

**CHECKLIST FOR DRAINAGE STUDY AND HYDRAULIC DESIGN**

I.D.: \_\_\_\_\_ COUNTY: \_\_\_\_\_ PROJECT ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_

*PRIOR TO FIELD SURVEY (TO BE COMPLETED PRIOR TO FIELD TRIP)*

APPROVED BY \_\_\_\_\_ DATE : \_\_\_\_\_

1. HAS PLANNING REPORT BEEN REVIEWED? ARE THERE ANY COMMITMENTS OR REQUIREMENTS WHICH WOULD AFFECT THE DESIGN?
  
2. ARE THERE ANY PRIOR SURVEYS AT STREAM CROSSINGS? ARE THERE ANY PRIOR SURVEYS AT UP AND DOWNSTREAM STRUCTURES
  
- 3 .WHAT IS FLOOD ZONE STATUS?
  
- 4.CHECK FOR SCS WATERSHED INVOLVEMENT.
  
5. ARE THERE ANY STREAM GAGES IN AREA? (DATES AND FREQUENCIES OF MAJOR FLOODS)
  
6. OBTAIN DRAINAGE AREA AND DESCRIPTION OF EXISTING STRUCTURES.
  
7. DEVELOP PRELIMINARY DESIGN DISCHARGES AND ESTIMATES OF STRUCTURE TYPES AND SIZES.
  
8. DETERMINE POSSIBLE PERMIT REQUIREMENTS,
  
9. PREPARE SKETCHES FROM AVAILABLE FIELD DATA.
  
10. ARE THERE ANY HYDROLOGIC / HYDRAULIC STUDIES WITHIN THE PROJECT AREA BY AGENCIES SUCH AS: THE CORPS OF ENGINEERS, TVA, CITIES OR COUNTIES?
  
11. WHAT ARE SOURCES FOR WATERSHED AREA OR DELINEATION?
  
12. HAS PROJECT INITIATION SHEET BEEN SUBMITTED?

### FIELD STUDY

THE FOLLOWING INFORMATION IS TO BE INCLUDED IN THE FIELD SURVEY NOTES:  
(CHECK LOCATION AND SURVEY NOTES AND SUPPLEMENT WITH ANY ADDITIONAL  
INFORMATION THAT MAY BE REQUIRED) ANSWER YES, NO, OR N/A

1. TOPO IS TO INCLUDE BUT NOT LIMITED TO:

- a. \_\_\_\_\_ CHANNEL BANKS AND WATERS EDGES
- b. \_\_\_\_\_ EXISTING STRUCTURES (BRIDGES, CULVERTS, AND STORM DRAINAGE SYSTEMS)
- c. \_\_\_\_\_ UTILITIES (POWER, WATER, GAS, TELEPHONE, SANITARY SEWER, ETC.)
- d. \_\_\_\_\_ ROADWAY PAVEMENT, SHOULDERS AND TOE OF FILLS
- e. \_\_\_\_\_ ANY DEVELOPMENT ADJACENT TO SITE, UP AND DOWNSTREAM
- f. \_\_\_\_\_ EDGE OF FLOODPLAIN
- g. \_\_\_\_\_ DRAINAGE COURSES AND DRAINAGE DITCHES
- h. \_\_\_\_\_ WETLAND LIMITS

2. LEVELS

- a. \_\_\_\_\_ CENTERLINE PROFILES OF NATURAL GROUND AND EXISTING HIGHWAY ( WHERE APPLICABLE ) ACROSS FLOODPLAIN
- b. \_\_\_\_\_ SECTION UNDER BRIDGE
- c. \_\_\_\_\_ SIZE, DEPTHS, AND INVERTS OF ALL CULVERTS AND STORM DRAINAGE SYSTEMS
- d. \_\_\_\_\_ STREAM BED, NATURAL GROUND, AND WATER SURFACE PROFILE ( NORMAL ELEVATION AND ELEVATION AT DATE OF SURVEY ) UP AND DOWNSTREAM FOR A SUFFICIENT DISTANCE BEYOND LIMITS OF CONSTRUCTION. (EXTEND OUTLET DITCH PROFILES AS FAR AS NECESSARY TO REACH ADEQUATE CAPACITY )
- e. \_\_\_\_\_ FLOODPLAIN CROSS-SECTIONS AS DEEMED NECESSARY FOR PERFORMING BACKWATER ANALYSIS
- f. \_\_\_\_\_ ELEVATION OF ANY UP OR DOWNSTREAM DEVELOPMENT THAT WOULD BE CONSIDERED IN DESIGN ( EXAMPLE: ELEVATION OF HOUSES, BASEMENTS, YARDS, GARDENS, BARNs, AND PONDS )
- g. \_\_\_\_\_ ELEVATION OF ANY DEBRIS OR OTHER HIGH WATER MARKS

3. SCOUR POTENTIAL: OBTAIN THE FOLLOWING FIELD INFORMATION IN ADDITION TO THE NORMAL BRIDGE CROSSING DATA

- a. \_\_\_\_\_ WHAT IS THE STREAM BEDS AND FLOODPLAIN MATERIAL? IF SAND, IS IT FINE ,MEDIUM, OR COURSE?
- b. \_\_\_\_\_ ARE THE STREAM BANKS STABLE? ARE THERE VISIBLE SLUMPS, VERTICAL BANKS, LEANING TREES, OR UNDERCUT BANKS?

