

# Sample Engineering Case Study Acquisition

## **Introduction**

In an effort to improve the quality of project applications, engineering case studies have been prepared for several common mitigation measures. The engineering cases studies provide focus on the types of information and data needed to ensure completeness of the sections of the project application affecting engineering feasibility. Of particular importance in the engineering review are:

- Scope of Work, including:
  - Problem Description and Proposed Solution;
  - Description of Existing Condition; and,
  - Work Schedule.
- Cost Estimate, including:
  - Conducting the Benefit-Cost Analysis;
  - Anticipated environmental resource remediation or historic property treatment measures;
  - Engineering schematics, detailed engineering drawings, or engineering designs;
  - Other related construction/demolition/relocation costs, such as survey, permitting, site preparation, material disposal; and,
  - Other related acquisition costs, such as appraisals, legal recordation, displacement costs for renters, maintenance.

For each of these sections in the project sub-application, the engineering case studies describe the general type of information that a Sub-applicant should submit. In order to provide additional guidance, the case studies also include sections of a sample project application that present the kind of specific information that the Sub-applicant would need to include in each engineering-related section to support the proposed project. These engineering case studies are not meant to represent complete project applications. Some relevant project information related to historic and environmental impacts, as well as information regarding the project's cost effectiveness may not be included.

Removing structures and infrastructure from hazardous areas is one of the most effective forms of mitigation. Commonly this is accomplished by acquiring hazard prone properties and either demolishing or relocating any structures located in these hazardous areas. Once the structures have been removed, deed restrictions are prepared for each property, restricting the use of the property as open space in perpetuity. Typically structures eligible for acquisition are ones that have repetitive damages due to flooding or are threatened by other impending natural hazards such as landslides. For this case study, riverine flooding is the hazard.

## **Scope of Work**

The proposed mitigation activity should be well-defined. For acquisition projects the scope of work is relatively straight-forward. The following information should be included within the scope of work description:

- List the number of each type of structure or property that is to be acquired. Include maps to clearly indicate the location of the facilities to be acquired.
- Describe how these homes have been selected, the level of the property owner commitment to this project, and the proposed approach for the acquisition process.
- State if there are any State or Local codes or standards that need to be followed (i.e. for

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removal of hazardous materials).

- Provide a statement or documentation certifying that the property will remain as open space in perpetuity.

### ***Example Scope of Work***

*Wrightsville has identified 30 home acquisition within this area for this acquisition project, and has identified this project as its number one priority for mitigation in the community. The project is titled the “Creebank Subdivision Residential Buyout”. Wrightsville will oversee the construction aspects of the project. The community’s GIS has been utilized to prepare a map which depicts the FEMA-identified 100-year floodplain for Swift Creek on the most recent version of an orthophoto quad dated October 2001. A copy of the map is attached to the application as an electronic file.*

A public meeting was held on March 23, 2003 at which homeowners were presented with the details of the proposed mitigation project, and interest in participating in the program was solicited. Subsequent to that meeting, 30 homeowners in this area have contacted the County expressing interest in participating in the program should funding become available, and submitted a letter of interest, of which copies are attached. Once a homeowner expressed written interest in the program, the County authorized a certified appraiser to conduct and appraisal on the property based on comparable properties in the area, in pre-flood condition in order to determine the properties’ Fair Market Value (FMV). These appraisals have been included as an attachment to the project application, and will serve as the basis of the cost estimate for this project.

*Once the properties have been acquired, all structures located and on these properties will be demolished by County contractors, and materials disposed in the County owned and operated landfill. It is possible that some, if not all, of the structures being proposed for acquisition contain asbestos insulation. Costs have been allocated for asbestos inspection fees for each of the 30 residential structures. If asbestos is detected, remediation will be necessary prior to demolition. The Township Housing Authority (THA) has a dedicated fund for environmental impact resolution. Full funding will be made available to the project for remediation, if necessary. See attached funds commitment letter from the THA Executive Director.*

*The total land area of the 30-home subdivision is 7.2 acres. This land will be dedicated to open space use in perpetuity by deed restriction and recorded with River County. The subject area will be graded and re-claimed with native ryegrass. When the properties have been acquired, recorded deed restrictions for each property will be provided to the state and FEMA, if needed.*

*Long-term maintenance of the property, which will ultimately be owned by the Township, will include landscape/lawn care. These costs will be budgeted annually by the community. (See attached letter from Township Board of Directors). The project also provides one unrelated, but important, benefit. The open space will enhance the viewscape of the Downtown Area Historic District. Ownership of the subject property by the Township will be recorded with the River County Clerk and Recorder.*

