

Wholesale Information and Trading System Manager

Schedule 2 – Non-Functional Requirements

9 September 2015

Version	Date	Annotation
1		Original, as agreed
1.1	25/05/2020	Update to clause 25.1(c) and 25.1(g)
1.2	22/06/2021	Update to clauses 2.3, 4.1(a), 8.2 and 14.2
1.3	19/02/2026	Update front page with current EA branding

Introduction

This document describes the non-functional features and attributes that the **Authority** requires of the Wholesale Information and Trading System (WITS) manager.

This document is part of the Wholesale Information and Trading System manager service provider agreement, and must be read in conjunction with that **agreement**, including the associated schedule 3 – WITS **functional specification**.

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1 Statutory Objective alignment

When providing the **services**, the **Provider** must provide those services in a way that assists the **Authority** to give effect to the **Authority's** statutory objective under section 15 of the **Act**. Nothing in this clause permits or requires the **Provider** to act in a manner that is inconsistent with the **Provider's** obligations under the **Act**, the **regulations**, the **Code**, elsewhere in the **agreement**, or any applicable law or regulation.

2 Application architecture

2.1 Industry standard

The **system** must be built on an industry standard, robust architecture that is resilient and scalable in the following areas:

- (a) hardware infrastructure;
- (b) operating system;
- (c) network topology;
- (d) application software;
- (e) database;
- (f) systems deployment and management; and
- (g) security, firewalls, virus protection, etc.

2.2 The **Provider** will not transition any infrastructure to a cloud based solution (or any non-**Provider** owned solution) without first obtaining the **Authority's** approval. This provision is to ensure that as technology develops in the future, the government standards for data integrity and security current and in development at the time will be taken into account as part of the development of the solution.

2.3 Independent environments

There must be a minimum of four separate and independent environments:

- (a) production
- (b) disaster recovery
- (c) development
- (d) **user** acceptance testing

Independence means that activity on the **user** acceptance testing and development environments must not affect the production environment in any way. The **user** acceptance testing environment must also be available for **users** to perform their own testing and staff training, during help desk hours. A robust

UAT environment must be made available sufficient for participant testing, with data refreshes being made upon reasonable request or annually.

22/06/2021 – Clause 2.3 amended, monthly UAT refresh no longer required, Variation #2

2.4 Scalability

The **system** must be easily scalable to accommodate for a growth in **users** and transactions, without significantly affecting performance and reliability.

- Full trader access - 25% growth
- Data access - 25% growth
- WITS free to air – 100% growth

If the **Provider** is using a cloud environment, the **Provider** must obtain assurances from the cloud provider that user/transaction growth can be readily accommodated within the timeframes specified by the **Authority** without impacting service levels.

2.5 Upgrades

Procedures for the implementation of upgrades to hardware and software must be agreed between the **Provider** and the **Authority** in accordance with the **agreement**. The timetable for the implementation of all upgrades must be advised to the **Authority**.

2.6 Data integrity maintenance

The **Provider** will be responsible for the maintenance of the **data** environment and must ensure that functionality is available within the application to reload corrected **data** if found within a reasonable period. The **Provider** must provide assistance to **users** in executing any such recovery.

The **Provider** must undertake the recovery of any database integrity and corruption issues and correct any errors that occur as a result of the **system** incorrectly processing any information.

The **system** must provide a mechanism for validation checks to prevent **users** from being able to load inaccurate information. This must be augmented by providing **users** with a file-checking facility.

2.7 Concurrent **users**

The **system** must be designed to cope with at least

200 concurrent full trader access users

150 concurrent data access users

500 concurrent WITS free to air users

Total **users** and the transaction volumes are detailed in Appendix D.

3 Websites, email addresses and branding

- 3.1 External communication with **users** and the public related to the **services** must include the **Authority's** approved logo, in a position on that communication type agreed with the **Authority**. This includes but is not limited to websites, templates for notices and **documentation** but excludes emails.
- 3.2 Website and generic email addresses relating to the **services** (except personal email addresses for the **Provider's** staff) are the property of the **Authority**. Where those addresses, including email addresses, use the **Provider's** registered domain, the **Provider** must cease using those addresses immediately if this **agreement** is terminated or expires.

For 12 months immediately after the **agreement** is terminated or expires or any transition period ends, whichever is the later, the **Provider** will forward any emails to the email address specified by the **Authority** and will post a message on the website directing viewers to a website address specified by the **Authority**.

4 Interoperability

4.1 interfaces

The following types of interface must be provided, as defined in the **functional specifications**:

- (a) a secure web browser user-interface for updating, viewing and downloading information in CSV and XML formatted files. Supported browsers must include currently supported versions of Microsoft Edge, Google Chrome and Firefox. The web server must support TLS 1.2 as a minimum; and
- (b) a facility to transfer files in CSV or XML format via SFTP.

22/06/2021 – Clause 4.1(a) amended, replaced Internet Explorer with Microsoft Edge, Variation #2

4.2 Extended System Interfaces

- (a) All inbound and outbound interfaces to the **system** must be efficient and secure. The interfaces must be designed using loose-coupling principles to ensure that the interfaces can be modified or re-implemented with minimal disruption, and so that the **system** can be easily separated with minimal disruption and cost from the other market operations service provider (MOSP) roles provided by the **Provider** to enable contestability of the MOSP roles.
- (b) All interfaces must be documented in the **functional specification** including source, target, format, mechanism and frequency.

5 Service Level Requirements

5.1 Continuous service

The **Provider** operates the electricity market wholesale information and trading platform used by electricity market participants to upload their bids and offers.

WITS also acts as a 'data hub' delivering pricing, scheduling and other market data to **users** and other parties. It must be available 24 hours daily and 7 days per week.

5.2 The WITS process is set out in the **Code** and **functional specification**. The **Code** also refers the "information system", and where the **Authority** defines the Information System to mean WITS is contained in the Information System Definition on the **Authority's** website (<http://www.ea.govt.nz/code-and-compliance/the-code/definitions/>). The **Code** sets out the minimum service levels however the parties may agree higher service levels in this **agreement**.

5.3 Service levels reported monthly

The **Provider** must provide the **Authority** a monthly report detailing service levels attained during the month and if not, reasons for any failure.

Table 1: Service levels reported monthly

Measure	Requirement	Report
Availability	>99.72%	% attained
File upload availability	>99.72%	% attained
Average time to publish NRSS & PRSS	<1.0 minutes	Actual minutes
Average time to publish NRSL & PRSL	<7.0 minutes	Actual minutes
Average time to publish interim/provisional/final prices	<1.5 minutes	Actual minutes

The target availability level of 99.72% relates to the equivalent of no more than 2 hours of unplanned outages per calendar month.

5.4 Maintenance

Unless otherwise approved in writing in advance by the **Authority** (such timely approval not to be unreasonably withheld) there must be no more than two planned outages per month, one of which is reserved for the monthly production release of **software**. Each planned outage must be at a time to be agreed by the **Provider** and the **Authority** and be no more than 2 hours in duration. Any planned outage of more than 2 hours duration must have the prior approval of the **Authority**, such timely approval not to be unreasonably withheld.

Approved, pre-planned outages do not count against service level targets.

