

NZFBF

NEW ZEALAND
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FACILITY



TE POU HERENGA PŪTEA O AOTEAROA

NZ Overnight Indexed Swap (NZOS) Closing Rate Methodology

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NEW ZEALAND FINANCIAL BENCHMARK FACILITY

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NZ Overnight Indexed Swap Closing Rate Pricing Service (NZOS)

Methodology

1.0 INTRODUCTION

The methodology for NZ Overnight Indexed Swaps should be read in conjunction with the Closing Rate Operating Guidelines and Principles. This document is available on the NZFBF website.

This document has been derived with the objective of ensuring:

- Compliance with the New Zealand benchmark administration licensing regime overseen by the FMA;
- Where appropriate, the alignment with the IOSCO Principles for Financial Benchmarks;
- A transparent Closing Rate process is maintained; and,
- Conformance with global best practice.

NZ Overnight Indexed Swaps (NZOS) - The Overnight Indexed Swap Closing mid-rate represents pricing of an interest rate swap for a range of different tenors, where the periodic floating payment is based on a return calculated from a daily compound of the overnight cash rate.

This document should be read in conjunction with the following NZFBF publications, all of which can be found on the NZFBF website:

- NZFBF Board Charter;
- NZFBF Constitution;
- NZFBF Code of Conduct & Conflicts of Interest;
- NZFBF Governance Conflicts Management Plan;
- NZFBF Complaint Process; and,
- NZFBF Whistle Blowing Process.

2.0 CAPTURE, CALCULATION AND PUBLICATION OF NZOS CLOSING RATES

2.1 Source of Data

Quotations for each security, where available, will be extracted from the Bloomberg ALLQ pages. The current Price-makers are:

ANZ Bank New Zealand Limited
ASB Bank Limited
Bank of New Zealand
Westpac Banking Corporation – New Zealand Branch

The two-way quotations appearing on Bloomberg ALLQ can be updated instantaneously by Price-makers and are considered live quotes. This includes the actual bid and offer rates (yields) and volumes published on either side of the market.

The following data is extracted from the respective ALLQ pages:

- Pricing Source (PCS)
- Bid
- Ask (Offer)
- Bid Size
- Ask (Offer) Size

- Time stamp of last update

The quotations published are deal-able on a RFQ basis whereby a counterparty will request either a two-way quote or a specific bid or offer in a specified volume based on the pricing observed on screen. This RFQ will “pop up” on the Price-maker’s Bloomberg and they can either accept or reject the terms of the RFQ or respond with amended pricing (either an improvement or deterioration).

2.2 Time of Data Snap

16:30 NZT

Three data snaps prior to the 16:32 closing snap will be carried out at randomised intervals from 16:15 onwards. This data will be stored in accordance with the audit trail protocol outlined in section 5.3 of the Operating Guidelines and Principles and can also be used as part of the contingency procedures as outlined in section 2.6.

An additional data snap will be taken at 14:00 and utilised in the contingency procedures if initiated.

If a Price-maker is not publishing to Bloomberg on any of the four pre-close snaps, an email will be sent from the NZFBF Helpdesk requesting that they resume publishing prices.

2.3 Calculation Methodology

The methodology is based on averaging all complying bids and all complying offers for each individual tenor/security from approved Price-makers. Data will be obtained in accordance with protocols outlined above.

1. For the quotations to be compliant and included in the calculation process, certain criteria are required to be met. These are as follows:
 - a) Comply with maximum bid/offer spread limits specified below;
 - b) The bid and offer are derived from a two-way price (i.e. a market price that simultaneously has a bid price (yield) and an offer price (yield)). One-sided quotations will not be included in calculations; and,
 - c) The data will have been updated on the relevant Bloomberg ALLQ screens by Price-makers at least once since the market opened on that day (07:30). If this is not the case, the price is deemed to be stale.
2. A quorum of two compliant quotations is required to calculate the Closing Rates.
3. Reminder emails will be sent from the NZFBF Helpdesk to Price-makers advising them to resume publishing at the 14:00 data snap or any of the pre-close data snaps between 16:15 and 16:30.
4. Should the quorum not be met, and stressed market conditions are deemed to be in existence by the Administrator, all published quotations (including those that do not comply with the bid/offer spread limits but excluding stale and one-sided quotations) from NZFBF approved Price-makers will be included in the Closing Rate determination.
5. Should stressed market conditions be deemed to be in existence and if three or more compliant and non-compliant quotations cannot be sourced, the NZFBF Helpdesk will contact the Price-makers in an effort to obtain a quorum for those tenors or securities that cannot be calculated. In the event that a quorum cannot be achieved following this step, no Closing Rates will be calculated.
6. The Closing Rate for each security or tenor will be derived in accordance with the following (unless stressed market conditions apply):
 - $(\text{Average of all complying bid rates} + \text{Average of all complying offer rates}) / 2$

