



Reviving
THE river OF grass

Capital Cost Estimating Tool

Tool Overview

- Provides “Planning Level Capital Cost Estimates”
 - Reservoirs
 - Flow-Ways
 - Stormwater Treatment Areas
 - Wetland Management Areas
 - Conveyance – new canals and improved canals
 - Aquifer Storage and Recovery
 - Infrastructure removal, relocation and replacement
- Provides consistency in capital cost comparisons
 - Feature types
 - Configurations

Tool Overview

- Capital construction costs for each feature type are calculated automatically using predetermined standard cost estimating criteria consistent with industry standards
- Significantly reduces the time and resources required to generate capital cost information
- Consistent calculations and assumptions allow equitable cost comparisons between configurations
- Continuity of the calculations ensures that the capital construction costs for the proposed configurations are consistent with engineering requirements and estimating methodology

Configuration Planning

- Engineer assigned to configuration development team will provide basic design information by feature type
 - Dimensions and Quantities (length, width, height, depth, area)
 - Capacities
 - Land use, soil type, muck depth, topography, clearing, grading
 - Infrastructure Impacts
- Basic design information will feed required entry fields in the Capital Cost Estimating Database
- Database will automatically calculate capital construction cost by feature type and generate the capital construction cost for the entire configuration

User Interface Data Input Screen – Page 1

EDT CONFIGURATION DATA ENTRY SHEET

Department:	Engineering	Record	307
Configuration:			
Feature:			

Facility Infrastructure:

Feature Type:		Cut Off Wall Height:	0.0 ft
Type of Storage		Cut Off Wall Length:	0 miles
Type of Elevation:		Interior Levee:	
Storage Volume:	0 ac ft	Length of Interior Levee:	0 0.0 0.0 mi
Max Water Depth	0.0 ft	Height of Interior Levee:	0 ft
Gross Acreage	0 ac	Number of Internal Cells:	0
Net Acreage:	0 ac	Number of Ctrl Struct within Cells	0
Length of Embankment	0.0 miles	Type of Structures within Cells:	
Height of Embankment:	0.0 ft	Flow Capacity of Each Structure	0 cfs
Top Width of Perim Canal	0 ft	Interior Borrow:	
Slope:	0.0 : 1	Length of Interior Borrow:	0.0 miles
Muck Depth	0	Height of Interior Borrow:	0 ft
Soil Type:		Add'l Int Borrow ~ Embankment higher than 35 ft:	
Land Use		Length of Addtl Borrow:	0.0 miles
Interior Clearing	0% of Net	Depth of Addtl Borrow:	0 ft
Interior Regrading	0% Acreage to be cleared	Aquifer Storage and Recovery (ASR):	
Topo Delta:	0	Units:	
Gravity Inflow Capacity	0 cfs (total flow)	5 MGD ASR System:	0 \$ 0
Gravity Inflow Type:		<small>equivalent to 8 cfs or 15 acft/day</small>	
Gravity Inflow Structure:		50 MGD ASR System:	0 \$
Pump St Inflow Capacity:	0 cfs (total flow)	<small>equivalent to 80 cfs or 150 acft/day</small>	
Gravity Outflow Capacity	0 cfs (total flow)		
Gravity Outflow Type:			
Gravity Outflow Structure:			
Pump St Outflow Capacity	0 cfs (total flow)		
Road Top of Embankment:	0 ft		
Perimeter Road - Embankment:	0 ft		
Access Road - Canal:			

User Interface Data Input Screen – Page 2

Conveyance:

Enhancement

new/
enhancement

ConveyanceID:	<input type="text"/>
Existing Canal:	<input type="text"/>
Canal TWidth:	<input type="text"/>
Canal BWidth:	<input type="text"/>
CanalDepth:	<input type="text"/>
CanalLength:	<input type="text"/>

Proposed Canal Width:	<input type="text"/>	ft
Proposed Canal Depth:	<input type="text"/>	ft
Proposed Bottom Width:	<input type="text"/>	ft
New Canal Width:	<input type="text" value="0"/>	ft
New Canal Length:	<input type="text" value="0.0"/>	miles
New Canal Depth:	<input type="text" value="0"/>	
New Canal Bottom Width:	<input type="text" value="0"/>	ft
Canal Velocity:	<input type="text" value="0"/>	ft/sec
Canal Cross Section:	<input type="text" value="0"/>	sf

Muck Depth - Canal:	<input type="text" value="0.0"/>	ft
Slope - Canal:	<input type="text" value="0.0"/>	

