NOTICE TO ARCHITECTS, ENGINEERS, AND PLANNERS

NOTICE IS HEREBY GIVEN, that the City of Oklahoma City has a project that requires the services of a consulting firm.

In order to be considered, the Consultant must comply with the Resolution establishing procedure for "Selection of Architects, Engineers, and Planners" adopted by the City Council on November 18, 1986, a copy of which may be obtained at http://okc.gov/departments/public-works/engineer-architect-resources/notice-to-a-e from the office of the Public Works Department Director.

Project Title: **DC-0311, Drainage Improvements, Sunnymeade Place & Croydon Ct in the vicinity of W. Wilshire Blvd & W. Britton Road off Sunnymeade Place**

Scope of Work: Scope of Work: Conduct a site survey including existing utilities, easements/rights-of-way. Perform additional hydrological and hydraulic analysis of the existing drainage system if needed. Prepare drainage calculations, maps and exhibits as needed to illustrate findings. Provide alternatives/recommendations for lessening/alleviating the flooding conditions. Include a variety of erosion control products that may be best suited for the site conditions/channel hydraulics. Additional engineering reports are attached to the advertisement on the website.

Fixed Limit of Construction: $4,368,811

A question and answer session will be held from 2:00 to 3:00 pm on January 17, 2020 at 420 W. Main Street, on the 10th Floor Conference Room. Please address your questions at the meeting.

As a part of your Letter of Interest, provide your understanding of the project and your expertise and experience on similar projects. **Please provide a contact name and email address in your letter of interest.**

Refer to the basic contract located on http://okc.gov/departments/public-works/engineer-architect-resources/notice-to-a-e . All contracts with the City or its related Trusts use this contract. Please review the contract to ensure insurance and indemnity requirements will be met.

Please include a 254 Form with your Letter of Interest.

Time Schedule for the above project: The Preliminary Report is required within One Hundred Twenty (120) days and Final Plans and Specifications in One Hundred Twenty (120) days of the issuance of the Work Order. Last date for submitting Letter of Interest **(four copies of letter and all attachments and an electronic copy, provided on a flash drive)** to the Public Works Department Director, 420 W. Main Street, Suite 700, Oklahoma City, OK 73102: prior to 5:00 p.m. January 24, 2020. Emailed submittals are not being accepted at this time.

Eric J. Wenger, P.E., Director
Public Works/City Engineer

NICHOLS HILLS SUBURBAN TRACTS TO NICHOLS HILLS, OKLAHOMA SUBDIVISION DRAINAGE EVALUATION AND IMPROVEMENTS

SE of Britton Road and N. May Avenue
City of Oklahoma City, Oklahoma

OKC # DC-0250
HCA 091026

PRELIMINARY DESIGN REPORT

Prepared By:

Horan, Carroll & Associates, Inc.
Civil Engineering & Surveying

Prepared for:

The City of
OKLAHOMA CITY

January 24, 2012

THE CITY OF OKLAHOMA CITY

APPROVAL SHEET

DC-0250

Nichols Hills Suburban Tracts Subdivision
Drainage Evaluation and Improvements

SE of Britton Road and N. May Avenue
City of Oklahoma City, Oklahoma

Prepared by:

HORAN, CARROLL & ASSOCIATES, INC.
2828 NW 57TH STREET, SUITE 224
OKLAHOMA CITY, OKLAHOMA 73112
PHONE: (405) 840-3900 FAX: (405) 840-3902
CA NO. 4741, RENEWAL DATE 06/30/2013

Gary M. Horan, P.E. # 19511 — Date: 2/1/2012

Recommended for Approval

Eric Wenger, P.E., City Engineer — Date: 6/28/12

APPROVED by the Trustees and signed by the Chairman of the Oklahoma City Municipal Facilities Authority this _____ day of _____, 2012.

_____
Chairman

ATTEST:

_____
Secretary

Table of Contents

I. INTRODUCTION

This report contains general information about the history, scope of work, design parameters, engineering recommendations, and anticipated cost associated with constructing drainage improvements and new street pavement in the Nichols Hills Suburban Tracts subdivision located southeast of Britton Road and May Avenue in Oklahoma City, Oklahoma.

II. HISTORY

There have been citizens within the subdivision complaining of flooding streets, particularly at the intersection of Sunnymeade Place and Croydon Court where the complaints indicate the street could not be used because of the depth of water on the street was interrupting travel. Furthermore, a resident located at 2606 Drakestone Avenue, which is located about 200 feet west of Greystone Avenue on the north side of Drakestone Avenue, has complained about the water level in the drainage ditch next to the house. A City of Oklahoma City Public Works Department representative reviewed the site and believed further analysis would be required. The Public Works Department provided some conceptual studies and determined improvements of the storm sewer system may be needed to reduce flooding. A detailed drainage study of the existing drainage system was recommended to help the City decide about what to do about the complaints. The City appropriated funds to have a consultant perform the preliminary engineering drainage analysis. The Oklahoma City Municipal Facilities Authority provided funding for engineering related to the drainage study. That study is complete and the storm sewer drainage report has been submitted to the City of Oklahoma City.

III. CONCEPT OF PROJECT

In general, the goal of the project was to determine if the existing storm sewer system was adequate to carry the ten-year storm event runoff and if not, determine what improvements may be necessary to carry that event. Furthermore, clarify if there is adequate slope from the downstream structures to construct new curb and gutter streets within the subdivision. In addition, provide estimated construction costs for those drainage and street improvements. To help accomplish this goal, engineering analysis and estimating was needed. To complete those tasks, the drainage analysis and conceptual construction plans to build the estimated improvements were prepared by Horan, Carroll and Associates, Inc.

IV. PROJECT DESCRIPTION AND SCOPE

The Nichols Hills Suburban Tracts subdivision is located southeast of Britton Road and May Avenue in Oklahoma City, Oklahoma. Construction within the subdivision appears to be in 1930's and 19040's. The streets are paved with asphalt and are typically 22 to 24 feet wide with ditches. The majority of the storm runoff within the subdivision is collected by the roadside ditches and then transported to storm sewer inlets and pipe. There are approximately 47 inlets within the subdivision. This storm sewer system has about 77 other inlets connected and drains into a double cell reinforced concrete box located at Wellington Avenue and Downing Street, which drains into a concrete lined channel at Downing Street and Village Drive.

To accomplish the goals of reducing street flooding and provided a safer road for the public, drainage improvements include adding inlet capacity and a large drainage system not only within the subdivision, but downstream as well are recommended. The storm sewer drainage report does include information used to evaluate the existing storm sewer system and information used to help determine preliminary recommendations to help reduce flooding. The project conceptual plans provided with the storm sewer drainage report show the estimated improvements.

V. PROJECT AGREEMENTS AND PERMITS

In general, a 404 Permit is required when constructing within areas that have a blue line shown on a United States Geological Survey (USGS) 7.5 minute topographic quadrangle map. These areas are considered to be protected under Section 404 of the Clean Waters Act. There are no blue lines shown on the USGS map within the estimated improvements. Therefore, HCA believes the City of Oklahoma City will not be required to obtain a 404 Permit through the US Army Corps of Engineers. Furthermore, no construction improvements or earthwork filling are anticipated to be within a FEMA designated flood zone area. The USGS map and FEMA map are included in the appendices of this report.

VI. UTILITIES

If the estimated drainage improvements are constructed, there appears to be several utilities that may need to be relocated, such as electric, gas, and City water. There also appear to be several sanitary sewer lines that run adjacent and across the storm sewer. The depth of the sanitary sewer was not surveyed, but the existing storm sewer appears to go over the sanitary sewer and therefore, it is anticipated

that the estimated storm sewer improvements will not be in conflict. Therefore, the proposed storm sewer should be able to be constructed without affecting the sanitary sewer. This information is based on the observations during the field survey, City GIS maps and/or atlas maps.

The cost of relocating utilities is usually the responsibility of the utility owner, unless the utility is already located in a private utility easement. The extent of any relocations will not become known until a full site survey has been done, plan-in-hand plans are complete, and subsequent utility relocation meetings are held.

The utility relocation meeting should be held after the plan-in-hand meeting. The City of Oklahoma City along with HCA should coordinate this meeting. This meeting will address the location of existing utilities, areas for relocations, existing easements, and right-of-way requirements. Information that is more accurate will be available after this meeting. Meeting minutes should be taken at this meeting and provided to the attendees.

VII. RIGHT-OF-WAY

The scope of the project did not include surveying the entire site and establishing existing right-of-way and easements. However, based on the City's GIS information, the existing right-of-way within the project limits will likely not be wide enough to construct the estimated drainage improvements. There may be the need to obtain easements where the estimated storm sewer will be located between lots and a more detailed study will be need along Downing Street. The conceptual plans show the existing right-of-way based on the GIS information.

The drainage improvements will help the citizens within the subdivision. For this reason, it is anticipated that most of the proposed right-of-way will be dedicated to help this project proceed forward. To help expedite these acquisitions, HCA can provide the City of Oklahoma City with legal descriptions and parcel maps of each parcel needed.

VIII. TECHNICAL DATA

The technical data to be prepared for the project includes:

- Construction plans for the drainage improvements and street resurfacing.
- Storm sewer report showing the drainage calculations for determining the storm water runoff as well as how the drainage structures were sized.

- Contract documents for bidding the project.
- Right-of-Way Documents and Legal Descriptions.

IX. CONCLUSIONS AND RECOMMENDATIONS

The drainage study indicates the complaints of street flooding within the Nichols Hills Suburban Tracts subdivision are reasonable. It appears from the platting dates the drainage system within the subdivision was constructed in the 1930's and 1940's. The current streets are asphalt with roadside ditches and not the typical curb and gutter used for subdivisions in urban areas. Therefore, the drainage study along with the current street drainage indicate this drainage system does not meet current City ordinances.

The runoff within the subdivision that is collected by storm sewers within the subdivision continues to a double cell reinforced concrete box that is located underneath Downing Street. The size of this box would have to be substantially increased to carry the storm runoff from a 50-year storm event. The expense to bring the drainage system to current City ordinances will not only include substantial cost for constructing the storm sewer, but also might include the relocation of residences along Downing Street. If this box is designed to carry the 50-year storm event, then it is recommended that additional analysis be done to determine the extent of the improvements.

The determination of the 100-year flood plain was not part of the scope of this project. The drainage study and conceptual construction plans prepared as part of this project include sizing of storm sewer for the 10-year storm event. These estimated improvements will reduce street flooding and improve drainage within the subdivision. These estimated drainage improvements do not significantly change the existing drainage patterns or create any more risk of flooding to any existing upstream improvements.

There were two sets of conceptual construction plans submitted as part of this project. One is titled "CONCEPTUAL PLANS WITH DITCHES" and shows a layout of what drainage structures would be needed to carry the 10-year storm event. The other set is titled "CONCEPTUAL PLANS WITH CURB AND GUTTER" and shows the above improvements with curb and gutter streets. These plans show the improvements recommended by HCA to meet the objectives provided by the City of Oklahoma City Public Works Department. HCA recommends these preliminary designs to the City of Oklahoma City.

X. COST ESTIMATES

The total cost of the project will not be known until the design is complete and the improvements bid. However, based on the conceptual plans and available information, we estimate the current construction cost for constructing the estimated drainage improvements as currently scoped at $10,800,000. Furthermore, to replace the streets within the subdivision with new asphalt paving along with curb and gutter is estimated to be an additional $1,200,000. These costs do not include funding for any right-of-way acquisitions, utility relocations, engineering, surveying, construction management, and materials testing. Detailed cost sheets are provided in the appendix and can be broken down into the following sections.

Section One: Construction of Structure 1 to Structure 8 or the reinforced concrete box from the open concrete channel located at the intersection of Downing Street and Village Drive to the intersection of Sunneymeade Place and Croydon Court. The estimated costs are:

- $4,300,000 drainage structures
- $140,000 street repair and pavement

There are approximately forty houses that face Downing Street. It may be cost affective to perform a study to determine the cost of purchasing and removing the house along Downing Street to help reveal if it is less expensive to build drainage channel instead of the box structure.

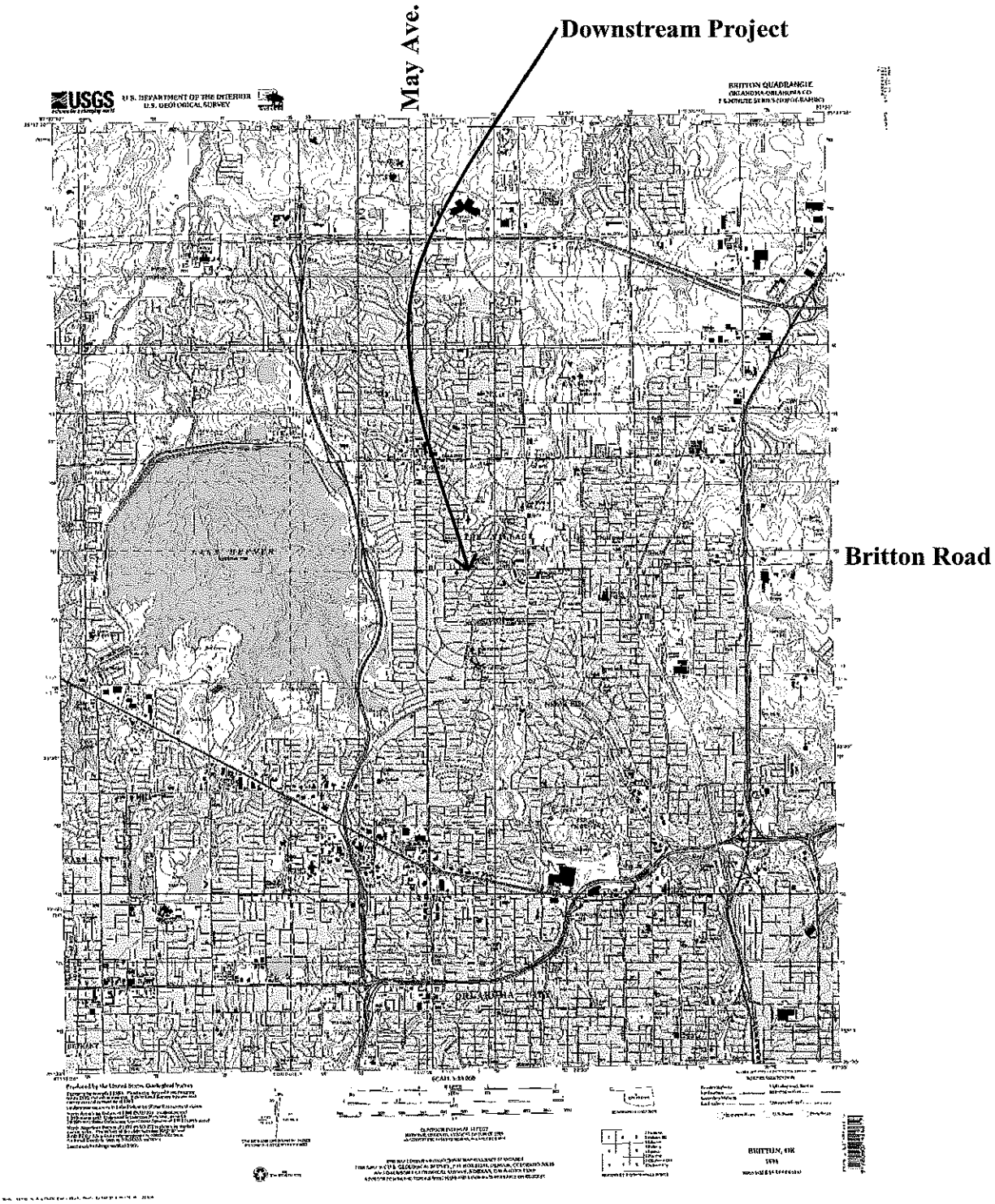
Section Two: Construction from Structure 8 to Structure 28 and from Structure 91 to Structure 95. This is the section of reinforced concrete box from the intersection of Sunneymeade Place and Croydon Court to the intersection of Drakestone Avenue and Guilford Lane and then to the intersection of Drakestone Avenue to Greystone Avenue. The estimated costs are:

- $5,000,000 drainage structures
- $450,000 street repair and pavement

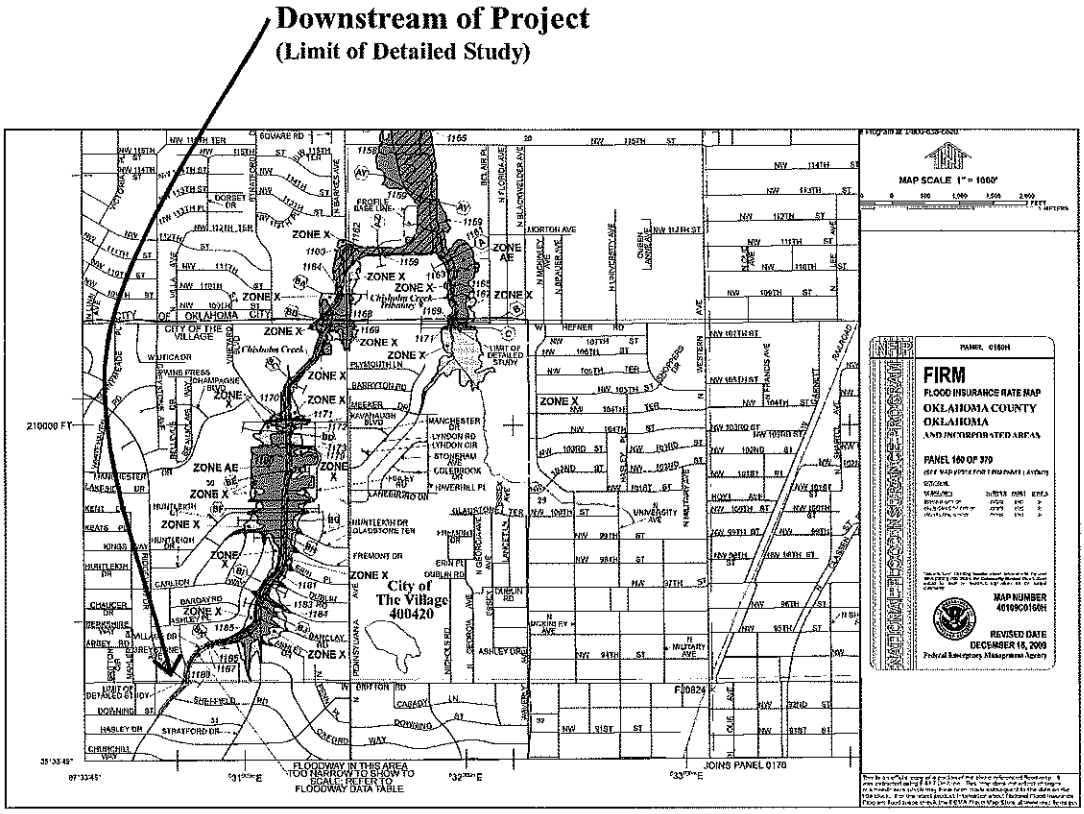
Section Three: Construction of the upstream structures from the above section that are along Drakestone Avenue, Guilford Lane, Dorchester Drive, and Elmhurst Avenue. The estimated costs are:

- $840,000 drainage structures
- $100,000 street repair and pavement

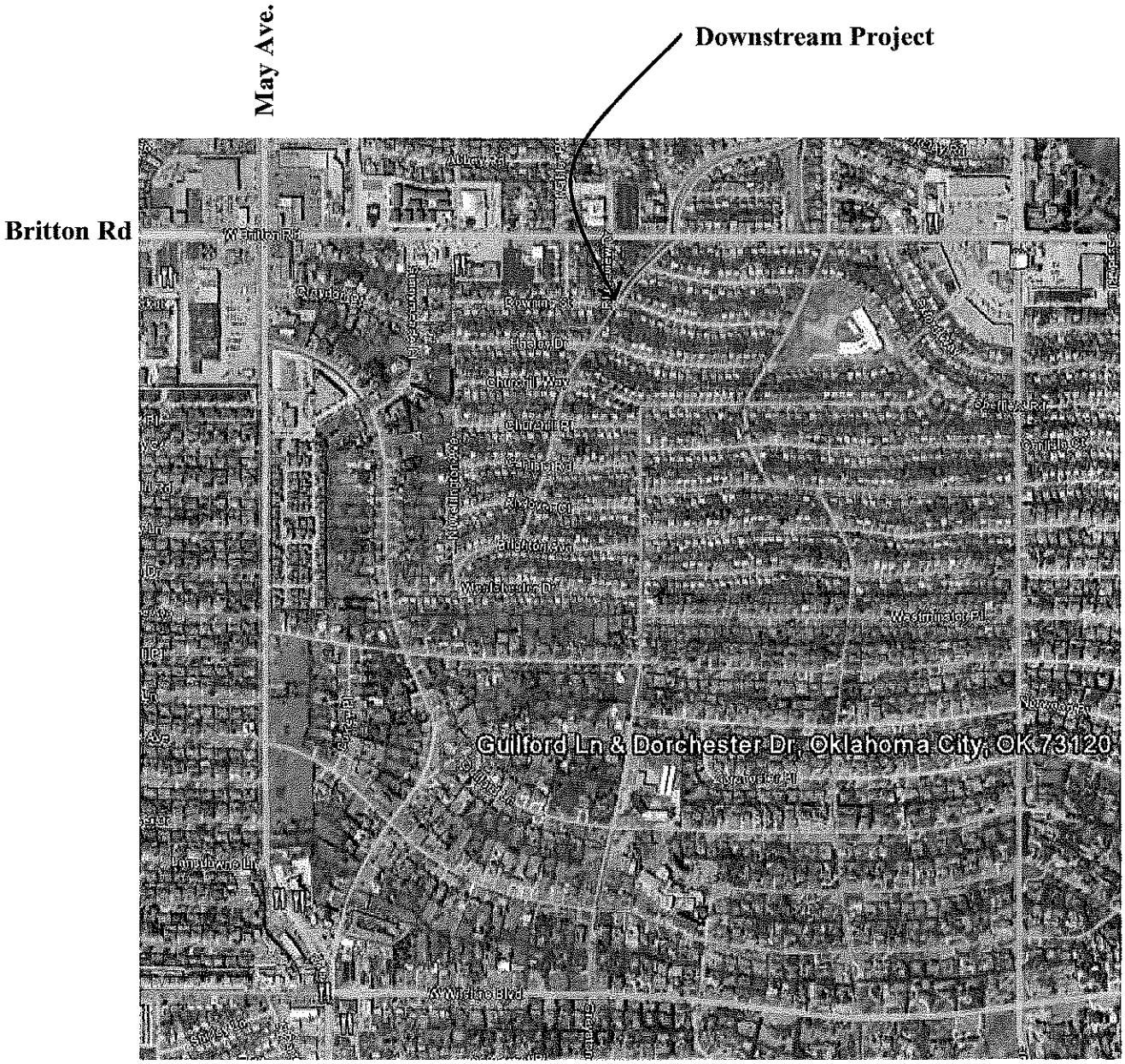
APPENDIX A: QUAD MAP



APPENDIX B: FEMA MAP



APPENDIX C: AERIAL MAP



APPENDIX D:

ESTIMATES OF CONSTRUCTION COST

(see next page)

CITY OF OKLAHOMA CITY

NICHOLS HILLS SUBURBAN TRACTS SUBDIVISION - SE OF MAY AND BRITTON

PRELIMINARY STORM SEWER (within subdivision limits and downstream)

ENGINEER'S CONCEPTUAL ESTIMATE

DC-0250

Section ID	Junction ID	Junction Type	# MH	# Inlets	Pipe ID	Pipe Len (ft)	Pipe Dim (in)	Conc. per Ft. (c.y.)	Reinf. per Ft. (Lb)	Cost per c.y of Conc	Cost per Lb Steel	Cost per Ft.	Cost of Inlet/MH	Cost of Pipe	Removal Cost	Combined Cost
	1	MH	1		1a Pipe	1215	48.00 x 500.00	5.04	912.8	$ 385.00	$ 0.85	$ 2,716.28	$ 1,000.00	$ 3,300,280.20	$ 243,000.00	$ 3,544,280.20
	2	CICI		1	2 Pipe	10	24					55	$ 2,500.00	$ 550.00	$ 250.00	$ 3,300.00
	3	CICI		1	3 Pipe	10	24					55	$ 2,500.00	$ 550.00	$ 250.00	$ 3,300.00
	4	MH	1		4 Pipe	30.09	48.00 x 500.00	5.04	912.8	$ 385.00	$ 0.85	$ 2,716.28	$ 1,000.00	$ 81,732.87	$ 752.25	$ 83,485.12
One	5	AI		1	5 Pipe	143.99	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 224,876.38	$ 3,599.75	$ 230,976.13
	6	AI		1	6 Pipe	220.63	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 344,568.90	$ 5,515.75	$ 352,584.65
	7	PIPE			7 Pipe	10	18					50	$ -	$ 500.00	$ 250.00	$ 750.00
	8	AI		1	8 Pipe	41.07	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 64,141.07	$ 1,026.75	$ 67,667.82
	9	PIPE			9 Pipe	10	24					55	$ -	$ 550.00	$ 250.00	$ 800.00
															SUBTOTAL =	**$ 4,287,143.92**
	10	AI		1	10 Pipe	177.34	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 276,960.75	$ 4,433.50	$ 283,894.25
	11	AI		1	11 Pipe	224.39	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 350,441.08	$ 5,609.75	$ 358,550.83
	12	MH	1		12 Pipe	252.85	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 1,000.00	$ 394,888.49	$ 6,321.25	$ 402,209.74
	13	AI		1	13 Pipe	10	18					50	$ 2,500.00	$ 500.00	$ 250.00	$ 3,250.00
	14	AI		1	14 Pipe	103.49	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 161,625.51	$ 2,587.25	$ 166,712.76
	112	MH	1		112 Pipe	118.73	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 1,000.00	$ 185,426.58	$ 2,968.25	$ 189,394.83
	15	MH	1		15 Pipe	11.4	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 15,482.80	$ 285.00	$ 16,767.80
	16	AI		1	16 Pipe	127.99	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 173,828.34	$ 3,199.75	$ 179,528.09
	17	AI		1	17 Pipe	12	18					50	$ 2,500.00	$ 600.00	$ 300.00	$ 3,400.00
	18	AI		1	18 Pipe	541	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 734,753.74	$ 13,525.00	$ 750,778.74
	19	MH	1		19 Pipe	312.76	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 424,771.87	$ 7,819.00	$ 433,590.87
	20	MH	1		20 Pipe	300.86	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 408,610.00	$ 7,521.50	$ 417,131.50
TWO	21	AI		1	21 Pipe	10.5	18					50	$ 2,500.00	$ 525.00	$ 262.50	$ 3,287.50
	22	AI		1	22 Pipe	50.25	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 68,246.54	$ 1,256.25	$ 72,002.79
	23	MH	1		23 Pipe	250.47	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 340,173.33	$ 6,261.75	$ 347,435.08
	24	PIPE			24 Pipe	10	24					55	$ -	$ 550.00	$ 250.00	$ 800.00
	25	AI		1	25 Pipe	49.47	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 67,187.19	$ 1,236.75	$ 70,923.94
	26	MH	1		26 Pipe	143.9	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 195,436.35	$ 3,597.50	$ 200,033.85
	27	AI		1	27 Pipe	10	18					50	$ 2,500.00	$ 500.00	$ 250.00	$ 3,250.00
	28	AI		1	28 Pipe	46.82	48.00 x 192.00	1.98	291.6	$ 385.00	$ 0.85	$ 1,010.16	$ 2,500.00	$ 47,295.69	$ 1,170.50	$ 50,966.19
	91	AI		1	91 Pipe	109.94	36.00 x 120.00	1.16	214.1	$ 385.00	$ 0.85	$ 628.59	$ 2,500.00	$ 69,106.63	$ 2,748.50	$ 74,355.13
	92	AI		1	92 Pipe	64.92	36.00 x 120.00	1.16	214.1	$ 385.00	$ 0.85	$ 628.59	$ 2,500.00	$ 40,807.74	$ 1,623.00	$ 44,930.74
	93	AI		1	93 Pipe	1256.49	36.00 x 120.00	1.16	214.1	$ 385.00	$ 0.85	$ 628.59	$ 2,500.00	$ 789,810.77	$ 31,412.25	$ 823,723.02
	94	AI		1	94 Pipe	30.25	18					50	$ 2,500.00	$ 1,512.50	$ 756.25	$ 4,768.75
	95	AI		1	95 Pipe	187.98	36.00 x 96.00	0.93	143.1	$ 385.00	$ 0.85	$ 479.69	$ 2,500.00	$ 90,171.19	$ 4,699.50	$ 97,370.69
															SUBTOTAL =	**$ 4,999,057.05**
	29	MH	1		29 Pipe	430.93	48.00 x 96.00	0.99	145.8	$ 385.00	$ 0.85	$ 505.08	$ 1,000.00	$ 217,654.12	$ 10,773.25	$ 229,427.37
	30	AI		1	30 Pipe	105.28	48.00 x 96.00	0.99	145.8	$ 385.00	$ 0.85	$ 505.08	$ 2,500.00	$ 53,174.82	$ 2,632.00	$ 58,306.82
	31	AI		1	31 Pipe	49.33	48.00 x 96.00	0.99	145.8	$ 385.00	$ 0.85	$ 505.08	$ 2,500.00	$ 24,915.60	$ 1,233.25	$ 28,648.85
	32	AI		1	32 Pipe	57.94	54					155	$ 2,500.00	$ 8,980.70	$ 1,448.50	$ 12,929.20
	33	AI		1	33 Pipe	161.93	54					155	$ 2,500.00	$ 25,099.15	$ 4,048.25	$ 31,647.40
	34	AI		1	34 Pipe	115.26	54					155	$ 2,500.00	$ 17,865.30	$ 2,881.50	$ 23,246.80
	35	AI		1	35 Pipe	324.92	54					155	$ 2,500.00	$ 50,362.60	$ 8,123.00	$ 60,985.60
	36	AI		1	36 Pipe	34.39	18					50	$ 2,500.00	$ 1,719.50	$ 859.75	$ 5,079.25
	37	AI		1	37 Pipe	43.57	54					155	$ 2,500.00	$ 6,753.35	$ 1,089.25	$ 10,342.60
	38	AI		1	38 Pipe	33.47	36					75	$ 2,500.00	$ 2,510.25	$ 836.75	$ 5,847.00
	39	AI		1	39 Pipe	363.21	54					155	$ 2,500.00	$ 56,297.55	$ 9,080.25	$ 67,877.80
	40	AI		1	40 Pipe	30.83	30					65	$ 2,500.00	$ 2,003.95	$ 770.75	$ 5,274.70
	41	AI		1	41 Pipe	338.63	48					120	$ 2,500.00	$ 40,635.60	$ 8,465.75	$ 51,601.35
THREE	42	AI		1	42 Pipe	32.86	24					55	$ 2,500.00	$ 1,807.30	$ 821.50	$ 5,128.80
	43	AI		1	43 Pipe	220.8	42					95	$ 2,500.00	$ 20,976.00	$ 5,520.00	$ 28,996.00
	44	AI		1	44 Pipe	34.9	24					55	$ 2,500.00	$ 1,919.50	$ 872.50	$ 5,292.00
	45	AI		1	45 Pipe	48.94	18					50	$ 2,500.00	$ 2,447.00	$ 1,223.50	$ 6,170.50
	46	AI		1	46 Pipe	217.7	36					75	$ 2,500.00	$ 16,327.50	$ 5,442.50	$ 24,270.00
	47	AI		1	47 Pipe	218.86	30					65	$ 2,500.00	$ 14,225.90	$ 5,471.50	$ 22,197.40
	48	AI		1	48 Pipe	30.56	18					50	$ 2,500.00	$ 1,528.00	$ 764.00	$ 4,792.00
	49	AI		1	49 Pipe	255.22	24					55	$ 2,500.00	$ 14,037.10	$ 6,380.50	$ 22,917.60
	50	AI		1	50 Pipe	40.3	42					95	$ 2,500.00	$ 3,828.50	$ 1,007.50	$ 7,336.00
	51	AI		1	51 Pipe	349.22	42					95	$ 2,500.00	$ 33,175.90	$ 8,730.50	$ 44,406.40
	52	AI		1	52 Pipe	51.37	42					95	$ 2,500.00	$ 4,880.15	$ 1,284.25	$ 8,664.40
	53	AI		1	53 Pipe	247.12	42					95	$ 2,500.00	$ 23,476.40	$ 6,178.00	$ 32,154.40
	54	CICI		1	54 Pipe	285.48	42					95	$ 2,500.00	$ 27,120.60	$ 7,137.00	$ 36,757.60
															SUBTOTAL =	**$ 840,297.84**
			10	47								**TOTALS =**	**$ 127,500.00**	**$ 9,530,683.82**	**$ 468,315.00**	**$ 10,126,498.82**