Under stressed market conditions (non-complying does not include one-sided or stale quotations):

- $(\text{Average of all complying \& non-complying bid rates} + \text{Average of all complying \& non-complying offer rates}) / 2$
7. Closing Rates will be calculated to four decimal places for each tenor and rounded to the nearest quarter basis point. For example, 0.7813 will be rounded to 0.7825.
 8. Closing Rates will be calculated for the following tenors: 1mth, 2mth, 3mth, 4mth, 5mth, 6mth, 9mth & 12mth.

9. Bid/offer volumes will have no bearing on the outcome of the calculated Closing Rates.
10. If there is no updated bid and/or offer data available from all of the Price-makers simultaneously, section 2.6 sets out the contingency procedures which will operate.

2.4 OIS Market Parcel Volumes and Maximum Bid / Offer Spreads

Maturity	Market Parcel Notional Principal	Maximum bid / offer spread (bp)
1 to 2 months	\$1,000 million	4
3 months	\$500 million	4
6 to 11 months	\$250 million	4
1 year	\$200 million	4
2 years	\$100 million	N/A
3 years	\$75 million	N/A
4 to 5 years	\$50 million	N/A
6 years	\$40 million	N/A
7 to 8 years	\$30 million	N/A
9 to 10 years	\$25 million	N/A
11 to 15 years	\$20 million	N/A
16 to 20 years	\$15 million	N/A
21 to 30 years	\$10 million	N/A

2.5 Calculation scenarios

Scenario 1: (3y Overnight Index Swap)

PCS	Bid	Ask	BSz (MM)	ASz (MM)
ANZX	2.32	2.35	50	50
BNZ	2.33	2.35	50	50
ASBK	2.325	2.35	50	50
WPAC	2.32	2.34	50	50

All bid offer spreads equal to or less than four basis points: Y

Average Bid: 2.32375

Average Offer: 2.3475

Calculated Closing Rate: $(2.32375+2.3475)/2 = 2.335625$, rounded to **2.3350**

Scenario 2: (3y Overnight Index Swap)

PCS	Bid	Ask	BSz (MM)	ASz (MM)
ANZX	2.32	2.37	50	50
BNZ	2.33	2.35	50	50
ASBK	2.325	2.35	50	50
WPAC	2.32	2.34	50	50

All bid offer spreads equal to or less than four basis points: N (ANZX spread five basis points)

Quorum (2 or more complying prices): Y

Average Bid: 2.325 (*ANZX price excluded)

Average Offer: 2.3467 (*ANZX price excluded)

Calculated Closing Rate: $(2.325+2.3467)/2 = 2.3359$, rounded to **2.3350**

Scenario 3: (3y Overnight Index Swap)

PCS	Bid	Ask	BSz (MM)	ASz (MM)
ANZX	2.32	2.37	50	50
BNZ	2.33	2.38	50	50
ASBK	2.325	2.37	50	50
WPAC	2.32	2.34	50	50

All bid offer spreads equal to or less than four basis points: N (ANZX & BNZ spread five basis points, ASBK four and a half basis points)

Quorum (2 or more complying prices): N (only WPAC comply – stressed market all bid/offers used in calculation)

Average Bid: 2.32375 (All prices included based on stressed market conditions, no stale or one-sided prices)

Average Offer: 2.365 (All prices included based on stressed market conditions, no stale or one-sided prices)

Calculated Closing Rate: $(2.32375+2.365)/2 = 2.344375$, rounded to **2.3450**.

