TRANSNET NATIONAL PORTS AUTHORITY

POSITION PAPER ON TARIFF METHODOLOGY FOR THE SETTING OF TARIFFS BY PORTS REGULATOR

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Contents

Abbreviations and Acronyms

RR	Revenue Requirement
v	value of the assets used in the regulated services
d	accumulated depreciation on assets
w	working capital
r	return on the capital reasonable expected
D	depreciation accounted for in the period of the tariff
E	operating expenses
T	taxation expense
C	Clawback
v- d+w	Regulated Asset Base
WACC	Weighted Average Cost of Capital
CAPM	Capital Asset Pricing Model
MRP	Market Risk Premium
MDS	Market Demand Strategy
SARB	South African Reserve Bank
DMS	Dimson, Marsh and Staunton
EBIT	Earnings before interest and taxes
ETIMC	Excessive Tariff Increase Margin Credit

1. Introduction

The regulatory framework for Transnet National Ports Authority's ("the Authority") tariffs is informed by the National Ports Act, Regulations issued under such Act and the Directives promulgated by the Ports Regulator. In terms of the regulatory framework, this position paper focuses solely on the Authority's overall revenue requirement and related tariff methodology. Structuring of tariffs, per the regulatory framework, is to be dealt with as part of the Authority's pricing strategy exercise.

Having a tariff methodology in place assists in the application of the regulatory framework in order to determine the Authority's overall revenue requirement. The regulatory framework does not set a tariff methodology nor does it constrain the Ports Regulator from adopting one different from the Authority. However it is advisable that agreement be reached between the Ports Regulator and the Authority on an appropriate tariff methodology as well parameters of the elements contained therein. Such agreement would bring about a higher level of certainty for all parties affected by the tariff determination process.

In order to identify an appropriate tariff methodology, the Authority sought guidance on experience with regulatory regimes around the world whilst keeping in mind the local economic landscape and legal framework in South Africa. Port facilities are key infrastructure for economic development and growth. Therefore, a sound approach to economic regulation, which promotes appropriate investment whilst allowing port users to access services at fair and reasonable tariffs, is required. To this end the Authority and the Regulator will need to apply judgement in achieving this balance to promote access and investment within the port system.

The tariff methodology should aim for simplicity, clarity and certainty. As the regulatory regime matures it may be appropriate to revisit and refine some elements of this methodology.

Having undertaken the process described above, the Authority is of the view that the Revenue Requirement methodology is the most appropriate for the organisation at present as it:

- ensures that the Authority in accordance with the Regulator's Directives, namely Directive 23(2) (as amended):
  - recovers its investments in port services and facilities;
  - recovers its cost of operations; and
  - achieves a return sufficient to recover the opportunity cost of the capital employed in the production of the regulated services.
- provides efficient price signals to market participants and consumers and provides the Authority with the incentive for efficient investment in relevant infrastructure and services;
- promotes the regulatory independence and certainty with its full disclosure requirement, including a system for smoothing tariff adjustments; and
- is commonly used in other regulated industries.

This document begins by introducing the primary legislation that gives effect to the regulation of port services in South Africa, and then covers the amended Ports Directives ("the Directives") for any prescription or guidance governing the way in which allowed revenue should be determined. Next, the mechanics of the proposed methodology, including the revenue requirements model, are introduced. The remaining Sections 4 to 11 describe principals in relation to how each of the 'building blocks' within the revenue requirements model should be determined.

2. Legal basis and Regulatory Requirements

2.1 National Ports Act, 2005

Section 30 of the National Ports Act, 2005 (Act No. 12 of 2005) ("the Act") specifies the functions of the Regulator, as:

Functions of Regulator

30 (1) the **main functions of the Regulator are to:**

(a) exercise economic regulation of the ports system in line with government's strategic objectives;

(b) promote equity of access to ports and to facilities and services provided in ports;

(c) monitor the activities of the Authority to ensure that it performs its functions in accordance with this Act.

(2) **The Regulator must:**

(a) Hear appeals and complaints contemplated in sections 46 and 47, respectively, and investigate complaints contemplated in section 48;

(b) Negotiate and conclude an agreement with the Competition Commission established by section 19 of the Competition Act, 1998 (Act No. 89 of 1998), to co-ordinate and harmonise the exercise of jurisdiction over competition matters, and to ensure consistent application of the principles of this Act;

(c) Advise and receive advice from any other regulatory authority;

(d) Consider proposed tariffs of the Authority, contemplated in section 72, in the prescribed manner;

(3) **The Regulator may, with the concurrence of the Minister, and by notice in the Gazette, issue directives not in conflict with this Act for matters relating to the proper performance of the functions of the Regulator, including:**

(a) forms to be used when complaints or appeals are submitted to the Regulator;

(b) Time periods within which complaints or appeals must be submitted;

(c) Information to be supplied when a complaint or appeal is submitted;

(d) Filing fees for the lodging of complaints or appeals with the Regulator;

(e) Access by the Regulator to confidential information of the Authority;

(f) Manner and form of participation in proceedings of the Regulator;

(g) Procedures regarding the running of the business of the Regulator;

(h) The filing of prices charged by the provider of any port service other than the Authority.