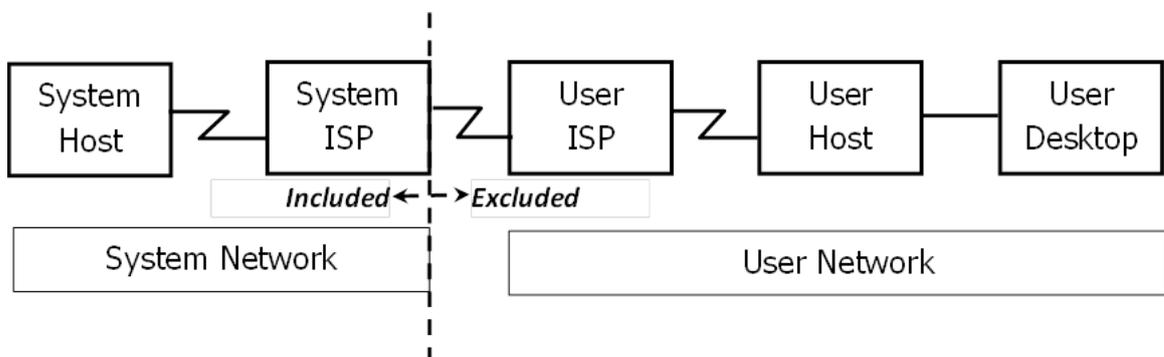
For urgent corrective maintenance (to fix **system** faults that are threatening the service levels set out in this document), the **Provider** may, having notified the **Authority**, undertake maintenance at any time. Any such unavailability will count against service level targets.

6 System availability

6.1 Service delineation

Both availability and outage service levels are delineated by the point at which any transaction enters or exits the **system's** subcontracted Internet Services Provider (ISP). All service components, including the **system** host, internal and wide area networks and ISP, are covered under availability and outage calculations. This is shown in Figure 1.

Figure 1: Service delineation



6.2 Calculation of availability

Availability will be calculated based on the number of minutes that the **system** is substantially unavailable in any one month due to failure of any component of the host or ISP, using the following formula:

$$\text{Availability} = 100 - (\text{minutes of unplanned outage and urgent corrective maintenance} / (\text{days in month} * \text{minutes of time from the appropriate availability window}) * 100)$$

6.3 Categorisation of outages

Unplanned and urgent corrective outages are included in the calculation of availability when the **system** is unavailable.

Planned, pre-approved, non-urgent maintenance outages are not included in the calculation of availability.

If the actions of any **user** has caused the outage to have occurred, or have contributed in a material fashion to the cause of the outage, then the **Provider** will not be held accountable for the outage. This includes any actions not taken by the **user** at the request of the **Provider** where acting on the recommendation would have avoided or minimised the outage. **User**-caused outages, or the

additional outage time caused by a **user** failing to take directed action, will not be included in the calculation of availability.

7 Recoverability and business continuity

7.1 Backup

Backup copies of all **data** and **processed data** must be taken at least daily and stored in a secure offsite location. Likewise, copies of the latest version of the **software** must also be kept offsite. At least weekly, a backup copy of the **data**, **processed data** and **software** must be delivered and stored at an offsite location at least 100km from the premises used to provide the regular **services**.

Alternatively, backup copies of the **data** and **processed data** can be stored in a cloud based facility, subject to approval by the **Authority** and compliance with Government Chief Information Officer (GCIO) standards for cloud based computing services.

The **Provider** must have a plan in place to restore backup **data** and **processed data**, and recover lost **data** up to the point of restoration. The plan must be available to the **Authority** as part of the **documentation**.

7.2 Business continuity plan

The **Provider** must develop and keep up to date a business continuity plan (BCP). If the **system** includes a cloud-based computing environment, then the **Provider** must provide assurance that the cloud provider maintains a fault-tolerant environment that meets the **Authority's** required service levels or can demonstrate a failover of the environment to another cloud based computing environment.

The BCP must:

- (a) be aligned with the current version of ISO 22301 or NFPA1600 or another recognised standard for business continuity planning;
- (b) be regularly tested (at least annually, but may be more frequently if required) and the results of each test reported to the **Authority** in the next monthly report;
- (c) be provided to the **Authority** before the initial BCP or any changes are implemented, and the **Provider** will consider any feedback provided by the **Authority**;
- (d) contain contact details for the **Provider** nominated contact person, including backup contacts. The contact details are to include multiple methods of contact including physical location and access details for all physical locations where the contact may be located when providing the **services**.

7.3 Recovery time

The BCP must include a disaster recovery plan designed to recover the **system** in the event that the **Provider's** site (that contains the **system**) is inoperable. A real-time disaster recovery **system** must be available to commence **services**

within a period of two hours from failure of the production **system** and must ensure that no more than ten minutes of pre-failure **data** and **processed data** is lost in the event of the primary **system** failing, and must ensure the lost **data** and **processed data** is restored with the cooperation of **users**.

7.4 Disaster recovery testing

The **Provider** must test the disaster recovery plan and disaster recovery **system** prior to the commencement of operation and every six months thereafter. The test must include:

- (a) obtaining the prior written approval from the **Authority** for the date and time of a disaster recovery test;
- (b) notification to all WITs **users** of the date and time of the disaster recovery test, and any changes to URLs, addresses etc. for the duration of the test;
- (c) activation of the disaster recovery **system** at the remote location;
- (d) verification of the disaster recovery **system** availability to an external **user**;
- (e) transfer of the production environment to the disaster recovery **system** for a period of at least two **business days** at the date and time agreed under a) above;
- (f) testing of files and updates; and
- (g) transfer of the production environment back to the production **system** at the date and time agreed under a) above.

The **Provider** must provide a written report to the **Authority**, in the next monthly report after completion of the disaster recovery test, of the results and ensuing actions.

7.5 Alternative submission and publication facility

The **Provider** must provide alternative submission and publication facilities to **users** in the event that the production **system** is unavailable, as required by the **Code**. These procedures must be agreed with the **Authority** and **users**.

8 Security and confidentiality

8.1 Authority Policies

The **Provider** must comply with the **Authority** policies as updated from time to time, related to information and security where those policies and updates are provided by the **Authority**. The policy outlines the **Authority's** expectations for managing personnel, physical and information security. The **Provider** may provide feedback to the **Authority** about the application of those policies. If the application of those policies will result in changes to the **services** or impose material costs on the **Provider**, the **Provider** may initiate the change management process to implement those changes.

8.2 Application of NZISM or NIST

The **Provider** must meet the objectives of the New Zealand Information Security Manual (NZISM) or the National Institute of Standards and Technology (NIST), and must use best endeavours to maintain the security of the system, data and processed data against unauthorised access or use.

22/06/2021 – Clause 8.2 amended, NIST is permitted as an alternative to NZISM, Variation #2

8.3 Authentication

The **system** must have a framework for management and authentication of **users**. The **system** must have the capability to recognise, block and report unauthorised access attempts.

8.4 **User** access provisions

- (a) Access restrictions are directed at preventing any action that would compromise a secure, reliable and efficient **system** for the wholesale electricity market.
 - (i) Restrictions on access to the **system**, and to **data** and **processed data** within the **system** apply to all **users** and are to protect confidential information, such as detailed submission, reconciliation or supporting information.
 - (ii) Restrictions also prevent activities that could interfere with access by other **users** or jeopardise the operation of the **system**.
- (b) The **Authority** may instruct the **Provider** from time to time to modify access restrictions for any **user** of the **system**.
- (c) The **system** must provide multiple categories of access to WITS. The **Authority** will advise the **Provider** of the category of access that must be given to each WITS **user**. There are three main categories of access to WITS:
 - WITS Free to Air
 - WITS Data
 - WITS Full Trader

WITS Free to Air provides web browser read-only access (downloadable) to a limited range of non-confidential information. WITS Free to Air must be available to anyone without **Authority** approval, via the **Authority's** website at: www.electricityinfo.co.nz/comitFta/ftaPage.main.

