Inner Harbor Navigational Canal Lock Replacement- Shallow Draft GRR

Annex 3: COST ENGINEERING

February 4th, 2016

Prepared by MVN ED Cost Section

INNER HARBOR NAVIGATION CANAL

LOCK REPLACEMENT (SHALLOW DRAFT LOCK)

FEASIBILITY STUDY

COST ENGINEERING APPENDIX

Contents

Cost Estimate

Section 1. Cost estimate development

a) The project cost estimate was developed in the MCACES MII cost estimating software and used the standard approaches for a feasibility estimate structure regarding labor, equipment, materials, crews, unit prices, quotes, sub- and prime contractor markups. This philosophy was taken wherever practical within the time constraints. It was supplemented with estimating information from other sources where necessary such as the previous report from 1997, quotes, bid data, and A-E estimates. The intent was to provide or convey a "fair and reasonable" estimate that which depicts the local market conditions. The estimates assume a typical application of tiering subcontractors. Given the long time over which this project/program is to be constructed and the unknown economic status during that time, demands from non-governmental civil works projects were not considered to dampen the competition and increase prices.

Section 2. Estimate Structure:

a) The estimate is structured to reflect the projects performed. The estimate has been subdivided by USACE feature codes that include levees, floodwalls, a lock structure, pipeline relocations, and a bridge.

Section 3. Bid competition:

a) It is assumed that there will not be an economically saturated market and that bidding competition will be present.

Section 4. Contract Acquisition Strategy:

a) It is assumed that the contract acquisition strategy will be similar to past projects with large unrestricted design/bid/build contracts. There are no declared contract acquisition plan/types at this time.

Section 5. Labor Shortages:

a) It is assumed there will be a normal labor market.

Section 6. Labor Rates:

a) Local labor market wages are above the local Davis-Bacon Wage Determination and actual rates have been used. This is based upon local information and payroll data received from the New Orleans District Construction Representatives and estimators with experiences in past years.

Section 7. Materials:

a) Cost quotes are used on major construction items when available. Recent quotes may include concrete, steel and concrete piling, rock, gravel and sand. Assumptions include:
    i) Borrow - Materials will be purchased as part of the construction contract. The estimate does anticipate contractor furnished materials for borrow. Prices include delivery of materials.
    ii) Concrete - will be purchased from commercial batch plants.

iii) Steel – Material will be fabricated by know suppliers.

b) The borrow quantity calculations followed the MVN Geotechnical guidance:

c) Hauled Levee: 10 BCY of borrow material = 12 LCY hauled = 8 ECY compacted.

d) An assumed average one-way haul distance of 21 miles was used based upon the local Contractor Furnished pit.

e) Haul speeds are estimated using 40 mph speed average given the long distances and rural areas.

f) Rock and stone - The New Orleans delta area has no rock sources. Historically, rock is barged from northern sources on the Mississippi River. This decision is based upon local knowledge, experience and supported with cost quotes.

Section 8. Equipment:

a) Rates used are based from the latest USACE EP-1110-1-8, Region III. Adjustments are made for fuel and facility capital cost of money (FCCM). Judicious use of owned verses rental rates was considered based on typical contractor usage and local equipment availability. Only a few select pieces of marine \ marsh equipment are considered rental. Full FCCM/Cost of Money rate is latest available; MII program takes EP recommended discount, no other adjustments have been made to the FCCM.

i) Trucking: The estimate assumed independent self-employed trucking subcontractors due to the large numbers of trucks required.

ii) Dozers: dozers of the D-5/D-6 variety were chosen based on historical knowledge. Heavier equipment gets mired in the mud and soft soils.

iii) Rental Rates: Rental rates were used for marsh equipment where rental is typical such as marsh backhoes.

Section 9. Fuel:

a) Fuels (gasoline, on and off-road diesel) were based on local market averages for on-road and off-road for the Gulf Coast area. The Team found that fuels fluctuate irrationally; thus, used an average.