Section 72 of the Act sets out Authority's obligations in relation to its tariff book:

Authority's tariff book

72. (1) (a) The Authority must, with the approval of the Ports Regulator, determine tariffs for services and facilities offered by the Authority and annually publish a tariff book containing those tariffs.

(b) The Authority may, with the approval of the Ports Regulator, amend the tariff book whenever it is necessary to do so.

(2) The Authority must, prior to any substantial alteration of a tariff, consult with the National Port Consultative Committee.

(3) Subject to section 9 of the Competition Act, 1998 (Act No. 89 of 1998), the tariffs contemplated in subsection (1) may vary between ports.

(4) Notwithstanding the provisions of this section, the Authority may enter into an agreement with a licensed operator or a party to an agreement or a port user for the variation of any tariff contemplated in subsection (1).

2.2 The Ports Directives

2.2.1 The Regulator developed the Directives, which were gazetted on 6 August 2009 and amended on 29 January 2010. Of these, the most pertinent to the setting and approval of tariffs are Directive 22 (which deals with the Approval and amendment of tariffs') and Directive 23 (which deals with Tariff requirements').

2.2.2 The opening statement of sub-directive 23(2), reads as follows: In considering the Authority's proposed tariffs, and any subsequent proposed significant variations, the Regulator must enable the Authority to;

(a) Recover its investment in owning, managing, controlling and administering ports and its investment in port services and facilities;

(b) Recover its costs in maintaining, operating, managing, controlling and administering ports and its costs in providing port services and facilities; and

(c) Make a profit commensurate with the risk of owning, managing, controlling and administering ports and of providing port services and facilities.

2.2.3 This sub-directive prescribes that the Regulator must enable the Authority to recover its investment, costs and to earn a profit commensurate with the risk it bears.

3. Tariff Methodology overview

3.1 Directive 22(1) states that "The Authority shall, within 30 days of the directives coming into effect and, thereafter on an annual basis on or before 1 August or at such longer intervals as the Authority and the Regulator may agree, submit its tariff book setting out its proposed tariff for all services and facilities offered by the Authority for the following financial year of the Authority, for approval by the Regulator."

3.2 For consistency with the requirement on Authority to publish annually its tariff book containing approved tariffs, this methodology assumes that the Authority should submit annually an application to the Regulator setting out proposed port tariffs for the following year ("the review period"). However, the methodology could be adapted to accommodate other periods if the Authority and the Regulator so agree.

3.3 Authority's application should set out its calculation of allowed revenues, and the various 'building blocks' within allowed revenues, used to compute the proposed tariffs.

3.4 As noted earlier, the Directives require that the Regulator must enable Authority to recover its investment, costs and to earn a profit commensurate with the risk it bears. The calculation of allowed revenues using an appropriate revenue requirements model would satisfy this requirement.

3.5 The key elements within the revenue requirements model are: allowed rate of return on investments, as well as allowances for expenses, tax obligations and depreciation to cover the consumption of assets.

3.6 Consistent with Directives 23(2)(a) and 23(2)(b), the Authority may in exceptional circumstances apply for an ex post adjustment to allowed revenues to deal with adverse outturns in forecast demand and/or costs in a preceding review period, which arise due to exogenous, unforeseen factors outside management control.

3.7 **The formula for calculating the allowed revenues, using a revenue requirement methodology is as follows:**

$$\text{Allowed revenues}_y = RAB_y \times WACC_y + E_y + D_y + T_y - (+)C_y + (-)ETIMC - F_{y-1} \times (1 + WACC_{y-1}) + F_y$$

where:

- RAB_y is the expected regulatory asset base related to period *y*;
- $WACC_{y-1}$ and $WACC_y$ are the Authority's weighted average costs of capital in periods *y*-1 and *y*, respectively;
- E_y is the expected quantum of operating and maintenance expenses over review period *y*;
- D_y is the allowance for depreciation expenses in review period *y* to cover the consumption of assets;
- T_y is the expected corporation tax expense related to the review period *y*;
- C_y is the claw back in period *y* in respect of the deviation between revenues allowed by the Regulator in respect of *y*-2, and those revenues that ought to have been allowed for the same year given the benefit of hindsight.
- $ETIMC$ provides the flexibility to smooth tariff increases over time avoiding spikes in tariff adjustments.
- F_{y-1} is any allowance for financing requirements given in review period *y*-1; and
- F_y is an allowance in review period *y* that is sufficient to meet any ongoing constraints imposed by financing relating to the period *y*.

The RAB in this model reflects the total enterprise value (debt plus equity)/ capital employed in the business. Under this specification, the appropriate rate of return (r) to allow the company to earn on its RAB is the WACC, which is a weighted average of the costs of debt and equity that finances the enterprise.

