Manhard CONSULTING LTD

Civil Engineers
Surveyors
Water Resources Engineers
Water & Wastewater Engineers
Construction Managers
Environmental Scientists
Landscape Architects
Planners

February 8, 2013

Mr. John Martini, PE
City of Sparks
Assistant Community Services Director
431 Prater Way
Sparks, NV 89431

RE: National Flood Insurance Program (NFIP)
Community Rating System (CRS) Program Services
City of Sparks, Nevada

Dear Mr. Martini:

Manhard Consulting, Ltd. (Manhard) has substantially completed the original Phase I - Evaluation of the City of Sparks' (City) current floodplain management program. As you may recall, the Scope of Work for the CRS Program Services was divided into four phases:

Phase I – Evaluation of Existing Program (Draft CRS Report Complete)
Phase II – Prepare Application of City's Preferred CRS Program
Phase III – CRS Program Implementation
Phase IV – MHMP Development (NOT NECESSARY PER PHASE ONE RESULTS)

Results and recommendations were provided to the City in the report entitled, "Draft NFIP CRS/CAV Evaluation Report", dated October 2012 (Draft CRS Report). Based on our review of the City's existing floodplain management program, the City is close to meeting the prerequisites to become a member of the CRS. To meet the prerequisites, the City needs to resolve the problems associated with the seven (7) non-compliant structures identified during the previous 2009 NFIP Community Assistance Program (CAP)/Community Assistance Visit (CAV), provided in Figure 1 on the following page.

A summary and time line of the work accomplished in Phase I, along with the reasoning and requirements for additional work to complete Phase I through Phase III is provided below:

- Phase I was authorized by the City on Monday, June 11, 2012.
- A Phase I kick-off meeting between City staff and Manhard staff was held on Tuesday, June 26, 2012.
- Manhard conducted phone calls on Thursday, June 28, 2012 with Kim Groenewold Davis (Nevada Floodplain Management Program), Cynthia McKenzie (FEMA Region IX

Mitigation Division – on her last day before retirement), and Dave Arkens (Nevada CRS Coordinator). Cynthia and Kim both acknowledged there is very little the City can actually do to resolve the 7 non-compliant structures by "typical measures", and both were aware of the complicating issues regarding the Truckee River Flood Management Authority's (TRFMA's) "Flood Project" and USACE. The plan established that day on the phone was for Manhard to meet with Cynthia's replacement, Michael Hornick (FEMA Region IX Mitigation Division), and develop a "game plan" for the City to obtain a "clean CAV". Once Mr. Hornick signs off on the City's CAV PLAN, then FEMA IX will give Dave Arkens the green light to start the CRS application process. That would be the starting point for Phase II (CRS Application) of Manhard's contract with the City.

Figure 1: Aerial view of the 7 non-compliant structures identified during previous 2009 CAV

- A meeting between City staff and Manhard staff was held on Friday, July 13, 2012 to collect/compile reports, FEMA correspondence, and data pertaining to the City's floodplain and stormwater management programs. City staff completed a CRS questionnaire provided by Manhard.

- Manhard staff met with Mr. Hornick (FEMA) in Oakland, California on Monday August 6, 2012 to confirm FEMA's position on the 7 non-compliant structures. Because Mr. Hornick had recently replaced Ms. Cynthia McKennzie, we wanted to ensure that he was aware of all previous CAV issues and discuss the unique CRS Program compliance complications for the City related to the future ever-evolving TRFMA Flood Project.

- Manhard conducted a field visit/survey at each of the 7 non-compliant structures on Friday, August 17, 2012 and evaluated alternative measures for flood mitigation and CRS Program compliance.

- Manhard completed a detailed analysis of the City's floodplain and stormwater management programs, and recommended "maximum extent practicable" solutions to mitigate the 7 non-compliant structures in the Draft CRS Report, submitted to the City on October 5, 2012.

