Algo Due Diligence Template.

GENERAL

This general section outlines the core features of the algorithm. Providers may consolidate answers 1–5 into a table or grid if they wish to cover multiple algorithms with the same template.

Q1	**Algo Provider (also referred to as "you" or "your" below as required):**
A1	Westpac Banking Corporation
Q2	**Algo name(s):**
A2	TWAP; Liquidity Seeker
Q3	**Liquidity type (internal, external, hybrid):**
A3	Hybrid
Q4	**Products covered (spot, NDF):**
A4	FX Spot
Q5	**Description[1] of algo(s):**
A5	Time Weighted Average Pricing - The TWAP Algo executes an order over a defined time period specified by the customer. The TWAP Algo converts the amount and duration into equal sub orders over the duration and starts transacting the trade at the agreed start time by passively placing orders into the market. If the passive order is not filled within an allocated timeframe, the TWAP Algo will leave the passive order and transact at the best market price(s) available to fulfil that piece of the order. The existing passive order becomes the passive order for the next time slice if still in the market. Liquidity Seeker Algorithm - The Liquidity Seeker Algo is designed to take advantage of available market liquidity. The Liquidity Seeker Algo gives the user the ability to specify a level of aggressiveness to tailor the market participation to their specific needs. The TWAP Algo and the Liquidity Seeker Algo collectively referred to as the FX Algos.

[1] You may find it helpful to refer to the 'algo archetypes' delineated in section 2.1 of FX execution algorithms and market functioning

GENERAL	
Q6	**Please describe any parameters or controls the user may adjust:**
A6	TWAP – Limit price, aggressiveness setting (three settings), inclusion of internal liquidity. Liquidity Seeker – Limit price, aggressiveness setting (five settings) , inclusion of internal liquidity.
Q7	**Please specify if the product is built internally or externally:**
A7	Internally
Q8	**If principal liquidity interacts with the Algo User's order, how does this happen and what steps are taken to ensure the fill is a fair one from the order's point of view?**
A8	The FX Algos will only trade on Westpac's internal price if it is the best effective price in the liquidity pool at the point of execution.
Q9	**If another part of your business needs to hedge or trade in the same direction as the Algo User's order, how are fills allocated between the two?**
A9	The FX Algos execute via a separate order router which has no connection to, or visibility of, other liquidity or orders being executed by other parts of the business.
Q10	**Are there any particular commercial interests in trading venues or other relevant service providers that interact with the algorithm provided by you? If so, how are such conflicts addressed?**
A10	No. Our FX client execution algos route child orders to a set of ECNs based on the lowest effective price (Effective Price = Original Price + (1 – Expected Fill Rate) * Cost of Missing). This effective price adjusts the observed ECN price to account for the expected fill rate and the associated cost of missing a fill. We do not penalise for brokerage costs.
Q11	**Please elaborate on your role as regards market risk, counterparty risk, and settlement risk.**
A11	Independent risk functions oversee market, counterparty and settlement risk. Automated systems are in place to exclude counterparties where determined by those risk functions.
Q12	**Is there anything else of which you feel the Algo User should be aware?**
A12	No.

ALLOCATION POLICY

There are many different approaches to allocations. It is important to understand what happens in circumstances where multiple clients wish to trade or, indeed, when one order would be used to fill the order of another client.

Q13	**If you have more than one client order wishing to trade in the same pair and on the same side, how are fills allocated amongst these orders?**
A13	FX Algo orders operate separately from one another and will, at each point of execution, trade on the best effective price available.
Q14	**If two client orders are eligible for execution netting, how does this process work?**
A14	Westpac does not currently have a netting capability for FX Algo orders.

ROUTING POLICY

Routing policy is an important topic. There are several components such as how execution venues are evaluated, curated, and prioritised. Also covered is the question of what fair-value mid the algo uses to make routing decisions and how information leakage is avoided when placing lit orders. Finally, internalisation is defined: some providers have a strict definition such as 'two algo orders netting' whereas others will include midbooks and trades where they have shown a skew through mid externally to incentivise another counterparty to fill them.

Q15	**How are hedging execution venues evaluated, including both observable (spread, impact) and implicit costs (information leakage)?**
A15	Effective prices are adjusted for expected venue fill rates which are updated regularly. Westpac curate the liquidity pool by actively engaging with ECNs and having an open dialogue, for example ensuring liquidity pools with high reject rates on the ECNs are removed from the pool. The Liquidity Seeker Algo is designed with market impact in mind. The aggression setting is utilised to manage how much available liquidity is being used in the market which will reduce signalling. It is not possible to have no information leakage. We minimise information leakage through internal review processes. In addition to this our FX Algos trade on anonymous order books which reduces information leakage from spread crossing orders.
Q16	**How do you prioritise between different execution venues (both external and internal sources) when routing orders?**
A16	Our FX Algos selects and routes child orders to a set of ECNs or internal liquidity based on the lowest effective price. This effective price adjusts the observed ECN price to account for the expected fill rate and the associated cost of missing a fill. We do not penalise for brokerage costs. [*Do we need to include this to answer this question?*]

