

Appendix D-2 – Hazard Mitigation Field Inspection Checklist

HAZARD MITIGATION FIELD INSPECTION CHECKLIST		
Name of Reviewer:		Applicant:
Name of Preparer:		PW No.      Date:
Disaster Type	Damaged Element/Mitigation Measure	Reference(s)
Flood	<b><u>Buildings-General</u></b>	
	<input type="checkbox"/> Relocate out of floodplain (critical facility)	FMMH pg. 72
	<input type="checkbox"/> Elevate building above Advisory Base Flood elevation and/or flood of record	Appendix A II.A.1 FMMH pg. 73
	<input type="checkbox"/> Install back-up generators and float switches in critical facilities	
	<input type="checkbox"/> Dry floodproof	Appendix A II.A.1 FMMH pg. 75
	• Example: Install watertight doors and seal building	
	<input type="checkbox"/> Protect with installation of flood gates	
	Wet floodproof	
	<input type="checkbox"/> • Example: Use water-resistant materials, such as epoxy flooring or flooring with waterproof adhesive, or install flood vents for water to enter and flow out	Appendix A II.A.2 FMMH pg. 74
	<input type="checkbox"/> Install breakaway walls	HMM pg. 27
	<input type="checkbox"/> Construct flood-resistant equipment enclosures	HMM pg. 36
	<input type="checkbox"/> Relocate essential services to higher floors	
	<input type="checkbox"/> Stabilize materials	
	<b><u>Building - Exterior</u></b>	
	<input type="checkbox"/> <b>Foundation</b>	
	• Install hydrostatic vents	
	• Install impressed current systems to protect exposed reinforcing steel	
	• Strengthen wall-to-foundation connect	HMM pg. 30
	<input type="checkbox"/> <b>Doors (exterior and rollup)</b>	
	• Replace with galvanized hollow-metal and fiberglass	
• Brace horizontally and vertically		
• Replace with stainless steel hardware		
• Install submarine doors		
<input type="checkbox"/> <b>Siding</b>		
• Install double-hemmed vinyl, naturally decay-resistant wood (cedar, redwood, cypress); attach with corrosion-resistant fasteners		
<input type="checkbox"/> <b>Fencing</b>		
• Use heavier gage material	FMMH pg. 94	
• Add back bracing to line posts	FMMH pg. 94	
• Install intermediate line posts	FMMH pg. 94	
<b><u>Building-Interior</u></b>		
<input type="checkbox"/> <b>Walls</b>		
• Install marine-grade plywood and fiberglass panels (in lieu of gypsum board)	HMM pg. 31	
• Use fiberglass tape, stainless steel fasteners	HMM pg. 31	
• Install ground fault interrupter (GFI) circuits	HMM pg. 32	
<input type="checkbox"/> <b>Ceiling</b>		
• Install mold-resistant ceiling tiles		

