

CITY COUNCIL AGENDA STATEMENT



Meeting Date: January 9, 2024
To: Honorable Mayor and Council Members
From: Brian Shea, Planning Director

Agenda Item: **Resolution 2024-08**, Approving An Interlocal Agreement Between The Monroe County And The City Of Marathon Regarding Roadway Vulnerability Analysis; Providing For Transmittal Of This Resolution To The County; And Providing For An Effective Date.

BACKGROUND & JUSTIFICATION:

The City of Marathon has been coordinating with the other Municipalities and the County on LiDAR data collection. The next stage is to use the data to develop preliminary plans for road elevation projects throughout Marathon. By coordinating under the County umbrella, a unified approach is achieved so that all data and plans meet the same standards.

CONSISTENCY CHECKLIST:

| | Yes | No |
|-----------------------|------------|-----------|
| 1. Comprehensive Plan | __X__ | ___ |
| 2. Other | _____ | _____ |

FISCAL NOTE:

The adopted FY24 Planning Department budget in the General Fund includes appropriations of \$480,000 for this project which is funded by impact fees for transportation.

RECOMMENDATION:

Approval of Resolution

Sponsored by: Garrett

**CITY OF MARATHON, FLORIDA
RESOLUTION 2024-08**

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MARATHON, APPROVING AN INTERLOCAL AGREEMENT BETWEEN THE MONROE COUNTY AND THE CITY OF MARATHON REGARDING ROADWAY VULNERABILITY ANALYSIS; PROVIDING FOR TRANSMITTAL OF THIS RESOLUTION TO THE COUNTY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the County and the City are authorized to enter into this Agreement and implement its provisions pursuant to Section 163.01, Florida Statutes, as amended, which permits local government units to make the most efficient use of their powers by enabling them to cooperate with each other for mutual advantage and to provide services and facilities in a manner and pursuant to forms of governmental organization that accords best with geographic, economic, and other factors influencing the needs and development of local communities; and

WHEREAS; in August 2021, Monroe County, on behalf of the five municipalities within Monroe County, issued a Request for Proposals (RFP) seeking proposals from experienced firms interested in providing engineering survey data collection using mobile scanning technologies and data preparation services using multiple kinematic terrestrial light imaging distance and ranging (LiDAR) scanners for data capture from a vehicle driving along the roadway while simultaneously recording positional data using a Global Positioning System (GPS) and inertia measurement units (IMU), and cameras, and other ground-based, land-based or aerial LiDAR methods ("Project"); and

WHEREAS; in 2019 Monroe County issued a Request for Proposals (RFP) seeking proposals from experienced firms interested in providing professional services for a roads vulnerability analysis and capital plan for the County and the municipalities ("Project"); and

WHEREAS, Monroe County has agreed to manage the work ("Work") conducted during this Project, and the roadway vulnerability analysis will only be conducted on roads within the four municipalities of Islamorada, Layton, Key Colony Beach and Marathon and the road elevation data collected during this project will be added to LiDAR data collected in Monroe County previously. The expenditure of public funds therefore serves a public purpose because the work conducted will provide necessary survey data for road elevation planning in the five municipalities to address sea level rise issues; and

WHEREAS, the roadway vulnerability analysis Work for the CITY is projected to cost \$471,131.85; and

WHEREAS, it is necessary for the Parties to enter into this Agreement in order to spell out the rights and responsibilities of the Parties under this Agreement including the financial responsibilities to pay for Work associated with this Project.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MARATHON, FLORIDA, THAT:

Section 1. The above recitals are true and correct and incorporated herein.

Section 2. The request for the Interlocal Agreement is hereby approved.

Section 3. The City Clerk shall forward a certified copy of this Resolution to the County.

Section 4. This resolution shall take effect immediately upon its adoption by the City of Marathon.

PASSED AND APPROVED BY THE CITY COUNCIL OF THE CITY OF MARATHON, FLORIDA, THIS 9TH DAY OF JANUARY, 2024.

THE CITY OF MARATHON, FLORIDA

Robyn Still, Mayor

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

Diane Clavier, City Clerk
(City Seal)

APPROVED AS TO FORM AND LEGALITY FOR THE USE AND RELIANCE OF THE CITY OF MARATHON, FLORIDA ONLY:

Steven Williams, City Attorney

**INTERLOCAL AGREEMENT
BETWEEN
MONROE COUNTY, FLORIDA
AND
CITY OF MARATHON, FLORIDA
FOR
MUNICIPALITIES ROADWAY VULNERABILITY ANALYSIS**

THIS INTERLOCAL AGREEMENT (“Agreement”) is entered into this 31st day of January 2024, pursuant to Section 163.01, Florida Statutes, between Monroe County, a political subdivision of the State of Florida, whose address is 1100 Simonton Street, Key West, Florida 33040 (“County”), and City of Marathon, Florida, a municipal corporation of the State of Florida (“CITY”). The County and CITY are hereinafter collectively referred to individually as a "Party" and collectively as the “Parties.”

WITNESSETH:

WHEREAS, the County and the CITY are authorized to enter into this Agreement and implement its provisions pursuant to Section 163.01, Florida Statutes, as amended, which permits local government units to make the most efficient use of their powers by enabling them to cooperate with each other for mutual advantage and to provide services and facilities in a manner and pursuant to forms of governmental organization that accords best with geographic, economic, and other factors influencing the needs and development of local communities; and

WHEREAS, in 2019 Monroe County issued a Request for Proposals (RFP) seeking proposals from experienced firms interested in providing professional services for a roads vulnerability analysis and capital plan for the County and the municipalities ("Project"); and

WHEREAS, **light imaging distance and ranging (LiDAR)** data already collected by the COUNTY on behalf of the municipalities will be used in the engineering analyses and for conceptual designs; and

WHEREAS, Monroe County has agreed to manage the work ("Work") conducted during this Project, and the roadway vulnerability analysis will only be conducted on roads within the four municipalities of Islamorada, Layton, Key Colony Beach and Marathon and the road elevation data collected during this project will be added to LiDAR data collected in Monroe County previously. The expenditure of public funds therefore serves a public purpose because the work conducted will provide necessary survey data for road elevation planning in the five municipalities to address sea level rise issues; and

WHEREAS, the roadway vulnerability analysis Work for the CITY is projected to cost \$471,131.85; and

WHEREAS, it is necessary for the Parties to enter into this Agreement in order to spell out the rights and responsibilities of the Parties under this Agreement including the financial responsibilities to pay for Work associated with this Project.

NOW THEREFORE, in consideration of the mutual covenants set forth herein and other valuable consideration, the sufficiency and receipt of which is acknowledged by both of the Parties, and pursuant to Section 163.01, et. seq., Florida Statutes, the Florida Interlocal Cooperation Act of 1969, the Parties hereto agree as follows:

SECTION 1. RECITALS. The foregoing recitals are true and correct and are hereby incorporated in this Agreement by reference.

SECTION 2. TERM AND TERMINATION.

The term of this Agreement shall run from the date on which the Agreement is executed by all of the Parties (“Effective Date”) and shall continue in full force and effect until the Parties have satisfied all of their obligations under this Agreement, unless terminated sooner as provided herein (“Term”). This Agreement is subject to annual appropriation by the governing boards of each of the Parties.

In the event that funding from any source used to pay for the Work is withdrawn, reduced, or limited in any way after the Effective Date of this Agreement but prior to completion of the Agreement, the County may terminate the Agreement, subject to renegotiation under new funding limitations and conditions.

SECTION 3. RESPONSIBILITIES OF THE PARTIES.

A. Each Party to this Agreement shall designate an individual who may be designated by title or position to oversee and administer the Party’s participation in this Agreement. The Parties’ initial Administrators shall be the following individuals:

For Monroe County:
Rhonda Haag
Director Sustainability and Projects
102050 Overseas Highway, Ste. 246
Key Largo, FL 33037
Bus: (305) 453-8774
Haag-rhonda@monroecounty-fl.gov

For the CITY:
Brian Shea
Planning Director
9805 Overseas Highway
Marathon, FL 33050
Tel: (305) 289-4112
Sheab@ci.marathon.fl.us

Either Party may change its Administrator at any time by delivering written notice of such Party’s new Administrator to the other Party.

B. The Scope of Services for Work to be performed for this Project is as shown in the HDR Amendment 8 attached as **Exhibit A** to this Agreement by entering into this Agreement; each Party agrees that it will comply with all terms and conditions.

C. Monroe County has overall responsibility for direction of any Work for the Project. If at any time, any CITY member directs work to be performed by either contractor on the Project, the CITY shall be responsible for full payment of that Work, including if necessary, reimbursement to the County for such Work. The County shall provide the deliverables to each CITY indicating the Work that has been performed. The County shall have sole responsibility for direction of Work performed under this Project.