ROUTING POLICY	
Q17	**If multiple clients enter orders in the same pair, will you aggregate these orders before placing orders externally or treat each client order individually and place multiple similar orders, which may compete with one another for fills?**
A17	The FX Algo orders will be treated individually.
Q18	**What – if any – ongoing work do you do in order to curate execution venues, where curation is possible? Approximately how often is this conducted?**
A18	Westpac curate the liquidity pool by actively engaging with ECNs and having an open dialogue, for example ensuring liquidity pools with high reject rates on the ECNs are removed from the pool. Conversations with ECNs occur regularly.
Q19	**Do you have any logic to avoid orders on venues where the order book is visible to all participants (lit execution venues) causing information leakage? If so, please describe it.**
A19	Our FX Algos contain logic that is designed to minimize market impact and signalling risk for client order executions whilst still providing a consistent execution schedule. This may be tailored in the algorithm aggressiveness parameter. We also use randomisation where suitable to avoid predictable trading patterns.
Q20	**Does the mid/fair-value used by the algorithm differ from the one used by your own market making system for pricing and risk management? If yes, please specify.**
A20	No.
Q21	Please define your understanding of 'internalisation' and, using an example, describe how this works in practice, demonstrating if/how your Algo Clients benefit from this process. If you wish to do so you may provide an indication of how much volume is internalised on average.
A21	All Westpac FX Algos offer clients the option of including internal liquidity. Our FX Algos will deal on our internal price where the price is better or equal to the best effective price on the liquidity sources available to the algo. The internal price is skewed in line with the price being shown to the external market and reflects our interests at that particular time. Hence if the internal price is better or equal to the market, then the client not only receives a better price, but will also have no market impact.

SEGREGATION POLICY

Segregation policy is all about keeping order information private and reducing the risk of signalling.

Q22	**Please describe if and how the algo orders are segregated within your institution.**
A22	FX Algo trades are visible only to a select group of e-traders. The e-traders do not run their own individual risk books and Westpac has rigorous systems and controls in place that are monitored in accordance with our three lines of defence model to limit the ability of traders to access client algo orders and/or influence trading against the bank's risk whilst supervising client algos. At times, e-Traders with spot trading responsibilities may be required to supervise a client algo. To minimise the risk of conflicts in this situation, controls are in place to prevent market making in the relevant currency pairs. In addition to this, a supervisor review of any trading activity whilst supervising an Algo order takes place post-Algo execution.
Q23	**Can sales and trading personnel who provide intraday 'market colour' view algo orders at any stage? If so, what steps have been taken to minimise the risk of information leakage?**
A23	No. Sales personnel have no visibility of FX Algo orders until post-trade when the relevant Sales person receives the TCA to send to the client.
Q24	**Can discretionary traders who may enter or exit risk for your institution view algo orders at any stage? If so, what steps have been taken to minimise the risk of information leakage?**
A24	At times, e-Traders with spot trading responsibilities may be required to supervise a client algo. To minimise the risk of conflicts in this situation, controls are in place to prevent market making in the relevant currency pairs. In addition to this, a supervisor review of any trading activity whilst supervising an Algo order takes place post-Algo execution.
Q25	**Can an electronic market making system view algo orders at any stage? If so, what steps have been taken to minimise the risk of information leakage or misuse of information?**
A25	No.
Q26	**Are algo order flows included in any market positioning tools or analyses that other clients may use?**
A26	No.

SAFETY FEATURES

Safety features might include fat-finger limits, kill switches or protections that automatically suspend the order when it trades too fast or in certain market conditions.

Q27	**Please describe any in-built safety features you have that may cause an order to be suspended or rejected.**
A27	There is a minimum and maximum amount allowed to be submitted. If the order falls outside of these limits the order will be rejected and the client will immediately see the rejection message. Clients have the ability to specify a limit price on the Algo order which will prevent the algo trading through that pre-defined level in the event of disorderly or volatile markets. Clients also have the ability to pause algo execution at any time. Latency checks, price reasonability checks, size reasonability checks and duplicate order checks are also in place.
Q28	**Please explain what you have done, and will continue to do, to ensure the integrity of the electronic trading system you provide for clients to use (including the system's reliability, security, capacity and contingency measures).**
A28	Client FX Algo orders are supervised by an e-trader at all times, including live alerting of any technical issues to the technology support team. In the event of issues being encountered with Algo execution there are a number of kill-switch mechanisms available with the intent of each to cease further execution, as per internal Kill Switch Procedure documentation. Further, Disaster Recovery plans are in place to accommodate outages, data loss and denials of physical access across geographies and office locations.

TCA

TCA is an increasingly important part of the service. Where the TCA is not third party it is important to understand internal metrics. For example, if you have 'beaten risk transfer price' by 3bp how is that risk transfer price calculated?

Q29	Do you support any TCA or analytics? If so, please specify which providers.
A29	Westpac have an internal TCA sent to clients post-Algo execution. Westpac also have the capability to provide clients' Algo data to BestX on request.
Q30	If you provide proprietary analytics, please describe how relevant metrics are calculated (mid-price, risk-transfer benchmarks, etc.).
A30	Primary Market Inception Mid price is taken from the primary market at the point of order inception. Theoretical risk transfer price is calculated for the original size of the Algo order using internal pricing models. Each child order fill also provides the market bid/offer at the time, which is also taken from the primary market.

TCA	
Q31	If you provide proprietary analytics, is there a difference in data provided to different users? If so, please elaborate.
A31	No.

SWAPS	
Algo Users may have a need to roll an algo execution entirely/partially to one or more forward value date/s. If roll forwards are executed with the Algo Provider, it is crucial to understand if the respective swap prices are competitive and whether potentially sensitive order information is exposed. For example, does the swaps trader know which side of the quote the algo execution is on or do they receive a two-sided RFQ? Also, does the swap trader know they are quoting a captive spot fill or does it appear the same as RFQs that are priced in competition with other banks?	
Q32	What information is provided to the STIRT desk when there is a request for swap pricing from an algo order?
A32	In facilitating a client rolling an Algo execution to forward dates the trader is not given any information on the origin of the trade. From the trader's perspective the price request is like any normal RFQ.