Office of Michael H. Barnes, P.E. **City of Richland Hills, Texas**

Memorandum

To: Honorable Mayor Bill Agan and members of the Richland Hills City Council.

From: Michael Barnes, P.E., City Engineer

Date: August 10, 2015

Subject: Letter of Map Revision (LOMR)

Council Action:

Approve Halff Associates to develop a LOMR for the area south of Baker Blvd. to Hwy 121 and from Rufe Snow to approx. Ash Park Dr. known as the BFC 5 water shed. The total cost not to exceed $57,800.

Background Information:

In 2008 the council approved a Drainage Utility Fee for the purpose of installing drainage improvements to reduce flooding primarily south of Baker Blvd. in the BFC 5 water shed. The total amount allocated for the improvements was $8,500,000.00. To date the city has sold $6,750,000.00 and has installed the Baker Blvd. Detention Pond, the Richland Elementary Detention Pond, the Matthews Dr. Interceptor and has almost completed the Kingsbury Bypass Interceptor(KBI). With the completion of the KBI the city is in a position to submit a LOMR to the Federal Emergency Management Association (FEMA) that will reduce the total area of the 100 Year Floodplain and/or the Floodway. By reducing the area of the floodplain this may take some residents out of the 100 Year Floodplain or at least lower the Base Flood Elevation (BFE) so they may not have to purchase flood insurance mandated by FEMA. Therefore, staff is recommending that Halff Associates prepare the LOMR at a not to exceed cost of $57,800. It is estimated it will take approx. 6 months to prepare the LOMR and another 6 months for FEMA to approve the LOMR.

Board/Citizen Input: NA

Financial Impact: $57,800

Staff Contacts:
Michael Barnes, P.E., City Engineer

817-616-3835

mbarnes@richlandhills.com

Attachments: Halff Associate Proposal

HALFF

August 7, 2015
1008-15-9813

Mr. Michael Barnes, P.E.
City of Richland Hills, Texas
City Engineer
6700 Rena Drive
Richland Hills, TX 76118

RE: ***Preparation of Letter of Map Revision (LOMR) for BFC-5***

Dear Mr. Barnes:

We are pleased to present the following proposal and fee schedule to provide engineering services required to prepare a Letter of Map Revision (LOMR) for Big Fossil Creek Tributary 5 within the City of Richland Hills.

The enclosed Contract Proposal includes Halff Associates' General Terms and Conditions, Attachment "A" – Scope of Work, and Attachment "B" – Basis of Compensation and Fee Schedule. The fees quoted in this proposal will be honored for up to 30 days from the date of this proposal.

We appreciate the opportunity to be of service to you and look forward to working with you on this project. If the attached documentation is acceptable please sign both copies and return one signed copy to our office. The receipt of the signed documentation by both parties will serve as notification to proceed, approval of the budget, and agreement to fee schedule and basis of compensation.

We will begin work on the services listed in Attachment "A" following receipt of the Notice-to-Proceed and anticipate six (6) months to complete the work described. It may take approximately 6-12 months or more for FEMA approval given the complexity of the modeling. Please feel free to contact us if you have any questions or comments concerning this matter.

Sincerely,
HALFF ASSOCIATES, INC.

Terry M. Barr, PE, CFM
Project Manager

Cc: File
Enc: Standard Form of Agreement
Attachment 'A' – Scope of Work
Attachment 'B' – Basis of Compensation

HALFF ASSOCIATES, INC.
4000 FOSSIL CREEK BLVD. TEL (817) 847-1422 WWW.HALFF.COM
FORT WORTH, TX 76137-2720 FAX (817) 232-9784

EXHIBIT A

STANDARD FORM OF AGREEMENT FOR PROFESSIONAL SERVICES

BETWEEN

CITY OF RICHLAND HILLS (CLIENT) AND HALFF ASSOCIATES, INC. (ENGINEER)

I. SCOPE - Halff Associates, Inc. (hereinafter "Engineer") agrees to perform the professional services described in the attached Scope of Services which incorporates these terms and conditions. Unless modified in writing by the parties hereto, the duties of Halff shall not be construed to exceed those services specifically set forth in the Scope of Services. The Scope of Services and these General Terms and Conditions, when executed by City of Richland Hills (hereinafter "Client"), shall constitute a binding Agreement on both parties. Engineer shall perform its obligations under this agreement as an independent contractor and not as an agent or fiduciary of any other party.