2.6 Contingency Procedures

If no Closing Rate data is able to be obtained from Bloomberg at 16:32, the following process replaces the normal process.

16:32 – Final snap attempt. If no data can be accessed from Bloomberg ALLQ source at this time – data taken from the most recent pre-close snap (between 16:15 and 16:30) will be used in the calculation process.

16:35 – If no data is available, the Closing Rate process is automatically extended by sixty minutes. If the issue is technical, emails with a template for manual completion are sent to Price-makers. Once responses have been obtained, this data is then used by NZFBF to calculate Closing Rates.

The NZFBF Helpdesk will also contact Price-makers as a follow up reminder.

17:05 - Email window closes

17:15 – If no contact is made or no Closing Rate data is received directly from Price-makers, the data extracted from a snap taken earlier in the day (14:00) is used in the calculation process.

17:30 - If the data extracted from a snap taken earlier in the day (14:00) is also unavailable – no determination of Closing Rates is completed for the day.

2.7 Publication

The NZOS Closing Rate information will be published in accordance with the following protocol:

- Closing Rates will be displayed in an ascending date of maturity and include an average rate for each security; and,
- Calculated Closing Rates will be disseminated to all participating Information Vendors by no later than 16:55 NZST on the Business Day to which they apply.

The data is distributed to subscribers via:

- An XML feed to the information vendors. Vendors are obligated to display the NZOS Closing rates on their vendor screens upon immediate receipt of the XML data; and,
- Excel spreadsheet distribution for subscribers to the NZOS Closes service.

2.8 Final Stage Methodology

The Final Stage Methodology defines how NZFBF will seek contributions from Price-makers in the event that the Closing Rates are not available and the Financial Markets Authority (FMA), instructs the banks to provide expert opinion.

Under the Final Stage Methodology, Closing Rates are defined as representative mid-rates for pre-approved and eligible NZ Overnight Indexed Swaps that are traded in the local New Zealand market at approximately 4.32pm on any NZ business day. Price-makers must only submit Closing Rates for NZ Overnight Indexed Swaps that solely reflect the above definition.

Price-makers should develop an internal Submissions Guide, formulated in accordance with the Closing Rate Final Stage Methodology and Code of Conduct when submitting Closing Rates. For clarity, each Price-maker is only required to submit rates that are reflective of their own mid-rates for the eligible NZ Overnight Indexed Swaps.

Guidance on selection and priority of inputs

Expert judgement involves the use of discretion by a Price-maker when determining the data inputs to be used in Closing Rate submissions and adjusting these inputs where necessary to reflect current market conditions. Price-makers must identify a range of data inputs that may be used in determining NZ Overnight Indexed Swap Closing Rate submissions as part of their Submissions Guide. Where possible, expert judgement should be supported by market data. In developing the Submissions Guide, Price-makers may have regard to the following:

- Genuine business purposes (where applicable in the context of submission); and,
- Trading in NZ Overnight Indexed Swaps by a Price-maker should be based on its genuine business purposes to buy or sell the derivative, as determined by the Price-maker.

Without limiting the matters it may have regard to, and for the avoidance of doubt in determining its genuine business purposes to buy or sell NZ Overnight Indexed Swaps, a Price-maker may have regard to:

- credit risk limit management when trading NZ Overnight Indexed Swaps; and,
- price and/or volume discovery.

and extrapolation of values using:

- Transactions in related NZ Overnight Indexed Swap markets (local and offshore);
- Transactions or quotes in local interest rate derivative markets that are independent of NZ Overnight Indexed Swaps; and,
- Prior or historical NZ Overnight Index Swaps data, accounting for current market conditions. A parallel shift may be applied to the data in order to reflect recent events/activity.

In addition to quantitative elements such as the above, the Submissions Guide should also incorporate the use of qualitative elements (i.e. expert judgement) with sufficient flexibility where quantitative data is limited or unavailable.

