AGENDA SECTION: OTHER BUSINESS
AGENDA ITEM # 12
REPORT # 12-82

STAFF REPORT
COUNCIL MEETING DATE:
June 25, 2012

ITEMS FOR COUNCIL CONSIDERATION:

Approval of Contract with Bengal Engineering for a Hydraulics and Hydrology Study for the Carpinteria Avenue Bridge Project

Report prepared by: Charles W. Ebeling, Director
Department: Public Works

Signature

Reviewed by City Manager:

Signature

ACTION X NON-ACTION ___ **STAFF RECOMMENDATION:**

Recommendation: That the City Council authorize execution of an engineering agreement with Bengal Engineering for the scope and cost of work in Attachment A: Hydraulics and Hydrology Analysis for the Carpinteria Avenue Bridge Project.

Sample Motion: I move to authorize the City Manager to sign the agreement for professional engineering services with Bengal Engineering for the Hydraulics and Hydrology Analysis for the Carpinteria Avenue Bridge Project.

I. BACKGROUND:

In 2010, the City of Carpinteria secured Federal funding through the Highway Bridge Program (HBP) to address structural deficiencies at the 1937 Carpinteria Avenue Bridge over Carpinteria Creek. The City's Department of Public Works has been working closely with the California Department of Transportation (Caltrans) District 5 Local Assistance Department on proceeding with the Preliminary Engineering (PE) phase of this project. The PE phase includes all preliminary engineering, environmental and final design work. At the beginning of 2012, the Public Works Department met with Caltrans representatives to perform a Field Review of the

project and complete the Preliminary Environmental Study (PES) form. Following the Field Review and completion of the PES, the first activity required for PE is to complete a Hydraulics and Hydrology Study for the bridge project.

II. DISCUSSION:

In compliance with Federal guidelines, the Public Works Department requested a scope and sealed fee for the required Hydraulic and Hydrology Study for the Carpinteria Avenue Bridge project from three qualified consultant firms. The scope of the Hydraulic and Hydrology Study includes a survey of the area within the flood plain around the existing Carpinteria Avenue Bridge, preparation of hydraulic modeling to assess water surface elevations for the existing and proposed replacement bridges for various flood conditions, including the 100-year event, and to prepare and get approval of the required Caltrans and Federal hydraulics and hydrology reports. This effort will allow the project to develop a preliminary replacement bridge design for the project.

On June 11th, 2012 proposals were received from two consultant firms. Public Works Staff reviewed the proposals and recommended that the City Council select Bengal Engineering to perform the Hydraulic and Hydrology Study. Subsequently, Staff negotiated the proposed cost and the resulting recommended contract fee is for $59,175, which is considered fair and reasonable for the extent and complexity of the work required.

II. POLICY:

The Carpinteria Avenue Bridge Project is included in the Bridges and Interchanges section of the current City of Carpinteria Capital Improvement Program. This project has also been in included in the Department of Public Works Annual Work Plan and Budget since 2010. This project also addresses many of the goals, objectives and policies in the Circulation Element of the City of Carpinteria General Plan.

III. FINANCIAL CONSIDERATIONS:

The negotiated contract fee to complete the Hydraulic and Hydrology Analysis for the Carpinteria Avenue Bridge Project is $59,175. This work will be funded through the Federal Highway Bridge Program (HBP), Development Impact Fees and Measure D funding. The HBP requires a local match to the Federal funding it provides. The City will provide the minimum match which is 11.43% of the total cost.

Project Costs:		**Project Funding:**	
H&H Study:	$59,175	HBP Federal Funds (88.53%)	$52,388
		City Local Match to HBP (11.47%) – (from DIFs):	$ 6,787
Total:	$59,175	Total:	$59,175

IV. ATTACHMENTS:

Attachment A: The Bengal Engineering scope of work and fee for the Hydraulic and Hydrology Study for the Carpinteria Ave Bridge Project.

ATTACHMENT A

Bengal Engineering, Inc.