II. COMPENSATION - Client agrees to pay monthly invoices or their undisputed portions within 30 days of receipt. Payment later than 30 days shall include interest at 1-1/2 percent per month or lesser maximum enforceable interest rate, from the date the Client received the invoice until the date Engineer receives payment. Such interest is due and payable when the overdue payment is made.

It is understood and agreed by the parties that Engineer's receipt of payment(s) from Client is not contingent upon Client's receipt of payment, funding, reimbursement or any other remuneration from others.

Time-related charges will be billed as specified in this Agreement. Unless stated otherwise in this Agreement, direct expenses, subcontracted services and direct costs will be billed at actual cost plus a service charge of 10 percent. Mileage will be billed at current IRS rates.

III. RESPONSIBILITY - Engineer is employed to render a professional service only, and any payments made by Client are compensation solely for the services rendered and the recommendations made in carrying out the work. Engineer agrees to follow the standard practices of the engineering profession to make findings, provide opinions, make factual presentations, and provide professional advice and recommendations. Nothing contained herein shall be argued to have created any warranty or certification, and Engineer shall not be required to provide any certification, assignment or warranty of its work, but upon request and for a separate fee and at Engineer's sole discretion, Engineer may agree to provide certain written statements regarding its services. Such statements shall be in a form acceptable to Engineer and shall be requested with sufficient advance notice to allow Engineer to review the documents and prepare a suitable statement.

Engineer's review or supervision of work prepared or performed by other individuals or firms employed by Client shall not relieve those individuals or firms of complete responsibility for the adequacy of their work. It is understood that any resident engineering or inspection provided by Engineer is for the purpose of determining compliance with the technical provisions of the project specifications and does not constitute any form of guarantee or insurance with respect to the performance of a contractor. Engineer does not assume responsibility for methods or appliances used by a contractor, for safety of construction work, or for compliance by contractors with laws and regulations.

IV. SCOPE OF CLIENT SERVICES - Client agrees to provide site access, and to provide those services described in the attached Scope of Services.

V. OWNERSHIP OF DOCUMENTS - Upon Engineer's completion of services and receipt of payment in full, Engineer grants to Client a non-exclusive license to possess the drawings and instruments produced in connection with Engineer's performance of the work under this Agreement, if any. Said drawings and instruments may be copied, duplicated, reproduced and used by Client for the purpose of constructing, operating and maintaining the improvements. Client agrees that such documents are not intended or represented to be suitable for reuse by Client or others for purposes outside the Scope of Services of this Agreement. Notwithstanding the foregoing, Client understands and agrees that any and all computer programs, GIS applications, proprietary data or processes, and certain other items related to the services performable under this Agreement are and shall remain the sole and exclusive property of Engineer and may not be used or reused, in any form, by Client without the express written authorization of Engineer. With regard to all drawings and instruments, Client agrees that any reuse by Client, or by those who obtain said information from or through Client, without written verification or adaptation by Engineer, will be at Client's sole risk and without liability or legal exposure to Engineer, Engineer's subconsultants or independent associates. Client agrees to indemnify Engineer, Engineer's subconsultants and independent associates for all damages, liability or cost arising from such reuse. Engineer may reuse all drawings, reports, data and other information developed in performing the services described by this Agreement in Engineer's other activities.

VI. INDEMNIFICATION - Engineer agrees to indemnify and hold Client harmless from any actual damages, liability or costs, including reasonable attorney's fees and expenses, to the extent caused directly by the negligent act or omission or willful misconduct of Engineer, Engineer's subconsultants or those for whom Engineer is legally liable, in the performance of the professional services which are the subject of this Agreement.

In the event that Client is found to be concurrently negligent, Engineer shall not indemnify for the proportionate negligence of Client, but shall only indemnify for the portion of negligence solely attributable to Engineer, its agents, servants, employees, subcontractors of any tier and their agents, servants and employees.

Neither party shall be liable to the other for incidental or consequential damages, whether or not the possibility of such damages has been disclosed or could have been reasonably foreseen.

The parties agree to indemnify one another against damages of third parties recoverable from the indemnitee to the extent caused by the comparative negligence of the indemnitor. Such negligence shall be measured by standards in effect at the time services are rendered, not by later standards.

Client acknowledges that Engineer may perform work at facilities that may contain hazardous materials or conditions, and that Engineer had no prior role in the generation, treatment, storage, or disposition of such materials. Engineer shall be indemnified and defended by Client for any and all claims arising out of the presence of hazardous materials or conditions except for those claims as determined by final judgment of a court of competent jurisdiction to arise out of the sole negligence of Engineer.

