



The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner



88

September 21, 2023

His Excellency, Governor Christopher T. Sununu
 and the Honorable Council
 State House
 Concord, New Hampshire 03301

REQUESTED ACTION

Authorize the Department of Environmental Services (NHDES) to amend a **SOLE SOURCE** Agreement (PO #7003054) with Research Triangle Institute, doing business as RTI International (RTI), (VC# 171105-B001), Research Triangle Park, NC, by extending the contract end date to October 31, 2025 from December 31, 2023 and increasing the contract amount by \$106,599 to \$438,277 from \$331,678 to allow for two years of support for watershed modeling and forecasting as well as public access to observed watershed data. The original agreement was approved by G&C on November 18, 2020 item# 94 with amendments approved on October 21, 2021 item# 88 and August 17, 2022 Item #42. 100% Dam Maintenance Funds

Funding is available in the account as follows:

	<u>FY 2024</u>	<u>FY 2025</u>
03-44-442030-38170000-102-500731	\$53,300	\$53,299
Dept. Environmental Services, Dam Maintenance Program, Contracts for Program Services		

EXPLANATION

Under RSA 483-D:1, NHDES was directed to develop a computer model to assist in managing flows in the entire Winnepesaukee River Basin, which includes Lake Winnepesaukee, Lake Winnisquam and Silver Lake. Over the years, contracts with RTI resulted in the expansion of the number of modeled and forecasted basins to fourteen, including over seventy important lakes and rivers throughout the state. These modeled basins include some of the most important water resource management sites in the State, including Lake Winnepesaukee, Newfound Lake, Lake Sunapee, Ossipee Lake, Mascoma Lake and many others. Additionally, a public webpage was developed by RTI to present observed lake and river level data as well as meteorological data from monitoring stations throughout the State. This public webpage has become a vital source of data and information for the public, as well as emergency responders on the local, state and national levels. This request is **SOLE SOURCE** because the flood forecasting and reservoir operations modeling systems produced by RTI are the industry standard for software that performs this function and the software and systems are proprietary to RTI. For this reason, RTI is the only vendor available to host and support this forecast system, and can most efficiently and cost-effectively provide this secure host and support service. The Department of Information Technology (DoIT) has provided a letter of approval for this agreement, which is attached to this request.

In 2001, NHDES procured the services of RTI International, to provide and support the RiverTrak® Forecast System. An agreement to modernize the RiverTrak® Forecast System was approved by Governor and Council on November 18, 2020, as Item #94 and resulted in the development and deployment of the Amanzi® Forecast System. During development of the new Forecast System, NHDES, in consultation with DoIT, sought an amendment to the original contract to allow RTI to host and support the Forecast System in an industry standard AZURE Cloud environment for one year, which was approved by Governor and Council on October 27, 2021 as Item #88. A further amendment to allow RTI to perform multiple enhancements to the Forecast System was approved by Governor and Council on August 17, 2022 as Item #42.

DoIT agrees that RTI's proposal to host and support the cloud-based Forecast System is the most complete and cost-effective solution for NHDES. It is also a significant step in the overall strategic effort to transition legacy applications to a modernized cloud-based infrastructure and service model.

Without a continued agreement with RTI for support and hosting of the Forecast System, NHDES would immediately lose the ability to accurately forecast conditions in some of the most important watersheds in the state of New Hampshire. The Forecast System is vital to NHDES's mission to manage these watersheds in the State. Flooding and/or poor management of these watersheds would have significant financial impacts and risks to life and property in many areas of the state. Hydrologic data collected for operations and modeling purposes are also made available as a public service to anyone with Internet access. NHDES provides near real-time information through the publicly available Forecast System web portal (nhdes.rtiamanzi.org). This web portal presents watershed data and information in a real-time human-usable format, ensuring that support to other state agencies, emergency responders on the state, national and local levels, as well as to the general public is more robust, timely, and effective. The Forecast System web portal continues to be used to inform daily water management decisions as well as to inform decisions made to prepare for and recover from flood-related events.