Canal Infl Capacity - Grav:	<input type="text" value="0"/>	(total flow)
Canal Grav Infl Type:	<input type="button" value="v"/>	
Canal Grav Infl Structure:	<input type="button" value="v"/>	
Canal Infl Capacity - Pump:	<input type="text" value="0"/>	(total flow)
Canal Outfl Capacity - Grav:	<input type="text" value="0"/>	(total flow)
Canal Grav Outfl Type:	<input type="button" value="v"/>	
Canal Grav Outfl Structure:	<input type="button" value="v"/>	
Canal Outfl Capacity - Pump:	<input type="text" value="0"/>	(total flow)

Other Impacts:

(lanes -
2, 4, 6) width

Roads to be removed	<input type="text" value="0.0"/>	miles	<input type="text" value="0"/>	<input type="text" value="0"/>
Roads to be constructed	<input type="text" value="0.0"/>	miles	<input type="text" value="0"/>	<input type="text" value="0"/>
Bridges to be removed	<input type="text" value="0.0"/>	ft	<input type="text" value="0"/>	<input type="text" value="0"/>
Bridges to be constructed	<input type="text" value="0.0"/>	ft	<input type="text" value="0"/>	<input type="text" value="0"/>
Transmission Lines removed	<input type="text" value="0.0"/>	miles		
Transmission Lines constructed	<input type="text" value="0.0"/>	miles		
Elec Substation:	<input type="text" value="0"/>	ea		
298 District Impact	<input type="text" value="0"/>	ea		
Railroads removed	<input type="text" value="0.0"/>	miles		
Railroads constructed	<input type="text" value="0.0"/>	miles		
Rail Yards removed	<input type="text" value="0.00"/>	ea		
Rail Yards constructed	<input type="text" value="0.00"/>	ea		
Railroad Bridges removed	<input type="text" value="0.00"/>	ft	<input type="text" value="0"/>	
Railroad Bridges constructed	<input type="text" value="0.00"/>	ft	<input type="text" value="0"/>	
Housing	<input type="text" value="0"/>	ea		
Farms	<input type="text" value="0"/>	ea		
Other Impacts:	<input type="text" value="0"/>		<input type="button" value="v"/>	\$

other impacts include, but not limited to
boat ramps/docks, box culverts, etc.:

Conveyance In and Out:	<input type="text" value="0"/>	ea
Degrdr Rds Fill Canal:	<input type="text" value="0"/>	smi
Telemetry Impact:	<input type="text" value="0"/>	ea
Airport Impact:	<input type="text" value="0"/>	ea
FPL Power Supply Imp:	<input type="text" value="0.0"/>	miles

Database Output - Quantities



Configuration: EDER Test

Description:

Calculation Qty Take Off:

Deep Storage Reservoir West

Storage Volume: 157,248

Max Water Depth: 18

Perimeter Levee:

Clearing and Grubbing:	Height of Embankment: <input type="text" value="36.0"/> ft Length of Embankment: <input type="text" value="17.0"/> mi x 5,280 = <input type="text" value="89,760"/>	width of embankment = 200 work zone: <input type="text" value="430"/>	<input type="text" value="886"/> AC
Clearing:	net AC x 1/4 of clearing = total AC for clearing		<input type="text" value="0"/> AC
Re-Grading:	net AC x 1/4 = 1/4 of regrading x 1.12 = total CV for regrading		<input type="text" value="0"/> CY
Demuck (Levee Footing):	(length x width x muck depth) / 27 x 1.12 = total		<input type="text" value="0"/> CY
Embankment:	(l1 - l2) / (2h) = assume 3 (rise) to 1 (run) side slopes h = height of embankment: <input type="text" value="36.0"/> ft l1 = width of base of embankment: <input type="text" value="430"/> ft l2 = width of top of embankment: <input type="text" value="14"/> ft End Area = (l1 + l2) / 2 x h: <input type="text" value="4,392"/> sq ft Volume = End Area x length / 27 x 1.12 = total	<input type="text" value="14"/> ft	<input type="text" value="16,353,075"/> CY
Compaction:	Average width x number of lifts = total SF h = height of embankment: <input type="text" value="36.0"/> ft Average base width from above x lifts = <input type="text" value="2,928"/> sf SF is total length / 9 x 1/4 = total SY	No. Lifts = h / 3: <input type="text" value="12"/> lifts	<input type="text" value="29,201,920"/> SY
Slope Dressing:	Side Slopes for Embankment and Canal: Use same quantity for Embankment and Canal A = height of Emb. B = h x slope: <input type="text" value="36.0"/> ft x 3 = <input type="text" value="108"/> B A x sq ft + B x sq ft = C x sq ft = sq ft on slope length 1 side 12,960 = <input type="text" value="114"/> slope length one side slope length x 2 x length / 9	<input type="text" value="108"/> B	<input type="text" value="2,270,768"/> SY
Slope Protection Riprap:	Perimeter Emb interior face was slope length from above for one side times the length Length of slope x 3 (assume 3 ft of riprap): <input type="text" value="342"/> lf Assume 1 side of embankment application		<input type="text" value="1,135,384"/> CY
Slope Protection Grassing:	Perimeter Emb interior face was slope length from above for one side times the length Length of slope from above =		<input type="text" value="1,135,384"/> SY
Cut Off Wall:	length of cut off wall x 22 sq		<input type="text" value="89,760"/> LF
Road Construction ~ Top of Embankment:	It is assumed that the width of road top of embankment will be 14 ft length x width / 9 x 1.12		<input type="text" value="139,627"/> SY
Perimeter Road:	Assume perimeter road width of 14 ft. Unit price incl hauling, grading and placing of off site material		<input type="text" value="139,627"/> SY