### **Problem Description and Proposed Solution**

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A detailed written description of the history of flooding and the characteristics of the flood problem that has occurred at the project location should be provided and should include the following information:

- Describe in detail the source of flooding (e.g. riverine, coastal, local drainage, etc.) and provide any explanation of the cause of flooding. (e.g. pre-FIRM construction, increased upstream development, inadequate drainage capacity of flooding source, etc.)
- List the history of previous flood events including dates, extent and magnitude of impacts, photos of historic flooding, overall cost of damages, and the estimated frequency of each specific event.
- If the facility is in a FEMA Special Flood Hazard Area (SFHA), list the corresponding flood depths and discharges from the Flood Insurance Study (FIS) for the various storm recurrence intervals.
- Briefly state the proposed solution, which will be described in detail in the scope-of-work section.

### ***Example Problem Description and Proposed Solution***

*The Creekbank Subdivision was built in 1965-67, prior to the community's participation in the National Flood Insurance Program (NFIP). Flood maps were first produced for the community in 1978 and revised for Swift Creek in 1999. The community has experienced flooding events on Swift Creek in 1969, 1976, 1988, 1992, 1996 and 2000. Photos of flooding during the 2000 storm event are included with the application. A community street map is included highlighting the location of the houses impacted by flood events. Upstream development may be contributing to increased flows on Swift Creek as more areas are paved over and natural flood storage areas are diminished.*

*The project area is located on the east bank of Swift Creek in Zone A1 on FIRM panel 10083D0003E dated May 3, 1999. Selected portions of the Flood Insurance Study – including the FIRM panel, stream profile and Summary of Discharges table are included as an electronic file.*

*A recent field report (attached) prepared by XYZ Engineering, Inc. has determined that the 30 target properties in the Creekbank Subdivision are now impacted by flooding when the 10-year flood event occurs. Average flooding depths are 0.5 feet above the 10-year flood elevation. These elevations were field verified by the XYZ Engineering survey department, and FEMA-approved elevation certificates were prepared. These elevation certificates are attached to the application as scanned electronic files.*

*This project proposes to acquire these 30 homes and dedicate the land to open space use as part of the community's ongoing flood control mitigation efforts.*

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### **Description of Existing Conditions**

The facility(ies) being acquired should be listed. The following information should be included in the property description of the application:

- List the number and location of properties or facilities that are being acquired. Provide a detailed map indicating their location.
- Describe the primary use of the facilities (e.g. single family residential, public library, commercial).
- If residential, state if the property is owner-occupied, rental or seasonal.
- Provide a detailed description of the facility including: construction type, square footage, age, value of structure, foundation type, condition, first floor elevation (elevation certificate), etc.
- List the damages that have occurred to the facility for various storm events and the costs associated with those damages. Include a history of flood insurance claims made for each property, if possible.
- If the property is commercial or industrial, the owner must provide information identifying what, if any, hazardous materials are known to exist within the facility that may require special handling or measures (e.g. fuel tanks, asbestos, medical wastes, etc.), and the owner must remove any such materials and obtain a clean-site certification from the appropriate state agency.

### ***Example Description of Existing Conditions***

*There are 30 residential structures located in the 100-year floodplain of Swift Creek. Twenty-four of the homes are owner-occupied, while six are rental properties. The buildings being acquired are masonry construction with slab-on-grade foundations built between 1965 and 1967. Average first floor elevations at the project site are 0.5 feet above the 10-year flood elevation based on water surface elevations taken from the community's Flood Insurance Study (FIS). (See attached electronic file). All 30 structures in the subdivision are required by their lenders to carry flood insurance. The written premium for these structures through the NFIP totals \$9,750 annually*

Electronic attachments include: 1) property type (residential, non-residential), age and value of structure obtained from County Clerk and Recorder's Office property records (scanned paper copies), 2) Base Flood Elevation data included as a table and estimated by XYZ Engineering from the community FIRM, which has been overlaid on 1"=100' orthophoto quad using GIS (map attached), and 3) finished floor elevations, included on FEMA-approved elevation certificates, for each structure based on field surveys conducted by XYZ Engineering's survey crew.

### **Work Schedule**

Additional supporting documentation should include a work schedule to:

- Describe the anticipated project schedule
- Include all phases of the task including: survey, appraisals, legal offers, closing, permitting, demolition, site preparation, etc.