RTI has agreed to provide the additional services necessary to host and support the Forecast System at a cost of \$53,300 for fiscal year 2024 and \$53,299 for fiscal year 2025. The total cost for the two-year agreement would be \$106,599.

The amendment has been approved by the Department of Justice as to form, substance and execution.

We respectfully request your approval.



Robert R. Scott, Commissioner



STATE OF NEW HAMPSHIRE
DEPARTMENT OF INFORMATION TECHNOLOGY
27 Hazen Dr., Concord, NH 03301
Fax: 603-271-1516 TDD Access: 1-800-735-2964
www.nh.gov/doit

Denis Goulet
Commissioner

October 2, 2023

Robert R. Scott, Commissioner
State of New Hampshire
Department of Environmental Services
29 Hazen Drive
Concord, NH 03301

Dear Commissioner Scott:

This letter represents formal notification that the Department of Information Technology (DoIT) has approved your agency's request to enter into a contract amendment with Research Triangle Institute (dba RTI International "RTI"), of Research Triangle Park, NC, as described below and referenced as DoIT No. 2021-024C.

This contract amendment enables DES to continue use of the RTI-owned and maintained cloud-based system for two years to host and support the Dam Bureau's Amanzi® Forecast System.

The price limitation will increase by \$106,599, from \$331,678 to \$438,277, and the amendment shall become effective upon Governor and Council approval through December 31, 2025.

A copy of this letter should accompany the Department of Environmental Services' submission to the Governor and Executive Council for approval.

Sincerely,

A handwritten signature in black ink that reads "Denis Goulet".

Denis Goulet

DG/ik
DoIT 2021-024C
cc: Rick McLaughlin, DoIT

**AMENDMENT #3
TO
AGREEMENT
BETWEEN THE
NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
AND
RTI INTERNATIONAL**

SUPPORT AND HOSTING OF THE AMANZI™ FORECAST SYSTEM

WHEREAS under NH RSA 483-D:1, the State of New Hampshire Department of Environmental Services (“NHDES”) was directed to develop a computer model to assist in managing flows in the Winnispeesaukee River Basin.

WHEREAS to fulfill this requirement, in 2001, NHDES procured the services of Riverside Technology Incorporated (now doing business as RTI International) to provide and support the RiverTrak© Forecast System.

WHEREAS, in 2020, NHDES has entered into a Sole Source Agreement with RTI in an amount not to exceed \$198,908 to modernize the RiverTrak© Forecast System through December 31, 2022 which was approved by Governor and Council on November 18, 2020 as Item 94.

WHEREAS, in 2021, NHDES, in consultation with the Department of Information Technology (“DoIT”), executed a Sole Source Amendment 1 to the Agreement to increase the not to exceed amount from \$198,908 to \$228,228 to provide funds for RTI to host and support the Amanzi™ Forecast System in an industry standard AZURE Cloud environment for one year, which was approved by Governor and Council on October 27, 2021 as Item 88.

WHEREAS, in 2022, NHDES, in consultation with the Department of Information Technology (“DoIT”), executed a Sole Source Amendment 2 to the Agreement with RTI to increase the not to exceed amount from \$228,228 to \$331,678 to provide funds allowing for needed enhancements, modifications, and updates to the Amanzi™ Forecast System, and to extend the completion date to December 31, 2023 from December 31, 2022, which was approved by Governor and Council on August 17, 2022 as Item 42.

WHEREAS the upgraded RiverTrak© Forecast System is referred to as a new system called the Amanzi™ Forecast System (“AFS”).

WHEREAS, NHDES has determined that, because the forecasting and reservoir operations modeling systems produced by RTI are custom applications of software modules, they can only be upgraded by RTI; and,

WHEREAS, NHDES wishes to execute an Amendment 3 to the Agreement to provide an additional \$106,599 to allow for two more years of continued support and hosting by RTI of the Amanzi™

Forecast System in an industry standard AZURE Cloud environment, and to extend the end date of the Agreement to October 31, 2025.