Section 10. Crews:

a) Major crew and productivity rates were developed and studied by senior USACE estimators familiar with the type of work. All of the work is typical to the New Orleans District. The crews and productivities were checked by local MVN estimators, discussions with contractors and comparisons with historical cost data. Major crews include clearing and grubbing, hauling, earthwork, piling and concrete.

b) Most crew work hours are assumed to be 10 hrs 6 days/wk which is typical to the area.

Section 11. Unit Prices:

a) The unit prices found within the various project estimates will fluctuate within a range between similar construction units such as floodwall concrete, earthwork, and piling. Variances are a result of differing haul distances, small or large business markups, subcontracted items, designs and estimates by others.

Section 12. Relocation Cost:

a) Relocation costs are defined as the relocation of utilities required for project purposes. In cases where potential significant impacts were known, costs were included within the cost estimate. The St. Claude Bridge is to be relocated as part of this project. Costs related to relocations were taken from the '97 report and escalated to current prices due to constraints in time.

Section 13. Mobilization:

a) Contractor mobilization and demobilization are based on the assumption that most of the contractors will be coming from within the Gulf Coast/Southern region. Mob/demob costs are based on historical studies of detailed Government estimate mob/demobs which averaged 4.9 to 5% of the construction costs. With undefined acquisition strategies and assumed individual project limits for the large number of potential contracts in this program, the estimate utilizes a more comprehensive approx. 5% value applied at each contract rather than risking minimizing mob/demob costs by detailing costs based on an assumed number of contracts. The 5% value also matches well with the 5% value previously prescribed by Walla Walla District, which has studied historical rates.

Section 14. Field Office Overhead:

a) The estimate used a field office overhead rate of 7% for the prime contractors at budget level development. Based on historical studies and experience, Walla Walla District has recommended typical rates ranging from 7% to 11% for large civil works projects; however, the range does not consider possible incentives such as camps, allowances, travel trailers, meals, etc. which have been used previously to facilitate projects. With undefined acquisition strategies and assumed individual project limits for the multiple number of potential contracts in this program, the estimate utilizes a more comprehensive percentage based approach applied at each contract rather than risking minimizing overhead costs by detailing costs based on an assumed number of contracts. The applied rates were previously discussed among numerous USACE District cost engineers including Walla Walla, Vicksburg, Norfolk, Huntington, St. Paul and New Orleans.

Section 15. Overhead assumptions may include:

a) Superintendent, office manager, pickups, periodic travel, costs, communications, temporary offices (contractor and government), office furniture, office supplies, computers and software, as-built drawings and minor designs, tool trailers, staging setup, camp and kitchen maintenance and utilities, utility service, toilets, safety equipment, security and

fencing, small hand and power tools, project signs, traffic control, surveys, temp fuel tank station, generators, compressors, lighting, and minor miscellaneous.

Section 16. Home Office Overhead:

a) Estimate percentages range based upon consideration of 8(a), small business and unrestricted prime contractors. The rates are based upon estimating and negotiating experience, and consultation with local construction representatives. The applied rates were previously discussed among numerous USACE District cost engineers including Walla Walla, Vicksburg, Norfolk, Huntington, St. Paul and New Orleans.

Section 17. Taxes:

a) Local taxes will be applied, using an average between the parishes that contain the work. Reference the LA parish tax rate website: http://www.laota.com/pta.htm

Section 18. Bond:

a) Bond is assumed 1% applied against the prime contractor, assuming large contracts.

Section 19. E&D and S&A:

a) USACE Costs to manage design (PED) and construction (S&A) are based on New Orleans District Programmatic Cost Estimate guidance:

    i) Planning, Engineering & Design (PED): The PED cost includes such costs as project management, engineering, planning, designs, investigations, studies, reviews, value engineering and engineering during construction (EDC). Historically New Orleans District has used an approximate 12% rate for E&D/EDC, applied against the estimated construction costs. Other USACE civil works districts such as St. Paul, Memphis and St. Louis have reported values ranging from 10-15%. Additional costs were added for project management, engineering, planning, designs, investigations, studies, reviews, value engineering. Specific PED costs were originally calculated and then that same percentage was carried forward on all future updates.

    ii) Supervision & Administration (S&A): Historically, New Orleans District used a range from 5% to 15% depending on project size and type applied against the estimated construction costs. Other USACE civil works districts such as St. Paul, Memphis and St. Louis report values ranging from 7.5-10%. Consideration includes that a portion of the S&A effort could be performed by contractors. Based on discussions with MVN Construction Division, an S&A cost based on contract durations was developed. Specific S&A costs were originally calculated and then that same percentage was carried forward on all future updates.

