Marsden Jacob Associates (MJA) in relation to issues arising primarily in relation to the first of the six declaration criteria which must be satisfied in the National Competition Council (NCC) consideration and decision on the application by Services Sydney for access to Sydney Water's sewerage network.

2. This criteria relates to the promotion of competition. A key issue here is whether a separate market for collection and treatment and for transportation of sewage can be delineated. First, are the assets distinct and separable? Sydney Water agrees that they can be; and second, can the market be economically separated? Sydney Water maintains the markets cannot be separated, primarily because of perceived difficulties in establishing meaningful prices and therefore meaningful competition as a result of the blending of heterogeneous volumes and loads during the transportation of sewage.

3. Services Sydney has therefore requested economic advice on the second part of this test. In providing this advice we have sought to address the following:

   (i) clarification of the separate functions currently undertaken by Sydney Water on an integrated basis, but separable on the basis of experience elsewhere;

   (ii) the contention that the heterogeneity of the product and the blending during transportation makes it impossible to establish a market, and in particular meaningful efficient prices, for the service of collecting and treating wastewater and the declared service of transportation;

   (iii) a hypothetical specification of market arrangements and pricing mechanisms. There are several options here. A particular issue to be dealt with in the market arrangements is the agreed need by all parties to directly address the heterogeneity/blending issue, thus preventing inappropriate 'cherry picking'[1]; and

   (iv) the contention that the Services Sydney proposal to compete in the dependent market of combined collection and treatment will provide no net benefits in terms of the promotion of competition over and above those achievable under the existing IPART arrangements for sewer mining.

[1] We note that winning customers away from an encumbent because the entrant can supply their services at a lower cost than the costs of the encumbent is not cherry picking or price arbitrage. Rather the ability to achieve lower costs and, therefore, prices and to improve is the process of efficient.

4. In addressing these specific issues MJA has had regard to the Guide prepared by the National Competition Council (NCC) on Part IIIA of the *Trade Practices Act* as to the matters and tests which need to be included in the consideration of Criterion (a) of s 44G (2)(a) of the *Trade Practices Act*.

# 2. Separability of functions

## 2.1. Introduction

5. The question of whether it is economic to separate functions within the sewerage network is central to both Services Sydney's application, and Sydney Water's objection to the application for access to Sydney Water's transportation network. It is therefore appropriate to review briefly the extent to which separability has occurred in the water and waste water industries and in the other network industries, such as gas and electricity.

## 2.2. Market segments

6. Sewerage systems are inherently simple systems.[2] Sewage is collected, transported and treated before disposal/return of the effluent and solids.

7. The distinct and separate nature of three prime functions (collection/transport/treatment) can be observed in numerous examples.

   (i) Early sewerage systems, including London, Paris and indeed Sydney, encompassed collection and transport with (little or) no treatment.

   (ii) In modern sewerage systems treatment is highly advanced and frequently provided by specialist entities (such as Thames Water or United Water) under Build Own Operate Transfer (BOOT) and/or similar long-term contracts. Wastewater Treatment Plants (WWTP) under BOOT and Public Private Partnership (PPP) arrangements are now common in the United Kingdom, Australia, South East Asia and, under the aegis of the World Bank, many developing countries.

   (iii) On a smaller scale, sewerage treatment plants (sometimes under separate ownership and operation) are beginning to be attached to the transportation systems to "*mine the sewer*".

   As noted in Sydney Water's submission to the NCC, provision for sewer mining is already in place in Sydney.

8. These three examples illustrate that sewerage treatment is not only potentially separable from the functions of collection and transport, but that this separation is observable in practice. Moreover, the now widespread use of BOOT arrangements worldwide illustrates that there is a market for the provision of waste water treatment by separate owners and operators.

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[2] Metering of the system itself is often no more than a meter at the entrance and exit of each wastewater treatment plant. Apart from the direct metering and sampling of a relatively few large tradewaste customers, the vast majority of customers are merely categorised. We understand that this description applies to the sewerage network of Sydney Water.

9. There are also close at hand examples of the separation of the functions of collection from the functions of transport and treatment.

   i) In Auckland, WaterCare Services Limited (WSL) provides transportation and treatment for sewage collected by four Local Network Operators (LNOs). The LNOs are separately owned and operated from each other and from WaterCare. In the case of three LNOs, the operating entity is owned by the respective town or local government. In the fourth case, the LNO is a specialist private company operating under a long-term contract.[3]

   ii) In Melbourne, the collection function is also legally and operationally separated from the functions of transport and treatment. In Melbourne, three separate retail water companies (Yarra Valley "Water, South-East Water and City West Water) collect the sewage which is then transported and treated by Melbourne Water.