NOW THEREFORE, amend the original Agreement as Amended between NHDES and RTI as approved by Governor and Council on August 17, 2022 as Item 42 in the following manner:

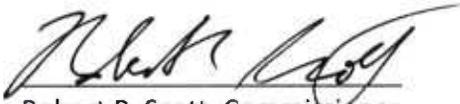
Change section 1.7 (Completion Date) in the General Provisions of the Agreement to read: October 31, 2025.

Change section 1.8 (Price Limitation) in the General Provisions of the Agreement to read: \$438,277.

Revise Exhibit B (Scope of Services), by inserting SERVICES FOR AMENDMENT 3, consisting of pages B-7 through B-11 at the end of the current Exhibit B to reflect the additional needed services.

Revise Exhibit C (Price And Payments) to insert Table C-4 to address the revisions to Exhibit B, SERVICES FOR AMENDMENT 3.

All other conditions outlined in the contract shall remain in effect.



Robert R. Scott, Commissioner
Department of Environmental Services



Alicia D. Brown, SSES Finance, Proposals/Contracts
RTI International



Assistant Attorney General
Department of Justice

*as to form, substance,
and execution.*

EXHIBIT B
SCOPE OF SERVICES FOR AMENDMENT 3

1. WORK TO BE PERFORMED BY THE CONTRACTOR

- 1.1 Work Program: The Work Program, as described below in Section 2, contains certain technical and professional activities to be performed with the funds pursuant to this Agreement.
- 1.2 Contractor Assurance: RTI International, heretofore known as the "Contractor", in consideration of the compensation to be provided pursuant to this Agreement, hereby covenants and agrees to perform and carry out in a satisfactory and proper manner, as determined by the New Hampshire Department of Environmental Services (NHDES), those activities identified and more particularly described below in the Work Program (individual work tasks and services).

2. WORK PROGRAM

- 2.1 Title: Support and Hosting of the Amanzi Forecast System
- 2.2 Objective: Under the scope of work in the initial contract a replacement system known as the Amanzi Forecast System (AFS) has been developed, implemented, and is currently hosted and supported by RTI in an industry standard AZURE cloud environment. The proposed amendment would continue support and hosting of the Amanzi Forecast System by RTI for an additional two years, ending on October 31, 2025.
- 2.3 Background/Description: On November 18, 2020 Governor and Council (item# 94) approved the request for NHDES to enter into a sole source contract with RTI International for the amount of \$198,908 with the express purpose of developing a modernized replacement for the legacy Rivertrak forecasting system. On October 27, 2021 as Item# 88, Governor & Executive Council also approved Amendment 1 to this contract provisioning 12-months of support and hosting of the new system, known as the Amanzi Forecast System (AFS), on RTI International's cloud-based servers. This amendment increased the total contract price by \$29,230 to \$228,228. In addition, on August 17, 2022 as item# 42, Governor & Executive Council also approved Amendment 2 to this contract providing for needed enhancements, modifications and upgrades to the Amanzi Forecast System (AFS). This amendment increased the total contract price by \$103,450 to \$331,678 and extended the contract completion data to December 31, 2023.

The current period of support and hosting of the Amanzi Forecast System by RTI is set to expire on October 31, 2023. This amendment seeks to extend the period of support and hosting by RTI for another two years, expiring on October 31, 2025. The explicit scope of

support and hosting services are described below in section 2.4. The proposed continuation of support and hosting of the Amanzi Forecast System by RTI would increase the total contract price by \$106,599 to \$438,277.