D. The project period under this Agreement is two years. The total budget for the Project is \$942,257.88. The CITY's share of the Project is Four Hundred Seventy-One Thousand One Hundred Thirty One and 85/100 Dollars (\$471,131.85). The total budget is split amongst the municipalities as shown below:

| MUNICIPALITY | STREET ELEVATION PLANNING |
|------------------|---------------------------|
| Islamorada | \$416,768.84 |
| Layton | \$ 12,079.86 |
| Marathon | \$471,131.85 |
| Key Colony Beach | \$ 42,277.33 |
| TOTAL | \$942,257.88 |

E. After issuance of the RFP for the roadway vulnerability analysis and capital plan services and receipt of proposals submitted by vendors in response to the RFP, the County hired HDR Engineering, Inc. as the contractor ("Contractor") to perform the work required for the Project. Throughout the Term of this Agreement, the Contractor will submit invoices to the County, with copies to the Cities, for the Work performed, up to the amounts shown in Exhibit A. The invoice shall show a breakdown of Work performed in the CITY.

F. Following receipt of the invoice from the Contractor, the County shall make payment to the Contractor in accordance with the Florida Local Government Prompt Payment Act and shall submit a reimbursement claim to the Agency for reimbursement of any eligible invoice costs in accordance with terms and conditions of any applicable grants.

G. Within ten (10) calendar days following receipt of the invoice from the Contractor, the CITY shall provide an electronic funds transfer (EFT) to deposit funds with the County in an amount necessary to pay 100% of amount of the invoice for Work performed in the CITY.

H. Within ten (10) days following receipt by the County of the eligible reimbursement costs from the Agency, the County will issue the approved reimbursement amount to the CITY by electronic funds transfer.

I. The CITY's obligation to pay is not conditioned upon the receipt of any grants. The CITY has an independent obligation to pay for all agreed-upon Work from any and all lawful available funding sources. CITY

J. By entering into this Agreement, each Party certifies that it registers with and uses the E-Verify system for applicable employees, contractors and subcontractors, as required by F.S. 448.095 and federal Executive Order 13465.

SECTION 4. RECORDS – ACCESS AND AUDITS.

A. Both Parties shall maintain all books, records, and documents directly pertinent to performance under this Agreement in accordance with generally accepted accounting principles consistently applied. Records shall be retained for a period of seven (7) years from the termination of this agreement or for a period of three (3) years from the date of submission of the final expenditure report in accordance with 2 CFR § 200.333, whichever is greater. Each Party to this Agreement or its authorized representatives shall have reasonable and timely access to such records of each other Party to this Agreement for public records purposes during the term of the Agreement and for four (4) years following the termination of this Agreement. If an auditor employed by the County determines that monies paid to the CITY pursuant to this Agreement were spent for purposes not authorized by this Agreement, the CITY shall repay the monies together with interest calculated pursuant to Sec. 55.03, of the Florida Statutes, running from the date the monies were paid by the County.

B. The Parties shall allow public access to all records subject to the provisions of Chapter 119, Florida Statutes, and the Constitution of the State of Florida and which have been made or received by either Party in conjunction with this Interlocal Agreement.

SECTION 5. NONDISCRIMINATION.

The Parties agree that there will be no discrimination against any person, and it is expressly understood that upon a determination by a court of competent jurisdiction that discrimination has occurred, this Agreement automatically terminates without any further action on the part of any Party, effective the date of the court order. The Parties agree to comply with all Federal and Florida statutes, and all local ordinances, as applicable, relating to nondiscrimination. These include but are not limited to: 1) Title VI of the Civil Rights Act of 1964 (PL 88-352) which prohibits discrimination on the basis of race, color or national origin; 2) Title IX of the Education Amendment of 1972, as amended (20 USC ss. 1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; 3) Section 504 of the Rehabilitation Act of 1973, as amended (20 USC s. 794), which prohibits discrimination on the basis of handicaps; 4) The Age Discrimination Act of 1975, as amended (42 USC ss. 6101-6107) which prohibits discrimination on the basis of age; 5) The Drug Abuse Office and Treatment Act of 1972 (PL 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; 6) The Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (PL 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; 7) The Public Health Service Act of 1912, ss. 523 and 527 (42 USC ss. 690dd-3 and 290ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; 8) Title VIII of the Civil Rights Act of 1968 (42 USC s. et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; 9) The Americans with Disabilities Act of 1990 (42 USC s. 1201 Note), as may be amended from time to time, relating to nondiscrimination on the basis of disability; 10) Monroe County Code Chapter 14, Article II, which prohibits discrimination on the basis of race, color, sex, religion, national origin, ancestry, sexual orientation, gender identity or expression, familial status or age; 11) Any other nondiscrimination provisions in any Federal or state statutes which may apply to the parties to, or the subject matter of, this Agreement.

SECTION 6. GOVERNING LAW, VENUE.

The laws of the State of Florida shall govern this Agreement. Any lawsuit to enforce the terms and conditions of this Agreement must be brought in Monroe County, Florida.

SECTION 7. SEVERABILITY.

If any provision or part of a provision of this Agreement is found by a court or other authority of competent jurisdiction to be void or unenforceable, that provision or part of a provision is to be deemed deleted from this Agreement and the remaining provisions to continue in full force and effect. The Parties shall, in this event, seek to agree upon a valid and enforceable provision or part of a provision to replace the provision or part of a provision found to be void and unenforceable.

SECTION 8. CODE OF ETHICS.

The Parties agree that officers and employees of the CITY and County required to comply with the standards of conduct for public officers and employees as delineated in Section 112.311, et seq., Florida Statutes, regarding, but not limited to, solicitation or acceptance of gifts; doing business with one's agency; unauthorized compensation; misuse of public position, conflicting employment or contractual relationship; and disclosure or use of certain information.

The County and CITY each warrant that, in respect to itself, it has neither employed nor retained any company or person, other than a bona fide employee working solely for it, to solicit or secure this Agreement and that it has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for it, any fee, commission, percentage, gift, or other consideration contingent upon or resulting from the award or making of this Agreement. Each Party further warrants that it has not employed, retained or otherwise had act on its behalf any former county officer or employee subject to the prohibition of Section 2 of Ordinance No. 010-1990 as amended by Ordinance 020-1990 or any county officer or employee in violation of Section 3 of Ordinance No. 010-1990. For the breach or violation of the provision, each Party shall have the right to terminate this Agreement without liability and, at its discretion, to offset from monies owed, or otherwise recover, the full amount of such fee, commission, percentage, gift, or consideration.

SECTION 9. AUTHORITY TO EXECUTE, EXECUTION IN COUNTERPARTS, EXECUTION BY ELECTRONIC SIGNATURES.

The persons signing below represent and warrant that each possesses the requisite authority to execute this Agreement and to bind his respective entity through his signature. This Agreement may be signed in counterparts. In accordance with Monroe County Ordinance No. 005-2018, an electronic signature is equally valid as a hard copy or wet signature.

SECTION 10. NOTICE.

Whenever any Party desires to give notice to the other, it must be given by written notice, either by registered first class U.S. mail, return receipt requested, or by certified mail, and sent to:

For the County:
Roman Gastesi
Monroe County Administrator
1100 Simonton St.
Key West, FL 33040

For the CITY:
George Garrett
City Manager
9805 Overseas Highway
Marathon, FL 33050

SECTION 11. ENTIRETY OF AGREEMENT. This Agreement constitutes the entire agreement between the County and the CITY, and supersedes all proposals, prior agreements, and all other communication between the Parties in relation to the subject matter covered by this Agreement. Except as otherwise provided herein, no revision, amendment or modification of this Agreement shall be effective unless reduced to writing and executed by both Parties.

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their Authorized Officers and have affixed their corporate seals hereon.

