

June 17, 2024

Noreen Housewright, PE, CFM  
Director of Engineering Services  
City of Grand Prairie Public Works  
300 W Main Street  
Grand Prairie, Texas 75050

**Subject: Proposal for Professional Water Resources Engineering Services  
Grand Prairie Flood Warning System Phase 5  
Walter P Moore Proposal No. 24-1220**

Dear Noreen:

Walter P Moore is pleased to submit this proposal to continue professional services for development of the Grand Prairie Flood Warning System. Since 2016 Walter P Moore has had the pleasure of providing services to the City of Grand Prairie to build, maintain, test, and improve a Flood Warning System (FWS), along with several other local drainage projects. We are grateful for the opportunity to continue this relationship and to further develop FWS capabilities for the City. We look forward to the opportunity to work on this project with you.

This proposal is presented in order to establish a basis for the commencement of our scope of services for Phase 5 of the Grand Prairie FWS.

This proposal is based on our understanding of the current FWS needs following the status meeting with the City to review Phase 4 findings and discuss next steps and gather input from City staff held in April 2024, including numerous meetings and coordination calls, and from our previous experience on previous phases of this project. Phase 5 will focus on updates to the FWS in the Fish Creek watershed and includes maintenance and monitoring of the system. Phase 5 will also include the development and execution of a half-day emergency preparedness workshop. A full scope of work and proposed fee can be found in the attached Schedule SC9 document.

We very much appreciate the opportunity to provide these services and look forward to working with you on this next phase of FWS development.

Sincerely,

**Walter P. Moore and Associates, Inc.**



**Rebekah Campbell, PE, CFM / Principal**  
713.630.7312 / rcampbell@walterpmoore.com

**Attachments:**

Schedule SC9 – Scope of Water Resources Engineering Services  
Schedule SC17 – Exclusions to Scope of Basic Services for Water Resources Engineering Services  
Schedule RC1 – Billing Rate Schedule Infrastructure Group 2024 Standard  
Schedule T3 – Terms of Agreement

## 04 Scope and Cost

### SCHEDULE SC9

#### Scope of Water Resources Engineering Services

##### Flood Warning System

##### Objectives

1. To provide a flood warning/forecasting system that will permit the City's Stormwater, Public Works and Office of Emergency Management departments to identify areas of inundation and allow the timely dispatch of first responders to these areas to close roads, evacuate, shelter-in-place and/or begin rescue operations.
2. To calibrate and validate the City of Grand Prairie hydrologic and hydraulic models based on recent historical flood data to improve the future performance of the flood warning/forecasting system.

For Phase 5, we recommend system updates and additions to the Fish Creek Watershed. The following tasks will be completed:

#### Phase 5 – Fish Creek

##### I. Data Collection

- A. Walter P Moore/FRG will determine what information is readily available from existing gauging systems, radar data, topographic information, previous studies (LOMRs and City of Grand Prairie studies), GIS data, field survey data, etc. This information will then be used to update the existing Fish Creek models and to calibrate the existing models with historical rainfall information.
- B. Walter P Moore/FRG will conduct field reconnaissance of three additional watch point sites (Kirby Creek at Corn Valley Road – Gage 6110, North Fork Fish Creek at Great Southwest Parkway – Gage 6120, and Fish Creek at Great Southwest Parkway – Gage 6140) on Fish Creek to understand the nature of the flooding, to categorize the type of flooding (e.g., low water crossing, riverine floodplain, combination, etc.), and to gather hydraulic parameter information (such as Manning's "n" values) of the stream in the vicinity of each location.