There is a range of different approaches to WACC and tax that could be used in the calculation of allowed revenues. The approach proposed in this methodology combines the so-called 'vanilla WACC' approach with an allowance for a forecast of the business's tax expense designed to be a close approximation to the actual tax that would be paid by the Authority if it were a standalone entity (see section 5).

The following sections discuss how each of the building blocks within the revenue requirements model is to be determined.

4. Regulatory Asset Base ("RAB")

4.1 Initial asset values

The regulatory asset base should reflect all assets that belong to the Authority. The primary components are likely to be:

- Fixed assets;
- Capital work in progress; and
- Working capital.

4.1.1 Fixed assets

At the start of formal regulation, it is necessary to establish the starting RAB.

Marine Business:

The Ports Regulator has confirmed in the ROD 12/13 that the 2010/11 tariff decision, which dealt with the Marine Business only, establishes the starting RAB at R43.589bn.

Real Estate Business:

The starting RAB for the Real Estate business comprising of assets rented out to external parties and Transnet divisions such as Transnet Port Terminals ("TPT") should be valued as Investment Property in terms of IAS 40.

4.1.2 Capital work in progress

Capital work in progress (CWIP) refers to assets that are under construction but that have not yet been commissioned (i.e. that have not begun to deliver services to customers).

There are two theoretically possible treatments for such assets. The first is to include these in the RAB only once they have been commissioned. The alternative is to include CWIP in the value of the RAB.

The latter approach avoids a significant increase in regulated prices once the completed investments are brought into use.

The inclusion of CWIP in the RAB also assists with the funding of port assets. Thus while the present value of the cash flows over the life are the same, the earlier cash flows allowed when CWIP is included immediately facilitates easier and possibly cheaper financing.

Forecasts of capital work in progress (CWIP) would be included in the opening and closing values of the RAB and escalated by average inflation for the year, using the monthly weighted average approach.

4.1.3 Working capital

Net working capital comprises of inventory, receivables plus operating cash, less trade payables and forms part of the RAB. The detailed explanation of the components of Net working capital is discussed below:

Current Assets

- Inventory

  Inventories on hand are required to maintain the port facilities, which are charged as tariffs. Average of the opening and closing balance has been used for this purpose.

  - Average Operating Cash

  Operating cash is that which remains in the Authority's institutional bank account (i.e. not swept into Current account held between Transnet Group and the Authority at year-end).

  - Trade receivables

  Revenue is assumed to be earned equally over the financial year and in terms of business practice is usually settled within 30/31 days from statement date. Therefore Trade Receivables has been based on the revenue requirement calculated in the tariff application inflated for 14% VAT divided by 12 months to account for the 1 month delay in receipt of cash.

Less: *Current Liabilities*

  - Trade Payables :

  This is informed by Operating Costs (excluding Labour Costs) and Capital Expenditure incurred by the business. Labour is excluded as this is paid within the month of incurrence.

    - Operating expenses (excluding Labour Costs) are usually settled within 30/31 days from invoice date and assuming they are incurred evenly throughout the year pertaining to the tariff application inflated by 14% VAT and divided by 12 to account for the 1-month delay in payment by the Authority.

    - Capital expenditure payables - in terms of the revenue requirement determination the Authority includes the Capital expenditure (CAPEX) for the coming year in the determination of the regulatory asset base. Hence, the

financing effect of the terms extended by creditors relating to capital expenditure needs to be included in current liabilities. This CAPEX can be split into that expected to be paid within 30/31 days from incurrence and the balance to be settled within a period greater than a year (retention monies to address latent defects and disputes).

- Payable within 30/31 days- 95% of the CAPEX spend in the Tariff Application should be used, inflated by 14% VAT and divided by 12 on the assumption that this is incurred evenly throughout the year.
- Retentions to be included is calculated by taking into account the balance of 5% CAPEX spend as contained in the Tariff Application inflated by 14% VAT.

- VAT Liability

This represents the Input VAT element contained within Trade receivables offset by Input VAT arising from Trade payables, Capital expenditure payable and retentions determined from above. As this provided the Authority with some form of financing on a day to day basis the sum of these components, assumed accrued evenly, should be calculated on a 22 day financing basis informed by average earning in the month (15 days) + 7 days for payment by the 7th in terms of SARS requirement.

- Current Tax Liability

The tariff application makes provision for a current tax expense in terms of the revenue requirement. The financing element of the current tax liability should therefore be considered as part of the current liabilities. The current tax system requires provisional tax payments at 6-month intervals; the liability has been averaged over the period of the financing, which equates to an effective quarter of a year financing assuming the tax is accrued evenly throughout the financial year.

- Provision for Leave Pay

This represents leave pay accrued for the Authority's employees which has not yet been settled and therefore suggests a form of Financing. The average leave pay for the application period has been estimated at 2.5% on the labour costs for the period.