WITS Data provides web browser read-only access (downloadable) to all non-confidential market **data** and **processed data**. WITS Data is restricted to persons approved by the **Authority**. WITS Data **users** include participants who do not need to use WITS access for the purposes of complying with the **Code**, as well as some non-participants.

WITS Data access requires FTP/SFTP, or web services interfaces to transfer data for integration into a **user's** back office system, and web browser access

WITS Full Trader is provided to **users** that need to submit information to the WITS **system**, as the specified 'information system', in order to comply with their **Code**-related obligations. Within WITS Full Trader, the level of write access varies in each case depending on the information that the participant is required to submit or receive under the **Code**. Only **users** approved by the **Authority** are allowed access to WITS Full Trader.

WITS Full Trader access requires FTP/SFTP, or web services interfaces to transfer data for integration into a **user's** back office system, and web browser access.

- (d) Participants that may require WITS Full Trader access to fulfil **Code** obligations are:
- (i) generators
 - (ii) retailers
 - (iii) direct purchasers
 - (iv) traders in electricity
 - (v) distributors
 - (vi) load aggregators
 - (vii) ancillary service agents
 - (viii) dispatchable demand purchasers
- (e) **User** access provisions must:
- (i) be assignable by access type (Full Trader, Data or free to air)
 - (i) be assignable by participant identifier (assigned by the **Authority**)
 - (ii) limit access to company specific information to the participant identifier
 - (iii) provide access to non-company specific information
 - (iv) be able to be individually set and control access at both function and specific data level for each **user** for
 - no access,
 - read only access or
 - read/write access.

8.5 Security policy

The **system** must have a security policy in place and have mechanisms that enforce the password standard, account lock-out for unsuccessful logon attempts and session timeouts. Session timeouts must be configurable. Any subsequent sessions must automatically terminate previous sessions.

8.6 Logs

The **system** must maintain audit logs of **user** interactions with the **system** and the **Provider** must investigate all alerts of repeated unsuccessful logons to prevent unauthorised access. The audit logs must provide information for **users** to analyse their own usage patterns of the **system**. This information must be made available on request.

8.7 Confidentiality

The **Provider** must ensure that all **data** and **processed data** remain confidential to the **Provider**, the **Authority** and the participant that provided the **data** unless the **services** or **Code** explicitly require the **Provider** to publish or release the **data** or **processed data**. The **system** must maintain the confidentiality of each participant's information by only allowing requests by that participant's **users** to access the **system** on their behalf.

8.8 Security and confidentiality incidents

Security and confidentiality related events will be reported to the **Authority** and a service management event created in GoToAssist according to the Service Management Procedure.

9 Capacity

9.1 Capacity planning strategy

The **Provider** must have a well-defined and documented capacity-planning strategy in place to ensure that the **system** always maintains enough capacity for the predicted amount of **data** and **processed data** and processing requirements plus a margin to ensure the service levels are always met.

9.2 Management utilities

The **Provider** must use system management utilities that will measure the capacity of the **system**, to show trends and therefore assist with predicting future capacity requirements.

9.3 Excess volumes

The **Provider** must promptly advise the **Authority** if increases in transactional volume beyond the levels agreed threaten the achievement of service levels. The **Provider** will promptly review the capacity of the **system** and increase its capacity, if necessary, to maintain the service levels.

If the service levels cannot be met and transaction and/or database volumes are less than those agreed, the **Provider** will be responsible for taking such remedial action as is necessary to meet service levels.

Where transaction and/or database volumes exceed those agreed with the **Provider**, or **Code** changes have increased complexity to the extent that service levels cannot be met, then the **Provider** and the **Authority** will initiate the agreed change control process if any changes to the **services**, **system** or **fees** are required.

10 Data Management

10.1 Data ownership

The **Provider** must store the **data** and **processed data** securely, manage data and **processed data** according to a lifecycle agreed with the **Authority**, and provide it to the **Authority** via SFTP or a secured online portal as agreed. The rights around use and ownership are defined in clause 9.7 of the **agreement**.

Data and **processed data** must not be used by the **Provider** for any unauthorised use.

10.2 Data provided to the Authority

- (a) The data and processed data that the **Provider** will send to the **Authority** is listed in **Appendix A**:
- (b) Unless agreed otherwise this **data** and **processed data** will be sent via SFTP.
- (c) If the **data** being provided will be late or missing, or there is an outage or disruption (planned or unplanned) to the system providing the **data**, the **Provider** will inform the appropriate **Authority** representative:
 - (i) as soon as practicably possible for unplanned outage, late or missing **data**;
 - (ii) at least one **business day** prior to a planned outage.

10.3 Archiving and restoring data

The architecture must allow historic **data** and **processed data** to be archived and restored without impacting the operation of the **system**.

10.4 History

The **system** must retain **data** and **processed data** for immediate access for a minimum of seven years, after which time the **Provider** may archive **data** and **processed data**. If **data** and **processed data** is archived, it must be archived via an **Authority**-approved mechanism and provided to the **Authority** with appropriate metadata attached as agreed by the **Authority**.

11 Audit trail/traceability

The **system** must maintain an audit trail of all **data** and **processed data** input, added or changed, confirmations delivered, notifications delivered and the delivery of information to **users**. Audit information must include time, **user**, method and any other pertinent information to allow for full tracking from source to destination.

12 Service management

12.1 Industry standard

The **Provider** must employ best practice such as ITIL (Information Technology Infrastructure Library) for service management including robust quality assurance processes.

12.2 Service management standards

The following service management standards set the minimum standards for fault reporting and restoration of the **services**. As the **Provider** would be both performing the **services** and supporting the **system** the service management standards apply equally for internal and external **users** of the system.

The service management standards are shown in Table 2:

Table 2: Service management standards

Severity level of Fault	Definition	Service Level response and response time
1	<p>Business Critical Failures: An error in, or failure of, the system that:</p> <ul style="list-style-type: none"> (a) materially impacts the operations of the service; (b) prevents necessary work from being done; or (c) disables major or critical functions of the system. 	<p>Level 1 Response: Acknowledgment of receipt of a support request within 15 minutes.</p> <p>Level 2 Response: Appropriately skilled person to respond within 1 hour of the support request.</p> <p>Level 3 Response: The Provider shall work on the problem continuously and implement a solution within 6 hours of receipt of the support request.</p> <p>If the Provider delivers a solution by way of a workaround reasonably acceptable to the user, the severity level assessment shall reduce to a severity level 2 or lower.</p>
2	<p>System Defect with Workaround:</p> <ul style="list-style-type: none"> (a) a critical error in the system for which a work-around exists; or (b) a non-critical error in the system that affects the operations of the user service. 	<p>Level 1 Response: Acknowledgment of receipt of a support request within 2 hours.</p> <p>Level 2 Response: The Provider shall, within 1 business day after the Level 1 Response time has elapsed, provide an emergency fix or workaround which allows the user to continue to</p>

Severity level of Fault	Definition	Service Level response and response time
		<p>use all functions of the system in all material respects.</p> <p>Level 3 Response:</p> <p>The Provider shall provide a permanent fix as soon as practicable and no later than 20 business days after receipt of the support request.</p>
3	<p>Minor Error:</p> <p>An isolated or minor error in the system that:</p> <ul style="list-style-type: none"> (a) does not significantly affect system functionality; (b) may disable only certain non-essential functions; or (c) does not materially impact the user's operation of the system. 	<p>Level 1 Response:</p> <p>Acknowledgment of receipt of the support request within 1 business day.</p> <p>Level 2 Response:</p> <p>The Provider shall provide a permanent fix within 40 business days after the Level 1 Response time has elapsed.</p>
4	<p>Non-disruptive error</p> <p>An isolated or minor error in the system that has agreement from the Authority and the user that reports the error to leave the fix until the next convenient release</p>	<p>Level 1 Response:</p> <p>Acknowledgment of downgrade of severity to level 4 within 1 business day of downgrade.</p> <p>Level 2 Response:</p> <p>The Provider shall provide a permanent fix at the next convenient opportunity as agreed with the Authority.</p>

12.3 Communication

If an incident affects more than one **user**, the **Provider** must notify all **users**.