##### II. Fish Creek Model Updates and Calibration

- A. Walter P Moore/FRG will update the existing hydraulic model for Fish Creek (2012) to include changes to the channel hydraulics reflected in the four LOMRs issued in 2019, 2020, 2022, and 2023 on this channel or tributaries.
- B. Walter P Moore/FRG will coordinate with City staff and conduct a desktop review of hydraulic structures and/or channel changes that have occurred along the stream since 2012. If needed, site visits will be conducted to verify updated information. Walter P Moore/FRG will update the hydraulic model to reflect any changes. It is assumed this physical and dimensional information is available from the City or can be provided by survey. However, field survey is not included in this scope of work. If survey is needed, Walter P Moore/FRG will develop a survey plan for the City to ensure that necessary data related to channel geometry changes are captured. Walter P Moore will coordinate with the City's field surveyor or will contract for field survey as Additional Services if requested.
- C. Walter P Moore/FRG will coordinate with City staff and conduct a desktop review of changes in watershed development that have occurred in Fish Creek since 2012 and, if needed, conduct site visits to verify information. Walter P Moore/FRG will update Fish Creek hydrologic models, including the tributary models of Kirby Creek, to account for development changes.
- D. Walter P Moore/FRG will calibrate and validate the hydrologic model results and/or rating curves at four (4) gage locations in the Fish Creek Watershed (gages 6110, 6120, 6130, and 6140) using radar rainfall data from three recent storm events. Storm events will be selected based on observed data availability/quality and significance of hydrologic response. Three observed storms will be analyzed to verify the reasonableness of results and how well the updated hydrologic and hydraulic models are able to project flood elevations at the five identified points of interest. Additional adjustments will be made as necessary to the hydrologic models (modification of infiltration parameters) and/or rating curves to create better correlation and replication of these three known flood events.
- E. Walter P Moore/FRG will update rating curves for the three existing watch points on Fish Creek (gages 6110, 6120, and 6140) based on results of the calibration exercise.
- F. Walter P Moore/FRG will update the hydrologic response relationships (nomographs) for the three existing watch points on Fish Creek (gages 6110, 6120, and 6140) based on results of the calibration exercise.

### III. Development of Three (3) Additional Watch Points at Kirby Creek at Corn Valley Road, Fish Creek at Great Southwest Parkway, and North Fork Fish Creek at Great Southwest Parkway

- A. For three additional critical locations (watch points) on Fish Creek (gages 6110, 6120, and 6140; Kirby Creek at Corn Valley Road, North Fork Fish Creek at Great Southwest Parkway), and Fish Creek at Great Southwest Parkway, Walter P Moore/FRG will establish correlations between rainfall total values and/or intensities and inundation levels at the watch points so that the City staff can easily understand the flood risks based on real-time rainfall information. Based on information provided by the City, Walter P Moore/FRG will determine critical thresholds of rainfall totals/durations that are likely to cause flooding at the watch points. This will be done by analyzing historical storm events from existing gage data along with numerous frequency-based storms using the calibrated hydrologic and hydraulic models of the streams at the identified locations. Once analyzed, a correlation between the total rainfall and/or intensity of rainfall and the stream levels will be determined.
- B. Walter P Moore/FRG will develop rating curves for the three additional critical points of interest based on the calibrated HEC-RAS models from Task II. Rating curves will be set up by running 25 profiles for the pertinent streams at the selected locations based on ratios of the 100-year discharge from 5% to 125% (in 5% increments). From these profiles, elevation vs. discharge rating curves will be created at the watch point locations.
- C. Walter P Moore/FRG will establish thresholds for each rating curve to identify elevations associated with road closures, structural flood damage, and/or other critical flood levels as described by City staff. It is assumed that much of this information is available from the City or can be provided by survey. However, field survey is not included in this scope of work. If survey is needed, Walter P Moore/FRG will develop a survey plan for the City to ensure that necessary data related to channel geometry changes are captured. Walter P Moore will coordinate with the City's field surveyor or will contract for field survey as Additional Services if requested.
- D. Walter P Moore/FRG will develop a GIS information library associated with a series of pre-determined rainfall thresholds at each of the two identified watch points on Fish Creek. An algorithm will also be developed to call up appropriate GIS files to indicate impending flood risk for the desired locations. As thresholds of rainfall are exceeded for contributing drainage areas to the points of interest, appropriate maps of the watersheds/critical locations will be called up from the GIS data library and published to the City internal web site. Inundation maps will be in whole-foot increments.
- E. The existing software program from Phases 1-4 of this project will be updated to include the three additional watch points. The program will extract data from publicly available sources (radar and/or precipitation gage data), analyze the rainfall, and apply the algorithm to call up the appropriate map. Results will be published to the City's internal web location for each point of interest and will include mapped locations of concern (i.e. non-flood, near-flood, flooding exceeding threshold) and mapping of inundated areas using the library of pre-prepared inundation maps.
- F. Walter P Moore/FRG will update the documentation completed in Phases 1 through 4 (assumptions, development of system, and procedures) to include the three additional watch points on Fish Creek and to document the calibration effort on Fish Creek.