Section 20. Contingencies:

a) Contingencies were developed using the USACE Abbreviated Cost Risk Analysis (ARA) cost related risks. See summary in Cost Schedule Risk Analysis (CSRA) section.

Section 21. Escalation:

a) Escalation used in the TPCS is based upon the US Army Corps of Engineers Engineering Manual (EM) 1110-2-1304 Civil Works Construction Cost Index System (CWCCIS) revised 30 Sept 2015.

Section 22. HTRW:

a) The estimate includes no costs for any potential Hazardous, Toxic, and Radioactive Waste (HTRW) concerns. Some material to be removed from the canal is assumed to be contaminated and will be contained in a Confined Disposal Facility (CDF).

Section 23. Cost Estimates for Final Array of Alternatives:

a) The preliminary cost estimates were developed during the planning process as a means of evaluating each restoration alternative and for use with the Institute for Water Resources (IWR) analysis. The costs estimated for all alternatives are shown on the section Alternative Formulation Cost Summary. Please note these preliminary costs estimates were used for planning purposes only and do not represent a fully funded costs estimate. These costs include contingencies calculated using the MCX Abbreviated Cost Risk Analysis program.

Schedule

a) The project schedule was developed based on the construction of the individual features of work which includes the dredging of a channel bypass, canal excavation, construction of a cofferdam, the new IHNC lock, a temporary and new bridge for St Claude, earthen levees and floodwalls.

Alternative Formulation Cost Summary

Abbreviated Risk Analysis

Project (less than $40M): **Inner Harbor Navigation Canal Lock Replacement**
Project Development Stage/Alternative: **Alternative Formulation**
Risk Category: **High Risk: Complex Project or Unique Type Construction**

Alternative: 110' x 1,200' Lock -22 Draft

Meeting Date: No meeting due to time constraints.

Total Estimated Construction Contract Cost = $ 517,488,140

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ 633,000		27.17%	$ 172,000	$ 805,000
1	02 RELOCATIONS	Relocations	$ 72,038,965		68.69%	$ 49,482,020	$ 121,520,985
2	05 LOCKS	Locks	$ 310,888,617		54.43%	$ 169,229,548	$ 480,118,165
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	Channels and Canals	$ 25,010,512		34.69%	$ 8,676,665	$ 33,687,177
4	11 LEVEES AND FLOODWALLS	Levees and Floodwalls	$ 109,502,307		29.02%	$ 31,774,766	$ 141,277,073
5					0.00%	$ -	$ -
6					0.00%	$ -	$ -
7					0.00%	$ -	$ -
8					0.00%	$ -	$ -
9					0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other	Remaining Construction Items	$ 47,739	*0.0%*	10.00%	$ 4,774	$ 52,512
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	$ 62,098,577		15.15%	$ 9,410,004	$ 71,508,581
14	31 CONSTRUCTION MANAGEMENT	Construction Management	$ 51,748,814		14.41%	$ 7,456,518	$ 59,205,332
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ 633,000	27.17%	$ 172,000	$	805,000.00
Total Construction Estimate	$ 517,488,140	50.08%	$ 259,167,774	$	776,655,913
Total Planning, Engineering & Design	$ 62,098,577	15.15%	$ 9,410,004	$	71,508,581
Total Construction Management	$ 51,748,814	14.41%	$ 7,456,518	$	59,205,332
Total	**$ 631,968,530**	**44%**	**$ 276,206,296**	**$**	**908,174,826**
		Base	**50%**		**80%**
	Range Estimate ($000's)	$631,969k	$797,693k		$908,175k

* 50% based on base is at 5% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analysis. Must include justification. Does not allocate to Real Estate.)