The **Provider** must develop multiple formal communication channels, such as email, text messaging, website etc., to promptly notify **users** and the representative of the **Authority** of outages and likely timeframes for restoration of service.

The **Provider** must provide an escalation process for **users** in the event of either a failure of the **system** extending beyond service level thresholds or in the event of continued **user** service issues.

For severity 1 and 2 incidents the **Provider** must also liaise with the representative of the **Authority** and **users** not less than daily, including advising of expected times for the resumption of the **services**.

12.4 Incident reporting

A summary of all incidents and their resolution times must be included in the monthly report on service levels.

The **Provider** will provide the **Authority** access to view (as a minimum) relevant entries on the GoToAssist system change and issue register.

13 Technology currency

13.1 The **Provider** will ensure all infrastructure hardware is kept current and up to date, and that all infrastructure operating systems and other supporting software are maintained at current supported versions. The **Provider** will ensure that vendor support is in place continuously for all aspects of the **systems**.

13.2 The **Provider** will provide to the annual auditor, confirmation that all infrastructure is current and that vendor support is in place for the coming year.

13.3 The **Provider** will not transition any infrastructure to a cloud based solution (or any non-**Provider** owned solution) without first obtaining the **Authority's** approval. This provision is to ensure that as technology develops in the future, the government standards for data integrity and security current and in development at the time will be taken into account as part of the development of the solution.

14 Changes to the services or system

14.1 Change control

For changes to the **services** or the **system**, the **Provider** must follow the change control process as set out in Appendix B of this document. The change control process must be integrated into the **Provider's** internal change management processes with respect to the efficient management and reporting of progress.

14.2 Which form of document is used to record a change.

All changes to the **services** or **system** must be agreed in writing by the **Provider** and the **Authority**, and that agreement will be recorded in either a change request (CR) or a Statement of Work (SoW) associated with the MSDA signed between NZX and the Authority on 10 July 2020. Generally a CR will be used when the change is of low complexity, low impact or low cost. A CR will be used if:

- (a) the cost of the change is below \$250,000; and

- (b) less than 10% of the functionality of the **system** or **services** is being altered; and
- (c) less than 10 % of the source code of the **software** is being altered; and
- (d) there is low probability of the scope or the charge to the **Authority** changing as the project progresses; and
- (e) the change is not a material part of a major **Authority** policy implementation; and
- (f) a formal warranty period is not required; and
- (g) there is no material impact on the **users** to implement the change in their systems.

22/06/2021 – Clause 14.2 amended, SDA replaced by SoW from signed MSDA, Variation #2

These are general guidelines and the **Provider** and the **Authority** may agree to use a CR if these thresholds are exceeded. However the **Provider** and the **Authority** must give explicit consideration to using a SDA, and if a CR is used, the reasons for doing so must be recorded in the CR.

The **Provider** and the **Authority** may agree to use a SDA for changes below these thresholds.

14.3 Industry standard

The **Provider** must employ industry standard software engineering practices including robust quality assurance processes. Any methodology must cover the whole system development lifecycle (SDLC) in the development and maintenance of software.

14.4 Flexibility

The **software** must be designed for flexibility to ensure changes to functions, as a result of **user**, participant or **Authority** requests and **Code** changes, can be made efficiently and cost effectively. The **system** must have a modular design which allows changes to specific business processes to be isolated to those areas only with minimal impact on other parts of the **system** or external interfaces.

The **Provider** must be able to develop custom reports, both one-off and for regular delivery, on request from the **Authority**.

15 Design consultation

The **Provider** must provide input to the design process for the **Authority's Code** amendment initiatives to promote efficient **Code** design. This is limited to a high level assessment of initiatives proposed by the **Authority**, and will require the **Provider** to proactively keep up to date with the **Authority's** initiatives.

Consequent changes to the **services** will be dealt with using the change control process, and therefore detailed input will be provided as part of the change control process, and is not required as part of the design consultation.

The **Provider** must respond constructively to requests for change from the **Authority** or other market operations service providers (MOSPs) by assessing the potential impact and cost and engaging in dialogue to achieve efficient design.

The **Provider** must proactively propose any changes that it perceives will improve efficiency of delivery of the **services**.

16 Audits under clause 3.17 of the Code

Audits required under the **Code** must be carried out in accordance with the software audit guidelines in Appendix C.

17 Government Standards

17.1 The **Provider** must also demonstrate alignment with the Records Management and Security Standards as referred to in the GEA-NZ standards.

17.2 Historical information

The **Provider** will be required to maintain all the historical **data** and **processed data** contained in the **system** immediately prior to 1 May 2016 for use in providing the **services** relating to periods prior to 1 May 2016.

17.3 The **Provider** will provide and keep updated an ICT operations risk assurance plan, consistent with the recommendations of the GCIO. This plan is to be included in the **documentation**.

18 User liaison

18.1 Operational Relationship

The **Provider** is required to maintain close contact with **users** and the **Authority**, be proactive, provide advice on future functionality and ensure that the **system** remains responsive, up to date and consistent with the needs of the industry.

The **Provider** will allow reasonable access for **Authority** staff to become familiar with the **Provider's services**. This may involve short term secondments, shadowing the **Provider's** staff, including developers and **system** support staff, or spending time and discussing the **services** with the **Provider's** staff while the **services** are being performed.

18.2 User group

The **Provider** will set up a **user** group for participants that use the **services**. The **user** group will be open to all **users** including the system operator and the **Authority**. The **user** group will meet regularly, at least biannually. The **Provider** may combine the **user** group meetings with similar meetings from the **Provider's** other MOSP roles.

18.3 User satisfaction survey

The **Provider** is required to develop, have approved by the **Authority**, and distribute a survey of all **users** that analyses the satisfaction levels of the **service** provision. The results must be consolidated and the report must include the actions the **Provider** proposes to take to resolve any unsatisfactory results. The report must be completed and provided to the **Authority** annually before the end of March, in a form agreed by the **Authority**.

18.4 Key stakeholder meetings

The **Provider** will conduct face to face stakeholder meetings with key stakeholders. These meetings will be conducted at least annually. The **Provider** may conduct additional stakeholder meetings at any time. The **Provider** and the **Authority** will agree the key stakeholders to be met and may agree to combine meetings with similar meetings required from the **Provider's** other MOSP roles. The **Provider** will report the outcomes of these meetings to the **Authority**.

19 Training

19.1 The **Provider** must make available structured Industry training beyond basic use of **software**, at the cost of the **user**. The training course will cover:

- (a) a brief introduction to the **Provider's** role and its place in the 'big picture';
- (b) a reasonably thorough review of key role processes;
- (c) an overview of important **user** obligations relevant to each role;
- (d) introduction to, and basic use of each role's **user** interface;
- (e) practical hands-on experience in a UAT type environment;
- (f) how to contact the **Provider's** team both for day to day operational issues and to engage in the development of the **systems**.