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Disaster Type	Damaged Element/Mitigation Measure	Reference(s)
	<input type="checkbox"/> <b>Doors</b> <ul style="list-style-type: none"> <li>• Install galvanized hollow-metal, vinyl, or fiberglass doors with stainless steel hardware</li> <li>• Install polyurethane wood doors</li> </ul>	HMH pg. 43
	<input type="checkbox"/> <b>Floors</b> <ul style="list-style-type: none"> <li>• Install vinyl sheet floors, vinyl tile with water-proof adhesives, terrazzo, ceramic tile, rubber sheets, epoxy formed-in-place, marine-grade plywood for subfloors</li> <li>• Substitute water-proof materials – copolymer floor</li> <li>• Install commercial rubberized tile or sheet flooring on athletic surfaces</li> </ul>	HMH pg. 31  HMH pg. 31
	<input type="checkbox"/> <b>Cabinets</b> <ul style="list-style-type: none"> <li>• Install marine-grade plywood, mold- and water-resistant materials for surfaces</li> </ul>	
	<input type="checkbox"/> <b>Elevators</b> <ul style="list-style-type: none"> <li>• Elevate controls, hydraulic pumps, and reservoirs</li> </ul>	HMH pg. 35
	<b>Other</b>	
	<input type="checkbox"/> <b>Mold Remediation</b> <ul style="list-style-type: none"> <li>• Use non-porous, water-resistant materials</li> </ul>	
	<input type="checkbox"/> <b>Generator</b> <ul style="list-style-type: none"> <li>• Elevate (on platform)</li> </ul>	
	<input type="checkbox"/> <b>HVAC</b> <ul style="list-style-type: none"> <li>• Elevate HVAC equipment</li> </ul>	HMH pg. 33
	<input type="checkbox"/> <b>Utilities</b> <ul style="list-style-type: none"> <li>• Line pipes using slip or inversion technique</li> <li>• Relocate, extend to bury lines</li> <li>• Elevate</li> <li>• Encase lines in concrete or conduit</li> <li>• Bury utilities</li> </ul>	FHMH pg. 85 FHMH pg. 82 FHMH pg. 83 FHMH pg. 84 FHMH pg. 87
	<input type="checkbox"/> <b>Electrical Power Distribution</b> <ul style="list-style-type: none"> <li>• Elevate pad-mounted transformers</li> <li>• Use multiple poles</li> <li>• Install anchoring</li> <li>• Replace damaged poles with higher-rated poles</li> <li>• Add guy wire or additional support to power lines</li> <li>• Remove larger diameter lines from poles</li> <li>• Elevate electrical panels</li> <li>• Provide looped distribution service or other redundancies in the electrical service to critical facilities</li> </ul>	Appendix A I.E.1 Appendix A I.E.2 Appendix A I.E.3 Appendix A I.E.4 Appendix A I.E.5 Appendix A I.E.6  Appendix A I.E.7
	<b><u>Drainage Crossings/Bridges/Roads</u></b>	
	<input type="checkbox"/> <b>Bridges</b> <ul style="list-style-type: none"> <li>• Lower bridge footings below scour line</li> <li>• Install flow deflectors and bull noses on upstream piers</li> <li>• Underpin footing prone to scour</li> <li>• Replace low-water crossings (for destroyed bridges with</li> </ul>	FHMH pg. 62  Appendix A I.A.4

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Disaster Type	Damaged Element/Mitigation Measure	Reference(s)
	low-traffic count) <ul style="list-style-type: none"> <li>• Construct bridge wingwalls</li> <li>• Install additional bridge openings or spans</li> <li>• Realign piers and abutments</li> <li>• Increase footing depth</li> </ul>	Appendix A I.A.3 FHMH pg. 49 FHMH pg. 51 FHMH pg. 52 FHMH pg. 61
	<input type="checkbox"/> <b>Culverts</b> <ul style="list-style-type: none"> <li>• Relocate to improve hydraulics and minimize erosion</li> <li>• Increase size (hydrologic/hydraulic study required)</li> <li>• Change culvert alignment</li> <li>• Increase entrance/outlet of culvert</li> <li>• Install additional culverts</li> <li>• Change culvert type: box or arch culverts, CMP vs RCP</li> <li>• Replace with bridge</li> <li>• Replace with or add a low-water crossing</li> </ul>	Appendix A I.A.2 HMM pg. 10 Appendix A I.A.2 FHMH pg 21 FHMH pg 23 FHMH pg. 22 FHMH pg. 6 & 24 FHMH pg. 25 FHMH pg. 26 FHMH pg. 27
	<input type="checkbox"/> <b>Drainage Structures</b> <ul style="list-style-type: none"> <li>• Increase capacity with multiple structure or larger structure</li> <li>• Line ditches</li> <li>• Protect outside curve walls with gabions</li> <li>• Install check dams</li> </ul>	Appendix A I.A.1 FHMH pg. 4 FHMH pg. 5 Appendix A I.A.5 FHMH pg. 7
	<input type="checkbox"/> <b>Roads</b> <ul style="list-style-type: none"> <li>• Stabilize shoulders with geo textile fabric</li> <li>• Pave gravel roads</li> <li>• Relocate road</li> <li>• Change geometry of the road</li> <li>• Grade ditches and shoulders</li> <li>• Install drainage structure</li> <li>• Elevate road</li> </ul>	Appendix A I.A.6 FHMH pg. 9 & 16 HMM pg. 4 HMM pg. 8 FHMH pg. 11  FHMG pg. 15
	<input type="checkbox"/> <b>Irrigation Facility</b> <ul style="list-style-type: none"> <li>• Install inverted siphon</li> <li>• Line earthen canals</li> <li>• Place riprap</li> <li>• Install flow diverters</li> </ul>	FHMH pg. 90 FHMH pg. 91
	<b>Sanitary and Storm Sewer Systems</b>	
	<input type="checkbox"/> <b>Access Cover</b> <ul style="list-style-type: none"> <li>• Elevate to hydraulic grade line</li> </ul>	Appendix A I.B.1
	<input type="checkbox"/> <b>Sewer Line</b> <ul style="list-style-type: none"> <li>• Repair lining or encasement of damaged sections</li> <li>• Relocate</li> <li>• Install backflow preventers</li> </ul>	Appendix A I.B.2
	<input type="checkbox"/> <b>Pump Stations</b>	