- The Draft CRS Report was provided to, and discussed in-detail, with Mr. Hornick during a meeting in Fairfield, CA on October 23, 2012, as a preliminary FEMA review of Manhard's assessment of the 7 non-compliant structures, potential administrative/passive and minor structural retrofit flood mitigation alternatives, and conclusions/recommendations. In general, Mr. Hornick agreed with Manhard's recommendations and added some potential measures to consider as well. However, it became increasingly clear that Manhard needed to determine the potential impacts effectuated by the TRFMA Flood Project within the City limits, in addition to the 7 non-compliant structures. Mr. Hornick also offered to conduct a "Pre-CAV" field assessment in the upcoming weeks. The "Pre-CAV" field assessment/meeting was being arranged to take place during November 2012, however, it had to be postponed due to Hurricane Sandy emergency response activities by FEMA, and Mr. Hornick was enlisted to assist in an "all-hands-on-deck" effort.

- The "Pre-CAV" field assessment/meeting was finally conducted on Tuesday, January 22, 2013 at each of the 7 non-compliant structures, with Jeff House (Manhard), Richard Brookes (City of Sparks), and Michael Hornick (FEMA IX) in attendance. Manhard's Draft CRS Report recommendations were used as the basis of conversation/deliberation at each structure during the field assessment. Mr. Hornick was hesitant to sign-off 100% on Manhard's proposed passive/administrative and minor structural retrofit measures without understanding the aforementioned TRFMA Flood Project. Specifically, we discussed: (1) adding engineered flow-through venting at truck bay doors that sense the presence of water and open to allow water to enter and exit the structure at controlled elevations; (2) "what and when" regarding the TRFMA Flood Project - Mr. Hornick's main concerns are (a) the TRFMA Flood Project has been an ongoing moving target concept/design for many years and often has not met benefit-cost metrics required for Federal Interest/Cost-Sharing, and (b) USACE/local sponsors may not ever fund/build the Project, and even if it is built, (c) what Level-of-Service (LOS) will it provide to the 7 non-compliant structures and the City; (3) conducting hydrologic and hydraulic (H&H) analysis and modeling as the means to determine the TRFMA Flood Project's potential impacts/protection measures from best-case to worst-case scenarios of LOS for the many conceptual storm frequency designs considered over the years (e.g., Local Rate Plan (LRP) 100-year Design, Locally Preferred Plan (LPP) 117-year Design, and 50-year Design, etc.), and (4) the realistic construction schedule time line for the ever-evolving TRFMA Flood Project.

The proposed administrative/passive measures (i.e., Emergency Action Plans) and the minor structural retrofit measures (i.e., truck bay doors with retrofitted flow-through venting) are only sufficient for CRS Program compliance if the TRFMA Flood Project or a City CIP flood mitigation project reduces the flood hazard potential at each structure. It is yet to be determined what minimum LOS provided by any flood mitigation project (City or TRFMA) will be "sufficient" for FEMA to accept as maximum extent practicable mitigation for the 7 non-compliant structures. Understanding that eliminating flooding potential up to the 100-year storm event is the "standard" basis for CRS Program compliance, not knowing what LOS is being provided is not a recommended path to follow as the City attempts to enter the CRS Program. Will a 50-year storm get the floors wet at these 7 non-compliant structures? Since one of the primary TRFMA Flood Project components is a levee/floodwall system along the Truckee River through Sparks, the operation of the levee/floodwall (e.g., gravity outlets, sluice/flap-gates, and hydraulic pumps) must be evaluated and optimized for maximum flood protection. What happens if certain levee outlets or pumps become non-functional and local stormwater runoff on the north (interior) side

of the levee/floodwall becomes "trapped" without adequate conveyance means to discharge to the Truckee River? The "trapped" stormwater (or interior drainage) would accumulate and rise, as more water enters the low-lying area from the interior side of the levee/floodwall. Consequently, more structures could be at risk of flooding, and therefore, non-compliant from a CRS Program standpoint. The primary objectives of the H&H analysis and modeling are to: (1) determine the LOS provided to the City by the TRFMA Flood Project; and (2) identify any deficiencies and corresponding corrective measures. The LOS must be evaluated for the low-lying areas on both sides of Interstate-80 within the City to ensure all flood hazards are identified for the aforementioned TRFMA Flood Project design storm frequencies, and also the types of storms (i.e., frontal, cloudburst, rain-on-snow, etc.) should be evaluated. Accordingly, it is vital for FEMA to understand and accept the potential flood hazards within the City of Sparks, as a whole (north-south-east-west), to achieve CRS Program compliance and qualification.