19.2 The **Provider** will provide basic training materials on line at no cost to the **user** by 1 October 2016.

19.3 The **Provider** will provide online help, to include full and detailed information about each aspect of the **system** including:

- (a) data definitions;
- (b) setup information;
- (c) FAQs;
- (d) **system user** guide;
- (e) troubleshooting guide;
- (f) contact information;
- (g) business continuity information.

This includes a searchable help system allowing **users** to easily locate the content they need. All of this material will be geared towards new **users** but will also be relevant to existing **users**.

- 19.4 The **Provider** must present to two one-day **Authority** initiated industry forums in Wellington per annum at no cost. The details of the forum and the material to be presented will be agreed at the monthly meeting at least one month prior to the scheduled forum date.

20 Documentation

20.1 Required documentation

The **Provider** must develop, maintain and provide as a minimum to the **Authority**:

- (a) an up-to-date **functional specification** against which the **software** comprised in the **system** including input and output interfaces can be audited as per the requirement in clauses 3.17 and 3.18 of the **Code**, and to assure the **Authority** that additional requirements are being provided correctly. The **functional specification** is the 'software specification' referred to in the **Code** as well as the document in which additional requirements requested by the **Authority** is recorded. The **functional specification** and any subsequent changes are the property of the **Authority**;
- (b) a **user** manual and online help facilities to enable new **users** to configure their systems correctly and access the **system** to the level of detail agreed with the **Authority**. The documentation must provide sufficient detail for new **users** to locate and use all the relevant functions. The **user** manual must include a troubleshooting guide, frequently asked questions and information on where and how to seek further help;
- (c) backup procedures describing alternative methods for the submission and delivery of **data** and **processed data** as required by the **Code**;
- (d) a business continuity process manual that describes the procedure, possible impacts on **users** and their operations and instructions on what **users** will need to do for business continuity; and
- (e) sufficient technical documentation for business continuity in case of the loss of key personnel. This must include a design specification that describes how the **system** delivers the functions described in the **functional specification** and operational requirement documents.
- (f) up to date, technical documentation that details the hardware, infrastructure and **software** configurations and settings. The purpose of this documentation is to enable the **Authority** to set up the **software** on a system with another provider without delay if this **agreement** is lawfully terminated, and to ensure the contestability of the WITS role at the natural expiry of this **agreement**.
- (g) business process information that covers all business processes required to perform the **services**, not just **software** based **services**.

20.2 Access to documentation

- (a) All **documentation** must be readily accessible at all times to **Authority** staff through the **Provider's** 'Provider Information Portal' (PIP). The **Provider** will ensure the PIP has the ability for the **Authority** to make copies of any **documentation** for its own use. The **Authority** will only use the **documentation**, including any copies, in accordance with the requirements of the relevant clauses of this **agreement** and the **Software Licence Agreement**.
- (b) The **Provider** must annotate any contents of the **documentation** that it considers may allow or facilitate unauthorised access to the **systems** if it was released by the **Authority**. The **Authority** acknowledges that annotated documentation is sensitive and the security of the **system** may be vulnerable if the **Authority** does not keep the annotated portions of the **documentation** confidential.

20.3 Software source code

- (a) The **Provider** will supply to the **Authority** a full copy of the **software** source code, including any associated scripts, on 1 May 2016.
- (b) The **Provider** will supply to the **Authority** an updated copy of the **software** source code, including any associated scripts, whenever the **software** or scripts are changed.
- (c) The **Provider** will supply to the **Authority** a full copy of the **software** source code, including any associated scripts, on 1 November 2016, and every six months thereafter, and whenever requested by the **Authority**.

21 Upgrade and improvement services

The **Provider** will provide Upgrade and improvement services to the **Authority**. These services are intended to advance **Authority** initiated programs and implement **Authority**, **Provider** or participant requested changes to the **Provider's systems** or **services**.

In managing the Upgrade and improvement service program, the **Authority** and the **Provider** will participate in a joint development process. This process will be governed by its own terms of reference and will regularly engage in joint development process (project coordination) meetings. The joint development process will, at a minimum, manage multiple project resource conflicts and priorities, and will agree a joint project lifecycle process. The parties agree that the project deliverables and project artefacts defined and agreed as part of the joint project lifecycle process from time-to-time will form part of the **agreement** deliverables.

22 Third party innovation

- 22.1 The **Provider** may offer related services to **users** that use the **software**, **system**, **data** or **processed data**.

- 22.2 The **Provider** must ensure that any advice it gives or services it offers to **users** as part of third party innovation is, to the extent possible, consistent with enabling the **user** to comply with their obligations under the **Code**. The **Provider** must advise any recipient of the third party innovation in writing that the responsibility for ensuring compliance with the **Code** lies with the **user**.
- 22.3 When offering or providing third party innovation, the **Provider** must contract directly with the **user**. The **Authority** will not be liable for any costs associated with providing the third party innovation that the **Provider** may incur and will not be liable for any loss, claim, demand, damage, cost, expense or liability in connection with the third party innovation.
- 22.4 In providing the third party innovation, the **Provider** must not disclose any **data, processed data, documentation** or other related information that is not normally available to the client that is receiving the third party innovation. No services may be offered that result in **data** being reported to the client that the client could not access through standard reporting.
- 22.5 Unless paragraph 22.6 applies, all additional functionality that a client requests the **Provider** to develop:
- (a) may be for the exclusive use of the **user** for a period of no more than six months;
 - (b) must be available for all **users** to use, once any exclusivity period ends;
 - (c) must follow the change control process and be audited in accordance with Part 3 of the **Code** and documented in the **functional specification**;
 - (d) is part of the **software, system** and/or **documentation** as appropriate.
- 22.6 Any additional functionality that a client requests the **Provider** to develop and is for the continued exclusive use of the **user**:
- (a) must be external to the **services** and the **system**, and will not be recorded in the **functional specification** or included in the **Authority's** software audits;
 - (b) must not detract from **system** performance or negatively impact any other user's use of, or access to, the **system**;
 - (c) will not be considered in any subsequent changes made by the **Authority** to the **services** or the **system**.
- 22.7 If any additional functionality developed by the **Provider** for exclusive use by a **user** requires modification or testing as a result of an **Authority** requested change to the **services**, such modification and testing must not negatively impact the delivery of **Authority** requested changes to the **services**.
- 22.8 If the **Provider**, or a client of the **Provider**, identifies any issue or defect with the **system**, or if a **user** requests any **system** enhancements, the **Provider** must pass that information on to the **Authority**. The **Authority** will prioritise any issue, defect or enhancement in the same way as it does others coming from any other **user**.

22.9 When developing additional functionality for a **user**, the **Provider** is responsible for making the **user** aware of the impact of sections 22.5, 22.7, and 22.8.

23 Performance management

23.1 Establishing a joint goal setting framework

The **Provider** will work with **Authority** to develop a meaningful and workable joint goal setting framework. This will be focused on the **Provider's** service provision activities or functions that will have the greatest impact on supporting the **Authority's** priorities for any given period and also which advance the **Authority's** statutory and organisational objectives. These goals may be short term focussed, or alternatively, span over several years.

Once established, the **Provider** and the **Authority** will regularly review progress at the monthly meetings. Annually, the parties will formally discuss results and set new or confirm ongoing goals and measures for the coming year.

23.2 Timing for performance management components

Activity	When
Establish goals	Annually in August
Establish measurement system	Annually in August
Self assessment and Authority review	Monthly meetings
Formal review and recognition	Annually in July or August

23.3 Systems roadmap

Annually the **Provider** will prepare an up-to-date strategic plan (road map) for the WITS role. While this process will be led by the **Provider** the plan will be developed and reviewed in close collaboration with the **Authority**. The road map process is intended to allow both parties to address issues of a longer term strategic nature.