4.2 Updating the initial RAB value

4.2.1 Method of updating

Once the opening value of the RAB has been set, use of a real as opposed to nominal WACC (described later) requires a rolling revaluation of the RAB on an annual basis. In the ROD for

FY 2012/13 the Ports Regulator has approved that the Trended Original Cost ("TOC") be used to roll forward the initial RAB valuation; the Authority proposes that TOC be used to roll forward RAB year on year. General inflation rate as measured by the Consumer Price Index ("CPI") informed by the South African Reserve Bank will be used to trend the RAB.

Disposals/ retirement of assets would be removed from the RAB at the value escalated by inflation less accumulated depreciation.

4.2.2 Capital investment

Forecast annual capital investment by the business in its regulated assets during the year for which tariffs are being set, should be included within the closing RAB for the period. This would be escalated by average inflation for year, using the monthly weighted average approach.

As noted above immediate inclusion of capital expenditure within the RAB leads to a smoother and more economically efficient tariff profile and aids financing of new infrastructure.

4.2.3 Depreciation

It is considered appropriate to allow a depreciation charge which constitutes a return of financial capital that can be used to finance the same financial value of replacement investment in the business. The standard practice would be to depreciate the regulatory value of an asset (TOC) over the remaining useful life of that asset, having regard to the condition of the asset and the period over which it has the prospect of remaining economically useful. The Authority annually undertakes an exercise to establish the remaining useful life of its assets which entails a fair amount of engineering judgement. (Refer section 8 below)

4.2.3 Changes in working capital

Working capital is estimated as the average level of working capital across the whole of the tariff year being applied for. For ease of determination as part of RAB; Working Capital will not be trended for inflation.

4.2.5 Calculation of RAB

Allowed revenues should reflect the average level of investment in the business over the tariff period. To approximate this, the RAB value to be used in the allowed revenues formula should reflect the expected average RAB value over the tariff period (i.e. the average between opening and closing values) for the review period.

The RAB value for the review period should be calculated using the following formula:

$$RAB_y = \frac{1}{2}\left(RAB_{O,y} + RAB_{C,y}\right)$$

Where:

- $RAB_{O,y}$ is the opening value of RAB for year y; or the closing value of RAB for year y-1; and
- $RAB_{C,y}$ is the closing value of RAB for year y.

The closing value of RAB is to be calculated as follows:

- $RAB_{C,y} = (RAB_{O,y} - WC_{y-1}) \times (1 + CPI_y) + CI_y - D + WC_y$,

Where:

- CPI_y = the annual rate of general inflation expected over the review period;
- CI_y = the value of expected capital investment over the review period, including new capital work in progress and newly commissioned assets, expressed in closing year prices;
- WC_{y-1} = the working capital included in the Opening RAB for Year y or closing RAB for year y-1 ;
- D = the depreciation allowance for assets within the RAB over the review period; and
- WC_y = the forecast average working capital over the review period.

Note the opening RAB of the year y will not automatically be the closing RAB of year y-1 but should be updated using the most current forecasts of its constituent parts.

When actually modelling RAB over time, care must be taken to match the timing of any balances that constitute the elements within RAB, and all flows should be treated as effectively arising on a mid-year basis.

5. Weighted Average Cost of Capital (WACC)

The cost of capital represents the minimum return that the Authority must make on its investment in order to continue to attract capital, given the risks investors bear when they commit funds to the business. In the allowed revenues formula, the cost of capital represents the rate of return the Authority is permitted to earn on its regulatory asset base. The product of the WACC and the RAB represents the total allowed return.

The cost of capital is typically measured using the Weighted Average Cost of Capital (WACC). The WACC takes into account the main sources of possible funding for a company, debt and equity, and the relative gearing of the company, in order to determine a (weighted) average cost of capital for the firm.

Allowed revenues must be sufficient to cover, among other things, the company's tax expenses. Conceptually, the simplest way to calculate the revenue required is to use what is known as a vanilla WACC and to make a separate allowance for tax expenses.

This is conceptually simple because the elements of WACC, the cost of equity and the cost of debt, correspond simply to the actual costs that the company 'writes cheques' for, i.e. it includes the amount paid to shareholders and the amount paid to debt providers as well as a separate allowance for amount paid in tax.

The vanilla WACC formula is calculated as follows:

$$Vanilla\_WACC = kd\,(g + ke)(1 - g)\,,$$

Where:

- kd = pre-tax cost of debt;
- ke = post-tax cost of equity;[1]
- g = gearing in the Authority's gearing (defined as the ratio of the value of debt to the value of debt plus equity).

5.1 Real vs. nominal

As the RAB is to be indexed to inflation and re-valued in nominal terms over time (TOC), the WACC to be applied to the RAB, in order to calculate the minimum allowed level of profit for the review period, must be expressed in real terms.

[1] Note, in order to achieve a post-tax cost of equity, no tax shield adjustment should be made to any of the elements within the cost of equity, including the risk-free rate.

5.2 Tax treatment

Interest on debt (unlike payments to equity investors) is a tax-deductible expense. This provides the business with a 'tax shield' on debt, which effectively lowers its financing costs. This tax shield needs to be accounted for in allowed revenues.