Manhard's proposed H&H analysis and modeling will provide the City and FEMA with a clear picture of Flood Project's impact and LOS "range" to manage the risks associated with the various alternatives for flood protection. The proposed H&H analysis and modeling are "additional services" to Manhard's original contract and will be included in the Phase I Final CRS Report. Upon FEMA approval of the Final CRS Report that includes an approved set of compliance measures for the 7 non-compliant structures (CAV PLAN), Phase I will be 100% complete. The City can then begin Phase II of this contract that includes developing the CRS Program Application in coordination with Dave Arkens (Nevada CRS Coordinator). Exhibit A - Scope of Services includes the additional H&H analysis and modeling services required for Phase I, Phase II (CRS Application), and Phase III (CRS Program Implementation). NOTE: It was determined during Phase I that Phase IV (Multi-Hazard Mitigation Plan (MHMP) Development) is not necessary, as discussed in the Draft CRS Report.

Fee Estimate – Phase I Additional Services, Phase II, and Phase III

Manhard proposes to perform the work as described in the attached Exhibit A – Scope of Services, on a Time and Materials Not-to-Exceed Without Written Authorization Basis for Three Hundred Seventy Five Thousand Dollars **($375,000.00)**, based on Exhibit B - Manhard's Schedule of Time and Materials Rates for 2013.

Schedule

The Project Schedule to perform the work contained in Exhibit A is as follows:

Phase I – Evaluation of Existing Program and Additional H&H Analysis and Modeling: 9 Months
Phase II – Prepare Application of City's Preferred CRS Program: 9 Months
Phase III – CRS Program Implementation Assistance: 12 Months

Total Project Time = 30 Months

Terms and Conditions

The work described in Exhibit A will be conducted in accordance to the City's standard contract Terms & Conditions, which are hereby acknowledged, incorporated, and made a part of this Proposal. If this proposal is acceptable, please provide an executed Purchase Order, and Manhard will begin work immediately.

We appreciate the opportunity to continue serving the City of Sparks. Should you have any questions, please do not hesitate to contact me at 404-569-1452, or Todd Cochran, PE, CFM at 404-569-1695, or Ms. Annje Dodd, PhD, PE at 707-845-1340.

Sincerely,
MANHARD CONSULTING, LTD.

Jeff House
National Director of Water Resources
Vice-President

Attachments
Exhibit A – Scope of Services
Exhibit B – Manhard's Schedule of Time and Materials Rates for 2013

EXHIBIT A - SCOPE OF SERVICES

BACKGROUND

Manhard Consulting, Ltd. (Manhard) originally provided a proposal to the City of Sparks (City) entitled, "National Flood Insurance Program (NFIP), Community Rating System (CRS) Program Services", dated May 29, 2012, which included a Scope of Work to conduct an assessment of the City's current floodplain management program, including: public information, mapping and regulations, flood damage reduction, and flood preparedness. The original Scope of Work for the NFIP/CRS Program Services proposal was divided into four phases, however, ONLY Phase I was approved for execution, with the remaining Phases II, III, and IV to be potentially executed in the future, depending on the results of Phase I. The Phases were proposed as follows:

Phase I – Evaluation of Existing Program (Draft CRS Report Complete)
Phase II – Prepare Application of City's Preferred CRS Program
Phase III – CRS Program Implementation
Phase IV – MHMP Development (Not Necessary Per Phase I Results)

The Phase I - Evaluation of Existing Program was the necessary first step and part of the overall required services associated with establishing a CRS Program for the City. The tasks involved to complete Phase I were (1) Evaluate the City's existing floodplain management program to identify whether the minimum requirements to receive incentives under the CRS Program are met, (2) Review and provide recommendations to address the seven (7) non-compliant structures identified during the 2009 NFIP Community Assistance Program (CAP)/Community Assistance Visit (CAV), and (3) Review the Washoe County's Multi-Hazard Mitigation Plan (MHMP) with respect to hazard mitigation funding eligibility for projects within the City, and provide recommendations to update the MHMP, develop an individual MHMP for the City, or neither (i.e., no revisions required).

