Procurement Path for a Flood Alarm System

Leaf River Basin Flood Early Warning System

A perspective on one pathway. Prepared by Michael Hoffman, North Star Group.

Preamble — Why this matters

A flood early warning system is mature technology. Reference deployments have been operating for decades. Harris County, Texas has run a basin-wide automated system since 1982. The Choctawhatchee, Pea, and Yellow Rivers basin in Alabama has operated the largest basin-wide flood warning system in that state since the late 1990s, designed by USACE Mobile District. The City of New Orleans operates an automated roadway flood early warning system. These deployments do not represent novel engineering. They represent a category of infrastructure with a documented safety record across multiple decades and multiple Gulf-region jurisdictions.

The economic case rests on three documented effects.

Reduced flood insurance cost across the participating community. FEMA's Community Rating System (CRS) credits flood warning and response programs under Activity 610. CRS classifications run from Class 10 (no participation, no discount) through Class 1 (maximum discount). National Flood Insurance Program (NFIP) premium discounts in CRS communities range from 5% to 45% in 5% increments. The discount applies to every NFIP policy in the participating community, including policies outside the Special Flood Hazard Area. Independent academic work on Mississippi and Alabama CRS communities has found measurable reductions in flood losses. Roseville, California operates near the top of the CRS scale through a warning-based mitigation strategy. Roseville is frequently cited as the policy reference for this approach.

Reduced flood damage and improved public safety. A 2022 Wharton study estimated cumulative flood damage reductions from CRS participation between 1998 and 2020 at approximately $10.1 billion nationally.[1] The mechanism is well understood: timely warnings move people and vehicles off impassable roads before water arrives.

Expanded buildable area inside the floodplain. Where local floodplain management ordinances credit a robust flood warning system as a qualifying mitigation pathway, the elevated-road requirement that otherwise constrains development in floodplain areas becomes one option among several rather than the only option. The economic implication for property owners and tax-base growth inside the Leaf and Bouie River Development District is material.

Each of these effects depends on local design, local procurement, and local floodplain management ordinance work. None of them is automatic. The chapters that follow describe one pathway toward those outcomes.

Chapter 1 — Executive Summary

A flood early warning system across the Leaf and Bouie River basin is within reach of Mississippi institutions to design. HB 1649 (2020) gives Forrest County, the City of Hattiesburg, and the City of Petal joint statutory authority for shared improvements within the development district. The basin already carries federal monitoring infrastructure that any new system would build on, not duplicate.

Three Mississippi state universities hold the relevant technical capacity. Ole Miss NCCHE built FEMA's national flood-modeling system. USM holds the NOAA-designated Mississippi Spatial Reference Center on the Hattiesburg campus. MSU leads the Northern Gulf Institute, a NOAA cooperative institute that already includes USM as a member institution. Engaging the three together extends an existing federally funded partnership rather than building a new one. It activates three congressional delegations.

A university engagement would proceed under Mississippi interlocal cooperation authority. That is a different procurement pathway from the advertised competitive bid path. Hardware procurement would follow at a later stage, scoped against the university-developed specification.

This is one perspective among several. The chapters that follow describe the environment, the typical university-led procurement sequence, the parallel commercial-vendor option, and the available funding pathways.

Chapter 2 — Environment and Institutional Capacity

The basin and the district

The Leaf and Bouie River Development District was established under Mississippi HB 1649 (2020). It covers approximately 1,316 parcels across Forrest County, the City of Hattiesburg, and the City of Petal. The district carries statutory authority for shared infrastructure improvements within its boundary. It carries an ad valorem funding mechanism. The three jurisdictions hold joint governance over district investments.

Existing federal and local infrastructure

The Leaf River at Hattiesburg is already federally monitored. USGS Gauge 02473000 reports in real time. NWS Jackson publishes forecasts at the Advanced Hydrologic Prediction Service. USGS maintains LiDAR-calibrated inundation maps at one-foot stage increments. Forrest County Emergency Management and City of Hattiesburg floodplain staff monitor those feeds today.