10. This second pair of examples illustrates that the collection function is not only potentially separable from the functions of transport and treatment, but that such separation occurs in practice and on commercial terms. [4]

11. When combined, these two sets of examples illustrate that the functions of collection, transport and treatment of sewage are each separable one from another and under commercial arrangements which satisfy the requirements of health, environmental and other regulatory authorities.

12. We therefore find misleading Sydney Water's statement that:

> *Sydney Water has not discovered any waste water system which has divided functionally between collection and transportation…*
>
> Its validity depends on the final qualification *"… in the way proposed by Services Sydney."*

13. Sydney Water (Sub., p. 28) asserts that:

> *…retail competition in the water sector has not previously been contemplated in Australia …*

[3] Within the Auckland region, four Local Network Operators (Metro Water Limited, United Water International Pty Ltd., Manukau City Council and Waitakere City Council) provide wastewater collection services to domestic and commercial customers. These collection systems then connect to the bulk wastewater system operated by Watercare Services Limited (WSL) for ultimate treatment and disposal.

[4] Marsden Jacob Associates (2003), *Auckland Local Network Operators : Wastewater Tariff Structure*, June.

14. This is factually incorrect since the NCC itself has previously commissioned and published a specific report on this issue.[5] We are also aware that retail competition has been so contemplated in the course of relevant National Competition Policy (NCP) reviews.[6]

15. The potential to separate the three major functions of a sewerage system and the increasing number of practical examples of such separations should not be a surprise. This is so because essentially the same functions can be distinguished in other utility services including electricity, gas and potable water where the separation of functions is more advanced or complete.

| Electricity | Gas | Water | Sewerage |
|---|---|---|---|
| Generation | Supply / Treatment | Supply / Treatment | Treatment / Disposal |
| Transmission | Transmission | Transmission | Transportation / Reticulation |
| Distribution / Reticulation | Distribution / Reticulation | Reticulation | |
| Retail | Retail | Retail | Retail collection |

16. In all four types of network systems:

    a) the generation / treatment function can − as we have noted above − be undertaken by different and independently owned and operated entities;

    b) the transmission / transportation function is inherently a natural monopoly since the infrastructure is uneconomic to duplicate. For this reason, the transmission / transportation is almost universally retained in public ownership or declared for common carriage; and

    c) the reticulation and the retail collection functions can be undertaken by separate entities − again as noted in examples cited above.

17. We can also note that:

    a) the electricity and gas sectors are now operated as competitive markets wherever possible and economic to do so. Thus in Australia we can observe the National Electricity Market (NEM) and wholesale and retail contestability for electricity. In the gas sector we observe competitive supply to cities and major customers from gas producers;

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5 Tasman Asia Pacific, (1997) *Third Party Access in the Water Industry, An assessment of the extent to which services provided by water facilities meet the criteria for declaration of access*, Report prepared for the National Competition Council, June.

6 See or example, Marsden Jacob Associates (1999), *NCP Review of Victorian Water Legislation Act*, scoping paper prepared for the Department of Natural Resources and Environment, Victoria. See also Marsden Jacob Associates (2001), National Competition Policy, *Review of Water Legislation*, June, report prepared for Department of Natural Resources and Environment, Victoria.

b) in England and Wales, competition in the supply of potable water can be observed in an increasing number of instances and all English and Welsh water companies have now developed and published their own access codes under the direction and guidance of Ofwat.

18. According to Ofwat[7],

> *The guidance refers only to common carriage of water. Much of it would also apply to common carriage of wastewater…*
>
> *If companies are approached for common carriage for sewerage they must treat it in the same way as an application for water common carriage."*

19. The fact that functionally separable markets can be readily observed in both the water and sewerage sectors (and that counterpart separations are similarly observable in electricity and gas), indicates that such separations can be economic and points to a now considerable body of experience in dealing with the necessary commercial and regulatory interfaces.

20. Nonetheless, Sydney Water has advanced an "in principle" argument as to why the market is not separable, and why separating the retail segment could not possibly provide economic benefits. This argument is based on its contention that:

(i) heterogeneous waste loads are input into the transport network;

(ii) upon entering the transportation network, the waste is blended into an "average" load of waste;

(iii) it is not possible for a supplier to extract for treatment the same actual waste from its contracted customer(s) since the transport system delivers only a "blended load"; and, therefore,

(iv) it is not possible for competing suppliers to establish prices commensurate with the waste that their customers discharge into the system; and, hence,

(v) prices in the market would be meaningless and result in inefficient price arbitrages. That is, Sydney Water also contend that there would be price arbitrage or cherry picking incentives, if the retail market were opened up to competition, as suppliers could target customers with "difficult to treat" waste and then charge according to the cost of treating the average load of waste that is extracted from the transport network.