In determining the priority of inputs, the below guidance should be observed:

- Transactional based data should be accorded the highest priority with transactional data that meets some or all of the criteria noted in section 2.1;
- Executable quote data should be accorded higher priority than indicative quote data; and,
- The most recent transactions in NZ Overnight Index Swaps should be given higher weighting relative to historical transactions.

2.9 Closing Rate Cessation Procedures

These procedures concern the actions that will be taken by NZFBF, in the event of cessation of a benchmark, in this case Closing Rates.

Various factors, including external factors beyond the control of NZFBF, might necessitate material changes to the Closing Rates. Subscribers and stakeholders of Closing Rates should have robust fallback provisions in place in the event of material change or cessation of the Closing Rates. For example, cessation can be invoked by NZFBF if they believe they are no longer in a position to calculate and publish Closing Rates and/or the benchmark is no longer representative.

Other entities within New Zealand can also invoke the cessation of the Closing Rates if they believe NZFBF is not in a position to calculate and publish Closing Rates and/or the benchmark is no longer representative. For example, the New Zealand Financial Markets Authority or Reserve Bank of New Zealand. These procedures do not refer to their actions or procedures.

Prior to cessation, notice will be provided to the necessary stakeholders and subscribers that there were issues pertaining to the calculation and publication of the Closing Rates. However, if cessation was to occur NZFBF would notify:

- NZFBF Board;
- The Financial Markets Authority;
- The Reserve Bank of New Zealand; and,
- Subscribers and other stakeholders of the Closing Rates.

Such notice would include:

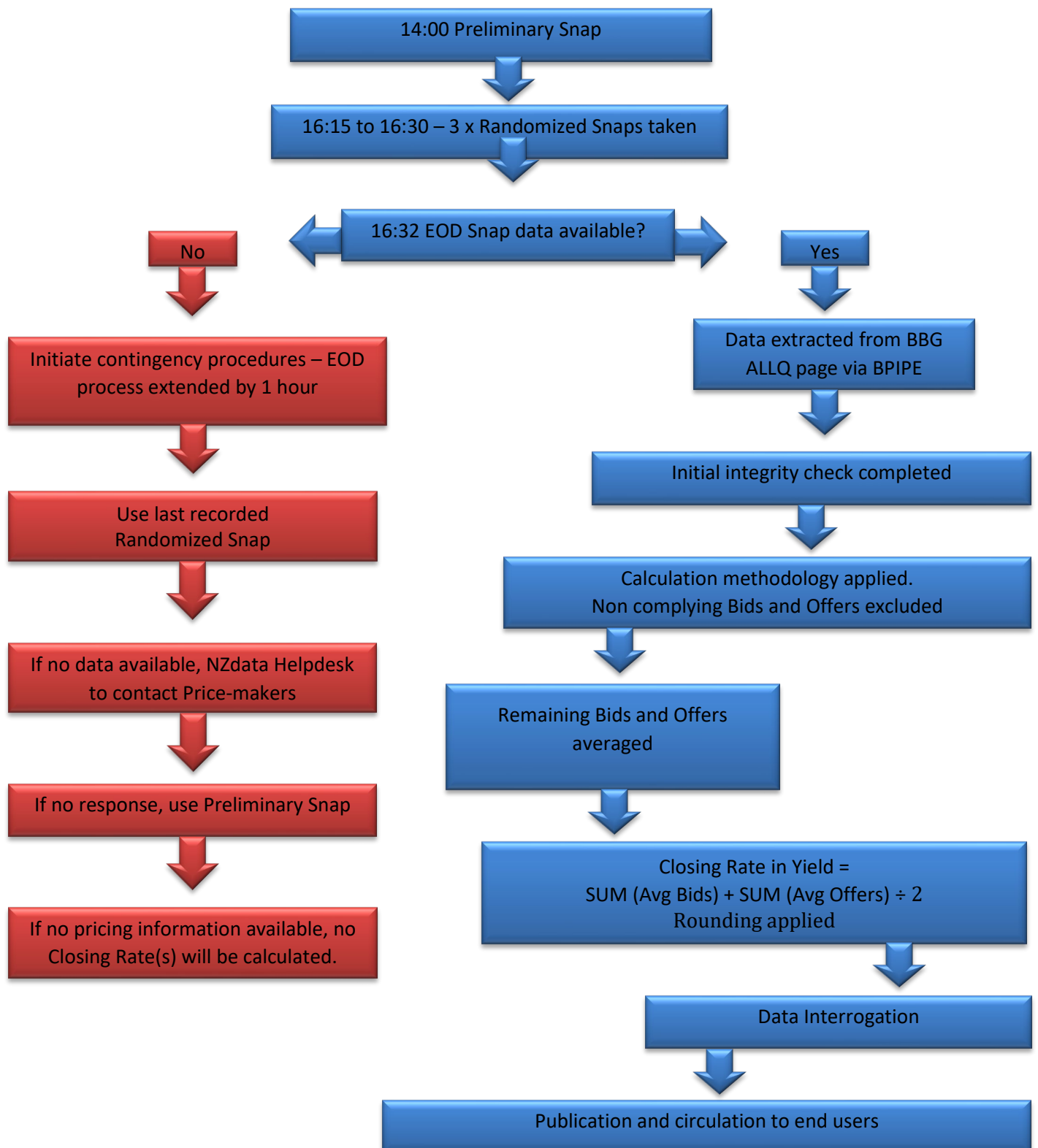
- A description of the issue;
- When cessation would likely occur;
- The potential to use other benchmarks be they a fallback benchmark interest rate or some other benchmark. The time required to implement a new benchmark if one is available;
- NZFBF's ability to continue as New Zealand's Benchmark Administrator; and,
- Options for an alternate Benchmark Administrator, if NZFBF were unable to continue.