A new system would add a basin-wide multi-jurisdictional layer on top of that infrastructure. The operative engineering question is not "what does the river do" but "at what stage do the access roads inside the district become impassable." That is a threshold-engineering and sensor-siting problem rather than a hydrologic discovery problem.

Mississippi institutions with relevant capacity

University of Mississippi — NCCHE. The National Center for Computational Hydroscience and Engineering operates at the University of Mississippi. NCCHE built DSS-WISE, a two-dimensional flood modeling system funded by FEMA. It is used at FEMA headquarters and across ten FEMA regional offices. NCCHE also developed the CCHE2D-FLOOD river inundation model. Applications include the 2008 Midwest Mississippi River flood and Hurricane Harvey forecasting. NCCHE has received federal funding through

USDA-ARS by congressional appropriation since 1989. Current director: Dr. Mohammad Al-Hamdan.

University of Southern Mississippi — Gulf Coast Geospatial Center. USM holds the NOAA designation as Mississippi Spatial Reference Center. It leads NOAA's five-state Geospatial Modeling Program. The Trent Lott National Center for Excellence sits on the Hattiesburg campus. USM publishes its own campus flood maps for the Hattiesburg and Gulf Coast Research Laboratory sites.

Mississippi State University — Northern Gulf Institute. MSU leads the Northern Gulf Institute (NGI), a NOAA Cooperative Institute headquartered at Stennis Space Center on the Mississippi Gulf Coast. NGI is a six-institution consortium led by MSU that already includes the University of Southern Mississippi as a member institution, along with Louisiana State University, Florida State University, the University of Alabama in Huntsville, and the Dauphin Island Sea Lab. NOAA funding for NGI is currently authorized at up to $86 million over five years (2021–2026). MSU also operates a NOAA cooperative institute. It carries depth in GIS, remote sensing, civil engineering, and environmental engineering. It is the state's land-grant institution. Director: Dr. Robert Moorhead.

The MSU–USM partnership through NGI is a material structural fact. Any consortium engagement between the two universities would extend an existing federally funded collaboration rather than build a new one.

None of the three has been approached at this stage. No roles have been assigned. Any consortium configuration is a question for the institutions themselves to answer.

Chapter 3 — Typical Procurement Path

This chapter describes a typical sequence for engaging state institutions on a project of this character. It is descriptive, not prescriptive.

Step one — invitation to discuss

The procurement office issues a short letter of interest, or a brief Request for Information, to the three named institutions. The letter describes the project at a high level. It identifies the three jurisdictions involved. It identifies the district as the funding mechanism. It asks two specific questions:

- Whether the institution would be interested in discussing the parameters of a flood study and flood early warning system spanning the Leaf and Bouie basin
- Whether the institution would prefer to respond as a single institution or as part of a joint or syndicated consortium with the other two

Step two — rough order of magnitude

The institutions are asked to return, within a stated window, a rough order of magnitude on three items:

- A sketch of the scope they would propose
- A rough order of magnitude on cost
- A rough order of magnitude on timeline

A ROM response is not a binding proposal. It is enough information to determine whether the institutions hold serious interest, whether the budget envelope is plausible, and whether the timeline fits the city and county fiscal-year cadence.

Step three — evaluation and pathway selection

The procurement office evaluates the responses against the city's standing criteria. The decision points include whether to proceed with a single institution, with a joint consortium, with a different pathway entirely, or to pause. A formal Scope of Work and interagency agreement under Mississippi Code § 17-13-1 et seq. would follow only if the city elects to proceed.

Step four — hardware procurement, later

Hardware procurement for sensors, communications equipment, and field installation does not happen in the university engagement. It happens later, against the specification the university work produces. That second-stage procurement runs through standard competitive procurement under Mississippi Code § 31-7-13. Sequencing the design first and the hardware second tends to produce a cleaner result than a single combined commercial procurement.

Chapter 4 — Commercial Vendor Alternative

If a straight commercial engagement is preferred, three reputable vendors have been surfaced as having documented experience in the Gulf Coast and Southeast region.