21. We do not disagree with Sydney Water's first three assessments. But we find Sydney Water to be incorrect on the fourth point. Since the fifth point follows from the fourth, we focus below on the fourth point.

[7] Ofwat (2002), *Access Codes for Common Carriage, Guidance,* March.

# 3. Establishing a retail collection market

## 3.1. Introduction

22. Sydney Water contends that there is no capacity to establish a retail collection market because it is not possible to establish a price for sewage transportation services so as to determine an appropriate pricing framework for the contracted services of collection and treatment given the blending of waste which occurs in a common transport network. Sydney Water contend that it is only possible to establish "average" prices for sewage collection and treatment because the load contained within the network is an "average" load of waste.

23. Under the scenario suggested by Sydney Water, a new entrant could target customers with "difficult to treat" waste, who would then be charged the average price only with the result that a competitor supplier would not bear the full cost of supplying such customers and therefore would be cross subsidised by Sydney Water. (Sydney Water refers to this phenomena both as a "price arbitrage" opportunity and as a "cherry picking" problem.)

24. Sydney Water (Sub., p. 24) contends that this pricing/cherry-picking issue is the central reason why it is important not to vertically separate the market:

> *Services Sydney has not addressed this issue, yet it goes to the heart of the contention that a dependent market exists separate from any primary market. If an economically meaningful price cannot be set, or cannot be set at a level at which the benefits arising from doing so exceed the costs, then the rationale for breaking a vertically integrated chain does not exist.*

25. However, neither the scenario suggested by Sydney Water, nor the consequences are inevitabilities: no such price arbitrage can arise provided it can be ensured that each supplier of collection and treatment services has an obligation to treat sewage that corresponds with the waste volumes and loads of its customers that is collected and then transported to its treatment plant(s), or provided that an appropriate cost compensation mechanism is in place to reflect the differential costs of treating heterogeneous volumes and loads from different sources.

26. Sydney Water's negative assessment of the ability to establish the necessary retail interface between customers and suppliers of collection and treatment services is based on misconstruction. It is a misconstruction since we can show both the possibility and the practical experience of establishing prices which reflect the costs of the collection and treatment of the volume and load of different customers, even though heterogeneous inputs have become anonymous and blended in transport/transmission.

27. As outlined below, this competitive model would be based on Services Sydney quantifying the individual and cumulative customer volume-load functions (so that Services Sydney could charge customers and gather revenue) and:

    - taking a volume of 'soup' from the Sydney Water system that had the same cumulative volume-load-capacity **with no compensation mechanism needed;** OR

    - taking the cumulative volume discharged by Services Sydney customers – **implementing a compensation mechanism based on the difference between***:*

        – the cost of treating the volume of 'soup'; and

        – the cost of treating the cumulative volume-load capacity.

        These costs should be the costs of an efficient producer, but other cost benchmarks may be more practically agreed between the parties.

28. Before illustrating the nature of these contractual arrangements for sewage, it is useful to explore briefly the counterpart experience in other network utilities.

### Electricity

29. Contestability in the electricity industry conceptually allows any generator or retailer to contract directly with customers. Since all electricity is fed into the transmission grid there is no possibility (once it has entered the grid) that the energy embodied in electrons despatched from power station A can be distinguished from the electricity despatched from power station B. Yet, power station A is able to supply directly with customers because we can measure what was despatched and what was received.

30. While we can measure what was despatched and what was received, we can not identify any particular package of unique energy en route along the transmission system, ie., there is anonymity of product and source.

31. As it happens, because of the technical nature of electricity all power stations on the same part of the grid deliver slightly different products so as to produce electricity with, desirably, identical characteristics. Thus electricity codes specify limits on the quality of supply covering frequency, voltage, power factors, harmonics, inductive interference, negative sequence voltage, load balance and disturbing loads of the 'product' electricity delivered to customers.[8] However, the uniform 'quality' of 'product' is determined by varying inputs from different generators. While Sydney Water suggests that the characteristics of supply must be identical, the electricity codes in fact show that electricity is be supplied at any of different standard nominal voltages and the uniform quality of other parameters results from and is determined by

[8] Office of the Regulator General (2001), *Electricity Distribution Code,* March, pp.14-17.

services procured from different generators.[9] Regardless of how identical the technical characteristics need to be for efficient system operation, such identity is not an essential requirement to make the economics of market transactions work.

32. The essential economic requirement for contestability in electricity and other cases where customers contract directly with competitive retailers, is that we know what each generator puts into the transmission system and what was taken out by each retailer's customers.[10] Once we know this basic information, we have the essentials to fashion a cost reflective price.