(SEAL)
Attest: KEVIN MADOK, CLERK

**BOARD OF COUNTY COMMISSIONERS
OF MONROE COUNTY, FLORIDA**

By: _____
As Deputy Clerk

By: _____
Holly Raschein, Mayor

Date:

APPROVED AS TO FORM AND LEGALITY FOR THE USE AND
RELIANCE OF MONROE COUNTY BOARD OF COUNTY
COMMISSIONERS ONLY:



CYNTHIA L. HALL, ASSISTANT COUNTY ATTORNEY

(SEAL)
Attest: DIANE CLAVIER, CITY CLERK

CITY OF MARATHON

By: _____

By: _____
George Garrett, City Manager

Date:

APPROVED AS TO FORM AND LEGALITY FOR THE USE AND
RELIANCE OF CITY OF MARATHON FLORIDA ONLY:

STEVE WILLIAMS, CITY ATTORNEY

EXHIBIT A

**AMENDMENT NO. 8 TO THE
SEA LEVEL RISE VULNERABILITY ANALYSIS AND PLANNING CONTRACT
FOR
COUNTY MAINTAINED ROADS INFRASTRUCTURE ADAPTATION
WITH
HDR ENGINEERING INC.
FOR MUNICIPAL PLANNING WORK**

**AMENDMENT NO. 8
TO THE AGREEMENT
FOR
SEA LEVEL RISE VULNERABILITY ANALYSIS AND PLANNING
FOR COUNTY MAINTAINED ROADS INFRASTRUCTURE ADAPTATION
BETWEEN
MONROE COUNTY BOARD OF COUNTY COMMISSIONERS
AND
HDR ENGINEERING INC.**

This AMENDMENT NO. 8 (“Amendment”) is made and entered into this ____ of ____, 2023 to that Agreement dated May 22, 2019 as amended November 17, 2020 under Amendment No. 1, April 21, 2021 under Amendment No. 2, and November 17, 2021 under Amendment No. 3, June 15, 2022 under Amendment No. 4, October 19, 2022 under Amendment No. 5, June 21, 2023 under Amendment No. 5A/5B, June 21, 2023 under Amendment No. 6, and November 8, 2023 under Amendment No. 7 (cumulatively, "Agreement"), by and between Monroe County "COUNTY," and HDR Engineering, Inc. "CONSULTANT".

WITNESSETH:

WHEREAS, the COUNTY recognized the need for immediate, coordinated, and visionary action to address the impacts of a changing climate and ensure the COUNTY provides for resilience for its more than 300 miles of roads infrastructure; and

WHEREAS, the recommendation for a Roads Adaptation Plan is *Green Keys* item 2-14, which specifies that the County shall conduct a County-wide roads analysis to identify near-term roads subject to inundation risk, including nuisance flooding, and that include related green infrastructure where appropriate; and

WHEREAS, on May 22, 2019, the parties entered into the Agreement, so that the CONSULTANT could provide professional services for vulnerability analysis on roadways in the unincorporated Monroe County; and

WHEREAS, the comprehensive County wide roads analysis extends beyond the County maintained roadways and in collaboration with the Village of Islamorada, City of Marathon, City of Layton, and City of Key Colony Beach, a continuation of the Roadway Vulnerability Analysis and Adaptation Plan is to provide consistency and fulfill the County’s long term goals; and

WHEREAS, the parties wish to amend the Agreement in order to cover services to be provided by the Consultant for the Roadway Vulnerability Analysis and Adaptation Plan in the municipalities of Islamorada, Marathon, Layton, and Key Colony Beach; and

WHEREAS, under the terms of this Amendment No. 8, the Consultant shall conduct the Roadway Vulnerability Analysis and Adaptation plan for 156 miles of locally maintained roads within the four municipalities; and

NOW, THEREFORE, in consideration of the mutual promises, covenants and agreements stated herein, and for other good and valuable consideration, the sufficiency of which is hereby acknowledged, COUNTY and CONSULTANT agree as follows:

1. Articles 2.1, 7.1, and 7.2.1 in the AGREEMENT are amended as follows:

ARTICLE II SCOPE OF BASIC SERVICES

2.1 DEFINITION

CONSULTANT’S revised Scope of Basic Services consist of those described in attached **Exhibit A-8**. The CONSULTANT shall commence work on the services provided for in this Amendment promptly upon his receipt of a written notice to proceed from the COUNTY.

ARTICLE VII COMPENSATION

7.1 PAYMENT SUM

The COUNTY shall pay the CONSULTANT for the CONSULTANT’S performance of this Amendment No. 8 an amount not to exceed Nine Hundred Forty-Two Thousand Two Hundred Fifty-Seven Dollars and Eighty-eight Cents (\$942,257.88). The total Agreement is not to exceed \$3,105,132.90, which includes the lump sum amount and time and materials amount of \$2,915,965.72 for Required Services and an amount not to exceed \$189,167.18 for Optional Services. The Contract Sum shall not exceed this amount unless amended by formal approval of the Monroe County BOCC. No charges shall be incurred by the County other than products or services that were ordered, provided and agreed upon by the COUNTY.

7.2 PAYMENTS

7.2.1 For its assumption and performances of the duties, obligations and responsibilities set forth herein, the CONSULTANT shall be paid according to the revised **Deliverable Schedule** attached as **Exhibit B-8**, and according to the Florida Local Government Prompt Payment Act, Section 218.70, Florida Statutes. Payments will be lump sum or time and materials, as indicated in Exhibit B-8. Partial payments of tasks and deliverables shall be allowed for any item over \$5,000. The Provider shall submit to the COUNTY an invoice with supporting documentation in a form acceptable to the Clerk. Acceptability to the Clerk is based on generally accepted accounting principles and such laws, rules and regulations as may govern the Clerk’s disbursement of funds. The Sustainability Director will review the request, note her approval on the request and forward it to the Clerk for payment.

7.2.2 Exhibits A-8 and B-8 attached to this Amendment are added to the Agreement.

7.2.3 All other provisions of the AGREEMENT dated the 22nd day of May, 2019 and amended November 17, 2020, April 21, 2021, November 17, 2021, June 15, 2022, October 19, 2022, June 21, 2023, and November 8, 2023 not inconsistent herewith, shall remain in full force and effect.

THE REMAINDER OF THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

IN WITNESS WHEREOF, each party has caused this Agreement to be executed by its duly authorized representative on the day and year first above written.

(SEAL)

Attest: KEVIN MADOK, Clerk

**BOARD OF COUNTY COMMISSIONERS
OF MONROE COUNTY, FLORIDA**

By: _____
As Deputy Clerk

By: _____
Mayor Holly Raschein

Date: _____

(Seal)

Attest:

HDR ENGINEERING, INC.

BY: _____

By: _____

Title: _____

Title: _____

EXHIBIT A-8

Monroe County Roadway Vulnerability Analysis and Capital Plan

Monroe County Municipalities Roadway Vulnerability Analysis

Scope of Services

REVISED: April 11, 2023

The following tasks are added through this Amendment. All other tasks from Exhibit A in the original Agreement as well as Exhibits A-1, A-2, A-3, A-4, A-5, A5A/A5B, A-6, and A-7 in prior amendments remain unchanged.

The Roadways Vulnerability Analysis and Planning currently underway by Monroe County is only being performed for County-maintained roads, and not for roads maintained by the municipalities.

The scope of Amendment 8 and this Exhibit A-8 is for the provision of professional services provided by HDR engineering Inc. (HDR) for the Monroe County Municipalities Roadway Vulnerability Analysis project. There are 156 miles of locally maintained roads within the four municipalities that will be evaluated under this study. This project shall provide the Vulnerability Analysis and Planning in Islamorada, Layton, Marathon, and Key Colony Beach. The following tasks shall be conducted for each municipality that participates in the regional resilience planning activities, and a series of Technical Memorandums tailored to each municipality considering the difference in size and existing conditions will be produced throughout the schedule of the project requiring the review and approval of the Municipalities and the County. Technical Memorandums will be submitted in electronic format and will be included as part of the Final Report. The project schedule accommodates a draft technical memorandum review for one (1) iteration of comments from the Municipalities and the County and approval for final technical memorandum for the corresponding memorandum submittals.

1. Task 1:

1.1. Initial Assessment

1.1.1. **GIS Analysis:** Using mobile LiDAR survey data to map out the present-day roadway elevation and assort the roadway segments in order of roadway elevation. Develop GIS Map using color configuration to depict the different existing roadway elevation segments, based on the LiDAR data.

1.1.1.1. Develop GIS database for project starting off with documentation of LiDAR data and the 156 miles of roadway.

1.1.1.2. Map out colored roadway segments (use color code configuration for segment elevations) comparing the existing road elevations with the existing mean high-water elevations.

1.1.1.3. Conduct a meeting with the County and municipalities to identify immediate areas and/or roadway segments of concern related to the data, such as obvious discrepancies and also gaps in data between actual recorded

flooding locations and GIS low elevation areas as well as define parameters for screening analysis that include but are not limited to roadway elevation, proximity to ocean, existing flooding conditions based on maintenance record maps and/or citizen complaints, FEMA boundary maps, history of King Tide flooding events (NOAA CO-OPS tide stations), etc.

1.1.1.4. Develop technical memorandum

1.1.1.5.

1.1.1 Deliverables:

- Technical Memorandum for Village of Islamorada will include the description of the screening analysis process for the evaluation of the existing ground information (LiDAR Data) and the existing mean high-water elevations to determine the critical and non-critical roadway segments among for the 69 miles of roadway.
- Technical Memorandum for the City of Layton will include the description of the screening analysis process for the evaluation of the existing ground information (LiDAR Data) and the existing mean high-water elevations to determine the critical and non-critical roadway segments for the 2 miles of roadway.
- Technical Memorandum for the City of Marathon will include the description of the screening analysis process for the evaluation of the existing ground information (LiDAR Data) and the existing mean high-water elevations to determine the critical and non-critical roadway segments for the 78 miles of roadway.
- Technical Memorandum for the City of Key Colony Beach will include the description of the screening analysis process for the evaluation of the existing ground information (LiDAR Data) and the existing mean high-water elevations to determine the critical and non-critical roadway segments for the 7 miles of roadway.
- A GIS map layer will be developed that will depict all municipality roadway segments with different colors assigned based on the range of elevations and mean high water elevation clearance they fall under.