Perimeter Canal:

Clearing and Grubbing:	Depth of Perimeter Canal: <input type="text" value="35.0"/> ft Length of Perimeter Canal: <input type="text" value="17.0"/> mi x 5,280 = <input type="text" value="89,760"/>	width of canal = 200 work zone: <input type="text" value="424"/>	<input type="text" value="874"/> AC
Demuck:	(length x canal width x muck depth) / 27 x 1.12 = total		<input type="text" value="0"/> CY
Blasting:	Blasting unit is per CV - USE SAME QUANTITY AS EXCAVATION		<input type="text" value="15,507,868"/> CY
Excavation:	Assume 1:1 sand and similar Emb and Fill - Therefore use Embankment Quantity		<input type="text" value="15,507,868"/> CY
Dewatering:	Dewatering unit is per CV - USE SAME QUANTITY AS EXCAVATION		<input type="text" value="15,507,868"/> CY
Slope Dressing:	SAME QUANTITY AS EMBANKMENT		<input type="text" value="2,207,691"/> SY
Slope Protection Grassing:	SAME QUANTITY AS EMBANKMENT		<input type="text" value="1,103,846"/> SY
Access Roads:	Assume access road width of 14 ft - Use two roads if canal width is > 100 ft. Unit price incl hauling, grading and placing of off site material		<input type="text" value="279,253"/> SY

Interior Levee:

Clearing and Grubbing:	Height of Interior Levee: <input type="text" value="0.0"/> ft Length of Interior Levee: <input type="text" value="0.0"/> mi x 5,280 = <input type="text" value="0"/>	width of interior levee = 200 work zone: <input type="text" value="0"/>	<input type="text" value="0"/> AC
Demuck (Levee Footing):	(length x width x muck depth) / 27 x 1.12 = total		<input type="text" value="0"/> CY

Database Output - Costs

<i>Description:</i>	<i>Calculation Qty Take Off:</i>	
Direct Cost Perimeter Levee:		175,568,132.63
Direct Cost Perimeter Canal		53,478,553.37
Direct Cost Interior Levee		0.00
Direct Cost Interior Borrow		0.00
Direct Cost Additional Interior Borrow		8,001,364.85
Direct Cost Structures / Pump Stations		87,700,000.00
Direct Cost Conveyance Enhancement		0.00
Direct Cost Conveyance New		13,640,659.15
Direct Cost Conveyance Structure		0.00
Direct Cost Construction Infrastructure ~ Conveyance		4,577,564.44
Direct Cost Construction Infrastructure		338,127,820.80
Direct Cost Other Impact		0.00
Subtotal Direct Cost		681,094,095.25
Mobilization	10% of Direct Cost	68,109,409.53
Field Office Overhead (FOOH)	8% of Direct Cost	54,487,527.62
Home Office Overhead (HOOH)	3% of Direct Cost	20,432,822.86
Subtotal		824,123,855.25
Bonds and Insurance	1.5% of Subtotal	12,361,857.83
Sales Tax	7% of 20% Subtotal	11,537,733.97
subtotal Total Cost		848,023,447.06
Profit	10% of subtotal Total Cost	84,802,344.71
Total Construction Cost		932,825,791.76
Planning, Design, Plans and Specs	12% of Total Construction Cost	111,939,095.01
Construction Management	5% of Total Construction Cost	46,641,289.59
Engineering During Construction	2% of Total Construction Cost	18,656,515.84
Construction Contingency	30% of Total Construction Cost	280,423,555.92
Total Feature Cost:		1,390,486,248.12

Remaining Work Effort

- Documentation - tool development and logic
- User manual with quick reference guide and example calculations
- Potential integration with Operations & Maintenance Cost Estimating Database
- Final system testing and quality assurance
- Product delivery, acceptance and application



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Questions??