## Gas

33. The point is illustrated further by gas production, transmission and reticulation. Gas from different fields can have different calorific values, sulphur content and so on. For the key characteristics, the pipeline operators specify the acceptable bands and limits that must be satisfied by fields and producers inputting gas for carriage and for final delivery to industry and residential customers − but any supplier can input gas into the transmission system and contract directly so long as gas which has too low a calorific value is balanced out by supplies of gas with high calorific content (and similar criteria are met). [11]

34. In the gas market, suppliers do not have to produce gas with identical characteristics. Rather they must be able to ensure that they, in conjunction with others, can deliver gas of acceptable quality to their directly contracted customers and for the market in general. What is essential, however, is that in addition to achieving ultimate blends of gas which fall within specified technical limits, the quantity and quality of gas from each supplier is measured and known and that the quality and quantity of gas taken by their customers is also measured and known.

35. Thus, combining heterogeneous gas inputs into a network where gas becomes "blended" into a homogenous commodity is a feature of the gas industry where common carriage and vertical separation is a long standing feature. In Australia, this is the case in NSW, Victoria, South Australia and is about to be so in Western

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9 Capacity, frequency support, voltage support, power factor are typical generic 'ancillary' services provided by generators in addition to energy and the uniform quality of other parameters is determined by services procured from different generators.

10 In practice we need to know a few other things because electricity is subject to system losses which decrease with voltage of the transmission, but increase with distance. A counterpart in a sewerage system is information on ingress and illegal connections.

11 As one of many examples, see Goldfields Gas Transmission, Terms and Conditions for Gas Pipeline Services, effective 21 December 2001, especially Fourth Schedule − Inlet Gas Specification. The GGT terms and conditions define gas properties in terms of minimums and/or maximums for four parameters: Gross Heating Value, the Wobbe Index, Flammability Limit and Hydrocarbon Dewpoint. These parameters are further supplemented by minimum and/or maximum limits on fuel components.

Australia. (ie., implementation by the Retail Energy Market Company (REMC) is scheduled for July 2004.)

36. It is useful to explore this pertinent example a little further. The market in South Australia will be supplied with gas from the Moomba Pipeline that is shipped to the Adelaide city 'gate' along two (2) pipelines and gas from the Otway Basin in Victoria via the SEAGas pipeline. Gas entering the Moomba transmission plant is sourced from different oil and gas wells and therefore has qualities in terms of different calorific value and other key parameters.[12] Retailers contract with suppliers who input different quality gas into the system; but once in the pipeline the gas is "blended" and has a common calorific value. As low calorific value gas is cheaper than high calorific value, there is a potential gaming problem because suppliers could purchase low calorific value gas and then sell a more value commodity to customers in the form of the "blended gas".

37. Market rules rectify this potential gaming incentive by simply recording both the volume and calorific value of gas input into the transmission plant, as both variables are relevant in assessing total kilojoules input into the system. The general objective being to ensure suppliers input of kilojoules into the network equates with what is taken out.

38. Similarly, a supplier may have contracts for gas that are delivered along either the Moomba Adelaide Pipeline (MAP) or the South East Australian gas pipeline (SEAGas) pipelines. Both of these pipelines deliver gas to the citygate. Once gas enters the city gate it is "blended", from these two pipeline, into a homogenous commodity with a common characteristics, including calorific value.

39. While gas in the respective pipelines has a common "blended" calorific value, the calorific value of gas in each of the two pipelines differs. Again, there is a potential gaming problem because, hypothetically, drawing gas from the low calorific value pipeline results in a supplier bearing a lower proportion of the total cost.

40. To overcome this problem the market operator records how much gas each supplier has taken from each pipeline, and takes account of both the volume and calorific value of gas sourced from each pipeline before calculating the total kilojoules input into the system.

41. In this particular example, there are two points at which heterogeneous gas is input into a common network at which point they become "blended" or homogenous. The objective of the market operator is to ensure that each retailers off-take from the system is consistent with its purchased inputs. This is complicated by the fact that inputs have variable calorific value. However, market arrangements have developed

[12] The calorific value is a measure of the burning point for gas. Gas with a lower burning point has a higher value, and vice versa.

to resolve this issue by recording both the calorific value and volume of gas inputs into the system. This enables the market operator to estimate the total energy input into the system. Together with meter data measuring gas consumed by each retailers consumers, the market operator is able to ensure that each retailer's gas supply obligations are met (ie., each retailer's input of gas, and off-takes are balanced).