This is done through the reduction in tax expense term, T in the allowed revenues formula. An allowance for tax calculated as proposed would, in expectations, automatically account for the effect of the tax shield. With this specification, the WACC used in the allowed revenues formula must, as described above, be the vanilla WACC.

Under this approach, no tax adjustment should be made to either the cost of equity or to the cost of debt. For the avoidance of doubt, the cost of equity in the vanilla WACC should be interpreted as a post-tax rate, and the cost of debt should be interpreted as a pre-tax rate.

5.3 Cost of equity

Whilst various models are available to determine the real cost of equity to be used in the WACC formula k_e, the Capital Asset Pricing Model ("CAPM") model is commonly used by practitioners and regulators alike to calculate the cost of equity. The Authority proposes to use the CAPM model for the determination of its real cost of equity, k_e.

The CAPM formula (which produces a post-tax cost of equity) to be applied for this purpose is:

$$k_e = r_{f,real} + \beta \times MRP,$$

Where,

- $r_{f,real}$ = real non-tax adjusted risk-free rate;
- β = beta coefficient (measures the Authority's exposure to market (non-diversifiable) risk; and
- MRP, = market risk premium, measures the premium (over and above the risk-free rate) that investors might expect to earn by investing in a fully diversified portfolio of all risky assets in the economy (i.e. "the market").

5.4 Risk-free rate

The cost of equity calculated using the CAPM is a post-tax return. Therefore, no further tax adjustment to the elements within the CAPM formula, including the risk-free rate, is required to arrive at a post-tax return.

A common regulatory approach to determining the risk-free rate is to take arithmetic averages of historic government yields and then adjust for inflation. South African Reserve Bank ("SARB")

bond yield data on bonds with maturities of 10 years or more are available from 1960 at monthly intervals.

A key question is over what historic horizon to average yields. Averaging over a very long horizon has the potential to produce more statistically precise estimates (i.e. ones with lower standard errors) if the underlying risk-free rate is static. However, the risk-free rate may not be static and a long estimation window risks including data that are less relevant to current market conditions. Conversely, averaging over too short a horizon risks the final estimate being overly influenced by anomalous periods, or 'peaks' or 'troughs' in interest rate cycles.

A moderately long averaging period of 25 years (300 monthly observations) is a sensible compromise.

SARB yields are available as nominal values. However, the WACC in the allowed revenues formula must be a real rate, so nominal SARB yields must be deflated to real values using a measure of inflation. For this purpose, the rate of inflation measured using the CPI index should be employed.

The real risk-free rate to be used in the CAPM is to be calculated using the following formula:

$$\text{Real risk - free rate to be applied in CAPM} = \frac{1}{300}\sum_{m=1}^{300}\left(\frac{1+r_{f,nom,m}}{1+CPI_m}-1\right)$$

Where,

- $r_{f,nom,m}$ is the nominal risk-free rate, expressed as an annual rate, observed in month m; and
- CPI_m is the contemporaneous rate of annual inflation, as measured by the CPI index.

The bond yield and CPI data to be used in this calculation should be the data that are most recently available at the time when Authority calculates its allowed revenue.

5.5 Market risk premium

The MRP is the premium demanded by investors for investing in the market portfolio comprising all risky assets in the economy, instead of a riskless asset. The MRP cannot be observed; it must be estimated.

By definition, the MRP is a forward-looking concept, but its likely future size is typically inferred from long-run historical data. In particular, a common approach to estimating the MRP is to

examine average historic excess returns on the market (i.e. the average spread between historic returns on a market proxy and the return on government securities) over a long period of time.

One of the best datasets available for this purpose is the one compiled by Professors Dimson, Marsh and Staunton (DMS), and published annually in the Credit Suisse Global Investment Returns Sourcebook. This dataset provides annual risk premium estimates for 19 countries, including South Africa, using historical returns data from 1900.

The main advantages of the DMS estimates are that they are independent, calculated in a consistent manner over time, and tend to be sensible values that are fairly stable from year to year.

When using DMS MRP estimates, there are two important choices that need to be made:

Firstly, should the excess market returns underlying the calculation be averaged using an arithmetic or geometric approach? The arithmetic mean measures the average of the annual returns for the period under consideration, whereas the geometric mean measures the constant annual return that compounded would be produce the same total return over the relevant period. For forward-looking analysis, and for the purposes of the CAPM, the arithmetic mean is considered to be the more appropriate measure.

Secondly, should the MRP be measured against bills or bonds? Excess market returns (i.e. market returns minus the appropriate risk-free rate) can be calculated either against short-run bills (i.e. with maturities of 12 months or less) or longer-dated bonds (i.e. with a maturity of 10 years). Since the risk-free rate to be used in the CAPM is measured using bonds rather than bills, it is appropriate for consistency to measure the MRP against bonds.

The Authority proposes that the most recent DMS estimate of the arithmetic MRP measured against bonds for South Africa be used to determine a MRP for its real cost of equity.

5.6 Beta

Since the Authority is not a quoted company, it is not possible to estimate its beta directly from trading data. Under these circumstances, the best approach for estimating its beta is the so-called 'comparator approach'.