Abbreviated Risk Analysis

Project (less than $40M): **Inner Harbor Navigation Canal Lock Replacement**
Project Development Stage/Alternative: **Alternative Formulation**
Risk Category: **High Risk: Complex Project or Unique Type Construction**

Alternative: 75' x 1,200' Lock -22 Draft

Meeting Date: No meeting due to time constraints.

Total Estimated Construction Contract Cost = $ 501,620,170

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ 633,000		27.17%	$ 172,000	$ 805,000
1	02 RELOCATIONS	**Relocations**	$ 72,038,965		68.69%	$ 49,482,020	$ 121,520,985
2	05 LOCKS	**Locks**	$ 295,453,204		54.43%	$ 160,827,414	$ 456,280,618
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	**Channels and Canals**	$ 24,625,694		34.69%	$ 8,543,164	$ 33,168,857
4	11 LEVEES AND FLOODWALLS	**Levees and Floodwalls**	$ 109,502,307		29.02%	$ 31,774,766	$ 141,277,073
5					0.00%	$ -	$ -
6					0.00%	$ -	$ -
7					0.00%	$ -	$ -
8					0.00%	$ -	$ -
9					0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 60,194,420		15.15%	$ 9,121,461	$ 69,315,881
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 50,162,017		14.41%	$ 7,227,875	$ 57,389,892
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ 633,000	27.17%	$ 172,000	$	805,000.00
Total Construction Estimate	$ 501,620,170	49.96%	$ 250,627,364	$	752,247,534
Total Planning, Engineering & Design	$ 60,194,420	15.15%	$ 9,121,461	$	69,315,881
Total Construction Management	$ 50,162,017	14.41%	$ 7,227,875	$	57,389,892
Total	**$ 612,609,608**	**44%**	**$ 267,148,700**	**$**	**879,758,308**
		Base	**50%**		**80%**
	Range Estimate ($000's)	$612,610k	$772,899k		$879,758k

* 50% based on base is at 5% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analysis. Must include justification. Does not allocate to Real Estate.	

Abbreviated Risk Analysis

Project (less than $40M): **Inner Harbor Navigation Canal Lock Replacement**
Project Development Stage/Alternative: **Alternative Formulation**
Risk Category: **High Risk: Complex Project or Unique Type Construction**

Alternative: 110' x 900' Lock -22 Draft

Meeting Date: No meeting due to time constraints.

Total Estimated Construction Contract Cost = $ 510,881,526

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	**Real Estate**	**$ 633,000**		**27.17%**	$ 172,000	$ 805,000
1	02 RELOCATIONS	**Relocations**	**$ 72,038,965**		68.69%	$ 49,482,020	$ 121,520,985
2	05 LOCKS	**Locks**	**$ 281,011,422**		54.43%	$ 152,966,153	$ 433,977,575
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	**Channels and Canals**	**$ 24,453,506**		34.69%	$ 8,483,428	$ 32,936,934
4	11 LEVEES AND FLOODWALLS	**Levees and Floodwalls**	**$ 109,502,307**		29.02%	$ 31,774,766	$ 141,277,073
5					0.00%	$ -	$ -
6					0.00%	$ -	$ -
7					0.00%	$ -	$ -
8					0.00%	$ -	$ -
9					0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other	**Remaining Construction Items**	**$ 23,875,327**	*4.9%*	10.00%	$ 2,387,533	$ 26,262,859
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	**$ 61,305,783**		15.15%	$ 9,289,869	$ 70,595,653
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	**$ 51,088,153**		14.41%	$ 7,361,323	$ 58,449,475
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ 633,000	27.17%	$ 172,000	$	805,000.00
Total Construction Estimate	$ 510,881,526	47.97%	$ 245,093,901	$	755,975,427
Total Planning, Engineering & Design	$ 61,305,783	15.15%	$ 9,289,869	$	70,595,653
Total Construction Management	$ 51,088,153	14.41%	$ 7,361,323	$	58,449,475
Total	**$ 623,908,462**	**42%**	**$ 261,917,093**	**$**	**885,825,555**
		Base	**50%**		**80%**
Range Estimate ($000's)		$623,908k	$781,059k		$885,826k

* 50% based on base is at 5% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analysis. Must include justification. Does not allocate to Real Estate.	

