national**grid**ESO

ASDP Service Provider – Web Services Specification Version 3_v1.1

Document Revision

Change History

DOC VERSION	DATE	CHANGES
1.0	13/01/2022	ASDP Version 3 Web Services for ASR Frequency Response (DM/DR)
1.1	03/03/2022	Corrected AUI example data

NEXT UPDATE	VERSION	PLANNED CONTENTS
	2.0	Dispatch/Cease, Nomination, RTM, Settlement Metering, PN services to version3

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1. Introduction

The PAS (Platform for Ancillary Services) project has an objective to replace and enhance systems across the ancillary service lifecycle. Starting with a flexible dispatch platform, capable of sending and receiving data, such as provider availability submissions and dispatch notifications. The platform is being rolled out to include Frequency Response, Reserve and other ancillary services. To implement this National Grid ESO is using web services to communicate with Ancillary Service Providers. To achieve the communication between National Grid ESO and Service Providers, systems from both sides should accept common data interfaces. This document provides the technical specifications required to establish communication between PAS and Service Providers.

1.1. Scope

This document describes the *version 3* of web services to be implemented from both National Grid ESO (PAS) system and Service Providers' systems.

It also describes the technical specifications including WSDLs (Web Services Description Language) and XSDs (XML Schema Definition), methods and parameters to be used to invoke the WSDLs, connection patterns and protocols, security measures.

The validations and exceptions are particular to each ancillary service and hence these will be published as a separate 'Business Logic Document' for each ancillary service.

2. Services

Both National Grid ESO and Service Providers should expose the web services to each other for effective communication.

The fields mentioned in this document are categorized into mandatory and optional in each web service. The optional fields are not expected to be submitted unless required for that ancillary service which is specified in Business Logic Document. The sample payloads for the web services are mentioned in the Appendix.
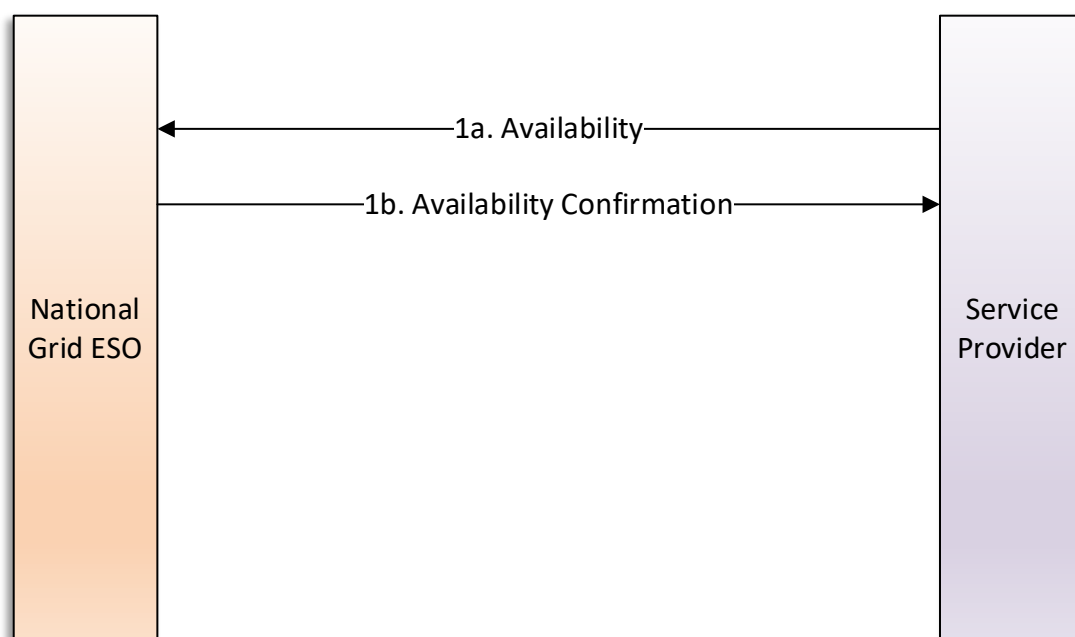
The below matrix specifies which web services are required for each ancillary service.