- 2.4 **Tasks:** Contractor shall perform the following tasks and provide the deliverables described herein for a period of 24 months of support and hosting:

Task A: Hosting of Amanzi Forecast System – Under this task, Contractor will continue hosting of the Amanzi Forecast System (AFS) in Microsoft (MS) Azure cloud environment using the resources listed in Table below. The shown specifications with respect to CPUs, memory, database size and diskspace will have been shown to allow effective operation of the Amanzi Forecast System (AFS) and lag-free access to its web interface under normal conditions.

AFS Component	Azure Resource	Specifications
Application Server	Virtual Machine	Standard D8s v3 (8 vcpus, 32 GiB memory)
Web Server	Virtual Machine	Standard D2s v3 (2 vcpus, 8 GiB memory)
Database	Hosted Database	General Purpose, D2ds_v4, 2 vCores, 8 GiB RAM, 128 GiB storage
Shared disk space	Disk	250 GB TiB Premium SSD
Static data and SFTP	Storage account	Up to 5 TB

Task B: Support of Amanzi Forecast System – Under this task, Contractor shall provide continuous general and on-demand support of the Amanzi Forecast System (AFS) to NHDES as outlined below:

1. Functional support for the existing 14 basins within the State of New Hampshire for which forecasting models have been developed and refined in the Amanzi Forecast System (AFS).
2. Functional support for the existing hydrometeorological monitoring sites in and near the State of New Hampshire for which data is ingested and presented in the Amanzi Forecast System (AFS).
3. Weekly system monitoring and review for the Amanzi Forecast System (AFS). This includes review of all workflow statuses to ensure all are running per schedule, review of VM disk usage and database storage, and clean-up of logs.
4. Maintenance and software updates of key components in the Amanzi Forecast System (AFS) including Docker, Prefect, Django, NGINX, React². This includes bug fixes and security patch versions but excludes version changes

RTI International
Support and Hosting of the Amanzi Forecast System
Exhibit B – Services For Amendment 3

that introduce backwards incompatibility.

5. Installation of operating system security updates and patches for the Amanzi Forecast System (AFS).
6. Troubleshooting and restarts of all components of the Amanzi Forecast System (AFS) as needed.
7. Routine clean-up maintenance of the virtual machines used for the Amanzi Forecast System (AFS) as needed (temporary files, log files, etc.).
8. Maintain network connectivity and communication between Amanzi Forecast System (AFS) components (database, application server, web server, docker network, docker containers, microservices).
9. Perform routine database maintenance for the PostgreSQL database integral to the Amanzi Forecast System (AFS).

Task C: Configuration Changes and Extended Support for the Amanzi Forecast System – Under this task, Contractor shall include 80 hours of extended support for the Amanzi Forecast System (AFS) for configuration changes or significant functional issues as outlined below.

1. Contractor may add a new hydrometeorological observation location, timeseries, or plot to the Amanzi Forecast System (AFS) as requested by NHDES.
2. Contractor may set up custom users and permissions for data access within the Amanzi Forecast System (AFS) as requested by NHDES.
3. Contractor may provide new or enhanced training and/or documentation for the Amanzi Forecast System (AFS) as requested by NHDES.
4. Contractor may make configuration changes for imports to the Amanzi Forecast System (AFS) as requested by NHDES.
5. Contractor may troubleshoot and correct significant problems with data ingest processes within the Amanzi Forecast System (AFS) as requested by NHDES.
6. Contractor may troubleshoot and correct significant problems with model execution processes within the Amanzi Forecast System (AFS) as requested by NHDES.

Task D: Support Hours and Service Uptime – Under this task, Contractor shall commit to providing best-effort service uptime for the Amanzi Forecast System (AFS) following the provisions below.

1. Contractor will respond to support requests within 8 business hours.
2. Contractor normal business hours are expected to be 8:00 am to 5:00 pm EST Monday through Friday.
3. Contractor is expected to provide emergency support during weekends and holidays, as staff are available.

Task E: Disaster Recovery and Data Loss Prevention – Contractor shall provide disaster recovery and data loss prevention services as outlined below.