1.1.2. **Site Assessment and Condition Survey:** Includes assessment of roadway pavement conditions and assessment of the anticipated service life relative to the condition of the existing roadway surfaces. Condition data collection will be conducted using a digital imaging vehicle on the 156 miles of roadways identified throughout the study area and based upon the existing PAVER database. The Distress data will be obtained from images using PAVER Image Inspector and evaluated by experienced pavement distress raters in accordance with ASTM D6433-16 “Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys”. Condition for each roadway section will be calculated in PAVER and reported in tabular and map formats. The predictive modeling function within PAVER will be used to forecast the remaining service life for each roadway section. The built-in GIS tools within PAVER will be used to create inventory and condition data for use in Desktop ArcGIS.

- 1.1.2.1. Information requests, sectioning review, data collection routing, and field prep
- 1.1.2.2. Digital imaging data collection
- 1.1.2.3. Condition surveys from collected images using ASTM D6433-16.
- 1.1.2.4. Produce current condition of roadway PAVER sections
- 1.1.2.5. Modeling of pavement service life based on current condition of each section
- 1.1.2.6. Document information in GIS with map and tabular reports
- 1.1.2.7. Develop technical memorandum.

1.1.2 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the criteria established for assessments and a table listing sections assessed with a rating of “poor, fair, and good” based on current condition for all roadway segments within the 2 miles of roadway. The results of the existing pavement assessment will be presented in tables and available through GIS maps.
- Technical Memorandum for the City of Marathon will include a summary of the criteria established for assessments and a table listing sections assessed with a rating of “poor, fair, and good” based on current condition for all roadway segments within the 78 miles of roadway. The results of the existing pavement assessment will be presented in tables and available through GIS maps.
- Technical Memorandum for Village of Islamorada will include a summary of the criteria established for assessments and a table listing sections assessed with a rating of “poor, fair, and good” based on current condition for all roadway segments within the 69 miles of roadway. The results of the existing pavement assessment will be presented in tables and available through GIS maps.
- Technical Memorandum for the City of Key Colony Beach will include a summary of the criteria established for assessments and a table listing sections assessed with a rating of “poor, fair, and good” based on current condition for all roadway segments within the 7 miles of roadway. The results of the existing pavement assessment will be presented in tables and available through GIS maps.
- Additionally, through predictive modeling and the use of the existing pavement assessment data, a summary of the forecasted year of terminal life for each roadway segment in each municipality will presented in a table format and graphical presentation of network condition transition by year.

- 1.1.3. **Roadway Data:** Identify roadway Characteristics and functional classification. Develop generalized Typical Sections for different types of existing roadway conditions. Using available GIS and desktop data, document existing readily visible utilities, Signs, and Signals. Inventory of existing bridges with typical section and specific structural information. Define roadways by category to develop type of roadway improvements based on area and/or type of roadway.

- 1.1.3.1. Desktop and/or GIS review of the 156 miles of roadway to gather following information:
- 1.1.3.2. Typical Section (Number of lanes, shoulder/C&G, divided/undivided)
- 1.1.3.3. Utilities
- 1.1.3.4. Lighting
- 1.1.3.5. Bridges (number of lanes, number of spans, railing type, location)
- 1.1.3.6. Intersections/side streets
- 1.1.3.7. Driveways/turnouts
- 1.1.3.8. Identify Critical County/City infrastructure in the vicinity of roadway segment/location including but not limited to healthcare/hospitals, fire/rescue, airports, law enforcement/military, schools/shelters, State/Government, water/wastewater, solid waste, and worship buildings listed in the Monroe County Comprehensive Emergency Preparedness plan. Coordination with municipalities will be conducted and review of the latest Monroe County Comprehensive Emergency Preparedness plan (dated 2012) to develop a list of “Essential Services, Critical Facilities and infrastructure”. These facilities may be either emergency incident sites due to disaster impacts or could be used as emergency management support facilities.
- 1.1.3.9. Review available information from municipalities (Existing project plans, reports, right-of-way maps)
- 1.1.3.10. Geotechnical: Review and compilation of historical documents provided by the county and municipalities; documents may include geotechnical soil borings, existing underground utility plans, as built roadway records, and roadway construction drawings. Existing data limits will be documented to determine extent of coverage and develop a comprehensive exploration program to supplement available County data. US Soil Conservation Service soil maps will be developed for assistance with drainage design and supplemented with double ring infiltration (DRI) tests. The DRI tests will determine infiltration rates and will include hand auger borings to determine seasonal high-water table and existing ground water level. Soil samples will be classified in accordance to ASTM D2487 and D2488. Conduct soil borings and pavement cores for pavement designs. The exploration effort will consist of several site visits within the municipality study limits where allowable testing within the allocated timeframe and budget would be obtained.
- 1.1.3.11. Field assessment for desktop information field validation and capture additional data.
- 1.1.3.12. Document information in program GIS
- 1.1.3.13. Develop technical memorandum

1.1.3 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the existing available information provided by the municipality that lists specific geotechnical, roadway, and utility data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review and field verification of specific roadway characteristics, roadway functional classification, posted speed, typical section description,

intersections/side streets, driveway access points, Critical Facilities, and bridges for each roadway segment within the 2 miles of roadway.

- Technical Memorandum for the City of Marathon will include a summary of the existing available information provided by the municipality that lists specific geotechnical, roadway, and utility data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review and field verification of specific roadway characteristics, roadway functional classification, posted speed, typical section description, intersections/side streets, driveway access points, Critical Facilities, and bridges for each roadway segment within the 78 miles of roadway.
- Technical Memorandum for the City of Key Colony Beach will include a summary of the existing available information provided by the municipality that lists specific geotechnical, roadway, and utility data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review and field verification of specific roadway characteristics, roadway functional classification, posted speed, typical section description, intersections/side streets, driveway access points, Critical Facilities, and bridges for each roadway segment within the 7 miles of roadway.
- Technical Memorandum for Village of Islamorada will include a summary of the existing available information provided by the municipality that lists specific geotechnical, roadway, and utility data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review and field verification of specific roadway characteristics, roadway functional classification, posted speed, typical section description, intersections/side streets, driveway access points, Critical Facilities, and bridges for each roadway segment within the 69 miles of roadway.
- All collected roadway information and inventory will be available under corresponding GIS layers.

1.1.4. **Stormwater Structures:** Collection and review of County and municipalities available data and integrating information into the GIS database. The County and municipalities are to provide GIS data that entails a layer with information and location of existing stormwater structures. Hydraulic modeling is not part of the scope for this project.

- 1.1.4.1. Desktop review of the locations identified within the 156 miles of roadway to determine type of roadside storm drain system in place and location of structures.
- 1.1.4.2. Review past designs, reports, analysis, GIS data, and studies to be provided by the municipalities.
- 1.1.4.3. Survey of downstream pipes and outfalls where information is not available.
- 1.1.4.4. Perform field surveying via RTK GPS or conventional methods when necessary, at specific locations.
- 1.1.4.5. Survey invert elevation at center of each assigned outfall structure directly or by offset at specific locations.

- 1.1.4.6. Digitally record outfall pipe diameter or dimensions
- 1.1.4.7. Field assessment for desktop information field validation and capture additional data
- 1.1.4.8. Document information in GIS
- 1.1.4.9. Develop technical memorandum

1.1.4 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the existing available information provided by the county and the municipality that lists specific stormwater data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review, survey, and field verification of stormwater facilities for each roadway segment listed in the 2 miles of roadway.
- Technical Memorandum for the City of Marathon will include a summary of the existing available information provided by the county and the municipality that lists specific stormwater data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review, survey, and field verification of stormwater facilities for each roadway segment listed in the 78 miles of roadway.
- Technical Memorandum for the City of Key Colony Beach will include a summary of the existing available information provided by the county and the municipality that lists specific stormwater data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review, survey, and field verification of stormwater facilities for each roadway segment listed in the 7 miles of roadway.
- Technical Memorandum for Village of Islamorada will include a summary of the existing available information provided by the county and the municipality that lists specific stormwater data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review, survey, and field verification of stormwater facilities for each roadway segment listed in the 69 miles of roadway.
- All collected stormwater information and inventory will be available under corresponding GIS layers.