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	<ul style="list-style-type: none"> <li>• Elevate or floodproof equipment and controls</li> <li>• Install camlocks, transfer switches, and electrical panels</li> <li>• Use submersible pumps/inline pumps</li> <li>• Install switches, circuit isolation, and quick connect capability</li> <li>• Dry floodproof building</li> </ul> <input type="checkbox"/> <b>Wastewater treatment plants</b> <ul style="list-style-type: none"> <li>• Elevate equipment and controls</li> <li>• Use submersible pumps</li> <li>• Dry floodproof building (see Buildings-General)</li> <li>• Wet floodproof building (see Buildings-General)</li> </ul> <p><b>Potable Water</b></p> <input type="checkbox"/> <b>Well System</b> <ul style="list-style-type: none"> <li>• Case well</li> <li>• Raise elevation of well head</li> <li>• Elevate controls, mechanical equipment, or electrical service</li> </ul> <input type="checkbox"/> <b>Raw Water Intake</b> <ul style="list-style-type: none"> <li>• Install buttressing</li> </ul> <input type="checkbox"/> <b>Water Treatment Plant</b> <ul style="list-style-type: none"> <li>• Elevation of Equipment and controls</li> <li>• Dry floodproof buildings (see Buildings-General)</li> <li>• Wet floodproof buildings (see Buildings-General)</li> </ul> <input type="checkbox"/> <b>Traffic Signals</b> <ul style="list-style-type: none"> <li>• Floodproof electrical controls</li> </ul> <input type="checkbox"/> <b>Signage(other)</b> <ul style="list-style-type: none"> <li>• Use multiple posts</li> <li>• Strengthen sign posts and panels</li> </ul> <input type="checkbox"/> <b>Above ground storage tanks</b> <ul style="list-style-type: none"> <li>• Install self-initiating disconnects and shut-off valves between tanks and distribution lines</li> </ul> <input type="checkbox"/> <b>Underground Pipeline</b> <ul style="list-style-type: none"> <li>• Install shut-off valves</li> </ul>	<p>Appendix A I.B.3a Appendix A I.B.3b Appendix A I.B.3c Appendix A I.B.3d Appendix A I.B.3a Appendix A I.C.1 Appendix A I.C.2 Appendix A I.D.1a Appendix A I.D.1a Appendix A I.D.1b Appendix A I.D.2 Appendix A I.D.3a Appendix A I.D.3b Appendix A II.J.2 Appendix A II.J.2 Appendix A I.F.2 Appendix A I.G</p>
Wind	<p><b>Buildings-Exterior</b></p> <input type="checkbox"/> <b>Roofs</b> <ul style="list-style-type: none"> <li>• Replace entire roof with: roof covering with a secondary membrane and fully-adhered roof covering</li> <li>• Attach roof-mounted equipment to foundation</li> <li>• Install hurricane clips</li> <li>• Strengthen soffit and overhang materials and means of attachment</li> <li>• Strengthen openings in roof system</li> <li>• Replace the gable-end framing with hipped roof framing</li> </ul> <input type="checkbox"/> <b>Doors</b>	<p>Appendix A II.B.1 HMH pg. 54 Appendix A II.B.2 Appendix A II.B.3 HMH pg. 49 Appendix A II.B.4 HMH pg. 62 Appendix A II.B.5 Appendix A II.B.6</p>