### Potable water

42. Similar issues arise with retail competition in the supply of potable water, as we understand occurs in England and Wales. Again, the different sources of water have different characteristics (for example, hardness), but the identity of the different waters is lost once it enters the common transmission system. Particularly where water from different sources has different levels of acidity/alkalinity, then mixing these waters and sharp changes in the mix can cause water quality problems. This is a technical issue. However, economic issues would arise:

- if the levels of water treatment required differed between two competitive supplies of untreated water; and
- if mixing (or changing the mix of water qualities) imposes costs on either the transport operator or on other distributors/customers.

In such cases it would be necessary to be able to measure the characteristics of each supply at source and to arrange some form of compensation, possibly on an 'unders' and 'overs' basis.

### Implications

43. These several examples illustrate that where the nature of the transmission/transport system results in the loss of identity of inputs from individual suppliers/customers:

(i) the key economic requirement to allow direct contracting and transactions between individual competitive suppliers and individual customers is the ability to know what the supplier put in and what the customer took out;

(ii) where different suppliers put in different qualities into the same transmission system, then the requirements of an efficient market are simply that some form of efficient mechanism for cost based compensation/equivalence is applied; and

(iii) physical and technical requirements differ from the essential requirements for commercial/market transactions. The technical requirements should not be confused as being economic requirements for establishing a contractual interface.

44. "Blending" of variable quality inputs into a homogenous commodity to be transported along a common transport network is a common feature of a number of network industries where transport network and retail /treatment segments of the market is separated.

45. Sydney Water has incorrectly focused on the perceived identical nature of the "output" from the gas and electricity networks. If, as for sewage, it examined "inputs" to the network it would have found that there is heterogeneity in the gas input into pipelines as gas from different sources has (amongst others) different calorific value. And given the significance of supply quality variables (in addition to transmission losses), there is also, effectively, heterogeneity in input of electricity into transmission networks.

46. We therefore reject as casual empiricism Sydney Water's contention that "*those network markets where vertical separation of dependent markets is economically viable, are characterised by identical outputs".*

47. A further feature of the examples examined in that market design and institutional response has sought to ensure that there are no 'gaming' possibilities, ie., that market participants do not have the opportunity to establish commercial relationships which would enable systematic cross subsidisation of their activities by other market participants.

48. In the electricity industry, power and associated services are supplied into the (NEM) market in five minute intervals by more than 150 individually registered units. The resulting market arrangements and protocols are therefore substantially more complex than would be required from arrangements required in a sewerage system where the period of settlement could be monthly or quarterly and it is unlikely that there would be more than a few, rather than many, plants. Thus, we should not infer that declaration for third party access inevitably requires the development and costs of a complex 'code' in the manner of the electricity market.

49. The lesson to be learned from the review of these other markets is that the blending of heterogeneous qualities and loss of supplier identity once the product enters the transmission/transportation system is not unusual, and that the potential for development of a retail market is not adversely affected by the presence of blending. This is so because it is not necessary to adopt average pricing based on the average blend that comes out at the end of the transport system.

50. Rather, we can still construct a simple cost reflective tariff provided we have appropriate information on what the customer/supplier put into the system and what the supplier/customer took out.

## 3.2. Market arrangements and interfaces for sewerage functions

51. We note Sydney Water's statement that it sees "no opportunity" for resolving the "blending" issue. This is somewhat ironic because Sydney Water treats blended waste at each of its three major wastewater treatment plants but this has not prevented Sydney Water from introducing a pricing regime for sewerage customers that is cost reflective and approved by IPART.

52. The pricing system for sewerage customers distinguishes between:

- domestic households;
- non-household customers ranging from CBD office blocks with low load to restaurants with high loads; and
- individual tradewaste customers.

53. Sydney Water describes how it charges domestic households (Sydney Water Sub., p. 22):

> *Sewage discharged from domestic households, for example, tends to be of relatively uniform pollution load and, given that the cost of distinguishing either sewage volume or pollution load on an individual household basis are likely to outweigh any benefits in terms of treatment costs avoided through altered discharge behaviour, Sydney Water charges a fixed fee per household for the total sewerage service.*

54. For non-household customers Sydney Water applies different cost drivers (Sydney Water Sub., p. 22):

> *However, the situation is quite different for non-household customers. Each non-household customer is effectively classified by Sydney Water according to the impact its pollution load is likely to impose on its treatment requirements and disposal facilities, and a schedule of tariffs is determined accordingly. For example, a restaurant pays relatively more for a given volume of waste discharged (using water taken as a proxy for sewage volume discharged) than would a CBD office block.*

