STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JAMES B. HUNT JR.
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

DAVID MCCOY
ACTING SECRETARY

MEMO TO: Debbie Barbour, PE
John Alford, PE
Bill Gilmore, PE
R. B. Davis, PE
Lubin Prevatt, PE
Bob Brown, PE
Charles Casey, PE
Roadway Design Project Engineers
Roadway Design Project Design Engineers
Design Services Engineering Coordination Section
Project Engineers and Project Design Engineers

FROM: Len Hill, PE
State Design Engineer

DATE: June 11, 1999

SUBJECT: Preliminary Cost Estimate Guide

In the interest of producing accurate, complete, and reliable construction cost estimates, a draft Preliminary Cost Estimate Guide has been compiled and circulated for comments. Attached is this guide in final form incorporating the comments and suggestions we received.

This guide will be used in the preparation of quantities for functional and preliminary cost estimates and will replace the "Consultant Guide" for estimating. Included with the guide are examples of an updated version of the "Consultant Guide" in both spreadsheet and ROSCOE format. It is our intent to eventually incorporate this Preliminary Estimate Cost Estimate Guide into the Roadway Design Manual.

The Preliminary Estimate Cost Estimate Guide is the result of efforts of both the Preliminary Estimates Section of Design Services and the Roadway Design Unit. Questions regarding this guide should be directed to Jay Bennett or Dewayne Sykes of Roadway Design or Alan Jones of Estimating.

RLH/dls
Attachment
cc: Calvin Leggett, PE
Victor Barbour, PE
Randy Garris, PE
Doug Lane
Alan Jones

North Carolina Department of Transportation
Design Services Unit
Preliminary Estimate Section

Functional / Preliminary Estimate List :

1. Clearing and Grubbing (acr. or ha.)
2. Earthwork (cy or m3) - unclassified, borrow, undercut, etc.
    a. Fine Grading (sy or m2)
3. Drainage (per mile or kilometer)
4. Paving (ton or mtn, w/ pavement design, or sy / m2 without)
    a. Stabilization (sy or m2)
    b. Shoulder Drains (lf or meter)
5. Curb & Gutter (lf or meter)
6. Guardrail (lf or meter)
7. Anchor Units (each-type)
8. Fencing (mile or kilometer)
9. Interchange Signing (type & location)
10. Traffic Control (TCP) (per mile or kilometer)
11. Thermo and Markers (per mile or kilometer)
12. Utilities (lf or meters)
13. Erosion Control (acres or hectares)
14. Traffic Signals (each and location)
15. Retaining Walls / Noise Walls (sf or m2, with avg. height)
16. Bridges (individual location)
17. RC Box Culverts (individual location)
18. Railroad Crossing (each-with or without gates)

See additional pages for detailed descriptions and explanations of this list.

Design Services Unit
Preliminary Estimate Section

Functional / Preliminary Estimate List Description :

In an effort to achieve consistency and improve accuracy in computing preliminary estimate costs, the following information should be included with all estimate requests, when applicable.

Depending on the stage and type of a project, some of this information may not be available. However, providing as much information as possible at each level will enhance estimate accuracy.

The following list of items and descriptions should be used as a general guide in compiling estimates. The list is set up as closely as possible to conform to the pay item list, and not necessarily by order of importance.

Clearing and Grubbing : Tree removal areas only, in acres or hectares.

Earthwork : (unclassified, borrow, undercut) in cubic yards or cubic meters.
If there are no quantities available, a profile with existing ground line and proposed grades will help. As a rule of thumb, design engineers should increase calculated quantities by 10%. Undercut through wetland areas should assume a depth of 3 feet x shoulder to shoulder width. Include fabric and back-fill items with undercut quantities.

Fine Grading : All new or widening work from shoulder point to shoulder point in square yards or square meters.

Drainage : Items and quantities preferred but a cost based on lengths and typicals can be used if quantities are not available.

Paving : Items and quantities preferred in tons or metric tons (including asphalt cement) when pavement design is available. If there is no pavement design, provide square yard or square meter and indicate full depth, partial depth, new, widening, resurfacing and removal areas. Also indicate where quantities are located on project (i.e.; -L-line,-Y-line, ramps, loops or service roads and if asphalt or concrete pavement. As a rule of thumb, design engineers should increase calculated quantities by 10%.

Subgrade Stabilization : In square yard or square meter, measured to one foot beyond edge of pavement. Stabilize everything over six feet wide at 100% until the right of way estimate.