NOTE: DOES NOT INCLUDE OTHER ITEMS, I.E. PAVEMENT

CITY OF OKLAHOMA CITY
NICHOLS HILLS SUBURBAN TRACTS SUBDIVISION
SE OF MAY AND BRITTON

PRELIMINARY PAVING (Street Repair for Pipe/Box under Pavement)

ENGINEER'S CONCEPTUAL ESTIMATE
DC-0250

Street ID	Street Length (ft)	Street Width (ft)	Asphalt Depth (in.)	Amount of AC 112lb/sy/in (lb)	Amount of AC (ton)	Cost per Ton		Cost
Downing	1215	26	5.25	2063880	1031.94	$ 65.00	$	67,076.10
Sunnymeade	50	26	5.25	84933.333	42.46667	$ 65.00	$	2,760.33
Croydon	250	26	5.25	424666.67	212.3333	$ 65.00	$	13,801.67
Guilford	2800	26	5.25	4756266.7	2378.133	$ 65.00	$	154,578.67
Drakestone	1650	26	5.25	2802800	1401.4	$ 65.00	$	91,091.00
Surrey	0	26	5.25	0	0	$ 65.00	$	-
Elmhurst	0	26	5.25	0	0	$ 65.00	$	-
Dorchester	0	26	5.25	0	0	$ 65.00	$	-
						sum =	$	329,307.77
					Pavement Removal sy	Cost per sy		
					17232.22	6	$	103,393.33
				Additional Items, i.e. drives, side drain, earthwork, erosion control			$	214,050.05
						TOTAL =	**$**	**646,751.15**

CITY OF OKLAHOMA CITY
NICHOLS HILLS SUBURBAN TRACTS SUBDIVISION
SE OF MAY AND BRITTON
PRELIMINARY PAVING (All Streets Replaced - Curb/Gutter Section)
ENGINEER'S CONCEPTUAL ESTIMATE
DC-0250

Street ID	Street Length (ft)	Curb/Gutter Length (ft)	Cost per ft	Asphalt Width (ft)	Asphalt Depth (in.)	Amount of AC 112lb/sy/in (lb)	Amount of AC (ton)	Cost per Ton		Cost
Downing	1215	0	20	26	5.25	2063880	1031.94	$ 65.00	$	67,076.10
Sunnymeade	1300	2600	20	22	5.25	1868533.3	934.2667	$ 65.00	$	112,727.33
Croydon	1050	2100	20	22	5.25	1509200	754.6	$ 65.00	$	91,049.00
Guilford	4700	9400	20	22	5.25	6755466.7	3377.733	$ 65.00	$	407,552.67
Drakestone	2600	5200	20	22	5.25	3737066.7	1868.533	$ 65.00	$	225,454.67
Surrey	900	1800	20	22	5.25	1293600	646.8	$ 65.00	$	78,042.00
Elmhurst	2640	5280	20	22	5.25	3794560	1897.28	$ 65.00	$	228,923.20
Dorchester	3340	6680	20	22	5.25	4800693.3	2400.347	$ 65.00	$	289,622.53
								sum =	$	1,500,447.50
							Pavement Removal sy	Cost per sy		
							51263.33	6	$	307,580.00
							Additional CICI	Cost Each		
							34	$2,500	$	85,000.00
					Additional Items, i.e. drives, side drain, earthwork, erosion control				$	750,223.75

TOTAL = $ 1,808,027.50


W BRITTON RD
WELLINGTON DR
SECTION ONE PIPE SYSTEM
N
W
E
S
1 inch = 150 feet
150 75 0 150
Feet
Legend
Streets
Storm Sewer
<all other values>
SubType
Concrete Channel
Earthen Channel
Flume
Gabion Basket
Grass Channel
Grated Inlet
Pipe line
Rip Rap
Slope wall
Effecitve Flood Zones
FLD_ZONE, FLOODWAY
500-Year
100-Yr Unstudied
100-Yr Studied
FLOODWAY
Drainage Junctions
<all other values>
SUBTYPE
InletBox
JunctionBox
Manhole
Other


N
W
E
S
1 inch = 300 feet
300 150 0 300
Feet
Legend
Streets
Storm Sewer
<all other values>
SubType
Concrete Channel
Earthen Channel
Flume
Gabion Basket
Grass Channel
Grated Inlet
Pipe line
Rip Rap
Slope wall
Effecitve Flood Zones
FLD_ZONE, FLOODWAY
500-Year
100-Yr Unstudied
100-Yr Studied
FLOODWAY
Drainage Junctions
<all other values>
SUBTYPE
InletBox
JunctionBox
Manhole
Other
SECTION TWO PIPE SYSTEM
PELHAM DR
DRAKESTONE AVE
CORNWALL PL


SECTION THREE PIPE SYSTEM
DRAKESTONE AVE
CORNWALL PL
WILTON LN
ELMHURST AVE
CHARING CROSS RD
MIDDLESEX DR
FARNSWORTH LN
ROSSMORE PL
BEVINGFORD LN
N
W
E
S
1 inch = 300 feet
300 150 0 300
Feet
Legend
Streets
Storm Sewer
<all other values>
SubType
Concrete Channel
Earthen Channel
Flume
Gabion Basket
Grass Channel
Graled Inlet
Pipe line
Rip Rap
Slope wall
Drainage Junctions
<all other values>
SUBTYPE
InletBox
JunctionBox
Manhole
Other

NICHOLS HILLS SUBURBAN TRACTS TO NICHOLS HILLS, OKLAHOMA SUBDIVISION DRAINAGE EVALUATION AND IMPROVEMENTS

SE of Britton Road and N. May Avenue
City of Oklahoma City, Oklahoma

OKC # DC-0250
HCA 091026

PRELIMINARY DESIGN REPORT

Prepared By:

Horan, Carroll & Associates, Inc.
Civil Engineering & Surveying

Prepared for:

The City of
OKLAHOMA CITY

January 24, 2012

THE CITY OF OKLAHOMA CITY

APPROVAL SHEET

DC-0250

Nichols Hills Suburban Tracts Subdivision
Drainage Evaluation and Improvements

SE of Britton Road and N. May Avenue
City of Oklahoma City, Oklahoma

Prepared by:

HORAN, CARROLL & ASSOCIATES, INC.
2828 NW 57TH STREET, SUITE 224
OKLAHOMA CITY, OKLAHOMA 73112
PHONE: (405) 840-3900 FAX: (405) 840-3902
CA NO. 4741, RENEWAL DATE 06/30/2013

Gary M. Horan, P.E. # 19511 — Date: 2/1/2012

Recommended for Approval

Eric Wenger, P.E., City Engineer — Date: 6/28/12

APPROVED by the Trustees and signed by the Chairman of the Oklahoma City Municipal Facilities Authority this _____ day of _____, 2012.

_____
Chairman

ATTEST:

_____
Secretary

Table of Contents

I. INTRODUCTION

This report contains general information about the history, scope of work, design parameters, engineering recommendations, and anticipated cost associated with constructing drainage improvements and new street pavement in the Nichols Hills Suburban Tracts subdivision located southeast of Britton Road and May Avenue in Oklahoma City, Oklahoma.

II. HISTORY

There have been citizens within the subdivision complaining of flooding streets, particularly at the intersection of Sunnymeade Place and Croydon Court where the complaints indicate the street could not be used because of the depth of water on the street was interrupting travel. Furthermore, a resident located at 2606 Drakestone Avenue, which is located about 200 feet west of Greystone Avenue on the north side of Drakestone Avenue, has complained about the water level in the drainage ditch next to the house. A City of Oklahoma City Public Works Department representative reviewed the site and believed further analysis would be required. The Public Works Department provided some conceptual studies and determined improvements of the storm sewer system may be needed to reduce flooding. A detailed drainage study of the existing drainage system was recommended to help the City decide about what to do about the complaints. The City appropriated funds to have a consultant perform the preliminary engineering drainage analysis. The Oklahoma City Municipal Facilities Authority provided funding for engineering related to the drainage study. That study is complete and the storm sewer drainage report has been submitted to the City of Oklahoma City.

III. CONCEPT OF PROJECT

In general, the goal of the project was to determine if the existing storm sewer system was adequate to carry the ten-year storm event runoff and if not, determine what improvements may be necessary to carry that event. Furthermore, clarify if there is adequate slope from the downstream structures to construct new curb and gutter streets within the subdivision. In addition, provide estimated construction costs for those drainage and street improvements. To help accomplish this goal, engineering analysis and estimating was needed. To complete those tasks, the drainage analysis and conceptual construction plans to build the estimated improvements were prepared by Horan, Carroll and Associates, Inc.

IV. PROJECT DESCRIPTION AND SCOPE

The Nichols Hills Suburban Tracts subdivision is located southeast of Britton Road and May Avenue in Oklahoma City, Oklahoma. Construction within the subdivision appears to be in 1930's and 19040's. The streets are paved with asphalt and are typically 22 to 24 feet wide with ditches. The majority of the storm runoff within the subdivision is collected by the roadside ditches and then transported to storm sewer inlets and pipe. There are approximately 47 inlets within the subdivision. This storm sewer system has about 77 other inlets connected and drains into a double cell reinforced concrete box located at Wellington Avenue and Downing Street, which drains into a concrete lined channel at Downing Street and Village Drive.

To accomplish the goals of reducing street flooding and provided a safer road for the public, drainage improvements include adding inlet capacity and a large drainage system not only within the subdivision, but downstream as well are recommended. The storm sewer drainage report does include information used to evaluate the existing storm sewer system and information used to help determine preliminary recommendations to help reduce flooding. The project conceptual plans provided with the storm sewer drainage report show the estimated improvements.

V. PROJECT AGREEMENTS AND PERMITS

In general, a 404 Permit is required when constructing within areas that have a blue line shown on a United States Geological Survey (USGS) 7.5 minute topographic quadrangle map. These areas are considered to be protected under Section 404 of the Clean Waters Act. There are no blue lines shown on the USGS map within the estimated improvements. Therefore, HCA believes the City of Oklahoma City will not be required to obtain a 404 Permit through the US Army Corps of Engineers. Furthermore, no construction improvements or earthwork filling are anticipated to be within a FEMA designated flood zone area. The USGS map and FEMA map are included in the appendices of this report.

VI. UTILITIES

If the estimated drainage improvements are constructed, there appears to be several utilities that may need to be relocated, such as electric, gas, and City water. There also appear to be several sanitary sewer lines that run adjacent and across the storm sewer. The depth of the sanitary sewer was not surveyed, but the existing storm sewer appears to go over the sanitary sewer and therefore, it is anticipated

that the estimated storm sewer improvements will not be in conflict. Therefore, the proposed storm sewer should be able to be constructed without affecting the sanitary sewer. This information is based on the observations during the field survey, City GIS maps and/or atlas maps.

The cost of relocating utilities is usually the responsibility of the utility owner, unless the utility is already located in a private utility easement. The extent of any relocations will not become known until a full site survey has been done, plan-in-hand plans are complete, and subsequent utility relocation meetings are held.

The utility relocation meeting should be held after the plan-in-hand meeting. The City of Oklahoma City along with HCA should coordinate this meeting. This meeting will address the location of existing utilities, areas for relocations, existing easements, and right-of-way requirements. Information that is more accurate will be available after this meeting. Meeting minutes should be taken at this meeting and provided to the attendees.

VII. RIGHT-OF-WAY

The scope of the project did not include surveying the entire site and establishing existing right-of-way and easements. However, based on the City's GIS information, the existing right-of-way within the project limits will likely not be wide enough to construct the estimated drainage improvements. There may be the need to obtain easements where the estimated storm sewer will be located between lots and a more detailed study will be need along Downing Street. The conceptual plans show the existing right-of-way based on the GIS information.

The drainage improvements will help the citizens within the subdivision. For this reason, it is anticipated that most of the proposed right-of-way will be dedicated to help this project proceed forward. To help expedite these acquisitions, HCA can provide the City of Oklahoma City with legal descriptions and parcel maps of each parcel needed.

VIII. TECHNICAL DATA

The technical data to be prepared for the project includes:

- Construction plans for the drainage improvements and street resurfacing.
- Storm sewer report showing the drainage calculations for determining the storm water runoff as well as how the drainage structures were sized.

- Contract documents for bidding the project.
- Right-of-Way Documents and Legal Descriptions.

IX. CONCLUSIONS AND RECOMMENDATIONS

The drainage study indicates the complaints of street flooding within the Nichols Hills Suburban Tracts subdivision are reasonable. It appears from the platting dates the drainage system within the subdivision was constructed in the 1930's and 1940's. The current streets are asphalt with roadside ditches and not the typical curb and gutter used for subdivisions in urban areas. Therefore, the drainage study along with the current street drainage indicate this drainage system does not meet current City ordinances.

The runoff within the subdivision that is collected by storm sewers within the subdivision continues to a double cell reinforced concrete box that is located underneath Downing Street. The size of this box would have to be substantially increased to carry the storm runoff from a 50-year storm event. The expense to bring the drainage system to current City ordinances will not only include substantial cost for constructing the storm sewer, but also might include the relocation of residences along Downing Street. If this box is designed to carry the 50-year storm event, then it is recommended that additional analysis be done to determine the extent of the improvements.

The determination of the 100-year flood plain was not part of the scope of this project. The drainage study and conceptual construction plans prepared as part of this project include sizing of storm sewer for the 10-year storm event. These estimated improvements will reduce street flooding and improve drainage within the subdivision. These estimated drainage improvements do not significantly change the existing drainage patterns or create any more risk of flooding to any existing upstream improvements.

There were two sets of conceptual construction plans submitted as part of this project. One is titled "CONCEPTUAL PLANS WITH DITCHES" and shows a layout of what drainage structures would be needed to carry the 10-year storm event. The other set is titled "CONCEPTUAL PLANS WITH CURB AND GUTTER" and shows the above improvements with curb and gutter streets. These plans show the improvements recommended by HCA to meet the objectives provided by the City of Oklahoma City Public Works Department. HCA recommends these preliminary designs to the City of Oklahoma City.

X. COST ESTIMATES

The total cost of the project will not be known until the design is complete and the improvements bid. However, based on the conceptual plans and available information, we estimate the current construction cost for constructing the estimated drainage improvements as currently scoped at $10,800,000. Furthermore, to replace the streets within the subdivision with new asphalt paving along with curb and gutter is estimated to be an additional $1,200,000. These costs do not include funding for any right-of-way acquisitions, utility relocations, engineering, surveying, construction management, and materials testing. Detailed cost sheets are provided in the appendix and can be broken down into the following sections.

Section One: Construction of Structure 1 to Structure 8 or the reinforced concrete box from the open concrete channel located at the intersection of Downing Street and Village Drive to the intersection of Sunneymeade Place and Croydon Court. The estimated costs are:

- $4,300,000 drainage structures
- $140,000 street repair and pavement

There are approximately forty houses that face Downing Street. It may be cost affective to perform a study to determine the cost of purchasing and removing the house along Downing Street to help reveal if it is less expensive to build drainage channel instead of the box structure.