- 1.1.5. **Environmental Assessment:** Develop a database that covers the study limits and will first be populated with observable information obtained from desktop references such as: Google Earth aerial and street view imagery, United States Fish and Wildlife (USFWS) National Wetland Inventory (NWI) coverages, the Monroe County Canal Management Master Plan Database, and the Florida Natural Areas Index. Additionally, collection and review of municipalities available data and integrating information into the overall project GIS database. The municipalities are to provide available GIS data that entails a layer with information and location of existing environmental features.

- 1.1.5.1. Desktop assessment
- 1.1.5.2. Field assessments as needed for clarification
- 1.1.5.3. Document information in GIS
- 1.1.5.4. Develop Technical Memorandum

1.1.5 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the existing available environmental information provided by the municipality and information gathered through desktop review, and field assessment.
- Technical Memorandum for the City of Marathon will include a summary of the existing available environmental information provided by the municipality and information gathered through desktop review, and field assessment.
- Technical Memorandum for the City of Key Colony Beach will include a summary of the existing available environmental information provided by the municipality and information gathered through desktop review, and field assessment.
- Technical Memorandum for Village of Islamorada will include a summary of the existing available environmental information provided by the municipality and information gathered through desktop review, and field assessment.
- Information gathered will be used to map out the environmental areas/ natural resources throughout the County. All collected environmental information and inventory will be available under corresponding GIS layers.

2. Task 2: Engineering Analysis

2.1. Storm Surge, Wind Waves, and Extreme Events Analysis:

Conduct numerical modeling using MIKE21. The separate municipalities with spatial variability in terrain (topography, bathymetry, shoreline alignment, etc.) will each be a high-resolution domain. The models will be run for a range of seasonal and extreme storm conditions at each time increment to help forecast increased vulnerability over time. Sea level rise and seasonal water values determined under the Monroe County Roadway Vulnerability Analysis and Adaptation Plan would be applied. Water level values for extreme storm surge (hurricane flooding) will be obtained from published studies by FEMA, NOAA, or other sources. Bathymetry and topography will be obtained from existing sources (no field surveys are included). Where appropriate, the bathymetry in the models could be varied for certain time increments to reflect long-term erosion trends; erosion trends would be based on readily available published data from previous studies.

Evaluation of the water surface elevations associated with extreme storms are a combination of sea level, storm surge, wind waves, and astronomical tides associated with Saffir-Simpson storm categories (1-5) for current storms and future storm scenarios at future SLR levels. Work with GIS to map information. The Roadway adaptation improvement projects are not

to be exclusively designed to withstand major storm and extreme events.

- 2.1.1. Data Collection
- 2.1.2. Conduct Modeling with MIKE21
- 2.1.3. Develop technical memorandum

2.1 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the evaluation and recommendation of the storm surge, wind waves, and extreme events analysis for 2025, 2030, 2035, 2040, 2045, 2060, and 2100.
- Technical Memorandum for the City of Marathon will include a summary of the evaluation and recommendation of the storm surge, wind waves, and extreme events analysis for 2025, 2030, 2035, 2040, 2045, 2060, and 2100.
- Technical Memorandum for the City of Key Colony Beach will include a summary of the evaluation and recommendation of the storm surge, wind waves, and extreme events analysis for 2025, 2030, 2035, 2040, 2045, 2060, and 2100.
- Technical Memorandum for Village of Islamorada will include a summary of the evaluation and recommendation of the storm surge, wind waves, and extreme events analysis for 2025, 2030, 2035, 2040, 2045, 2060, and 2100.
- The SLR projections and King Tide Predictions in association with current and future storm scenarios will be referenced in the MIKE21 software to model water surface elevations. Modeling information will be integrated with GIS and simulation video/graphics will be produced for public and stakeholder outreach activities based on the need of each municipality.

2.2. **Roads Vulnerability Assessment and Inundation Mapping:** Conduct a SLR vulnerability study of the roads to tidal and surge flooding conditions. Develop a GIS-based vulnerability assessment model to identify and prioritize the Municipalities roadways at risk for adverse impacts due to climate change. The model will be developed in the Spatial Modelbuilder environment of Desktop ArcGIS 10.6.1 using the raster overlay tools in the Spatial Analyst extension. The first stage of the vulnerability modeling involves identifying the roadways within each of the municipalities that will be physically affected. There are five principal effects to consider:

- Increase in Groundwater Elevation – As sea level rises, the Mean High High-Water (MHHW) groundwater elevation will also increase. Using the high-resolution LIDAR of the roadway surface and an estimate of future groundwater elevations, GIS model will identify those sections of roadway within each of the municipalities that will not have adequate clearance above the MHHW groundwater table.
- Sea Level Rise Inundation – Roadways in low-lying areas near the coastline will be subject to more frequent, periodic inundation by high tides as sea level rise progresses over time. The GIS model will compare the LIDAR roadway elevation against the MHHW ocean elevation for each sea level rise scenario and time frame chosen for the study to identify

which streets within each of the municipalities will be subject to flooding under those conditions.

- Storm Surge Inundation – The higher stand of the ocean elevation due to sea level rise will exacerbate the flooding induced by King tides and hurricane storm surge. GIS model will apply the storm surge elevations associated with the Hurricane Category most appropriate for the future sea level rise scenarios and time frames to identify those roadways within each of the municipalities at risk of inundation.
- Projected Wave Impact – In coastal areas, wave action driven by onshore winds can severely damage buildings and infrastructure. For a given storm surge scenario, parts of the landscape with direct exposure to wind-driven waves will be more severely impacted than areas that are sheltered by intervening buildings or vegetation.
- Roadway Existing Pavement Condition – Based on Pavement Condition Inventory (PCI) to be conducted under section 1.1.2. Roadways in Very Good condition can be presumed to be less vulnerable to degradation by SLR related impacts than roadways with Very Poor condition were presumed to be most vulnerable to future SLR impacts.

A vulnerability flood score will be assigned to each one of 156 miles of the Municipalities roadway miles. All segments will be individually ranked based on their vulnerability flood score.

Inundation mapping will be provided utilizing a GIS tool that is designed to look at smaller scale areas of inundation. This tool will be used to focus in on smaller scale inundation mapping areas such as specific Key or geographic feature of interest.

- 2.2.1. Set up GIS Vulnerability Assessment Spatial Modelbuilder Model and all GIS data sets
- 2.2.2. Conduct meeting with the municipalities to establish vulnerability parameters and weight factors.
- 2.2.3. Conduct vulnerability assessment for 2025, 2030, 2035, 2040, 2045, 2060, and 2100. Generate Vulnerability Score for the 156 miles of municipalities road segments/locations.
- 2.2.4. Develop inundation maps for different scenarios. The municipalities and project areas within them will be categorized relative to flood exposure as well as critical areas.
- 2.2.5. Develop technical memorandum

2.2 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the applicability and operation of the GIS model, vulnerability analysis methodology, the inputs it requires and the outputs it generates, and a vulnerability flood score for the municipality's 2 miles of roadways. Inundation maps that cover all the municipality's roadways will be prepared for 2025, 2030, 2035, 2040, 2045, 2060, and 2100.
- Technical Memorandum for the City of Marathon Layton will include a summary of the applicability and operation of the GIS model, vulnerability analysis methodology, the inputs it requires and the outputs it generates, and a vulnerability flood score for the municipality's 78 miles of roadways. Inundation maps that cover all the municipality's roadways will be prepared for 2025, 2030, 2035, 2040, 2045, 2060, and

2100.

- Technical Memorandum for the City of Key Colony Beach will include a summary of the applicability and operation of the GIS model, vulnerability analysis methodology, the inputs it requires and the outputs it generates, and a vulnerability flood score for the municipality's 7 miles of roadways. Inundation maps that cover all the municipality's roadways will be prepared for 2025, 2030, 2035, 2040, 2045, 2060, and 2100.
- Technical Memorandum for Village of Islamorada will include a summary of the applicability and operation of the GIS model, vulnerability analysis methodology, the inputs it requires and the outputs it generates, and a vulnerability flood score for the municipality's 69 miles of roadways. Inundation maps that cover all the municipality's roadways will be prepared for 2025, 2030, 2035, 2040, 2045, 2060, and 2100.
- Inundation analysis data will be available under corresponding GIS layers.

2.3. Prioritization of Roadway Segments based on Vulnerability Assessment: Development of a flexible scheme based on the results from the vulnerability analysis conducted through the GIS-based vulnerability assessment model and information gathered from the municipalities decision makers and policy administrators. Following the identification of at-risk roadways, GIS model will evaluate the criticality of the roadways affected based on a variety of engineering, environmental, cultural, and emergency response factors. Each factor would be assigned a weight in the GIS model that could be adjusted to reflect their relative importance as determined following coordination with the Municipalities.