24 Provider contacts

The **Provider** will advise the **Authority** of all changes in operational and management personnel used to provide the **services**, including contact details for new personnel. The **Provider** will provide to the **Authority**, and keep up to date, the **Provider's** most current organisational structure for personnel used to provide the **services**.

25 Monthly Report

25.1 The **Provider** will provide a monthly report by the 10th business day of the month, reporting on the monthly activities for the previous calendar month. The monthly report will be published by the **Authority**, should not include specific reference to any **users**, and will contain:

- (a) a report on the status of the **functional specification**;
- (b) the report on service levels as specified in paragraph 5.3;
- (c) a summary of WITS service activities and relevant market information, if requested by the Authority;

25/05/2020 – Clause 25.1(c) amended Variation #1

- (d) confirmation that the backup requirements have been met or if not, the reasons for not;
- (e) details of any BCP or disaster recovery testing performed;
- (f) details of any security breaches and attempts at breaching the security of the **systems**;

~~(g) measure of the **system** capacity and utilisation of that capacity;~~

25/05/2020 – Clause 25.1(g) removed Variation #1

- (h) a summary of all service management incidents and their resolutions;
- (i) a summary report of the status of all CRs and SDAs;
- (j) a summary of all design consultation provided including the number of chargeable hours for each staff member for which the **Authority** will be charged;
- (k) details of the number of hours used for Upgrade and improvement services for each resource for the month, and the year to date totals
- (l) a summary of any **user** group meetings held and the items discussed;
- (m) a list of any key stakeholder interviews planned for the coming month and a report of discussions and resultant actions from any key stakeholder interviews conducted;
- (n) the status of any **Provider** initiated audits performed during the month, and the status of action on recommendations from previous **Provider** or **Authority** initiated audits;
- (o) breaches of the **Act**, regulations, **Code**, or **agreement**;
- (p) events that may highlight an area where a change to the **Code** may need to be considered;
- (q) any other matters reasonably required by the **Authority**.

25.2 Combining Monthly reports

The **Provider** may combine monthly reports for multiple MOSP roles it holds. A combined report must contain all the required information for each role.

26 Meetings

26.1 Monthly operational meeting

Operational representatives from the **Provider** and the **Authority** will meet monthly, generally towards the end of the month. These meetings should not be cancelled but may be moved up to one week to suit availability of staff. Alternates may attend in place of unavailable staff, but those alternates must familiarise themselves with the discussion topics prior to the meeting. The purpose of these meetings is to build and maintain an excellent working relationship between the operational teams. Standing agenda items will include:

- (a) review the issues register;
- (b) review any open change requests;
- (c) update and inform the operational teams of progress on any projects managed outside the operational teams;
- (d) discuss any items of interest from the monthly report;
- (e) discuss progress on any actions resulting from a **Provider** initiated or **Code** mandated **software audit**.

26.2 Joint development programme (project coordination) meeting

Project and operational management representatives from the **Provider** and the **Authority** will meet regularly, but no less often than two monthly. The purpose of these meetings is to:

- (a) review and manage resource allocations for all changes that are in progress or are shortly to start, including managing prioritisation requests from requestors of change ;
- (b) coordinate projects that involve multiple MOSPs and/or the system operator;
- (c) review the use of resources against available Upgrade and improvement services hours, and agree if unused hours will be transferred to the following financial year.

26.3 Regular relationship managers meeting

Relationship managers or executives will meet regularly but no less often than two monthly. The purpose of these meetings is to:

- (a) ensure there is open dialogue and no surprises between the parties;
- (b) ensure there is an excellent working relationship between the parties;
- (c) address any escalated issues.

26.4 Annual meeting

Representatives from the **Provider** and the **Authority** will meet annually to:

- (a) review the previous year's performance;
- (b) set any new or changed **performance measures**;

- (c) discuss the planned number of hours, project programme and project priorities for the Upgrade and improvement services;
- (d) discuss technology currency and vendor support arrangements;
- (e) review the **Provider's** alignment with the **Authority's** statutory objective, and agree any actions for the coming year to increase alignment;
- (f) review the **Provider's** plan for **Provider** funded enhancements, **system** maintenance and infrastructure lifecycle maintenance;
- (g) review the ICT operations risk assurance plan and the systems roadmap;
- (h) for any year in which **Provider** initiated audits (or any part thereof) will be performed, set the scope of the audit(s).

26.5 Combining meetings from different roles

The **Provider** and the **Authority** may agree to combine the above meetings with similar meetings from the **Provider's** other MOSP roles.

Appendix A Extended interfaces

A.1 The following table lists the interfaces from the WITS **system**. The formats and technical details of these interfaces must be documented in the **functional specifications**

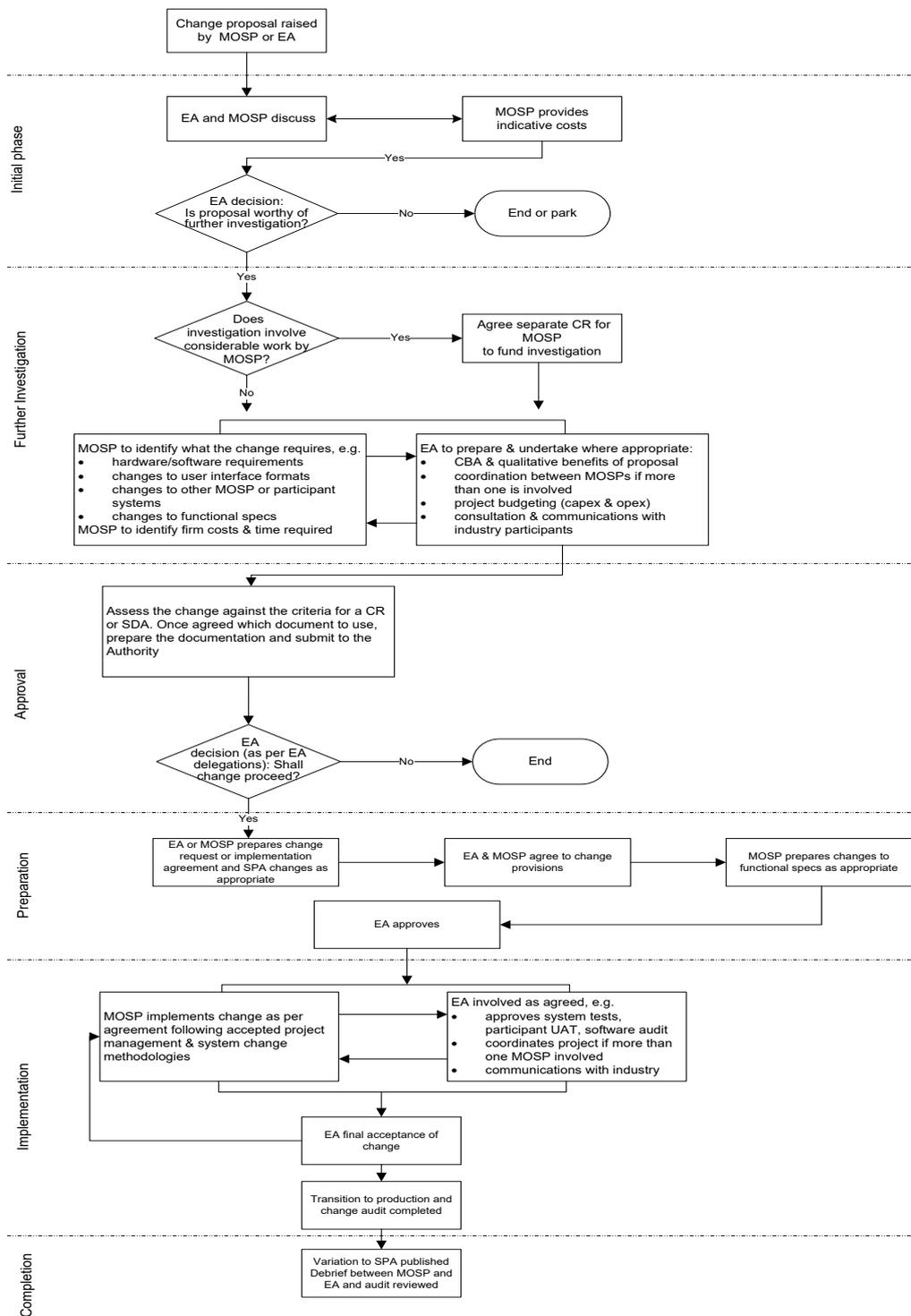
System A	Push / Pull	System B	How	For	Description
WITS	pushes to	MOSP data archive	DB Link	Archiving	Archiving of old data (10 days to 2 months depending on tables)
WITS	pushes to	Authority	Automatic SFTP	Pricing Case Files register	Details of all pricing case files and whether they are associated with a price type publication
WITS	pushes to	Authority	Manual SFTP	Monthly data	All Generator Offers for the previous month (i.e. File of April's offers to be supplied in May)
WITS	pushes to	Authority	Manual SFTP	Monthly data	All Final Energy Prices for the previous month
WITS	pushes to	Authority	Manual SFTP	Monthly data	All Bids, Difference Bids, Retailer Reserves, Generator Reserves and Frequency Keeping orders for previous month
WITS	pushes to	Authority	Manual SFTP	Monthly data	All Final Reserve Energy Prices for the previous month
WITS	pushes to	Pricing manager	Automatic SFTP	Pricing validation	Details of all pricing case files and whether they are associated with a price type publication
WITS	pushes to	Clearing manager	Automatic SFTP	Must Run Dispatch Auction	Bids and demand data entered into the WITS front end is passed to clearing manager for processing