Table 1 - Web Services by Service Type

Web Service	Dynamic Moderation (DMH/DML)	Dynamic Regulation (DRH/DRL)	Dynamic Containment (DCH/DCL)
Availability	✓	✓	✓
Availability Confirmation	✓	✓	✓

Sl.No.	Service	Service Description	Implemented by	Applicable Ancillary Service
1a	Availability	Web service for National Grid ESO to receive availability data from Service Providers. This would include declarations and redeclarations.	National Grid ESO	DMH, DML, DRH, DRL, DCH, DCL
1b	Availability Confirmation	Web service for Service Providers to receive an availability confirmation from National Grid ESO post data validation of availability payload.	Service Providers	DMH, DML, DRH, DRL, DCH, DCL

3. Web Services Specification

This document provides details about the version 3 set of Web Services for the PAS system. Version 3 is for the new set of Frequency Response products introduced to the market by National Grid ESO. National Grid ESO will provide details of when Service Providers can be onboarded in the appropriate communication.

It is expected that both National Grid ESO and Service Providers develop URI client based (**?wsdl based**) *SOAP 1.1* Web Services rather than file based (.wsdl based).

Datetime fields for all web services below should be in **UTC standard** unless specified explicitly.

It is recommended that Service Providers enable logs to capture any http errors and the appropriate messages that come along with it synchronously.

Note: The Service Providers who are already using version 1 or version 2 set of web services may need not change to version 3 for those ancillary services. The PAS system will be compatible with all the set of versions.
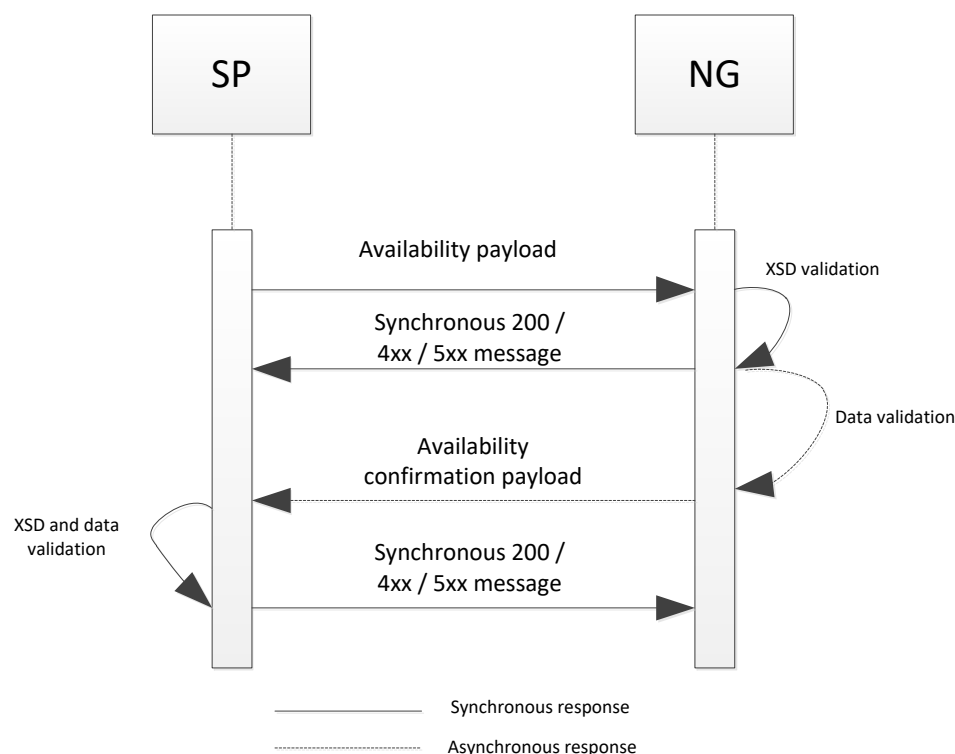
3.1. Availability Service v3

This service will be implemented by National Grid ESO to receive the availability data submissions from Service Providers. The specifications below will be followed by National Grid ESO to implement the service.

Owner: National Grid ESO

Request: Below are the service parameters, data types, size, formats and lists.

Service Type: This is synchronous service which will send 200 OK synchronously after the data has reached the end point successfully and all XSD validations have passed. On XSD validation failures, a 4xx or 5xx error message is synchronously sent back by National Grid ESO. On any data validation failures, the error codes / messages are communicated asynchronously using Availability Confirmation web service by National Grid ESO.

3.1.1. Availability Service Inbound

Frequency Response Ancillary Services (Dynamic Moderation (High/Low), Dynamic Containment (High/Low) and Dynamic Regulation (High/Low)) can submit the availabilities using the OfferBid array as mentioned below for a particular Availability Window or a group of Windows as required.

