1.4.9 Synchronous Optical Network Services (SONETS) [C.2.5.2]

Agencies benefit from an integrated and interoperable, end-to-end synchronous optical network (SONET) transmission service to support their communication needs. The operation of an integrated metropolitan and wide-area carrier-class SONET network, [redacted] ***provides highly reliable, survivable, and managed SONET services.***

1.4.9.1 Technical Approach to Transport/IP/Optical Service Delivery [L.34.1.4.1]

1.4.9.1.a Approach to Service Delivery

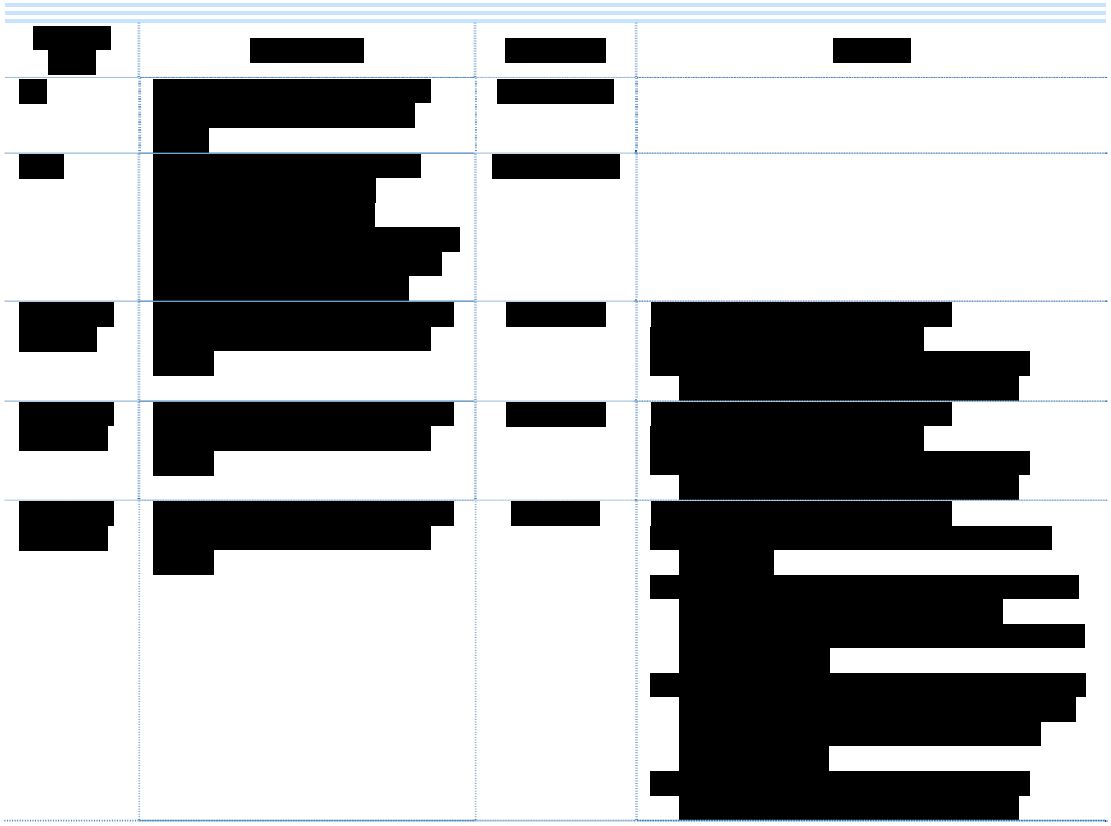
(a) Analyze the service requirements specified in this solicitation and describe the approaches to service delivery for each service.

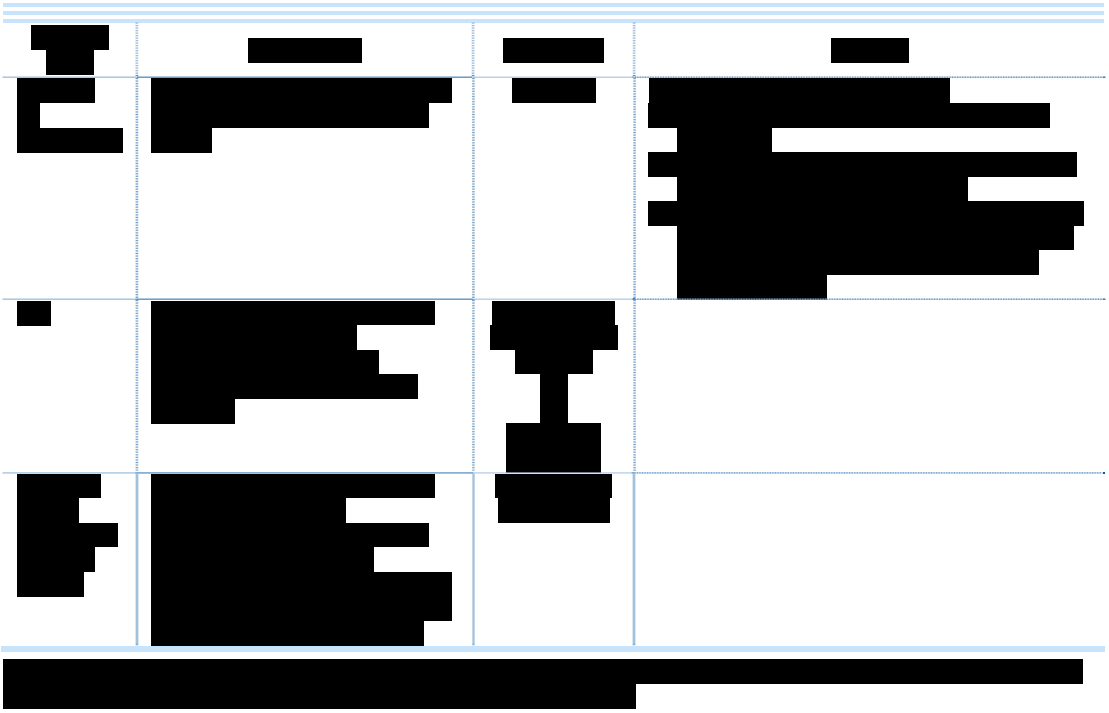
[redacted]