VII. INSURANCE - Engineer shall maintain during the life of the Agreement the following minimum insurance:

A. Commercial general liability insurance, including personal injury liability, blanket contractual liability, and broad form property damage liability. The limit shall be not less than $1,000,000.
B. Automobile bodily injury and property damage liability insurance with a limit of not less than $1,000,000.
C. Statutory workers' compensation and employers' liability insurance as required by state law.
D. Professional liability insurance (Errors and Omissions) with a limit of $1,000,000 per claim/annual aggregate.

VIII. SUBCONTRACTS - Engineer shall be entitled to subcontract any portion of the work described in the Scope of Services.

HALFF ASSOCIATES, INC.

Standard Form of Agreement - General Terms and Conditions (continued)

IX. ASSIGNMENT - This Agreement is binding on the heirs, successors, and assigns of the parties hereto. Neither this Agreement, nor any claims, rights, obligations or duties associated hereto, shall be assigned or assignable by either Client or Engineer without the prior written consent of the other party.

X. INTEGRATION - These terms and conditions and the letter agreement (Scope of Services) to which they are attached represent the entire understanding of Client and Engineer. No prior oral or written understanding shall be of any force or effect with respect to those matters covered herein. The Agreement may not be modified or altered except in writing signed by both parties.

XI. JURISDICTION AND VENUE - This Agreement shall be administered and interpreted under the laws of the State Texas. Exclusive venue shall lie in Tarrant County, Texas.

XII. SUSPENSION OF SERVICES - If work under this Agreement is suspended for more than thirty (30) calendar days in the aggregate, the Engineer shall be compensated for services performed and charges incurred prior to receipt of notice to suspend and, upon resumption, an equitable adjustment in fees to accommodate the resulting demobilization and mobilization costs and there also shall be an equitable adjustment in the work schedule based on the delay caused by the suspension. If work under this Agreement is suspended for more than ninety (90) calendar days in the aggregate, the Engineer may, at its option, terminate this Agreement upon giving notice in writing to the Client. Engineer may request that the work be suspended by notifying Client, in writing, of circumstances that are interfering with normal progress of the work. If the Client fails to make payments when due or otherwise is in breach of this Agreement, the Engineer may suspend performance of services upon five (5) calendar days' notice to the Client. The Engineer shall have no liability whatsoever to the Client for any costs or damages as a result of such suspension caused by any breach of this Agreement by the Client.

XIII. TERMINATION OF WORK - Either the Client or the Engineer may terminate this Agreement at any time with or without cause upon giving the other party ten (10) calendar days' prior written notice. Client agrees that termination of Engineer for Client's convenience shall only be utilized in good faith, and shall not be utilized if the purpose or result is the performance of all or part of Engineer's services under this Agreement by Client or by another service provider. Following such termination and the Client shall, within ten (10) calendar days receipt of a final invoice, pay the Engineer for all services rendered and all costs incurred up to the date of Engineer's receipt of notice of termination, in accordance with the compensation provisions of this contract.

XIV. TAXES - The fees and costs stated in this Agreement, unless stated otherwise, exclude all sales, consumer, use and other taxes. Client agrees to fully reimburse Engineer and its subconsultants for taxes paid or assessed in association with the work under this Agreement, whether those taxes were in effect as of the date of this Agreement or were promulgated after the date of this Agreement. This clause shall not apply to taxes associated with reimbursable or other project related expenses, which shall be identified in the applicable invoice for reimbursement by Client.

XV. ALTERNATIVE DISPUTE RESOLUTION - Any conflicts or disputes that arise under or through this Agreement or following the completion thereof shall be discussed at a meeting of one senior management person from Client and one from Engineer. This meeting shall be a condition precedent to the institution of any legal or equitable proceedings, unless such meeting will infringe upon schedules defined by applicable statutes of limitation or repose. Should such a situation arise, the parties agree that such meeting shall still be required, but the institution of said proceedings shall not be precluded for failure to meet this specific meeting requirement.

XVI. SEVERABILITY - Should any one or more of the provisions contained in this Agreement be determined by a court of competent jurisdiction or by legislative pronouncement to be void, invalid, illegal, or unenforceable in any respect, such voiding, invalidity, illegality, or unenforceability shall not affect any other provision hereof, and this Agreement shall be considered as if the entirety of such void, invalid, illegal, or unenforceable provision had never been contained in this Agreement.