Name	Description	Data type	Size/Format/ List	Mandatory / Optional	Constraint / Notes
ServiceType	Type of Service	String	25 Characters DMH	Mandatory	Service Types from the list only should be

Name	Description	Data type	Size/Format/ List	Mandatory / Optional	Constraint / Notes
			DML DCH DCL DRH DRL		populated in this filed
UnitID	Contract Identifier	String	20 Characters	Mandatory	As per the framework agreement
AUI	Availability Unique Identifier - ID of the message	String	20 Characters	Optional	Custom generated ID
AvailabilityWindow	NA	NA	NA	Mandatory	Start of AvailabilityWindow array
StartDateTime	Start date and time for Availability	Datetime	YYYY-MM-DDThh:mm:ss TZD e.g. 2021-07-16T19:20:30Z	Mandatory	The start time should match the contract window start time. Time should be in UTC standard with Time Zone Designator (Z)
EndDateTime	End date and time for Availability	Datetime	YYYY-MM-DDThh:mm:ss TZD e.g. 2021-07-16T19:20:30Z	Mandatory	The end time should match the contract window end time. Time should be in UTC standard with Time Zone Designator (Z)
OfferBid	NA	NA	NA	Optional	Start of OfferBid array
OfferBid_Number	Number	Integer	1	Optional	Offer Bid number

Name	Description	Data type	Size/Format/ List	Mandatory / Optional	Constraint / Notes
			e.g. 999 or -999		
UtilisationPrice	Price in £/MWh	Numeric	5.2 e.g. 12345.12	Optional	Utilisation price
BreakPoint	MW	Numeric	5.6 e.g. 12345.123456	Optional	The MW value to be submitted
BreakPoint_Max	MW	Numeric	5.6 e.g. 12345.123456	Optional	Max MW value
AvailabilityPrice	Price in £/MWh	Numeric	5.2 e.g. 12345.12	Optional	Availability price
OfferBid	NA	NA	NA	Optional	End of OfferBid array
UtilisationPercent_Lead	Lead Utilisation Percentage	Percentage	3.2	Optional	Lead Percentage
UtilisationPercent_Lag	Lag Utilisation Percentage	Percentage	3.2	Optional	Lag Percentage
Band	NA	NA	NA	Optional	Start of Band array
BandID	Band Identifier	Integer	3	Optional	Band Number
LeadLagIndicator	To indicate if this band belongs to Lead or Lag	Enumeration	LEAD LAG	Optional	Lead or Lag
Q	MVAr	Numeric	5.6	Optional	Q value
Q_Max	MVAr	Numeric	5.6	Optional	Q Max value
AssociatedL	MVAr	Numeric	5.6	Optional	Associated Lead/Lag value
AvailabilityCost	Cost in £	Numeric	5.2 e.g. 12345.12	Optional	Availability cost
UtilisationCost	Cost in £	Numeric	5.2 e.g. 12345.12	Optional	Utilisation Cost

Name	Description	Data type	Size/Format/ List	Mandatory / Optional	Constraint / Notes
MaxUtilisationCost	Cost in £	Numeric	5.2

e.g. 12345.12 | Optional | Maximum Utilisation cost |
| Band | NA | NA | NA | Optional | End of Band array |
| AvailabilityWindow | NA | NA | NA | Mandatory | End of AvailabilityWindow array |
| GateClosure | To indicate if this is pre or post gate closure submission | Enumeration | PRE

POST | Optional | PRE to indicate pre gate closure submission and POST to indicate post gate closure submission |
| DateTimeStamp | Date and time when the web service payload was sent to National Grid ESO | Datetime | YYYY-MM-DDThh:mm:ss TZD
e.g. 2021-07-16T19:20:30Z | Mandatory | Time should be in UTC standard with Time Zone Designator (Z) |

Guidelines:

1. Service Providers should invoke the Availability webservice to submit any declarations or redeclarations for all Ancillary Services.

2. Service Providers can send availabilities for multiple windows using a single xml, multiple OfferBid arrays in a single AvailabilityWindow where applicable.

3. Service Providers would invoke the Webservice as per the WSDL url: https://test.pas.nationalgrid.com/services/V3_Sandbox_ConsumeAvailabilityService?wsdl and sample payloads in Appendix 1A.