AT&T has developed a track record of knowledge and experience in providing complex Defense and Government network services on a national and global basis. [redacted]

AT&T's proposed SONET services solution is based on new technologies that we continue to deploy and integrate into our core network infrastructure. [redacted]

[redacted]





As a framework for providing SONET services, the AT&T solution enables:

- High Reliability
- High Survivability
- Maximum Security and Information Assurance

Full Interoperability

- Efficient Provisioning
- End-to-End Maintenance
- Extensibility and Reach.

[redacted]

[redacted]

SERVICE APPROACH	[redacted]
High Reliability	[redacted]
High Survivability	[redacted]
Maximum Security and Information Assurance	[redacted]
Full Interoperability	[redacted]
Efficient Provisioning	[redacted]
Extensibility and Reach	[redacted]
End-to-End Maintenance	[redacted]

[redacted]

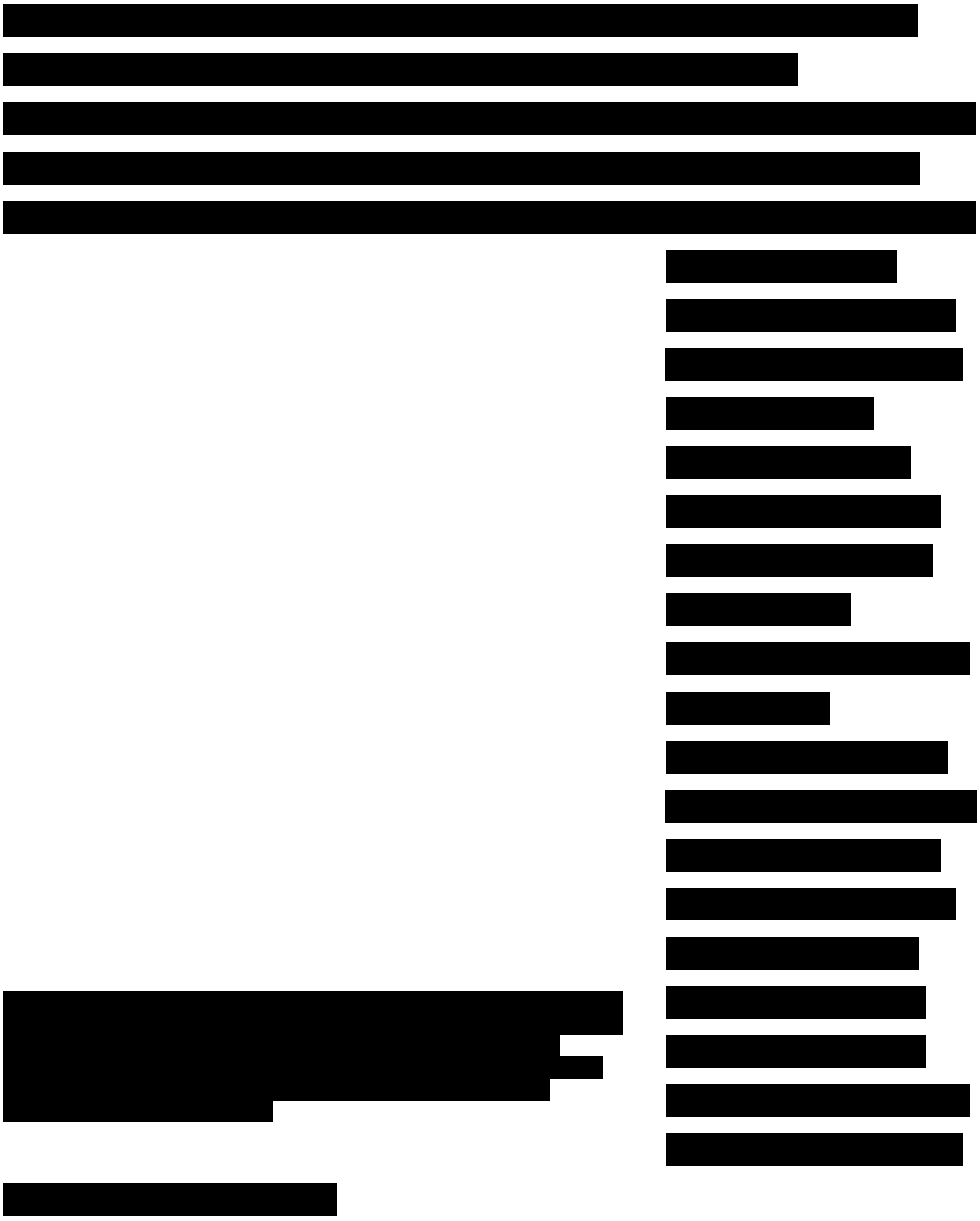
[redacted]