1. Contractor shall maintain system back-ups using tools available in MS Azure to recover from a disaster or data loss event, including snap-shots of OS, VM data hard-drives, and the integral PostgreSQL database.
2. Contractor shall maintain all system configuration data and code in existing enterprise GitHub account to allow for the expedited reestablishment of the Amanzi Forecast System (AFS) on new VMs in the unlikely event of catastrophic MS Azure data loss or failure.

2.5 Assumptions and Limits: The technical assumptions and limits to the proposed support and hosting agreement by the Contractor are outlined below.

1. Contractor shall not provide interpretation of inflow forecasts created by the Amanzi Forecast System (AFS).
2. Contractor shall not perform software upgrades to the components of the Amanzi Forecast System (AFS) as these can introduce breaking changes.
3. Contractor shall not provide new features or functionality for the Amanzi Forecast System (AFS)
4. The number of concurrent users of the Amanzi Forecast System (AFS) processing modeling components will be limited to one (1) model or processing job at a time.
5. It is assumed that the variable costs for hosting, which include network bandwidth, domain name server, virtual networking, container registry, etc. will not exceed \$50 per month.
6. Secure shell (SSH) will be used to provide remote access to the VMs hosting the Amanzi Forecast System (AFS).
7. As specified, the Amanzi Forecast System (AFS) is expected to support up to ten (10) simultaneous authenticated users (i.e. forecasters with read and write permissions) and up to fifty (50) simultaneous un- authenticated users (i.e. public users). Unauthenticated users may be throttled/limited as needed to prevent them from degrading system performance for authenticated users.
8. The Application Server and the Web Server virtual machines will run a Long-term Support (LTS) version of Ubuntu Linux (currently version 20.04).
9. Hosting under this contract amendment will start on November 1, 2023 when the initial hosting outlined in contract Amendment 1 ends.

2.6 Extension of Contract End-Date to Include Support and Hosting Period: In the contract amendment approved by Governor & Council on August 17, 2022, the contract period was extended to December 31, 2023 to cover an unknown start date for the initial year of support and hosting after system development. This initial year of support and hosting began on November 1, 2022 and is set to expire on October 31, 2023. As such, it is proposed that the contract end date be extended to October 31, 2025 to include the requested addition of two years of support and hosting.

RTI International
Support and Hosting of the Amanzi Forecast System
Exhibit B – Services For Amendment 3

2.7 Agreement Duration: Governor and Council approval through October 31, 2025.

EXHIBIT C

Price and Payments

All services shall be performed to the satisfaction of NHDES before payment is made. All payments shall be made upon receipt and approval of stated outputs and upon receipt of an associated invoice. The billing for the "Support and Hosting of the Amanzi Forecast System", detailed in Exhibit B, is to be done upon a quarterly basis as detailed in Table C-4 below.

The total cost of the contract shall not exceed \$438,277. NHDES agrees to pay the invoices as submitted by the Contractor. Invoices are subject to the approval of the Contract Officer before payment is processed.

1. DELIVERABLE PAYMENT SCHEDULE.

All charges by Research Triangle Institute (RTI International), under this Contract for the "Modernization of Dam Bureau RiverTrak® Forecast System" shall be at a fixed price in accordance with the schedules set forth in Table C-1 below.

All charges by Research Triangle Institute (RTI International), under this Contract for the "Hosting and Support of the Dam Bureau Forecast System" shall be at a fixed price one-time up-front payment set forth in Table C-2 below.

All charges by Research Triangle Institute (RTI International), under this Contract for the "Enhancements to the Amanzi Forecast System" shall be at a fixed price in accordance with the schedules set forth in Table C-3 below.

All charges by Research Triangle Institute (RTI International), under this Contract for the "Support and Hosting of the Amanzi Forecast System" shall be at a quarterly fixed price in accordance with the schedules set forth in Table C-4 below.