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Disaster Type	Damaged Element/Mitigation Measure	Reference(s)
	<ul style="list-style-type: none"> <li>• Brace garage doors horizontally or vertically</li> <li>• Install hurricane rated shutters</li> <li>• Replace with stronger doors, frames, hinges, and lock hardware</li> </ul> <input type="checkbox"/> <b>Windows</b> <ul style="list-style-type: none"> <li>• Install hurricane-rated shutters</li> <li>• Replace glass with impact-resistant material, such as laminated glass panes or blast film</li> </ul> <input type="checkbox"/> <b>Walls</b> <ul style="list-style-type: none"> <li>• Install framing connectors</li> </ul> <input type="checkbox"/> <b>Siding</b> <ul style="list-style-type: none"> <li>• Replace with stronger siding and attachments</li> </ul> <input type="checkbox"/> <b>Mechanical/Electrical Rooftop Equipment</b> <ul style="list-style-type: none"> <li>• Anchor electrical equipment and rooftop units with hurricane straps, tie-downs, or braces</li> <li>• Relocate units inside building</li> <li>• Reposition rooftop unit</li> </ul> <p><b>Other</b></p> <input type="checkbox"/> <b>Above ground storage tanks</b> <ul style="list-style-type: none"> <li>• Installation of self-initiating disconnects and shut-off valves between tanks and distribution lines</li> </ul> <input type="checkbox"/> <b>Signage</b> <ul style="list-style-type: none"> <li>• Strengthen sign posts and panels</li> <li>• Use stronger building material</li> <li>• Use multiple posts and stronger panels and fasteners</li> <li>• Replace strain poles with mast arm poles</li> </ul>	<p>HMH pg. 65 Appendix A II.C.1,2,3,4 Appendix A II.I.2 HMH pg. 64</p> <p>Appendix A II.C.1,2,3,4 HMH pg. 66 Appendix A II.G HMH pg.67</p> <p>HMH pg. 50</p> <p>Appendix A II.H.2 HMH pg. 63</p> <p>Appendix A II.D.1 HMH pg. 69 &amp; 82</p> <p>HMH pg. 70</p> <p>Appendix A I.F.1</p> <p>Appendix A II.J.2</p> <p>Appendix A II.J.2 HMH pg. 16 HMH pg. 15</p>
<b>Wind and Rain</b>	<p><b>Building-General</b></p> <input type="checkbox"/> <b>Venting</b> Replace vents with rain- and water-resistant vents	Appendix A II.H.3
	<input type="checkbox"/> <b>Doors/Windows</b> <ul style="list-style-type: none"> <li>• Install weather stripping; upgrade weather stripping</li> <li>• Install rain-resistant venting</li> </ul> <input type="checkbox"/> <b>Ceiling</b> <ul style="list-style-type: none"> <li>• Install mold-resistant ceiling tiles</li> </ul>	Appendix A II.I.1 HMH pg. 74 HMH pg. 76
	<input type="checkbox"/> <b>Gutters and Downspouts</b> <ul style="list-style-type: none"> <li>• Upgrade gutter and downspout system</li> </ul>	Appendix A. II.J.3 HMH pg. 60
<b>Earthquake</b>	<b>Buildings-General</b>	

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<b>Disaster Type</b>	<b>Damaged Element/Mitigation Measure</b>	<b>Reference(s)</b>
	<input type="checkbox"/> Reinforce buildings with steel moment frames <input type="checkbox"/> Increase lateral support by infilling openings <input type="checkbox"/> Protect walls by stiffening floors <input type="checkbox"/> Create separation joints between structures <input type="checkbox"/> <b>Walls</b> <ul style="list-style-type: none"> <li>• Brace non-structural interior walls and partitions</li> </ul> <input type="checkbox"/> <b>Parapets</b> <ul style="list-style-type: none"> <li>• Brace parapets, anchoring veneer, or cladding</li> <li>• Install flexible piping at pipe/conduit connections</li> </ul> <input type="checkbox"/> <b>Electrical</b> <ul style="list-style-type: none"> <li>• Brace electrical lines</li> </ul> <input type="checkbox"/> <b>Bridges</b> <ul style="list-style-type: none"> <li>• Install cables to restrain bridge</li> </ul>	          Appendix A II.F.2  Appendix A II.F.3 Appendix A II.E  Appendix A II.F1  Appendix A I.A.7
<b>Coastal Storm</b>	<b>Marine Piers</b> <ul style="list-style-type: none"> <li>• Install open decking of floating decking with uplift-resistant tie-downs and fasteners</li> </ul>	Appendix A II.J.3
<b>NOTES/COMMENTS</b>		
<b>References:</b>		
FEMA Policy 9526.1 Hazard Mitigation Funding Under Section 406 (Stafford Act) (7/30/07) Flood Hazard Mitigation Handbook for Public Facilities (FHMH) – Produced by FEMA Region 10 (6/01) Hurricane Mitigation - A Handbook for Public Facilities (HMH) (5/05)		