[redacted]

1.4.9.1.b Benefits to Technical Approach

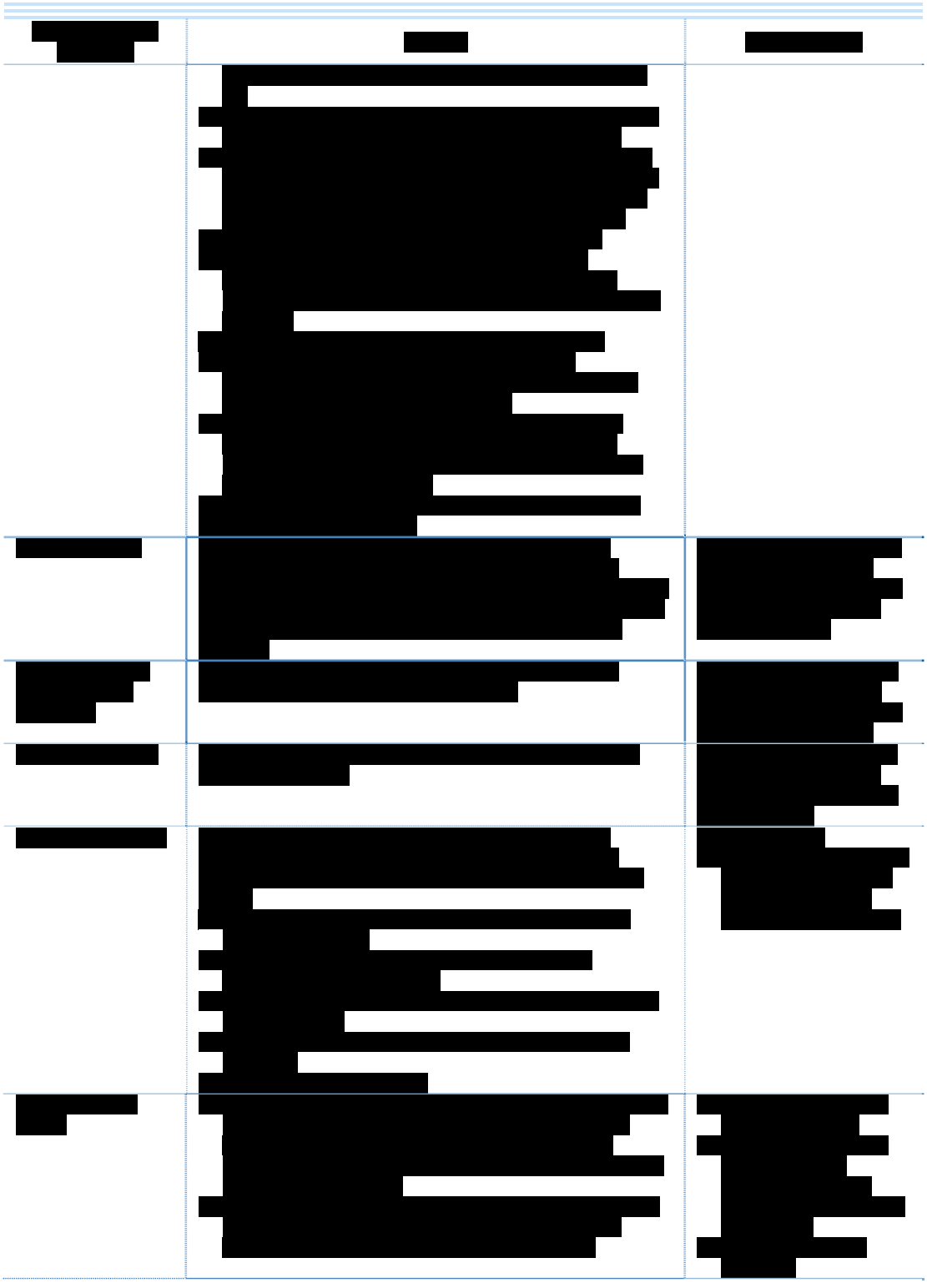
(b) Describe the expected benefits of the offeror's technical approach, to include how the services offered will facilitate Federal Enterprise Architecture objectives (http://www.whitehouse.gov/omb/egov/a-1-fea.html).

The reliability of SONET services is backed by [redacted]



[redacted]

AT&T's Networx services, in general, and SONET services, in particular, support the Government's vision of transformation [redacted]



AT&T's development of net-centric technologies supports solutions based on service oriented architecture (SOA), which uses standardized, web-adapted components. Our approach ensures that the criteria listed below are followed:

- Technical Reference Model capabilities are fully met and linked to the Service Component Reference Model (SRM) and Data Reference Model (DRM).
- These links are structured to support BRM functions and provide line-of-sight linkage to mission performance and ultimate accomplishment per the PRM.