### IV. Optimization/Maintenance-of-Systems

- A. Walter P Moore/FRG will conduct continuous monitoring of the Flood Warning System and coordination with City during significant rainfall events.
- B. Walter P Moore/FRG will create and issue After-Action Reports following any flood events in the City (identified through coordination with City staff) within the contract period. After-Action Reports will include a summary of the system performance during the event(s) including, but not limited to, a timeline of flood warning system messages, a comparison of stream gage observations and system predictions, high water mark information (where available), and notes on system or gage performance issues.
- C. Walter P Moore/FRG will identify any issues or errors with the system or gages and determine a resolution or recommendations to the City for resolution (in the case of gage/data errors).
- D. Walter P Moore/FRG will evaluate the system performance on a recurring basis and make any necessary recommendations for improvements based on system performance or new information.

### V. Project Management and Coordination

- A. Walter P Moore/FRG will meet with City staff to kickoff Phase 5 to determine critical thresholds for the additional watch points, to provide updates, to discuss system optimization and maintenance, and to update emergency operations staff on new locations added to the system. This task assumes up to two in-person and four virtual meetings may be required by the City.
- B. Walter P Moore will provide overall project coordination for the various project subtasks.

### Scope of Future Phases 2025-2027

We recommend future phases of the City of Grand Prairie Flood Warning System development be scoped by watershed, similar to Phase 5. Phases 6 – 8 are outlined broadly below based on a rough budget estimate of \$200,000 per phase. We understand that the City of Grand Prairie would like the following goals achieved by the end of Phase 7:

1. Inundation map libraries are available for all COGP stream gage locations
2. There are sufficient resources and foundational knowledge to plan and execute a Functional Flood Preparedness Exercise/Simulation with City staff and emergency responders

A finalized scope, schedule, and fee for each phase will be developed prior to contracting for each phase.

#### Phase 6 (2025) – Bear Creek

- I. Data Collection – \$15,000
- II. Bear Creek Model Calibration – \$40,000
- III. Development of Three (3) Additional Watch Points at Bear Creek @ Shady Grove Rd, Bear Creek @ Trinity Rd, and Dry Branch Creek @ Thousand Oaks Rd – \$80,000
- IV. Optimization/Maintenance-of-Systems – \$35,000
- V. Project Management and Coordination – \$30,000

#### Phase 7 (2026) – Johnson Creek

- I. Data Collection – \$10,000
- II. Johnson Creek Model Updates and Calibration – \$30,000
- III. Development of Two (2) Additional Watch Points at Arbor Creek @ W Tarrant Rd and Johnson Creek Tributary @ Duncan Perry Rd\* – \$60,000
- IV. Preparation of Functional Preparedness Exercise Material – \$35,000
- V. Optimization/Maintenance-of-Systems – \$35,000
- VI. Project Management and Coordination – \$30,000

#### Phase 8 – Mountain Creek (2027)

- I. Data Collection – \$10,000
- II. Mountain Creek and Joe Pool Model Updates and Calibration – \$30,000
- III. Development of Two (2) Additional Watch Points at Cedar Creek @ Bardin Rd and Alsbaugh Creek @ Camp Wisdom Rd – \$60,000
- IV. Functional Preparedness Exercise/Simulation – \$35,000
- V. Optimization/Maintenance-of-Systems – \$35,000
- VI. Project Management and Coordination – \$30,000

