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, reloacation and replacement
- Provides consistency in capital cost comparisons
  - Feature types
  - Configurations

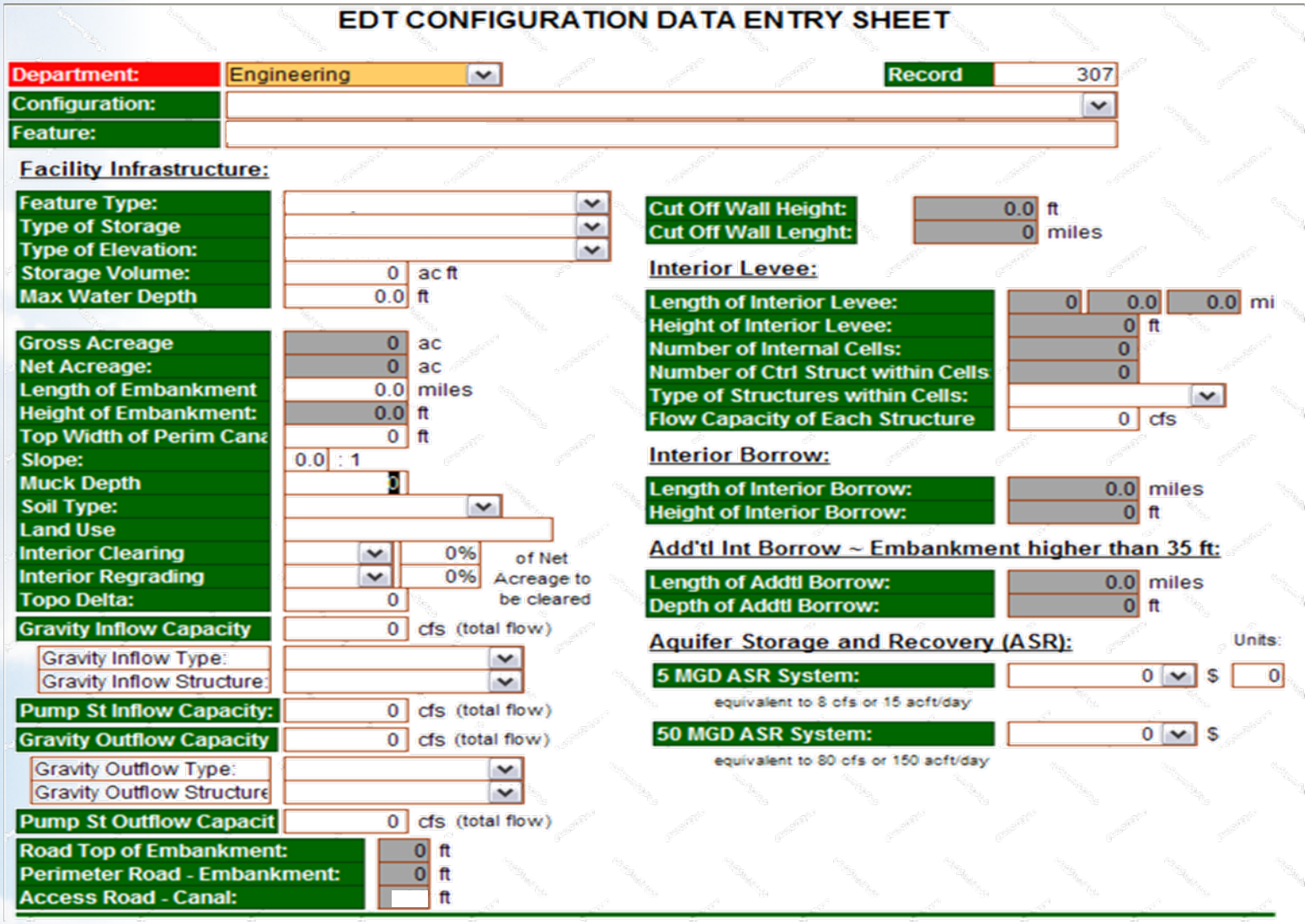
Tool Overview

- 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

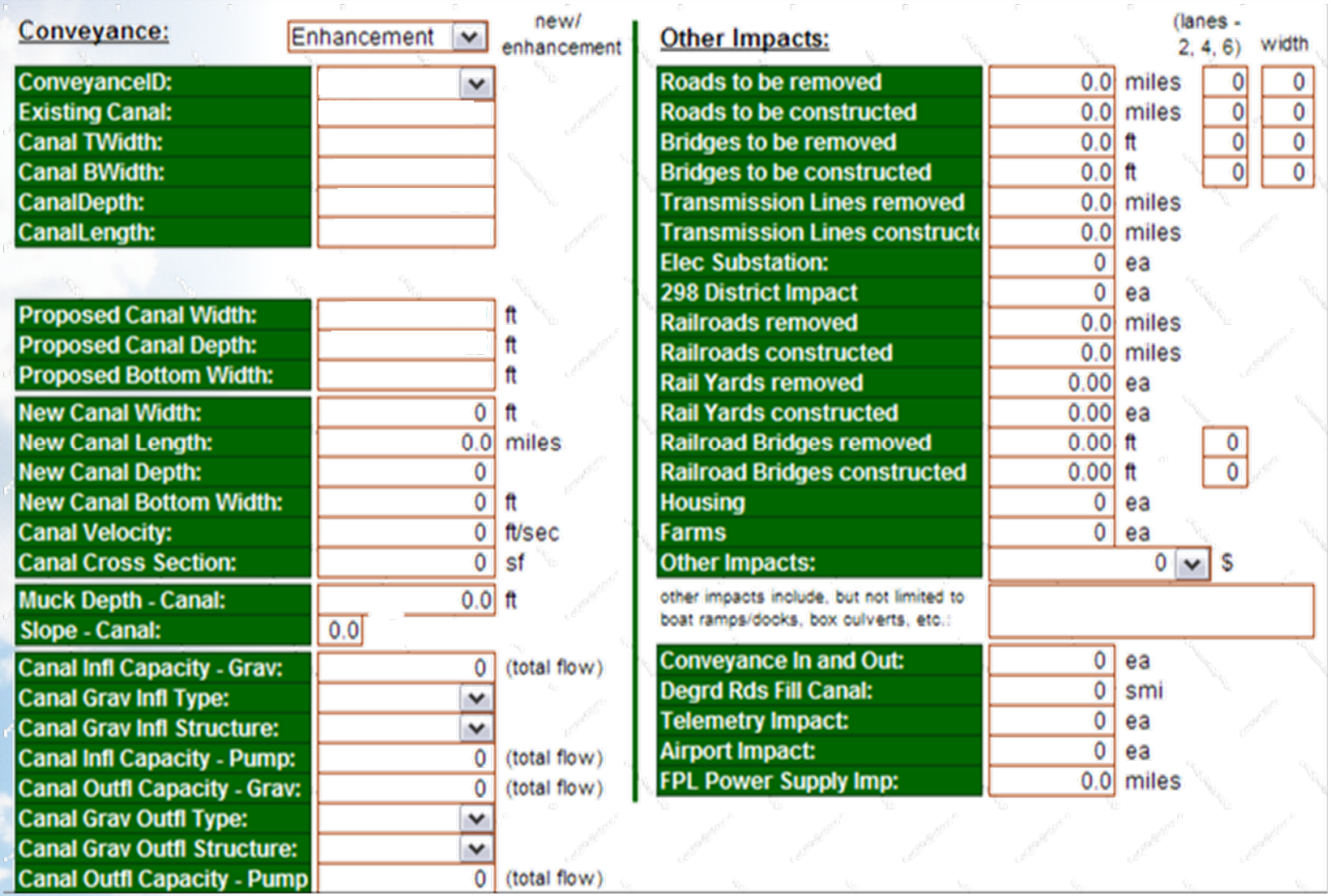
Configuration Planning

- 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



User Interface Data Input Screen – Page 2



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 36.0 ft; width of embankment + 200 work zone 430; Length of Embankment 17.0 mi x 5,280 = 89,760	886	AC
Clearing:	net AC is % of clearing = total AC for clearing	0	AC
Re-Grading:	net AC is qty/ac = qty; qty x % of regrading x 1.12 swell = total CY for regrading	0	CY
Demuck (Levee Footprint):	(length x width x muck depth)/27 x 1.12 swell	0	CY
Embankment:	(b1+b2)/2xhx1 = assume 3 (run):1 (rise) side slopes; h = height of embankment 36.0 ft; b1 = width of top of embankment 14 ft; b2 = width of base of embankment = (hx3)x2+b1 230 ft; End Area = (b1+b2)/2xh 4,392 sf; Volume = End Area x length / 27 x 1.12 swell	16353,075	CY
Compaction:	Average width x number of lifts = use 1.5 ft lifts; h = height of embankment 36.0 ft; No. Lifts = h/1.5 24 Lifts; Average base width from above x lifts = 2,928 sf; SF x total length / 9 sf/sy = total SY	29,201,920	SY
Slope Dressing:	Side Slopes for Embankments and Canal; Use same quantity for Embankments and Canal; A = height of Emb; B = h x slope 36.0 ft = A; x 3 = 108 = B; A sqrd + B sqrd = C sqrd; sqrd of = slope length 1 side; 12,960 = 114 slope length one side; slope length x 2 x length / 9	2,270,768	SY