XVII. TIMELINESS OF PERFORMANCE - Engineer shall perform its professional services with due and reasonable diligence consistent with sound professional practices.

XVIII. AGREED REMEDIES - In recognition of the relative risks and benefits of the Project to both the Client and the Engineer, and acknowledging that the allocation of risks and limitations of remedies are business understandings between the parties and these risks and remedies shall apply to all possible legal theories of recovery. Client further agrees, to the fullest extent permitted by law, and notwithstanding any other provisions of this Agreement or the existence of applicable insurance coverage, that the total liability, in the aggregate, of the Engineer and Engineer's officers, directors, employees, agents, and subconsultants to the Client or to anyone claiming by, through or under the Client, for any and all claims, losses, costs or damages whatsoever arising out of, resulting from, or in any way related to, the services under this Agreement from any cause or causes of the Engineer or the Engineer's officers, directors, employees, agents, and subconsultants, shall not exceed the Engineer's fee for the services performed under this Agreement or $50,000, whichever is greater. Increased limits may be negotiated for additional fee.
Further, it is the intent of the parties to this Agreement that Engineer's services under this Agreement shall not subject Engineer's individual employees, officers or directors to any personal legal exposure for claims and risks associated with the services performed or performable under this Agreement.

XIX. WAIVER - Any failure by Engineer to require strict compliance with any provision of this Agreement shall not be construed as a waiver of such provision, and Engineer may subsequently require strict compliance at any time, notwithstanding any prior failure to do so.

APPROVED:
Engineer: HALFF ASSOCIATES, INC.
Signature: _____
Name: Terry M. Barr, P.E., CFM
Title: Authorized Agent
Date: 08/07/2015

APPROVED:
Client: _____
Signature: _____
Name: _____
Title: _____
Date: _____

City of Richland Hills, Texas
BFC-5 Letter of Map Revision (LOMR)

Attachment 'A'
Scope of Work

Preface

Beginning with an update to the fee structure and rates of the City's stormwater utility in 2008, the City of Richland Hills has actively worked to evaluate the flood hazards within the Big Fossil Creek Tributary 5 (BFC-5) watershed and systematically address them. The *Richland Hills BFC-5 Preliminary Design Analysis*, which identified flood prone areas and laid out a phased plan for improvement implementation, was completed by Halff Associates, Inc. (Halff) in October 2009.

Since the completion of the plan, the City of Richland Hills has contracted with Halff for the design and construction assistance of four (4) separate flood mitigation projects within the watershed. These include the following:

- Baker Boulevard Detention – A series of two separate detention ponds north of Baker Blvd which receive flow from the Hardisty area, between Hovenkamp and SH26 and discharge under Baker Blvd.
- Richland Elementary Detention and Latham Channel Improvements – Addition of a 35 ac-ft detention pond on the Richland Elementary property as well as channel upstream of Latham and culvert improvements at Latham Drive.
- Matthews Interceptor – Construction of approximately 2400 LF of large dimension reinforced concrete box from King's Ct, down Matthews Ave to the U.S. Army Corps of Engineers (COE) Sump.
- Kingsbury Bypass – Placement of 2200 LF of reinforced concrete box culvert connecting the Richland Elementary detention pond at Scruggs Place Dr. to the Matthews Interceptor at Lavon Dr.

In addition, some improvements have been made in the Upper Hardisty area to facilitate development along SH26. The addition of these flood reduction projects has resulted in a significant change in the 100-year flow patterns and floodplain limits within the BFC-5 watershed. The City has tasked Halff with updating the models to reflect these physical changes and submitting an application to FEMA for a letter of map revision (LOMR).

Project Summary

The purpose of the study is to prepare a detailed hydrologic and hydraulic analysis of BFC-5 from the upper limits of the watershed to the COE Sump. Given the complex nature of the flow patterns, the use of 2D modeling for the Preliminary Design Analysis (using InfoWorks SD/2D), and the significant amount of storm sewer contributing to the change in flow patterns, Halff is proposing to use HEC-RAS v. 5.0 with 2D analysis to model the watershed and submit to FEMA. Information developed as part of the initial plan and subsequent design projects will be utilized and converted to the HEC-HMS and HEC-RAS platforms, which are approved by FEMA. It is anticipated that, given the newness of HEC-RAS 2D, significant coordination with FEMA will be required to secure approval of the LOMR. The tasks necessary for completion and approval of the LOMR are detailed in the scope of services provided.