Civil, Bridge, Hydraulics, Structural & Highway Engineers

June 11, 2012

Mr. Charlie Ebeling, P.E., T.E.
Director of Public Works
City of Carpinteria
5775 Carpinteria Avenue
Carpinteria, CA 93013-2603

RE: Hydraulics and Hydrologic Analysis for the Carpinteria Avenue Bridge Project, Carpinteria, California

Dear Mr. Ebeling,

Bengal Engineering (BE) is pleased to submit this proposal to perform a Hydrologic and Hydraulics Analysis for the Carpinteria Avenue Bridge Project, in accordance with your June 1, 2012 request.

A. Project Understanding

The Structure Maintenance and Investigations Division of the California Department of Transportation (Caltrans) has listed the Carpinteria Avenue Bridge (Br. No. 51C-0172) over Carpinteria Creek as "Functionally Obsolete" in their *Structure Inventory and Appraisal Report*, dated February 08, 2012. The City of Carpinteria is planning to replace the bridge due to its structural, geometric and hydraulic inadequacies and is pursuing Federal Highway Bridge Program (HBP) funding, which is administered by Caltrans.

Bengal Engineering (Bengal) has been asked to provide a proposal to perform the required Hydrologic and Hydraulics Analysis for the existing bridge, in order to provide the necessary recommendations for the replacement structure.

Bengal has decades of experience in bridge inspection, bridge design, as well as expertise in the hydraulic analysis of structures such as this one, which is in need of replacement.

Bengal provides full-service heavy civil engineering, structural design, and construction management throughout the Tri-County's.

Bengal is well-known by local agencies for such work.

Photo: Carpinteria Ave. Bridge, looking at upstream face.

Pursuant to the goals of the RFQ, Bengal Engineering is a Caltrans-Certified DBE and Federally-Certified 8(a) Small Disadvantaged Business (SDB) firm. Bengal is also a Certified California Small Business. We've reviewed and will comply with the four UDBE- and DBE-related documents from the Caltrans Local Assistance Procedures Manual, and exhibits 10-O1 and 10-O2 are attached, as requested.

Bengal understands the DBE and UDBE goals for the Carpinteria Avenue Bridge Project. Not only is Bengal a DBE firm, but our proposed sub-consultants have the following Caltrans certifications:

- AP Engineering and Testing (Geotechnical Sampling and Testing) – Caltrans-certified Underutilized Disadvantaged Business Enterprise (UDBE) firm
- Central Coast Aerial Mapping, Inc. (Aerial Survey) – Caltrans-certified State Women Business Enterprise (SWBE) and State Minority Business Enterprise (SMBE) firm

B. Scope

Bengal Engineering will perform the following tasks:

TASK 1: FIELD REVIEW BRIDGE REACH AND PDT MEETING
Bengal will field review the proposed bridge reach with the City Engineers. A Project Development Team (PDT) meeting will also be included in the field review.

Assumption: One PDT meeting is included in the field review.

Deliverable: None

TASK 2: TOPOGRAPHIC SURVEY
Bengal will perform topographic mapping for the hydraulic modeling. Work will include the aerial mapping and hydraulic cross sections required to perform the hydraulics analysis.

Deliverable: Topographic Map of the project site.

TASK 3: DATA PREPARATION
Bengal will review the topographic and ground surveys and develop the cross sections necessary for the hydraulic modeling.

Deliverable: Cross sections and profile for hydraulic analysis.

TASK 4: HYDRAULICS AND HYDROLOGY ANALYSIS
This task includes the work required to complete the hydraulics and hydrology analysis and to prepare a Final Hydraulics Report (FHR) and Location Hydraulic Study for the replacement of the existing Carpinteria Avenue Bridge over Carpinteria Creek (Br #51C-0172) for the City.

The location of the Bridge over Carpinteria Creek is shown in Figure 1 below.