2. FIXED PRICE PAYMENT SCHEDULE

Tables C-1, C-2, C-3, and C-4 Payment Schedule:

Contractor Initials: ADB
Date: 9/5/2023

Table C-1

Modernization of Dam Bureau RiverTrak® Forecast System			
PHASE 1			
Deliverable	Percentage	Due Date	Payment Amount
Amanzi™ based forecast system implemented on NHDES infrastructure ingesting all data products listed in Table 2-1	13%	3 months from start of Phase 1	\$ 25,084
Amanzi™ based forecast system implemented on NHDES infrastructure for data processing and 3-day deterministic forecasting (as listed in Table 2-1 and Table 2-2 of project proposal)	17%	5 months from start of Phase 1	\$ 33,044
Fully functional internal web-interface deployed and tested on NHDES infrastructure	8%	6 months from start of Phase 1	\$ 16,574
On-site training on the operation of the Amanzi™ based forecast system provided	5%	7 months from start of Phase 1	\$ 10,209
Processes and models configured to allow the use of 72-hour QPF and tested for proper functionality	1%	5 months from start of Phase 1	\$ 2,680
Sunapee (SUNNH) models configured and parameterized to produce less flashy results; models deployed in the current RiverTrak® system for testing	2%	2 months from start of Phase 1	\$ 4,544
Highland & Island Pond (ILPNH) models configured and parameterized to realistically respond to MAP and MAT inputs; models deployed in the current RiverTrak® system for testing	2%	3 months from start of Phase 1	\$ 3,216
Phase 1 Total:	48%		\$95,351

Contractor Initials: ADB
 Date: 9/5/2023

PHASE 2 (starts after completion of Phase 1)			
Deliverable	Percentage	Due Date	Payment Amount
Amanzi™ based forecast system including 365-day probabilistic forecasting for the Winnepesaukee watershed deployed and tested on NHDES infrastructure	12%	2 months from start of Phase 2	\$ 24,477
Baker River watershed models and Amanzi™ system reconfigured to include 8 flood control dams and tested for proper functioning	5%	3 months from start of Phase 2	\$ 9,016
National Water Model (NWM) forecast download and processing added to all forecast locations; internal web interface configured to display NWM forecasts	6%	4 months from start of Phase 2	\$ 11,851
SNODAS data processed and integrated in internal web-interface	3%	4 months from start of Phase 2	\$ 5,943
Fully functional external web-interface deployed and tested on NHDES infrastructure	5%	5 months from start of Phase 2	\$ 10,947
50 hours of on-call support provided	5%	12 months after Task 8 deliverable	\$ 10,243
Phase 2 Total:	36%		\$72,457

Contractor Initials: ADB
Date: 9/5/2023

PHASE 3 (starts after completion of Phase 1)			
Deliverable	Percentage	Due Date	Payment Amount
Memorandum on collected and reviewed data required for the development of the optimization scheme	1%	1 month from start of Phase 3	\$ 1,269
Memorandum on the definition of the optimization objectives, constraints, and algorithm	1%	2 months from start of Phase 3	\$ 2,645
Draft stand-alone optimization model for the Winnepesaukee River as described in Section 2.3.1 and 2.3.2 of project proposal	6%	5 months from start of Phase 3	\$ 11,661
Fully tested stand-alone optimization model for the Winnepesaukee River as described in Section 2.3.1 and 2.3.2 of project proposal	3%	6 months from start of Phase 3	\$ 5,750
Optimization model integrated into the Amanzi Forecast System	2%	7 months from start of Phase 3	\$ 3,037
User's manual and supporting documentation; Presentation	3%	7 months from start of Phase 3	\$ 6,718
Phase 3 Total:	16%		\$ 31,080
Modernization of Dam Bureau RiverTrak[®] Forecast System Project Total:	100%		\$ 198,908

Table C-2

Hosting and Support of the Dam Bureau Forecast System			
Deliverable	Percentage	Due Date	Payment Amount
Hosting and Support of the Dam Bureau Forecast System Project Total:	100%	1-year of hosting & support to begin upon completion of Deliverable C in Table C-3 below	<u>\$ 29,320</u>