While the Vulnerability Assessment determined the extent to which each asset is at risk from new conditions arising from climate change, the Criticality Assessment was a community-based assessment of the *importance* of each infrastructure asset. The following steps occurred during the Criticality Assessment:

Prepare List of Criticality Factors – Identify a short list (5 – 10) of factors that would affect the relative importance of an infrastructure asset. For example, all else being equal, a fire hydrant next to a hospital is more critical to the community than a fire hydrant located next to an empty lot. The Criticality Factors identified for the County project are being recommended to be used for the Municipality assessment.

- a. Number of Residential Units Per Road Segment
- b. Roadways Associated With Critical Facilities (Police, Fire, Hospital)
- c. Non-Residential Parcel Building Size
- d. T&E and Focus Species Values Associated With Road Segment
- e. Wetlands Associated With Road Segment
- f. Roadway Functional Class and Evacuation Routes

2.3.1. Develop materials for team internal working meeting.

2.3.2. Conduct working meeting with each municipality to conduct prioritization exercise and document the provision of additional input and/or data. Prioritization exercise will define highest ranked roadway segments/locations in each municipality will be recommended for concept development evaluation.

2.3.3. Develop technical memorandum

2.3 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the results and input from the flexible scheme analysis, list of roadway segments within the 2 miles of roadway recommended to move forward with adaptation improvements, and prioritization schedule.
- Technical Memorandum for the City of Marathon will include a summary of the results and input from the flexible scheme analysis, list of roadway segments within the 78 miles of roadway recommended to move forward with adaptation improvements, and prioritization schedule.
- Technical Memorandum for the City of Key Colony Beach will include a summary of the results and input from the flexible scheme analysis, list of roadway segments within the 7 miles of roadway recommended to move forward with adaptation improvements, and prioritization schedule.
- Technical Memorandum for Village of Islamorada will include a summary of the results and input from the flexible scheme analysis, list of roadway segments within the 69 miles of roadway recommended to move forward with adaptation improvements, and prioritization schedule.

3. Task 3: Flood Mitigation Concept Development

Develop general flood mitigation concepts for the roadway segments/locations recommended as a result from the Prioritization of Roadway Segments. Concepts to consider potential phasing of future adaptation and evaluation for opportunities to implement green infrastructure and green road solutions.

3.1. Design

3.1.1. Roadway Design:

Criteria and Standards: Define roadway criteria and standards to be used in the evaluation based on roadway category. Development of typical section and identification of proposed non-compliant elements.

Green Infrastructure and Green Road Solutions: Worldwide case studies will be evaluated to determine innovative solutions that complement the green engineering design. Specific solutions will be provided with the conceptual road designs. Incorporation of **recreational opportunities** will also be considered as part of the adaptation improvements evaluation and recommended where applicable and feasible to implement and specific solutions will be provided. Consideration of available roadside undeveloped municipalities owned parcels of land will be evaluated for stormwater management and recreational opportunities. Permeable asphalt surfaces, underground stormwater collection systems, and/or bio-swales are some options that will be considered as part of green engineering solutions.

Pavement Design: Develop two general reconstruction pavement design recommendations. Requires soil boring and pavement cores at certain locations (Geotechnical efforts included under Task 1) and review of FDOT traffic count stations if available. One design with limerock base and one with asphalt base.

Utilities: Establish potential impacts with proposed roadway improvements. Scope does not include sub surface utility engineering.

Maintenance of Traffic: Evaluate the MOT for proposed improvements to identify challenges and applicable MOT level in accordance with the FDOT Design Manual.

Signing and Pavement Marking: Evaluate potential signing and marking to determine if specific challenges or issues arise from corresponding adaptation improvements.

Landscape: Assessment for existing tree or vegetation impacts as well as identify specific locations that would require the restoration or addition of new landscape to help mitigate erosion and/or compliment the aesthetics of the residential areas based on proposed improvements.

3.1.2. Stormwater Design:

Conduct a criticality/prioritization analysis of storm water infrastructure in conjunction with the vulnerability assessment. Evaluate existing infrastructure operation and recommendations to improve the system against degree of flooding and ability to efficiently remove the water trapped as a result of increased elevation of roadways and infrastructure. Evaluation to be based on available published precipitation data, as well as the anticipated rise in sea-level over the next fifty years. Hydraulic modeling is not included as part of the scope.

Analyze additional alternatives to solving potential flooding/ drainage problems other than road elevation.

3.1.3. Evaluation of Existing Bridges:

Evaluation of existing bridges located along roadway segments that are being recommended for adaptation improvements using existing available inspection reports. This task does not include field bridge inspections. Determine whether bridges can be modified or need to be replaced based on location, type of bridge, current conditions, adaptation improvements, and SLR impacts.

3.1.4. Develop roadway and drainage concept plans including typical section, plan layout, and specific details.

3.1.5. Develop technical memorandum

3.1 Deliverables:

- Technical Memorandum for the City of Layton will include summary of design decisions and overview analysis of the recommended improvements for the roadway segments/locations recommended as a result from the Prioritization of Roadway Segments. Concept Plans including roadway typical sections and roadway/stormwater plans. Bridge adaptation improvements will be provided with applicable roadway segments.
- Technical Memorandum for the City of Marathon will include summary of design decisions and overview analysis of the recommended improvements for the roadway segments/locations recommended as a result from the Prioritization of Roadway Segments. Concept Plans including roadway typical sections and roadway/stormwater plans. Bridge adaptation improvements will be provided with applicable roadway

segments.

- Technical Memorandum for the City of Key Colony Beach will include summary of design decisions and overview analysis of the recommended improvements for the roadway segments/locations recommended as a result from the Prioritization of Roadway Segments. Concept Plans including roadway typical sections and roadway/stormwater plans. Bridge adaptation improvements will be provided with applicable roadway segments.
- Technical Memorandum for Village of Islamorada will include summary of design decisions and overview analysis of the recommended improvements for the roadway segments/locations recommended as a result from the Prioritization of Roadway Segments. Concept Plans including roadway typical sections and roadway/stormwater plans. Bridge adaptation improvements will be provided with applicable roadway segments.

3.2. Environmental and Permitting: Conduct environmental impact assessment and identify required permitting with respect to proposed scope and roadway adaptation recommendation.

Compare the recommended roadway adaptation improvements with the information obtained during the desktop survey to develop a subset of roadways that have protected resources or locations that could affect the permitting of the proposed strategy. The results of the evaluation will be included as part of the database. Based on the findings of the desktop review and the recommended adaptation improvement locations, the team will conduct site visits to a subset of roadways that are likely to have ecological constraints that would require additional permitting through the following agencies:

- United States Army Corps of Engineers,
- USFWS - Consultation
- NMFS – Consultation
- Department of Environmental Protection
- South Florida Water Management District,
- Florida Keys National Marine Sanctuary, and
- Monroe County, FL.

The limited assessment will document the presence of water resources, mangroves, and special status species for designated roadways per section 1.1.5. Personnel will also investigate the site for the purpose of identifying water control structures. For roadways whose strategy involves the installation or modification of water control structures, the limited site evaluation will involve the performance of in-water inspections for up to 20 sites where Outstanding Florida Waters could be affected. The performance of in-water surveys will be based on need and site conditions.

During each site visit, professional staff members will take notes on observed conditions, photos of protected resource or structures that may influence the permitting process, and document whether the road serves residences or commercial enterprises. The information obtained during the survey will be added to the GIS database. The proposed database will be populated with information obtained during the desktop and limited site assessment activities. The information obtained from the field exploration will be used to evaluate permitting requirements relative to the proposed resiliency recommendation. Furthermore, the database will identify which permits and permitting agencies may have jurisdiction based on the

proposed strategy.

3.2 Deliverables:

- Technical Memorandum for the City of Layton will include a summary of the Environmental analysis conducted based on the adaptation improvements. The footprint as well as the anticipated consequences of the adaptation improvements will be evaluated against the desktop survey and field assessment to develop a subset of roadways that have protected resources or locations that could affect the permitting of the proposed strategy. A list of anticipated permits for the proposed improvements along the prioritized roadway segments will be provided.
- Technical Memorandum for the City of Marathon will include a summary of the Environmental analysis conducted based on the adaptation improvements. The footprint as well as the anticipated consequences of the adaptation improvements will be evaluated against the desktop survey and field assessment to develop a subset of roadways that have protected resources or locations that could affect the permitting of the proposed strategy. A list of anticipated permits for the proposed improvements along the prioritized roadway segments will be provided.
- Technical Memorandum for the City of Key Colony Beach will include a summary of the Environmental analysis conducted based on the adaptation improvements. The footprint as well as the anticipated consequences of the adaptation improvements will be evaluated against the desktop survey and field assessment to develop a subset of roadways that have protected resources or locations that could affect the permitting of the proposed strategy. A list of anticipated permits for the proposed improvements along the prioritized roadway segments will be provided.
- Technical Memorandum for Village of Islamorada will include a summary of the Environmental analysis conducted based on the adaptation improvements. The footprint as well as the anticipated consequences of the adaptation improvements will be evaluated against the desktop survey and field assessment to develop a subset of roadways that have protected resources or locations that could affect the permitting of the proposed strategy. A list of anticipated permits for the proposed improvements along the prioritized roadway segments will be provided.
- Environmental analysis and field assessment information will be made available through corresponding GIS layers.