Shoulder Drains : In linear feet or meters.

Curb and Gutter : In linear feet or meters, and indicate type (i.e.: 2'-6", etc.)

Guardrail : In linear feet or meters, and indicate type (i.e.: shop curved, double face, etc.)
Anchors : Number and type of each.

Fencing : Advise if project is controlled access. Price usually based on length along -L-line. (per mile or kilometer). Indicate woven wire or chain link material.

Interchange Signing : Indicate type (complexity) of interchange, location and number of each.

Traffic Control : (TCP) Supply traffic counts if available. Costs are established based on type of work and lengths along widening sections and locations where interchanges and proposed lines cross existing road.

Thermoplastic Markers and Markings : Based on lengths and widths of -L-lines, -Y-lines, ramps and loops.
Painting : Need lengths and widths of all sections involved.

Utilities : Only concerned with sanitary sewer and water lines, not fiber optic cable or gas lines. Show linear feet or meters of each when impacted by project, if known.

Erosion Control : (Area of seeding and mulching) Provide quantity in acres or hectares, not in length or %. Indicate proposed average right of way width. Erosion control is usually everything inside the right of way that is not paved, plus easement areas.

Traffic Signals : Per each basis. Indicate whether new or upgrades. Show number of phases, if known.

Retaining Walls : Supply square feet or square meter and average height above ground at each location.. Indicate if walls are gravity or other types.
Noise Walls : In square feet or square meter. Assume all noise walls are pile and panel unless told otherwise.

Bridges : Show length and clear roadway width. Indicate if bridge is stage constructed, if it is in horizontal / vertical curve, bridge height (i.e., tri-level, etc.), if bridge is new or widened, if abutments are required, and if bridge is over water, railroad or existing roadway. Treat each location separately, do not lump several together and provide a total square yard or square meter. Give a description of each bridge and location.
For bridge removals, supply length, width and if it is staged removal.

RC Box Culverts : Show number of barrels, height and width of barrels, total length of culvert (indicate whether new or extensions and if extension if one or two sides), fill height above top slab of box, skew angle, if box is staged construction and if shoring is needed (if so, give a square feet or square meter quantity).

Railroad Crossings : Indicate if signals or signals with gates are required. Indicate if crossing is rubberized. Show if double signals and gates are required.

In addition to this general list there may be other project-specific items that will need to be added in some situations. Those items will need to be addressed on a project by project basis by the design engineer. There are also some items that need to be provided in order to produce a higher quality estimate.

* Indicate what stage the project is in (i.e. : functional, preliminary, etc.)

* Include any mapping, title sheets, typical sections, etc. that are available.

* Provide lengths of -L-lines, -Y-lines, ramps, loops and service roads, separately.

* Provide proposed typicals for -L-lines, -Y-lines, ramps, loops and service roads. For widening typicals, include existing pavement width.

* Give number and types of interchanges (i.e. : diamond, clover, directional, etc.)

* Have someone review and correct items and quantities before sending them to the preliminary estimate section.

There are also things that can be done to save time in preparing estimates :

* Leave occasional blank lines in estimates for adding omitted items.
  Leave enough room on last sheet of estimate for additional information. At least 6 to 8 lines.
* Leave unit price and amount columns blank. Do not write in them. That space is needed to add prices and extend costs.
* Compute all quantities consistently. For example, if all plans, typicals, hearing maps, etc. are in English, do all quantities in English.
* Round quantities to useable amounts (i.e. : show guardrail at 1,350 LF not 1,349.556 LF).

* Abbreviate description definitions when possible. No need to write "Asphalt Concrete Binder Course, Type HDB", when just "HDB" will be sufficient.

Be sure to note if special costs need to be included in project totals. For example, items such as interchange lighting, portable lighting for night work, conc. median barrier, milling, shoulder drains, etc. are project-specific items that may need to be added.

Pr.Est.ListDesc.doc

List of Items for Preparing
Functional / Preliminary
Cost Estimates

The items listed below are to be used as a general guide in preparing both functional and preliminary cost estimates. Some items may not be needed, and others may need to be added on a project by project basis. This list is only part of an overall package which includes a detailed description of each item. Descriptions of each item need to be used in order to calculate quantities properly.