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### ***Example Work Schedule***

*The estimated duration for all phases of the acquisition project is thirty (30) months according to the schedule, below.*

<i>Description of Task</i>	<i>Starting Point</i>	<i>Unit of Time</i>	<i>Duration</i>	<i>Unit of Time</i>
<i>Property survey</i>	<i>0</i>	<i>Month</i>	<i>1</i>	<i>Months</i>
<i>Appraisals</i>	<i>1</i>	<i>Month</i>	<i>1</i>	<i>Months</i>
<i>Purchase offers, closing costs, legal fees</i>	<i>2</i>	<i>Month</i>	<i>24</i>	<i>Months</i>
<i>Asbestos survey</i>	<i>26</i>	<i>Month</i>	<i>1</i>	<i>Months</i>
<i>Demolition plan, permitting and contracting</i>	<i>27</i>	<i>Month</i>	<i>1</i>	<i>Months</i>
<i>Site preparation</i>	<i>28</i>	<i>Month</i>	<i>1</i>	<i>Months</i>
<i>Demolition</i>	<i>29</i>	<i>Month</i>	<i>1</i>	<i>Months</i>
<i>Grading and landscaping</i>	<i>29</i>	<i>Month</i>	<i>1</i>	<i>Months</i>

### **Cost Estimate**

- Make sure all anticipated acquisition costs are detailed.
- Costs should be included for, at a minimum, the following tasks: site assessment, surveys, permitting, appraisals, legal recordation, property acquisition, displacement costs for renters, hazardous material inspection, structural demolition or relocation, management, and administration.
- Provide the source of the estimate (e.g. documented local cost, bids from qualified professionals, published national or local cost estimating guides, etc.)
- Consider the potential future date of construction when compiling the cost estimate.

### ***Example Cost Estimate***

*As stated previously, property appraisals have been completed for all properties included in this application, and the acquisition fees for these properties have been based on these appraisals. A summary of these appraisals is included in the Property Data summary table attached, and individual copies of each appraisal are also included as attachments. Additional costs for this project include legal fees and closing costs, site demolition costs, and asbestos inspection. These costs have been estimated by local contractors and are included in the following cost estimate table. In addition, documentation of each unit cost as submitted from the appropriate resource has also been attached.*

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<i>Item Name</i>	<i>Cost Classification</i>	<i>Unit Quantity</i>	<i>Unit of Measure</i>	<i>Cost Estimate (\$)</i>
<i>Phase 1 Site Assessment</i>	<i>Miscellaneous</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 5,000.00</i>
<i>Site Preparation Prior to Demolition</i>	<i>Preliminary expense</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 12,000.00</i>
<i>Subdivision and Survey</i>	<i>Architectural engineering basic fees</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 4,000.00</i>
<i>Permits</i>	<i>Construction and project improvement</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 3,000.00</i>
<i>Write-up and recordation of deed restrictions</i>	<i>Miscellaneous</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 4,000.00</i>
<i>Property and Improvements Acquisition</i>	<i>Land, structures, right-of-way</i>	<i>30</i>	<i>Appraised Values</i>	<i>\$ 1,560,000.00</i>
<i>Demolition</i>	<i>Demolition and removal</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 312,000.00</i>
<i>Site Grading and Landscaping</i>	<i>Construction and project improvement</i>	<i>1.00</i>	<i>Acre</i>	<i>\$ 15,000.00</i>
<i>Spec's, Contracting and Construction Inspection</i>	<i>Architectural engineering basic fees</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 60,000.00</i>
<i>Asbestos inspection fees</i>	<i>Miscellaneous</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 10,000.00</i>
<i>Contract Administration</i>	<i>Administrative expense</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 60,000.00</i>
<i>Certified Appraisal Fees</i>	<i>Miscellaneous</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 5,000.00</i>
<i>Legal and Accounting Fees</i>	<i>Administrative expense</i>	<i>1.00</i>	<i>Lump Sum</i>	<i>\$ 10,000.00</i>
<b>Total Cost Estimate</b>				<b>\$ 2,060,000.00</b>

Total Cost Estimate is \$ 2,060,000, with a proposed Federal share of \$ 1,545,000.

Attached supporting documentation includes:

- XYZ Engineering - Asbestos inspection, Subdivision and survey, Specifications, contracting and construction inspection
- ABC Hauling and Demolition, Inc. - Site Preparation Prior to Demolition, Demolition; Site Grading and Landscaping
- Township – Contract administration; Legal and accounting fees; Write-up and recordation of deed restrictions; Permits
- MNOP Appraisal Service - Certified Appraisal Fees and Property Appraisal Sheets