Manhard has substantially completed Phase I. Results and recommendations were provided to the City in the report entitled, "Draft NFIP CRS/CAV Evaluation Report", dated October 2012 (Draft CRS Report). Based on our review of the City's existing floodplain management program, the City is close to meeting the prerequisites to become a member of the CRS. To meet the prerequisites, the City needs to resolve the problems associated with the 7 non-compliant structures identified during the previous 2009 CAV. The Truckee River Flood Management Authority's (TRFMA's) Flood Project, if constructed, will provide benefits in the industrial area of the City where the 7 non-compliant buildings are located. The extent of flood protection that will be provided by the TRFMA Flood Project is unknown. This is because the TRFMA Flood Project has been an ongoing moving target concept/design for many years and often has not met benefit-cost metrics required for Federal Interest/Cost-Sharing. Furthermore, USACE/local sponsors may not ever fund/build the Project, and even if it is built, what Level-of-Service (LOS) will it provide to the 7 non-compliant structures and the City?

The proposed administrative/passive measures (i.e., Emergency Action Plans) and the minor structural retrofit measures (i.e., truck bay doors with retrofitted flow-through venting) are only sufficient for CRS Program compliance if the TRFMA Flood Project or a City CIP flood mitigation project reduces the flood hazard potential at each structure. It is yet to be determined what minimum LOS provided by any flood mitigation project (City or TRFMA) will be "sufficient" for FEMA to accept as "maximum extent practicable" mitigation for the 7 non-compliant structures.

Understanding that eliminating flooding potential up to the 100-year storm event is the "standard" basis for CRS Program compliance, not knowing what LOS is being provided is not a recommended path to follow as the City attempts to enter the CRS Program. Will a 50-year storm get the floors wet at these 7 non-compliant structures? Since one of the primary TRFMA Flood Project components is a levee/floodwall system along the Truckee River through Sparks, the operation of the levee/floodwall (e.g., gravity outlets, sluice/flap-gates, and hydraulic pumps) must be evaluated and optimized for maximum flood protection. What happens if certain levee outlets or pumps become non-functional and local stormwater runoff on the north (interior) side of the levee/floodwall becomes "trapped" without adequate conveyance means to discharge to the Truckee River? The "trapped" stormwater (or interior drainage) would accumulate and rise, as more water enters the low-lying area from the interior side of the levee/floodwall. Consequently, more structures could be at risk of flooding, and therefore, non-compliant from a CRS Program standpoint. It is for these reasons that H&H analysis and modeling are being proposed to galvanize Manhard's Phase I Evaluation and flood mitigation measures (CAV PLAN). The primary objectives of the H&H analysis and modeling are to: (1) determine the LOS provided to the City by the TRFMA Flood Project; and (2) identify any deficiencies and corresponding corrective measures. The LOS must be evaluated for the low-lying areas on both sides of Interstate-80 within the City to ensure all flood hazards are identified for the aforementioned TRFMA Flood Project design storm frequencies, and also the types of storms (i.e., frontal, cloudburst, rain-on-snow, etc.) should be evaluated. Accordingly, it is vital for FEMA to understand and accept the potential flood hazards within the City of Sparks, as a whole (north-south-east-west), to achieve CRS Program compliance and qualification. Manhard's proposed CRS H&H analysis and modeling will provide the City and FEMA with a clear picture of Flood Project's impact and LOS "range" to manage the risks associated with the various alternatives for flood protection.