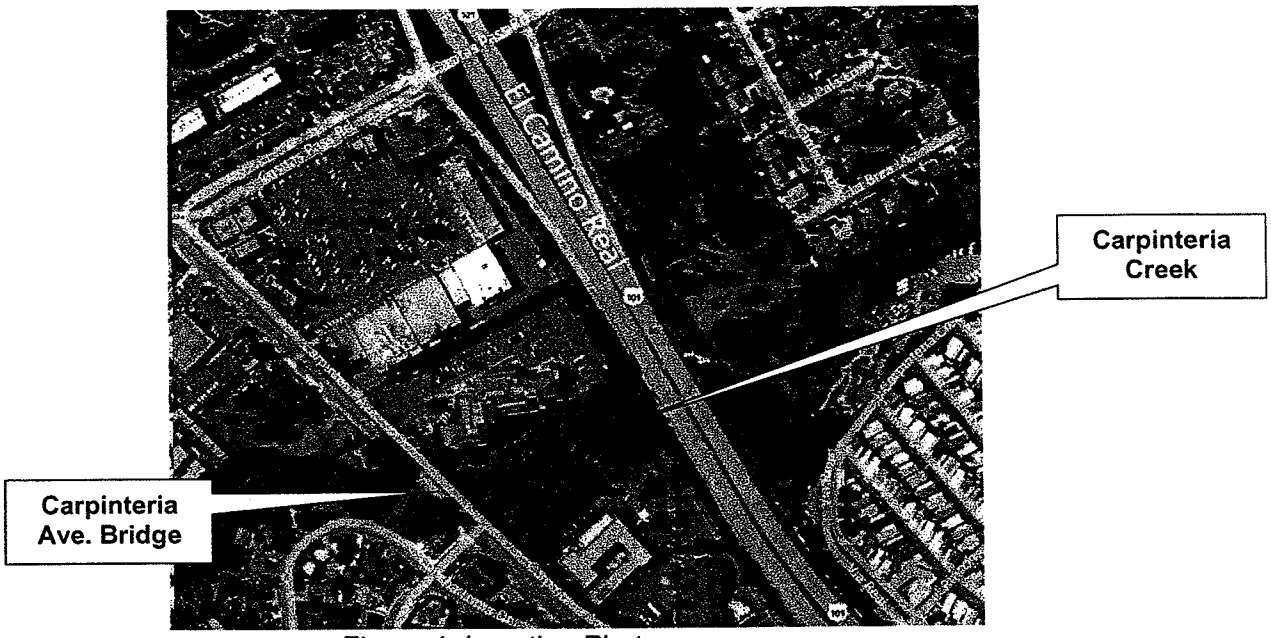

Figure 1: Location Photo

The FHR proposed to be completed by Bengal would follow the Caltrans format for similar reports and be prepared in accordance with the Caltrans Local Assistance Program Guidelines.

Sub-task 1: Verify FEMA Discharge Estimate
The watershed basin and rate of discharge for Carpinteria Creek will be described. Peak discharges for the 50-and 100-year flood events will be estimated, based upon FEMA and the Caltrans' study for the Hwy 101 improvements.

The City of Carpinteria will be contacted to determine if there is any existing hydrology information available. The City of Carpinteria Public Works Department or Caltrans Local Assistance will be contacted to determine if there are any previous hydraulic reports (e.g. for the Hwy 101 widening project).

Assumptions: Existing hydrology information is available from FEMA and/or City of Carpinteria.

A separate task order will be required if no existing hydrology information is available or the discharge information provided by FEMA/City of Carpinteria is questionable.

Deliverable: Estimate of discharge to be incorporated in the FHR (Sub-task 10).

Sub-task 2: Duplicate Effective Model
Hydraulic parameters (water surface elevations and velocity) will be obtained from the Army Corps of Engineers HEC-RAS (Hydraulic Engineering Center River Analysis System), version 4.1 model, based on:

- Cross sections obtained by Bengal.
- Cross section developed by Caltrans for the Hwy 101 project.

The Hydraulic Model – HEC-RAS Analysis
The Carpinteria Avenue Bridge over Carpinteria Creek is in a designated FEMA floodplain where detailed studies have been performed. The Floodplain Evaluation would first require developing a Duplicate Effective Model used in the Flood Insurance Study. The model information will be obtained from FEMA or the City of Carpinteria. The entire model may not need to be re-created, however.