High Sierra Electronics, a division of AEM. Manufactures the Series 3480 Advance Warning Station, which pairs water-level sensors with roadside flashing lights or crossing arms. The architecture is a direct match for the road-impassability trigger pattern. ALERT2 protocol, interoperable with USGS and NWS networks. Reference deployment: City of New Orleans automated roadway flood early warning system. AEM also operates the Elements 360 software platform used by the Harris County Flood Control District.

OTT HydroMet (incorporating Sutron). Manufactures water-level sensors and dataloggers. The OTT Radar Level Sensor provides non-contact measurement that survives inundation. The OTT Compact Bubbler Sensor offers an alternative measurement path at secondary stations. SUTRON XLink 500 and SatLink 3 dataloggers handle remote telemetry. OTT markets FEMA Community Rating System credit improvement explicitly as a procurement outcome. Reference deployments: the 139-station Harris County Flood Control District network, and the basin-wide Choctawhatchee, Pea, and Yellow Rivers system in Alabama designed by USACE Mobile District.

OmniWarn. Turnkey integrator combining Federal Signal sirens, water-level sensors, software, and IPAWS-compatible public alerting in a single package. Holds Federal Signal distribution rights across six states; the specific state footprint is worth confirming against the three Mississippi jurisdictions. The product is sized for community and campus deployments rather than basin-wide federal-scale networks.

A commercial procurement proceeds through the standard Mississippi Code § 31-7-13 advertised competitive bid path. The vendors bring proven architectures, established support models, and defined product roadmaps. This is the most common procurement pattern for flood warning systems in the Gulf region.

The two pathways are not mutually exclusive. A university-led design phase can produce the specification against which commercial vendors compete in a subsequent procurement. A commercial integrator can be engaged directly if the city prefers a single end-to-end contract. Either sequencing is defensible.

Chapter 5 — Funding Pathways

This chapter summarizes the verified funding pathways available for a flood alarm system serving Forrest County, the City of Hattiesburg, and the City of Petal. Each entry notes what has been verified against primary sources and what remains contingent.

Preconditions already satisfied

Hazard Mitigation Plan coverage. All three jurisdictions are covered under the MEMA District 8 Regional Hazard Mitigation Plan, FEMA-approved, expiring 2030-04-30. This is the eligibility precondition for FEMA Building Resilient Infrastructure and Communities (BRIC), Flood Mitigation Assistance (FMA), and Hazard Mitigation Grant Program (HMGP) funding. No additional planning work is required to apply.

NFIP participation. All three jurisdictions participate in the National Flood Insurance Program, with continuous regular-phase participation since the 1970s (Hattiesburg 1970, Petal 1980, Forrest County 1990).

The Community Rating System position — and the gap

The Community Rating System is FEMA's voluntary program within the NFIP that provides flood insurance premium discounts to communities that exceed minimum NFIP requirements. Flood warning systems credit under CRS Activity 610 (Flood Warning and Response). CRS classes range from Class 10 (no participation, no discount) to Class 1 (45 percent discount), in 5 percent increments.

Current status of the three jurisdictions, verified from the FEMA Community Status Book for Mississippi:

Jurisdiction	CID	CRS Class	NFIP Premium Discount	Effective
Hattiesburg	280053C	Class 7	15 percent	2026-04-01
Petal	280260C	Not in CRS	0 percent	—
Forrest County	280052C	Not in CRS	0 percent	—

Hattiesburg moved from Class 8 to Class 7 effective April 1, 2026, an outcome of years of floodplain management work by City staff. The 15 percent discount applies to every NFIP policy inside Hattiesburg city limits, including policies outside the Special Flood Hazard Area. Property owners in Petal and unincorporated Forrest County receive no equivalent discount.

A coordinated flood warning system can serve two CRS purposes simultaneously: contributing additional Activity 610 credit toward a Class 6 score for Hattiesburg, and establishing the credit basis under which Petal and Forrest County can enter CRS at a participating class. The community-wide premium savings stream is the durable financial benefit of the system, distinct from any capital-grant match.