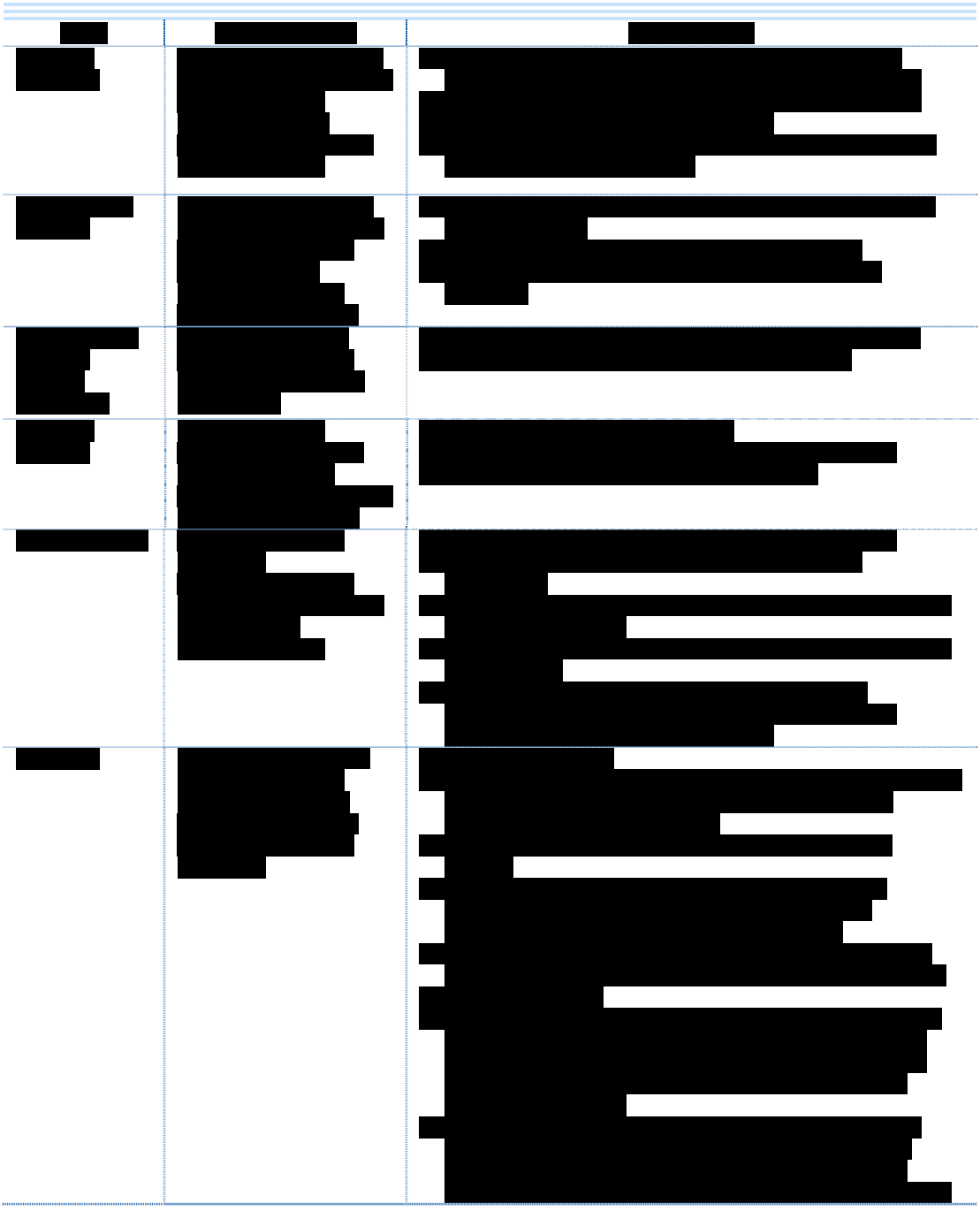
1.4.9.1.c Major Issue to Service Delivery

(c) Describe the problems that could be encountered in meeting individual service requirements, and propose solutions to any foreseen problems.

In transitioning into any new service delivery model, whether it be task-based or fully outsourced, unforeseen issues can always arise. Therefore, it is important that GSA selects a service provider, such as AT&T, which brings the depth and background that minimize an Agency's risk during transition. Our experience has enabled us to develop proven methods, processes, and procedures applicable to the simplest or the most complex projects.

As with all large SONET projects, we enter each of these risks and others (after identification and characterization) into our risk-tracking database. AT&T immediately takes steps to mitigate risks before they become an issue.

Because risk management is more effective when all stakeholders are active in the process, AT&T engages the GSA, the client Agency, and other Government solution partners for success with risk mitigation activities.



[redacted]

1.4.9.1.d Network Architecture Synchronization

(d) Describe the synchronization network architecture to support the offeror's access and transport networks.

AT&T is a leader in the area of network synchronization, by virtue of our active role in the international and domestic standards organizations and our existing industry-unique dedicated timing and synchronization network for distributing Stratum 1-traceable timing to our own national and international telecommunications networks.

[redacted]

[redacted]

1.4.9.2 Satisfaction of Transport/IP/Optical Performance Requirements [L.34.1.4.2]

1.4.9.2.a Service Quality and Performance

(a) Describe the quality of the services with respect to the performance metrics specified in Section C.2 Technical Requirements for each service.

AT&T understands that the KPIs chosen by the Government are built around realistic thresholds that represent operational assurance. [redacted]

[redacted] **Table 1.4.9.2-1** summarizes the performance metrics to which AT&T adheres versus the Government's targets.