System A	Push / Pull	System B	How	For	Description
WITS	pushes to	Clearing manager	Automatic SFTP	Prudential management	Final trading information required for management of prudential requirements such as offers, pre-dispatch schedules, final prices for energy and reserves
WITS	pushes to	Clearing manager	Automatic SFTP	Grid information	Grid information
WITS	pushes to	System operator	Automatic SFTP	Ancillary services	Upload additional information required by the system operator such as frequency keeping offers

Appendix B Change control process

B.1 If the change proposal is identified by the **Provider**, an initial assessment of materiality and cost is made. If the materiality and cost is low, or the change is to remedy a failure of the **Provider** to meet the terms of this **agreement**, then the change is at the **Provider's** cost. The **Provider** may consult with the **Authority** as part of this initial assessment process.

Change Control Process



Appendix C **Audit guidelines (For audits under clause 3.17 of the Code)**

C.1 Purpose of this appendix

The purpose of this appendix is to provide the **Provider** with guidelines for deciding when software audits are required. Clauses 3.16 to 3.18 of the **Code** set out **Provider's** responsibilities for software audits. This appendix considers in more detail what should be the extent of an annual audit, exactly what types of **software** changes should require a software audit and how **software** changes that do not require auditing should be treated.

C.2 Definition of software

The term "software" is defined in Part 1 of the **Code**, and for the purpose of this appendix is interpreted to mean the application **software** that the **Provider** uses to deliver the functions defined in the **functional specification** that forms part of this **agreement**.

C.3 Purpose of software audits

The purpose of software audits is to give assurance to the **Authority** that the **software** delivers the functions described in the **functional specification** and that it conforms to the **Code** and the Electricity Industry Act 2010 (**Act**).

C.4 Code mandated Audits

In accordance with clause 3.17 of the **Code**, there are three types of audit that the **Provider** is subject to:

- (a) an initial audit before any **software** is first used by the **Provider** in connection with the **Code**, and Part 2 and subpart 1 of Part 4 of the **Act**;
- (b) an annual audit (within 1 month after 1 March in each year) of all **software** used by the **Provider**;
- (c) an audit of any changes to the **software** or the **functional specification**, before it is used by the **Provider**.

The following software audit guidelines relate to items (b) and (c) only.

C.5 Software Change Audit

- (a) **Software** and **functional** specification changes that require auditing

All changes to the **software** must be implemented by following the **software** change control process as specified in this **agreement**.

All changes to the **software** and **functional specifications** must be audited, except bug fixes and enhancements that fall outside the scope of the core functionality as described in section C.10 "Not-auditable changes" below. Every change must be incorporated into a new release of the **software**. Details of each new release must be documented (as release notes) and published to all participants prior to its deployment into production.

Each release must be uniquely identified by its own release number. It should be noted that, in accordance with the **Code**, the **software** must be fully audited before being released into production for the first time. This will be a special case of a software change audit: one that reviews not only every function of the **software** but also the **software** development and **system** implementation processes.

(b) Purpose of the software change audit

The purpose of a software change audit is to provide assurance to the **Authority** that the requested change has been implemented as described in the updated **functional specification** and that it conforms with the **Code** and the **Act**. In addition, while it is not part of a software change audit to test the **software** for bugs, the audit must determine whether the **software** has been adequately tested.

C.6 Audit process

For a software change audit the auditor must:

- (a) ensure that the **functional specification** has been updated in sufficient detail so that the updates made are consistent with the rest of the document. The **Provider** is expected to keep the **functional specification** up-to-date, such that it always reflects the current state of the **software** and to maintain it at the same level of detail as in the original version of the document;
- (b) check that the change to the **software** conforms with the requirements of the **Code** and **Act**;
- (c) verify that the **software** performs as described in the updated **functional specification**. The objective should be to discover whether all the functionality has been delivered as described; however, it is agreed that this will involve only checking a representative sample of possible scenarios;
- (d) review the test scripts and test results from the testing stages of the change control process to determine whether all reasonable tests have been conducted and signed off correctly. The **Provider** must, therefore, develop and retain test scripts for all changes made to the **software** and record the results of testing.

C.7 Software change audit report

The software change report must state whether:

- (a) the **functional specification** has been updated;
- (b) the **software** change conforms with the **Code** and the **Act**;
- (c) the **software** change was tested properly.

The **Provider** must send the software change audit report to the **Authority** within one month following the completion of the software change audit.

C.8 Annual Audit

Purpose of the annual audit

The purpose of the annual audit is to provide assurance to the **Authority** that there has been no detrimental impact arising from changes made to the **software** during the previous year, and that the **software** is still compliant with the **Code** and the **Act**. It will also provide an opportunity to review the performance of the **software** during the previous year and to comment on any areas of concern or any trends identified or areas that the **Authority** directs. The objective of this should be to encourage the **Provider** to make improvements where possible.

Audit process

(a) For the annual audit the auditor must:

- (i) Check that all the functions described in the latest version of the **functional specification** are still being delivered by the **software**, in order to provide extra assurance that the changes made throughout the year have not adversely affected any of the other functions;
- (ii) Examine the fault log required under this **agreement** to discover what faults have occurred and whether they have been adequately tested and fixed. During the lifetime of the **system** the number of faults should fall rapidly. Once stable, new faults should be rare; however, when major changes are made there may be a temporary increase in the number of faults found. Any deviation from this general pattern could indicate problems with the **software**;
- (iii) Review the change history of the **software** for the previous year. The **Provider** must keep a log of all changes made to the **software** and also all upgrades of the development environment, database, communications and operating system software. Each change must have a set of relevant test scripts and signed test results;
- (iv) Examine the monthly performance reports and check that **performance standards** have been met and are being measured correctly. Any drops in performance must be explained. The overall trend should be one of constant or improving performance through the year. If this is not observed then it may indicate that the capacity of the **system** needs to be upgraded;
- (v) Check whether a **user** survey has been conducted by the **Provider** and examine the responses. The responses should be positive overall. Any issues mentioned by more than one **user** should have already been addressed or be in the process of being addressed by the **Provider**;
- (vi) confirm technology currency and vendor support arrangements.