4. National Grid ESO will reject the availability (through Availability Confirmation web service 3.2.3) for a specific availability window as specified in business logic document

5. AUI should have 15-18 characters in total with the following algorithm to make it unique to 1 in million times. This field is used for traceability purposes. See example payloads in Appendix for reference.

   a. First 3 characters will have 'AUI'

   b. Next 2 characters will be random small case alphabets from a-z

   c. Next characters will be a random number from 1 to 9999

d. Next 3 characters will be random alphabets between A-Z

e. The last 6 characters will be MMHHdd (where MM is month e.g. 08; HH is hours e.g. 16; dd is date e.g. 28)
So, an example AUI will be 'AUIxq34YMU081816'

3.2. Availability Confirmation Service v3

This service will be implemented by Service Provider to receive the confirmation of data validation of Availability Declaration / Redeclaration against the contract data. The below specifications will be followed by Service Provider to implement the service.

Owner: Service Provider

Service Type: This is asynchronous to Availability web service and synchronous on its own i.e. Service Provider should send 200 ok synchronously after the availability confirmation data has been received and validated by Service Provider successfully. In the case of XSD or data validation failure, National Grid ESO expects Service Provider to send synchronous 4xx or 5xx error message back. The pattern diagram is represented in section 3.1.

Request: Below are the service parameters, data types, size, formats etc.

SLA: Within 5 minutes of receiving the Availability payload, National Grid ESO will send the Availability confirmation payload

3.2.1. Availability Confirmation Service Outbound

Name	Description	Data type	Size/Format/ List	Mandatory / Optional	Constraint / Notes
ServiceType	Type of Service	String	25 Characters DMH DML DCH DCL DRH DRL	Mandatory	Service Types from the list only should be populated in this filed
UnitID	Contract Identifier	String	20 Characters	Mandatory	
AUI	Availability Unique Identifier - ID of the Availability web service message	String	20 Characters	Optional	

AvailabilityWindow	NA	NA	NA	Optional	Start of AvailabilityWindow
StartDateTime	Start date and time for Availability	Datetime	YYYY-MM-DDThh:mm:ss TZD e.g. 2021-07-16T19:20:30Z	Mandatory	Time should be in UTC standard with Time Zone Designator (Z)
EndDateTime	End date and time for Availability	Datetime	YYYY-MM-DDThh:mm:ss TZD e.g. 2021-07-16T19:20:30Z	Mandatory	Time should be in UTC standard with Time Zone Designator (Z)
Validation	To indicate if the data submitted for this availability window is valid or invalid	Enumeration	VALID INVALID	Optional	Validation message
WindowReason	Reason for rejecting the availability data in a particular AvailabilityWIndow	String	200 Characters	Optional	Error codes are mentioned in business logic document
AvailabilityWindow	NA	NA	NA	Optional	End of AvailabilityWindow
Confirmation	Message to inform if the xml payload file is accepted	Enumeration	ACCEPTED REJECTED	Mandatory	Confirmation message
FileReason	Reason for rejecting the availability file over and above the fields within the AvailabilityWindow arrays	String	200 Characters	Optional	Error codes are mentioned in business logic document
DateTimeStamp	Date and time when the web service was sent to National Grid ESO	Datetime	YYYY-MM-DDThh:mm:ss TZD e.g. 2021-07-16T19:20:30Z	Mandatory	Time should be in UTC standard with Time Zone Designator (Z)

Guidelines:

1. National Grid ESO would invoke this service to confirm the validation of the availability data received from Service Provider.

2. National Grid ESO will send a single confirmation xml even when Service Providers send multiple windows using a single Availability Service xml.

3. Validation and Confirmation is segregated in this version and relevant reasons made available at the appropriate place which are detailed in business logic document.

4. Service Provider would implement the Webservice as per the WSDL url: https://test.pas.nationalgrid.com/services/V3_SP_Sandbox_ConsumeAvailabilityConfPS?wsdl and the sample payloads will be sent by National Grid ESO are available in Appendix 1B.

4. Security of messages

National Grid ESO will secure its webservices as mentioned below and would expect SPs to do the same.

1. Transport Layer security using https / SSL / TLS

2. Authenticate the message through username tokens (username and password)

3. Whitelist IP address – NG to whitelist SP IP address(es) and SP can also whitelist NG IP addresses

National Grid ESO would introduce Digital Certificates and Signatures (through binary tokens) at a later point in time. The specification will be updated with the appropriate timelines until which the above security pattern would need to be followed.