\*pending gage installation

Task		Walter P Moore				FRG			Budget
		Chief Hydrologist	Senior Project Manager	Senior GIS Specialist	Graduate Engineer	Senior Project Manager	Student	Senior Programmer	
Task 1: Data Collection									
1	Obtain data	1	2	8	16	2	16		
2	Site visit		8	1		8	16		
Subtotal		1	10	9	16	10	32	0	\$12,800.00
Task 2: Fish Creek Model Updates and Calibration									
1	LOMR Updates	1	8	4	27				
2	Hydraulics Updates	1	1		8		4		
3	Hydrology Updates	1	1	4	8		4		
4	Calibration (3 storms; 4 gauges)	2	16		80				
5	Update Rating Curves				2				
6	Update Nomographs	2	4		40	4	16		
Subtotal		7	30	8	165	4	24	0	\$42,900.00
Task 3: Development of 3 Additional Watch Points at Kirby Creek @ Corn Valley Road, Fish Creek @ Great Southwest Parkway, and North Fork Fish Creek @ Great Southwest Parkway									
1	Establish Correlations between Rainfall/Elevations	2	12		40	12	40		
2	Rating Curve Development	2	4	4	8				
3	Establish Thresholds	2	2	4	8	4			
4	GIS Inundation Map Library	2	4	24					
5	Publish Results to City Internal Web Location					12	160	24	
6	Documentation	4	4	8	40	2	4		
Subtotal		12	26	40	96	30	204	24	\$63,900.00
Task 4: Optimization/Maintenance-of-Systems									
1	Storm Event Monitoring	2	12			24	40		
2	After-Action Reports	4	12			30	60		
3	Errors/Issues Identification	4	8	2	4	8	20	24	
4	System Performance Evaluation	4	8	2	4	8	19		
Subtotal		14	40	4	8	70	139	24	\$49,500.00
Task 5: Project Management and Coordination									
1	Coordination with City	16	24	2	8	12	8		
2	Coordination with Team	8	12	8	12	12	12		
Subtotal		24	36	10	20	24	20	0	\$30,900.00
Total Hours		58	142	71	305	138	419	48	
TOTAL BUDGET									\$200,000.00

## **SCHEDULE SC17**

### **Exclusions to Scope of Basic Services for Water Resources Engineering Services**

These services are excluded because either the scope is still undefined, the work is not anticipated to be required, or the work is to be provided by others or another group within Walter P Moore from whom you have received a separate proposal. If it becomes necessary for Walter P Moore to provide any of these or other services beyond the scope of our Basic Services and said services are authorized by the Client, they will be performed for an additional fee on a time and expense basis in accordance with the attached Schedule T3 or upon a fee basis established at such time as the scope of work is defined.

Specifically excluded services include:

- A. Surveying
- B. Rain/stream gauge procurement, installation, or maintenance
- C. Gauge-Adjusted Radar Rainfall (GARR) product development
- D. Floodplain mitigation coordination and design
- E. Wetlands and environmental studies
- F. Detention design
- G. USACE 404 permitting
- H. Permit Expediting
- I. Requests for Letters of Map Change from FEMA (CLOMR/LOMR)

**SCHEDULE RC1**  
**Billing Rate Schedule**  
**Infrastructure Group 2024 Standard**

Category	Rate
Senior Principal/Managing Principal	\$375.00
Principal	\$330.00
Chief Hydrologist	\$310.00
Managing Director	\$310.00
Team Director	\$290.00
Senior Project Manager	\$290.00
Project Manager	\$240.00
Senior Engineer	\$240.00
Engineer	\$185.00
Graduate Engineer	\$165.00
Senior Transportation Planner	\$225.00
Transportation Planner	\$170.00
Graduate Transportation Planner	\$145.00
Senior Graphic Designer	\$145.00
Senior GIS Specialist	\$220.00
GIS Specialist	\$175.00
Senior Designer	\$230.00
Designer	\$150.00
BIM Manager	\$235.00
CAD Manager	\$235.00
Senior CAD Technician	\$160.00
CAD Technician	\$130.00
Senior Field Representative	\$170.00
Field Representative	\$150.00
Engineering Intern	\$115.00
Project Accountant	\$150.00
Senior Administrative Assistant	\$150.00
Administrative Assistant	\$120.00

- Notes:
- 1. These billing rates are effective through December 31, 2024.
  - 2. Rates are adjusted annually.