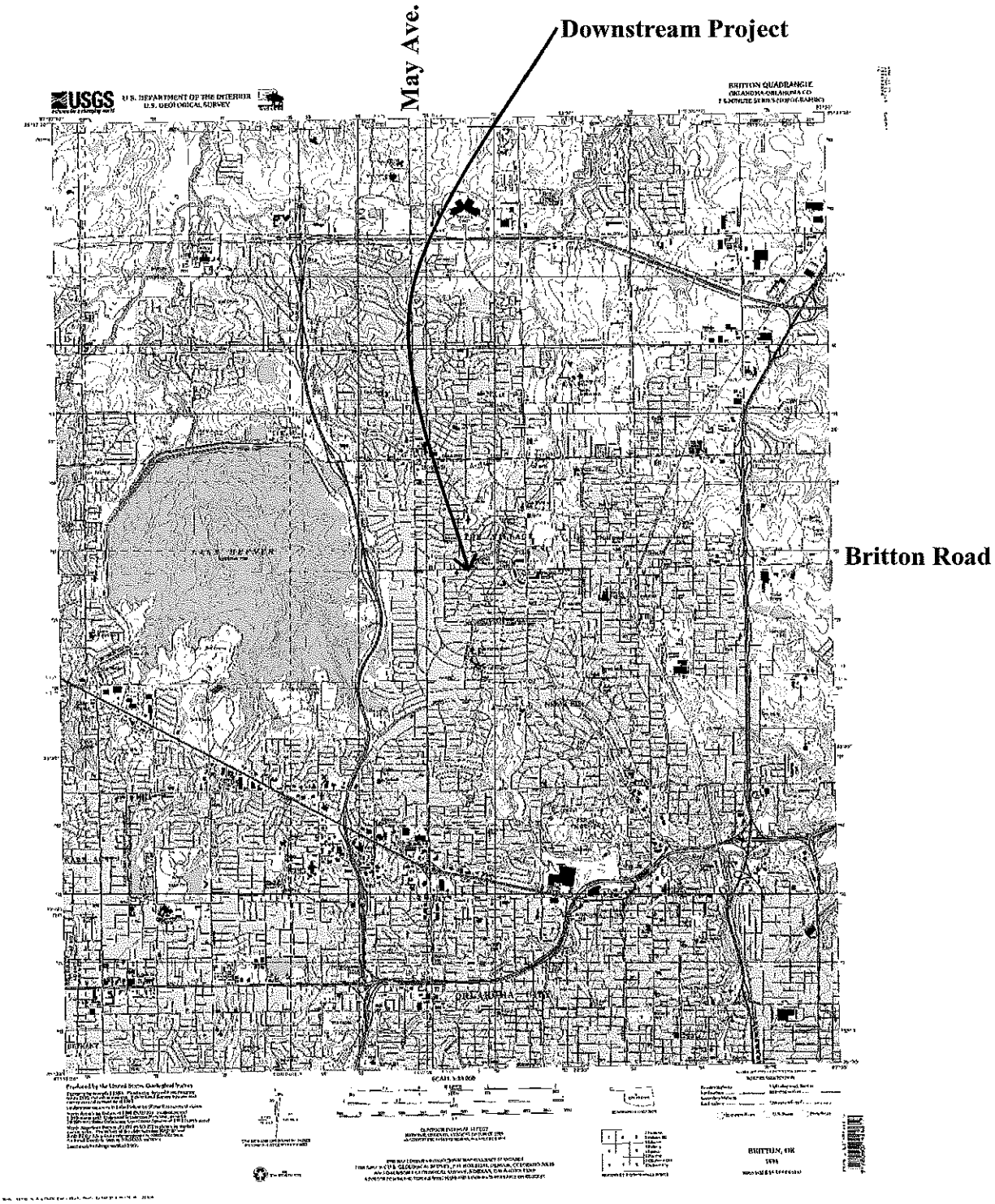
Section Two: Construction from Structure 8 to Structure 28 and from Structure 91 to Structure 95. This is the section of reinforced concrete box from the intersection of Sunneymeade Place and Croydon Court to the intersection of Drakestone Avenue and Guilford Lane and then to the intersection of Drakestone Avenue to Greystone Avenue. The estimated costs are:

- $5,000,000 drainage structures
- $450,000 street repair and pavement

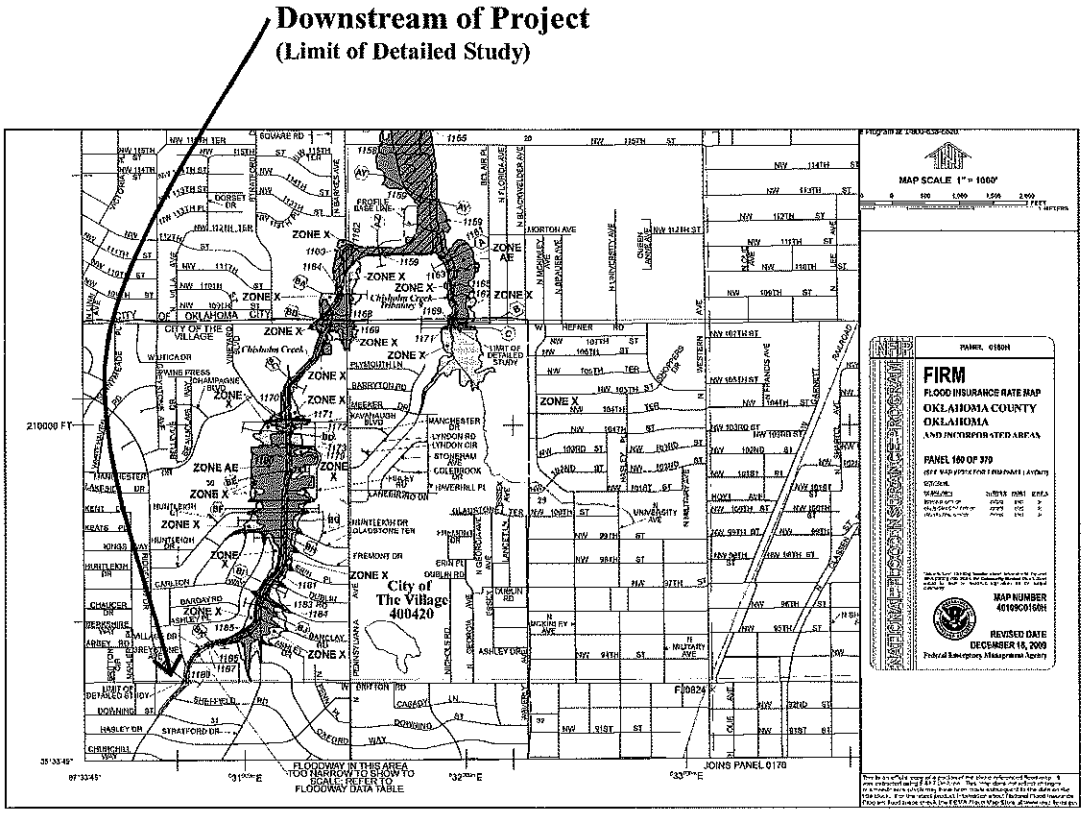
Section Three: Construction of the upstream structures from the above section that are along Drakestone Avenue, Guilford Lane, Dorchester Drive, and Elmhurst Avenue. The estimated costs are:

- $840,000 drainage structures
- $100,000 street repair and pavement

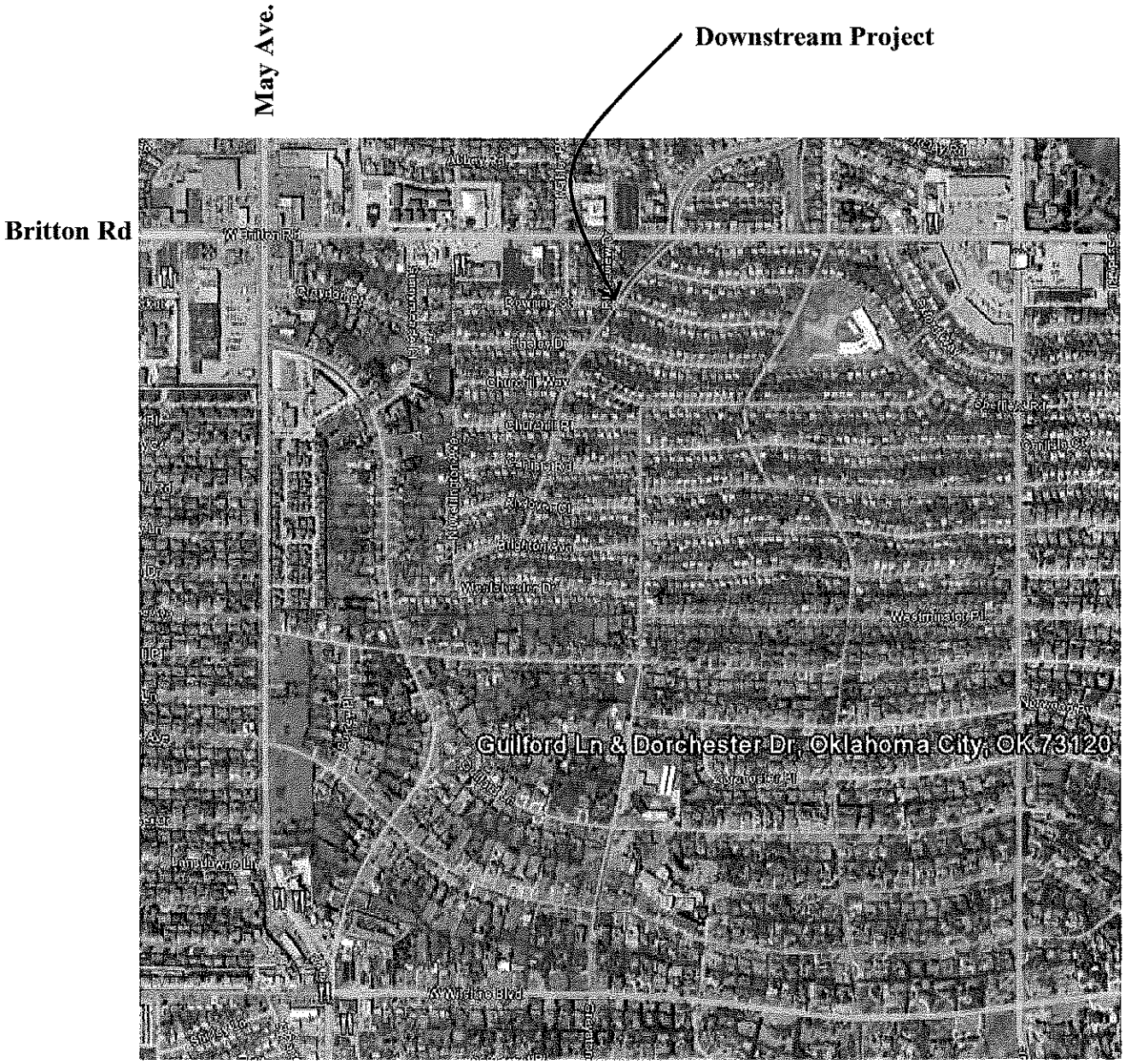
APPENDIX A: QUAD MAP



APPENDIX B: FEMA MAP



APPENDIX C: AERIAL MAP



APPENDIX D:

ESTIMATES OF CONSTRUCTION COST

(see next page)

CITY OF OKLAHOMA CITY

NICHOLS HILLS SUBURBAN TRACTS SUBDIVISION - SE OF MAY AND BRITTON

PRELIMINARY STORM SEWER (within subdivision limits and downstream)