4.1. Authentication using username and passwords

This section details how to use the UsernameToken with the WSS: SOAP Message Security specification [WSS]. More specifically, it describes how a web service consumer can supply a UsernameToken as a means of identifying the requestor by "username", and using a password (or shared secret, or password equivalent) to authenticate that identity to the web service producer.

The <wsse:UsernameToken> element is introduced in the WSS: SOAP Message Security documents as a way of providing a username.

Within <wsse:UsernameToken> element, a <wsse:Password> element may be specified. Passwords of type PasswordText and PasswordDigest are not limited to actual passwords, although this is a common case. Any password equivalent such as a derived password can be used.

Passwords of type PasswordDigest are defined as being the Base64 [XML-Schema] encoded, of the UTF8 encoded password (or equivalent). However, unless this digested password is sent on a secured channel or the token is encrypted, the digest offers no real additional security over use of wsse:PasswordText.

When a UsernameToken is referenced using <wsse:SecurityTokenReference> the ValueType attribute is not required. If specified, the value of UsernameToken MUST be specified.

A Service Provider can have multiple contracts across multiple ancillary services; however, the assumption is that there will be a single set of web services exposed to National Grid ESO and hence National Grid ESO would expect to have a single web services password per Service Provider. The same will be the situation for the web services exposed by National Grid ESO.

The usernames and passwords should be changed every 6 months to avoid any security breach. Once every 6 months, National Grid ESO will share the passwords to the appropriate Service Provider IT personnel securely and expect Service Providers to do the same.

4.2. Sample request Header with username token

```
<soapenv:Header>

  <wsse:Security soapenv:mustUnderstand="1" xmlns:wsse="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">

    <wsse:UsernameToken wsu:Id="UsernameToken-4" xmlns:wsu="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd">

      <wsse:Username>Weblogic</wsse:Username>

      <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-
username-token-profile-1.0#PasswordText">FMW@12345</wsse:Password>

    </wsse:UsernameToken>

  </wsse:Security>

</soapenv:Header>
```

In order to enable testing of this username token, please contact National Grid ESO.

4.3. User credentials for Sandbox environment web services

User credentials for the sandbox environments could be requested from National Grid ESO by sending an email to: box.support.pas@nationalgrid.com

5. Response Pattern for web services

When an xml is sent to the end point, it is expected to send synchronous response. National Grid ESO is following in-line wsdl response and requests Service Providers to follow the same. This pattern is embedded in the wsdls and explained below.

5.1. Success synchronous response

When the party is expected to send synchronous successful response, along with 200 http status code, the following is expected in xml format.

```
<soapenv:Envelope xmlns:env="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">

  <env:Header xmlns:ins="http://www.nationalgrid.com/pas/cdsa/xyz"/>

  <env:Body xmlns:ins="http://www.nationalgrid.com/pas/cdsa/xyz">

    <ns1:xyzResponse xmlns:ns1="http://www.nationalgrid.com/pas/cdsa/xyz">
```

```
        <ns1:ServiceType> </ns1:ServiceType>

        <ns1:UnitID> </ns1:UnitID>

        <ns1:Response> </ns1:Response>

      </ns1:xyzResponse>

    </env:Body>

</soapenv:Envelope>
```

ServiceType tag in the above xml will have the ServiceType sent by the party in the payload

UnitID tag in the xml will have the UnitID sent by the party in the payload

Response tag in the xml will have SUCCESS

5.2. Failure synchronous response

When the party is supposed to send synchronous failure response, along with non-200 http status code, the following is expected in xml format.

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:env="http://schemas.xmlsoap.org/soap/envelope/">