55. And for trade waste the following pricing regime applies (Sydney Water Sub., p. 22):

> *The charging basis for those customers with the most significant sewage treatment and disposal requirements is further refined by means of a trade waste charging regime. Trade waste customers are subject to special tariffs that determine a total charge according to both the volume of waste discharged – measured directly, rather than on the basis of water taken - and its pollution load as determined by regular sampling and testing of waste discharged. Charges for the pollution load element of trade waste further distinguish different biological and chemical parameters of effluent, in order to assess the ease or difficulty of its treatment.*
>
> *Relative to standard domestic strength sewage, some trade waste customers, such as a large drinks producer, may have trade waste that is relatively easy to treat. Others, such as abattoirs or industrial processing facilities, may discharge waste with very high pollution load and, accordingly, pay a much higher charge per unit of volume. Some substances are prohibited from discharge into the sewerage system*

56. Sydney Water's pricing structure for sewerage services indicates that, despite the heterogeneous qualities of sewage from different customers that it has been able to construct a pricing and contractual regime with the ability to signal treatment costs to customers. If Sydney Water finds this charging regime an efficient basis for its current commercial arrangements with customers, then we must ask why a similar or improved set of market arrangements and contracts could not be implemented by a competitor?

57. As demonstrated below, the market design options we examine offer at least as accurate price signalling as currently applies and the prospect to improve. Moreover, our proposed market design options would ensure each supplier bears the full treatment cost attributable to its customers and that there are no systematic cross subsidisation possibilities.

### Indicative contractual arrangements

58. One form of contractual arrangements between a competitive supplier of collection and treatment services would be for the competitive supplier to contract to collect, transport, treat and dispose of the sewage of individual customers.

59. For large tradewaste customers the sequence of actions would involve the competitor supplier of treatment services:

- contracting to deal with the customer's volumes and loads at agreed fees;
- contracting with the owner and operator of the sewerage network for the input and transport of this volume and load through the sewer network to the competitor supplier's wastewater treatment plant; and
- contracting with the owner and operator of the sewerage network to take (and treat at the competitor supplier's plant) the volumes and load inputted by its contracted customers at the competitor supplier's plant. (ie., each looks after his own).

We note that the arrangements set out in the second and third dot points are consequences of contracting for the transmission / transportation service and could be expected to form part of any contract for the provision of these services. If so, separate contacts would not be required.

60. For each tradewaste customer, the contracting wastewater treatment plant could therefore need to treat the volume, the biological oxygen demand (BOD), suspended solids, grease levels, hydrocarbon levels and so on collected from the customer and transported in the sewer.

61. At first sight, such agreements and obligation might appear unworkable if taken literally. This would be the case where the level of one of the loads, say BOD, were

particularly high. In that case the competitive supplier would need to treat a much higher volume of the blended sewage in order to satisfy that BOD. Indeed, if taken literally, and restricted to a single customer, the entrant's plant would then need to treat higher volumes of 'soup' and then return some of the water and other constituents so that the encumbent's wastewater treatment plant could continue to treat the previous 'averages'.

62. Fortunately, commonsense and large numbers are likely to prevail in practice.

- First, the point of extracting the contracted volumes and amounts of inappropriate load is to prevent the encumbent from being loaded with higher costs due to cherry-picking along the lines suggested by Sydney Water. This focus on costs suggests that equivalence need not be set in precise physical terms but can be effected through a price or cost compensation mechanism. Such mechanisms can be observed in both the electricity and gas sectors. The extent to which these measure are required will depend in practice whether there are in fact material cost impacts.

- Second, competitor suppliers of collection and treatment services are unlikely to restrict themselves to one customer or one class of customer. As more customers are captured by the competitor supplier the nature of the sewage from these customers will converge towards the mean. This is obvious when we consider the nature of the volume and load that a competitor supplier would be obligated to deal with if that supplier captured, say, every second customer in each class. In this case there would be little or no difference in the characteristics of the volumes and loads which need to be treated.

63. Thus, even if the competitor supplier were to win one customer only, the blending of that customer's load in transportation would not preclude the establishment of an efficient price/compensation mechanism. Moreover, such a price and compensation mechanism would preclude the inappropriate price arbitrages/cherry-picking which Sydney Water has incorrectly contended are inevitable.

64. Thus, under this improved option we would need to specify contracts between:

- customers and suppliers/providers of collection and treatment services which involves payment by the customer for the collection and treatment of sewage of equivalent volume and load;

- between new suppliers of collection and treatment services and Sydney Water for the transport of sewage; and

- competitive suppliers of collection and treatment services for cost compensation on 'overs' and 'unders' based on differences between the volumes and loads of inputted and treated sewage (ie., each pays if he looks after his own).