Voluntary discontinuation

If NZFBF determined it could no longer continue as the Benchmark Administrator, for whatever reason, it would notify the stakeholders noted above. Following this, a market notification would be made giving at least six-month's notice.

NZFBF would work with stakeholders to identify expressions of interest from other administrators in publishing the Closing Rates and NZFBF would be prepared to work with the successful administrator to transition the benchmark.

3.0 NZFBF CLOSING RATE – DECISION TREE



4.0 APPENDIX I¹

Key Definitions

Administration: Includes all stages and processes involved in the production and dissemination of a Closing Rate, including:

- a) Collecting, analysing and/or processing information or expressions of opinion for the purposes of the determination of a Closing Rate;
- b) Determining a Closing Rate through the application of a formula or another method of calculating the information or expressions of opinions provided for that purpose; and
- c) Dissemination to users, including any review, adjustment and modification to this process.

ALL Quote (“ALLQ”): Bloomberg screen that displays bid/offer quotes for securities and derivative instruments. ALLQ can also be used as a liquidity platform where trades can be executed through dealers with whom permission has been given to trade. ALLQ refreshes pricing automatically and displays the time for each pricing update.

Audit trail: For the purposes of the Closing Rate determination process, the documentation and retention of all relevant data, submissions, other information, judgments (including the rationale for any exclusions of data), analyses and identities of Submitters used in the Closing Rate determination process for an appropriate period.

Benchmark: The Benchmarks in scope of this report are prices, estimates, rates, indices or values that are:

- a) Made available to users, whether free of charge or for payment;
- b) Calculated periodically, entirely or partially by the application of a formula or another method of calculation to, or an assessment of, the value of one or more underlying Interests;
- c) Used for reference for purposes that include one or more of the following:
 - determining the interest payable, or other sums due, under loan agreements or under other financial contracts or instruments;
 - determining the price at which a financial instrument may be bought or sold or traded or redeemed, or the value of a financial instrument; and/or
 - measuring the performance of a financial instrument.

Benchmark Administrator (“Administrator”): An entity or legal person that controls the creation and operation of the Closing Rate Administration process, whether or not it owns the intellectual property relating to the Closing Rates. In particular, it has responsibility for all stages of the Closing Rate Administration process, including:

1. The calculation of the Closing Rates;
2. Determining and applying the Closing Rate methodology; and
3. Disseminating the Closing Rates.

Benchmark User: A person or entity that purchases Closing Rate determination services from an Administrator.

Bloomberg: A third party platform that provides a real time source of market data, pricing information and news.