KEY PERFORMANCE INDICATOR (KPI)	SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICE QUALITY LEVEL
AV (SONETS) (SDP-TO-SDP)	Routine	99.9%	[redacted]
	Critical	99.999%	[redacted]
TIME TO RESTORE (TTR)	Without Dispatch	4 hr	[redacted]
	With Dispatch	8 hr	[redacted]
BIT ERROR RATIO (BER)	Routine	10^{-12} Out of Service Monitoring **	[redacted]

***

[redacted]

1.4.9.2.b Approach to Monitoring and Measuring Performance

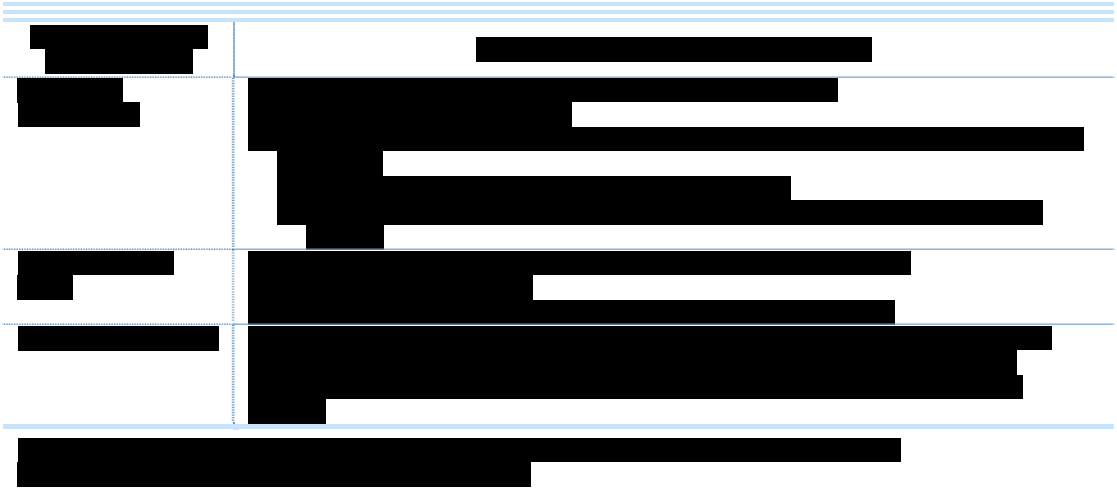
(b) Describe the approach for monitoring and measuring the Key Performance Indicators (KPIs) and Acceptable Quality Levels (AQLs) that will ensure the services delivered are meeting the performance requirements.

Of equal importance to identifying the KPIs for a service is the method by which the KPIs are captured, measured, and monitored. Agencies will receive

the most accurate assessment of the service when the KPI measurement and monitoring methodology replicates the real performance experienced by

Agency personnel. [redacted]

Table 1.4.9.2-2 outlines the methods used to measure the various key performance indicators. [redacted]



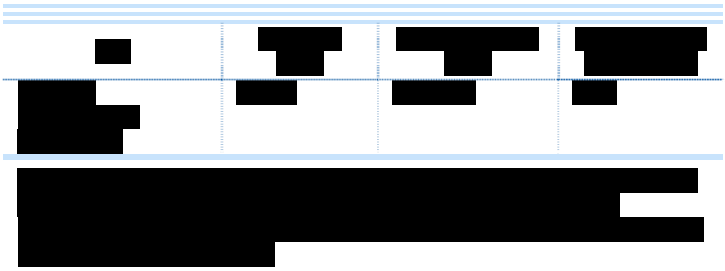
[redacted]

1.4.9.2.c Performance Level Improvements

(c) If the offeror proposes to exceed the Acceptable Quality Levels (AQLs) in the Key Performance Indicators (KPIs) required by the RFP, describe the performance level improvements.

[redacted]

[redacted]



[redacted]

1.4.9.2.d Rationale and Benefits for Additional Performance Metrics

(d) Describe the benefits of, rationale for, and measurement of any additional performance metrics proposed.

[redacted]