The process to be undertaken by the Authority in beta determination involves the following steps:

1. Identify a set of peer companies that are traded;

   In its 2011/12 tariff application, the Authority used 11 port companies as comparator firms for the purposes of estimating its asset beta. In its Record of Decision on that tariff application, the Regulator commented that the Authority "did not sufficiently argue the appropriateness of the selection as proxies for the NPA".

In its 2012/13 tariff application, the Authority expanded its list of comparator firms to 17 ports for the purposes of estimating its asset beta. Once again the Regulator was not convinced that the ports chosen represented an appropriate proxy for the Authority.

The nature and functioning of ports is varied and "no two ports are alike". This could possibly explain the concern raised by the Regulator in past RODs. The Authority therefore revisited its approach in terms of beta determination focusing on its operating environment.

South Africa is highly integrated with the world economy, which plays a central role in shaping our economic prospects. Since 2000, the world has experienced unusually strong economic cycles and shocks, and these have been reflected in domestic demand and GDP growth. In the near term, South Africa will be affected by international trade and investment trends, and is vulnerable to changes in global demand.

The Authority provides a platform for the South African market (import & export) to trade and compete globally with 98% of seaborne cargo moving through the port system. The JSE Top 40 companies are fairly active in the domestic, regional and international space and their exposures to market risk can be considered a fair reflection of global risk. For this reason the Authority is of the view that the JSE Top 40 companies are a good proxy in order to determine an appropriate asset beta.

2. Estimate the equity betas of the peer companies.

   The equity beta data of the JSE Top 40 companies is obtained from Bloomberg. The Authority is of the view that the 5 year average equity beta should provide a fair reflection of the market risk avoiding the volatility of short term shocks and long term obsolete historic trends.

3. De-lever the equity beta

   The asset beta is derived by de-levering the equity beta of the JSE Top 40 companies. In order to remove the effects of the capital structure of the JSE Top 40 companies the gearing levels of these companies needs to be established.

   The gearing values for JSE Top 40 companies are calculated automatically by Bloomberg using the Top 40 Index which is considered to be one company. This index would effectively weight the shares and not cap any debt values where cash exceeded debt. The debt values have been taken on a quarterly basis (not semi-annual) and divide them by the equity values to get debt to equity ratios for each quarter. An average for these values results in the determination of the level of gearing.

There are several methods available to de-lever and lever betas. One of the most common is the Hamada formula which allows for tax but avoids the complexity and empirical difficulty of having to estimate debt betas. The Hamada de-levering formula should be used to convert the equity betas of JSE Top 40 companies into asset betas:

$$\beta_a = \frac{\beta_e}{1+(1-t)\frac{d}{e}}$$

Where in terms of the JSE Top 40 companies,

- β_a is the asset beta;
- β_e is the equity beta;
- d is the value of debt in the capital structure;
- e is the value of equity in the capital structure; and
- t is the rate of corporation tax in South Africa.

4. Re-lever the JSE Top 40 companies' asset beta

For consistency the re-levering Hamada formula should also be used to transform the average of JSE Top 40 companies' asset betas to an estimate of the Authority's equity beta:

$$\beta_e = \overline{\beta}_a\left(1+(1-t')\right)\frac{d'}{e'}$$

where,

- β_e is the estimated equity beta of the Authority;
- $\overline{\beta}_a$ is an average of the JSE Top 40 companies' asset betas;
- $\frac{d'}{e'}$ is the Authority's debt-to-equity ratio; and
- t' is the rate of corporation tax in South Africa.

5.7 Gearing

The Authority, as a division of Transnet Ltd, does not raise its own capital, so it is not possible to observe its optimal capital structure directly. A pragmatic solution to this problem is to assume that the Authority's historical average gearing is reflective of its capital structure.

The capital structure weights used in the WACC formula should, where feasible, reflect market values. The market value of debt can be difficult to obtain, so book values are typically used as a proxy measure. For quoted companies, the market value of equity is measured using total market capitalisation. However, the Authority is not a traded company, so it is not feasible to obtain a direct measure of market capitalisation.

The RAB value of the business is the nearest simple proxy to an enterprise value (i.e. the market value of the company's assets). A simple proxy for market value of equity in the capital structure of the business may be obtained by subtracting the book value of the Authority's debt from its RAB.

5.8 Cost of debt

There are two possible approaches to determining Authority's cost of debt. The first is to obtain a forward-looking estimate of the Authority's cost of borrowing, and the other is to adopt the company's embedded debt costs.

Sub-directive 23(2)(b) states that the Ports Regulator "must enable" the Authority's to "recover its costs in maintaining, operating, managing, controlling and administering ports and its costs in providing port services and facilities". The cost of debt finance is such a cost. The requirement under sub-directive 23(2) (b) suggests that NPA's actual, embedded debt costs should be used to determine the cost of debt applied within the WACC.