ENGINEER'S CONCEPTUAL ESTIMATE

DC-0250

Section ID	Junction ID	Junction Type	# MH	# Inlets	Pipe ID	Pipe Len (ft)	Pipe Dim (in)	Conc. per Ft. (c.y.)	Reinf. per Ft. (Lb)	Cost per c.y of Conc	Cost per Lb Steel	Cost per Ft.	Cost of Inlet/MH	Cost of Pipe	Removal Cost	Combined Cost
	1	MH	1		1a Pipe	1215	48.00 x 500.00	5.04	912.8	$ 385.00	$ 0.85	$ 2,716.28	$ 1,000.00	$ 3,300,280.20	$ 243,000.00	$ 3,544,280.20
	2	CICI		1	2 Pipe	10	24					55	$ 2,500.00	$ 550.00	$ 250.00	$ 3,300.00
	3	CICI		1	3 Pipe	10	24					55	$ 2,500.00	$ 550.00	$ 250.00	$ 3,300.00
	4	MH	1		4 Pipe	30.09	48.00 x 500.00	5.04	912.8	$ 385.00	$ 0.85	$ 2,716.28	$ 1,000.00	$ 81,732.87	$ 752.25	$ 83,485.12
One	5	AI		1	5 Pipe	143.99	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 224,876.38	$ 3,599.75	$ 230,976.13
	6	AI		1	6 Pipe	220.63	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 344,568.90	$ 5,515.75	$ 352,584.65
	7	PIPE			7 Pipe	10	18					50	$ -	$ 500.00	$ 250.00	$ 750.00
	8	AI		1	8 Pipe	41.07	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 64,141.07	$ 1,026.75	$ 67,667.82
	9	PIPE			9 Pipe	10	24					55	$ -	$ 550.00	$ 250.00	$ 800.00
															SUBTOTAL =	**$ 4,287,143.92**
	10	AI		1	10 Pipe	177.34	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 276,960.75	$ 4,433.50	$ 283,894.25
	11	AI		1	11 Pipe	224.39	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 350,441.08	$ 5,609.75	$ 358,550.83
	12	MH	1		12 Pipe	252.85	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 1,000.00	$ 394,888.49	$ 6,321.25	$ 402,209.74
	13	AI		1	13 Pipe	10	18					50	$ 2,500.00	$ 500.00	$ 250.00	$ 3,250.00
	14	AI		1	14 Pipe	103.49	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 2,500.00	$ 161,625.51	$ 2,587.25	$ 166,712.76
	112	MH	1		112 Pipe	118.73	48.00 x 288.00	2.84	551	$ 385.00	$ 0.85	$ 1,561.75	$ 1,000.00	$ 185,426.58	$ 2,968.25	$ 189,394.83
	15	MH	1		15 Pipe	11.4	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 15,482.80	$ 285.00	$ 16,767.80
	16	AI		1	16 Pipe	127.99	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 173,828.34	$ 3,199.75	$ 179,528.09
	17	AI		1	17 Pipe	12	18					50	$ 2,500.00	$ 600.00	$ 300.00	$ 3,400.00
	18	AI		1	18 Pipe	541	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 734,753.74	$ 13,525.00	$ 750,778.74
	19	MH	1		19 Pipe	312.76	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 424,771.87	$ 7,819.00	$ 433,590.87
	20	MH	1		20 Pipe	300.86	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 408,610.00	$ 7,521.50	$ 417,131.50
TWO	21	AI		1	21 Pipe	10.5	18					50	$ 2,500.00	$ 525.00	$ 262.50	$ 3,287.50
	22	AI		1	22 Pipe	50.25	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 68,246.54	$ 1,256.25	$ 72,002.79
	23	MH	1		23 Pipe	250.47	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 340,173.33	$ 6,261.75	$ 347,435.08
	24	PIPE			24 Pipe	10	24					55	$ -	$ 550.00	$ 250.00	$ 800.00
	25	AI		1	25 Pipe	49.47	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 2,500.00	$ 67,187.19	$ 1,236.75	$ 70,923.94
	26	MH	1		26 Pipe	143.9	48.00 x 240.00	2.52	456.4	$ 385.00	$ 0.85	$ 1,358.14	$ 1,000.00	$ 195,436.35	$ 3,597.50	$ 200,033.85
	27	AI		1	27 Pipe	10	18					50	$ 2,500.00	$ 500.00	$ 250.00	$ 3,250.00
	28	AI		1	28 Pipe	46.82	48.00 x 192.00	1.98	291.6	$ 385.00	$ 0.85	$ 1,010.16	$ 2,500.00	$ 47,295.69	$ 1,170.50	$ 50,966.19
	91	AI		1	91 Pipe	109.94	36.00 x 120.00	1.16	214.1	$ 385.00	$ 0.85	$ 628.59	$ 2,500.00	$ 69,106.63	$ 2,748.50	$ 74,355.13
	92	AI		1	92 Pipe	64.92	36.00 x 120.00	1.16	214.1	$ 385.00	$ 0.85	$ 628.59	$ 2,500.00	$ 40,807.74	$ 1,623.00	$ 44,930.74
	93	AI		1	93 Pipe	1256.49	36.00 x 120.00	1.16	214.1	$ 385.00	$ 0.85	$ 628.59	$ 2,500.00	$ 789,810.77	$ 31,412.25	$ 823,723.02
	94	AI		1	94 Pipe	30.25	18					50	$ 2,500.00	$ 1,512.50	$ 756.25	$ 4,768.75
	95	AI		1	95 Pipe	187.98	36.00 x 96.00	0.93	143.1	$ 385.00	$ 0.85	$ 479.69	$ 2,500.00	$ 90,171.19	$ 4,699.50	$ 97,370.69
															SUBTOTAL =	**$ 4,999,057.05**
	29	MH	1		29 Pipe	430.93	48.00 x 96.00	0.99	145.8	$ 385.00	$ 0.85	$ 505.08	$ 1,000.00	$ 217,654.12	$ 10,773.25	$ 229,427.37
	30	AI		1	30 Pipe	105.28	48.00 x 96.00	0.99	145.8	$ 385.00	$ 0.85	$ 505.08	$ 2,500.00	$ 53,174.82	$ 2,632.00	$ 58,306.82
	31	AI		1	31 Pipe	49.33	48.00 x 96.00	0.99	145.8	$ 385.00	$ 0.85	$ 505.08	$ 2,500.00	$ 24,915.60	$ 1,233.25	$ 28,648.85
	32	AI		1	32 Pipe	57.94	54					155	$ 2,500.00	$ 8,980.70	$ 1,448.50	$ 12,929.20
	33	AI		1	33 Pipe	161.93	54					155	$ 2,500.00	$ 25,099.15	$ 4,048.25	$ 31,647.40
	34	AI		1	34 Pipe	115.26	54					155	$ 2,500.00	$ 17,865.30	$ 2,881.50	$ 23,246.80
	35	AI		1	35 Pipe	324.92	54					155	$ 2,500.00	$ 50,362.60	$ 8,123.00	$ 60,985.60
	36	AI		1	36 Pipe	34.39	18					50	$ 2,500.00	$ 1,719.50	$ 859.75	$ 5,079.25
	37	AI		1	37 Pipe	43.57	54					155	$ 2,500.00	$ 6,753.35	$ 1,089.25	$ 10,342.60
	38	AI		1	38 Pipe	33.47	36					75	$ 2,500.00	$ 2,510.25	$ 836.75	$ 5,847.00
	39	AI		1	39 Pipe	363.21	54					155	$ 2,500.00	$ 56,297.55	$ 9,080.25	$ 67,877.80
	40	AI		1	40 Pipe	30.83	30					65	$ 2,500.00	$ 2,003.95	$ 770.75	$ 5,274.70
	41	AI		1	41 Pipe	338.63	48					120	$ 2,500.00	$ 40,635.60	$ 8,465.75	$ 51,601.35
THREE	42	AI		1	42 Pipe	32.86	24					55	$ 2,500.00	$ 1,807.30	$ 821.50	$ 5,128.80
	43	AI		1	43 Pipe	220.8	42					95	$ 2,500.00	$ 20,976.00	$ 5,520.00	$ 28,996.00
	44	AI		1	44 Pipe	34.9	24					55	$ 2,500.00	$ 1,919.50	$ 872.50	$ 5,292.00
	45	AI		1	45 Pipe	48.94	18					50	$ 2,500.00	$ 2,447.00	$ 1,223.50	$ 6,170.50
	46	AI		1	46 Pipe	217.7	36					75	$ 2,500.00	$ 16,327.50	$ 5,442.50	$ 24,270.00
	47	AI		1	47 Pipe	218.86	30					65	$ 2,500.00	$ 14,225.90	$ 5,471.50	$ 22,197.40
	48	AI		1	48 Pipe	30.56	18					50	$ 2,500.00	$ 1,528.00	$ 764.00	$ 4,792.00
	49	AI		1	49 Pipe	255.22	24					55	$ 2,500.00	$ 14,037.10	$ 6,380.50	$ 22,917.60
	50	AI		1	50 Pipe	40.3	42					95	$ 2,500.00	$ 3,828.50	$ 1,007.50	$ 7,336.00
	51	AI		1	51 Pipe	349.22	42					95	$ 2,500.00	$ 33,175.90	$ 8,730.50	$ 44,406.40
	52	AI		1	52 Pipe	51.37	42					95	$ 2,500.00	$ 4,880.15	$ 1,284.25	$ 8,664.40
	53	AI		1	53 Pipe	247.12	42					95	$ 2,500.00	$ 23,476.40	$ 6,178.00	$ 32,154.40
	54	CICI		1	54 Pipe	285.48	42					95	$ 2,500.00	$ 27,120.60	$ 7,137.00	$ 36,757.60
															SUBTOTAL =	**$ 840,297.84**
			10	47								**TOTALS =**	**$ 127,500.00**	**$ 9,530,683.82**	**$ 468,315.00**	**$ 10,126,498.82**

NOTE: DOES NOT INCLUDE OTHER ITEMS, I.E. PAVEMENT

CITY OF OKLAHOMA CITY
NICHOLS HILLS SUBURBAN TRACTS SUBDIVISION
SE OF MAY AND BRITTON

PRELIMINARY PAVING (Street Repair for Pipe/Box under Pavement)

ENGINEER'S CONCEPTUAL ESTIMATE
DC-0250

Street ID	Street Length (ft)	Street Width (ft)	Asphalt Depth (in.)	Amount of AC 112lb/sy/in (lb)	Amount of AC (ton)	Cost per Ton		Cost
Downing	1215	26	5.25	2063880	1031.94	$ 65.00	$	67,076.10
Sunnymeade	50	26	5.25	84933.333	42.46667	$ 65.00	$	2,760.33
Croydon	250	26	5.25	424666.67	212.3333	$ 65.00	$	13,801.67
Guilford	2800	26	5.25	4756266.7	2378.133	$ 65.00	$	154,578.67
Drakestone	1650	26	5.25	2802800	1401.4	$ 65.00	$	91,091.00
Surrey	0	26	5.25	0	0	$ 65.00	$	-
Elmhurst	0	26	5.25	0	0	$ 65.00	$	-
Dorchester	0	26	5.25	0	0	$ 65.00	$	-
						sum =	$	329,307.77
					Pavement Removal sy	Cost per sy		
					17232.22	6	$	103,393.33
				Additional Items, i.e. drives, side drain, earthwork, erosion control			$	214,050.05
						TOTAL =	**$**	**646,751.15**

CITY OF OKLAHOMA CITY
NICHOLS HILLS SUBURBAN TRACTS SUBDIVISION
SE OF MAY AND BRITTON
PRELIMINARY PAVING (All Streets Replaced - Curb/Gutter Section)
ENGINEER'S CONCEPTUAL ESTIMATE
DC-0250

Street ID	Street Length (ft)	Curb/Gutter Length (ft)	Cost per ft	Asphalt Width (ft)	Asphalt Depth (in.)	Amount of AC 112lb/sy/in (lb)	Amount of AC (ton)	Cost per Ton		Cost
Downing	1215	0	20	26	5.25	2063880	1031.94	$ 65.00	$	67,076.10
Sunnymeade	1300	2600	20	22	5.25	1868533.3	934.2667	$ 65.00	$	112,727.33
Croydon	1050	2100	20	22	5.25	1509200	754.6	$ 65.00	$	91,049.00
Guilford	4700	9400	20	22	5.25	6755466.7	3377.733	$ 65.00	$	407,552.67
Drakestone	2600	5200	20	22	5.25	3737066.7	1868.533	$ 65.00	$	225,454.67
Surrey	900	1800	20	22	5.25	1293600	646.8	$ 65.00	$	78,042.00
Elmhurst	2640	5280	20	22	5.25	3794560	1897.28	$ 65.00	$	228,923.20
Dorchester	3340	6680	20	22	5.25	4800693.3	2400.347	$ 65.00	$	289,622.53
								sum =	$	1,500,447.50
							Pavement Removal sy	Cost per sy		
							51263.33	6	$	307,580.00
							Additional CICI	Cost Each		
							34	$2,500	$	85,000.00
					Additional Items, i.e. drives, side drain, earthwork, erosion control				$	750,223.75

TOTAL = $ 1,808,027.50


W BRITTON RD
WELLINGTON DR
SECTION ONE PIPE SYSTEM
N
W
E
S
1 inch = 150 feet
150 75 0 150
Feet
Legend
Streets
Storm Sewer
<all other values>
SubType
Concrete Channel
Earthen Channel
Flume
Gabion Basket
Grass Channel
Grated Inlet
Pipe line
Rip Rap
Slope wall
Effecitve Flood Zones
FLD_ZONE, FLOODWAY
500-Year
100-Yr Unstudied
100-Yr Studied
FLOODWAY
Drainage Junctions
<all other values>
SUBTYPE
InletBox
JunctionBox
Manhole
Other


N
W
E
S
1 inch = 300 feet
300 150 0 300
Feet
Legend
Streets
Storm Sewer
<all other values>
SubType
Concrete Channel
Earthen Channel
Flume
Gabion Basket
Grass Channel
Grated Inlet
Pipe line
Rip Rap
Slope wall
Effecitve Flood Zones
FLD_ZONE, FLOODWAY
500-Year
100-Yr Unstudied
100-Yr Studied
FLOODWAY
Drainage Junctions
<all other values>
SUBTYPE
InletBox
JunctionBox
Manhole
Other
SECTION TWO PIPE SYSTEM
PELHAM DR
DRAKESTONE AVE
CORNWALL PL


SECTION THREE PIPE SYSTEM
DRAKESTONE AVE
CORNWALL PL
WILTON LN
ELMHURST AVE
CHARING CROSS RD
MIDDLESEX DR
FARNSWORTH LN
ROSSMORE PL
BEVINGFORD LN
N
W
E
S
1 inch = 300 feet
300 150 0 300
Feet
Legend
Streets
Storm Sewer
<all other values>
SubType
Concrete Channel
Earthen Channel
Flume
Gabion Basket
Grass Channel
Graled Inlet
Pipe line
Rip Rap
Slope wall
Drainage Junctions
<all other values>
SUBTYPE
InletBox
JunctionBox
Manhole
Other

Croydon Ct and Sunnymeade Pl Acquisition

ACQUISITION AND DEMOLITION OF 8 FLOOD-PRONE BUILDINGS IN THE NICHOLS HILLS SUBDIVISION IN OKLAHOMA CITY

Item Name	Budget Item	Unit Quantity	Unit of Measurement	Unit Cost	Cost Estimate	Notes
Acquisition/Relocation Items						
Grant Project Management	Personnel	10	Each	$6,500.00	$65,000.00	
Abstracting	Contractual	10	Each	$900.00	$9,000.00	
Title Opinion	Contractual	10	Each	$400.00	$4,000.00	
Land Acq Svcs- Appraisals, Neg., URA (Robin Rd)	Contractual	10	Each	$16,500.00	$165,000.00	
Supplemental Housing Payments - Owner Occupants	Contractual	4	Each	$31,000.00	$124,000.00	Assumes maximum shortfall payment to owner occupant
URA Tenant Relocation Costs	Contractual	4	Each	$31,000.00	$124,000.00	Assumes maximum relocation benefits to each tenant
URA Tenant Moving Expenses	Equipment	4	Each	$2,500.00	$10,000.00	
Title Curative	Contractual	10	Each	$1,600.00	$16,000.00	
Title Insurance	Contractual	10	Each	$400.00	$4,000.00	
Closing	Contractual	10	Each	$400.00	$4,000.00	
Demolition	Contractual	8	Each	$16,000.00	$128,000.00	
Investigative Services	Contractual	10	Each	$10,000.00	$100,000.00	
Subtotal Acquisition/Relocation Items					**$753,000.00**	
Purchase of Real Estate:						
9312 Sunnymeade Place	Contractual	1	Each	$198,226.00	$198,226.00	Assumes maximum price from current MLS estimate range
9308 Sunnymeade Place	Contractual	1	Each	$140,750.00	$140,750.00	Assumes maximum price from current MLS estimate range
9304 Sunnymeande Place	Contractual	1	Each	$157,921.00	$157,921.00	Assumes maximum price from current MLS estimate range
9300 Sunnymeade Place	Contractual	1	Each	$205,076.00	$205,076.00	Assumes maximum price from current MLS estimate range

ACQUISITION AND DEMOLITION OF 8 FLOOD-PRONE BUILDINGS IN THE NICHOLS HILLS SUBDIVISION IN OKLAHOMA CITY

Item Name	Budget Item	Unit Quantity	Unit of Measurement	Unit Cost	Cost Estimate	Notes
9232 Sunnymeade Place	Contractual	1	Each	$181,954.00	$181,954.00	Assumes maximum price from current MLS estimate range
9228 Sunnymeade Place	Contractual	1	Each	$265,813.00	$265,813.00	Assumes maximum price from current MLS estimate range
2801Croydon Court	Contractual	1	Each	$192,699.00	$192,699.00	Assumes maximum price from current MLS estimate range
2804 Crydon Court	Contractual	1	Each	$179,170.00	$179,170.00	Assumes maximum price from current MLS estimate range
2800 Croyden Court (vacant lot)	Contractual	1	Each	$81,162.00	$101,452.50	Assessor's Value x 1.25
SunnyMeade Parcel 3724087345110 (vacant Lot south of 2800 Croyden Ct.)	Contractual	1	Each	$100,200.00	$125,250.00	Assessor's Value x 1.25
Subtotal Purchase of Real Estate					**$1,748,311.50**	
				Total Cost	**$2,501,311.50**	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Project Summary:

Project Number: 17OKC02 Disaster #:

Program: HMGP Agency: Meshek & Associates LLC

Analyst: Jason Kleps Discount Rate: 0.070

Point of Contact: Phone Number:

Address:

Email:

Comments:

Structure Summary For:

2801 Croydon Ct, 2801 Croydon Ct, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact: Ryan Gotcher

Benefits: $324,047 Costs: $243,626 BCR: 1.33

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	1.33	$324,047	$243,626

2804 Croydon Ct, 2804 Croydon Ct, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact: Warwick Leftwich

Benefits: $366,838 Costs: $230,097 BCR: 1.59

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	1.59	$366,838	$230,097

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

9228 Sunnymeade Pl, 9228 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact: Victor & Doris Koehn

Benefits: $92,344 Costs: $316,740 BCR: 0.29

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	0.29	$92,344	$316,740

9232 Sunnymeade Pl, 9232 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact: James & Ashley Merritt

Benefits: $1,239,489 Costs: $232,881 BCR: 5.32

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	5.32	$1,239,489	$232,881

9300 Sunnymeade Pl, 9300 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact: Ronald & Dee Lois

Benefits: $384,308 Costs: $256,003 BCR: 1.50

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	1.50	$384,308	$256,003

9304 Sunnymeade Pl, 9304 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact:

Benefits: $92,655 Costs: $208,848 BCR: 0.44

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	0.44	$92,655	$208,848

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

9308 Sunnymeade Pl, 9308 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact: WG Townsend

Benefits: $81,860 Costs: $191,677 BCR: 0.43

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	0.43	$81,860	$191,677

9312 Sunnymeade Pl, 9312 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Structure Type: Building Historic Building: No Contact: Rolanda Shrader

Benefits: $82,901 Costs: $249,153 BCR: 0.33

Mitigation	Hazard	BCR	Benefits	Costs
Acquisition	Flood	0.33	$82,901	$249,153

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 2801 Croydon Ct, 2801 Croydon Ct, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $324,047 Costs: $243,626 BCR: 1.33

