

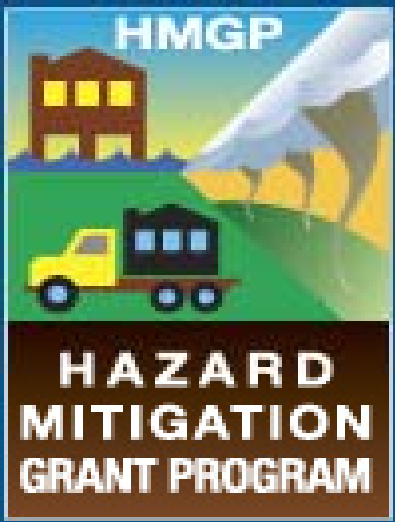
HAZARD MITIGATION GRANT PROGRAM

FUNDING OPPORTUNITIES FOR STORMWATER MANAGEMENT



FEMA

Unified Hazard Mitigation Assistance



Request for HMGP

- HMGP may become available after a Presidential Disaster Declaration
- Request is made by the Governor
- Request can be for the entire State or in specific jurisdictions

Eligible Applicants

- State Agencies
- Local Governments
- Private Non Profit (PNP) – 501C3



HMGP Cost-Share

Type Cost-Share	Requirement
Federal share	Up to 75%
Non-Federal share	At least 25%
In-kind contributions	No cash requirement
Other Federal funds	In some cases (CBDG)
ICC insurance benefits	Possible cost share for elevation/acquisition/relocation projects

Projects—Cost-Effectiveness

- **Cost-Effectiveness:**
 - Benefit-Cost Ratio of at least 1:0
 - Demonstrates that the overall mitigation project benefits will be greater than or equal to the project costs
 - Should be calculated using FEMA-provided software