1.4.9.3 Satisfaction of Transport/IP/Optical Service Specifications [L.34.1.4.3]

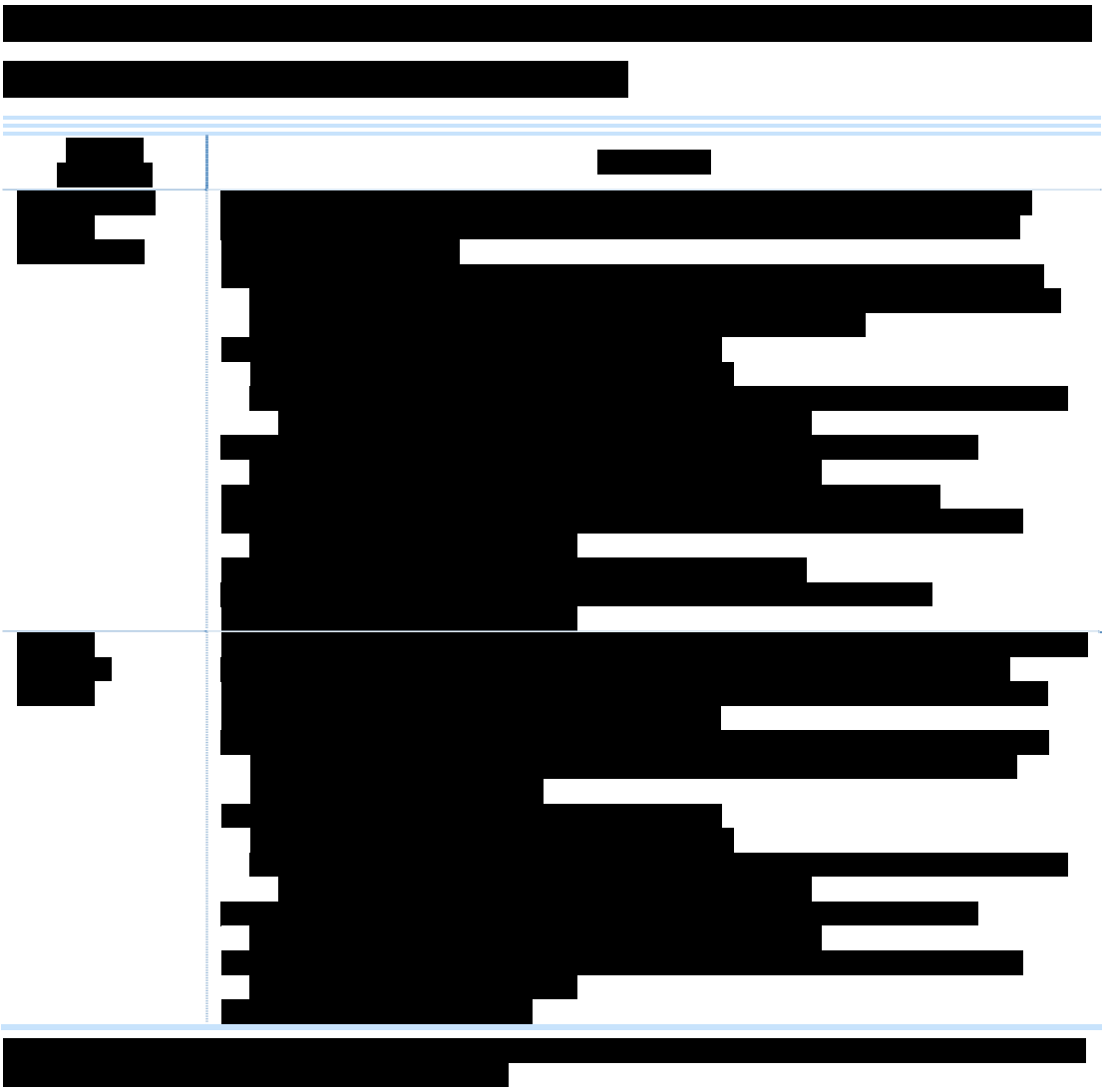
1.4.9.3.a Service Description

(a) Provide a technical description of how the service requirements (e.g., capabilities, features, interfaces) are satisfied.

SONET service is a high-speed, point-to-point service that transmits simultaneous full-duplex digital signals at SONET-based speeds between a designated POP in one exchange area and a designated POP in another

exchange area, over a combination of a mesh network and self-healing rings. Access to this service is by dedicated access only.

[redacted]



[redacted]

Table 1.4.9.3-2 provides a technical description of the adherence to standards and connectivity options that AT&T's SONET services offer.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFIT TO AGENCY
Standards	[redacted]	Agencies will have interoperability with other networks that use standard interfaces.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFIT TO AGENCY
Connectivity	[redacted]	Agencies will have interoperability with existing Agency networks as well as continuity of service for circuits that ride on other carriers' networks.

Table 1.4.9.3-2: Standards and Connectivity Options of AT&T's SONET Service. *Compliancy to standards and connectivity requirements for SONETS.*

Table 1.4.9.3-3 provides a description of the adherence to the technical capabilities that AT&T's SONET services offer.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFIT TO AGENCY
Geographical Coverage	[redacted]	Agencies benefit from availability of SONET service at majority of SDPs.
Gateway functionality [optional]	[redacted]	Agencies are assured full interoperability of synchronous transport between global SDP locations.
Network Topologies	[redacted]	Agencies are assured maximum availability circuit uptime by combinations of SONET/SDH topologies.
Protection Methods	[redacted]	Agencies have their choice of SONET/SDH protection methods that best suit their business needs.
Transmux Capability	[redacted]	Agencies benefit from efficient bandwidth usage to maximize the network total cost of ownership.
Concatenation Methods	[redacted]	Agencies benefit from the ability to transport non-TDM services over the existing SONET infrastructure to maximize the network total

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFIT TO AGENCY
	[redacted]	cost of ownership.
SONET performance	[redacted]	Agencies benefit from highly reliable network transport infrastructure.
Performance monitoring	[redacted]	Agencies benefit from a highly reliable network since potential problems are proactively monitored and corrected without impacting service.
Synchronization and Timing Methods	[redacted]	Transport network errors are greatly reduced by the use of a GPS-based synchronization network. Because the SONET network is timed from a GPS-based highly reliable timing system, the need to align data streams for multiple back to back multiplexing is eliminated. This reduces the total cost of ownership to Agencies over asynchronous networks.
Interfaces	[redacted]	Agencies will have seamless interoperations with other interfacing networks.
Next Generation SONET [optional]	[redacted]	Agencies benefit from the efficient transport of Ethernet packets (for IP traffic) over a SONET infrastructure. Transport of IP traffic over a highly reliable network is possible, while still maximizing the total cost of ownership.
Data Communications Channel	[redacted]	Agencies' edge devices will communicate with each other transparently over SONET infrastructure.
Integrated Control Plane	[redacted]	Agencies benefit from MPLS like routing capabilities within a mesh configured SONET network. This increases the reliability of the network.