Task 1: Project Management

The ENGINEER's project management activities shall include task leadership and direction, telephone and written communication, project update meetings, project status reports, project schedule and updates, and personnel and data management among other general project management activities. Specific tasks include the following:

A. Engineer will attend one (1) project kickoff meeting to discuss project objectives, process and schedule. The project manager and lead engineer will participate from Halff.

B. Engineer will attend up to three (3) progress meetings to discuss project progress and address any issues. The project manager and lead engineer will participate from Halff.

C. Engineer will attend one (1) public meeting to present modeling information to the public and/or City Council. Halff will prepare the necessary presentation and exhibits for the meeting in advance.

Task 2: Data Collection

The ENGINEER shall perform data collection and field reconnaissance tasks to ensure projects are completed and the modeling data is current. Specific tasks include:

A. Collect any technical data available from FEMA Region VI in regards to the current effective hydraulic and hydrologic models.

B. Evaluate and update the InfoWorks SD/2D model to ensure it includes all constructed improvements.

C. Perform field reconnaissance to ensure projects have been completed and document improvements for the LOMR submittal.

D. ENGINEER will use design drawings, contractor mark-ups, and available as-built survey data. Additional as-built survey is not included in this scope of services. If additional survey is required, it will be covered under a contract amendment.

Task 3: Development of Hydrologic Models

The ENGINEER shall develop detailed existing land-use conditions HEC-HMS models for the watershed. The drainage basin delineation, infiltration loss parameters, and travel time parameters shall be consistent with those developed as part of the InfoWorks SD/2D modeling effort conducted with the BFC-5 Preliminary Design Analysis (2009). Because the flow hydrographs developed in HEC-HMS will be routed through a 2D model, no hydrologic routing will be calculated.

The ENGINEER shall fully annotate the HEC-HMS model, including descriptive comments in all relevant fields, and clearly label the simulation runs with respect to the return period. The ENGINEER shall use the 10-, 25-, 50-, 100-, and 500-year return events to develop hydrologic models. The ENGINEER shall use rainfall data from the June 2009 storm paired with photographic documentation to perform hydrological analysis and a high water mark simulation/validation with hydraulic models. This analysis was conducted as part of the InfoWorks SD/2D modeling to validate those models. Specific tasks include:

A. Verify hydrologic parameters, including design rainfall, infiltration loss, and hydrograph transform, meets current drainage criteria and physical conditions in the watershed. Update as needed.

B. Construct HEC-HMS model using the hydrologic components in the InfoWorks SD/2D model. No hydrologic routing reaches will be included.

C. Run and troubleshoot the HEC-HMS model to ensure consistency with the InfoWorks SD/2D model.

D. Compare the HEC-HMS and InfoWorks SD/2D model results. A maximum variation of 5% between the results of the two models for both the peak discharges and total volume will be considered acceptable.

E. Perform QA/QC of the HEC-HMS model. Review forms will be included in the final report submittal.

Task 4: Development of Hydraulic Models and Floodplain Maps

The ENGINEER will use the latest HEC-RAS model software (version 5.0) to develop hydraulic models for the study. Given the use of InfoWorks SD/2D in the planning and design phases of the project, and the complex nature of the flow patterns, a 2D model of the "stream" and overland areas will be developed using HEC-RAS 2D. The ENGINEER will develop water surface profiles for the 10-, 25-, 50-, 100-, and 500-year return events and will provide floodplain mapping for the 100- and 500-year events per FEMA criteria. Specific tasks include:

A. Evaluation and updates to the existing InfoWorks SD/2D model based on the construction of projects. The model will be used as a comparison to the HEC-RAS model for the purpose of validation.

B. Construct HEC-RAS 2D model using updated terrain information as well as construction drawings and field survey data.

   i. The ENGINEER will use the 2009 TNRIS LiDAR to provide terrain information and the 3D design data from CADD to incorporate the physical changes into the terrain. These attributes can be merged into the base terrain in HEC-RAS version 5.0

   ii. The hydraulic model will be fully geo-referenced for seamless incorporation into the City's GIS inventory.

   iii. Above ground changes to the terrain, such as the detention ponds upstream of Baker Blvd and at Richland Elementary, as well as the channel improvements upstream of Latham will be incorporated into the terrain. Underground infrastructure, such as the Matthews Interceptor and Kingsbury Bypass will **NOT** be included in the HEC-RAS model.