The closest observable proxy for TNPA's actual cost of debt is the average embedded cost of debt of its parent, Transnet Ltd. Additionally, using embedded debt costs would be consistent with the use of Transnet target capital structure as a proxy for TNPA's gearing.

Since a vanilla WACC is proposed, the cost of debt must be expressed as a pre-tax rate (i.e. free of any adjustment for corporation tax).

The nominal cost of debt should be converted to a real rate using the Fisher equation:

$$k_{d,real=} \frac{(1+k_{d,nom})}{(1+CPI)} - 1$$

Where,

- $k_{d,nom}$ is Transnet Ltd's embedded cost of debt; and
- CPI is a forecast of inflation over a period that matches the average maturity of the embedded debt, measured using the CPI.

6. Expenses (including group overhead costs)

Allowed operational costs in any given tariff period are to be based on a best forecast of costs for the tariff period under review, supplied by the Authority.

Allowed costs may include all costs legitimately incurred in the pursuit of the regulated business including a reasonable allocation of corporate head office costs.

Forecast costs for the Authority are determined through a rigorous budgeting process which commences in October each year and is ultimately defended to the Transnet Board of Directors in February the following year. The Authority is of the view that these forecast costs, adjusted for updated information available just prior to the tariff application being made on 1 August each year, be used for tariff determination purposes. Cost increases in excess of inflation will certainly be described fully in the tariff application for the Ports Regulator's consideration.

The general claw back mechanism included in the Revenue Requirement formula will adjust for any under-recovery or over-recovery of allowed revenues, part of which could arise from differences in forecasted expenses. The mechanics of the claw-back parameter is described in section 9 below.

7. Taxation

As noted above, if a vanilla WACC is used, a separate allowance has to be made for tax. Authority is not a legal entity for which tax is calculated and paid. Furthermore, any attempt to estimate a pro rata share of actual tax paid by Transnet may be quite unrepresentative of the tax burden that would have be borne by the Authority had it been a separate corporation. Under these circumstances, a pragmatic solution is to make a notional tax allowance that is as close an approximation as is reasonably possible to the actual tax that the Authority would have paid. The simple calculation of the notional tax expense uses the following formula:

$$T_{\text{notional, simple}} = t \times \underbrace{\frac{k_{e,\text{ post-tax, real}}}{1-t} \times (1-g) \times RAB}_{\text{notional measure of profit before tax}}$$

All else equal, allowed revenues under this specification would be mathematically identical to allowed revenues set using a pre-tax WACC and no explicit adjustment for tax. Historically, a pre-tax WACC approach has been the most commonly used in regulatory decisions.

However, this simple notional approach to calculating the tax allowance ignores two important distortions:

- Firstly, the business receives the tax shield related to the nominal rather than real cost of its debt. Since the value of the former will always be greater than the value of the latter (assuming that inflation is always positive), the simple calculation above will, other things being equal, overstate the required tax allowance in the allowed revenue formula. An explicit adjustment should be made in recognition of the fact that the tax shield is derived from the nominal cost of debt and not the real cost of debt reflected in the vanilla WACC.

- Secondly, the value of depreciation that is conventionally used in the calculation of tax obligations is based on historic cost accounting measures of the value of the business's assets. In contrast, because the RAB is indexed to inflation, the value of depreciation provided for in allowed revenues is commensurate with a current cost valuation of the assets (TOC). To the extent that inflation has been positive, simply using the value of depreciation in the regulatory accounts for the purposes of determining the tax allowance will understate the revenue that is required.

Correcting these two material distortions (plus any difference between expenses allowed for regulatory and tax purposes – unlikely to be as material) results in the following calculation of, the notional tax allowance

$$T_{\text{notional, corrected}} = t \times \begin{pmatrix} \text{AR} - k_{d,\text{nominal, pre-tax}} \times g \times RAB \\ -D_{\text{tax}} - E_{\text{tax}} \end{pmatrix}$$

Where:

- AR = the allowed revenue for review period
- D_{tax} = the value of depreciation of the business's assets for tax purposes.
- E_{tax} = the value of expenses for tax purposes

8. Depreciation

The depreciation amount calculated on a straight line basis over the service life of each of the assets or classes of assets in the RAB for the tariff period under review is included as a depreciation charge in the allowed revenues formula.

An appropriate depreciation rate must be used in computing depreciation charges to reflect the different estimated service lives of the respective assets in each class of plant accounts, or each plant account, or each class of assets within a plant account.

The depreciation rates used in determining the Authority's allowed revenue should be based on the estimated service life of plant (40yrs), as developed by a study of the company's history and experience (taking into account all relevant factors including variations in use, increasing obsolescence or inadequacy) and such engineering, economic or other depreciation studies and other information as may be available with respect to future operating.