Drainage Projects

- Application
- Shortcomings
- Success Stories

Drainage Projects: Biddison Run Stabilization

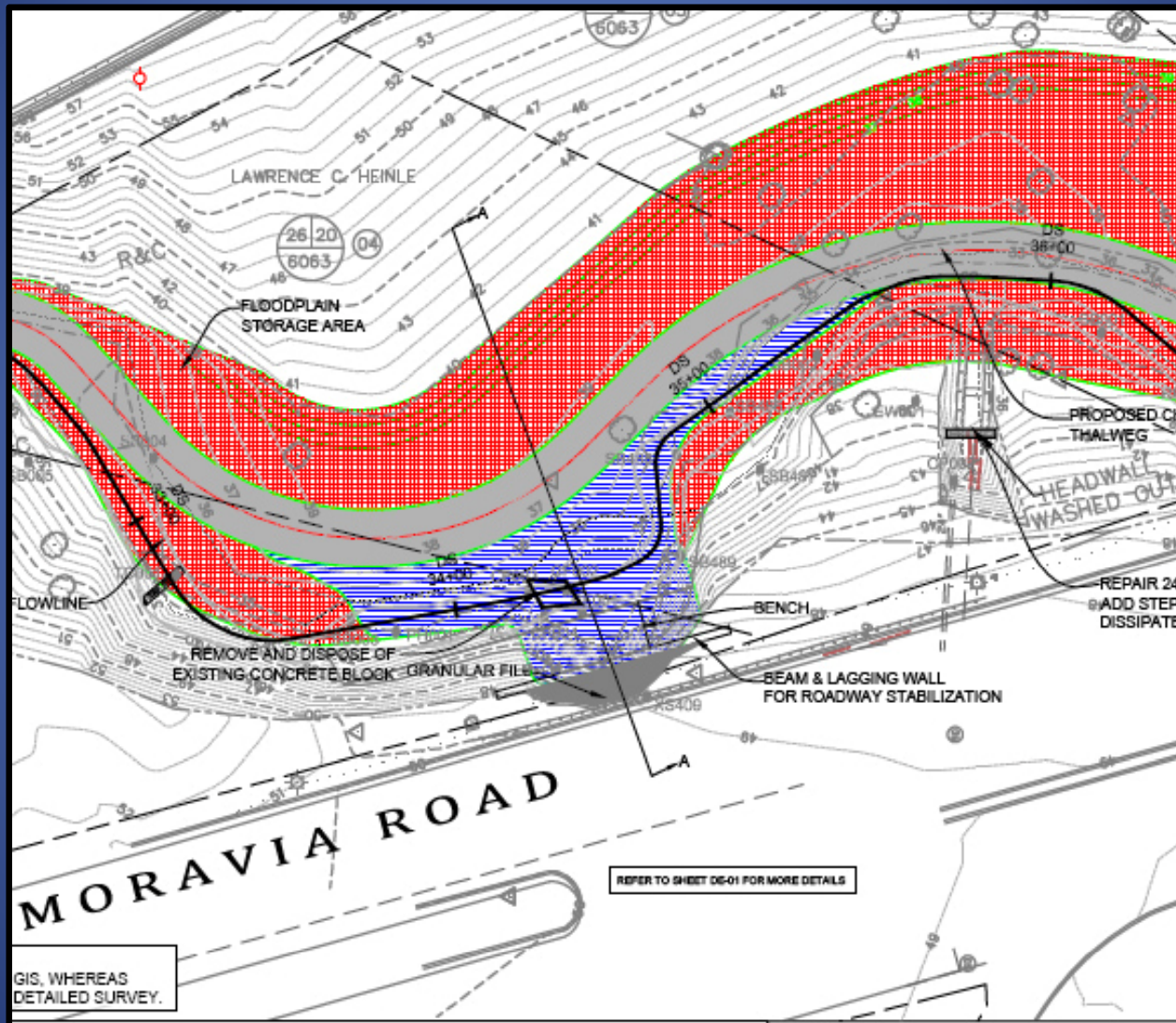


July 2010 – Erosion has progressed significantly. Photos on the right show that Moravia Road is now being undermined.