3.3. **Surveying and Mapping:** Collect additional ground survey, right-of-way and other site and/or private property limits based on proposed improvements and specific locations along the prioritized roadway segments. Right-of-way survey and data received to be used for identification of potential encroachments on to private property.

3.3.1. Perform research to obtain property plat(s) and deed(s) of record adjacent to each subject area. Obtain record right-of-way width from County or State authority and

right-of-way plans of record, if available. Also research relative utility easement information.

- 3.3.2. Plot and mosaic record plans and deeds in MicroStation (CAD), overlay on existing orthophotography.
- 3.3.3. Conduct field surveys to locate boundary and right-of-way evidence called-for on plans of record, evidence found existing in the field and physical and man-made features required to determine boundary, right-of-way and easement lines that impact the subject area where potential right-of way impacts require further verification.
- 3.3.4. Resolve final boundary, right-of-way and easement lines from mosaic and field surveyed evidence and deliver in MicroStation (CAD)

3.3 Deliverables:

- MicroStation (CAD) Right-of-way files for the City of Layton
- MicroStation (CAD) Right-of-way files for the City of Marathon
- MicroStation (CAD) Right-of-way files for the City of Key Colony Beach
- MicroStation (CAD) Right-of-way files for Village of Islamorada

3.4. **Cost Estimates:** Develop conceptual roadway cost estimates for preliminary design concepts using the FDOT published Historical Unit Cost. Coordination with the municipalities will also be conducted for review of recent County project bid tabs and construction prices. A percentage value will be assigned for other design components such as Signing and Pavement Marking and MOT.

- 3.4.1. Conduct meeting with the County and municipalities for review of unit prices and additional input.
- 3.4.2. Develop quantities and cost estimates
- 3.4.3. Develop technical memorandum

3.4 Deliverables:

- Conceptual Construction Cost Estimate for the City of Layton identified projects.
- Conceptual Construction Cost Estimate for the City of Marathon identified projects.
- Conceptual Construction Cost Estimate for the City of Key Colony Beach identified projects.
- Conceptual Construction Cost Estimate for Village of Islamorada identified projects.

4. Task 4: Policy, Regulatory, Legal and Funding

Review existing policies and regulations in place and how they will be impacted by proposed adaptation improvements. Conduct evaluation and identify funding and grant opportunities. Develop specific funding alternatives. The submittal of the documents has been divided into two (2) groups. The first group that consists of the Future Growth, Roads Liability, and Level of Service will be completed and submitted prior to the Prioritization Exercise Workshop Meeting with the municipalities. The second group of documents consists of Road Adaptation

Approaches, Implementation, Guidance, and Transportation as a Whole will be completed and submitted prior to the development of the Adaptation Plan.

Documents that will be produced:

- i. **Future Growth:** Policy paper on population projections and growth potential and other current or future policies impacting growth and development for years 2030, 2060 and 2100. Analyze existing information regarding population projections and growth patterns related to unit allocations, growth policy, land acquisition, and flows of recovery funds from Hurricane Irma.
- ii. **Roads Liability:** Legal memorandum to include in depth discussion of road ownership and responsibility for maintenance upgrades. Include information regarding legal and policy obligations to meet various goals such as ongoing maintenance, reasonable access, and/or consideration of upgrades to address future conditions. Review of case law, statutes and case studies. Provide new information not previously provided to County or municipalities.
- iii. **Level of Service:** Legal memorandum for level of service determinations that include legal and policy implications of establishing level of service that go beyond the traditional notion of road capacity for traveling vehicles. Includes recommendations and pros/cons for various approaches and focuses on information not previously provided to the County or municipalities.
- iv. **Alternative Funding Strategies:** Policy memorandum for funding structures. Review of bonding, grants, and other capital planning tools. A list of available grants will be provided and the benefits for corresponding funding opportunities. A separate detailed analysis will be provided for all funding alternatives to pay for the road adaptations.
- v. **Implementation:** Prepare draft Ordinance and/or other policy implementation framework. Work with County and municipalities to manage public perceptions and expectations on future level of service that the municipalities may provide.

Task 4: Deliverables: In-depth policy and legal analysis documents on future growth, roads liability, level of service, alternative funding strategies, and ordinance for each municipality.

5. Task 5: Public and Stakeholder Outreach Plan

5.1 The public/stakeholder outreach plan will establish the tasks and the overall schedule of the project that will entail corresponding meetings/presentations and shall be prepared in coordination with the County and municipalities. Public outreach will be maintained throughout the life of the project through the use of virtual webinars and briefings, websites, email blasts, and social media. Additional outreach activities (meetings/workshops/briefings), as listed below, to specific groups outside of the major milestone date will be conducted based on specific needs for each municipality.

5.2 The milestone date will be established after Roads Implementation Plan is completed. By this date all legal and policy documentation, vulnerability/criticality assessments, all conceptual designs including cost estimates, and adaptation improvements plan will have been completed. Presentation, graphic boards, interactive GIS maps, and modeling video clips in conjunction with handouts will be used.

5.3 Public/Stakeholder Outreach Activities:

- 1 set public meetings in each municipality (4 meetings)
- 1 Deliverable review meeting with each municipality (4 meetings)
- Briefings to elected officials (A max of 1 round of meetings per municipality) (4 meetings)
- Senior Management Meeting Presentations (A max of 1 round of meetings per municipality) (4 meetings)
- Coordination with FDOT and other relevant agencies for studies and projects along SR 5/Overseas Highway

Task 5. Deliverables:

For each municipality the CONSULTANT will prepare for and set up all in-person or virtual public meetings, prepare press releases for the County and municipalities to issue, issue email blasts, prepare and manage social media, prepare and manage online survey tools, and documentation of meeting minutes/comments.

Additionally, the CONSULTANT will prepare Power Point Presentations, Graphics (Boards/images), handouts, and provide GIS support. Two (2) persons at a minimum from the team are to attend Public/Stakeholder outreach activities. A monthly report will be prepared summarizing outreach activities, including the number of stakeholders and members of the public reached through email, the number attending the public meetings, a copy of the outreach materials, and a list of public comments received through any outreach method.

6. Task 6: Final Report and Roads Implementation Plan

Develop a regional, comprehensive, and integrated roads adaptation plan for each municipality based on the results and guidance from previous tasks. Determine schedule on when corresponding adaptation improvements are required to be implemented. The plan schedule will be dynamic to accommodate updates based on actual information vs projected information.

Report to include:

1. Vulnerability Analysis and road adaptation recommendations
2. GIS Data sets and maps
3. Engineering Designs/Concept Plans including Green roads and Recreational Opportunities and recommendations
4. Policy and regulatory requirements
5. Summary of Public/stakeholder involvement engagement effort
6. Implementation Program

Final presentation to each municipal council outlining the implementation work plan recommendations and lessons learned throughout the study process. Members of the presentation team shall include the project manager, the environmental lead, the outreach/policy lead, the green roads lead, and the funding alternatives lead.

Task 6. Deliverables:

- Final Report and Roads Implementation Plan for the City of Layton.
- Final Report and Roads Implementation Plan for the City of Marathon.
- Final Report and Roads Implementation Plan for the City of Key Colony Beach.
- Final Report and Roads Implementation Plan for Village of Islamorada.

Exhibit B-8

Monroe County Roadway Vulnerability Analysis and Capital Plan

Monroe County Municipalities Roadway Vulnerability Analysis

Delivery Schedule

Revised – November 28, 2023

The following tasks with associated delivery schedules are added through this Amendment. All other tasks from Exhibit B in the original Agreement as well as Exhibits B-1, B-2, B-3, B-4, B-5, B-5A, and B-6 in prior amendments, remain unchanged.