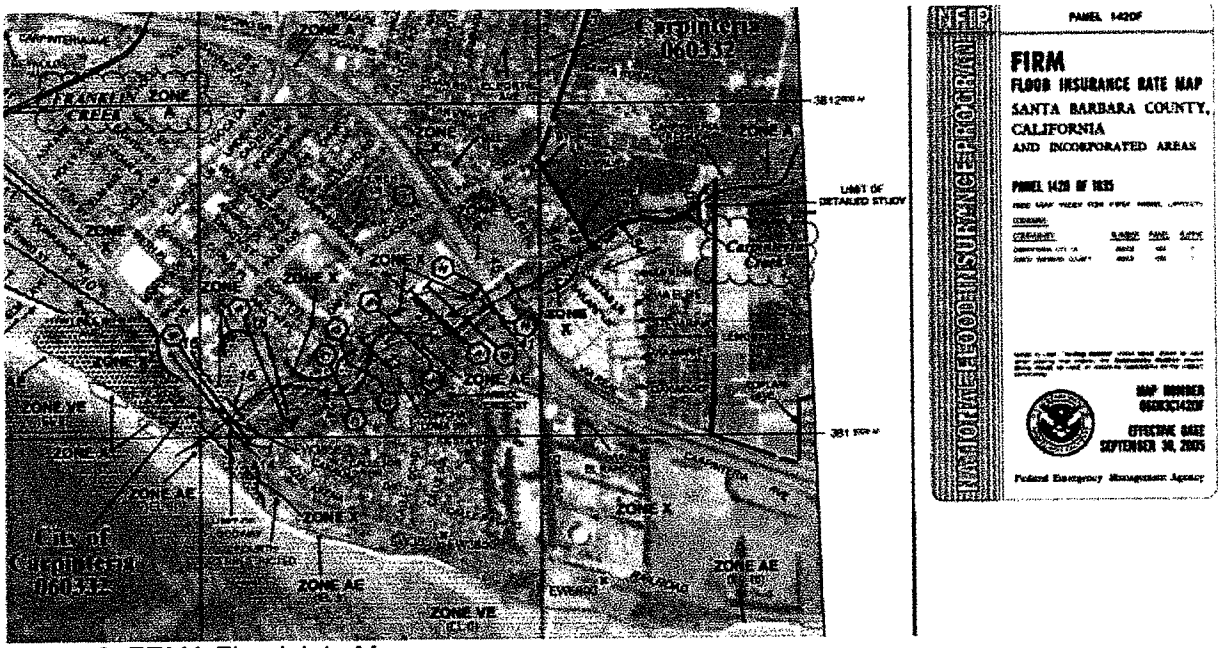

Figure 2: FEMA Floodplain Map

Once the Duplicate Effective Model has been established, the corrected effective model (for both the existing and post-project conditions) will be created in HEC-RAS.

The river reach will be described. Manning's "n" values for the channel and overbank will be estimated from the field investigation, as well as engineering judgment.

Deliverable: None. The information will be used to develop the Location Hydraulic Study.

Sub-task 3: Corrected Effective Model
If the morphology has not changed substantially from the original HEC-RAS, the Existing Conditions Model will be developed from the Duplicate Effective Model described above. If substantial differences have changed the hydraulics (channel widening, channel bed degradation, etc.), a new model (corrected effective model) will be created to represent existing conditions and calibrated (if calibration data is available) from the survey data acquired by BE. The hydraulic variables (water surface elevation, velocity, etc.) will be determined for the 50- and 100-year discharges estimated under "hydrology" above. This model will be used to represent the existing conditions for the bridge design.

Deliverables: Water surface elevation, velocity estimates and hydrologic summary table variables will be incorporated in the FHR (Sub-task 10).

Sub-task 4: Proposed Conditions Model
Bengal will modify the existing conditions model with the proposed bridge configuration. The hydraulic variables (water surface elevation, velocity, etc.) will be determined for the 50- and 100-year discharges estimated under "hydrology" above. Results from the Hydraulic analysis will be provided in both tabular as well as graphical output formats by BE.

Hydrologic Summary Table
The Hydrologic Summary Table will be completed and provided for the Bridge Foundation Plan, in the format shown below.

Drainage Area: _____ Square miles

Design Base Overtopping
Frequency (Years) 50 & 100
Discharge (Cubic feet per second)
Water Surface (Elevation at u/s face of Bridge)

Flood plain data are based upon information available when the plans were prepared and are shown to meet Federal requirements. The accuracy of said information is not warranted by the State and interested or affected parties should make their own investigation.