Slope Protection Riprap:	Perimeter Embankment face use slope lengths from above for one side times the length; Length of slope x 3 (assume 3 ft of riprap) 342 sf; Assume 1 side of embankment application	1,135,384	CY
Slope Protection Grassing:	Perimeter levee exterior face use slope lengths from above for one side times the length; Length of slope from above =	1,135,384	SY
Cut Off Wall:	length of cut off wall x 5280	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 lanes	139,627	SY
Perimeter Road:	Assume perimeter road width of 14 ft. Unit price incl hauling, grading and placing of off site material	139,627	SY
Perimeter Canal:			
Clearing and Grubbing:	Depth of Perimeter Canal 35.0 ft; width of canal + 200 work zone 424; Length of Perimeter Canal 17.0 mi x 5,280 = 89,760	874	AC
Demuck:	(length x canal width x muck depth)/27 x 1.12 swell	0	CY
Blasting:	Blasting unit is per CY ~ USE SAME QUANTITY AS EXCAVATION	15,507,868	CY
Excavation:	Assume balanced and similar Emb and Fill ~ Therefore use Embankment Quantity	15,507,868	CY
Dewatering:	Dewatering unit is per CY ~ USE SAME QUANTITY AS EXCAVATION	15,507,868	CY
Slope Dressing:	SAME QUANTITY AS EMBANKMENT	2,207,691	SY
Slope Protection Grassing:	SAME QUANTITY AS EMBANKMENT	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	279,253	SY
Interior Levee:			
Clearing and Grubbing:	Height of Interior Levee 0.0 ft; width of interior levee + 200 work zone 0; Length of Interior Levee 0.0 mi x 5,280 = 0	0	AC
Demuck (Levee Footprint):	(length x width x muck depth)/27 x 1.12 swell	0	CY

Database Output - Costs

Description:		*Calculation Qty Take Off:*
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**

Total Configuration Cost:	**5,956,967,131.19**

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

Questions??