AT EXISTING CROSSING SITES:

- c. \_\_\_\_\_ OBTAIN A TYPICAL CHANNEL SECTION AT SUFFICIENT DISTANCE UP OR DOWNSTREAM BEYOND CROSSING AFFECTS
- d. \_\_\_\_\_ OBTAIN BED PROFILE EXTENDING WELL BEYOND SCOUR AREA
- e. \_\_\_\_\_ WHAT TYPE FOUNDATION DOES EXISTING STRUCTURE HAVE?  
IF FOOTING IS VISIBLE, NOTE CONDITION
- f. \_\_\_\_\_ OBSERVE GROUND CONDITIONS AROUND EXISTING PIERS AND SPILL THROUGH SLOPES. IS THERE INDICATION OF PREVIOUS SCOUR? IF SO IS DEPTH RECOGNIZABLE?

4. RECONNAISSANCE

- a. \_\_\_\_\_ DRIFT POTENTIAL, SIZE AND QUANTITY. ( QUESTION SOURCES WHEN HIGH-WATER INFORMATION IS OBTAINED.)
- b. \_\_\_\_\_ IDENTIFY CULTURE IN FLOODPLAIN FOR DETERMINATION OF FLOW RESISTANCE AND DISTRIBUTION ( ESTIMATE "N" VALUES )
- c. \_\_\_\_\_ IDENTIFY DEVELOPMENT IN FLOODPLAIN THAT COULD BE AFFECTED BY BACKWATER, DOWNSTREAM EROSION OR REDUCTION OF FLOW
- d. \_\_\_\_\_ IDENTIFY STORAGE AREAS SUCH AS PONDS, LAKES, ETC., FOR POSSIBLE ADJUSTMENT OF DISCHARGE RATES WHERE APPLICABLE
- e. \_\_\_\_\_ REVIEW ADEQUACY OF DOWNSTREAM CHANNELS FOR CONVEYANCE OF INCREASED DISCHARGE RATES
- f. \_\_\_\_\_ PHOTOGRAPHS OF SITE(S)
- g. \_\_\_\_\_ LOCATION AND CLASSIFICATION OF WETLANDS

5. OBTAIN HISTORICAL H.W. INFORMATION SOURCES: ( NAMES AND ADDRESSES )

- a. \_\_\_\_\_ LOCAL RESIDENTS
- b. \_\_\_\_\_ BRIDGE MAINTENANCE PERSONNEL
- c. \_\_\_\_\_ ROADWAY MAINTENANCE PERSONNEL
- d. \_\_\_\_\_ FREQUENT ROAD USERS ( EX. MAILMAN, DELIVERY PEOPLE )

QUESTIONS:

- a. \_\_\_\_\_ MAXIMUM H.W., WHEN IT OCCURRED?, WHAT DAMAGE OCCURRED?, PERIOD OF KNOWLEDGE OF PROVIDER
- b. \_\_\_\_\_ OTHER LESSER FLOOD LEVELS, HOW OFTEN?
- c. \_\_\_\_\_ YEARLY OCCURRENCE
- d. \_\_\_\_\_ O.H.W. FOR POSSIBLE PERMIT

6. DATA ON UP AND DOWNSTREAM CROSSINGS

- a. \_\_\_\_\_ SIZE
- b. \_\_\_\_\_ RELATIVE LEVELS OF STRUCTURE AND ROADWAY
- c. \_\_\_\_\_ PERFORMANCE ( FLOOD HISTORY )

HYDRAULIC STUDY

THE FOLLOWING INFORMATION IS TO BE COMPLETED BY THE DESIGN ENGINEER AT THE COMPLETION OF THE PROJECT DESIGN.

- 1. WHAT DESIGN FREQUENCIES WERE USED FOR DRAINAGE STRUCTURES? WHY?
  
- 2. WHAT ALTERNATES HAVE BEEN CONSIDERED FOR THE MAJOR DRAINAGE STRUCTURES
  
- 3. HAS AN ECONOMIC ANALYSIS BEEN MADE FOR ANY CROSSING DESIGNS?  
HAS A LESSER DESIGN STANDARD BEEN CONSIDERED?

4. HAS PROPOSED STRUCTURE OR DESIGN BEEN CHANGED FROM WHAT WAS RECOMMENDED IN PLANNING REPORT? IF SO, HAS PLANNING BEEN NOTIFIED OF CHANGES?
  
5. HAVE INVERT GRADES OF STORM DRAINAGE SYSTEMS BEEN PLOTTED AND PROVISIONS MADE FOR UTILITY CONFLICTS?
  
6. HAVE WATER SURFACE PROFILES THROUGH STORM DRAINAGE SYSTEMS BEEN PLOTTED?
  
7. HAVE EVALUATIONS BEEN MADE OF OUTLET CHANNELS FOR POTENTIAL AFFECT OF PROJECT DEVELOPMENT?

APPROVED BY \_\_\_\_\_

DATE \_\_\_\_\_