C.9 Annual audit report

The annual audit report must:

- (a) detail whether the **software** still delivers the functionality described in the **functional specification**;
- (b) summarise all the changes that have been made to the **software** during the previous year, including any changes that are still in progress, and their cumulative effect, if any, on the **software** as a whole;
- (c) comment on performance and any discernible trends;
- (d) summarise all the fault activity that has occurred, highlighting any perceived problem areas;
- (e) comment on the level of **user** satisfaction with the **software**, noting any particular concerns of **users** and how these issues are being addressed.
- (f) confirm technology currency and vendor support arrangements.

The **Provider** must send the annual audit report to the **Authority** by 1 May in the relevant year.

C.10 Not-auditable changes

- (a) Software bugs

Software bugs remain in programs as a result of inadequate testing and, as such, are the responsibility of the **Provider**. The annual audit will offer an opportunity to check that bugs have been fixed and tested properly and allow the auditor to form at least a partial opinion about the overall quality of the **software** and the likelihood of future problems.

- (b) Infrastructure Software Upgrades

This category includes upgrades to database management, operating system, communications and other third-party software. Although these upgrades should not require auditing, it is expected that the **Provider** will perform extensive testing before putting them into production, as any incompatibilities between the upgrade and the **software** may adversely affect the performance levels specified in the **agreement**. The **Provider** is required to inform the **Authority** of these upgrades.

- (c) Other enhancements (additional functionality)

These are enhancements to the **system** developed by the **Provider** that fall outside the scope of the **software** as defined by the **functional specification** and the **Code**, and which are therefore not directly auditable. Depending on the exact nature of the proposed enhancement, the **Authority** may decide that a **software** audit is warranted in order to ensure that the existing functionality described in the **functional specification** is not adversely impacted.

C.11 Auditor

The **Provider** shall ensure that the same auditor (meaning, where the auditor is a company, the same person leading the audit) is not used for more than two consecutive annual audits except as otherwise agreed by the **Authority**

Appendix D Indicative Volumes as at 1 March 2015

D.1 Typical volumes for information received and published per participant company

File Type	Average number of files received per day	Average CSV file size (kB)
Order confirmations – bid	4	50
Order confirmations – offer	133	12
Order confirmations – GCMP	7	35
Order confirmations – PCMP	7	20
Order confirmations – FK	13	10
5-minute prices	288	16
5-minute prices summary	288	0
5-minute average prices	48	12
Real-time dispatch arc flows	288	1
Real-time dispatch infeasibilities	288	0
Weekly dispatch arc flows	1	62
Weekly dispatch infeasibilities	1	30
Weekly dispatch HVDC component flows	1	65
Weekly dispatch HVDC risk offsets	1	125
Weekly dispatch forecast demand	1	25
Weekly dispatch prices	1	3,400
Weekly dispatch reserve prices	1	30
Non-responsive prices (short)	48	110
Non-responsive prices (long)	12	850
Non-responsive arc flows (short)	48	5

File Type	Average number of files received per day	Average CSV file size (kB)
Non-responsive arc flows (long)	12	20
Non-responsive frequency keeping indications (short)	48	1
Non-responsive frequency keeping indications (long)	12	10
Non-responsive forecast demand (short)	48	1
Non-responsive forecast demand (long)	12	10
Non-responsive schedule (short)	48	350
Non-responsive schedule (long)	12	2,500
Non-responsive HVDC component flows (short)	48	2
Non-responsive HVDC component flows (long)	12	16
Non-responsive HVDC risk offsets (short)	48	4
Non-responsive HVDC risk offsets (long)	12	30
Non-responsive infeasibilities (short)	48	1
Non-responsive infeasibilities (long)	12	4
Non-responsive reserve aggregates (short)	48	80
Non-responsive reserve aggregates (long)	12	650
Non-responsive reserve prices (short)	48	1

File Type	Average number of files received per day	Average CSV file size (kB)
Non-responsive reserve prices (long)	12	10
Non-responsive SRC results (short)	48	5
Non-responsive SRC results (long)	12	40
Non-responsive station security constraints (short)	48	1
Non-responsive station security constraints (long)	12	10
Non-responsive aggregate quantities load/generation (short)	48	1
Non-responsive aggregate quantities load/generation (long)	12	10
Non-responsive aggregate quantities supply/demand (short)	48	1
Non-responsive aggregate quantities supply/demand (long)	12	10
Non-responsive supply/demand curve (short)	48	70
Non-responsive supply/demand curve (long)	12	550
Price-responsive prices (short)	48	110
Price-responsive prices (long)	12	850
Price-responsive arc flows (short)	48	5
Price-responsive arc flows (long)	12	20
Price-responsive schedule (short)	48	350
Price-responsive schedule (long)	12	2,500

File Type	Average number of files received per day	Average CSV file size (kB)
Price-responsive HVDC component flows (short)	48	2
Price-responsive HVDC component flows (long)	12	16
Price-responsive HVDC risk offsets (short)	48	4
Price-responsive HVDC risk offsets (long)	12	30
Price-responsive infeasibilities (short)	48	1
Price-responsive infeasibilities (long)	12	4
Price-responsive reserve aggregates (short)	48	80
Price-responsive reserve aggregates (long)	12	650
Price-responsive reserve prices (short)	48	1
Price-responsive reserve prices (long)	12	10
Price-responsive station security constraints (short)	48	1
Price-responsive station security constraints (long)	12	10
Price-responsive aggregate quantities load/generation (short)	48	1
Price-responsive aggregate quantities load/generation (long)	12	10
Price-responsive aggregate quantities supply/demand (short)	48	1

File Type	Average number of files received per day	Average CSV file size (kB)
Price-responsive aggregate quantities supply/demand (long)	12	10
Price-responsive supply/demand curve (short)	48	90
Price-responsive supply/demand curve (long)	12	750
Provisional prices	1	630
Provisional reserve prices	1	5
Final prices	1	630
Final reserve prices	1	5
Historic bids	1	200
Historic offers	1	500
Order downloads – bid	1	20
Order downloads – offer	1	50
Order downloads – GCMP	1	50
Order downloads – PCMP	1	15
Order downloads – FK	1	20
Constrained on/off	1	14

D.2 Typical monthly statistics

Total number of visits	5,000
Number of hits	11,000,000
Total bandwidth	150 GB

D.3 Number of **users**

WITS full trader access	105
WITS data access	81
Unique visitors per month to WITS free to air	3,000

D.4 Typical volumes for information uploaded to the system operator

File type	Average uploaded per day	Maximum uploaded per day
Bids	38,000	84,000
Offers	19,000	35,000
Reserve bids	2,500	10,000
Reserve offers	6,000	9,000

D.5 Typical help desk incidents

Month	Incidents
2014-01	32
2014-02	39
2014-03	31
2014-04	27
2014-05	24
2014-06	27
2014-07	21
2014-08	25
2014-09	19
2014-10	19
2014-11	9
2014-12	6
Annual Total	279