Federal pathways

FEMA BRIC — open now, deadline July 23, 2026. The Building Resilient Infrastructure and Communities program reopened March 25, 2026 with $1 billion available for the combined fiscal years 2024 and 2025 cycle. Flood warning systems are explicitly eligible. The project cap is $20 million, well above the working envelope for this system. Subapplicants apply through MEMA on a state deadline that lands before the federal July 23 close. BRIC scoring this cycle gives priority to first-time applicants and to projects with strong construction-readiness (percent design completion). A completed design phase from

a university or commercial engagement materially strengthens a subsequent BRIC implementation application.

FEMA Flood Mitigation Assistance (FMA). An annual cycle administered through MEMA. Eligible activities include flood warning systems serving NFIP-insured properties. Lower funding ceiling than BRIC but a recurring window.

FEMA Hazard Mitigation Grant Program (HMGP). Post-disaster only. Activated by a presidential disaster declaration that includes Forrest County. The most recent qualifying declaration covering Forrest County is DR-4626-MS (Hurricane Ida, October 2021); subsequent winter-storm declarations in 2026 did not include Forrest County. HMGP is not a fresh window today.

USACE Mobile District — Continuing Authorities Program. Section 22 (Planning Assistance to States) supports federally cost-shared planning studies. Section 205 (Small Flood Control Projects) supports federal cost-share on construction of small flood-damage-reduction projects under a $10 million federal share cap. Mobile District designed the Choctawhatchee-Pea-Yellow basin system in Alabama.

USDOT BUILD program. The fiscal year 2026 cycle closed February 24, 2026. The next window is the FY27 cycle, expected to open in late 2026 or early 2027. Roadway-impassability framing fits BUILD merit criteria.

EPA Clean Water State Revolving Fund. Administered in Mississippi through the Mississippi Department of Environmental Quality (MDEQ). Low-interest loans for water-infrastructure resilience.

NOAA cooperative agreement through Northern Gulf Institute. The existing $86 million NOAA award to NGI (2021–2026) covers cooperative research and applied science activities. A design phase could be folded into the existing cooperative-institute relationship through MSU.

State and Congressional pathways

Mississippi legislative appropriation. A direct state line-item appropriation can be pursued through the South Mississippi delegation. The state’s 2023 Hazard Mitigation Plan is the policy frame for state mitigation investments.

Community Project Funding. Annual congressional appropriations request available to both Mississippi senators and the relevant House member. Specific to single named projects.

Local pathways

Leaf and Bouie River Development District ad valorem. Established under HB 1649 (2020), the district carries statutory authority to allocate a minimum of 15 percent and up to 100 percent of district property tax revenue to district improvements. This is the most direct local funding mechanism. It does not require new tax authority.

District bond issuance. Mississippi development districts typically carry bonding authority for capital improvements within the district, repaid through the ad valorem stream. Provides front-loaded capital at the cost of debt service.

Tri-jurisdictional general fund cost-share. Under Mississippi Code Section 17-13-1 et seq. interlocal cooperation, the City of Hattiesburg, Forrest County, and the City of Petal can share project costs outside the district mechanism.

Private and non-governmental sources

Foundation grants. Several national foundations fund Gulf-region resilience work, including the Walton Family Foundation, the Kresge Foundation, and the Robert Wood Johnson Foundation. Typically smaller dollar amounts than federal sources but useful as match.

Near-term constraints worth noting

The BRIC July 23, 2026 deadline is the most consequential near-term federal window. A design completed before a future BRIC implementation cycle (likely FY26 or FY27) strengthens construction-readiness scoring on the implementation application. Funding pathways requiring a new presidential disaster declaration covering Forrest County (HMGP, FMA Swift Current) are not available without that triggering event.

Closing note

This is one pathway worth considering. It rests on established statutory authority. It draws on existing federal partnerships with FEMA and NOAA. It brings Mississippi institutions to a Mississippi problem. The supporting material is available, and direct questions on this perspective are welcome.

Sources cited

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