Line Item	Des	Sec No.	Item and Description	Quantity
1		G	Clearing & Grubbing	Acres or Hectares
			(wooded area only)	
2		G	Unclassified Excavation	Cubic Yards or Cubic Meters
2		G	Borrow Excavation	Cubic Yards or Cubic Meters
2		G	Undercut Excavation	Cubic Yards or Cubic Meters
2		D	Fine Grading	Square Yards or Square Meters
			(Area from shoulder point to shoulder point, less pavement)	
3		D	Drainage	Miles or Kilometers
			(Provide lengths & typicals for -L- lines, all -Y- lines, all ramps, all loops,	
			all service roads and any detours)	
4		P	Paving Items	Tons or Metric Tons Preferred
				Square Yards or Square Meters
				(if no pavement design available)
			(Give quantities for new full depth, including full depth paved shoulders)	
5		G	Curb & Gutter	Linear Feet or Meters
6		G	Guardrail	Linear Feet or Meters
7		G	Anchor Units	Each (Indicate Types)
8		G	Fencing	Miles or Kilometers
9		Y	Interchange Signing	Each
			(Indicate type of interchange and location of each situation)	
10		Y	Traffic Control (TCP)	Miles or Kilometers
			(Based on same typicals, etc. supplied for drainage)	
11		G	Thermo & Markers	Miles or Kilometers
			(Based on same typicals, etc. supplied for drainage)	
12		U	Utilities	Linear Feet or Meters
			(Sanitary sewer and water line information only)	
13		G	Erosion Control	Acres or Hectares
			(Area within right of way, less pavement, plus easement areas)	
14		Y	Traffic Signals	Each
			(Indicate new or upgrade, and # of cycles, if known)	
15		S	Noise / Retaining Walls	Square Feet or Square Meters
			(Indicate type and average height for each location)	
16		S	Bridges / Structures	Square Feet or Square Meters
			(Give detailed information for each location)	

Line Item	Des	Sec No.	Item and Description	Quantity
17		S	RC Box Culverts	Each
			(Give detailed information for each location)	
18		R	Railroad Crossing	Each
			(Indicate location and if gates are required)	

If you have questions on what to include, contact the preliminary estimate section at 919-250-4128.

All projects in the NC-TIP are to be priced by the preliminary estimate section.

Note : Structure / Bridge details :

A. Show width x length (width = clear roadway + sidewalks)

B. Indicate scope of work (new, widening, rehab., retrofit, detour, removal, phased construction, and if bridge is in hori horizontal curve.

C. Location (ie. NC-55 over US-64)

Note : RC Box Culvert details :

A. Show # of barrels, width & height of each, length, fill height above top slab, and skew.

B. Indicate new or extension, and if phased constructed

C. Calculate sheet piles if needed (in square feet or square meters)

D. Give location (name of stream)

Note : Include layout of project with each estimate request :

A. Sketch showing layouts and /or segments, grade separations, and Interchange locations.

B. Length and Typical Section descriptions of -L- line, all -Y-lines, all ramps, all loops, all service roads and detours.

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PRELIMINARY ESTIMATE DIVISION OF HIGHWAYS

LIST OF ITEMS FOR PREPARING FUNCTIONAL/PRELIMINARY COST ESTIMATES

THE ITEMS LISTED BELOW ARE TO BE USED AS A GENERAL GUIDE IN PREPARING FUNCTIONAL AND PRELIMINARY COST ESTIMATES. SOME ITEMS MAY NOT BE NEEDED AND OTHERS MAY NEED TO BE ADDED ON A PROJECT BY PROJECT BASIS. THIS LIST IS ONLY PART OF AN OVERALL PACKAGE WHICH INCLUDES A DETAILED DESCRIPTION OF EACH ITEM. DESCRIPTIONS OF EACH ITEM NEED TO BE USED IN ORDER TO CALCULATE QUANTITIES PROPERLY.