Abbreviated Risk Analysis

Project (less than $40M): **Inner Harbor Navigation Canal Lock Replacement**
Project Development Stage/Alternative: **Alternative Formulation**
Risk Category: **High Risk: Complex Project or Unique Type Construction**

Alternative: 110' x 1,200' Lock -16 Draft

Meeting Date: No meeting due to time constraints.

Total Estimated Construction Contract Cost = $ 508,397,421

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ 633,000		27.17%	$ 172,000	$ 805,000
1	02 RELOCATIONS	**Relocations**	$ 72,038,965		68.69%	$ 49,482,020	$ 121,520,985
2	05 LOCKS	**Locks**	$ 302,214,326		54.43%	$ 164,507,772	$ 466,722,098
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	**Channels and Canals**	$ 24,641,823		34.69%	$ 8,548,759	$ 33,190,582
4	11 LEVEES AND FLOODWALLS	**Levees and Floodwalls**	$ 109,502,307		29.02%	$ 31,774,766	$ 141,277,073
5					0.00%	$ -	$ -
6					0.00%	$ -	$ -
7					0.00%	$ -	$ -
8					0.00%	$ -	$ -
9					0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other	**Remaining Construction Items**	$ (0)	*0.0%*	0.00%	$ (0)	$ (0)
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 61,007,691		15.15%	$ 9,244,698	$ 70,252,389
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 50,839,742		14.41%	$ 7,325,529	$ 58,165,271
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ 633,000	27.17%	$ 172,000	$	805,000.00
Total Construction Estimate	$ 508,397,421	50.02%	$ 254,313,318	$	762,710,740
Total Planning, Engineering & Design	$ 61,007,691	15.15%	$ 9,244,698	$	70,252,389
Total Construction Management	$ 50,839,742	14.41%	$ 7,325,529	$	58,165,271
Total	**$ 620,877,854**	**44%**	**$ 271,055,546**	**$**	**891,933,400**

	Base	50%	80%
Range Estimate ($000's)	$620,878k	$783,511k	$891,933k

* 50% based on base is at 5% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analysis. Must include justification. Does not allocate to Real Estate.	

Abbreviated Risk Analysis

Project (less than $40M): **Inner Harbor Navigation Canal Lock Replacement** — **Alternative: 110' x 1,200' Lock -22 Draft**

Project Development Stage/Alternative: **Alternative Formulation**

Risk Category: **High Risk: Complex Project or Unique Type Construction** — **Meeting Date: No meeting due to time constraints.**

Total Estimated Construction Contract Cost = $ 517,488,140

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ 633,000		27.17%	$ 172,000	$ 805,000
1	02 RELOCATIONS	**Relocations**	$ 72,038,965		68.69%	$ 49,482,020	$ 121,520,985
2	05 LOCKS	**Locks**	$ 310,888,617		54.43%	$ 169,229,548	$ 480,118,165
3	09 CHANNELS AND CANALS (Except Navigation Ports and Harbors)	**Channels and Canals**	$ 25,058,250		34.69%	$ 8,693,227	$ 33,751,477
4	11 LEVEES AND FLOODWALLS	**Levees and Floodwalls**	$ 109,502,307		29.02%	$ 31,774,766	$ 141,277,073
5					0.00%	$ -	$ -
6					0.00%	$ -	$ -
7					0.00%	$ -	$ -
8					0.00%	$ -	$ -
9					0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other	**Remaining Construction Items**	$ -	*0.0%*	0.00%	$ -	$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	**Planning, Engineering, & Design**	$ 62,098,577		15.15%	$ 9,410,004	$ 71,508,581
14	31 CONSTRUCTION MANAGEMENT	**Construction Management**	$ 51,748,814		14.41%	$ 7,456,518	$ 59,205,332
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals					
Real Estate	$ 633,000	27.17%	$ 172,000	$	805,000.00
Total Construction Estimate	$ 517,488,140	50.08%	$ 259,179,561	$	776,667,701
Total Planning, Engineering & Design	$ 62,098,577	15.15%	$ 9,410,004	$	71,508,581
Total Construction Management	$ 51,748,814	14.41%	$ 7,456,518	$	59,205,332
Total	**$ 631,968,530**	**44%**	**$ 276,218,083**	**$**	**908,186,614**
		Base	**50%**		**80%**
	Range Estimate ($000's)	$631,969k	$797,700k		$908,187k

* 50% based on base is at 5% CL.