Appendix D-3 – Hazard Mitigation Proposal Review Checklist

HAZARD MITIGATION CHECKLIST			
In Support of Hazard Mitigation Proposal Preparation			
Name of Reviewer:		Applicant:	
Name of Preparer:		PW No.	Date:
Section	Block	Content	Comments
BASIC PROJECT INFORMATION	Sheet	<input type="checkbox"/> Sheet ____ of ____ Sheets	
	Applicant	<input type="checkbox"/> Indicate name as included in NEMIS/EMMIE; do not abbreviate	
	Category	<input type="checkbox"/> Identify primary category of work	
	Project Number	<input type="checkbox"/> Match to related Project Worksheet Number	
SCOPE OF MITIGATION WORK	Scope of Work	<input type="checkbox"/> Identify damaged elements to be mitigated from the Project Worksheet	
		<input type="checkbox"/> Describe the work in quantifiable (length, width, height, depth, capacity) and descriptive (brick, wood, asphalt) terms	
		<input type="checkbox"/> Describe the work necessary to mitigate the damaged element(s) or repair facility to pre-disaster condition	
		<input type="checkbox"/> Provide all design assumptions, methods of repair, and calculations to support the work	
		<input type="checkbox"/> Describe <b>how</b> the proposed mitigation will prevent future damage	
		<input type="checkbox"/> Identify the PWs that have been prepared for the facility, reference those PWs	
		<input type="checkbox"/> Reference the FEMA Policy (9526.1 or other) for Cost Effectiveness	
		<input type="checkbox"/> Describe the basis for the cost estimate (how the work was or will be performed, methodology used to develop costs, reasonableness of costs, procurement method for work by contract) and use of CEF	
PROJECT COST	Project Cost	<input type="checkbox"/> Identify items needed if HMP is approved	
		<input type="checkbox"/> Identify items not needed if approved	
		<input type="checkbox"/> Provide line item for all work items in Scope of Work	
		<input type="checkbox"/> Reference appropriate cost code and unit price	
		<input type="checkbox"/> Refer to CEF documentation, if used	
		<input type="checkbox"/> Type of labor (overtime, regular time, temporary hires, volunteer, prison labor, etc.)	
		<input type="checkbox"/> Describe pay policy	

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Name of Reviewer:		Applicant:	
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Section	Block	Content	Comments
		<input type="checkbox"/> Contract type (Lump Sum, Unit Price, Time and Materials, Cost Plus Percentage of Cost, Master Services Agreement)	
		<input type="checkbox"/> Review procurement policy	
		<input type="checkbox"/> Describe bid process or sole source	
		<input type="checkbox"/> Comment on contract issues and state that the HMP is subject to further review	
<b>SIGNATURES</b>	<b>Signatures</b>	<input type="checkbox"/> Recommended by Agency/Date	
		<input type="checkbox"/> Concur (State Representative)/Agency/Date	
		<input type="checkbox"/> Concur (Local Representative)/Agency/Date	
<b>DOCUMENTATION</b>	<b>Supporting Documentation (as applicable to project)</b>	<input type="checkbox"/> Photographs of site, overall facility, specific damages, and conditions that are applicable to the mitigation proposal	
		<input type="checkbox"/> Drawing, sketches, and plans of pre-disaster facility design (to scale)	
		<input type="checkbox"/> Drawings and sketches of disaster-related damages (to scale)	
		<input type="checkbox"/> Drawings and sketches of the proposed repair and mitigation (to scale)	
		<input type="checkbox"/> Facility inspection/safety reports (e.g., for bridges and dams)	
		<input type="checkbox"/> Relevant correspondence or information received from the applicant or State	
		<input type="checkbox"/> BCA calculations	
		<input type="checkbox"/> Engineering/ Technical Reports	
		<input type="checkbox"/> Engineering specifications for repair (such as Department of Public Works [DPW] standard design drawings)	
		<input type="checkbox"/> Documents supporting compliance with environmental or historic preservation issues	
		<input type="checkbox"/> Cost Estimating Format Spreadsheets	