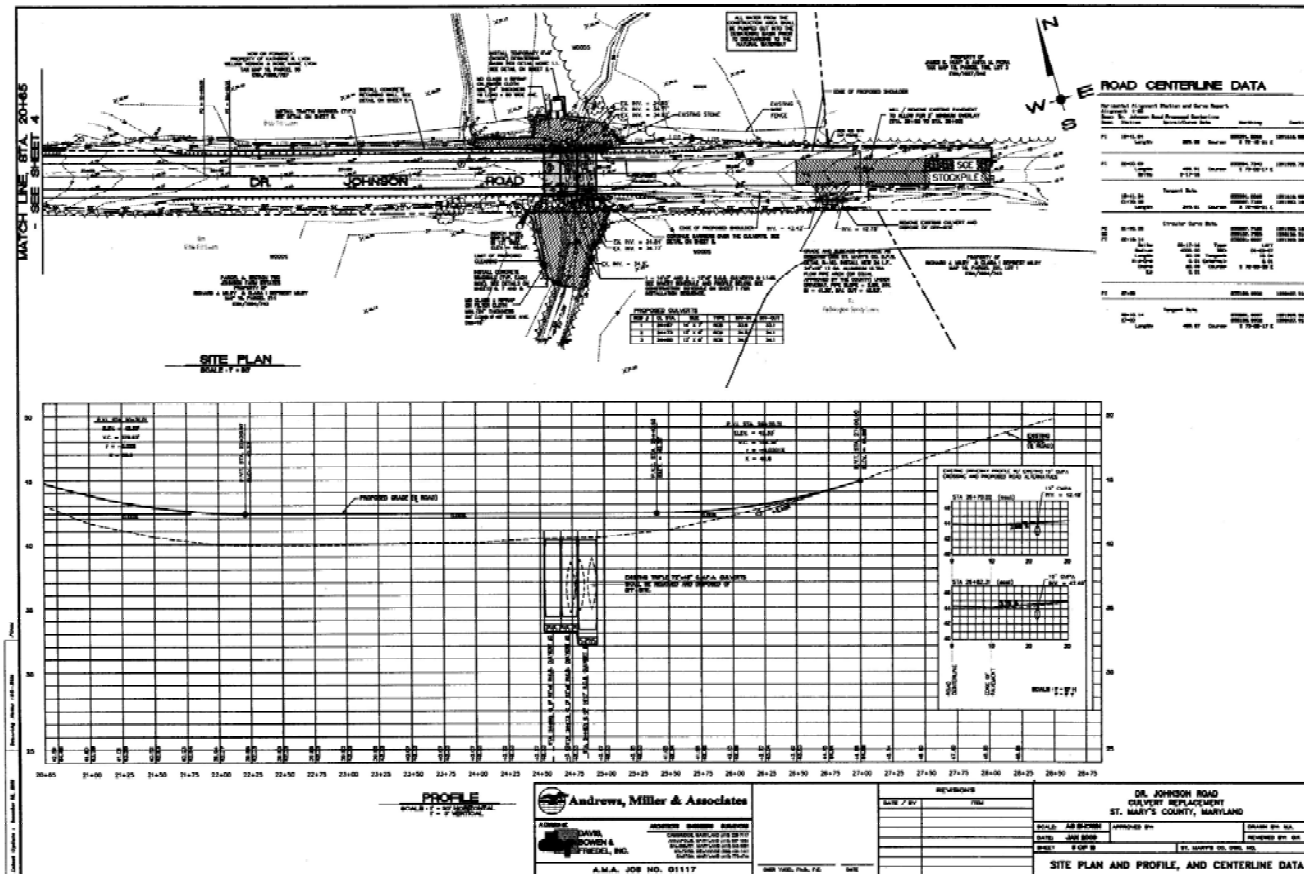


Photos taken 7/22/10

Figure 1: Erosion progression (July 2010)



Drainage Projects: Dr. Johnson Road Culvert Replacement



FLOODING EVENTS CLOSING DR. JOHNSON ROAD

Date	Road Closed	No. Days Closed	Event	Rainfall Amount
9/6/2008	Yes	2	Tropical Storm Hanna	4" - 8"
9/1/2006	Yes	2	Tropical Storm Ernesto	7" - 10"
9/18/2003	Yes	2	Hurricane Isabel	10"
6/7/2003	Yes	1	Unnamed Heavy Rain Event	2" - 3"
3/20/2003	Yes	1	Unnamed Heavy Rain Event	2.5"
2/22/2003	Yes	2	Unnamed Heavy Rain Event	3" - 4"
8/12/2001	Yes	1	Unnamed Heavy Rain Event	2.68"
7/26/2001	Yes	2	Unnamed Heavy Rain Event	5.15"
7/16/2001	Yes	1	Unnamed Heavy Rain Event	2.46"
6/15/2001	Yes	1	Tropical Storm Allison	2.45"
5/25/2001	Yes	1	Unnamed Heavy Rain Event	1.92"
3/21/2001	Yes	2	Nor'easter	2.5"
12/16/2000	Yes	1	Unnamed Heavy Rain Event	2.28"
11/25/2000	Yes	1	Unnamed Heavy Rain Event	1.94"
9/24/2000	Yes	1	Unnamed Heavy Rain Event	2.91"
9/14/2000	Yes	1	Unnamed Heavy Rain Event	1.72"
9/2/2000	Yes	1	Unnamed Heavy Rain Event	3.75"
8/4/2000	Yes	½	Unnamed Heavy Rain Event	1.67"
7/28/2000	Yes	½	Unnamed Heavy Rain Event	2.25"
7/3/2000	Yes	½	Unnamed Heavy Rain Event	2.64"
6/27/2000	Yes	½	Unnamed Heavy Rain Event	1.50"
6/15/2000	Yes	½	Unnamed Heavy Rain Event	1.75"
6/12/2000	Yes	½	Unnamed Heavy Rain Event	2.51"
3/21/2000	Yes	1	Unnamed Heavy Rain Event	2.54"
3/24/2000	Yes	1	Unnamed Heavy Rain Event	2.54"
9/16/1999	Yes	2	Hurricane Floyd	8" - 12"