Table 1.4.9.3-3: Technical Capabilities of AT&T's SONET Service. *Compliancy to SONETS technical capabilities.*

Table 1.4.9.3-4 provides a technical description of the adherence to the features that AT&T's SONET services offer.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
[redacted]	[redacted]	[redacted]
Channelization	[redacted]	Agencies benefit from standard SONET payload management.
Dedicated Metro Ring	[redacted]	Agencies benefit from a dedicated private SONET metro network.
DS1 Rate Synchronization Service	[redacted]	DS1 rate synchronization enables Agencies to benefit from the contractor's synchronization network timing at minimal cost.
1:1 Equipment Protection	[redacted]	Agencies benefit from redundancy of client side" interfaces to Agency-owned equipment.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
1+1 Equipment Protection	[redacted]	Agencies benefit from full redundancy of client side interfaces to Agency-owned equipment for maximum protection from equipment interface failures.
Network Side Equipment Protection	[redacted]	Agencies experience the benefits of a self-healing network. No service outage will be experienced in case of a network side equipment or route failure.
Framing for Electrical Interfaces	[redacted]	Agencies benefit from standard lower speed electrical framing formats to support legacy services.
Geographic Diverse protection	[redacted]	Agencies benefit from redundant delivery paths to the SDP(s) to protect from a single point of failure.
Local and Remote Node Multiplexing	[redacted]	Agencies have the option of not worrying about SONET ring capacity. AT&T handles SONET bandwidth management.

Table 1.4.9.3-4: SONET Service Features. *AT&T's technical equipment and methodologies provide the required SONETS performance for Agencies.*

Dedicated bandwidth will be permanently available until a service request for modification, move, or disconnect is received from the Agency. Highly available, SONET-based transport network will allow for high-quality service delivery.

Agencies benefit from a robust SONET service offering that meets all of the capabilities, features, and interfaces required. Services are delivered in a low-risk manner and are deployed and operated in a high-quality manner.

1.4.9.3.b Attributes and Values of Service Enhancements

(b) If the offeror proposes to exceed the specified service requirements (e.g., capabilities, features, interfaces), describe the attributes and value of the proposed service enhancements.

[redacted]

[redacted]

[redacted]

[redacted]

1.4.9.3.c Service Delivery Network Modifications

(c) Describe any modifications required to the network for delivery of the services. Assess the risk implications of these modifications.

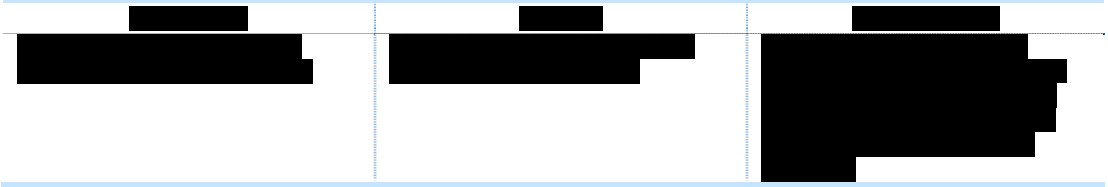
[redacted]

1.4.9.3.d Transport/IP/Optical Service Experience

(d) Describe the offeror's experience with delivering the mandatory Transport/IP/ Optical Services described in Section C.2, Technical Requirements.

AT&T operates nearly [redacted] interlocking regional (intercity) SONET rings and more than [redacted] metro SONET rings. [redacted]

[redacted]



[redacted]

[redacted]

[redacted]

AT&T looks forward to offering SONET services to Agencies as part of the Networx contract. Agencies will enjoy the same high-quality service experienced by [redacted]

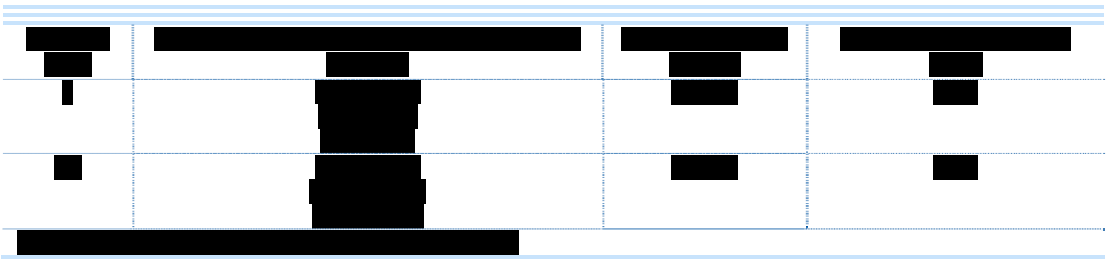
1.4.9.4 Robust Delivery of Transport/IP/Optical Services [L.34.1.4.4]

1.4.9.4.a Network Traffic Utilization

(a) Given the offeror's current network capacity and utilization, explain how the offeror will support the Government requirements specified in the traffic model. Describe the impact on capacity and utilization, as well as any infrastructure build out contemplated.

Considering AT&T's network capacity for SONET services, the requirements specified in the traffic model (Networx hosting model) will easily be supported.