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analysis. Must include justification. Does not allocate to Real Estate.)

Total Project Cost Summary (TPCS)

This section will present the Total Project Cost Sheet for the Tentatively Selected Plan.

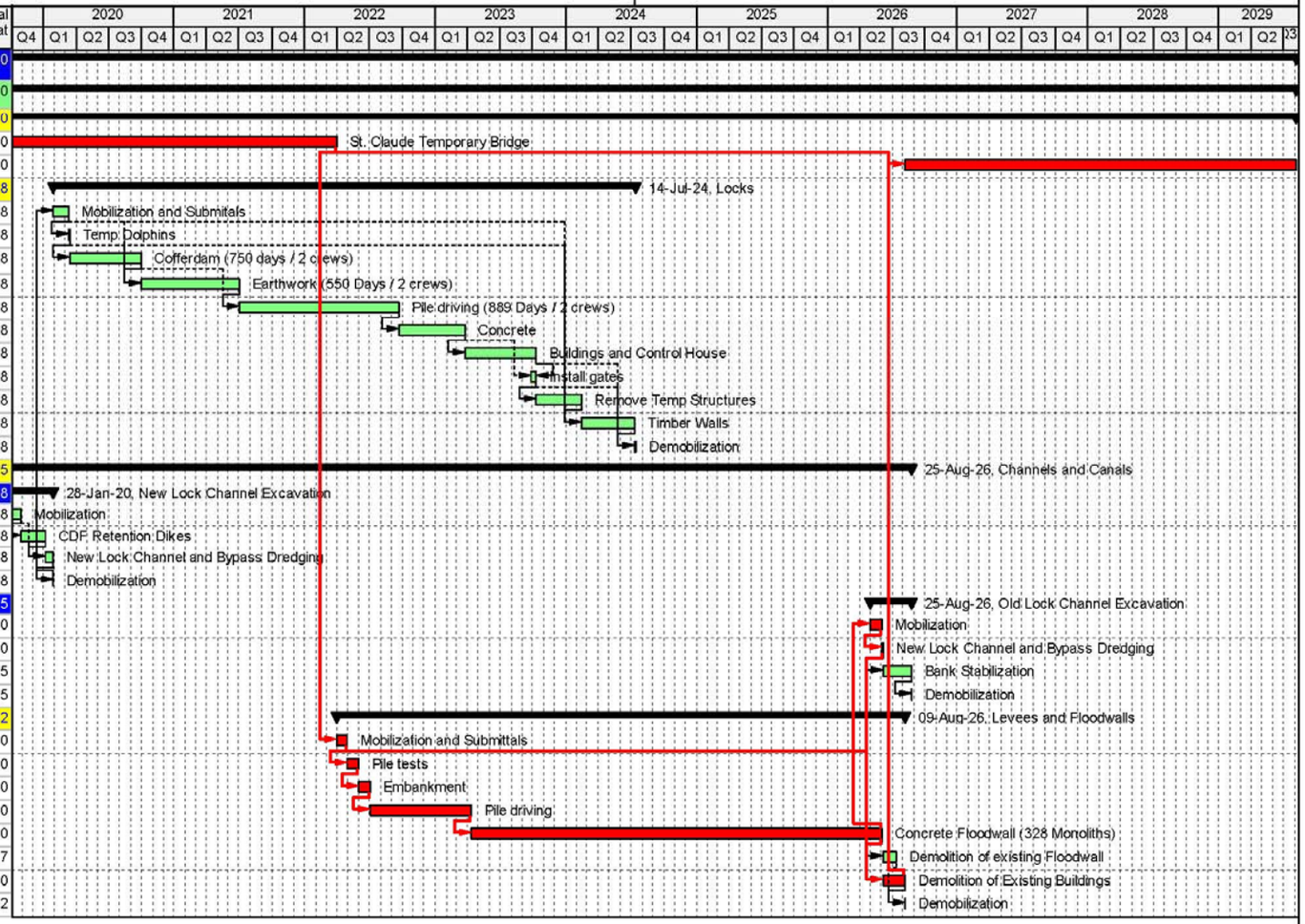
MII Cost Estimate

This section will present the MII Cost Report Summary for the Tentatively Selected Plan.