C. Add flow hydrographs from HEC-HMS model at internal boundary condition locations in the Unsteady Flow Data editor

   i. Overflow hydrographs will be used to accommodate storm sewer improvements. These hydrographs will be the difference between the full flow hydrograph and the storm sewer hydrographs at a given flow change location as determined by the InfoWorks SD model. These assumptions will be documented in the annotated HEC-RAS model, which will include descriptive comments in all relevant fields.

ii. Calculations used to determine the "overflow hydrographs" will be provided to the CITY in the report.

D. Determine hydraulic model boundary conditions for the 2D model. Boundary conditions will need to be dynamic in order to avoid adding volume to the system artificially. ENGINEER will evaluate the analysis of the COE Sump prepared as part of the InfoWorks SD/2D model and make the necessary updates to ensure an accurate boundary condition for all studied rainfall events.

E. Run and troubleshoot the HEC-HMS model to ensure consistency with the InfoWorks SD/2D model. ENGINEER will provide comparisons of the InfoWorks SD/2D model and the HEC-RAS 2D model and make adjustments as needed.

F. Generate floodplain mapping for the 25-, 100-, and 500-year rainfall events.

i. Inundation limits will be provided in a georeferenced format for incorporation into the City's GIS Inventory.

ii. ENGINEER will review floodplain limits and compare to the effective FEMA floodplain information. A discussion regarding the preliminary delineation between the CITY and ENGINEER will be conducted and specific affected properties will be identified.

iii. Floodway limits will be assumed to be the same as the 100-year floodplain limits since the area is considered to be fully developed.

iv. An encroachment analysis will **NOT** be performed. If an encroachment analysis is required, it will be covered under a contract amendment.

G. Perform QA/QC of the HEC-RAS 2D model as well as the floodplain mapping. Review forms will be included in the final report submittal.

Task 5: Letter of Map Revision Preparation and Coordination

The ENGINEER shall prepare a LOMR application package with complete supporting documentation, including a report narrative and the requisite tables, mapping exhibits, and profiles. Following the City's review and approval, the ENGINEER shall represent the City to submit the LOMR application to FEMA. The ENGINEER will provide the City two copies of the final LOMR application package. The City will be responsible for the payment of FEMA's LOMR review and processing fees. Specific tasks include:

A. Prepare a written report that details the study intent, data sources, modeling assumptions and methodology, physical changes to the watershed, and changes to the floodplain and base flood elevations.

B. The LOMR application typically includes the following MT-2 forms although others may be required for the floodplain restudy:

Form 1	Overview & Occurrence
Form 2	Riverine Hydrology and Hydraulics Form
Form 3	Riverine Structures Form

C. Prepare mapping exhibits including floodplain work maps, FEMA FIRM panel overlay maps, and work maps associated with the InfoWorks SD/2D modeling.

D. Provide the City with a public notification template as well as a list of affected properties. Changes in the floodplain will require public notification as part of the LOMR approval

process. The City is responsible for the cost of mailing public notification to individual property owners or posting an ad in the newspaper.

E. Perform QA/QC of the report narrative, exhibits, profiles, and MT-2 forms. Review forms will be included in the final report submittal.

F. The ENGINEER shall respond to comments made by FEMA on the LOMR application package. Based on the comments received, the ENGINEER shall make necessary revisions to the LOMR submittal package and address all comments and provide additional required information to fulfill FEMA requirements for issuance of a of the FEMA LOMR for this study, if applicable.

City of Richland Hills, Texas
BFC-5 Letter of Map Revision (LOMR)

Attachment 'B'
Basis of Compensation

A. Compensation

1. Payment for all services listed in Attachment 'A' will be computed on the basis of actual direct salary costs to determine the payment due for labor services. The multiplier is a factor which compensates the Engineer for fringe benefits, overhead, and profit. Total payments for all services described in Attachment 'A' shall not exceed **$ 57,800.00** without an approved change order.

2. The Engineer is not responsible for the cost of the FEMA review fees or the cost of public notification, whether the notification is sent to individual property owners or posted in the newspaper.

3. Payment shall be made monthly upon receipt of an invoice from the Engineer, prepared from the records of the Engineer.

B. Schedule

1. The project (excluding FEMA review of LOMR) will be completed within six (6) months after receiving the Notice to Proceed letter from the City.