Drift
Bengal will research bridge maintenance records for the existing bridge and the adjacent bridges upstream and downstream of the proposed bridge to determine if any maintenance challenges have occurred, such as debris getting caught on the piers. This helps to determine the necessary freeboard, span lengths and the type of bridge pier that will minimize debris capture and therefore future maintenance of the proposed bridge.

Deliverables: Water surface elevation, velocity estimates and hydrologic summary table variables will be incorporated in FHR to be prepared under Sub-task 8.

Sub-task 5: Bridge Profile
Bengal will develop the bridge profile of the replacement structure, for the purpose of developing a "proposed condition" hydraulic model.

Deliverable: None. The information will be used to develop the HEC-RAS hydraulic model.

Sub-task 6: Scour and Degradation
Bengal will review maintenance records for the existing and adjacent bridges over Carpinteria Creek to determine if the stream has degraded over time. If degradation is found, the cause of the degradation will be investigated and future degradation during the expected 75-year life of the bridge will be estimated using straight-line extrapolation.

To aid in our scour and channel degradation analysis, BE will sample and test the surface and near-surface soils below the bridge. Our sub-consultant, AP Engineering and Testing, will conduct the sampling and laboratory testing.

Contraction and abutment scour will be estimated using the methods described in the Federal Highway Administration (FHWA) Publication HEC-18, *Evaluating Scour at Bridges*. Up to two alternative pier configurations will be considered.

The Colorado State University (CSU) Equation will be used for estimating local pier scour, as recommended in the Federal Highway Administration (FHWA) Publication HEC-18, *Evaluating Scour at Bridges*.

Assumptions: Degradation estimates will be straight line extrapolation, using the best available data, if no numeric sediment transport models are available. No scour counter-measure options or design are included in this task.

Deliverable: Scour estimates will be incorporated in FHR.

Sub-task 7: Bank Protection
Bengal will prepare calculations to determine the need for bank protection. If bank protection is required, parameters will be provided assuming a layered Caltrans Design.

Assumptions: Hydraulic calculations show that bank protection is necessary. It is assumed that rock slope protection will be utilized as the bank protection. If alternative bank protection is requested, a separate task order will be necessary. Final bank protection plans and specifications shall be prepared by others.

Deliverable: Bank protection parameters will be incorporated in FHR (Sub-task 10).

Sub-task 8: Location Hydraulic Study
Using the HEC-RAS output data, BE will complete a Location Hydraulic Study (Floodplain Evaluation Report) in accordance with 23 CFR 650.113. This report is generally included in the CEQA environmental document for the bridge.

Deliverable: Location Hydraulic Study, to be included as an Appendix to the FHR.

Sub-task 9: Prepare Draft Report
Bengal will prepare a draft technical hydrology, hydraulics and scour report. A draft outline of the report will include:

- Table of Contents, List of Tables, List of Figures
- Executive Summary
- Bridge History
- Basin and Drainage
- HEC-RAS Hydraulic Analysis
- Boundary Conditions
- Drift and Freeboard Requirements
- Existing Conditions Model Description and Results
- Proposed Conditions Model Description and Results
- Hydrologic Summary Table
- Scour Analysis
- Local Pier, Contraction and Abutment Scour
- Degradation and Geomorphology Changes
- Bank Protection Design Parameters

Assumptions: We have budgeted one review of the draft final report.

Deliverable: PDF version of the draft report, to be provided to via electronic mail.

Sub-task 10: Prepare Final Hydraulic Report (FHR)

Bengal will prepare a final technical hydrology, hydraulics and scour report, incorporating review comments from the Draft Report.

Deliverable: 3 bound copies of the final (signed and stamped) version of the report will be provided.

C. Assumptions and Limitations

- A soil investigation is excluded.
- Bridge structural analysis is excluded.
- Utility investigation is excluded.
- Environmental investigation(s) are excluded.
- Right of way research is excluded.

D. Proposed Fee and Method of Payment
Our proposed services will be performed on a time-and-materials basis, with a not-to-exceed budget, as presented in the attached "Project Fee Estimate".