Phase I – Evaluation of Existing Program and Additional H&H Analysis and Modeling

The proposed CRS H&H analysis and modeling are "additional services" to Manhard's original contract. A description of the work required to complete Phases I, II, and III is provided below. It should be noted that the City already has a substantial start on the base H&H analysis and modeling required for Phase I (e.g., the City's Stormwater Master Plan SWMM5 model), and Manhard has conducted several modeling efforts in Sparks, including: (a) SWMM5 in the lower portion of the North Truckee Drain (NTD) watershed while preparing the City of Reno Stormwater Master Plan in 2008, (b) HEC-HMS and SWMM5 for the Sun Valley Dam Pilot Study, (c) numerous CLOMRs/LOMRs and land development H&H analyses in Eagle Canyon, Brookstone, Pioneer Meadows, D'Andrea, and Sonoma Highlands, and most importantly, (d) the ongoing TRFMA Regional Hydrologic GSSHA Model, in which a number of key components of the TRFMA model can be directly re-used in this CRS H&H analysis and modeling effort, and more importantly, reducing the overall H&H analysis and modeling costs by approximately 40% – specifically:

a) **DEM** – All digital terrain and surface construction (detailed break lines/points) and surface inconsistency resolution (digital dam removal issues) have been completed, resulting in a clean, accurate, and "polished" DEM.
b) **Land Use** – Manhard has developed existing 2010, 2008, 2005, and 1997 land use layers.
c) **Impervious Surfaces** – Manhard has performed a detailed digitization of impervious areas. Not good enough for a stormwater utility, but good enough to get a good estimate of percent impervious for each sub-basin within a few percentage points.

d) **Soils** – Manhard has processed the SSURGO soil textures. Manhard also has a soils-land use intersection layer that can be used from the GSSHA model.
e) **Channels** – Manhard has all channels with a drainage area over 50-acres digitized and have estimated the channel sizes, and field verified a few with GPS. Some channel geometries are educated guesses, based on available GIS-based topographic mapping. Where more detailed topography was available, cross-sections have been cut from the terrain. This channel layer can be used to "burn-in" streams when ArcHydro is used to delineate the sub-basins for SWMM5.
f) **Detention** – Manhard has compiled most-to-all of the data needed for detention stage-storage-discharge relationships throughout Sparks.
g) **Gage-Adjusted Radar Rainfall (GARR)** – Manhard has already compiled NOAA Level III NEXRAD data and processed/gage-adjusted the NYE 2005 storm event for model calibration, and the NYE 1997 and January 2008 storm events for model validation.

Manhard will compile previous models/data and develop a new updated SWMM5 model for the "Upper Sparks" watershed areas (basically, above McCarran Boulevard), and develop a new FLO-2D PRO model in the "Lower Sparks" watershed areas (basically, below McCarran Boulevard) to serve as the "surrogate" model in which all other runoff hydrographs and relevant modeling nodes/links, and other elements will be input to create one model platform to serve as the basis for all detailed computations and simulations, including: interior/exterior hydrograph comparison analysis; gravity/pumping outlet optimization and levee/floodwall operations analysis; level-of-service analysis; alternatives and benefit-cost analysis (BCA); and recommendations and corrective measures. The 2-Dimensional flow calculation abilities of FLO-2D PRO are perfectly suited to simultaneously model shallow sheet flow, open channel/conduit flow, and concentrated flow through hydraulic structures, such as the City's stormwater infrastructure pipe network, sluice/flap gates, and the proposed gravity/pumping outlets at the levee/floodwall. USACE has recently developed a detailed FLO-2D model on behalf of TRFMA for the Flood Project levee/floodwall system and surrounding area through Sparks. Manhard will "absorb" USACE's FLO-2D model's pertinent features into the new surrogate FLO-2D PRO model. This model will become the City's comprehensive "living" model which can be used for many purposes in land planning, stormwater master planning, system capacity analysis and design, stormwater management design, flood mitigation CIP design, local/regional conveyance and detention design, and early flood warning analysis - to name a few.