Recurring Interval Associated to Flood Events 1999 - 2008

Year	Rainfall Average (inches)	Associated Recurring Interval
2008	6	0.6
2006	8.5	9.0
2003	6	3.0
2001	3.23	0.6
2000	2.63	0.6
1999	10	4.5

DPW&T
Traffic Reports

Start Time	Mon 16-Jun-08	Tue 17-Jun-08	Wed 18-Jun-08	Thu 19-Jun-08	Fri 20-Jun-08	Average Day	Sat 21-Jun-08	Sun 22-Jun-08	Week Average
12:00 AM	*	2	22	8	4	9	*	*	9
01:00	*	2	0	4	4	2	*	*	2
02:00	*	2	2	6	9	5	*	*	5
03:00	*	0	1	0	0	0	*	*	0
04:00	*	0	0	0	0	0	*	*	0
05:00	*	6	2	0	0	2	*	*	2
06:00	*	8	6	14	8	9	*	*	9
07:00	*	38	34	36	37	36	*	*	36
08:00	*	54	54	64	58	58	*	*	58
09:00	*	40	48	33	36	39	*	*	39
10:00	46	38	34	35	38	38	*	*	38
11:00	54	45	50	44	*	48	*	*	48
12:00 PM	58	43	88	57	*	62	*	*	62
01:00	61	42	93	52	*	62	*	*	62
02:00	72	42	52	53	*	55	*	*	55
03:00	78	60	52	40	*	58	*	*	58
04:00	86	90	72	84	*	83	*	*	83
05:00	90	104	118	86	*	100	*	*	100
06:00	114	113	92	120	*	110	*	*	110
07:00	72	100	97	114	*	96	*	*	96
08:00	58	76	90	72	*	74	*	*	74
09:00	44	64	82	74	*	66	*	*	66
10:00	24	58	42	60	*	46	*	*	46
11:00	13	25	26	30	*	24	*	*	24
Day Total	870	1052	1157	1086	194	1082	0	0	1082
% Avg. WkDay	80.4%	97.2%	106.9%	100.4%	17.9%				
% Avg. Week	80.4%	97.2%	106.9%	100.4%	17.9%	100.0%	0.0%	0.0%	
AM Peak Vol.	11:00 64	08:00 54	08:00 54	08:00 64	08:00 58	08:00 58			08:00 58
PM Peak Vol.	18:00 114	18:00 113	17:00 118	18:00 120		18:00 110			18:00 110
Grand Total	870	1052	1157	1086	194	1082	0	0	1082
ADT		ADT 1,098		AADT 1,098					

Cost Justification for Dr. Johnson Road Culvert Replacement Damages Before Mitigation

EVENT	ACTION	RATE (\$)	TIME (HR)	TOTAL
2003				
	DPW			
	Maintenance of traffic	400	11	\$4,400.00
	Debris removal and culvert clean out	250	14	\$3,500.00
	Event monitoring / traffic control	200	25	\$5,000.00
	Pre and post event stream maintenance	400	13	\$5,200.00
	SUB TOTAL			\$18,100.00
	EMT/POLICE			
	Detour time response	150	2	\$300.00
	Coordination efforts	100	3	\$300.00
	Event monitoring / traffic control	150	22	\$3,300.00
	SUB TOTAL			\$3,900.00
	SCHOOL			
	Detour time response	50	20	\$1,000.00
	SUB TOTAL			\$1,000.00
	UTILITIES			
	Detour time response	100	20	\$2,000.00
	SUB TOTAL			\$2,000.00
	TOTAL			\$25,000.00

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