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.564010000000	Longitude:	-97.564254000000		
Size of Building:	1,102	BRV ($/sf):	$110.70	Total BRV:	$121,991
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No
Structure Elevation:	1,202.00	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	0
Effective FIS Date:	01/08/2018	FIRM Panel Number:	0	FIRM Effective Date:	01/08/2018
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$121,991 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:	0.00			Flood Zone Determination:	Unknown
Breaking Wave Height:	-1,704.67			Utilities that are not elevated:	No
Height FFE Above Grade:	1,202.00			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Length of road (miles)	
Total Reduced Street Maintenance Costs	$0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,200.7	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.81	546.0	1,201.81	546.0
50	2.00%	1,201.99	796.0	1,201.99	796.0
100	1.00%	1,202.01	908.0	1,202.01	908.0
500	0.20%	1,202.40	1,185.0	1,202.40	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$3,050	0.0%	0.0%	$0
0.0	13.4%	0.0%	$16,347	0.0%	0.0%	$0
1.0	23.3%	0.0%	$28,424	0.0%	0.0%	$0
2.0	32.1%	0.0%	$39,159	0.0%	0.0%	$0
3.0	40.1%	0.0%	$48,919	0.0%	0.0%	$0
4.0	47.1%	0.0%	$57,458	0.0%	0.0%	$0
5.0	53.2%	0.0%	$121,991	0.0%	0.0%	$0
6.0	58.6%	0.0%	$121,991	0.0%	0.0%	$0
7.0	63.2%	0.0%	$121,991	0.0%	0.0%	$0
8.0	67.2%	0.0%	$121,991	0.0%	0.0%	$0
9.0	70.5%	0.0%	$121,991	0.0%	0.0%	$0
10.0	73.2%	0.0%	$121,991	0.0%	0.0%	$0
11.0	75.4%	0.0%	$121,991	0.0%	0.0%	$0
12.0	77.2%	0.0%	$121,991	0.0%	0.0%	$0
13.0	78.5%	0.0%	$121,991	0.0%	0.0%	$0
14.0	79.5%	0.0%	$121,991	0.0%	0.0%	$0
15.0	80.2%	0.0%	$121,991	0.0%	0.0%	$0
16.0	80.7%	0.0%	$121,991	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$2,928	0.0%	0.0%	$0
0.0	8.1%	0.0%	$9,881	0.0%	0.0%	$0
1.0	13.3%	0.0%	$16,225	0.0%	0.0%	$0
2.0	17.9%	0.0%	$21,836	0.0%	0.0%	$0
3.0	22.0%	0.0%	$26,838	0.0%	0.0%	$0
4.0	25.7%	0.0%	$31,352	0.0%	0.0%	$0
5.0	28.8%	0.0%	$35,134	0.0%	0.0%	$0
6.0	31.5%	0.0%	$38,427	0.0%	0.0%	$0
7.0	33.8%	0.0%	$41,233	0.0%	0.0%	$0
8.0	35.7%	0.0%	$43,551	0.0%	0.0%	$0
9.0	37.2%	0.0%	$45,381	0.0%	0.0%	$0
10.0	38.4%	0.0%	$46,845	0.0%	0.0%	$0
11.0	39.2%	0.0%	$47,821	0.0%	0.0%	$0
12.0	39.7%	0.0%	$48,431	0.0%	0.0%	$0
13.0	40.0%	0.0%	$48,797	0.0%	0.0%	$0
14.0	40.0%	0.0%	$48,797	0.0%	0.0%	$0
15.0	40.0%	0.0%	$48,797	0.0%	0.0%	$0
16.0	40.0%	0.0%	$48,797	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 27970.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$5,335
	100%	$5,335

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$15,466	Annual:	$0	Annual:	$15,466
Present Value:	$220,682	Present Value:	$0	Present Value:	$220,682

Mitigation Benefits:	$220,682	Mitigation Costs:	$243,626
Benefits Minus Costs:	($22,944)	Benefit-Cost Ratio:	0.91

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$242,199	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$243,626	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 2804 Croydon Ct, 2804 Croydon Ct, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $366,838 Costs: $230,097 BCR: 1.59

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.564365000000	Longitude:	-97.564009000000		
Size of Building:	957	BRV ($/sf):	$115.21	Total BRV:	$110,256
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No
Structure Elevation:	1,201.61	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	
Effective FIS Date:		FIRM Panel Number:		FIRM Effective Date:	
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$110,256 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:				Flood Zone Determination:	
Breaking Wave Height:	-1,704.67			Utilities that are not elevated:	No
Height FFE Above Grade:	1,201.61			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Length of road (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Total Reduced Street Maintenance Costs $0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,200.7	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.81	546.0	1,201.81	546.0
50	2.00%	1,201.99	796.0	1,201.99	796.0
100	1.00%	1,202.01	908.0	1,202.01	908.0
500	0.20%	1,202.40	1,185.0	1,202.40	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$2,756	0.0%	0.0%	$0
0.0	13.4%	0.0%	$14,774	0.0%	0.0%	$0
1.0	23.3%	0.0%	$25,690	0.0%	0.0%	$0
2.0	32.1%	0.0%	$35,392	0.0%	0.0%	$0
3.0	40.1%	0.0%	$44,213	0.0%	0.0%	$0
4.0	47.1%	0.0%	$51,931	0.0%	0.0%	$0
5.0	53.2%	0.0%	$110,256	0.0%	0.0%	$0
6.0	58.6%	0.0%	$110,256	0.0%	0.0%	$0
7.0	63.2%	0.0%	$110,256	0.0%	0.0%	$0
8.0	67.2%	0.0%	$110,256	0.0%	0.0%	$0
9.0	70.5%	0.0%	$110,256	0.0%	0.0%	$0
10.0	73.2%	0.0%	$110,256	0.0%	0.0%	$0
11.0	75.4%	0.0%	$110,256	0.0%	0.0%	$0
12.0	77.2%	0.0%	$110,256	0.0%	0.0%	$0
13.0	78.5%	0.0%	$110,256	0.0%	0.0%	$0
14.0	79.5%	0.0%	$110,256	0.0%	0.0%	$0
15.0	80.2%	0.0%	$110,256	0.0%	0.0%	$0
16.0	80.7%	0.0%	$110,256	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$2,646	0.0%	0.0%	$0
0.0	8.1%	0.0%	$8,931	0.0%	0.0%	$0
1.0	13.3%	0.0%	$14,664	0.0%	0.0%	$0
2.0	17.9%	0.0%	$19,736	0.0%	0.0%	$0
3.0	22.0%	0.0%	$24,256	0.0%	0.0%	$0
4.0	25.7%	0.0%	$28,336	0.0%	0.0%	$0
5.0	28.8%	0.0%	$31,754	0.0%	0.0%	$0
6.0	31.5%	0.0%	$34,731	0.0%	0.0%	$0
7.0	33.8%	0.0%	$37,267	0.0%	0.0%	$0
8.0	35.7%	0.0%	$39,361	0.0%	0.0%	$0
9.0	37.2%	0.0%	$41,015	0.0%	0.0%	$0
10.0	38.4%	0.0%	$42,338	0.0%	0.0%	$0
11.0	39.2%	0.0%	$43,220	0.0%	0.0%	$0
12.0	39.7%	0.0%	$43,772	0.0%	0.0%	$0
13.0	40.0%	0.0%	$44,102	0.0%	0.0%	$0
14.0	40.0%	0.0%	$44,102	0.0%	0.0%	$0
15.0	40.0%	0.0%	$44,102	0.0%	0.0%	$0
16.0	40.0%	0.0%	$44,102	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 18400.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$3,509
	100%	$3,509

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$20,290	Annual:	$0	Annual:	$20,290
Present Value:	$289,518	Present Value:	$0	Present Value:	$289,518

Mitigation Benefits:	$289,518	Mitigation Costs:	$230,097
Benefits Minus Costs:	$59,421	Benefit-Cost Ratio:	1.26

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$228,670	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$230,097	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 9228 Sunnymeade Pl, 9228 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $92,344 Costs: $316,740 BCR: .29

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.563678000000	Longitude:	-97.563356000000		
Size of Building:	1,601	BRV ($/sf):	$95.08	Total BRV:	$152,223
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No
Structure Elevation:	1,202.81	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	
Effective FIS Date:		FIRM Panel Number:		FIRM Effective Date:	
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$152,223 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:				Flood Zone Determination:	
Breaking Wave Height:	-1,704.37			Utilities that are not elevated:	No
Height FFE Above Grade:	1,202.81			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Length of road (miles)	
Total Reduced Street Maintenance Costs	$0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,198.4	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.19	546.0	1,201.19	546.0
50	2.00%	1,201.63	796.0	1,201.63	796.0
100	1.00%	1,201.80	908.0	1,201.80	908.0
500	0.20%	1,202.19	1,185.0	1,202.19	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$3,806	0.0%	0.0%	$0
0.0	13.4%	0.0%	$20,398	0.0%	0.0%	$0
1.0	23.3%	0.0%	$35,468	0.0%	0.0%	$0
2.0	32.1%	0.0%	$48,864	0.0%	0.0%	$0
3.0	40.1%	0.0%	$61,041	0.0%	0.0%	$0
4.0	47.1%	0.0%	$71,697	0.0%	0.0%	$0
5.0	53.2%	0.0%	$152,223	0.0%	0.0%	$0
6.0	58.6%	0.0%	$152,223	0.0%	0.0%	$0
7.0	63.2%	0.0%	$152,223	0.0%	0.0%	$0
8.0	67.2%	0.0%	$152,223	0.0%	0.0%	$0
9.0	70.5%	0.0%	$152,223	0.0%	0.0%	$0
10.0	73.2%	0.0%	$152,223	0.0%	0.0%	$0
11.0	75.4%	0.0%	$152,223	0.0%	0.0%	$0
12.0	77.2%	0.0%	$152,223	0.0%	0.0%	$0
13.0	78.5%	0.0%	$152,223	0.0%	0.0%	$0
14.0	79.5%	0.0%	$152,223	0.0%	0.0%	$0
15.0	80.2%	0.0%	$152,223	0.0%	0.0%	$0
16.0	80.7%	0.0%	$152,223	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$3,653	0.0%	0.0%	$0
0.0	8.1%	0.0%	$12,330	0.0%	0.0%	$0
1.0	13.3%	0.0%	$20,246	0.0%	0.0%	$0
2.0	17.9%	0.0%	$27,248	0.0%	0.0%	$0
3.0	22.0%	0.0%	$33,489	0.0%	0.0%	$0
4.0	25.7%	0.0%	$39,121	0.0%	0.0%	$0
5.0	28.8%	0.0%	$43,840	0.0%	0.0%	$0
6.0	31.5%	0.0%	$47,950	0.0%	0.0%	$0
7.0	33.8%	0.0%	$51,451	0.0%	0.0%	$0
8.0	35.7%	0.0%	$54,344	0.0%	0.0%	$0
9.0	37.2%	0.0%	$56,627	0.0%	0.0%	$0
10.0	38.4%	0.0%	$58,454	0.0%	0.0%	$0
11.0	39.2%	0.0%	$59,671	0.0%	0.0%	$0
12.0	39.7%	0.0%	$60,433	0.0%	0.0%	$0
13.0	40.0%	0.0%	$60,889	0.0%	0.0%	$0
14.0	40.0%	0.0%	$60,889	0.0%	0.0%	$0
15.0	40.0%	0.0%	$60,889	0.0%	0.0%	$0
16.0	40.0%	0.0%	$60,889	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 19998.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$3,814
	100%	$3,814

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$748	Annual:	$0	Annual:	$748
Present Value:	$10,675	Present Value:	$0	Present Value:	$10,675

Mitigation Benefits:	$10,675	Mitigation Costs:	$316,740
Benefits Minus Costs:	($306,065)	Benefit-Cost Ratio:	0.03

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$315,313	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$316,740	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 9232 Sunnymeade Pl, 9232 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $1,239,489 Costs: $232,881 BCR: 5.32

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.563893000000	Longitude:	-97.563335000000		
Size of Building:	1,008	BRV ($/sf):	$115.21	Total BRV:	$116,132
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No

Structure Elevation:	1,200.02	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	
Effective FIS Date:		FIRM Panel Number:		FIRM Effective Date:	
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$116,132 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:				Flood Zone Determination:	
Breaking Wave Height:	-1,704.37			Utilities that are not elevated:	No
Height FFE Above Grade:	1,200.02			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Length of road (miles)	
Total Reduced Street Maintenance Costs	$0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,198.4	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.19	546.0	1,201.19	546.0
50	2.00%	1,201.63	796.0	1,201.63	796.0
100	1.00%	1,201.80	908.0	1,201.80	908.0
500	0.20%	1,202.19	1,185.0	1,202.19	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$2,903	0.0%	0.0%	$0
0.0	13.4%	0.0%	$15,562	0.0%	0.0%	$0
1.0	23.3%	0.0%	$27,059	0.0%	0.0%	$0
2.0	32.1%	0.0%	$37,278	0.0%	0.0%	$0
3.0	40.1%	0.0%	$46,569	0.0%	0.0%	$0
4.0	47.1%	0.0%	$54,698	0.0%	0.0%	$0
5.0	53.2%	0.0%	$116,132	0.0%	0.0%	$0
6.0	58.6%	0.0%	$116,132	0.0%	0.0%	$0
7.0	63.2%	0.0%	$116,132	0.0%	0.0%	$0
8.0	67.2%	0.0%	$116,132	0.0%	0.0%	$0
9.0	70.5%	0.0%	$116,132	0.0%	0.0%	$0
10.0	73.2%	0.0%	$116,132	0.0%	0.0%	$0
11.0	75.4%	0.0%	$116,132	0.0%	0.0%	$0
12.0	77.2%	0.0%	$116,132	0.0%	0.0%	$0
13.0	78.5%	0.0%	$116,132	0.0%	0.0%	$0
14.0	79.5%	0.0%	$116,132	0.0%	0.0%	$0
15.0	80.2%	0.0%	$116,132	0.0%	0.0%	$0
16.0	80.7%	0.0%	$116,132	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$2,787	0.0%	0.0%	$0
0.0	8.1%	0.0%	$9,407	0.0%	0.0%	$0
1.0	13.3%	0.0%	$15,446	0.0%	0.0%	$0
2.0	17.9%	0.0%	$20,788	0.0%	0.0%	$0
3.0	22.0%	0.0%	$25,549	0.0%	0.0%	$0
4.0	25.7%	0.0%	$29,846	0.0%	0.0%	$0
5.0	28.8%	0.0%	$33,446	0.0%	0.0%	$0
6.0	31.5%	0.0%	$36,581	0.0%	0.0%	$0
7.0	33.8%	0.0%	$39,253	0.0%	0.0%	$0
8.0	35.7%	0.0%	$41,459	0.0%	0.0%	$0
9.0	37.2%	0.0%	$43,201	0.0%	0.0%	$0
10.0	38.4%	0.0%	$44,595	0.0%	0.0%	$0
11.0	39.2%	0.0%	$45,524	0.0%	0.0%	$0
12.0	39.7%	0.0%	$46,104	0.0%	0.0%	$0
13.0	40.0%	0.0%	$46,453	0.0%	0.0%	$0
14.0	40.0%	0.0%	$46,453	0.0%	0.0%	$0
15.0	40.0%	0.0%	$46,453	0.0%	0.0%	$0
16.0	40.0%	0.0%	$46,453	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	**Before Mitigation Values:**			**After Mitigation Values:**		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 19998.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$3,814
	100%	$3,814

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$81,141	Annual:	$0	Annual:	$81,141
Present Value:	$1,157,820	Present Value:	$0	Present Value:	$1,157,820

Mitigation Benefits:	$1,157,820	Mitigation Costs:	$232,881
Benefits Minus Costs:	$924,939	Benefit-Cost Ratio:	4.97

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$231,454	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$232,881	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 9300 Sunnymeade Pl, 9300 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $384,308 Costs: $256,003 BCR: 1.50