## SCHEDULE T3

### Terms of Agreement

#### I. Fee Basis

- A. Lump Sum – Invoices and payments will be based on percent complete to date for work performed by Walter P. Moore and Associates, Inc., “WALTER P MOORE”.  
Reimbursable Expenses – For project-related expenses and subcontracts will be billed and paid at cost. Mileage will be charged at the current prevailing federal rate of reimbursement. Sales taxes, if applicable will be paid by the CLIENT.
- B. If WALTER P MOORE is subpoenaed related to this project or is requested by CLIENT to perform services in support of litigation or any other legal proceeding, including but not limited to by preparing a certificate of merit, or its equivalent, then CLIENT will be responsible for WALTER P MOORE’S fees on a time and material basis and such services shall be performed under a separate Agreement between WALTER P MOORE and CLIENT.

#### II. Invoices and Payments

- A. WALTER P MOORE will prepare and present invoices to CLIENT and CLIENT shall pay WALTER P MOORE for approved invoices within thirty (30) days from date CLIENT receives invoice from WALTER P MOORE.
- B. Payment for the full fee is due to WALTER P MOORE upon completion of the project.

#### III. Responsibilities of Client

- A. The CLIENT shall, with reasonable promptness, provide all available information regarding requirements for This Part of the Project.
- B. The CLIENT shall advise WALTER P MOORE of the identity and scope of services of other consultants participating in the Project.

#### IV. Use of WALTER P MOORE’s Documents

- A. Except for reference and coordination purposes in connection with future additions or alterations to the Work, Reports, Drawings, Specifications, and other documents prepared by WALTER P MOORE are instruments of WALTER P MOORE’s service for use solely with respect to this Project and, unless otherwise provided, WALTER P MOORE shall be deemed the author of these documents and shall retain all common law, statutory, and other reserved rights, including the copyright. WALTER P MOORE’s Drawings, Specifications or other documents shall not be used by the CLIENT or others on other projects, or for completion of the Project by others except by agreement in writing and with appropriate compensation to WALTER P MOORE.
- B. WALTER P MOORE’s Reports, Drawings, Specifications, Photographs, Data or other documents shall be used by WALTER P MOORE for internal and external training, teaching, publishing and marketing purposes. WALTER P MOORE will maintain confidentiality of the client names and project details if specifically requested to do so.

#### V. Modifications of Documents

No changes shall be made to WALTER P MOORE’s documents without written permission of WALTER P MOORE.

#### VI. Insurance

WALTER P MOORE shall obtain insurance covering claims arising out of the performance of professional services under this Agreement and caused by errors, omissions, or negligent acts for which WALTER P MOORE is legally liable. This insurance shall be maintained in force by WALTER P MOORE for a reasonable period after the date of Substantial Completion of the Project as agreed to by the CLIENT and WALTER P MOORE.

#### VII. Controlling Law and Disputes

The Agreement, and its interpretation and performance, shall be governed by the laws of the United States of America and State of Texas notwithstanding any choice of law principles. Exclusive venue for any dispute arising out of the interpretation or performance of the Agreement shall be in county and state where the Project is located.



#### VIII. Limit of Liability

- A. WALTER P MOORE shall meet the recognized standards of practice in performing the services covered by this Agreement. **WALTER P MOORE makes no other express or implied warranties regarding the performance or result of these services.**
- B. WALTER P MOORE shall not be responsible for the acts or omissions of the CLIENT, other consultants, CONTRACTOR, Subcontractors, or other persons performing any of the Work
- C. Inasmuch as the remodeling and/or rehabilitation of an existing structure requires that certain assumptions be made regarding existing conditions, and because these assumptions may not be verifiable without expending inordinate amounts of time and money, or damaging otherwise adequate and serviceable portions of the structure, the CLIENT shall, except for cases of proven negligence on the part of WALTER P MOORE, hold harmless, indemnify, and defend WALTER P MOORE from and against any and all claims arising out of the assumptions made regarding existing conditions in the performance of professional services provided under this Agreement.
- D. **To the maximum extent permitted by law, Client agrees to limit Walter P Moore's liability for claims arising from or related to the Agreement or the Scope of Services to the Sum of \$50,000 or Walter P Moore's paid fee, whichever is less. This limitation shall apply regardless of the cause of action or legal theory pleaded or asserted, including any kind of indemnity.**
- E. WALTER P MOORE shall indemnify and hold harmless the CLIENT from and against all damages to the extent caused by the negligent acts or omissions of WALTER P MOORE for services performed under this Agreement.
- F. CLIENT shall indemnify and hold WALTER P MOORE harmless from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, to the extent caused by the negligent acts or omissions of CLIENT.