  <env:Body xmlns:ins="http://www.nationalgrid.com/pas/cdsa/xyz">

    <ns1:xyzResponse xmlns:ns1="http://www.nationalgrid.com/pas/cdsa/Instruction">

      <ns1:ServiceType> </ns1:ServiceType>

      <ns1:UnitID></ns1:UnitID>

      <ns1:Response> </ns1:Response>

      <ns1:Details> </ns1:Details>

    </ns1:xyzResponse>

  </env:Body>

</soapenv:Envelope>
```

ServiceType tag in the above xml will have the ServiceType sent by the party in the payload

UnitID tag in the xml will have the UnitID sent by the party in the payload

Response tag in the xml will have FAILURE

Details tag will have the appropriate error message why the service has failed.

6. National Grid ESO Public Facing IP

Service Providers are requested to whitelist the below IP addresses from National Grid ESO in case they don't want other traffic to come through. These IP addresses are the same for test and production traffic.

62.190.154.115
62.190.148.115
65.209.62.115
65.196.116.115

7. Open and Closed Issues

ID	ISSUE	RESOLUTION	OWNER	TARGET DATE	IMPACT DATE	OPEN/ CLOSED
1	The Datetime datatype follows YYYY-MM-DDThh:mm:ss or YYYY-MM-DDThh:mm:ss.sss pattern without having the time zone designator at the end.	To follow w3c standard specification in version 3 set of web services. Time Zone Designator (Z) for zero UTC offset added for all the DateTime datatypes of v3 services in the format YYYY-MM-DDThh:mm:ssTZD e.g. 2021-07-16T19:20:30Z	National Grid ESO	March 2022		CLOSED

8. Appendix: About the xsd and wsdls

National Grid ESO requests all the Service Providers to implement their relevant web service (Availability Confirmation) with the same service name, port type, binding operation names and namespaces. The services should be exposed as https but using http bindings. In order to facilitate quick development for Service Provider, National Grid ESO has mocked Service Provider web services which are available in the relevant sections of this specification.

9. Appendix 1: Sample payloads for v3 Web Services

9.1. Appendix 1A: Availability Service Inbound

```
<soapenv:Envelope xmlns:ava="http://www.nationalgrid.com/pas/cdsa/Availability"
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">

  <soapenv:Header>

    <wsse:Security soapenv:mustUnderstand="1" xmlns:wsse="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd" xmlns:wsu="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd">

      <wsse:UsernameToken wsu:Id="UsernameToken-CC41A651D47C8E5D2316400957078552">

        <wsse:Username>XXXXXXXXXXXXX</wsse:Username>

        <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-
username-token-profile-1.0#PasswordText">XXXXXXXXXXXXX</wsse:Password>

      </wsse:UsernameToken>

    </wsse:Security>

  </soapenv:Header>

  <soapenv:Body>

    <ava:AvailabilityDetails>

      <ava:ServiceType>DCH</ava:ServiceType>

      <ava:UnitID>ABC123</ava:UnitID>

              <ava:AUI>AUIXQ34YMU081816</ava:AUI>

      <ava:AvailabilityWindow>

        <ava:StartDateTime>2021-10-01T03:00:00Z</ava:StartDateTime>

        <ava:EndDateTime>2021-10-01T07:00:00Z</ava:EndDateTime>

        <ava:OfferBid>

          <ava:OfferBid_Number>1</ava:OfferBid_Number>

          <ava:BreakPoint>30</ava:BreakPoint>

        </ava:OfferBid>

      </ava:AvailabilityWindow>
```

```
      <ava:DateTimeStamp>2021-10-01T01:00:00Z</ava:DateTimeStamp>

    </ava:AvailabilityDetails>

  </soapenv:Body>

</soapenv:Envelope>
```

9.2. Appendix 1B: Availability Confirmation Service Outbound

```
<soapenv:Envelope xmlns:ava="http://www.nationalgrid.com/pas/cdsa/AvailabilityConfirmation"
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/">

  <soapenv:Header>

    <wsse:Security soapenv:mustUnderstand="1" xmlns:wsse="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd" xmlns:wsu="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd">

      <wsse:UsernameToken wsu:Id="UsernameToken-CC41A651D47C8E5D2316400964670337">

        <wsse:Username>XXXXXXXXX</wsse:Username>

        <wsse:Password Type="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-
username-token-profile-1.0#PasswordText">XXXXXXXXXX</wsse:Password>

      </wsse:UsernameToken>

    </wsse:Security>

  </soapenv:Header>

  <soapenv:Body>

    <ava:Availability_Conf_Message>

      <ava:ServiceType>DCH</ava:ServiceType>

      <ava:UnitID>ABC123</ava:UnitID>

              <ava:AUI>AUIXQ34YMU081816</ava:AUI>

      <ava:AvailabilityWindow>

        <ava:StartDateTime>2021-10-01T03:00:00Z</ava:StartDateTime>

        <ava:EndDateTime>2021-10-01T07:00:00Z</ava:EndDateTime>

        <ava:Validation>VALID</ava:Validation>

      </ava:AvailabilityWindow>

      <ava:Confirmation>ACCEPTED</ava:Confirmation>

      <ava:DateTimeStamp>2021-10-01T01:00:00Z</ava:DateTimeStamp>

    </ava:Availability_Conf_Message>

  </soapenv:Body>

</soapenv:Envelope>
```