2. ENGINEER will provide the CITY with monthly updates on the modeling and submittal preparation as well as the FEMA comment process.

City of Richland Hills, Texas
BFC-5 Drainage Improvements

Attachment 'B-1'
Basis of Compensation
Fee Summary

Letter of Map Revision (LOMR)

Task 1: Project Management	$ 5,300
Task 2: Data Collection	$ 2,840
Task 3: Hydrologic Models	$ 6,040
Task 4: Hydraulic Models and Floodplain Mapping	$ 19,840
Task 5: Letter of Map Revision Preparation and Submittal	$ 23,870
TOTAL MAXIMUM FEE (HOURLY NOT TO EXCEED)	**$ 57,800**

City of Richland Hills, Texas
BFC-5 Letter of Map Revision (LOMR)

Attachment 'B-2'
Basis of Compensation
Level of Effort Estimate

Project Phases and Tasks*	Principle-in-Charge	Project Manager	Professional Engineer	Engineer in Training	Licensed Surveyor	Senior GIS	2-Man Survey Crew	Administrative	Effort Subtotal	Direct Costs	Project Total
Task 1: Project Management											
Project Kickoff Meeting (1)		2	2						$600.00		$600
Project Update Meetings (3)		6	6						$1,800.00		$1,800
Invoicing		2						4	$620.00		$620
Preparation and Public Meeting (1)		4	4	8		2			$2,280.00		$2,280
Subtotal Task 1	0	14	12	8	0	2	0	4	$5,300.00	$0.00	$5,300.00
Task 2: Data Collection											
Field Reconnaissance	1	2	4	4					$1,520.00		$1,520
Compile Existing As-Built Survey Information			2	4	4				$1,320.00		$1,320
Subtotal Task 2	1	2	6	8	4		0	0	$2,840.00	$0.00	$2,840.00
Task 3: Hydrologic Analysis											
Hydrologic Parameter Verification		1	2	4					$880.00		$880
HEC-HMS Model Construction		1	2	4					$880.00		$880
HEC-HMS Model Run/Troubleshoot		1	2	4					$880.00		$880
HEC-HMS Results Comparison to InfoWorks SD	1	2	4	8					$1,960.00		$1,960
Model QA/QC	4	4							$1,440.00		$1,440
Subtotal Task 3	5	9	10	20	0		0	0	$6,040.00	$0.00	$6,040.00

City of Richland Hills, Texas
BFC-5 Letter of Map Revision (LOMR)

Attachment 'B-2'
Basis of Compensation
Level of Effort Estimate

Project Phases and Tasks*	Principle-in-Charge	Project Manager	Professional Engineer	Engineer in Training	Licensed Surveyor	Senior GIS	2-Man Survey Crew	Administrative	Effort Subtotal	Direct Costs	Project Total
Task 4: Hydraulic Analysis											
Evaluate/Update InfoWorks SD Model	4	1	2	4					$1,680.00		**$1,680**
Construct HEC-RAS 2D Model		4	8	24					$4,400.00		**$4,400**
Unsteady Flow Data		1	2	8					$1,320.00		**$1,320**
Establish Boundary Conditions	1	2	4	12					$2,400.00		**$2,400**
HEC-RAS 2D Model Run/Troubleshoot	2	4	8	24					$4,800.00		**$4,800**
Floodplain/Floodway Mapping	1	2	4	8		4			$2,360.00		**$2,360**
Model & Mapping QA/QC	8	8							$2,880.00		**$2,880**
Subtotal Task 4	16	22	28	80	0	4	0	0	$19,840.00	$0.00	**$19,840.00**
Task 5: LOMR Preparation and Coordination											
Report Preparation and Digital Submittal	2	4	8	24					$4,800.00		**$4,800**
Preparation of MT-2 Forms		2	4	4					$1,320.00		**$1,320**
Map Exhibits and Profile Preparation		2	4	12		4			$2,600.00		**$2,600**
Public Notification Template		1	2	2					$660.00		**$660**
Report and MT-2 QA/QC	4	4							$1,440.00		**$1,440**
FEMA Coordination and Comment Response	4	40	16	32					$12,960.00		**$12,960**
Subtotal Task 5	10	53	34	74	0	4	0	0	$23,780.00	$0.00	**$23,780.00**
PROJECT TOTALS	32	100	90	190	4	10	0	4	$57,800.00	$0.00	**$57,800.00**