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.564137000000	Longitude:	-97.563381000000		
Size of Building:	1,453	BRV ($/sf):	$99.71	Total BRV:	$144,879
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No
Structure Elevation:	1,200.99	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	
Effective FIS Date:		FIRM Panel Number:		FIRM Effective Date:	
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$144,879 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:				Flood Zone Determination:	
Breaking Wave Height:	-1,704.37			Utilities that are not elevated:	No
Height FFE Above Grade:	1,200.99			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Length of road (miles)	
Total Reduced Street Maintenance Costs	$0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,198.4	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.19	546.0	1,201.19	546.0
50	2.00%	1,201.63	796.0	1,201.63	796.0
100	1.00%	1,201.80	908.0	1,201.80	908.0
500	0.20%	1,202.19	1,185.0	1,202.19	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$3,622	0.0%	0.0%	$0
0.0	13.4%	0.0%	$19,414	0.0%	0.0%	$0
1.0	23.3%	0.0%	$33,757	0.0%	0.0%	$0
2.0	32.1%	0.0%	$46,506	0.0%	0.0%	$0
3.0	40.1%	0.0%	$58,096	0.0%	0.0%	$0
4.0	47.1%	0.0%	$68,238	0.0%	0.0%	$0
5.0	53.2%	0.0%	$144,879	0.0%	0.0%	$0
6.0	58.6%	0.0%	$144,879	0.0%	0.0%	$0
7.0	63.2%	0.0%	$144,879	0.0%	0.0%	$0
8.0	67.2%	0.0%	$144,879	0.0%	0.0%	$0
9.0	70.5%	0.0%	$144,879	0.0%	0.0%	$0
10.0	73.2%	0.0%	$144,879	0.0%	0.0%	$0
11.0	75.4%	0.0%	$144,879	0.0%	0.0%	$0
12.0	77.2%	0.0%	$144,879	0.0%	0.0%	$0
13.0	78.5%	0.0%	$144,879	0.0%	0.0%	$0
14.0	79.5%	0.0%	$144,879	0.0%	0.0%	$0
15.0	80.2%	0.0%	$144,879	0.0%	0.0%	$0
16.0	80.7%	0.0%	$144,879	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$3,477	0.0%	0.0%	$0
0.0	8.1%	0.0%	$11,735	0.0%	0.0%	$0
1.0	13.3%	0.0%	$19,269	0.0%	0.0%	$0
2.0	17.9%	0.0%	$25,933	0.0%	0.0%	$0
3.0	22.0%	0.0%	$31,873	0.0%	0.0%	$0
4.0	25.7%	0.0%	$37,234	0.0%	0.0%	$0
5.0	28.8%	0.0%	$41,725	0.0%	0.0%	$0
6.0	31.5%	0.0%	$45,637	0.0%	0.0%	$0
7.0	33.8%	0.0%	$48,969	0.0%	0.0%	$0
8.0	35.7%	0.0%	$51,722	0.0%	0.0%	$0
9.0	37.2%	0.0%	$53,895	0.0%	0.0%	$0
10.0	38.4%	0.0%	$55,633	0.0%	0.0%	$0
11.0	39.2%	0.0%	$56,792	0.0%	0.0%	$0
12.0	39.7%	0.0%	$57,517	0.0%	0.0%	$0
13.0	40.0%	0.0%	$57,951	0.0%	0.0%	$0
14.0	40.0%	0.0%	$57,951	0.0%	0.0%	$0
15.0	40.0%	0.0%	$57,951	0.0%	0.0%	$0
16.0	40.0%	0.0%	$57,951	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 19998.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$3,814
	100%	$3,814

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$21,209	Annual:	$0	Annual:	$21,209
Present Value:	$302,639	Present Value:	$0	Present Value:	$302,639

Mitigation Benefits:	$302,639	Mitigation Costs:	$256,003
Benefits Minus Costs:	$46,636	Benefit-Cost Ratio:	1.18

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$254,576	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$256,003	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 9304 Sunnymeade Pl, 9304 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $92,655 Costs: $208,848 BCR: .44

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.564352000000	Longitude:	-97.563377000000		
Size of Building:	770	BRV ($/sf):	$125.91	Total BRV:	$96,951
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No
Structure Elevation:	1,202.59	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	
Effective FIS Date:		FIRM Panel Number:		FIRM Effective Date:	
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$96,951 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:				Flood Zone Determination:	
Breaking Wave Height:	-1,704.37			Utilities that are not elevated:	No
Height FFE Above Grade:	1,202.59			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Length of road (miles)	
Total Reduced Street Maintenance Costs	$0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,198.4	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.19	546.0	1,201.19	546.0
50	2.00%	1,201.63	796.0	1,201.63	796.0
100	1.00%	1,201.80	908.0	1,201.80	908.0
500	0.20%	1,202.19	1,185.0	1,202.19	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$2,424	0.0%	0.0%	$0
0.0	13.4%	0.0%	$12,991	0.0%	0.0%	$0
1.0	23.3%	0.0%	$22,590	0.0%	0.0%	$0
2.0	32.1%	0.0%	$31,121	0.0%	0.0%	$0
3.0	40.1%	0.0%	$38,877	0.0%	0.0%	$0
4.0	47.1%	0.0%	$45,664	0.0%	0.0%	$0
5.0	53.2%	0.0%	$96,951	0.0%	0.0%	$0
6.0	58.6%	0.0%	$96,951	0.0%	0.0%	$0
7.0	63.2%	0.0%	$96,951	0.0%	0.0%	$0
8.0	67.2%	0.0%	$96,951	0.0%	0.0%	$0
9.0	70.5%	0.0%	$96,951	0.0%	0.0%	$0
10.0	73.2%	0.0%	$96,951	0.0%	0.0%	$0
11.0	75.4%	0.0%	$96,951	0.0%	0.0%	$0
12.0	77.2%	0.0%	$96,951	0.0%	0.0%	$0
13.0	78.5%	0.0%	$96,951	0.0%	0.0%	$0
14.0	79.5%	0.0%	$96,951	0.0%	0.0%	$0
15.0	80.2%	0.0%	$96,951	0.0%	0.0%	$0
16.0	80.7%	0.0%	$96,951	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$2,327	0.0%	0.0%	$0
0.0	8.1%	0.0%	$7,853	0.0%	0.0%	$0
1.0	13.3%	0.0%	$12,894	0.0%	0.0%	$0
2.0	17.9%	0.0%	$17,354	0.0%	0.0%	$0
3.0	22.0%	0.0%	$21,329	0.0%	0.0%	$0
4.0	25.7%	0.0%	$24,916	0.0%	0.0%	$0
5.0	28.8%	0.0%	$27,922	0.0%	0.0%	$0
6.0	31.5%	0.0%	$30,539	0.0%	0.0%	$0
7.0	33.8%	0.0%	$32,769	0.0%	0.0%	$0
8.0	35.7%	0.0%	$34,611	0.0%	0.0%	$0
9.0	37.2%	0.0%	$36,066	0.0%	0.0%	$0
10.0	38.4%	0.0%	$37,229	0.0%	0.0%	$0
11.0	39.2%	0.0%	$38,005	0.0%	0.0%	$0
12.0	39.7%	0.0%	$38,489	0.0%	0.0%	$0
13.0	40.0%	0.0%	$38,780	0.0%	0.0%	$0
14.0	40.0%	0.0%	$38,780	0.0%	0.0%	$0
15.0	40.0%	0.0%	$38,780	0.0%	0.0%	$0
16.0	40.0%	0.0%	$38,780	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 19998.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$3,814
	100%	$3,814

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$770	Annual:	$0	Annual:	$770
Present Value:	$10,986	Present Value:	$0	Present Value:	$10,986

Mitigation Benefits:	$10,986	Mitigation Costs:	$208,848
Benefits Minus Costs:	($197,862)	Benefit-Cost Ratio:	0.05

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$207,421	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$208,848	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 9308 Sunnymeade Pl, 9308 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $81,860 Costs: $191,677 BCR: .43

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.564564000000	Longitude:	-97.563372000000		
Size of Building:	795	BRV ($/sf):	$125.91	Total BRV:	$100,098
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No

Structure Elevation:	1,203.90	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	
Effective FIS Date:		FIRM Panel Number:		FIRM Effective Date:	
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$100,098 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:				Flood Zone Determination:	
Breaking Wave Height:	-1,704.37			Utilities that are not elevated:	No
Height FFE Above Grade:	1,203.90			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Length of road (miles)	
Total Reduced Street Maintenance Costs	$0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,198.4	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.19	546.0	1,201.19	546.0
50	2.00%	1,201.63	796.0	1,201.63	796.0
100	1.00%	1,201.80	908.0	1,201.80	908.0
500	0.20%	1,202.19	1,185.0	1,202.19	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$2,502	0.0%	0.0%	$0
0.0	13.4%	0.0%	$13,413	0.0%	0.0%	$0
1.0	23.3%	0.0%	$23,323	0.0%	0.0%	$0
2.0	32.1%	0.0%	$32,132	0.0%	0.0%	$0
3.0	40.1%	0.0%	$40,139	0.0%	0.0%	$0
4.0	47.1%	0.0%	$47,146	0.0%	0.0%	$0
5.0	53.2%	0.0%	$100,098	0.0%	0.0%	$0
6.0	58.6%	0.0%	$100,098	0.0%	0.0%	$0
7.0	63.2%	0.0%	$100,098	0.0%	0.0%	$0
8.0	67.2%	0.0%	$100,098	0.0%	0.0%	$0
9.0	70.5%	0.0%	$100,098	0.0%	0.0%	$0
10.0	73.2%	0.0%	$100,098	0.0%	0.0%	$0
11.0	75.4%	0.0%	$100,098	0.0%	0.0%	$0
12.0	77.2%	0.0%	$100,098	0.0%	0.0%	$0
13.0	78.5%	0.0%	$100,098	0.0%	0.0%	$0
14.0	79.5%	0.0%	$100,098	0.0%	0.0%	$0
15.0	80.2%	0.0%	$100,098	0.0%	0.0%	$0
16.0	80.7%	0.0%	$100,098	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$2,402	0.0%	0.0%	$0
0.0	8.1%	0.0%	$8,108	0.0%	0.0%	$0
1.0	13.3%	0.0%	$13,313	0.0%	0.0%	$0
2.0	17.9%	0.0%	$17,918	0.0%	0.0%	$0
3.0	22.0%	0.0%	$22,022	0.0%	0.0%	$0
4.0	25.7%	0.0%	$25,725	0.0%	0.0%	$0
5.0	28.8%	0.0%	$28,828	0.0%	0.0%	$0
6.0	31.5%	0.0%	$31,531	0.0%	0.0%	$0
7.0	33.8%	0.0%	$33,833	0.0%	0.0%	$0
8.0	35.7%	0.0%	$35,735	0.0%	0.0%	$0
9.0	37.2%	0.0%	$37,237	0.0%	0.0%	$0
10.0	38.4%	0.0%	$38,438	0.0%	0.0%	$0
11.0	39.2%	0.0%	$39,239	0.0%	0.0%	$0
12.0	39.7%	0.0%	$39,739	0.0%	0.0%	$0
13.0	40.0%	0.0%	$40,039	0.0%	0.0%	$0
14.0	40.0%	0.0%	$40,039	0.0%	0.0%	$0
15.0	40.0%	0.0%	$40,039	0.0%	0.0%	$0
16.0	40.0%	0.0%	$40,039	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 19998.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$3,814
	100%	$3,814

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$13	Annual:	$0	Annual:	$13
Present Value:	$191	Present Value:	$0	Present Value:	$191

Mitigation Benefits: $191 Mitigation Costs: $191,677

Benefits Minus Costs: ($191,486) Benefit-Cost Ratio: 0.00

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$190,250	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$191,677	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Structure and Mitigation Details For: 9312 Sunnymeade Pl, 9312 Sunnymeade Pl, Oklahoma City, Oklahoma, 73120, Oklahoma

Benefits: $82,901 Costs: $249,153 BCR: .33

Hazard: **Flood**

Mitigation Option: Acquisition

Latitude:	35.564762000000	Longitude:	-97.563383000000		
Size of Building:	1,240	BRV ($/sf):	$106.81	Total BRV:	$132,444
Residential:	Yes	Building Type:	One-Story		
Obstruction:	N/A	Foundation Type:	Slab	Basement:	No
Building Primary Use:		Structure Type:		Historic Building:	No
Structure Elevation:	1,203.41	First Floor Being Raised:		Demolition Threshold:	50.00%
Source of Flood Data:	HH	Project in SFHA:	Yes	Community ID Number:	
Effective FIS Date:		FIRM Panel Number:		FIRM Effective Date:	
Project Useful Life:	100	H&H Study Title:	OKC Drainage	H&H Effective Date:	01/08/2018
Flood Zone:		Loss of Rent:	$0		
Building Contents:	$132,444 (Default)			Value of Crawlspace Contents:	$0
Ground Surface Elevation:				Flood Zone Determination:	
Breaking Wave Height:	-1,704.37			Utilities that are not elevated:	No
Height FFE Above Grade:	1,203.41			One Time Displacement Costs:	$0
NFIP:	No			Displacement Costs:	$267 (Default)
ICC:	No			Current federal lodging per diem:	$91
				Population affected :	4
				Current federal meals per diem:	$51
				Cost per person to eat meals at home:	$7

Street Maintenance Details

Street maintenance budget ($)

Miles of street (miles)

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Length of road (miles)	
Total Reduced Street Maintenance Costs	$0.00

Volunteer Costs

Number of Volunteers Required:	1	Number of Hours Volunteered/Person:	8
Cost of Volunteers Time ($/Hour/Person):	$21.45	Number of Days Lodging/Volunteer:	0
Per-Person Cost of Lodging for a Volunteer:	$0.00	Cost of Volunteers:	$0.00

Social Benefits

Mental Stress and Anxiety

Number of Person:	4
Treatment Costs per person:	$2,443.00
Total Mental Stress and Anxiety Cost:	$9,772.00

Lost Productivity

Number of Worker:	2
Productivity Loss per person:	$8,736.00
Total Lost Productivity Cost:	$17,472.00

Riverine Elevation and Discharge Data

Streambed Elevation (ft):	1,198.4	Flood Profile Number:	
Flood Source Name:			
Elevation At Which Barrier Will Be Overtopped:			
FEMA Elevation Certificate Diagram Description:	Other	Other Elevation Source:	LiDAR