Manhard's deliverables for Phase I will be three (3) distinct technical reports:

- **Final NFIP CRS/CAV Evaluation Report**
  a. To be submitted to FEMA for CAV PLAN approval, and serve as the basis of Phases II and III.
- **H&H Analysis and Modeling Report**
  a. Includes 2 (Upper & Lower Sparks) comprehensive "living" H&H models.
- **Levee/Floodwall Operations and Interior Drainage Optimization Report**
  a. Includes LOS Analysis, Alternatives Analysis, and Benefit-Cost Analysis.

These technical reports will include all supporting documentation and digital files, including GIS geodatabases, shapefiles, spreadsheets, computations, H&H analysis and modeling, QA/QC, mapping/figures, and reporting found in each report. Manhard will provide monthly status reports throughout Phase I (9 Months).

Phase II – Prepare Application of the City's Preferred CRS Program

Manhard will review the categories for which NFIP provides CRS points, and in conjunction with the City, determine any additional points for which the City could qualify and attain the desired CRS score/classification, based on long-term program and funding commitments. Manhard will coordinate with Nevada's State CRS Coordinator, Dave Arkens, and prepare the CRS application on behalf of the City to join the NFIP CRS Program. FEMA does not charge a fee to communities for participating in the CRS Program.

Manhard's deliverables will be a CRS Application to submit to NFIP, and a Final CRS Implementation Report with supporting documentation of the program to follow and maintain the City's preferred CRS rating. Manhard will provide monthly status reports throughout Phase II (9 Months).

Phase III – CRS Program Implementation Assistance

Manhard will work with City staff to implement the CRS program identified during Phases I and II, including the CRS application/audit coordination, NFIP's CAP/CAV coordination, and final program management of the recommended and FEMA-accepted CAV Punchlist Alternatives (CAV PLAN).

Manhard will provide monthly status reports of CRS Program Implementation throughout Phase III (12 months).

Cost Estimate

Manhard will complete the work outlined above on a Time and Materials Not-to-Exceed Without Written Authorization Basis for Three Hundred Seventy Five Thousand Dollars **($375,000.00).** This fee is based on Exhibit B, Manhard's Schedule of Time and Materials Rates for 2013.

A summary of the estimated fees per Phase is provided below.

Phase	Description	Estimate
I	Evaluation of Existing Program and Additional H&H Analysis and Modeling	$200,000
II	Prepare Application of the City's Preferred CRS Program	$100,000
III	CRS Program Implementation Assistance	$ 75,000
	Total	**$ 375,000**

END OF EXHIBIT A – SCOPE OF SERVICES

EXHIBIT B - SCHEDULE OF TIME AND MATERIAL RATES FOR 2013

CATEGORY	CURRENT HOURLY RATES
President/Executive Vice-President	$175.00
Vice President	$170.00 - $195.00
Area Manager/Director	$120.00 - $175.00
Senior Project Manager	$130.00 - $168.00
Project Manager	$100.00 - $135.00
Project Engineer	$82.00 - $103.00
Staff Engineer	$78.00 - $88.00
Senior Planner	$105.00 - $140.00
Land Planner	$75.00 - $92.00
Landscape Designer/Architect	$75.00 - $85.00
Environmental Scientist	$70.00 - $100.00
Operations Manager	$105.00
Operator	$55.00 - $72.00
Project Surveyor	$105.00
Staff Surveyor	$75.00 - $89.00
Construction Manager/Coordinator	$100.00 - $120.00
Survey/Construction Technician	$60.00 - $80.00
GPS Base Station w/Two Receivers	$30.00
Geodimeter	$20.00
Engineering CADD Technician	$75.00 - $90.00
CADD Work Station	$42.00
1-Person Crew	$125.00
2-Person Crew	$163.00
3-Person Crew	$216.00
Administrative Assistant	$48.00 - $62.00
Expert Testimony & Depositions	$250.00

	CURRENT SF RATE
Printing – Paper	$0.15
Printing – Vellum	$1.75
Printing – Mylar, Film, Clear Acetate	$2.50