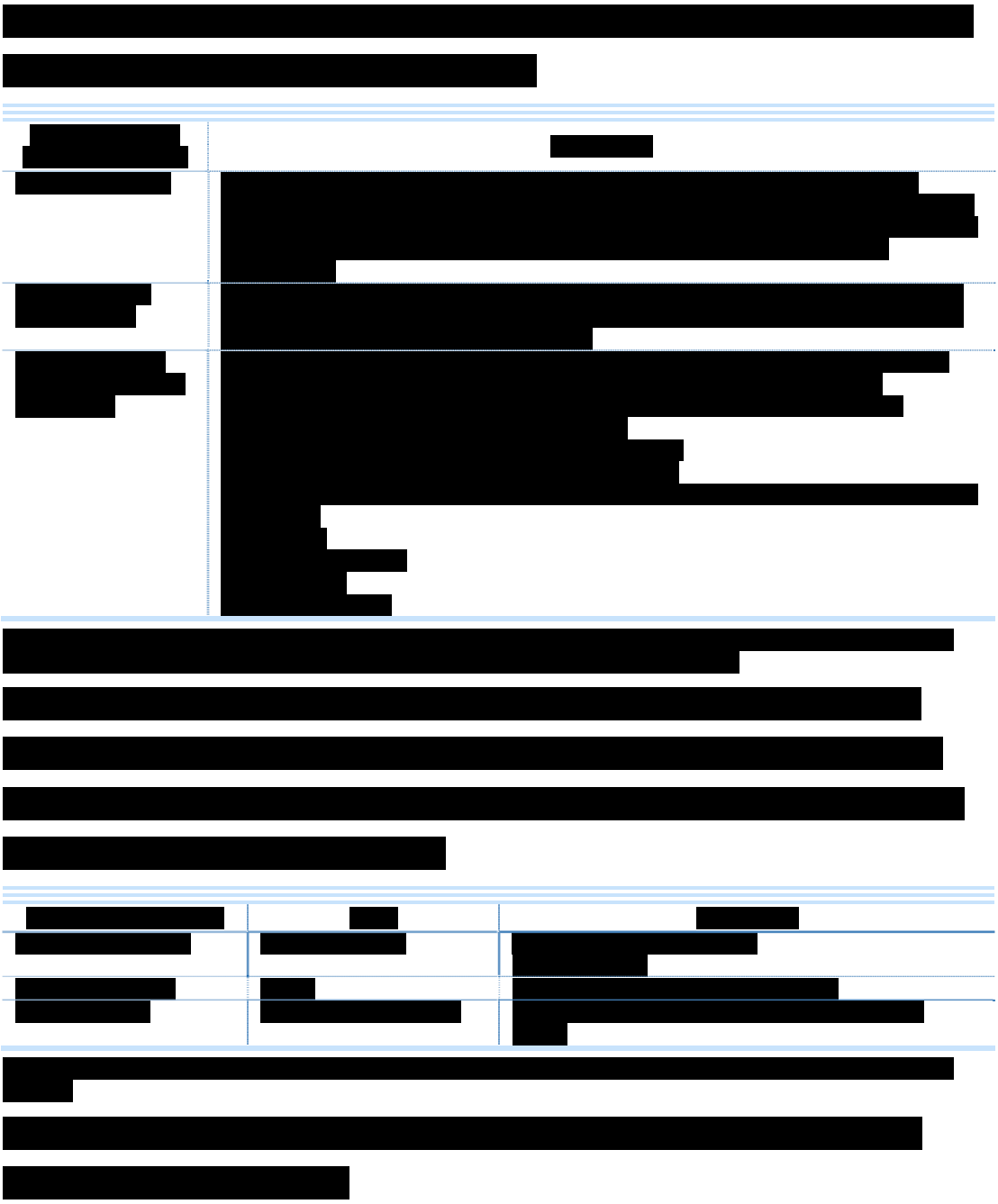
[redacted]



[redacted]

1.4.9.4.b System Robustness and Resiliency

(b) Describe the measures and engineering practices designed to provide robustness of the access and backbone networks, ensure resiliency, and plan for growth.



[redacted]

[redacted]

Rigorous engineering practices and measurements of the network allow Agencies to obtain a scalable, reliable service to build and operate their mission-critical applications. [redacted]

[redacted]

SONET services provided to the Agencies are secure, scalable, and reliable. The backbone and access SONET networks are engineered for robustness and also easily scalable [redacted].

1.4.9.5 Transport/IP/Optical Service Optimization and Interoperability [L.34.1.4.5]

1.4.9.5.a Approach to Optimizing IP-based and Optical Services

(a) Describe the offeror's approach for optimizing the engineering of IP-Based and Optical Services.

Engineering optimization of the IP-based and optical services is described in Section 1.3.6.2.a, Approach to Optimizing IP-Based and Optical Services.

1.4.9.5.b Network Architecture Optimization

(b) Describe how the offeror will use methods such as remote concentration, switching/routing capabilities, and high bandwidth transmission facilities to optimize the network architecture.

Optimization of the network architecture through the use of remote concentration, switching/routing capabilities, and high bandwidth transmission facilities is described in Section 1.3.6.2.b, Methods for Optimizing the Network Architecture.

1.4.9.5.c Optimizing Engineering Techniques

(c) Describe the engineering techniques for optimizing access for improved performance or increased efficiency in areas where large concentrations of diverse customer applications exist (e.g., the use of multi-service edge platforms).

Optimization of the access for improved performance or increased efficiency through the use of multiservice edge (MSE) platforms is described in Section 1.3.6.2.c, Performance Level Improvements.

1.4.9.5.d Vision to Implement Service Internetworking

(d) Describe the offeror's vision for implementing service internetworking over a common infrastructure (e.g., IP-centric architecture). Include a view on network interoperability, control plane integration, and optical infrastructure support for IP-Based Services. Describe the benefits and rationale of the offeror's approach.

The implementation of service internetworking over a common infrastructure (including network interoperability, control plane integration, and optical infrastructure support) is described in Section 1.3.6.2.d, Vision for Service Interoperability.

1.4.9.6 Narrative Responses

1.4.9.6.1 [redacted]

[redacted]

1.4.9.7 Stipulated Deviations

[redacted]

1.4.9.7.1 Reserved