LINE	DES	SEC	ITEM DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
1	G		CLEARING & GRUBBING (WOODED AREA ONLY)	ACRES OR HECTARES		
2	G		UNCLASSIFIED EXCAVATION	CUBIC YARDS OR CUBIC METERS		
2	G		BORROW EXCAVATION	CUBIC YARDS OR CUBIC METERS		
2	G		UNDERCUT EXCAVATION	CUBIC YARDS OR CUBIC METERS		
2	D		FINE GRADING (AREA FROM SHOULDER POINT TO SHOULDER POINT,LESS PAVING AREAS)	SQUARE YARDS OR SQUARE METERS		
3	D		DRAINAGE (PROVIDE LENGTHS & TYPICALS FOR -L-LINE,ALL-Y-LINES,ALL RAMPS,) (ALL LOOPS,ALL SERVICE ROADS AND ALL DETOURS.)	MILES OR KILOMETERS		
4	P		PAVING ITEMS (GIVE QUANTITIES FOR NEW FULL DEPTH,INCLUDING FULL DEPTH PAVED SHLDRS.) (WIDENING,RESURFACING,PARTIAL DEPTH PAVED SHLDRS.,ETC.)	TONS OR METRIC TONS PREFERRED SQUARE YARDS OR SQUARE METERS IF NO PAVEMENT DESIGN.		
4	P		SUBGRADE STABILIZATION (1'BEYOND FULL DEPTH PAV'T)	SQUARE YARDS OR SQUARE METERS		
4	P		SHOULDER DRAINS	LINEAR FEET OR METERS		
5	G		CURB & GUTTER	LINEAR FEET OR METERS		
6	G		GUARDRAIL	LINEAR FEET OR METERS		
7	G		ANCHOR UNITS	EACH (INDICATE TYPES)		
8	G		FENCING	MILES OR KILOMETERS		
9	Y		INTERCHANGE SIGNING (INDICATE TYPE OF INTERCHANGE AND LOCATION OF EACH SITUATION)	EACH		
10	Y		TRAFFIC CONTROL (TCP) (BASED ON SAME TYPICALS, ETC. SUPPLIED FOR DRAINAGE)	MILES OR KILOMETERS		
11	Y		THERMO & MARKERS (BASED ON SAME TYPICALS, ETC. SUPPLIED FOR DRAINAGE)	MILES OR KILOMETERS		

LINE/DES/SEC		ITEM DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
12	U	UTILITIES (GIVE SEWER AND WATER LINE INFORMATION ONLY)		LINEAR FEET OR METERS	
13	G	EROSION CONTROL (AREA WITHIN RIGHT OF WAY,LESS PAVEMENT,PLUS EASEMENTS)		ACRES OR HECTARES	
14	Y	TRAFFIC SIGNALS (INDICATE NEW OR UPGRADE AND # OF CYCLES, IF KNOWN)		EACH	
15	S	NOISE/RETAINING WALLS (INDICATE TYPE AND AVERAGE HEIGHT FOR EACH LOCATION)		SQUARE FEET OR SQUARE METERS	
16	S	BRIDGES/STRUCTURES (GIVE DETAILED INFORMATION FOR EACH LOCATION)		SQUARE FEET OR SQUARE METERS	
17	S	RC BOX CULVERTS (GIVE DETAILED INFORMATION FOR EACH LOCATION)		LUMP SUM	
18	R	RAILROAD CROSSING (INDICATE LOCATION AND IF GATES ARE REQUIRED)		EACH	

IF YOU HAVE QUESTIONS ON WHAT TO INCLUDE, CONTACT THE PRELIMINARY ESTIMATE SECTION AT 250-4128.

NOTE: ALL PROJECTS IN THE NC-TIP ARE TO BE PRICED
BY THE PRELIMINARY ESTIMATE SECTION.
DO NOT CALCULATE ESTIMATES ON THIS FORM.

NOTE: GIVE QUANTITY FOR ALL LUMP SUM ITEMS.

NOTE: STRUCTURE/BRIDGE DETAILS:
A. SHOW WIDTH X LENGTH (WIDTH= CLEAR RDWY + SIDEWALKS)
B. INDICATE SCOPE OF WORK (NEW, WIDENING, REHAB.,IN CURVE, RETROFIT, DETOUR, PHASE CONSTRUCTION, OR REMOVAL)
C. LOCATION (EX. NC-55 OVER US-64)

NOTE: RC BOX CULVERT DETAILS:
A. SHOW #BARRELS @ WIDTH X HEIGHT - LENGTH - FILL HT.- SKEW
B. INDICATE NEW OR EXTENSION, AND IF PHASED CONSTRUCTED
C. CALCULATE SHEET PILES (SQ.FT.) IF NEEDED
D. LOCATION (SHOW NAME OF STREAM)

NOTE: INCLUDE LAYOUT OF PROJECT WITH EACH ESTIMATE REQUEST :
A. SKETCH SHOWING ALTERNATES AND/OR SEGMENTS, GRADE SEPARATIONS AND INTERCHANGE LOCATIONS.
B. LENGTH AND TYPICAL SECTION DESCRIPTION (EACH ESTIMATE)