Required Services

| Scope of Work (Deliverables) | Amount (Lump Sum) | Due Date |
|--|--------------------------|-----------------|
| 1.1.1 GIS Database setup and Initial Elevation Analysis: Technical Memorandums will include the description of the screening analysis process for the evaluation of the existing ground information (LiDAR Data) and the existing mean high-water elevations to determine the critical and non-critical roadway segments. A summary of the results will be provided, and a GIS map layer will be developed that will depict all municipality roadway segments with different colors assigned based on the range of elevations and mean high water elevation clearance they fall under. | \$13,308.97 | 2/1/2024 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$5,900.51 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$6,465.53 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 290.86 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 652.07 | |
| 1.1.2 Site Assessment and Condition Survey: Technical Memorandums will include a summary of the criteria established for assessments and a table listing sections assessed with a rating of “poor, fair, and good” based on current condition for all roadway segments identified in Exhibit A. The results of the existing pavement assessment will be presented in tables and also available through GIS maps. Additionally, through predictive modeling and the use of the existing pavement assessment data, a summary of the forecasted year of terminal life for each roadway segment will be presented in a table format and graphical presentation of network condition transition by year. | \$62,562.51 | 3/1/2024 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$27,674.30 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$31,314.63 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 958.11 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 2,615.47 | |

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| 1.1.3 Roadway Data: Technical Memorandums will include a summary of the existing available information provided by the county that lists specific geotechnical, roadway, and utility data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review and field verification of specific roadway characteristics, roadway functional classification, posted speed, typical section description, intersections/side streets, driveway access points, Critical Facilities, and bridges for each roadway segment listed in exhibit A. All collected roadway information and inventory will be available under corresponding GIS layers. Includes Geotechnical data. | \$89,185.81 | 4/1/2024 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$39,527.05 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$44,424.54 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 1,251.20 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 3,983.02 | |
| 1.1.4 Stormwater Structures: Technical Memorandums will include a summary of the existing available information provided by the county that lists specific stormwater data as well as data coverage and specific infrastructure location. The technical memo will also include a summary table for the information gathered through desktop review, survey, and field verification of stormwater facilities for each roadway segment listed in exhibit A. All collected stormwater information and inventory will be available under corresponding GIS layers. | \$19,024.18 | 4/1/2024 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$8,399.85 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$9,206.88 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 479.65 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 937.80 | |
| 1.1.5 Environmental Assessment: Technical Memorandums will include a summary of the existing available environmental information provided by the municipalities and information gathered through desktop review, and field assessment. Information gathered will be used to map out the environmental areas/ natural resources throughout the County. All collected environmental information and inventory will be available under corresponding GIS layers. | \$4,995.98 | 4/1/2024 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$2,239.59 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$2,373.59 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 124.40 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 258.40 | |

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| <p>2.1 Storm Surge, Wind Waves, and Extreme Events Analysis: Technical Memorandums will include a summary of the evaluation and recommendation of the wind wave analysis for 2025, 2030, 2035, 2040, 2045, 2060, and 2100. The SLR projections and King Tide Predictions in association with current and future storm scenarios will be referenced in the MIKE21 software to model water surface elevations. Modeling information will be integrated with GIS and simulation video/graphics will be produced for public and stakeholder outreach activities.</p> | \$49,873.19 | 6/1/2024 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$22,109.93 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$24,950.57 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 698.41 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 2,114.28 | |
| <p>2.2 Vulnerability Assessment and Inundation Mapping: Technical Memorandums will include a summary of the applicability and operation of the GIS model, criticality analysis methodology, the inputs it requires and the outputs it generates, and a vulnerability flood score for the County roadways identified in Exhibit A. Inundation maps that cover all the County roadways identified in Exhibit A will be prepared for 2025, 2030, 2035, 2040, 2045, 2060, and 2100. Inundation analysis data will be available under corresponding GIS layers.</p> | \$90,553.24 | 9/1/2024 |
| <i>Technical Memorandum for Islamorada</i> | \$40,140.21 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$45,392.96 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 1,106.27 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 3,913.80 | |
| <p>2.3 Prioritization of Roadway Segments based on Vulnerability Assessment: Technical Memorandums will include a summary of the results and input from the flexible scheme analysis, list of #TBD of roadway segments recommended to move forward with adaptation improvements, and prioritization schedule.</p> | \$26,287.40 | 12/1/2024 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$11,648.90 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$12,934.56 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 370.59 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 1,333.35 | |
| <p>3.1 Design: Technical Memorandums will include summary of design decisions and overview analysis of the recommended improvements for the #TBD roadway segments/locations recommended as a result from the Prioritization of Roadway Segments. Concept Plans including roadway typical sections and roadway/stormwater plans will be included. Bridge adaptation improvements will be provided with applicable roadway segments.</p> | \$187,655.28 | 5/1/2025 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$83,727.89 | |

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| <i>Technical Memorandum for the City of Marathon</i> | \$94,590.32 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 1,626.99 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 7,710.08 | |
| 3.2 Environmental and Permitting: Technical Memorandum will include a summary of the Environmental analysis conducted based on the adaptation improvements. The footprint as well as the anticipated consequences of the adaptation improvements will be evaluated against the desktop survey and field assessment to develop a subset of roadways that have protected resources or locations that could affect the permitting of the proposed strategy. A list of anticipated permits for the proposed improvements along the #TBD roadway segments will be provided. Environmental analysis and field assessment information will be made available through corresponding GIS layers. | \$39,268.61 | 5/1/2025 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$17,414.77 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$19,816.14 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 379.97 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 1,657.73 | |
| 3.3 Surveying and Mapping: MicroStation (CAD) Right-of-way files for the TBD roadway segments. | \$90,512.06 | 5/1/2025 |
| <i>MicroStation (CAD) Right-of-way files for Village of Islamorada</i> | \$40,443.08 | |
| <i>MicroStation (CAD) Right-of-way files for the City of Marathon</i> | \$45,800.84 | |
| <i>MicroStation (CAD) Right-of-way files for the City of Layton</i> | \$ 610.81 | |
| <i>MicroStation (CAD) Right-of-way files for the City of Key Colony Beach</i> | \$ 3,657.33 | |
| 3.4 Cost Estimates: Develop conceptual roadway cost estimates for preliminary design concepts. | \$80,744.72 | 6/1/2025 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$35,937.10 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$40,702.99 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 738.19 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 3,366.44 | |
| Task 4 Deliverable: In-depth policy and legal analysis documents on future growth, roads liability, level of service, and ordinance. | \$25,315.25 | 6/1/2025 |
| <i>Technical Memorandum for Village of Islamorada</i> | \$ 11,097.44 | |
| <i>Technical Memorandum for the City of Marathon</i> | \$ 12,345.84 | |
| <i>Technical Memorandum for the City of Layton</i> | \$ 487.56 | |
| <i>Technical Memorandum for the City of Key Colony Beach</i> | \$ 1,384.41 | |

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| Task 5 – Public and Stakeholder Outreach Plan: The consultant will prepare for and set up all in-person or virtual public meetings, prepare press releases, issue email blasts, prepare and manage social media, prepare and manage online survey tools, and documentation of meeting minutes/comments. Additionally, the CONSULTANT will prepare Power Point Presentations, Graphics (Boards/images), handouts, and provide GIS support. Two (2) persons at a minimum from the team are to attend Public/Stakeholder outreach activities. A monthly report will be prepared summarizing outreach activities, including the number of stakeholders and members of the public reached through email, the number attending the public meetings, a copy of the outreach materials, and a list of public comments received through any outreach method. | \$95,556.21 | 2/1/2025 |
| <i>Public and Stakeholder Outreach Plan for Village of Islamorada</i> | \$40,762.99 | |
| <i>Public and Stakeholder Outreach Plan for the City of Marathon</i> | \$47,052.62 | |
| <i>Public and Stakeholder Outreach Plan for the City of Layton</i> | \$ 2,076.89 | |
| <i>Public and Stakeholder Outreach Plan for the City of Key Colony Beach</i> | \$ 5,663.71 | |
| 6.1 Develop Implementation Plan: Develop a regional, comprehensive, and integrated roads adaptation plan based on the results and guidance from previous tasks. Determine schedule on when corresponding adaptation improvements are required to be implemented. | \$29,916.78 | 8/1/2025 |
| <i>Implementation Plan for Village of Islamorada</i> | \$13,026.70 | |
| <i>Implementation Plan for the City of Marathon</i> | \$15,090.67 | |
| <i>Implementation Plan for the City of Layton</i> | \$431.15 | |
| <i>Implementation Plan for the City of Key Colony Beach</i> | \$1,368.26 | |
| 6.2 Prepare Final Report and Final Presentation to Municipalities: Final Report that includes Vulnerability Analysis and road adaptation recommendations, GIS Data sets and maps, Engineering Designs/Concept Plans, Policy and regulatory requirements, Summary of Public/stakeholder involvement engagement effort, and Implementation Program. Final presentation to the County (BOCC) outlining the implementation work plan recommendations and lessons learned throughout the study process. Final presentation is to include Visioning graphics and evaluation | \$37,497.74 | 9/1/2025 |
| <i>Final Report and Presentation for Village of Islamorada</i> | \$16,718.53 | |
| <i>Final Report and Presentation City of Marathon</i> | \$18,669.17 | |
| <i>Final Report and Presentation for the City of Layton</i> | \$ 448.82 | |
| <i>Final Report and Presentation for the City of Key Colony Beach</i> | \$ 1,661.22 | |