Project Construction Schedule

IHNC Shallow Draft | Classic Schedule Layout | 29-Jan-16 14:02

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Total		3596	01-Oct-19	05-Aug-29	0
IHNC Shallow Draft		3596	01-Oct-19	05-Aug-29	0
Relocations		3596	01-Oct-19	05-Aug-29	0
A1210	St. Claude Temporary Bridge	913	01-Oct-19	01-Apr-22	0
A1220	St Claude Permanent Bridge	1095	06-Aug-26	05-Aug-29	0
Locks		1628	28-Jan-20	14-Jul-24	1848
A1040	Mobilization and Submitals	45	28-Jan-20	13-Mar-20	1848
A1045	Temp Dolphins	2	13-Mar-20	15-Mar-20	1848
A1050	Cofferdam (750 days / 2 crews)	200	15-Mar-20	01-Oct-20	1848
A1060	Earthwork (550 Days / 2 crews)	275	01-Oct-20	03-Jul-21	1848
A1070	Pile driving (889 Days / 2 crews)	445	03-Jul-21	21-Sep-22	1848
A1080	Concrete	185	21-Sep-22	25-Mar-23	1848
A1085	Buildings and Control House	200	25-Mar-23	11-Oct-23	1848
A1090	Install gates	14	27-Sep-23	11-Oct-23	1848
A1095	Remove Temp Structures	125	11-Oct-23	13-Feb-24	1848
A1100	Timber Walls	150	13-Feb-24	12-Jul-24	1848
A1110	Demobilization	2	12-Jul-24	14-Jul-24	1848
Channels and Canals		2521	01-Oct-19	25-Aug-26	1075
New Lock Channel Excavation		120	01-Oct-19	28-Jan-20	1848
A1000	Mobilization	30	01-Oct-19	31-Oct-19	1848
A1005	CDF Retention Dikes	68	31-Oct-19	07-Jan-20	1848
A1010	New Lock Channel and Bypass Dredg	20	07-Jan-20	27-Jan-20	1848
A1030	Demobilization	2	27-Jan-20	28-Jan-20	1848
Old Lock Channel Excavation		115	03-May-26	25-Aug-26	1075
A1230	Mobilization	30	03-May-26	02-Jun-26	0
A1240	New Lock Channel and Bypass Dredg	5	02-Jun-26	07-Jun-26	0
A1260	Bank Stabilization	78	07-Jun-26	24-Aug-26	1075
A1270	Demobilization	2	24-Aug-26	25-Aug-26	1075
Levees and Floodwalls		1591	01-Apr-22	09-Aug-26	1092
A1120	Mobilization and Submittals	30	01-Apr-22	01-May-22	0
A1130	Pile tests	30	01-May-22	31-May-22	0
A1140	Embankment	35	31-May-22	05-Jul-22	0
A1150	Pile driving	280	05-Jul-22	11-Apr-23	0
A1160	Concrete Floodwall (328 Monoliths)	1148	11-Apr-23	02-Jun-26	0
A1180	Demolition of existing Floodwall	35	07-Jun-26	12-Jul-26	1117
A1190	Demolition of Existing Buildings	60	07-Jun-26	06-Aug-26	0
A1200	Demobilization	3	06-Aug-26	09-Aug-26	1092



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

US Army Corps of Engineers
Team New Orleans
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Cost and Schedule Risk Analysis (CSRA)

A Cost and Schedule Risk analysis will be prepared alongside a report once a Tentatively Selected Plan has been chosen. This section will serve as a summary of the Risk report.