Bona fide: Refers to data where the parties submitting the data have executed, or are prepared to execute, transactions generating such data and the concluded transactions were executed at arm’s-length from each other.

BPIPE: BPIPE is the Bloomberg technology that allows users such as the NZFMA to access real time data from Bloomberg ALLQ pages based on predetermined parameters. For instance, the data could be readily obtained in a preferred format, e.g. xml and formatted according to the NZFMA’s requirements.

Business Day: A Business Day is defined as a day on which banks in New Zealand are generally open for

¹ Source: IOSCO Principles for Financial Benchmarks July 2013 and NZFMA internal documents

business (refer NZFMA website for a detailed definition).

Calculation Agent: An entity with delegated responsibility for determining a Closing Rate through the application of a formula or other method of calculating the information or expressions of opinions provided for that purpose, in accordance with the methodology set out by the Administrator.

Closing Rate: An instrument valuation as at the market close on any trading day, the calculation of which has been determined in line with the methodologies specified in these Operating Guidelines & Principles. The Closing Rate is intended to provide an indication of market value and specifically should not be used for settlement purposes. In this way, Closing Rates are distinct from Benchmarks.

Contingency procedure: An alternative to the normal procedure – triggered if an unusual but anticipated situation arises.

Interest: Refers to any physical commodity, currency or other tangible goods, intangibles (such as an equity security, bond, futures contract, swap or option, interest rates, another index, including indexes that track the performance of a rule-based trading strategy or the volatility of a financial instrument or another index), any financial instrument on an Interest, which is intended to be measured by a Closing Rate. Depending on the context, it is assumed that the word “Interest” also includes the market for such Interest.

Market Parcel: The minimal notional size of a trade (or bid or offer) for a financial instrument that is accepted by Price-makers as a fair reflection for a standard market transaction.

Material Error: Materiality relates to the seriousness of the error and how this error may impact on what is meant to be represented. In regard to the Closing Rates, a material error can be defined by a movement greater than 2.0 bps in the benchmark. Therefore, if an error will see the Closing Rate benchmark to move by more than a two basis points, this will warrant a re-calculation of rates.

Methodology: The written rules and procedures according to which information is collected and the Closing Rate is determined.

Outliers: Outliers are an internal metric used by NZFBF to identify if a Price-makers rate is significantly different from the other Price-makers in the market. This outlier test is undertaken on data at the 5 snaps between 2:00pm and 4:32pm and will be flagged in the email notifications. The metric for outliers is One Standard Deviation from the average bids and offers for that tenor in that market.

Over-the-counter: Financial instruments that are bought and sold and privately negotiated directly between two counterparties, without the use of an exchange or other intermediary.

Participants: Legal entities involved in the production, structuring, use or trading of financial contracts or financial instruments used to form the Closing Rates, or which reference the Closing Rates.

Price-maker: A financial institution approved by the NZFMA to supply two-way quotations via a third party platform for the calculation of the OIS Closing Rates.

Publish or make available: Refers to the expectation that a party such as an Administrator should provide a document or notice to Stakeholders. The means by which such notice is made should be proportionate to the breadth and depth of the Closing Rate used by Stakeholders, as determined by the Administrator on a “best efforts” basis. Ordinarily, posting a document or notice on the Administrator’s website will meet this expectation.

Stakeholder: Refers to Subscribers and other persons or entities who own contracts or financial instruments that reference a Closing Rate.

Stale Rates: Stale rates refer to the NZFBF metric used to identify if a Price-makers rates are current and up to date. The stale rate times for Closing Rates are as follows:

- 4:00pm – NZSW, NZGS & NZOS
- 7:30am – NZBO, NZBR, NZRR & NZNG

Stressed market conditions: When a market is exposed to heightened volatility which negatively impacts liquidity and the ability to execute transactions. One of the potential consequences is financial instrument bid/offer spread widening. The maximum bid / offer spread limits set out in this document have been determined by Price-makers as maximum acceptable level for normal market conditions.

Two-way: A price that has a bid price (yield) and an offer price (yield). The bid offer spread is the difference between the bid price and offer price.