Contractor Initials: ADB
Date: 9/5/2023

Table C-3

Enhancements to the Amanzi Forecast System			
Deliverable	Percentage	Due Date	Payment Amount
A. Update Amanzi Forecast System OpTable	100%	1 month from start of Enhancement work	<u>\$10,750</u>
B. User Interface Enhancements	100%	2 months from start of Enhancement work	<u>\$21,223</u>
C. Data Ingest and Processing Enhancements	100%	2 months from start of Enhancement work	<u>\$17,333</u>
D. Additional Calibration of Winnepesaukee Basin Optimization Model	100%	2 months from start of Enhancement work	<u>\$11,572</u>
E. Enhance Manual Data Entry	100%	3 months from start of Enhancement work	<u>\$26,869</u>
F. Create Mobile-Ready Versions of Webpages	100%	4 months from start of Enhancement work	<u>\$15,703</u>
Enhancements to Amanzi Forecast System Total:	100%		<u>\$103,450</u>

Contractor Initials: ADB
Date: 9/5/2023

Table C-4

Support and Hosting of Amanzi® Forecast System			
Deliverable	Percentage	Due Date	Payment Amount
1. 3 months AFS support and hosting	25%	January 31, 2024	<u>\$ 13,325</u>
2. 3 months AFS support and hosting	25%	April 30, 2024	<u>\$ 13,325</u>
3. 3 months AFS support and hosting	25%	July 31, 2024	<u>\$ 13,325</u>
4. 3 months AFS support and hosting	25%	October 31, 2024	<u>\$ 13,325</u>
5. 3 months AFS support and hosting	25%	January 31, 2025	<u>\$ 13,325</u>
6. 3 months AFS support and hosting	25%	April 30, 2025	<u>\$ 13,325</u>
7. 3 months AFS support and hosting	25%	July 31, 2025	<u>\$ 13,325</u>
8. 3 months AFS support and hosting	25%	October 31, 2025	<u>\$ 13,324</u>
AFS Support and Hosting Total:	100%		<u>\$106,599</u>

Notwithstanding any other provision of this Contract, in no event shall the total payment made by the State exceed \$438,277.

3. PAYMENTS

The State shall pay RTI International within thirty (30) calendar days of the State's receipt of a correct and undisputed invoice.

Contractor Initials: ADB
Date: 9/5/2023

State of New Hampshire

Department of State

CERTIFICATE

I, David M. Scanlan, Secretary of State of the State of New Hampshire, do hereby certify that RESEARCH TRIANGLE INSTITUTE is a North Carolina Nonprofit Corporation registered to transact business in New Hampshire on April 05, 2000. I further certify that all fees and documents required by the Secretary of State's office have been received and is in good standing as far as this office is concerned.

Business ID: 338837

Certificate Number: 0006316987



IN TESTIMONY WHEREOF,

I hereto set my hand and cause to be affixed
the Seal of the State of New Hampshire,
this 5th day of September A.D. 2023.

A handwritten signature in black ink, appearing to read "D. Scanlan".

David M. Scanlan
Secretary of State



Delegation of Signatory Authority Warrant

Alicia Brown

In accordance with my delegation from the President and CEO, whose authority is authorized by resolution of the Board of Governors, and within the responsibilities of your position, you are hereby delegated the authority to execute all such documents, affidavits, certifications, contracts and other agreements related to Contracts that evidence a commitment on the part of RTI International and are undertaken in the ordinary course of business. The limitations of your delegated signatory authority are set forth below. This delegation remains in effect until it is amended and may not be subdelegated. All signature authority is deemed null and void once employment with RTI ends.

Limits of Signatory Authority
\$50,000,000

A handwritten signature in black ink that reads "Stacey Passwaters".

Stacey Passwaters
Sr. Director, SSES Contracts & Subcontracts
RTI International

June 6, 2023

Date