65. A supplier competing with the encumbent monopolist will establish contracts across "n" different customers which result in the obligation to treat the equivalent of

$$\sum_{i=1}^{n} \text{ML of water}$$

$$\sum_{i=1}^{n} \text{tonnes of suspended solids}$$

$$\sum_{i=1}^{n} \text{tonnes of grease}$$

$$\sum_{i=1}^{n} \text{tonnes of hydro-carbons and/or nitrates and/or phosphates}$$

and so on. Regular metering sampling and surveying is required to establish these aggregates.

66. The fact that sewage load has multiple characteristics means that in contract negotiations we must choose

- either a single characteristic other than volume (akin to calorific value in the case of gas); or
- construct a cost weighted index of the major load characteristics. Such cost based weights are sometimes referred to as conversion factors since they can be used to convert a specific volume and load into "standard load equivalents".

67. Does this sanguine conclusion extend to residential and non-household customers and any others who are not directly metered?

68. We consider that it does. Sydney Water does not directly meter the quality or volume of sewage of the overwhelming majority of its wastewater customers because the quality of their sewage is essentially homogeneous within each major category. This is most obvious with the waste from household customers where volumes and loads tend to be uniform and low. We note the corollary that arrangements to address heterogeneity will only be necessary to the extent that the impact of any increase in the average pollution load of the intermingled sewage as a result of the addition of a Services Sydney customer is material.

69. Within the totality of non-household customers, Sydney Water has categorised them according to type and level of load so that cost reflective charges can be applied.

70. If these categorisations are accurate and efficient for Sydney Water, then they should be accurate and efficient as the basis for categorising customers and setting cost reflective charges for each category of customer captured by a competitor supplier.

71. If these categorisations are not efficient as a basis for setting non-distorting prices by the competitor supplier, then they are not an efficient basis for pricing by Sydney Water − and need to be changed.

72. In summary, there are well developed mechanisms for ensuring that prices charged and received by different treatment plants reflect the costs of efficient treatment for different customers provided we can measure or estimate the volume and load characteristics. These mechanisms are not dependent on preservation of the identity of the source of the product as it exits from the transport system. Nor are they invalidated by the blending within the transport system of other heterogeneous volumes and loads.

73. Pricing mechanisms of this type can be observed in any network industry which is vertically separated.

74. While such pricing/compensation mechanisms can be established in physical terms, economic and day-to-day efficiency will be enhanced where such arrangements are in dollar terms.

75. As a final point, we that to the extent that any issues arising from the heterogeneity of sewage cannot be addressed commercial arrangements with respect to the price of transmission / transportation services, other commercial arrangements are available. For example, Services Sydney could agree with Sydney Water not to allow its customers to input sewage into Sydney Water's system above a certain pollution load either by ensuring adequate treatment on the customers premises or not signing customers with pollution loads significantly above the average of the intermingled sewage.

### Prices and terms and conditions for transportation services

76. In some places in its submission, Sydney Water suggests that heterogeneity/blending issues will preclude the setting of a meaningful price for access to the services of transportation of sewage.

77. Thus, Sydney Water contends (Sub., p. 3) *"it is not possible to determine a price for the transport services that Services Sydney seeks, other than in a purely arbitrary way, because the end product bears no resemblance to the input product."*

78. We disagree with this contention.

- first, because the cost of sewage transport is much less influenced − if at all − by the permitted load characteristics of particular customers. It is notable that the detail in Sydney Water's submission (Sub., p. 22) links load characteristics to *"treatment and disposal costs"* (ie., costs in the dependent market) but not to the costs of transport; and

- second, to the extent that the costs of transporting sewage are influenced by load levels, then the same principles as outlined above to derive meaningful prices for retail competition in electricity, gas, potable water and, in the future, sewerage can be applied.

### Ingress and wet weather flows

79. Ingress and wet weather flows are a common feature of sewerage systems. Sewage transportation systems are designed carefully to handle these flows as are the treatment plants. These flows do not present a major problem for vertically separating the functions, nor for establishing meaningful prices for either collection/treatment or the transportation service.

80. Ingress and wet weather flows must pass through the treatment plants. If these flows are treated as a bundled product with the contracted flows and load then that cost of treating these flows would be an overhead cost. Competing service providers could be obliged to take some proportion of wet weather flows (for example, in the same proportion as dry weather flows) and the cost of treatment of these wet weather flows would be included in the prices charged to customers for collection and treatment services.

81. Alternatively, ingress and wet weather flows could be treated as a separate product in which case Services Sydney could offer to reach a commercial arrangement with Sydney Water to treat these additional flows.

82. In summary, ingress and wet weather flows are simply one of numerous practical issues that would need to be identified and could be resolved in a contractual (or arbitrated) agreement between the parties.