#### IX. Successors and Assigns

- A. The CLIENT and WALTER P MOORE, respectively, bind themselves, their partners, successors, assigns, and legal representatives to the other party to this Agreement and to the partners, successors, assigns and legal representatives of such other party with respect to all covenants of this Agreement. Neither CLIENT nor WALTER P MOORE shall assign this Agreement without written consent of the other.
- B. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under this Agreement.
- C. Nothing contained in this paragraph shall prevent WALTER P MOORE from employing such independent professional associates and consultants as WALTER P MOORE may deem appropriate to assist in the performance of services hereunder.
- D. Nothing under this Agreement shall be construed to give any rights or benefits in this Agreement to anyone other than CLIENT and WALTER P MOORE, and all duties and responsibilities undertaken pursuant to this Agreement will be for the sole and exclusive benefit of CLIENT and WALTER P MOORE and not for the benefit of any other party.

#### X. Hazardous Materials

WALTER P MOORE shall have no responsibility for the discovery, presence, handling, removal, or disposal of or exposure of persons to hazardous materials in any form at the Project site, including but not limited to asbestos, asbestos products, polychlorinated biphenyl (PCB) or other toxic substances.

#### XI. Termination

This Agreement may be terminated by either party upon not less than seven days' written notice should the other party fail substantially to perform in accordance with the terms of this Agreement through no fault of the party initiating the termination.

#### XII. Force Majeure

In the event that WALTER P MOORE is obstructed, interrupted, or impeded, directly or indirectly, in performing any of its obligations under the Agreement by sickness, disease, infection, epidemic, government order, building closure, adverse weather, war, attack, labor unrest or shortage, civil unrest or any other occurrence beyond the control of WALTER P MOORE, or by any complications, responses (e.g., COVID plans), or unreasonable risks arising from such occurrences, then WALTER P MOORE shall be excused from any further performance of its obligations under the Agreement and entitled to adjustment of the Project schedule and its compensation under this Agreement. Additionally, any obligation by WALTER P MOORE to attend an in-person meeting or site visit shall be: (a) excused if it would, in WALTER P MOORE's judgment, be unsafe or its purposes may be satisfied virtually, and (b) subject to any reasonable protocols that WALTER P MOORE has adopted for the health and safety of its employees.

### **XIII. Waiver**

The failure on the part of either party, at any time, to require full performance by the other party of any portion of the Agreement, shall not be deemed a waiver of, or in any way affect, that party's rights to enforce such provisions or any other provision at a later time. Any waiver by any party of any provision or on any occasion shall not be taken or held to be a waiver of any other provision or on any other occasion.

### **XIV. Severability and Survival of Terms**

If any one or more provisions of the Agreement, any portion thereof, or the application thereof to any person or circumstance, shall for any reason be held invalid, illegal or unenforceable in any respect, any such invalidity, illegality or unenforceability shall be deemed stricken and shall not affect any other provision of the Agreement or the application of such provisions to other persons or circumstances, and the balance of the Agreement shall be enforced to the greatest extent permitted by law. Limitations of liability and remedies and all indemnity obligations shall survive termination of the Agreement for any cause.

### **XV. Dispute Resolution**

- A. If a dispute arises out of or relates to this contract or the breach thereof, and if the dispute cannot be settled through negotiation, the parties agree first to try to settle the dispute by mediation administered by the American Arbitration Association under its Construction Industry Mediation Procedures before resorting to arbitration or litigation.

### **XVI. Meaning of Terms**

- A. WALTER P MOORE – WALTER P MOORE shall mean Walter P. Moore and Associates, Inc. and WALTER P MOORE'S independent professional associates or consultants.
- B. CLIENT – CLIENT shall mean the party with whom this contract is executed by WALTER P MOORE.
- C. CONTRACTOR – CONTRACTOR shall mean a third party, if any, engaged to provide construction services based on the Work provided by WALTER P MOORE.