The average depreciation used for accounting purposes (International Accounting Standard 16), will be applied to the regulatory asset base. The proposed method to determine depreciation for the Authority is thus summarised as follows:

- Depreciation is on a straight line basis
- The service life of the asset which is reviewed annually will be used
- RAB value will inform the depreciation value

In accordance with IAS 16, the following principles are applied:

- Depreciation commences when the asset is declared available for its intended use after the commissioning of the asset.
- The useful lives and residual values of assets are reviewed and adjusted annually, in accordance with IAS 16.
- An asset's carrying value is written down immediately to its recoverable value if the asset's carrying value is greater than its estimated recoverable value.
- Assets in the course of construction are not depreciated.

9. Claw-back mechanism

The key purpose of applying claw-back is to ensure that the Authority or its customers do not gain or lose out from discrepancies between forecasts made at the time of the tariff application and actual figures of capital expenditure, operating expenditure, depreciation, taxation, volume figures, volume mix and tariff structuring.

The effect of applying claw-back mechanism is that deviations from the revenue numbers approved by the Ports Regulator that are caused by reasonable forecasting differences are corrected through adjustments made on the allowed revenue.

In the Record of Decision (ROD), the Ports Regulator decided to adjust the tariff increases to remove the total impact of over recovery of revenue over a period of two tariff determinations. The Ports regulator removed the interim claw-back (50%) of the forecast over recovery from the revenue allowed. At the next tariff decision, the Ports Regulator would remove the residual over-recovery and the impact thereon, based on the audited actual year end revenue.

With these considerations in mind, the value of any claw-back for over-recovery or under-recovery of revenues for year *y* may be calculated as:

$$C_y = \Delta AR_{y-2}(1+WACC_{y-1})(1+WACC_{y-2})$$

Where,

- C_y = the value of the claw-back to correct for the effect of outturn revenues over a period of two tariff determinations.
- *ΔARy-2* = is the difference between actual revenues observed in year y-2 and the revenues that the Regulator ought to have set in that period, had it enjoyed perfect foresight over volumes, expenses, tax obligations and depreciation (i.e. the elements of allowed revenues for which it is possible to observe ex post values after the fact);
- *WACC y-1* and *WACC y-2* are the rates of profit allowed to the Authority over review periods y-1 and y-2, respectively. Differences between forecasts and actuals for y-2 are compounded forward within the claw-back to account for the approximate time value of money over these years.

10. Excessive Tariff Increase Margin Credit (ETIMC)

Since access to capital is essential to investment and the effective provision of port services, the Authority considers it prudent to retain an Excessive Tariff Increase Margin Credit (ETIMC) to offset against future large, justified tariff increases resulting from the capital expenditure programmes.

In the event that the tariff determination warrants an excessive annual tariff adjustment that could impact negatively on the industry, this ETIMC could be used as a mechanism to phase in or delay tariff spikes over a longer period of time to allow industry to adjust to significant increases at a more sustainable rate.

Any debit or credit balance remaining within ETIMC will attract a return aligned to the WACC determined. Release of the ETIMC, or portion thereof, will be subject to agreement between the Regulator and Authority as part of the multi-year tariff application (discussed below).

11.Financing Factor

The F-factor caters for differences between the revenue adjustment to meet debt obligation projections made when the allowable revenue was determined and the actual debt obligation payments made for that period. If the allowable revenue does not enable the Authority's regulated activity to operate with debt service cover ratio (DSCR) acceptable, then additional revenue may be allowed.

In each period *y*, the Authority would repay to consumers any financing allowance granted in the previous period, *y-1*, compounded up one period by the WACC determined in that period to account for the time value of money. In other words, $F_{y-1} \times (1 + WACC_{y-1})$ would be deducted when calculating allowed revenues in period *y*. If it is expected that the Authority will require a provision to finance its operations during period y, then the value F_y would be added to allowed revenues for that period (and repaid with interest through a reduction in allowed revenue in period *y+1*).

12. Multi - year tariff application

The South African ports occupy a central position in the transport and logistics chain and with 98% of cargo traffic passing through them annually, ports are inherently required to play a leading role in influencing economic growth through the efficient provision of infrastructure.

The concept of multi-year tariff framework provides an element of certainty to all stakeholders as contains the tariff trajectory over time ("control period") within a certain bandwith. Benefits of a multi-year tariff approach include:

- reduced regulatory effort by all affected parties;
- providing the Authority with more space to focus on its business plans over the entire control period without the concern of annual tariff determinations;
- providing certainty to funders of the Authority;
- allowing customers to plan their business accordingly during the control period.

The Authority opts to adopt a multi-year tariff application approach from 2014/15 to 2018/19 with fixed identical tariffs per annum during the control period as this will provide a smooth tariff trajectory over time. This multi-year tariff approach is premised on agreement being reached on the Tariff Methodology and its parameters contained in this position paper.

13. Tariff Methodology Review

The Authority's proposal is to adopt a multi-year tariff application approach as described above. The control period envisaged would be FY 2014/15 to FY 2018/19. Therefore any agreed tariff methodology would need to remain in force over such control period. Assessment of the suitability between the Ports Regulator and the Authority of the agreed tariff methodology should commence after FY 2016/17 such that any amendments can be implemented for tariff applications relating to financial years beyond FY 2018/19.

End