PURPOSE: A Policy For Projects Utilizing Federal Funds To Determine When To Use A Risk Assessment Or Risk Analysis In The Design Of Flood Plain Encroachments.

GENERAL: In accordance with the requirements of the Federal Highway Administration (23CFR 650A) the design of all flood plain encroachments "shall be supported by the analysis of design alternatives with consideration given to capital costs and risks, and other economic, engineering, social and environmental concerns." The analysis of capital cost and risk shall consist of a risk assessment or risk analysis, as appropriate. The risk analysis is based on the least total expected cost design procedure described in the FHWA Hydraulic Engineering Circular No. 17.

1. Decisions Affected by Economic Analysis or Assessment:

The design decisions which are subject to this economic analysis include but are not limited to the following:

1.1. For transverse encroachments:
- 1.1.1. Finish grade elevation
- 1.1.2. Type, size and location of drainage structure
- 1.1.3. Span length
- 1.1.4. Orientation of bridge bents to flood flow
- 1.1.5. Channel changes

1.2. For longitudinal encroachments:
- 1.2.1. Extent of the encroachment on flood plain
- 1.2.2. Channel Changes

2. Constraints Affecting Decisions:

There are various constraints which may control any of the design decisions and which may eliminate that design from the economic analysis. Some of these constraints are:

2.1. Backwater produced by any encroachment is limited to 1.0 foot for the flood which has the probability of 1% of occurrence in any one year. (Consult the latest FEMA regulations in regards to backwater depth allowed)

2.2. No backwater may be produced by an encroachment on a designated floodway over and above that already existing when the floodway was established.

2.3. Design discharges are subject to the following minimum requirements:

2.3.1. For pavement drainage, bridge deck drains, drainage inlets and median drainage - 10 Year Flood (Probability = 10%)

2.3.2. Secondary Roads - 25 Year Flood (Probability = 4%)

2.4. Limitations imposed by roadway geometrics such as maximum or minimum grade lines, sight distance, vertical curvature, etc.

2.5. Grades may be controlled by intersection with or clearance over or under highways or railroads.

2.6. Navigational clearance requirements.

2.7. Structures adjacent to the roadway such as dams, levees, buildings, etc., which may control grades, structure size, location or structure type.

2.8. Allowable stream velocities which are controlled by potential channel instability and/or bank degradation, depending on soil types present.

2.9. Provision for debris passage which will affect grades and span lengths.

2.10. Geological or geomorphic considerations, including subsurface conditions, which may affect location and type of substructure for bridges.

2.11. Structural requirements.

2.12. Social considerations including the importance of the facility as an emergency evacuation route.

2.13. Availability of construction funds for the facility.

3. Levels of Analysis Required:

3.1. For structural replacement on the same alignment with no appreciable grade change: A risk assessment

3.2. For structural replacement on the same alignment with grade change:

3.2.1. Grade change due to increased superstructure depth - A risk assessment

3.2.2. Grade change due to increased levels of design flood frequency - A risk assessment or risk analysis

3.3. For a relocation - A risk assessment or risk analysis

3.4. For new construction - A risk assessment or risk analysis

3.5. For locations where there is a high risk of damage to property due to backwater or to increased concentration of flow - A risk analysis.