We have estimated the cost of our services, based on our current understanding of the scope and complexity of the work. If additional work or services are identified beyond the original scope of work, Bengal will seek prior approval from the City before performing additional work.

E. Timeline
We are ready to proceed. The deliverables are planned to be completed by December, 2012.

F. Termination (a clause required by the State of California)
This contract may be cancelled by either party with written notice.

If the City would like to cancel the contract, we will stop work but will likely need some time to "wrap things up". The amount of time required to organize the files will depend on the timing of the notice to stop work.

Bengal Engineering will invoice the City for the work performed to the time of termination, plus the "wrap-up time".

G. Pauses in Work
Our proposal assumes that we will pursue the project without stopping. If the project "pauses" for more than two months, additional costs could be required to re-activate the project.

We look forward to your response.

Md. Wahiduzzaman

Md Wahiduzzaman, P.E.
CEO

Our contact information is:

Bengal Engineering, Inc.
250 Big Sur Drive
Goleta, CA 93117

Phone (805) 685-6511

Email: Md@BengalEngineering.com

Website: www.BengalEngineering.com

Attachments:

1. Exhibit 10-O1 Local Agency Proposer UDBE Commitment
2. Exhibit 10-O2 Local Agency Proposer DBE Information
3. Project Fee Estimate (sealed envelope)

EXHIBIT 10-O1 LOCAL AGENCY PROPOSER UDBE COMMITMENT (CONSULTANT CONTRACTS)

NOTE: PLEASE REFER TO INSTRUCTIONS ON THE REVERSE SIDE OF THIS FORM

LOCAL AGENCY: City of Carpinteria LOCATION: Carpinteria, CA

PROJECT DESCRIPTION: Hydraulics and Hydrologic Analysis of the Carpinteria Avenue Bridge Project

PROPOSAL DATE: June 12, 2012

PROPOSER'S NAME: Bengal Engineering

CONTRACT UDBE GOAL (%): 5.65%

WORK ITEM NO.	DESCRIPTION OR SERVICES TO BE SUBCONTRACTED (or contracted if the proposer is a UDBE)	UDBE CERT NO. AND EXPIRATION DATE	NAME OF EACH UDBE (Must be certified at the time proposals are due - include UDBE address and phone number)	PERCENT PARTICIPATION OF EACH UDBE
	Soil Sampling and Testing	33877	AP Engineering and Testing	3.9%

For Local Agency to Complete:

Local Agency Proposal Number: _____

Federal-Aid Project Number: _____

Federal Share: _____

Proposal Date: _____

Total Claimed UDBE Commitment: 3.9 %

Md. Wahiduzzaman
Signature of Proposer

June 7, 2012 (805) 685-6511
Date (Area Code) Tel. No.

Md Wahiduzzaman
Person to Contact (Please Type or Print)

Local Agency certifies that the UDBE certifications have been verified and all information is complete and accurate/unless noted otherwise.

_____ _____ _____
Print Name Signature Date
Local Agenc Representative

(Area Code) Telephone Number: _____

Local Agency Proposer UDBE Commitment (Consultant Contracts)
(Rev 6/27/09)

Distribution: (1) Original - Local agency files

EXHIBIT 10-O2 LOCAL AGENCY PROPOSER DBE INFORMATION (CONSULTANT CONTRACTS)

NOTE: PLEASE REFER TO INSTRUCTIONS ON THE REVERSE SIDE OF THIS FORM

LOCAL AGENCY: City of Carpinteria LOCATION: Carpinteria, CA

PROJECT DESCRIPTION: Hydraulics and Hydrologic Analysis of the Carpinteria Avenue Bridge Project

TOTAL CONTRACT AMOUNT ($): 59,175

PROPOSER'S NAME: Bengal Engineering, Inc.

WORK ITEM NO.	DESCRIPTION OR SERVICES TO BE SUBCONTRACTED (or contracted if the proposer is a DBE)	DBE CERT NO. AND EXPIRATION DATE	NAME OF EACH DBE (Must be certified at the time proposals are due - include DBE address and phone number)	DOLLAR AMOUN T OF EACH DBE
	Hydraulics / Hydrology Study	31261	Bengal Engineering	$42,350

For Local Agency to Complete:

Local Agency Contract Number: _____

Federal-Aid Project Number: _____

Federal Share: _____

Contarct Award: _____

Total Claimed DBE Participation: $ 42,350 — 71 %

Local Agency certifies that the DBE certifications have been verified and all informations is complete and accurate.