# 4. Comparison with sewer mining

83. Sydney Water (Sub., p. 57) focus on the perceived lack of benefits from third party access over and above those achievable under sewer mining:

> *The Application, in substance, contemplates the activity of sewer mining by a third party. Third parties are already entitled to engage in that activity, at a price set by IPART. In those circumstances, the benefits (if any) of declaration of the Transmission Service and the Interconnection Service are not sufficiently superior to the benefits offered by the current system for the provision of sewage collection services in metropolitan Sydney and the management of the water cycle generally to justify the imposition of the significant public costs that would arise as a result of declaration in this case.*

84. Our comments on this matter can be brief. In economic terms, sewer mining differs in several critical ways from Services Sydney's proposal to offer a combined collection and treatment service.

i) Sewer mining involves no competition with the encumbent's monopoly. As a result, none of the potential gains in productive efficiency available from applying actual competitive pressures to the encumbent's business are likely to be achieved.

ii) Sewer mining involves no contact with, or competition for, customers. The customers have no choice but to remain exclusively with the encumbent and the limited range of services offered. They can not exercise choice to purchase a portfolio of services better suited to their preferences. Sewer mining is an alternative production technology/configuration with little or no impact on competition for customers or customer choice or sovereignty.

iii) Sewer mining allows the company undertaking the activity to recoup its costs by selling reclaimed water, but it denies that company the ability to secure alternative revenue sources direct from customers, for instance for providing a green service akin to 'green electricity' or 'greenfleet'.[13] In comparison with competition in the market for combined collection / treatment services, sewer mining will not, in general, promote as viable competitors or as strong a level of competition.

85. By comparison with sewer mining, the combining of collection and treatment as proposed by Services Sydney therefore offers greater opportunity to promote competition.

[13] In addition, sewer mining provides neither a long-term, nor an enforceable, right of access, both of which are necessary to encourage efficient investment by an entrant.

# 5. Concluding comments

86. We conclude that heterogeneity in supply and blending during transport are issues observable in the network utilities of electricity, gas, potable water and sewerage. Sewerage is not unique.

87. Particularly in the two energy sectors, well established mechanisms are in place to allow meaningful commercial interfaces and prices, even in these more complex markets.

88. Similar, practical − albeit simpler − mechanisms based on knowing what is put into the transport system and what is taken out are available now to achieve meaningful commercial interfaces and prices in a vertically separated sewerage system.

89. The contractual agreements between retailers and the wholesaler in each of Melbourne and Auckland and the more frequently encountered examples of BOOT contracts for water and waste water treatment provide directly relevant examples of negotiated arrangements.

90. The combination of retail collection and treatment as proposed by Services Sydney requires, first linking these two familiar sets of contracts; and second, (to ensure that the resulting promotion of competition is efficient and in the public interest) a cost compensation mechanism along the lines we have outlined needs additionally to be inserted in the set of contracts.

91. Based on the cited experience elsewhere, we consider that these contracts are readily capable of being negotiated privately between the parties. We note that BOOT contracts for waste water treatment deal with many similar issues and such contracts are concluded regularly across Australia.

92. Should agreement on these contracts not be achieved, then arbitration may be requested and the Australian Consumer and Competition Commission (ACCC) and the Australian Competition Tribunal have the ability to arbitrate on these terms and conditions.

93. Since there are both agreed principles and relevant practical examples of such contracts which are *prima facie* consistent with the matters which the Commission must take into account (s 44 X), we consider that the Commission and Tribunal should be able to efficiently and effectively arbitrate appropriate terms and conditions.

94. Importantly, our consideration of (s 44 X) indicates no reason to preclude a satisfactory arbitration.

95. On the particular matter of the legitimate business interests of the access provider, we note that we have outlined how prices in the dependent market can be set efficiently in order to prevent inappropriate price arbitrage against the encumbent. We have also indicated how prices for the declared service and transportation can also be set to reflect load characteristics should these be shown to impact on users' transportation costs materially.

96. Declaration of the transportation service is expected to have demonstrable benefits in terms of promoting competition over and above those offered by sewer mining. These include direct competitive pressure on the encumbent monopoly and so increased productive efficiency;[14] direct contact with customers and the ability to service different needs and preferences; and the development of additional revenue sources for the entrant which will promote stronger, more viable, sustainable competition.

97. The costs of establishing arrangements for a vertically separated market should not be overestimated. Importantly, they should also be compared with the public benefits arising from the promotion of competition. As the example of the Services Sydney proposal illustrates, these benefits need not be restricted to the immediate dependent markets but potentially extend into other dependent markets including the provision of environmental and ecological services and outcomes and sustainable water supplies.

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[14] In addition, forcing integrated monopolies to understand their component costs is a major source of cost efficiency improvement.

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