Recurrence Interval (yr)	Percent Annual Chance (%)	Elevation Before Mitigation (ft)	Discharge Before Mitigation (cfs)	Elevation After Mitigation (ft)	Discharge After Mitigation (cfs)
10	10.00%	1,201.19	546.0	1,201.19	546.0
50	2.00%	1,201.63	796.0	1,201.63	796.0
100	1.00%	1,201.80	908.0	1,201.80	908.0
500	0.20%	1,202.19	1,185.0	1,202.19	1,185.0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Building	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.5%	0.0%	$3,311	0.0%	0.0%	$0
0.0	13.4%	0.0%	$17,748	0.0%	0.0%	$0
1.0	23.3%	0.0%	$30,860	0.0%	0.0%	$0
2.0	32.1%	0.0%	$42,515	0.0%	0.0%	$0
3.0	40.1%	0.0%	$53,110	0.0%	0.0%	$0
4.0	47.1%	0.0%	$62,381	0.0%	0.0%	$0
5.0	53.2%	0.0%	$132,444	0.0%	0.0%	$0
6.0	58.6%	0.0%	$132,444	0.0%	0.0%	$0
7.0	63.2%	0.0%	$132,444	0.0%	0.0%	$0
8.0	67.2%	0.0%	$132,444	0.0%	0.0%	$0
9.0	70.5%	0.0%	$132,444	0.0%	0.0%	$0
10.0	73.2%	0.0%	$132,444	0.0%	0.0%	$0
11.0	75.4%	0.0%	$132,444	0.0%	0.0%	$0
12.0	77.2%	0.0%	$132,444	0.0%	0.0%	$0
13.0	78.5%	0.0%	$132,444	0.0%	0.0%	$0
14.0	79.5%	0.0%	$132,444	0.0%	0.0%	$0
15.0	80.2%	0.0%	$132,444	0.0%	0.0%	$0
16.0	80.7%	0.0%	$132,444	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Contents	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (pct)**	**Before Mitigation User Entered (pct)**	**Before Mitigation ($)**	**After Mitigation (pct)**	**After Mitigation User Entered (pct)**	**After Mitigation ($)**
-2.0	0.0%	0.0%	$0	0.0%	0.0%	$0
-1.0	2.4%	0.0%	$3,179	0.0%	0.0%	$0
0.0	8.1%	0.0%	$10,728	0.0%	0.0%	$0
1.0	13.3%	0.0%	$17,615	0.0%	0.0%	$0
2.0	17.9%	0.0%	$23,708	0.0%	0.0%	$0
3.0	22.0%	0.0%	$29,138	0.0%	0.0%	$0
4.0	25.7%	0.0%	$34,038	0.0%	0.0%	$0
5.0	28.8%	0.0%	$38,144	0.0%	0.0%	$0
6.0	31.5%	0.0%	$41,720	0.0%	0.0%	$0
7.0	33.8%	0.0%	$44,766	0.0%	0.0%	$0
8.0	35.7%	0.0%	$47,283	0.0%	0.0%	$0
9.0	37.2%	0.0%	$49,269	0.0%	0.0%	$0
10.0	38.4%	0.0%	$50,859	0.0%	0.0%	$0
11.0	39.2%	0.0%	$51,918	0.0%	0.0%	$0
12.0	39.7%	0.0%	$52,580	0.0%	0.0%	$0
13.0	40.0%	0.0%	$52,978	0.0%	0.0%	$0
14.0	40.0%	0.0%	$52,978	0.0%	0.0%	$0
15.0	40.0%	0.0%	$52,978	0.0%	0.0%	$0
16.0	40.0%	0.0%	$52,978	0.0%	0.0%	$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Displacement	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$12,015	0.0		$0
2.0	90.0		$24,030	0.0		$0
3.0	135.0		$36,045	0.0		$0
4.0	180.0		$48,060	0.0		$0
5.0	225.0		$60,075	0.0		$0
6.0	270.0		$72,090	0.0		$0
7.0	315.0		$84,105	0.0		$0
8.0	360.0		$96,120	0.0		$0
9.0	405.0		$108,135	0.0		$0
10.0	450.0		$120,150	0.0		$0
11.0	495.0		$132,165	0.0		$0
12.0	540.0		$144,180	0.0		$0
13.0	585.0		$156,195	0.0		$0
14.0	630.0		$168,210	0.0		$0
15.0	675.0		$180,225	0.0		$0
16.0	720.0		$192,240	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Depth-Damage Functions Using USACE Generic

Loss of Function	Before Mitigation Values:			After Mitigation Values:		
Flood Depth (ft)	**Before Mitigation (Days)**	**Before Mitigation User Entered (Days)**	**Before Mitigation ($)**	**After Mitigation (Days)**	**After Mitigation User Entered (Days)**	**After Mitigation ($)**
-2.0	0.0		$0	0.0		$0
-1.0	0.0		$0	0.0		$0
0.0	0.0		$0	0.0		$0
1.0	45.0		$0	0.0		$0
2.0	90.0		$0	0.0		$0
3.0	135.0		$0	0.0		$0
4.0	180.0		$0	0.0		$0
5.0	225.0		$0	0.0		$0
6.0	270.0		$0	0.0		$0
7.0	315.0		$0	0.0		$0
8.0	360.0		$0	0.0		$0
9.0	405.0		$0	0.0		$0
10.0	450.0		$0	0.0		$0
11.0	495.0		$0	0.0		$0
12.0	540.0		$0	0.0		$0
13.0	585.0		$0	0.0		$0
14.0	630.0		$0	0.0		$0
15.0	675.0		$0	0.0		$0
16.0	720.0		$0	0.0		$0

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Environmental Benefits

Land Use

Total Project Area (Acres): 19998.00000000

Parcel Type	% of Parcel Type Being Used	$/Acre/Year
Green Open Space	100%	$3,814
	100%	$3,814

Other Benefits

Other Benefits Before Mitigation

No Data

Other Benefits After Mitigation

No Data

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

BCR Calculation Results

Expected Annual Damages Before Mitigation		Expected Annual Damages After Mitigation		Expected Avoided Damages After Mitigation (Benefits)	
Annual:	$86	Annual:	$0	Annual:	$86
Present Value:	$1,232	Present Value:	$0	Present Value:	$1,232

Mitigation Benefits: $1,232 Mitigation Costs: $249,153

Benefits Minus Costs: ($247,921) Benefit-Cost Ratio: 0.00

Cost Estimate

Project Useful Life (years):	100	Construction Type:	
Mitigation Project Cost:	$247,726	Detailed Scope of Work:	Yes
Annual Project Maintenance Cost:	$100	Detailed Estimate for Entire Project:	Yes
Final Mitigation Project Cost:	$249,153	Years of Maintenance:	100
Cost Basis Year:		Present Worth of Annual Maintenance Costs:	$1,427
Construction Start Year:		Estimate Reflects Current Prices:	Yes
Construction End Year:		Project Escalation:	

Total Benefits: **$2,664,443** Total Costs: **$1,929,025** BCR: **1.03**

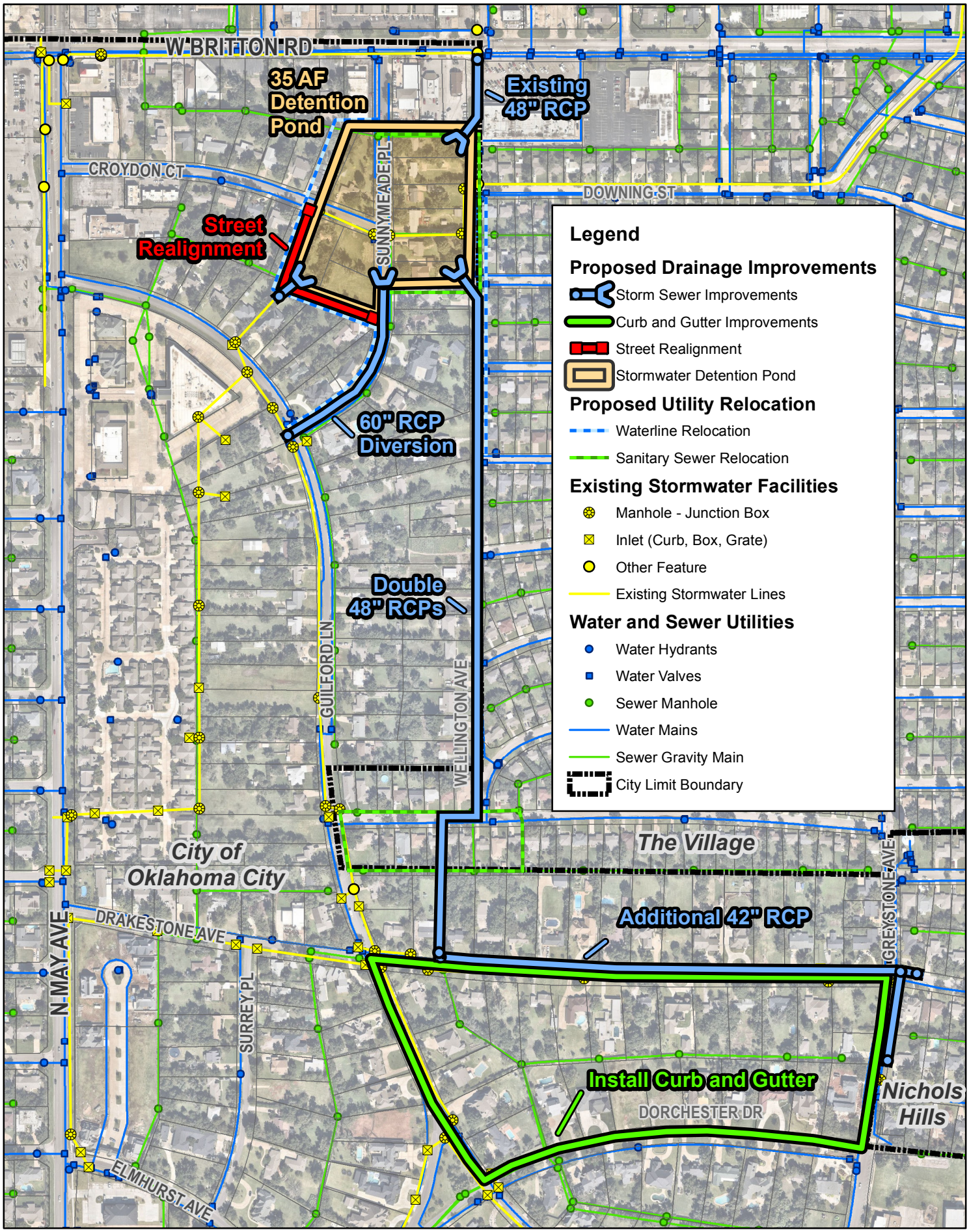
Project Number: 17OKC02 Disaster #: Program: HMGP Agency: **Meshek & Associates LLC**

State: Point of Contact: Analyst: Jason Kleps

Justification/Attachments

Field	Description	Attachments

Nichols Hills Drainage Improvements



OKLAHOMA CITY NICHOLS HILLS DRAINAGE IMPROVEMENTS					
ITEM NUMBER	ROADWAY AND STORM SEWER PAY ITEMS (Double 48" RCP)	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	TRENCH EXCAVATION	CY	17841	$ 12.00	$ 214,092.00
2	ASPHALTIC CONCRETE PAVEMENT	TON	1777	$ 85.00	$ 151,048.19
3	SUBGRADE PREPARATION	SY	5887	$ 5.00	$ 29,433.33
4	CONC. CURB (6" BARRIER-INTEGRAL)	LF	3015	$ 35.00	$ 105,525.00
5	(SP) 48" CORRUGATED POLYPROPYLENE PIPE	LF	5268	$ 210.00	$ 1,106,280.00
6	INLET	EA	8	$ 5,000.00	$ 40,000.00
7	JUNCTION BOX	EA	6	$ 12,000.00	$ 72,000.00
8	GRANULAR BACKFILL	CY	13849	$ 45.00	$ 623,205.00
9	REMOVE CURB & GUTTER	LF	3015	$ 7.00	$ 21,105.00
10	PAVEMENT REMOVAL	SY	1777	$ 12.00	$ 21,324.45
11	REMOVE DRIVEWAY	SY	768	$ 12.00	$ 9,216.00
12	6" P.C. CONC. DRIVEWAY (HES)	SY	768	$ 75.00	$ 57,600.00
13	SOLID SLAB SODDING	SY	4811	$ 3.50	$ 16,838.89
14	TEMPORARY SILT FENCE	LF	2165	$ 3.00	$ 6,495.00
15	MOBILIZATION	EA	1	$ 157,000.00	$ 157,000.00
				ROADWAY AND STORM SEWER SUBTOTAL	$ 2,631,162.86

ITEM NUMBER	ROADWAY AND STORM SEWER PAY ITEMS (Storm sewer and roadway on Drakestone, Greystone, Dorchester & Guilford)	UNIT	QUANTITY	UNIT PRICE	AMOUNT
16	TRENCH EXCAVATION	CY	5313	$ 12.00	$ 63,756.00
17	ASPHALTIC CONCRETE PAVEMENT	TON	3462	$ 85.00	$ 294,227.50
18	SUBGRADE PREPARATION	SY	11467	$ 5.00	$ 57,333.33
19	CONC. CURB (6" BARRIER-INTEGRAL)	LF	8600	$ 35.00	$ 301,000.00
20	(SP) 42" CORRUGATED POLYPROPYLENE PIPE	LF	2022	$ 180.00	$ 363,960.00
21	JUNCTION BOX	EA	4	$ 12,000.00	$ 48,000.00
22	GRANULAR BACKFILL	CY	1843	$ 45.00	$ 82,935.00
23	REMOVE CURB & GUTTER	LF	200	$ 7.00	$ 1,400.00
24	PAVEMENT REMOVAL	SY	3462	$ 12.00	$ 41,538.00
25	REMOVE DRIVEWAY	SY	3024	$ 12.00	$ 36,288.00
26	6" P.C. CONC. DRIVEWAY (HES)	SY	3024	$ 75.00	$ 226,800.00
27	SOLID SLAB SODDING	SY	9556	$ 3.50	$ 33,444.44
28	TEMPORARY SILT FENCE	LF	8600	$ 3.00	$ 25,800.00
29	MOBILIZATION	EA	1	$ 109,000.00	$ 109,000.00
				ROADWAY AND STORM SEWER SUBTOTAL	$ 1,685,482.28

ITEM NUMBER	60" STORM SEWER DIVERSION AT SUNNYMEADE	UNIT	QUANTITY	UNIT PRICE	AMOUNT
30	TRENCH EXCAVATION	CY	1351	$ 12.00	$ 16,212.00
31	ASPHALTIC CONCRETE PAVEMENT	TON	483	$ 85.00	$ 41,055.00
32	SUBGRADE PREPARATION	SY	1600	$ 5.00	$ 8,000.00
33	CONC. CURB (6" BARRIER-INTEGRAL)	LF	1200	$ 35.00	$ 42,000.00
34	(SP) 60" CORRUGATED POLYPROPYLENE PIPE	LF	579	$ 250.00	$ 144,750.00
35	MANHOLE (8' DIA.)	EA	6	$ 8,500.00	$ 51,000.00
36	GRANULAR BACKFILL	CY	625	$ 45.00	$ 28,142.17
37	REMOVE CURB & GUTTER	LF	1200	$ 7.00	$ 8,400.00
38	PAVEMENT REMOVAL	SY	483	$ 12.00	$ 5,796.00
39	REMOVE DRIVEWAY	SY	300	$ 12.00	$ 3,600.00
40	6" P.C. CONC. DRIVEWAY (HES)	SY	300	$ 75.00	$ 22,500.00

41	SOLID SLAB SODDING	SY	1200	$ 3.50	$ 4,200.00
42	TEMPORARY SILT FENCE	LF	1200	$ 3.00	$ 3,600.00
				60" STORM SEWER DIVERSION SUBTOTAL	$ 379,255.17

ITEM NUMBER	DETENTION POND PAY ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
43	EARTHWORK	CY	65000	$ 15.00	$ 975,000.00
44	ASPHALTIC CONCRETE PAVEMENT	TON	296	$ 85.00	$ 25,146.19
45	SUBGRADE PREPARATION	SY	980	$ 5.00	$ 4,900.00
46	SOLID SLAB SODDING	SY	28465	$ 3.50	$ 99,627.89
47	TEMPORARY SILT FENCE	LF	2100	$ 3.00	$ 6,300.00
48	POND OUTLET STRUCTURE	LS	1	$ 100,000.00	$ 100,000.00
				DETENTION POND SUBTOTAL	$ 1,210,974.08

ITEM NUMBER	WATERLINE PAY ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
49	TRENCH EXCAVATION	CY	1133	$ 12.00	$ 13,600.00
50	GRANULAR BACKFILL	CY	1133	$ 45.00	$ 51,000.00
51	6" WATERLINE RELOCATION	LF	2550	$ 120.00	$ 306,000.00
				WATERLINE SUBTOTAL	$ 370,600.00

ITEM NUMBER	SANITARY SEWER PAY ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
52	TRENCH EXCAVATION AND BACKFILL (0' TO 10')	CY	4000	$ 12.00	$ 48,000.00
53	GRANULAR BACKFILL	CY	4000	$ 45.00	$ 180,000.00
54	SANITARY SEWER MANHOLE (4' DIA.)	EA	14	$ 3,500.00	$ 49,000.00
55	8" PVC PIPE C-900	LF	2700	$ 120.00	$ 324,000.00
				SANITARY SEWER SUBTOTAL	$ 601,000.00

PROJECT SUBTOTAL	$ 6,878,474.38
15% CONTINGENCY	$ 1,031,771.16
PROJECT TOTAL	$ 7,910,245.54