_____ _____ _____
Print Name Signature Date
Local Agency Representative

(Area Code) Telephone Number: _____

Md. Wahiduzzaman
Signature of Proposer

June 7, 2012 (805) 685-6511
Date (Area Code) Tel. No.

Md Wahiduzzaman
Person to Contact (Please Type or Print)

For Caltrans Review:

_____ _____ _____
Print Name Signature Date
Caltrans District Local Assistance Engineer

Local Agency Proposer DBE Information (Consultant Contarcts)
(Rev 6/27/09)

Distribution: (1) Copy - Fax or scan a copy to the Caltrans District Local Assistance Engineer (DLAE) within 15 days after contract execution. Failure to send a copy to the DLAE within 15 days after contract execution may result in deobligation of funds for this project.
(2) Original - Local agency files

Fee Estimate for Hydraulics and Hydrologic Analysis

Project No.:

Title: **Hydraulics and Hydrologic Analysis for the Carpinteria Avenue Bridge Project**

Bengal Engineering, Inc.
Civil, Bridge, Hydraulics, Structural & Highway Engineers

Bengal Engineering
250 Big Sur Drive
Goleta, CA 93117
(805) 685-6511

Client: City of Carpintera/DPW ATTN: Mr. Charlie Ebeling, PE, TE
Prepared by: MW
EIN 20-2027764
Date: June 11, 2012
Billing Type: T&M

Item Descriptions	HOURS																		TOTAL HOURS	LABOR COST
	SPEC. CONSULT.	PROJECT MANAGER	BRIDGE ENG	STRUCT. DESIGN	CIVIL ENG	TECH / DRAFTER	GEOTECH ENG	ENG GEOLOGIST	CLERICAL											
Task 1.0: Field Review Bridge Reach & PDT Meeting		4	4		4														12	1800
Task 2.0: Topographic Survey		1			12														13	1950
Task 3.0 Data Preparation		3	4		20	20													47	5750
Task 4.0: Hydraulics and Hydrology Analysis		2	8		24														34	5100
Sub-task 1: Verify FEMA Discharge Estimate		1			8														9	1350
Sub-task 2: Duplicate Effective Model		2	2		20														24	3600
Sub-task 3: Corrected Effective Model		1	2		16														19	2850
Sub-task 4: Proposed Conditions Model		1	2		16														19	2850
Sub-task 5: Bridge Profile		2	8		16														26	3900
Sub-task 6: Scour & Degradation		1	2		8			2											13	1950
Sub-task 7: Bank Protection		1	4		4														9	1350
Sub-task 8: Location Hydraulic Study		1	2		16														19	2850
Sub-task 9: Prepare Draft Report		2	2		24														28	4200
Sub-task 10: Prepare Final Hydraulic Report (FHR)		1	2		16														19	2850
TOTALS	-	23	42	-	204	20	-	2	-	-	-	-	-	-	-	-	-	-	291	42350

Classification	Rate/Hr.
Special Consultant	175.00
Project Manager	150.00
Bridge Engineer	150.00
Senior Engineer	150.00
Structural Design	150.00
Civil Engineer	150.00
Sanitary Engineer	150.00
Drafter/Technician	85.00
Geotech Engr	150.00
Eng. Geologist	150.00
Clerical	55.00
Average Rate:	145.53

Expenses	Units	Unit Cost	Billing Factor	Reimbursables	Consultant
Aerial Topographic Survey	1	4500	1.15		5175
Ground Control & Survey	1	8000	1.15		9200
Soil Testing	1	2000	1.15		2300
Surveyor		0	1.15		
Misc	1	150	1.00		150
BW - Size D		0.9	1.15		
Color - Size D		4.25	1.15		
Mylar - Size D	0	14	1.15		
Color Photocopies - Letter Size		0.39	1.15		
BW Photocopies - Letter Size		0.1	1.15		
Mail		2	1.15		
					$16,825.00

Grand Total = $59,175.00